© ASHRAE. Per international copyright law, additional reproduction, distribution, or transmission in either print or digital form is not permitted without ASHRAE's prior written permission.

CONTENTS

ASHRAE Guideline 44-2024
Protecting Building Occupants from Smoke During Wildfire and Prescribed Burn Events

SECTION	PAGE
Foreword	2
1 Purpose	2
2 Scope	2
3 Definitions and Symbols	2
4 Background	5
5 Design and Commissioning	12
6 Operation During a Wildland Fire Event	24
7 References	39
Informative Appendix A: Analysis of Particulate Matter Concentrations During Recent U.S. Western Wildfires	47
Informative Appendix B: Managing Air-Side Economizer and Demand-Control Ventilation for Smoke	51

Preview

NOTE

Approved addenda, errata, or interpretations for this guideline can be downloaded free of charge from the ASHRAE website at www.ashrae.org/technology.

© 2024 ASHRAE

180 Technology Parkway · Peachtree Corners, GA 30092 · www.ashrae.org · All rights reserved.

ASHRAE is a registered trademark of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

© ASHRAE. Per international copyright law, additional reproduction, distribution, or transmission in either print or digital form is not permitted without ASHRAE's prior written permission.

(This foreword is not part of this guideline. It is merely informative and does not contain requirements necessary for conformance to the guideline.)

FOREWORD

In recent years, the incidence of wildland fires has increased in both the number of fires per year and the severity and duration of each event. In some cases, smoke events have lasted several weeks to months. The smoke produced from wildland fires can have a significant negative impact on ambient air quality, both local and distant, which in turn can negatively impact health. This guideline provides detailed information on the impacts of smoke on human health, with best practices in both building design and building operation to reduce the impact of prolonged smoke events on indoor air quality. The overall goal is to reduce exposure of occupants to wildland fire smoke, thereby protecting their health and wellbeing.

1. PURPOSE

The purpose of this guideline is to recommend building measures to minimize occupant health impacts from wildfire and prescribed burn smoke events.

2. SCOPE

2.1 This guideline applies to commercial buildings; institutional buildings, including health care facilities; and multiunit residential buildings, as well as dedicated spaces within these building types intended for temporary human occupancy during a wildfire or prescribed burn smoke event.

2.2 This guideline addresses buildings expected to be occupied by potentially at-risk populations, including children and older adults.

2.3 This guideline provides recommendations related to the design, installation, commissioning, operation, and maintenance of building envelope, ventilation, and air-cleaning systems.

2.4 This guideline and its measures do not apply to internally generated smoke (e.g., from internal fires or structure fires).

3. DEFINITIONS AND SYMBOLS

3.1 Definitions

actuator: a device, either electrically, pneumatically, or hydraulically operated, that acts as a motor to change the position of movable devices such as valves or dampers.

air cleaning: the use of equipment that reduces the concentration of airborne contaminants, such as microorganisms, dusts, fumes, respirable particles, other particulate matter, gases, odors, and/or vapors in air.

air economizer: duct and dampers arrangement with an automatic control system that together allow a cooling system to supply outdoor air to reduce or eliminate the need for mechanical cooling during mild or cold weather.

air intake: device or opening through which air is withdrawn from or discharged into a conditioned space (grilles, registers, diffusers, and slots may be used as air inlets).

air leakage

a. the flow of air through the building envelope caused by a specified pressure difference; a measure of airtightness, cfm, at fixed pressure (m^3/s at fixed pressure).
b. undesirable or unwanted leakage of air from within a component within an air-distribution system that could include such items as ducts, air terminal devices, and air-handling units (AHUs).

ambient air quality: attributes of the respirable air outdoors, including particulate matter, gases, and bioaerosols.

as low as reasonably achievable (ALARA): recognition that absolute concentration thresholds may not be possible under some circumstance.

microbiological contaminants: pollutants of biological origin, including bacteria, molds, and viruses.

blower door: an assembly consisting of a fan/blower and a calibrated flow measuring station (orifice plate, flow nozzles, flow ring, etc.) used for pressurizing or depressurizing a building envelope.

building automation system (BAS): an energy management system, usually with additional capabilities, relating to the overall operation of the building in which it is installed, such as equipment monitoring, protection of equipment against power failure, and building security.

building envelope: outer elements of a building, including walls, windows, doors, roofs, and floors, including those in contact with earth.

Preview