

Fire Prevention Association of Nevada Uniform Guideline for Smoke Control Testing & Recertification



SNFC / FPAN International Fire Code Committee
Revised April 14, 2025

1.0 PURPOSE:

This guideline establishes responsibilities and requirements for submittals, document reviews, testing, reports, and permits for the required testing of the smoke control systems. The purpose of the testing process is to confirm that the smoke control systems are in compliance with the approved design documents and applicable codes. The term smoke control systems henceforth will include smoke control systems (active and passive) smoke removal systems, stairway pressurization systems, elevator hoistway and machine room pressurization systems.

It is not the intent of this program to supplant the maintenance, inspection, and testing of building fire protection and life safety systems otherwise required by other applicable codes, standards, and ordinances. Compliance with this guideline does not relieve the Owner from compliance with the maintenance, inspection, and testing required by other applicable codes, standards, and ordinances.

All testing and inspections of the smoke control and smoke removal systems will be in compliance with the adopted Code of the Jurisdiction that the property is located in. For dedicated, non-dedicated smoke control systems and smoke removal systems, the testing and inspection services will be in accordance with Section 909.20.

Section 909.20 - Maintenance smoke control and smoke removal systems shall be maintained to ensure to a reasonable degree that the system is capable of controlling smoke for the duration required. The system shall be maintained in accordance with the manufacturer's instructions and Sections 909.20.1 through 909.20.6.

2.0 SCOPE:

This guideline applies to all high-rise buildings, office buildings, hospitals, malls, arenas, underground buildings, atriums, and any other structure containing a smoke control system. The primary intent of this testing guideline is to outline the requirements for the commissioning of new smoke control systems and the annual and semiannual testing of the existing smoke control systems, including any interrelated systems (e.g., fire alarm initiating devices and passive construction).

3.0 DEFINITIONS:

Dedicated Systems: Smoke control systems that are installed for the sole purpose of providing smoke control. They are separate systems of air-moving and distribution equipment that do not function under normal building operating conditions. Upon activation, these systems operate specifically to perform the smoke control function.

Non-Dedicated Systems: Systems that share components with some other system(s) such as the building HVAC system. Activation causes the system to change its mode of operation to achieve the smoke control objectives.

Testing Intervals: The smoke control systems addressed in this guideline are required to be tested in their entirety as outlined below:

- Smoke control systems installed in new structures shall be tested 100% prior to occupancy.
- Dedicated systems shall be tested on a semi-annual basis.
- Non-Dedicated systems including smoke removal systems shall be tested on an annual basis.

If a different testing interval is requested, then one of the following requests must be submitted to the Authority Having Jurisdiction (AHJ) for review and approval.

- Alternate Means and Methods Request (AMMR)
- Code Modification
- Request for Alternate Methods (RFAM)

An example of the alternate testing intervals are:

- When approved by the Code Official and after 100% of the smoke control systems have been tested/recertified, at least 50% of the smoke control system(s) shall be tested annually as required for dedicated and non-dedicated systems. Cumulative testing using the 50% option shall result in a 100 percent of the systems being tested every 2 years.
- When approved by the Code Official and after 100% of the smoke control systems have been tested/recertified, the smoke control system(s) shall be tested annually as required for dedicated and non-dedicated systems. Cumulative testing using the 20% option shall result in a 100 percent of the systems being tested every 5 years.

Responsible Registered Design Professional: An architect registered pursuant to NRS Chapter 623 or a professional engineer licensed pursuant to NRS Chapter 625, who is responsible for the coordination of each aspect of the construction documents, shall be required to sign and seal the report.

Special Inspector: An individual qualified under a specific technical discipline approved by the Jurisdiction, and possessing the licensure required for the practice of that technical discipline within the jurisdiction. To qualify as an approved special inspector, an individual must obtain and maintain national certifications, satisfy educational requirements, and possess an appropriate level of experience. In addition, an individual must demonstrate competence to the satisfaction of the Code Official.

Testing Agent: Those individuals who through coordinated actions are responsible for implementing the test plan. These individuals shall be licensed, certified and qualified as required by the regulations of the State of Nevada and the Jurisdiction.

A. Recognized Certification Categories: The following certifications are recognized for special inspection personnel approval requests:

- ICC (Building Inspector or Fire Inspector):
- NICET (Smoke-Control /Fire Protection): Level II in; Fire Protection Engineering Technology, Water Based Fire Protection Systems Layout Subfield (N-II-FPSL); Fire Alarm Systems Subfield
- NFPA (Smoke Control): Certified Fire Protection Specialist (CFPS), Certified Fire Inspector (CFI)

B. Recognized Education: The following degrees are deemed certifications as provided in this Guideline.

- Engineering Degree: An engineering degree, from a curriculum listed as accredited by the United States Department of Education, resulting in issuance of a diploma of at least the Bachelor of Science designation.
- Architecture Degree: An architecture degree, from a curriculum listed as accredited by the United States Department of Education, resulting in issuance of a diploma of at least the Bachelor of Architecture designation.

C. Technical Degree: A degree from a curriculum of an educational institution listed in the Database of Accredited postsecondary Institutions and Programs, published by the United States Department of Education, in a field related to the request.

D. Professional Licensure: A professional engineering or architecture license issued by the Nevada State Licensing Boards is recognized as provided in this TG. Designations recognized are:

- Civil (CE)
- Structural (SE)
- Mechanical (ME)
- Fire Protection (FPE)
- Electrical Engineering (EE)
- Architecture (ARCH)

Smoke Control Diagram: A design document that depicts device locations and functions, equipment performance, systems integration and sequencing of smoke control measures necessary to verify compliance to the design approach for smoke control outlined in the approved fire protection report. At a minimum, these diagrams shall include an equipment/device input/output matrix, smoke control zone layouts, control wiring details, and activation zone layouts.

Sequence of Operations (Matrix): A document that identifies the input/output configuration of smoke control systems.

Test Plan: Proposed detailed procedures and methods that are to be used for the testing of the smoke control systems, including all the items/equipment subject to such tests. At a minimum, the test plan shall include test scenarios (listing all smoke control equipment), testing schedule, matrices (F/A & S.C), and smoke control drawings utilized for preparing the test plan. A detailed narrative explaining how the smoke control system testing will be accomplished will also be included in the test plan.

Smoke Control Zone: A space within a building enclosed by smoke barriers, including the top and bottom, which is part of a zoned smoke control system.

- Subzone: A smoke control zone that shares activation with the surrounding smoke control zone(s).

Smoke Barrier: A continuous membrane, either vertical or horizontal, such as a wall, floor, or ceiling assembly that is designed and constructed to restrict the movement of smoke in conjunction with a smoke control system.

Smoke Control Mode: A predefined operational configuration of a system or device for the purpose of smoke control.

- Smoke Control System, Mechanical: An engineered system that uses mechanical fans to produce pressure differences across smoke barriers or establish airflows to limit and direct smoke movement. For purposes of this guideline, mechanical smoke control systems include stairway pressurization systems, elevator hoistway and machine room pressurization systems.
- Smoke Control System, Passive: A system of smoke barriers arranged to limit the migration of smoke.

Final Report: A report prepared by the Special Inspector and submitted to the Code Official that documents special inspection activities and compliance with the approved life safety systems test plan and applicable design documentation. For all new construction, the report will also contain the following statement:

"I have reviewed this report and by personal knowledge and on-site observation certify that the smoke control and/or smoke removal system is in substantial compliance with the approved design documents, and to the best of my understanding complies with requirements of the applicable codes as identified in the smoke control and/or removal report."

Certificate of Compliance: For all new construction, a Certificate of Compliance will be provided by the special inspector certifying that the referenced property and/or smoke control systems are in substantial compliance with the design intent. The certificate shall identify the company and special inspector that performed the testing, name, date and address of the property and or smoke control systems being tested. A copy of this certificate will be included in the appendices of the final report.

Certificate of Satisfactory Performance: A certificate issued by Code Official attesting to the satisfactory completion of the testing required by this testing guideline and the submittal of all documentation required verifying the successful functional testing of the smoke control systems in accordance with the approved Test Plan and design documents. In lieu of issuing a Certificate of Satisfactory Performance, the Jurisdiction may stamp the final report with an acceptance/approval stamp.

Smoke Control Tag: The Special Inspector will attach a tag on or near the Firefighters Smoke Control Panel (FFSCP) when they have completed their test and inspect services for the property. The tag shall meet the following requirements:

- A tag for recording the installation, maintenance and inspection of a smoke control or smoke removal system must be at least 4 inches long and 2 inches wide.
- The tag must be attached to the system by the last person to test, inspect, or work on the system for any purpose. The tag must be punched in an approved manner to indicate the type of service performed on the system and the date. The tag must be signed with a legible signature by the holder of a certificate of registration who directly supervises the work, and such information must remain permanently on the tag. A number stamp or date stamp must not be used on the tag.
- A tag must be attached to the system at the conclusion of the successful testing of the system immediately after its installation.
- The tag must be printed by a printing company and include the following information:
 - The date of installation, maintenance, or inspection;
 - The name, address and telephone number of the special inspection company;
- If the system remains impaired and the licensee special inspector does not have the authority to correct the impairment, the word “impairment” must be written across the tag in black letters that are bold. The licensee special inspector shall notify the property owner and the authority having jurisdiction of the impairment in writing not later than the next business day after completing the work. Refer to Section 5.22 for clarification of an impairment.
- If a deficiency is discovered in the system, the licensee special inspector shall notify the property owner of the deficiency in writing. The word “deficiency” must be written across the tag in black letters that are bold. Upon receiving a notice of deficiency, the property owner shall correct the deficiency within 30 calendar days of such receipt. If the property owner fails to correct the deficiency within 30 calendar days after receiving the notice of deficiency, the licensee special inspector shall submit the notice of deficiency to a fire code official within 2 business days after the 30 calendar days expire. Refer to Section 5.20 for clarification of a deficiency.

4.0 REFERENCES:

The codes and standards listed below are presented only as a compilation of references that may be used to assess existing smoke control/removal systems within a building. Compliance for any existing building will be assessed against the Code of Record applicable at the time of construction or major systems renovation as may be appropriate.

- Building Administrative Code, adopted at the time of design.
- International Building Code with Southern Nevada Amendments
- Uniform Mechanical Code with Southern Nevada Amendments
- National Electrical Code with Southern Nevada Amendments
- International Fire Code with Southern Nevada Amendments
- Retroactive Life and Fire Safety Standards for Existing Buildings, 1981
- Uniform Building Code with Southern Nevada Amendments
- Uniform Fire Code with Southern Nevada Amendments

5.0 RESPONSIBILITIES

Owner:

- 5.01. The Owner is responsible for maintaining compliance with the applicable Codes, Standards, and this Guideline.
- 5.02. The Owner shall designate and contract with the Testing Agent at the time of commissioning and thereafter for recertification testing and, when applicable, the Responsible Registered Design Professional. The Owner shall authorize peer reviews, when applicable.
- 5.03. The Owner shall maintain existing as-built smoke control diagrams and coordinate updates of the smoke control diagrams, as necessary for the life of the system. Where such smoke control diagrams do not exist or do not reflect the correct as built condition of the property, the Owner shall hire a competent person to prepare the drawings.
- 5.04. The Owner shall coordinate document submittals, including:
 - Testing Schedule Intervals.
 - Test Plan.
 - Final report.
- 5.05. The Owner or an authorized representative of the Owner shall submit a permit application for Smoke Control Recertification Testing at the time the schedule and test plan are submitted to the Code Official.
- 5.06. The Owner shall provide access for all due diligence surveys, testing, and observations/inspections.

- 5.07. The Owner shall assign operations and maintenance personnel to participate in the smoke control systems testing.
- 5.08. The Owner shall coordinate the activities of all required testing companies associated with the life safety systems.
- 5.09. The Owner shall pay all required permit fees, for all reviews of reports, test plans, and final reports, as well as any for the Code Official observations/inspections, based on the hourly rates as determined by the Jurisdiction. The Owner shall pay an administrative fee as determined by the Jurisdiction at the time the final report is submitted to Code Official.

Authority Having Jurisdiction (AHJ):

- 5.10 The AHJ shall review and approve the test plan.
- 5.11 The AHJ shall issue a permit application number for each property.
- 5.12 The AHJ shall observe the smoke control systems tests and/or recertification testing at their discretion or when requested by the Owner or the Testing Agent.
- 5.13 The AHJ shall review and approve the final report.

Testing Agent/Special Inspection Firms:

- 5.14 The Testing Agent shall prepare and submit the test plan and ensure the test plan is coordinated with the testing schedule.
- 5.15 The Testing Agent shall coordinate all required testing.
- 5.16 The Testing Agent shall advise the Code Official in advance of significant tests (e.g., full shunt trip of primary power), so that the Code Official can arrange to observe the tests, as necessary.
- 5.17 The Testing Agent shall be responsible for all notifications to and coordination with the Code Official.
- 5.18 The Testing Agent shall assign personnel to the project who are approved by Code Official as Special Inspectors.
- 5.19 The Testing Agent shall document the results of all smoke control/smoke removal systems tests covered under the approved life safety systems test plan.
- 5.20 The testing agency shall issue a punch list to the owner when deficiencies to the smoke control system are discovered during the testing and inspection process. Deficiency” means, for the purpose of any fire protection equipment for the protection of life and property, a condition that:

- Will or has the potential to adversely impact the performance of the fire system or unit or portion thereof; and
 - Does not rise to the level of an impairment.
- 5.21 The testing agency shall issue a Non-Compliance Report (NCR) to the owner and forward a copy to the AHJ within 24 hours of the discovery of an impairment to the smoke control system during the testing and inspection process. “Impair” or “impairment” means, for the purpose of any fire protection equipment for the protection of life and property, a condition:
- In which the fire system or a unit or portion thereof is not in good working order; and
 - That may result in the fire system or a unit or portion thereof not functioning in the event of a fire.
- 5.22 The Testing Agent shall witness all smoke control testing covered under the approved test plan.
- 5.23 The Testing Agent shall prepare and submit the final report. The report will be submitted electronically to the AHJ and a hard copy will be provided to the client for their records.

6.0 FUNCTIONAL TESTING

Fire Alarm:

- 6.1 Within each active smoke control zone, a minimum of 20 percent of each type of input device shall be initiated, including duct detectors and special suppression systems, as applicable.
- An additional ten (10) percent of the same type of input device shall be functionally tested for each device failure up to a maximum of two (2) failures (i.e., a total of 30 percent of devices if one failure occurs or a total of 40 percent of devices if two failures occur).
 - If three (3) failures occur in the same device type, then 100 percent of that device type shall be functionally tested in that zone.
- 6.2 If functional testing of any device identifies a need to reprogram the system to correct output functions, then 100 percent of that type of device shall be tested to confirm the proper revised output function.
- 6.3 One-hundred (100) percent of the sprinkler waterflow switches within a test zone shall be functionally tested when activation of sprinkler waterflow initiates that smoke zone.

- 6.4 For each input device that is initiated, 100 percent of the required output functions shall be confirmed.
- 6.5 Duct detectors associated with smoke control related fans (i.e., stairway, elevator press fans, fans used for makeup/supply air, etc.) or damper shall be tested semiannually where part of a dedicated system or annually where part of a non-dedicated system. Testing shall verify the manual and automatic override of the duct detector.

Dampers (Fire/Smoke, Smoke, and Automatic Control Dampers):

- 6.6 Dampers installed within, and associated with the smoke control system/ zone serving a respective area will be visually inspected to confirm the equipment matches specified equipment per the approved design documentation.
- 6.7 Dampers installed within and associated with the smoke control system/ zone serving a respective area will be visually inspected for proper operation.
- 6.8 Dampers will be inspected with no active alarms and after an alarm is initiated to confirm proper functionality and indication at the Firefighters Smoke Control Panel (FFSCP). Confirmation of the proper “failure position” for the dampers is to be conducted through power loss.
- 6.9 Local initiating devices associated with fire/smoke and smoke dampers will be activated to confirm operation of the damper with proper reporting to the fire alarm panel. All initiating device fire alarm addresses will be confirmed to be properly coordinated and recorded.
- 6.10 Confirmation of emergency power supply to dampers is to be confirmed by performance of a shunt test of the facility’s normal power system to the emergency /standby power supply system. The shunt test will be conducted once every test cycle or every 36 months as required by the NEC as adopted by the Code Official.
- 6.11 For new dampers, the UL listing requirements will be verified and recorded and will include make, model, leakage rating, etc. Existing dampers will be confirmed to be maintained and operable.

Doors (Self / automatic closing, roll down, sliding, accordion, etc.)

- 6.12 All doors located in smoke barriers for the respective smoke zone will be visually inspected to confirm the proper fire-resistance rating and “S” rating, where required, is provided per the approved design documentation.
- 6.13 All smoke control related doors located at smoke barriers will be inspected for proper functionality.
- 6.14 Doors provided with magnetic hold-open devices within the zone will be functionally tested to confirm proper release, closure, latching and re- latching of the door upon local detection and zone activation.

- 6.15 Automatic closing, roll down, sliding or accordion doors required to close for proper smoke control system configuration / operation will be functionally tested to confirm proper release, closure, and seating of the door upon activation of local detection, manual operation, and zone activation. Proper position status of the doors will be confirmed at this time.

Fans

- 6.16 All smoke control fans will be visually inspected to confirm that they have been properly maintained and operate per the approved documentation. It will be confirmed that the proper number of belts are provided (a minimum of two), the motor has a minimum service factor of 1.15, and the fan rotates in the correct direction, and meets the required temperature rating where required by the Code of record and/or design documents.
- 6.17 Confirmation of proper monitoring of smoke control fans by the fire alarm panel will be conducted. The main disconnect switch associated with the fan will be placed into the off position and confirm that a fault light is indicated on the FFSCP.
- 6.18 The operating conditions (rpms, amps, CFM, and voltage) of the smoke control fans will be measured to confirm the unit is operating within the design parameters. Measuring the fan operating conditions will occur upon confirmation of the proper performance of the associated smoke zone. Measurements will be taken by an approved air balance company.
- 6.19 Fan motor horsepower shall be determined by measurement of actual operating voltage and current draw.
- 6.20 Confirmation of proper emergency power supply to smoke control fans will be conducted by the performance of a shunt test of the facility's normal power system to emergency power supply system.

System Performance:

- 6.21 Stair pressurization systems shall be verified to provide the required pressure differentials within the maximum allowable door operating forces.
- When provided, the discharge flow rates through damper relief openings (e.g., barometric dampers) serving pressurized exit enclosures shall be verified at the design pressure difference.
- 6.22 Differential pressures between smoke control zones and/or rate of air- change per-hour shall be verified to confirm design criteria performance levels. Sufficient tests shall be undertaken to qualify the design criteria performance considering building and climatic conditions at the time of testing.

- 6.23 Pressure differentials will be measured from the corridor to the guestrooms where the original design required a pressure differential. If the original design did not state a pressure differential was required, no measurements will be taken. The number of rooms to be measured will be detailed in the test plan.
- Where two rooms on the same side of the corridor fail on a floor the entire floor will be rebalanced/retested.
- 6.24 Fan measurements (cfm) shall be taken when the fan performance must be confirmed as part of the performance criteria for a smoke control zone (e.g., areas with smoke control based on the exhaust method or the airflow method).
- 6.25 Where Variable Frequency Drives (VFDs) are incorporated with fans provided for smoke control functions, these drive devices are to be confirmed as providing the required responses for each design service level. VFD settings shall be recorded in the final report.

Sequence Testing:

- 6.26 Confirmation that the FFSCP has priority over all possible control features of the smoke control system for each possible permutation is to be performed. Confirmation that the smoke zone and applicable equipment (fans, dampers, doors, etc.) are capable of manual control from the FFSCP (manual "On" and manual "Off" after automatic initiation).
- 6.27 Automatic control of the smoke zone is to be confirmed. Automatic initiation of the smoke zone occurs upon activation of a smoke detector and/or waterflow switch associated with the zone. Upon activation, the proper sequence of operations per the approved design documents will be confirmed visually for all related smoke control equipment only, and at the FFSCP. Testing shall include all control sequences and that the FFSCP has priority for all permutations.

Performance Testing:

- 6.28 Confirmation of the compliance of the smoke control systems shall be as detailed in the design documents, test plan, and test scenarios.
- 6.29 A certified AABC, NEB, or NCI Air Balance Company will confirm the required pressure differentials supply and exhaust fan cfm quantities and door opening forces.

Elevators:

- 6.30 Testing of elevators shall only be required where an elevator pressurization system is installed.
- 6.31 Fan measurements shall be taken when the fan performance must be confirmed as part of the performance criteria for the elevator machine room or hoistway pressurization system.

- 6.32 Where Variable Frequency Drives (VFDs) are incorporated with fans provided for elevator machine room or hoistway pressurization system, these drive devices are to be confirmed as providing the required responses for each design service level. VFD settings shall be recorded in the final report.
- 6.33 Fan motor horsepower shall be determined by measurement of actual operating voltage and current draw.
- 6.34 Where the design requirements specified a safety factor for the number of fan drive belts, the actual number of installed and serviceable belts shall be verified.
- 6.35 All smoke control fans will be visually inspected to confirm that they have been properly maintained and operate per the approved documentation. It will be confirmed that the proper number of belts are provided (a minimum of two), the motor has a minimum service factor of 1.15, and the fan rotates in the correct direction, and meets the required temperature rating where required by the Code of record and/or design documents.
- 6.36 Where applicable, automatic and manual activation of elevator hoistway vents shall be confirmed through testing.
- 6.37 All elevator lobbies that serve as passive smoke zones or passive sub-zones shall be tested to confirm the minimum required pressure differential between the lobby and adjacent zones are achieved, when applicable.
- 6.38 Where applicable, smoke detectors in elevator lobbies shall be activated to confirm proper closure of the lobby doors on hold open devices and any dampers associated with the lobby and/or machine room.

7.0 SMOKE BARRIER CONSTRUCTION INSPECTIONS

- 7.1 Visually inspect all smoke zone boundaries, smoke barriers, smoke partitions, fire barriers, and fire partitions to confirm continuity and that required opening protection and through penetrations are installed. Smoke barrier performance will be tested for all possible mechanical system configurations.

8.0 TESTING ON SECONDARY POWER

- 8.1 Confirmation of emergency power supply to the smoke control systems is to be confirmed by performance of a shunt test of the facility's normal power system to the emergency /standby power supply system. Testing will be in accordance with IFC Section 909.20.4 or 909.20.5 unless an approved alternate testing interval is approved. If the alternate testing interval is approved, then testing will comply with NFPA 110 and will occur every 36 months for Level 1 systems.

APPENDIX A

REFERENCE DOCUMENTS TO BE USED AS NEEDED

Applicable Codes

- Building
- Fire
- Mechanical
- Approved Code Modifications or Variances

Design Methodology

- Describe the original design criteria
- Designate smoke zones using mechanical technology
- Pressure Differential
- Exhaust Method
- Designate smoke zones using passive technology
- Small scale drawings showing zoning_

Testing forms

- Area or equipment covered
- Acceptability of test results
- Signature of inspector(s) and date of test_

Testing scenarios

- Shall be designed to anticipate all potential events
- Designate whether testing is intrusive or non-intrusive to the normal operations of the facility
- Fans shall be tested to verify airflow and amperage_

Control Diagrams

- Location of all devices that initiate smoke control
- Location of all devices involved in the smoke control process (including control dampers, smoke dampers, variable air volume controls, and fans)
- Identification of all devices provided with standby power
- Locations of active and passive smoke barriers
- Smoke control method being used for each smoke zone
- Capacities of each fan involved in smoke control
- Sequence of operations (including timing, if necessary to prevent ductimplosion or explosion)
- Positioning of each damper for every fire scenario

Life Safety Report or Fire Protection Report

- Sprinkler System
- As-built drawings

Fire Alarm System

- As-built drawings
- Original Program of Record (showing revision level)
- Current Program of Record (showing revision level)
- Print out of comparison report using built-in software
- Record of inspections, tests and maintenance
- Diskette or flash drive of original fire alarm programming
- Identify applicable maintenance procedures_

As-built Mechanical Drawings

- Design documents (specifications)
- Identify applicable maintenance procedures

As-built Building Automation System Drawings

- Design documents (specifications)
- Identify applicable maintenance procedures

As-built Architectural Drawings

- Wall ratings
- Door ratings and hardware schedule
- Draft curtains
- Smoke barriers
- Identify applicable maintenance procedures_ _

Review Operations and Maintenance Documentation

- Documentation of changes to system_

Sample Certificate of Compliance

- Statement
- Tag

Final Report

- Acceptance and resolution for all non-compliance items
- Submitted electronically with hard copies issued to the client for their records.