

Chapter 1 : Functions | ASHRAE Control of Fire and Smoke

Systems discussed in the handbook include those for stairwell pressurization, elevator pressurization, zoned smoke control, and atrium smoke control. This is the first smoke control book with climatic data so that users will have easy-to-use weather data specifically for smoke control design for locations in the U.S., Canada, and throughout the.

In building fires, smoke often flows to locations remote from the fire, threatening life and damaging property. Stairwells and elevators frequently fill with smoke, thereby blocking or inhibiting evacuation. The idea of using pressurization to prevent smoke infiltration of stairwells began to attract attention in the late s. This concept was followed by the idea of the pressure sandwich i. This chapter discusses smoke control systems and fire management in buildings, including the relationship with HVAC. A smoke control system is an engineered system that modifies smoke movement for the protection of building occupants, firefighters and property. The focus of code-mandated smoke control is life safety. For an extensive technical treatment of smoke control and related topics, see the Handbook of Smoke Control Engineering Klote et al. For those interested in the theoretical foundations of smoke control, the Smoke Control Handbook includes an appendix of derivations of equations. For further information about heat and smoke venting for large industrial and storage buildings, refer to NFPA Standard Various forms of analysis have been used to quantify protection. Specific life safety objectives differ with occupancy; for example, nursing home requirements are different from those for office buildings. Two basic approaches to fire protection are 1 to prevent fire ignition and 2 to manage fire effects. Figure 1 shows a decision tree for fire protection. Building occupants and managers have the primary role in preventing fire ignition, though the building design team may incorporate features into the building to support this effort. Examples include compartmentation, suppression, control of construction materials, exit systems, and smoke control. Historically, fire safety professionals have considered the HVAC system a potentially dangerous penetration of natural building membranes walls, floors, etc. For this reason, HVAC has traditionally been shut down when fire is discovered; this prevents fans from forcing smoke flow, but does not prevent ducted smoke movement caused by buoyancy, stack effect, or wind. Smoke control methods have been developed to address smoke movement; however, smoke control should be viewed as only one part of the overall building fire protection system. Simplified Fire Protection Decision Tree 1. The most efficient way to limit fire damage is through compartmentation. However, fire can easily pass through openings for plumbing, HVAC ductwork, communication cables, or other services. Therefore, fire stop systems are installed to maintain the rating of the fire-rated assembly. The rating of a fire stop system depends on the number, size, and type of penetrations, and the construction assembly in which it is installed. Performance of the entire fire stop system, which includes the construction assembly with its penetrations, is tested under fire conditions by recognized independent testing laboratories. TPFS is required by building codes under certain circumstances for specific construction types and occupancies. TPFS classifications are published by testing laboratories. Each classification is proprietary, and each applies to use with a specific set of conditions, so numerous types are usually required on any given project. The construction manager and general contractor, not the architects and engineers, make work assignments. Sometimes they assign fire stopping to the discipline making the penetration; other times, they assign it to a specialty fire-stopping subcontractor. The Construction Specifications Institute CSI assigns fire-stopping specifications to Division 7, which Encourages continuity of fire-stopping products on the project by consolidating their requirements e. Maintains flexibility of work assignments for the general contractor and construction engineer Encourages prebid discussions between the contractor and subcontractors regarding appropriate work assignments 2. Dampers that are intended to resist the passage of both fire and smoke are called combination fire and smoke dampers. For more detailed information about dampers, including pressure losses, flow characteristics, actuators, installation, and balancing, see Felker and Felker Fire Dampers Fire dampers are intended to prevent the spread of flames from one part of the building to another through the ductwork. Fire dampers are two-position devices open or closed , and are usually of either the multiblade Figure 2 or curtain design Figure 3. Most multiblade fire dampers are held open by a fusible link and are spring loaded. In a fire, hot gases cause

this link to come apart so that the spring makes the blades slam shut. Some manufacturers use other heat-responsive devices in place of fusible links. Typically, curtain dampers are also held open by a fusible link that comes apart when heated. Curtain dampers often rely on gravity to make the blades close off the opening, but horizontal ceiling curtain dampers must have spring closure. This standard addresses fire dampers intended for use 1 where air ducts penetrate or terminate at openings in walls or partitions, 2 in air transfer openings, and 3 where air ducts extend through floors. Curtain Fire Damper Fire dampers are evaluated for use as static, dynamic, or combination fire and smoke dampers. Static dampers are for applications where the damper will never have to close against an airstream, such as when HVAC systems are automatically shut down when a fire is detected. Dynamic dampers are for applications where the damper may be required to close against airflow, such as an HVAC system that remains operational for smoke control purposes. A smoke damper is not required to withstand high temperature and will not prevent a fire from spreading. Smoke dampers are of the multiblade design Figure 2 , and may be either two-position devices open and closed , or may be modulated between the open and closed positions to serve as both a smoke damper and a control damper. This standard includes construction requirements; air leakage tests; and endurance tests of cycling, temperature degradation, salt-spray exposure, and operation under airflow.

Chapter 2 : Handbook | smoke control expert

and Smoke Control, and the chair of the research subprogram of ASHRAE Technical Committee , Enclosed Vehicular Facilities. Dr. Kashef is a registered professional engineer in the province of Ontario.

Links Scope of TC 5. Handbook The ASHRAE Handbook is published in a series of four volumes, one of which is revised each year, ensuring that no volume is older than four years. Fire and Smoke Control Smoke, which causes the most deaths in fires, consists of airborne solid and liquid particles and gases produced when a material undergoes pyrolysis or combustion, together with air that is entrained or otherwise mixed into the mass. In building fires, smoke often flows to locations remote from the fire, threatening life and damaging property. Stairwells and elevators frequently fill with smoke, thereby blocking or inhibiting evacuation. For an extensive technical treatment of smoke control and related topics, see the Handbook of Smoke Control Engineering, referred to in this chapter as the Smoke Control Handbook. For those interested in the theoretical foundations of smoke control, the Smoke Control Handbook includes an appendix of derivations of equations. Comment on the Handbook: Review a Handbook Chapter: Programs Technical committees develop and sponsor technical sessions at the winter and annual conferences. These DVDs are ideal for use at chapter meetings, in university courses, or company lunch and learns. Products available from the most recent conference may be found here. Research Technical Committees are responsible for identifying research topics, proposing research projects, selecting bidders, and monitoring research projects funded by ASHRAE. In addition TC 5,6 has the following research project under development: Main goal is to determine when existing calculations are no longer valid. Designer could then choose how to deal with it treat as multiple atria, use CFD, etc. John Klote will take the lead and contact the TC responsible for the weather data about what info is needed for smoke control, so that future updates to the ASHRAE weather data will be more useful for smoke control designers. ASHRAE does not write rating standards unless a suitable rating standard will not otherwise be available. If MTG involvement add here otherwise leave blank. Include other activities, such as MTG involvement, into this section. It does not present official positions of the Society nor reflect Society policy. Contact the TC 5.

Chapter 3 : | Consulting-Specifying Engineer

foundations of smoke control, the Smoke Control Handbook includes an appendix of derivations of equations. National Fire Protection Association (NFPA) Standard 92 provides information about smoke control systems for buildings.

Chapter 4 : | Plant Engineering

Unique to previous smoke control literature, this handbook provides many example calculations to help designers prevent smoke damage. ASHRAE, founded in , is an international organization of some 50, persons.

Chapter 5 : Handbook of Smoke Control Engineering

TC is concerned with the design and application of systems and components for the protection of life and property from fire and smoke in buildings. Handbook The ASHRAE Handbook is published in a series of four volumes, one of which is revised each year, ensuring that no volume is older than four years.

Chapter 6 : Documents | ASHRAE Control of Fire and Smoke

The Handbook of Smoke Control Engineering extends the tradition of the comprehensive treatment of smoke control technology, including fundamental concepts, smoke control systems, and methods of analysis.

Chapter 7 : Book of the month: HVAC Applications ASHRAE Handbook ! - Swegon Air Academy

Smoke Control Engineering Handbook. This usage is a departure from the earlier ASHRAE smoke control books and earlier versions of NFPA 92A. hazard analysis.

Chapter 8 : CHAPTER FIRE AND SMOKE CONTROL

Handbook of Smoke Control Engineering The Table of Contents and the Index can be used so readers can go directly to their topic of interest. The handbook format has no introductory chapter, and the most fundamental material is in the first chapters and applied material is in later chapters.

Chapter 9 : Smoke control handbook published | Control Engineering

Chapter 2 of the Smoke Control Handbook lists design climatological data for design of smoke control systems for many locations in the United States, Canada, and other countries. These data consists of winter temperature, summer temperature, and wind speed.