Shaping Tomorrow's 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 Americans spend around 87% of their time inside buildings – amplifying the importance of indoor air quality. The quality of the air inside our buildings has a significant impact on a person's health, performance and wellbeing. Indoor air is a significant exposure route for airborne contaminants and may contain particles and gases with impacts that range from eye and lung irritation to exposure to infectious pathogens, poisonous compounds, or carcinogens. These contaminants can impact health, comfort, well-being, learning, sleep, and work performance.

The direct connection between health and wellness encourages building designers and operators to prioritize indoor air quality (IAQ) in buildings. Cost-benefit analyses have estimated the health and economic benefits of improved IAQ to be far greater than the costs of implementing strategies that yield IAQ 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 efficiently and can be implemented to 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 support standards, guidelines, and other resources related to efficiently improving IAQ, such as:

- ***ANSI/ASHRAE Standard 62.1, Ventilation and Acceptable Indoor Air Quality*** – This Standard establishes ventilation and other IAQ 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*** – Residential (multifamily to single family homes) 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*** – This

Standard was developed in conjunction with U.S. Green Building Council, the International Code Council and Illuminating Engineering Society, this standard provides IAQ requirements beyond those in Standard 62.1.

- **ASHRAE Standard 241*, 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.
- **ASHRAE Guideline 42, *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 through the management of indoor contaminant sources, and through enhanced ventilation and air-cleaning-system design, installation, commissioning, and operation and maintenance.
- **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.
- ***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.
- The importance of IAQ and the fundamentals of achieving good IAQ through building design and operation should be included in education programs for all stakeholders in built environment – 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, specifically:
    - Standard 62.1-2022 for commercial buildings
    - Standard 62.2-2022 for residential buildings
    - Standard 170-2021 for healthcare buildings
    - Standard 241-2023 for pathogen mitigation
- 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 adding them.

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Updated June 2024