

Smoke Control System Revisions

7/15/08

The city may require additional information as needed. For preparation information, see description sheet # 1, *Standards for Plans and Drawings*. If you have any questions concerning your application, please visit or call Development Services (425-452-6800) between 8 a.m. and 4 p.m., Monday through Friday (Wednesday, 10 to 4). Assistance for the hearing impaired: dial 711 (Telecommunications Relay Service).

Because of the complexity of smoke control systems, it is important that the design documents clearly identify the expected performance of the system. These documents must also clearly identify the expected performance of *each component* in the smoke control system. Components include all passive and active elements that work together to provide smoke control in accordance with International Building Code (IBC) Section 909.

Projects subject to this guide may include those involving:

- Additions or alterations to existing buildings affecting the use, occupancy, or leakage area of one or more smoke-control zones
- Adding, removing, or altering the location of smoke barriers or openings therein
- Adding, removing, or replacing equipment serving the smoke control system, including dedicated or non-dedicated fan equipment
- Adding, removing, replacing, or altering devices or systems that are capable of affecting the function of the smoke control system, including fire alarm detection devices

Where a new smoke control system is required by additions or alterations to an existing building, see Guide 42b.

To more clearly identify the systems involved, the background systems and floor plans should be in light line weight with the pertinent systems in heavy line weight.

To obtain the smoke control permit, documentation containing the following details/ specifications is required.

This submittal checklist must be completed and submitted with the application. *Submit 2 sets of documents.*

- The detailed design report for the existing building condition must be referenced to identify the effects of the project on the smoke control system. In the absence of this information, the apparent smoke control approach for the entire building and the existing smoke control sequence of operation for the affected zones must be identified and described by a Professional Engineer competent in the design of smoke control systems.
- A Concise Narrative Description of the smoke control system and any special requirements of the design must be provided. This description will be required to be on every set of associated design plans and be shown on future tenant improvement drawings for the life of the building as described in Sheet 42c.
- When the project would result in deviation from the original Detailed Design Report or concise narrative description, an updated smoke control system rational analysis must be performed in accordance with IBC Section 909.4 and must be prepared by a Professional Engineer (P.E.) competent in the design of smoke control systems. This analysis must be stamped by the P.E. and address all modified and affected smoke zones, and update the detailed design report and concise narrative description.
- The Architect of Record, Mechanical and Electrical Engineers of Record, and fire alarm and sprinkler system designers for the project must sign the smoke control system design documents that they prepared. If the rational analysis was prepared by another party, each designer must provide written documentation that they have read and incorporated the rational analysis in their design, such as by a written statement on the record drawings.

- If the project resulted in deviation from the concise narrative description or detailed design report, the author of the updated detailed design report or concise narrative description must review design documents pertaining to the smoke control system when prepared by others and provide a letter identifying that the design complies with the smoke control system requirements.
- Indicate on the design plans the location of all (new and existing) devices that will initiate smoke control, devices involved in the smoke control process (including actuators, control dampers, fire and smoke dampers, variable air volume controls, and fans), and identification of devices provided with emergency power.
- Provide smoke-control zone drawings that clearly identify the existing configuration of affected active and passive smoke-control zones.
- Provide smoke-control zone drawings that clearly identify the configuration of active and passive zones after completion of the project. Sprinkler zones must be coordinated with smoke zones.
- Identify the smoke control method being used for each affected smoke-control zone, including applicable calculations (supporting analysis utilizing computational fluid dynamics (CFD) or a network flow analysis may be required), and identify unique or unusual fire loads.
- Provide details of each new fan involved in smoke control, including its capacity, the number of belts and wiring for power, control, and monitoring. Where an existing fan is replaced, identify the existing fan operating capacity in smoke control mode.
- Provide the sequence of operations (including sequence of operations, if necessary, to prevent duct implosion or explosion) and updated performance matrix with the positioning of each damper for every fire scenario in each affected smoke control zone.
- Seismic anchorage of critical systems and include the design with the submittal (IBC 403.14).
- Identify modifications to electrical loads of the individual equipment associated with the smoke control system and confirm adequate capacity of associated emergency generator.
- Full-scale color illustration of Fire-fighter's Smoke Control Panel (FSCP), if revised or added.
- Where the project work is limited to modifications within an existing smoke zone, operational testing only is required to demonstrate appropriate system responses based on alarm sequences initiated in affected zones, as well as system responses in the affected zones based on alarm sequences initiated in adjacent zones. Manual control of equipment in affected zones via the FSCP must also be verified.
- When the project work adds, modifies, or replaces smoke control zones, barriers, or fan equipment, in addition to operational testing as described in Item 15, performance testing of the affected zones is required and a Special Inspector Test Procedure to evaluate the affected areas of the smoke control system in accordance with City of Bellevue Fire Department Development Standards (BFDDS) Chapter 11. Performance tests shall minimally demonstrate satisfactory performance of the elements of the affected smoke-control zones. If variable frequency drive (VFD) settings are modified, tests must be performed as required in the modified area, and in adjacent areas served by previous fan speed to confirm proper pressures.

To incorporate all of this information, the control diagrams will include portions of the automatic sprinkler design, fire alarm design, mechanical shop drawings, mechanical design documents, electrical design documents, and architectural drawings. Architectural drawings need to show wall and opening protection ratings, draft curtains, smoke barriers, and passive boundaries as applicable. This results in a comprehensive package of smoke-control design documents that requires careful thought in preparation and review by the contractors and special inspector.

Approved smoke control system features are described in BFDDS Chapter 11, Smoke Control.