

DEVELOPMENT OF A PLANNING FRAMEWORK TO PROTECT COMMERCIAL BUILDING OCCUPANTS FROM WILDFIRE SMOKE

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INTRODUCTION: ASHRAE Guideline Project Committee (GPC) 44P is tasked with developing guidelines for heating, ventilation and air conditioning (HVAC) and other building measures to minimize occupant exposures and health impacts from wildfire and prescribed burn smoke events. The committee was asked to develop an interim framework to address urgent needs as building owners and managers prepare for the 2021 wildfire season.

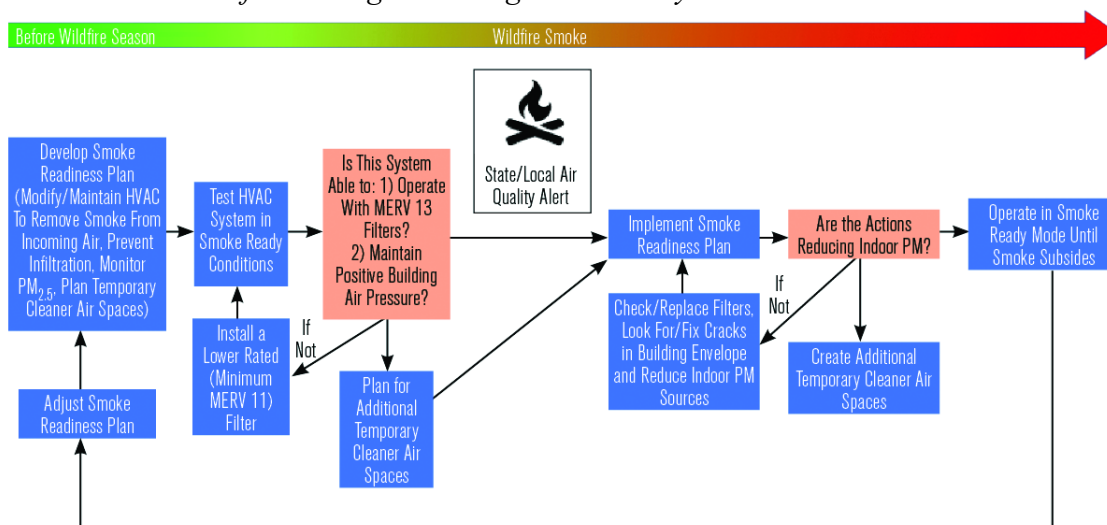
METHODS: The committee defined the scope of the framework to focus on reducing exposure to fine particulate matter (PM_{2.5}) in commercial buildings, schools, multi-unit residential buildings, and similar buildings that use air handling units to provide HVAC for occupied areas. Existing resources were consulted in developing the recommendations, as well as best practices and the extensive expertise of the committee members. The interim document is informed by evidence on wildfire smoke, its potential health effects, and the projected efficacy of various building and HVAC measures to reduce smoke exposure.

RESULTS AND DISCUSSION: Advanced planning for wildfire smoke events is critical for building managers, especially because some measures can be challenging or impossible to implement once smoke has already arrived. The planning framework identifies the following elements that building managers should include in a written, building-specific Smoke Readiness Plan (summarized in the Figure):

1. Purchase and make provisions to store smoke preparation supplies, such as portable air cleaners and extra filters.
2. Evaluate the ability of the HVAC system(s) to handle higher efficiency filters. (The planning framework recommends MERV 13 or higher filters during smoke events, whenever possible.)
3. Conduct a full maintenance check on the HVAC system and make repairs if needed.
4. Assess and maintain adequate air flows to protect occupant health and equipment during smoke events.
5. Prepare to add supplemental filtration at the intake air vent where possible.

6. Assess filter conditions by adding a port or pressure gauge to measure the filter pressure drop on at least one typical air-handling unit.
7. Weatherize the building to limit smoke intrusion. Consider measures such as limiting allowable entrances to reduce smoke entry.
8. Prepare to monitor indoor PM_{2.5} by purchasing one or more low-cost air sensors designed to measure the pollutant. These low-cost sensors can be used to show trends in PM_{2.5} levels (i.e., whether PM_{2.5} is increasing or decreasing). These low-cost sensors will not be as accurate as regulatory monitors but can show whether your interventions are reducing indoor PM_{2.5}.
9. Determine how to create temporary cleaner air spaces within the building.
10. Anticipate sources of indoor PM_{2.5}, such as cooking, vacuum cleaning, use of printers or copiers, and smoking, that can increase levels of PM_{2.5} within the building.

FIGURE: Flowchart for making a building smoke ready



CONCLUSIONS: The Planning Framework provides guidance applicable to many types of buildings for the current wildfire season, however there are still many considerations for protecting building occupants from smoke from wildfires and prescribed burns that could not be addressed in this interim document. The committee is working to produce a guideline document, *Protecting Building Occupants from Smoke During Wildfire and Prescribed Burn Events*, which is expected to be completed in 2022. The guideline document will provide comprehensive information for building design, commissioning, operation, and maintenance for schools, commercial buildings, and multi-unit residential buildings to protect occupants from smoke during wildfires and prescribed burns.

REFERENCES:

- ASHRAE. 2021. Planning Framework for Protecting Commercial Building Occupants from Smoke During Wildfire Events. Available from: <https://www.ashrae.org/file%20library/technical%20resources/covid-19/guidance-for-commercial-building-occupants-from-smoke-during-wildfire-events.pdf>

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