

EBTRON Insight

Wildfires have Increased Advocacy for Better Indoor Air Quality and Building Codes

In recent years, a record number of wildfires in Canada and the Western United States has sparked a renewed discussion about indoor air quality (IAQ). Building codes and ASHRAE's Ventilation and IAQ Standards (62.1, 62.2) basis for achieving IAQ is through dilution (ventilation) and air cleaning (filtration) as well as ensuring air that enters or leaves a building in a controlled and intended manner (pressurization control). These things are essential to maintaining indoor contaminant levels generated by people, building materials, and components below thresholds. In some instances, the contaminants outdoors may be higher than indoors, universally measured by the air quality index (AQI) 1, and sometimes differs by country.² Wildfires generate gases and particulate matter that the AQI measures; it is a good indicator to determine when the outdoor air is at risk. These contaminants can be filtered out. The amount of removal depends on the efficacy of the filters used.

Recent events have put the AQI index in the unhealthy to hazardous levels. With the increase in wildfires and other events that release contaminants into the air, it is good practice to have a contingency plan^{2,3} that can be implemented to keep the people indoors protected from the bad outdoor air while also protecting them from contaminants generated indoors.

That is why it is essential to:

1. Ensure adequate filtration to defend against harmful particles.
 - Maintain an inventory of additional MERV 11 filters at a minimum for use on all outdoor air inlets.
 - Verify that existing filtration systems have correct MERV ratings and fit well without air gaps.
 - Add in-room filtration systems as needed.



2. Make sure ventilation is compliant with building codes.

- Directly measure with installed flow measurement or validate by an Accredited TAB professional⁵, Note: TAB measurement is only suitable for a moment; the environment and degradation impact systems.

- Inspect, maintain, and monitor the system often.⁶

3. Maintain positive building pressurization.

- Ensure windows and doors are properly closed.
- Control the pressurization flow by ensuring the ventilation rates exceed exhaust and relief rates during all operation and dynamic reset modes.

ASHRAE Journal stated one of the points on the Smoke Readiness Plan. "Optimize System Airflows- Assess and maintain adequate airflows that are protective of human health and equipment health during smoke events. Prior to wildfire season, determine an outdoor air intake level that controls odor, temperature, indoor contaminant levels and maintains a positive building pressure consistent with the building and HVAC system design."



Filtering, ventilation, and pressure control are the foundation of maintaining a healthy building during normal operation and an outdoor event such as a wildfire. Integrated airflow measuring devices into a building automation system, the ventilation rates can automatically adjust or be adjusted as conditions change. In addition, it prepares the building for any future need to increase and confirm ventilation rates. Proper outdoor air ventilation and building pressurization are essential for reducing indoor pollution concentration. Uncontrolled or imbalanced airflow can cause unwanted air to enter a space through walls, windows, and doors; janitor closets or mechanical rooms; toilet or locker rooms; basements or underground. Installed airflow measuring solutions can also indicate when filters are becoming loaded and need replacement.

If you don't measure it, you can't control it.

When upgrading a mechanical system or setting up an HVAC system, it's essential to prioritize measurement, control, and fault alerts as the foundation for these systems. Airflow measurement and control costs in an HVAC system are minimal compared to the future impact and cost due to overventilation, inadequate ventilation, and infiltration.

REFERENCES

1. [Air Quality Index](#)
2. [Wikipedia Air Quality Index](#)
3. [Guideline 44P, Protecting Building Occupants from Smoke During Wildfire and Prescribed Burn Events](#)
4. [Planning Framework for Protecting Commercial Building Occupants from Smoke During Wildfire Events](#)
5. [ASHRAE 62.1-2022 Addendum L7 Ventilation for Existing Buildings](#)
6. [ASHRAE 62.1-2022 Table 8-1 Minimum Maintenance Activity and Frequency for Ventilation System Equipment and Associated Components](#)

ABOUT THE AUTHOR

Darryl DeAngelis holds a B.S. degree in Marine Engineering from the Massachusetts Maritime Academy. He is a LEED AP certified professional and has garnered more than 30 years of experience in the HVAC industry. His extensive work history includes roles as a contractor, system designer, consultant engineer, product development engineer, sales manager, product manager, and market intelligence manager. The Director of Business Development for EBTRON has 20 years of experience with ASHRAE and has contributed to the development of standards and guidelines. He is also a member of ASTM, ISIAQ, and I2SL, and has three HVAC-related patents.