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The Winston-Salem Fire Department Fire Protection Development Standards utilize the North Carolina State Building Codes as the basis for application of these standards. All references included herein are from the International Building Codes with North Carolina Amendments. Link to access codes used in this document: (http://www.ecodes.biz/ecodes_support/Free_Resources/2012NorthCarolina/12NorthCarolina_main.html)

Additional requirements included in this document are references to City of Winston-Salem Ordinances and Unified Development Ordinances.

These are minimum fire protection standards only and are not to be construed as complying with all regulations of other departments of the City of Winston-Salem. The omission of any code requirement in this document does not excuse the requirement.
Chapter 1 - Construction Plan Submittal and Review

Plans review and inspections are conducted through the Fire Prevention Bureau of the Winston-Salem Fire Department. The plan reviewers’ office is located in the Bryce A. Stuart Municipal Building, 100 East First Street, Suite 328, Winston-Salem, NC 27101. The telephone number is 336-734-1290.

For all commercial, multi-family and Industrial building projects inside the city limits of Winston-Salem (excluding WS/FC Schools), the Winston-Salem/Forsyth County Building Inspections Division will forward a set of construction plans to the Winston-Salem Fire Department for review. The Winston-Salem Fire Department will contact the person, indicated on the plans as the contact person, to discuss Fire Code requirements for the project. A fax or email will also be sent to the contact person with the requirements listed. A building permit will not be signed off by the Winston-Salem Fire Department Plan Review Section, if further information or a resubmittal of the plans is required.

Construction documents for fire protection systems shall be submitted for review and approval prior to any system installation.

Plan Review
The Plan Review section is responsible for reviewing building construction plans to ensure that they are designed in compliance with the Fire Code. These personnel also review fire protection equipment plans for accuracy prior to approving their installation. Examples would include fire alarm systems, fire sprinkler and standpipe systems, and restaurant hood extinguishing systems. (Contractors submitting plans should follow the respective submittal requirements. Plans, required items, and summary sheets can now be submitted for review via e-mail to (plans@cityofwsfire.org ). Information is included in the submittal requirements. Once the plans have been approved, you will receive notification via e-mail or fax for all submittals. The subcontractor may then install the system. After installation is completed, a Fire Code Official inspects the system to ensure that it meets the specifications of the approved plans. In order to recover a portion of the plan review costs, the City has implemented a fee schedule. Construction plan comments can also be found at http://www.inspectnet.org

Please contact 336-734-1290 for any construction and/or fire protection system related questions.

Upon approval of the plans, an approval letter will be issued for the installation of the particular system. When requesting a final inspection from the Winston-Salem Fire Department, you must submit the Statement of Compliance prior to any inspection being scheduled. If there are multiple fire protection systems being installed at the same location, the final inspection may be held until all trades have completed their installations so that the Fire Code Official may conduct one inspection. Rough-in inspections can be scheduled after approval of any fire protection system.
Note: In some rare cases you may receive approval contingent that other items will need to be added and/or relocated. These items will be noted and checked upon inspection and updated plans will be submitted before final approval.

Please call 336-734-1290, to request an inspection or if you should have any questions regarding these requirements.

**Statement of Compliance**

Section 901.2.1 of the North Carolina State Fire Prevention Code states the following:

“Before requesting final approval of the installation, where required by the Fire Code Official, the installing contractor shall furnish a written statement to the Fire Code Official that the subject fire protection system has been installed in accordance with approved plans and has been tested in accordance with the manufacturer’s specifications and the appropriate installation standard. Any deviations from the design standards shall be noted and copies of the approvals for such deviations shall be attached to the written statement.”

The above-referenced Statement of Compliance shall be furnished to the Winston-Salem Fire Department upon request for a final inspection of any fire protection system installation. This Statement of Compliance shall be on the installing company’s letterhead with the project name and address clearly indicated along with the type of fire protection system installed. The installer shall print their name and sign their name to this Statement of Compliance.

Additional certifications or information may be required at the time of the final inspection, such as, but not limited to, the Record of Completion forms for fire alarm systems.

**Section 1.1 - Contractors License Required**

When required by the General Statutes, general construction, plumbing, mechanical, electrical, fire protection, or gas work shall be performed by an appropriately licensed individual. No permits for such work shall be issued to an unlicensed person or firm (Chapter 3, Section 301.6 – North Carolina Administrative and Enforcement Code).
Chapter 2 - Site Plan Submittal Requirements

Site Plan documents for new construction shall be submitted for review and approval prior to site preparation work beginning. Design, construction and installation shall be in accordance with the appropriate City of Winston-Salem Ordinances, North Carolina Fire Prevention Code requirements and applicable NFPA and other Standards.

Site plan documents for construction projects shall contain the following information:

1. Fire lane locations and pavement marking specifications
2. Fire hydrant locations with associated water lines, location, and size
3. Fire department connection (4" Storz) locations and "FDC" sign specifications
4. Turning radius drawings and pavement driving lane markings
5. Landscaping details including overhanging trees and shrubbery
6. Building overhangs and drive-through locations and height clearances
7. Building entrance and exit locations
8. The anticipated fire flow requirements for the building
9. The intended use of the building including secondary uses
10. Drawings shall be scaled and indicated
11. Any other items requiring fire department consideration

See the following sections for additional information pertaining to Site Plan Requirements:

1. Section 2.1 - Fire Department Site Access Requirements
   a. Section 2.1.1 - Cul-de-sac Streets
2. Section 2.2 - Fire Hydrants
   a. Section 2.2.1 Fire Service Water Main Size Requirements
3. Section 2.3 Confirmation of Acknowledgement and Acceptance

Section 2.1 - Fire Department Site Access

The purpose of fire department access is to allow emergency vehicles to approach a building as close as practical in order to deploy hose, ladders and other fire suppression/rescue equipment necessary for fire control, EMS and rescue operations.

Emergency Vehicle Access

The purpose of this Section is to ensure that all premises shall be readily accessible for emergency service vehicles, particularly fire-fighting equipment.

Access to buildings shall also be designed in accordance with Section 503 of the North Carolina Fire Prevention Code and the City of Winston-Salem Technical Standards Manual.
North Carolina State Fire Code

Section 503 Fire Apparatus Access Roads

503.1 Where required.

Fire apparatus access roads shall be provided and maintained in accordance with Sections 503.1.1 through 503.1.3.

503.1.1 Buildings and facilities.

Approved fire apparatus access roads shall be provided for every facility, building or portion of a building hereafter constructed or moved into or within the jurisdiction. The fire apparatus access road shall comply with the requirements of this section and shall extend to within 150 feet (45 720 mm) of all portions of the facility and all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building or facility.

Exception: The Fire Code Official is authorized to increase the dimension of 150 feet (45 720 mm) where:

1. The building is equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3.

2. Fire apparatus access roads cannot be installed because of location on property, topography, waterways, non-negotiable grades or other similar conditions, and an approved alternative means of fire protection is provided.

3. There are not more than two Group R-3 or Group U occupancies.

503.1.2 Additional access.

The Fire Code Official is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.
503.1.3 High-piled storage.

Fire department vehicle access to buildings used for high-piled combustible storage shall comply with the applicable provisions of Chapter 23.

503.2 Specifications.

Fire apparatus access roads shall be installed and arranged in accordance with Sections 503.2.1 through 503.2.8.

503.2.1 Dimensions.

Fire apparatus access roads shall have an unobstructed width of not less than 20 feet (6096 mm), exclusive of shoulders, except for approved security gates in accordance with Section 503.6, and an unobstructed vertical clearance of not less than 13 feet 6 inches (4115 mm).

Fire access roads shall not exceed 6% in grade. The maximum angle of approach shall not exceed 8 degrees and 87.75 inches. The maximum angle of departure shall not exceed 8 degrees and 130 inches.

503.2.2 Authority

The Fire Code Official shall have the authority to require an increase in the minimum access widths where they are inadequate for fire or rescue operations.

503.2.3 Surface.

Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all-weather driving capabilities.

503.2.4 Turning radius.

The required turning radius of a fire apparatus access road shall be determined by the Fire Code Official. Turning radius shall be designed and installed as per the following Department of Fire and Life Safety specifications:

- Inside to Inside = 24' 5"
- Curb to Curb = 40' 2"
- Wall to Wall = 47' 7"

503.2.5 Dead ends.

Dead-end fire apparatus access roads in excess of 150 feet (45 720 mm) in length shall be provided with an approved area for turning around fire apparatus.
Where a bridge or an elevated surface is part of a fire apparatus access road, the bridge shall be constructed and maintained in accordance with AASHTO HB-17 Standard Specification for Highway Bridges. Bridges and elevated surfaces shall be designed to carry the imposed loads of fire apparatus. Vehicle load limits shall be posted at both entrances to bridges when required by the Fire Code Official. Where elevated surfaces designed for emergency vehicle use are adjacent to surfaces which are not designed for such use, approved barriers, approved signs or both shall be installed and maintained when required by the Fire Code Official.

### 503.2.7 Grade.
The grade of the fire apparatus access road shall be within the limits established by the Fire Code Official based on the Winston-Salem Fire Department’s apparatus.

Dead-end fire apparatus access road turnarounds shall be installed as approved by the Winston-Salem City Engineering Division or shall be approved by the Fire Code Official.

### 503.2.8 Angles of approach and departure.
The angles of approach and departure for fire apparatus access roads shall be within the limits established by the Fire Code Official based on the Winston-Salem Fire Department’s apparatus.

### 503.3 Marking.
Where required by the Fire Code Official, approved signs or other approved notices or markings that include the words NO PARKING – FIRE LANE shall be provided for fire apparatus access roads to identify such roads or prohibit the obstruction thereof. The means by which fire lanes are designated shall be maintained in a clean and legible condition at all times and be replaced or repaired when necessary to provide adequate visibility.

### 503.6 Security Gates.
The installation of security gates across a fire apparatus access road shall be approved by the Fire Code Official. Where security gates are installed, they shall have an approved means of emergency operation. The security gates and the emergency operation shall be maintained operational at all times. Electric gate operators, where provided, shall be listed in accordance with UL 325. Gates intended for automatic operation shall be designed, constructed and installed to comply with the requirements of ASTM F 2200.

**Turnarounds Approved by the Winston-Salem Department of Public Works**

*Contact information for Public Works is for the Senior Administrative Assistant – 336-734-1470*

See next three pages
OFFSET TURNAROUND

PERMANENT

NOTE:
STANDARD CURB AND GUTTER MAY BE REQUIRED AT THE END OF PAVEMENT TO CONTROL DRAINAGE.

CITY OF WINSTON—SALEM
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

N.T.S. REVISED
APPROVED BY:

streets\streetdetails\offset_turnaround.dwg

V-6
T" TURNAROUND
PERMANENT

NOTE:
STANDARD CURB AND GUTTER MAY BE REQUIRED AT
THE END OF PAVEMENT TO CONTROL DRAINAGE.

CITY OF WINSTON–SALEM
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

V-5
Section 2.2 - Fire Hydrants

The deployment of fire hose directly affects the positioning of fire apparatus in proximity to a fire. The installation and distribution of fire hydrants are crucial in the suppression of fires, explosions or other emergencies requiring the application of water.

Fire Hydrants

Hydrant Spacing. All newly-installed fire hydrants shall be not more than 700 feet on center for residential property, except as provided herein. In commercial, industrial and multi-family construction developments, hydrants shall be spaced at 500 foot intervals. No application for development shall be approved for any building unless a hydrant is installed within 400 feet of the most remote area of the building. Structures with sprinkler systems shall provide fire hydrants within 100 feet of the Fire Department Connection (FDC). Mains shall be sized to provide 500 gpm for exterior hose streams.

Exceptions to hydrant spacing (North Carolina Fire Code Section 507):

- **For Group R-3 and Group U occupancies, the distance requirement shall be 600 feet (183 m).**
- **For buildings equipped throughout with an approved automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2, the distance requirement shall be 600 feet (183 m).**

Fire hydrants shall not be installed on water mains of less than six inches diameter or on water mains or water systems not designed to carry fire protection flows. Systems not designed for fire flows shall have the capacity to maintain a pressure of at least 30 pounds per square inch (gauge) throughout the system during peak flow.

Testing and Acceptance. All newly installed fire hydrants shall be tested, inspected and certified by the City/County Utilities Department.

Hydrant Specifications

All fire hydrants installed within the City of Winston-Salem shall meet the specifications of the City/County Utilities Department including having the Winston-Salem thread design pattern.

Fire Hydrants

- All fire hydrants shall be dry-barrel fire hydrants which comply with ANSI/AWWA C502.
- All hydrants will have a dry top with O-ring seals which permanently seal off the stem operating threads from water and keep the lubricant in.
• All hydrants shall be opened by turning the operating nut on top of the hydrant counterclockwise. The main valve shall be a compression-type valve with a valve opening of 4 ½” or 5 1/4” unless otherwise specified.

• Each hydrant will have two hose nozzles and one steamer nozzle. The 2 ½” hose nozzles and the 4 1/4” steamer nozzle shall have Winston-Salem standard threads. The nozzle shall be fastened into the hydrant barrel by mechanical means, but shall not be leaded into the barrel. Nozzle caps shall be chained to the barrel.

• All hydrants will be furnished with a breakable traffic feature that will break upon impact. The feature shall consist of a breakable safety flange on the barrel and a breakable safety coupling in the main valve stem.

• Hydrants must have a bronze main valve seat ring that threads into a bronze drain ring. Each hydrant shall have at least two bronze drain outlets.

• All hydrants will have 6” mechanical joint base connections unless otherwise specified by the Engineer.

• Hydrants shall be designed for a minimum working pressure of 250 psi.

• Assembled hydrants shall be subjected to hydrostatic tests of twice the rated working pressure in accordance with ANSI/AWWA C502.

• All exterior iron surfaces below ground level shall be covered with two coats of asphaltic varnish or fusion bonded epoxy.

• All exterior iron surfaces above ground level shall be painted yellow to the satisfaction of City requirements. Yellow paint shall be Rust-Oleum 7446, Rust-Oleum V2148, or Kimball Midwest 80-942.

• All interior iron surfaces of the hydrant shoe which are in contact with water (including the lower valve plate and nut) shall be coated with a minimum of 8 mils of fusion bonded epoxy or liquid epoxy in accordance with ANSI/AWWA C550.

• All hydrants shall have a thrust or anti-friction washer in the operating area of the hydrant bonnet.

• A weather cap around the operating nut on top of the hydrant is required.

• Hydrants accepted by the City of Winston- Salem are as follows:
  o Super Centurion 250, manufactured by Mueller Company
  o MK-73-5, manufactured by American Flow Control
  o K-81A Guardian, manufactured by Kennedy Valve Company VI6

• Hydrants will normally be three and one-half feet from the ground to the bottom of the hydrant (42” bury). However, when plans indicate a deeper bury is required, such hydrants will be furnished conforming to the depth of bury as shown on the plans.

• Hydrant extensions will be installed only if necessary.

**Setting Fire Hydrants**

Hydrants will include furnishing, unloading, hauling, and installing the hydrant in the location indicated on the drawings in accordance with the following specifications:

• Hydrants will be set as shown on the Engineer’s drawings or in accordance with specific instruction from the Engineer.

• Hydrant legs will be included with the quantity of 6” water pipe and will be measured from the center of the main to the center of the hydrant.

• A concrete thrust block will be poured behind and under the hydrant shoe.
- Number 57 stone will be placed around the base of each hydrant from the bottom of the thrust block to within 12 inches of the surface of the ground. Such material will extend at least 6 inches away from the hydrant barrel in all directions and particular care will be taken to prevent this material from becoming filled with earth or other improper material which will prevent proper drainage from the hydrant barrel.
- A 6” gate valve with box will be furnished and installed in each hydrant leg.
- Each hydrant shall be painted with at least one coat of yellow paint after the hydrant has been set and final grade has been established.
- Hydrants must be installed in accordance with the City of Winston-Salem detail drawing for hydrant and valve installation and may not be backfilled until inspected and approved by the Engineer.
- Hydrant extensions will be installed only if necessary. When installing a hydrant extension, care shall be taken to insure that the breakable safety coupling in the main valve stem is at the same location as the safety flange on the barrel.
- Private fire service mains and appurtenances shall be installed in accordance with NFPA 24. This will be reviewed, inspected and tested by the Winston-Salem Fire Department.
HYDRANT AND VALVE INSTALLATION

NOTES:
1. HYDRANTS, VALVES AND THEIR ACCESSORIES ARE TO BE FURNISHED AS SPECIFIED IN THE TECHNICAL SPECIFICATIONS OF THE ENGINEERING DIVISION OF THE CITY OF WINSTON-SALEM, N.C.

2. ANY JOINTS BETWEEN THE VALVE AND HYDRANT MUST HAVE RETAINER CLANDS.

CITY OF WINSTON-SALEM
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

N.T.S. APPROVED
REvised 9-1-08

R:\Data \AutoCAD Stuff \Utility Spec Drawings \hyd_valve_install.dwg

VII-35
2 1/2" HOSE NOZZLE FOR HYDRANTS

THREAD DATA
7 1/2 THREADS PER INCH
.133 PITCH
RIGHT HAND
NATIONAL FORM

MAX 2.940" O.D. OF THREADS
MIN 2.910" O.D. OF THREADS
MAX 2.854" PITCH DIAMETER
MIN 2.838" PITCH DIAMETER
2.767" ROOT DIAMETER
2.468" BORE DIAMETER

CITY OF WINSTON-SALEM
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

N.T.S. REVISED 9-20-01

utility_spec_drawings/hose_nozzle.dwg

VII-36
4 1/4" STEAMER NOZZLE FOR HYDRANTS

THREAD DATA
4 THREADS PER INCH
250 PITCH
RIGHT HAND
V FORM

CITY OF WINSTON-SALEM
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

N.T.S. REVISED 9-20-01

utility_spec_drawings/steamer_nozzle.dwg

VII-37
### Thrust Block Specifications

**For All Bends**

Widen trench to accommodate anchor or plug if required.

**For Tee or Wye Fittings**


<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>DEGREE OF BEND</th>
<th>BEND DIMENSIONS (FEET)</th>
<th>VOLUME CU. YD.</th>
<th>TEE AND PLUGS (FEET)</th>
<th>VOLUME CU. YD.</th>
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<td><strong>4” &amp; 6”</strong></td>
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<tr>
<td></td>
<td>11 1/4</td>
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<td>2.50</td>
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<td>1.83</td>
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1. Thrust blocks are required whenever the pipeline changes direction, changes size, dead ends, and at valves.
2. Use 2500 P.S.I. concrete.
3. No concrete shall be poured on any part of the joint.
4. The consulting engineer shall be responsible to the verify the type & size of all thrust blocks.
Section 2.2.1 - Fire Service Water Main Size Requirements

Requirements in residential zoning districts from the Winston-Salem/Forsyth County Unified Development Ordinance:

Public or Private Utilities

Water

- All subdivisions of land within one thousand (1,000) feet of public water shall be required to provide public water to the subdivision and install fire hydrants in accordance with the Winston-Salem Fire Department. The preliminary subdivision plat shall indicate that public water is to be used.

- If public water is not available or required, the preliminary subdivision plat shall indicate the private water system to be used.

- If fire hydrants are installed as part of a private water system, the system and fire hydrants shall be approved by the Winston-Salem Fire Department.

Section 2.3 - Fire Department Connections

Fire department connections (FDC) shall be installed in accordance with the NFPA standards applicable to the system design and shall comply with Section 912 of the North Carolina State Fire Code.

- Location - With respect to hydrants, driveways, buildings and landscaping, fire department connections shall be so located that fire apparatus and hose connected to supply the system will not obstruct access to the buildings for other fire apparatus. The location of fire department connections shall be approved by the Fire Code Official.

- Visible location - Fire department connections shall be located on the street side of buildings, fully visible and recognizable from the street or nearest point of fire department vehicle access or as otherwise approved.

- Hydrant locations shall be taken into consideration before installing the connections.

- Existing buildings - On existing buildings, wherever the fire department connection is not visible to approaching fire apparatus, the fire department connection shall be indicated by an approved sign mounted on the street front or on the side of the building. Such sign shall have the letters FDC at least 6 inches (152 mm) high and words in letters at least 2 inches (51 mm) high or an arrow to indicate the location. All such signs shall be subject to the approval of the Fire Code Official.
• **Access** - Immediate access to fire department connections shall be maintained at all times and without obstruction by fences, bushes, trees, walls or any other fixed or moveable object.
  - Exception - Fences, where provided with an access gate equipped with a sign complying with the legend requirements and a means of emergency operation. The gate and the means of emergency operation shall be maintained operational at all times.

• **Locking fire department connection caps** - The Fire Code Official is authorized to require locking caps on fire department connections for water-based fire protection systems where the responding fire department carries appropriate key wrenches for removal.

• **Clear space around connections** - A working space of not less than 36 inches (762 mm) in width, 36 inches (914 mm) in depth and 78 inches (1981 mm) in height shall be provided and maintained in front of and to the sides of wall-mounted fire department connections and around the circumference of free-standing fire department connections, except as otherwise required or approved.

• **Physical protection** - Where fire department connections are subject to impact by a motor vehicle, vehicle impact protection shall be provided in accordance with Section 312 of the North Carolina State Fire Code.

• **Signs**. A metal sign with raised letters at least 1 inch (25 mm) in size shall be mounted on all fire department connections serving automatic sprinklers, standpipes or fire pump connections. Such signs shall read: AUTOMATIC SPRINKLERS or STANDPIPES or TEST CONNECTION or a combination thereof as applicable. Where the fire department connection does not serve the entire building, a sign shall be provided indicating the portions of the building served.

• **Backflow protection** - The potable water supply to automatic sprinkler and standpipe systems shall be protected against backflow as required by the International Plumbing Code and the City of Winston-Salem.

• **Inspection, testing and maintenance** - All fire department connections shall be periodically inspected, tested and maintained in accordance with NFPA 25.

• **A Storz 4” x 4” coupling with a 30-degree downturn.**
Chapter 3 - Building Plan Submittal Requirements

Construction documents for new and up-fit construction shall be submitted to the Winston-Salem/Forsyth County Building/Inspections Department for review and approval prior to work beginning. Construction, installation and testing shall be in accordance with the appropriate City of Winston-Salem Ordinances, North Carolina Building/Fire Prevention Code requirements and NFPA and other Standards.

Building plan submittals shall contain, among other items, the following information:

1. Building floor plan with an Appendix B.
2. Intended occupancy use classifications and secondary uses.
4. Fire rated assembly locations and specifications.
5. Fire separation locations and specifications.
6. Fire door locations and door specifications.
7. Hazardous materials storage array, locations and specifications.
8. Installation or Removal of Tanks for liquid motor fuels and LPG, LNG, CNG.
   a. The sizes and locations of tanks shall be indicated.
   b. Tank specifications shall be included.
9. High-piled combustible storage and rack storage array details.
   - Plans shall include drawings, diagrams and specifications on rack storage arrangements.
10. Kitchen hood installation locations and specifications.
    - See fire suppression system plan submittal requirements.
11. Paint spray booths and associated system locations and specifications;
    - See fire suppression system plan submittal requirements.
12. Flammable/Combustible liquid storage rooms, hazardous materials storage rooms and clean room locations and specifications;
    - Special agent protection systems - See fire suppression system plan submittal requirements.
13. Compressed gas or medical gas system piping diagrams.
    a. Plans shall indicate all valve locations.
    b. Plans shall indicate all emergency shutoff locations and associated equipment and signs.
    c. Pipe sizes and working pressures shall be indicated.
14. Drawings and specifications for all buildings shall indicate how required fire separations and fire resistive integrity will be maintained.
    a. Where penetration of a fire separation wall, floor or rated assembly will be made, drawings shall indicate in sufficient detail how the fire resistive integrity will be maintained.
    b. Where penetrations are sealed, plans shall include specification on what materials are to be used to seal penetrations.
15. Fire detection and protection equipment installations;
    a. See fire alarm system plan submittal requirements.
    b. See fire sprinkler/standpipe system plan submittal requirements.
    c. See fire suppression system plan submittal requirements.
16. Any other items requiring Winston-Salem Fire Department consideration.
17. Drawings shall be scaled.
18. A Winston-Salem Fire Department approved set of plans shall be maintained on the project site at all times while the project is under construction.

See the following sections for additional information pertaining to building plan requirements:

1. Section 3.1 - Fire Alarm Submittal Requirements
2. Section 3.2 - Fire Sprinkler/Standpipe System Plan Submittal Requirements
3. Section 3.3 - Installation of Electric Fire Pumps
4. Section 3.4 - Fire Suppression System Plan Submittal Requirements

Section 3.1 - Fire Alarm System Plan Submittal Requirements:

The following information must be submitted to and approved by the Winston-Salem Fire Department Fire Code Official prior to any installation per section 901.2 and 907.1.1 of the North Carolina State Fire Prevention Code.

1. Submit ONE set of plans to plans@cityofwsfire.org, or mail to:
   Winston-Salem Fire Department Plans Review
   Bryce A. Stuart Municipal Building /Attn: Fire Prevention Bureau
   Suite 328
   100 East First Street
   Winston-Salem, NC 27101
2. Provide a cover letter with the following information:
   a. Project name and complete project address
   b. Installation company name and address
   c. Contact name, phone number, fax number and email address
   d. W-S building permit number (if applicable)
3. Payment of the plan review fee of $120.00; checks must be made payable to “City of Winston-Salem.”
4. Payment can be made electronically at: www.cityofwsfire.org. (On the Winston-Salem Fire Department home page, click on “Pay Fire Dept. Permit Fees and Citations online”). Visa, MasterCard and Discover are accepted.
5. The check-off list that must be submitted with fire alarm plans can be found on page 74 of this document.
6. FIRE ALARM PLANS MUST HAVE A PROFESSIONAL ENGINEER SEAL PER G.S 89C. NOTE: Professional Engineer – A person who has been duly licensed as a professional engineer in the State of North Carolina.
7. A scaled, sealed and detailed floor plan with the system designer indicated and the date of design. The preferable scale is 1/8 inch and the scale must be clearly indicated on the plans. An elevation view must also be included.
8. The locations of all the initiating and notification devices must be clearly indicated along with the candela rating of all strobes.
10. Alarm control/panel location.
11. Annunciation of the system and location of annunciator panel.
12. Power connection; electrical breaker controlling the alarm panel must be equipped with a breaker lock.
13. Battery and voltage drop calculations for the entire system. The total number and amperage of the batteries to be utilized must be clearly indicated.
14. Electrical wiring diagram, type and size.
15. Manufacturers, model numbers, and listing information for all the equipment, devices, and materials to be installed.
16. The interface of all fire safety control functions.
17. The locations of all water control valves and required tamper switches for sprinkler systems.

Codes used in the review process:
North Carolina State Fire Prevention
North Carolina State Building
Applicable National Fire Protection Association Standards

NOTE – Additional information may be required prior to approval of the submitted plans. The above requested information is not all-inclusive.

Fire detection/protection equipment and associated systems shall be a separate plan submittal and permit fee from Site and Building Plan submittals. Permits shall be issued for each individual plan submittal with all subsequent inspections and tests being conducted accordingly.

Plans approved by the Winston-Salem Fire Department give permission for installation of the fire protection system. Installation shall not begin without a permit. Final approvals are subject to field inspections. Any approval issued by the Fire Code Official’s plans review area does not release the contractor or property owner from the responsibility of full compliance with applicable codes.

All installations shall be in accordance with the approved plans. Any deviations from the plans should be discussed with the Fire Code Official prior to making changes. Some changes will require a re-submittal to the Winston-Salem Fire Department for re-approval.
Section 3.2 - Fire Sprinkler/Standpipe System Plan Submittal Requirements

The following information must be submitted to and approved by the Winston-Salem Fire Department Fire Code Official prior to any installation per section 901.2 of the North Carolina State Fire Prevention Code.

1. Submit **ONE** set of plans to plans@cityofwsfire.org or mail to:
   Winston-Salem Fire Department Plans Review
   Bryce A. Stuart Municipal Building /Attn: Fire Prevention Bureau
   Suite 328, Winston-Salem, NC 27101
2. Provide a cover letter with the following information:
   1. Project name and complete project address
   2. Installation company name and address
   3. Contact name, phone number, fax number and email address
3. **W-S building permit number** (if applicable)
4. Payment of the plan review fee of $120.00; checks must be made payable to “City of Winston-Salem.”
5. Payment can also be made electronically at: www.cityofwsfire.org. (On the Winston-Salem Fire Department home page click on “Pay Fire Dept. Permit Fees and Citations online”). Visa, MasterCard and Discover are accepted.
6. The check-off list that must be submitted with fire sprinkler plans can be found at the end of this document.
7. A scaled and detailed floor plan with the system designer indicated and the date of design. The preferable scale is 1/8 inch and the scale must be clearly indicated on the plans. An elevation view must also be included.
8. The classification of the commodity to be protected must be indicated. A description of the exact commodity and height must be included to verify the correct classification. The storage configuration, if any, must also be indicated.
9. The square footage of each riser’s protection area and clear notations of any non-sprinkled areas must be indicated.
10. Descriptions and specifications for all the system’s components including pipe sizes and sprinkler heads.
11. Hydraulic calculations for the system; this shall include hydraulic calculations for any modifications to a previously hydraulically calculated system.
12. Type of system being installed (ex – Class I Standpipe, NFPA 13 Wet-pipe Sprinkler).
13. Standpipe hose thread patterns must be Winston-Salem 2 ½ inch and National Standard 1 ½ inch. The protection zone is a maximum of 120 feet from the standpipe hose connection as measured around any obstructions.
14. A scaled site plan must be included indicating the FDC location and all on-site fire hydrants. The building and all fire apparatus access roadways must also be indicated.
15. The FDC must be a Storz 4” x 4” coupling with a 30-degree downturn.
16. The plans must indicate the locations of all water control valves and required tamper switches.
Codes used in the review process:
North Carolina State Fire Prevention
North Carolina State Building
Applicable National Fire Protection Association Standards

NOTE – Additional information may be required prior or approval of the submitted plans. The above requested information is not all-inclusive.

Sprinkler System “Small Job” Requirements

The following describes a “small job”:

1. 20 heads or less that will be added, relocated, or changed out.
2. Cannot be located in or will not affect the remote area.
3. No phased-in work. If the overall job will affect more than 20 heads, plans need to be submitted as normal.
4. This change only applies to light and ordinary hazard occupancies/areas.

The following must be submitted for “small jobs”.

1. Submit ONE set of plans to plans@cityofwsfire.org or mail to:
   Winston-Salem Fire Department Plans Review
   Bryce A. Stuart Municipal Building (formerly ‘City Hall South’)
   Suite 328
   100 East First Street
   Winston-Salem, NC 27101
2. Payment of the plan review fee of $120.00; checks must be made payable to “City of Winston-Salem.”
3. Payment may also be made electronically at: www.cityofwsfire.org. (On the Winston-Salem Fire Department home page click on “Pay Fire Dept. Permit Fees and Citations online”). Visa, MasterCard and Discover cards are accepted.
4. No calculations are required.
5. Hydrostatic report (working pressure only), and letter of certification at the time of the inspection will be required.
6. Provide a cover letter with the following information:
   1. Project name and complete project address
   2. Installation company name and address
   3. Contact name, phone number, fax number and email address
   4. W-S building permit number (if applicable)

Section 3.3 - Installation of Fire Pumps

Article 695.3 of the National Electrical Code (NEC) states electric motor-driven fire pumps shall have a reliable source of power.
Section 913.2 of the N. C. Fire Prevention Code states that the fire pump, driver and controller shall be protected in accordance with NFPA 20 against possible interruption of service through damage caused by explosion, fire, flood, earthquake, rodents, insects, windstorm, freezing, vandalism and other adverse conditions.

Fire Pumps

913.1 General. Where provided, fire pumps shall be installed in accordance with this section and NFPA 20.

913.2 Protection against interruption of service. The fire pump, driver, and controller shall be protected in accordance with NFPA 20 against possible interruption of service through damage caused by explosion, fire, flood, earthquake, rodents, insects, windstorm, freezing, vandalism and other adverse conditions.

913.2.1 Protection of fire pump rooms. Rooms where fire pumps are located shall be separated from all other areas of the building in accordance with Section 913.2.1 of the International Building Code.

913.3 Temperature of pump room. Suitable means shall be provided for maintaining the temperature of a pump room or pump house, where required, above 40° F (5° C).

913.3.1 Engine manufacturer’s recommendation. Temperature of the pump room, pump house or area where engines are installed shall never be less than the minimum recommended by the engine manufacturer. The engine manufacturer’s recommendations for oil heaters shall be followed.

913.4 Valve supervision. Where provided, the fire pump suction, discharge and bypass valves, and the isolation valves on the backflow prevention device or assembly shall be supervised open by one of the following methods.

1. Central-station, proprietary or remote-station signaling service.

2. Local signaling service that will cause the sounding of an audible signal at a constantly attended location.

3. Locking valves open.

4. Sealing of valves and approved weekly recorded inspection where valves are located within fenced enclosures under the control of the owner.
913.4.1 Test outlet valve supervision. Fire pump test outlet valves shall be supervised in the closed position. 913.5 Testing and maintenance. Fire pumps shall be inspected, tested and maintained in accordance with the requirements of this section and NFPA 25.

913.5.1 Acceptance test. Acceptance testing shall be done in accordance with the requirements of NFPA 20.

913.5.2 Generator sets. Engine generator sets supplying emergency or standby power to fire pump assemblies shall be periodically tested in accordance with NFPA 110.

913.5.3 Transfer switches. Automatic transfer switches shall be periodically tested in accordance with NFPA 110.

913.5.4 Pump room environmental conditions. Tests of pump room environmental conditions, including heating, ventilation and illumination shall be made to ensure proper manual or automatic operation of the associated equipment.

Section 3.4 - Fire Suppression System Plan Submittal Requirements

Automatic Extinguishing Systems

(Fixed-Pipe Kitchen Systems, Paint Spray Booths, etc.)

The following information must be submitted to and approved by the Winston-Salem Fire Department prior to any installation per Section 901.2 of the North Carolina State Fire Prevention Code and the Winston-Salem Fire Marshal's Office:

1. Submit ONE set of plans to plans@cityofwsfire.org, or mail to: Winston-Salem Fire Department Plans Review Bryce A. Stuart Municipal Building Suite 328 100 East First Street Winston-Salem, NC 27101 2. Provide a cover letter with the following information:
   a. Project name and complete project address
   b. Installation company name and address
   c. Contact name, phone number, fax number and email address
   d. W-S building permit number (if applicable)
3. Payment of the plan review fee of $120.00; checks must be made payable to “City of Winston-Salem.”
4. Payment can also be made electronically at www.cityofwsfire.org. (On the Winston-Salem Fire Department home page click on "Pay Fire Dept. Permit Fees and Citations online"). Visa, MasterCard and Discover cards are accepted.
5. The check-off list that must be submitted with automatic extinguishing system plans can be found at the end of this document.

6. A scaled and detailed floor plan with the system designer indicated and the date of design. The preferable scale is 1/8 inch and the scale must be clearly indicated on the plans. An elevation view must also be included.

7. The type of system being installed including the manufacturer’s model number, UL listing date and total flow points available.

8. The installer’s name, certification, and date of the last manufacturer's training school attended; also include a copy of your certificate.

9. Clearly indicate all of the systems components including a piping diagram.

10. Number and dimensions of all exhaust ducts including the location, number, and height of all protection nozzles.

11. Number and dimensions of all plenums including the location, number, and height of all protection nozzles.

12. Number, description, and dimensions of all appliances being protected including the location, number, and height of all protection nozzles.

13. Number, location, and temperature rating of all detection devices.

14. Number and location of all manual activation devices.

15. Four-page information form (available on our website)

16. Type of fuel being utilized and type of shutoffs provided.

17. Location, type, and size of all portable fire extinguishers.

18. The method of annunciation must be indicated (must activate building fire alarm system, if present)

19. Booth specifications and UL Listing information if applicable.

20. Ventilation specifications and CFM calculations if applicable.

21. Make-up air system shall shut down when the system activates.

Codes used in the review process:
North Carolina State Fire Prevention
North Carolina State Building
North Carolina State Mechanical
Manufacturer’s Requirements / Manual
Applicable National Fire Protection Association Standards

NOTE – Additional information may be required prior to approval of the submitted plans. The above requested information is not all-inclusive.
Spray Booths

The following information must be submitted to and approved by the Winston-Salem Fire Department Fire Code Official prior to any installation:

1. Submit **ONE** set of plans to plans@cityofwsofire.org or mail to:
   Winston-Salem Fire Department Plans Review
   Bryce A. Stuart Municipal Building
   Suite 328
   100 East First Street
   Winston-Salem, NC 27101

2. Provide a cover letter with the following information:
   a. Project name and complete project address
   b. Installation company name and address
   c. Contact name, phone number, fax number and email address
   d. W-S building permit number (if applicable)

3. A scaled and detailed floor plan with the architect/designer indicated and the date of the design. The preferable scale is 1/8 inch and the scale must be clearly indicated on the plans. An elevation view must also be included.

4. If the booth is pre-engineered, submit all manufacturer’s documentation including specifications and UL listing information.

5. The installer’s name, certification, and date of the last manufacturer’s training school attended; also include a copy of the certificate

6. Construction of the spray booth must comply with Section 1504.3.2 of the North Carolina State Fire Code and applicable provisions of NFPA 33.

Spray Booth Fire Protection

Spray booths shall be protected by an **approved** automatic fire-extinguishing system complying with Chapter 9 of the North Carolina State Fire Code. Protection shall also extend to exhaust plenums, exhaust ducts and both sides of dry filters when such filters are used.

The checklist that must be submitted with automatic extinguishing system plans can be found at the end of this document.
Chapter 4 - High-Rise Construction Plan Review Submittal Requirements

High-rise buildings present the fire department with numerous challenges to fire and life safety during fire/EMS/natural disaster and other types of emergency response incidents. Therefore, it is imperative that all Fire and Building Code requirements for fire and life safety systems, devices and construction types be met during the construction of high-rise buildings.

The North Carolina Building Code (NCBC), provides requirements for commercial construction. The NCBC establishes minimum standards for high-rise construction. The North Carolina Fire Code (NCFC) provides minimum standards for the installation of fire and life safety systems and/or devices to be installed in commercial and residential structures.

The items listed below are the minimum requirements for high-rise construction plans submitted for review, site preparation, building construction and fire protection system installation.

**Fire Sprinkler Systems**

1. Fire sprinkler systems shall be installed per Chapter 9 of the NCFC, Section 403.2 of the NCBC and NFPA Standards 13, 13-R and 25.
2. Fire Department Connections (FDCs) shall be placed at a location accessible to the Fire Department as determined by the Fire Code Official and shall consist of one Storz 4” x 4” coupling with a 30-degree downturn.
3. FDCs shall be marked with a sign indicating the system(s) they serve and signage shall meet the specification outlined in this manual.
4. Valves controlling water supply to fire sprinkler, standpipe and other types of fire suppression systems shall have electronic tamper switches installed. All tamper switches shall be connected and monitored by the building’s fire alarm system.
5. Any valves kept in a normally closed position shall be labeled with a sign meeting specifications in this manual indicating "Valve Normally Closed:"
6. Water flow, tamper and other fire suppression switches, sensors, devices and other appliances shall be zoned and/or addressed to indicate a distinct signal and location to the fire alarm panel.
7. Fire pumps and associated controller devices shall be installed per Chapter 9 of the NCFC and NFPA Standard 20.
8. If an electric fire pump is installed, the pump, controller and all other associated equipment shall be connected to the building’s standby power, light and emergency system. Activation shall be in accordance with the requirements of Section 604 of the NCFC, Article 695 of the National Electric Code and Section 403.10 of the NCBC.
9. If a water tank is installed to meet the water supply requirements of NFPA Standard 22 and NCFC Section 508, plans shall specify tank design, tank installation and a site plan indicating the tank’s installation location. Water tank level shall be monitored by the fire alarm system and a supervisory signal shall be activated upon the water tank reaching a low level indication. Water tank filling shall be accomplished by automatic means and if the means is controlled by electronic means, the electronic devices shall be supervised.

- As required by NFPA 13 as referenced by the Fire Code, a sprinkler head(s) shall be installed in all hydraulic elevator pit areas.
- All construction documents shall be submitted in paper or electronic format.

Fire Standpipe Systems

1. Fire standpipe systems shall be installed as per Chapter 9 of the NCFC, Section 905 of the NCBC and NFPA Standards 14, and 25.
2. All standpipe connections shall be installed at an approved level to the floor they serve. Connections shall be 2½” Winston-Salem Thread and have a metal cap placed to protect the threads. The installation height of the standpipe connection shall be determined by the Fire Code Official. Piping at the connection shall be painted red in color to a length determined by the Fire Code Official.
3. Fire department connections (FDC) shall be installed as per NCFC Code Section 912 at a location accessible to the Winston-Salem Fire Department determined by the Fire Code Official.
4. FDCs shall be marked with a sign indicating the system(s) they serve and signage shall meet the specifications outlined in this manual.
5. All valves controlling water supply to fire sprinkler, standpipe and other types of fire suppression systems shall have electronic tamper switches installed. All tamper switches shall be connected to and monitored by the building’s fire alarm system.
6. Any valves normally closed shall be labeled with a sign indicating “Valve Normally Closed”.
7. Water flow, tamper and other fire suppression switches, sensors, devices and other appliances shall be zoned and/or addressed to indicate a distinct signal and location to the fire alarm panel.
8. Fire pumps and associated controller devices shall be installed per Chapter 9 of the NCFC and NFPA Standard 25.
9. If an electric fire pump is installed, the pump, controller and all other associated equipment shall be connected to the building’s standby power, light and emergency system. Activation shall be in accordance with the requirements of Section 604 of the NCFC, Article 695 of the National Electrical Code and 403.10 of the NCBC.
10. If a water tank is installed to meet the water supply requirements of NFPA Standard 22 and NCFC Section 903.3.5.2, plans shall specify tank design, tank installation and a site plan indicating the tank’s installation location. Water tank level shall be monitored by the fire alarm system and a supervisory signal shall be activated upon the water tank reaching a low level indication. Water tank filling shall be accomplished by automatic means and if the means is controlled by electronic means, the electronic devices shall be supervised.
11. All construction documents shall be submitted in paper or electronic format.
Fire Alarm/Voice Communication/2-Way Communication Systems

1. Fire Alarm Systems shall be installed as per Chapter 9 of the North Carolina State Fire Code, Section 907 of the North Carolina State Building Code and NFPA Standard 72.

2. Water flow, tamper and other fire suppression switches, sensors, devices and other appliances shall be zoned and/or addressed to indicate a distinct signal and location to the fire alarm panel. Zone maps shall be installed on the final inspection.

3. If a Smoke Control System is installed, all plans shall detail the operational sequence and integration with the fire alarm.

4. Plans shall detail the building’s HVAC shutdown and fire damper sequence in the event of fire alarm activation. All HVAC smoke detectors, upon activation, shall initiate a supervisory signal to the building’s fire alarm system. A remote annunciator shall be installed at all HVAC smoke detector locations. The remote annunciator shall indicate an alarm condition and be capable of resetting the detector.

5. All HVAC air handling devices shall be numbered with a 6-inch number indicating the unit’s system it controls.

6. A firefighter 2-way phone system shall be installed at locations approved by the Fire Code Official and as required by Section 907.2.13.2 of the NCFC.

7. Plans shall indicate all fire alarm system detection and notification device locations. All notification devices shall be installed to the requirements of the current code. All devices shall be labeled with a label indicating the devices’ zone number and/or “address”.

8. A Fire Alarm Remote Annunciator Panel shall be installed at the main entrance lobby doorway. The location shall be determined by the Fire Code Official and indicated on the submitted plans.

9. An Emergency Voice/Communication Alarm System, which is also allowed to serve as a public address system, shall be installed as per Section 907.6.2.2 of the NCFC. A script and/or recording of the intended Voice/ Communication Alarm message shall be submitted at the time of plan submittal.

10. Multiple languages can be required by the Fire Code Official, if necessary.

11. If monitorable single station smoke alarms are installed in tenant rooms, activation of the devices shall indicate a trouble alarm at a constantly attended location within the facility.

12. All Mag-Lock devices, components and systems shall be connected to the fire alarm and de-energize upon fire alarm activation. Plans shall indicate Mag-Lock locations and integration with the fire alarm system.

13. Plans for all locking devices, including but not limited to access control and mag-locking devices must be submitted to the Building Inspections Department. The Fire Code Official’s Office will be part of the review process.

14. Locking devices are not allowed on the inside of interior exit stairwell doors in five-, six- or seven-story buildings unless it meets high-rise requirements.

15. All fire protection systems and alarms shall be monitored by an approved central station or other approved means as detailed by NFPA Standard 72.

16. A passive repeater may be installed in the building within the City of Winston-Salem.

17. All construction documents shall be submitted in paper or electronic format.
Fire Command Center

1. A Fire Command Center shall be constructed in the building as required by NCFC Section 508. As per Code, the Fire Command Center shall have the following minimum items installed:

   - The emergency voice/alarm communication system unit.
   - The fire department communications system.
   - Fire-detection and alarm system annunciator system.
   - Annunciator visually indicating the location of the elevators and whether they are operational.
   - Status indicators and controls for HVAC air-handling systems.
   - The fire-fighter's control panel required by Section 909.16 for smoke control systems installed in the building.
   - Controls for unlocking stairway doors simultaneously.
   - Sprinkler valve and water-flow detector display panels.
   - Emergency and standby power status indicators.
   - A telephone for fire department use with controlled access to the public telephone system.
   - Fire pump status indicators.
   - Schematic building plans indicating the typical floor plan and detailing the building core, means of egress, fire protection systems and associated devices, fire-fighting equipment and fire department access.
   - A worktable shall be available (Minimum Size 4’X4’).
   - Generator supervision devices, manual start and transfer features.
   - Public address system, where specifically required by other sections of this code.

2. Provisions shall also be made to unlock and raise any overhead and sliding fire doors from the Fire Command Center. The method used shall be approved by the Fire Code Official.

   - A minimum of 5 elevator car door and 5 firefighter service elevator keys shall be placed the Fire Command Center.
   - All Fire Command Center, Fire Control Room and Fire Pump Rooms shall be accessible through an approved location.
   - All Fire Command Center, Fire Control Room, Fire Protection System Rooms shall have a sign meeting specifications outlined in this manual installed on the doors of the rooms.

Elevators

1. Elevators shall be specified and installed in accordance with ASME A17.1, NCFC Section 607 and the NCBC.
2. Plans shall indicate the designated elevator recall floor and the alternate recall floor.
3. Indicate the owner’s numbering system for elevators with appropriate sign specifications for all required signs. All signs shall meet the requirements of North Carolina State Fire Code Section 607.2
4. Show pressurization, ventilation, and smoke control of elevator hoistways.
5. Smoke detection shall be installed in all elevator lobbies and control equipment rooms.
6. A sprinkler head(s) shall be installed in all hydraulic elevator pit areas.
7. Plans shall indicate elevator operation while the building is on emergency and standby power.
8. A minimum 3A:40B:C fire extinguisher shall be installed in all elevator equipment control rooms.
9. A minimum of 5 elevator car door and 5 firefighter service elevator keys shall be placed in the master key box in the Fire Command Center.
10. Additions or modifications to entrances or doors will require approval or labeling by a testing laboratory before they will be acceptable.

Standby Power, Light and Emergency Systems

1. Building services, systems and fire protection elements required to have Emergency and Standby Power Systems shall be installed to meet the requirements listed in North Carolina State Fire Code Section 604, NEC, and the NCBC.
2. Describe the Emergency and Standby Power System operational sequence for buildings with an atrium and for high-rise structures.
3. Detail the size, location and type of generator intended for the installation. Generator and fuel tank locations shall be detailed on the Building Site Plan.
   - Indicate operational emergency power system provided for: Elevator car lighting and operation.
   - Exit signs and illumination.
   - Fire alarm and smoke control system
4. Submit an emergency operational plan, which will be approved prior to issuance of a Certificate of Occupancy.

Smoke Control System

Smoke control systems shall be installed as per NCFC Section 909, North Carolina State Building Code and all other associated requirements. Mechanical Smoke Control System requirements are detailed in this manual.

Evacuation and Safety Plan

1. Fire safety and evacuation plans shall be developed by the building owner, current tenant and/or lessee. Plans shall be developed in accordance with North Carolina State Fire Code, Section 404. All plans shall be written and available for review by the facility employees, tenants and Fire/Law Enforcement/EMS personnel. Assistance with the development of these plans is available if needed.
2. Evacuation plans shall be legible, provide an overhead view and indicate two paths of travel to an exit from the area and/or room in which they are posted. Two copies of the emergency plan shall be submitted to the Fire Code Official for approval prior to final inspections and acceptance testing.

3. Evacuation Plans shall be posted in each tenant room, residential space, conference and/or meeting room, break room, stairwell and at prominent locations on each floor in the building. All locations shall be approved by the Fire Official at the time of inspection. The Fire Official may designate additional locations based upon need.

4. After the certificate of occupancy, evacuation drills shall be conducted for all employees of the building and documentation shall be provided to the Fire Code Official upon request. Evacuation Drills shall be conducted in accordance with the Section 405 of the North Carolina State Fire Code.

**Area of Rescue Assistance (ARA)**

Area of rescue assistance shall be installed in accordance with NCBC and all other associated requirements. Area of rescue assistance requirements are detailed on page 24 of this manual.

**Acceptance Testing**

All building services, systems and fire protection equipment shall be tested in accordance with the applicable Standard, Code or reference governing the service, system or fire protection equipment prior to approval and a CO being issued.

The provisions of this section are applicable to high rise structures constructed in the City of Winston-Salem. All other sections of this manual should be consulted to ensure Code compliance.
Chapter 5 - Mechanical Smoke Control System Plan Submittal Requirements

Section 909 of the 2012 North Carolina State Fire Code, establishes minimum standards for Mechanical Smoke Control Systems (MSCS) in buildings and/or structures governed by the North Carolina Building, Electrical and Mechanical Codes.

No work is permitted without approved plans. Section 901.2 of the Fire Code requires Construction Documentation and Calculations to be submitted and approved prior to the installation of Fire Protection Systems. The items listed below are the requirements for smoke control system plans submitted for review:

Design Criteria
1. What design method was used to determine system requirements?
2. Is any portion of building HVAC system used in Smoke Control?
3. Is any portion of MSCS normally used by building HVAC system?
4. Provide a note indicating the effect the HVAC system will have on the Smoke Control System. Include all permutations of system status.

Calculations
1. Plans and documentation shall show calculations for the appropriate design method for Smoke Barrier, Pressurization or Airflow (NCFC 909.5, 909.6, 909.7)
2. Plans and documentation shall show calculations for the design fire

System Components
1. Detail all fan and fan motor types, including listing manufacturer, model, belts, etc
2. Include fan motor details (Including fan performance curves)
3. Location of all fans, ductwork, inlets and outlets on a scaled floor plan

Duct and Dampers
1. Duct materials, manufacturer, listing, test report for leak testing, etc. Including details on duct construction (No flexible duct permitted except for vibration control)
2. Include details on method of duct attachment. Ductwork shall be directly attached to fire-resistant structural members by approved noncombustible hangers.
3. Details on Automatic Dampers, including listing, manufacturer, model, etc
4. Include details on Automatic Damper Operation

Power Supply System
1. Standby power is required for all atrium smoke control systems
2. Power transfer shall occur within 60 seconds of power failure
3. Standby power and transfer switches and associated equipment shall be located in a separate room
4. The room shall be a 1-hour-rated enclosure ventilated directly to and from the exterior
5. The room door shall be labeled with a sign reading “Smoke Control System” meeting the specifications listed in the manual.
Detection System
1. A detail of the smoke detection system shall be shown, including positive confirmation of actuation, override and system failure
2. All wiring (conductors) shall be fully enclosed in raceway and protected from sharp edges or other forms of damage
3. All junctions, access and terminations shall be clearly marked and identified from the exterior of the junction or terminal box

Control Air Tubing
1. All air roll tubing shall be sized to meet the intended system response time
2. All control tubing materials shall be listed and approved
3. All tubing shall be pressure tested for leakage by an approved method
4. All control tubing serving the smoke control system shall be isolated by automatic isolator valves or shall be an independent system

Firefighter Control Panel (FCP)
1. Panel shall be installed in an approved location. Mounting height, panel layout and location shall be approved by the Fire Code Official.
2. Fans, major ducts and dampers shall be shown on a drawing located at the FCP. The drawing shall indicate the system's connection to respective ducts with clear indication of direction of airflow
3. Provisions for manual control and override of automatic controls such as automatic fire doors shall be provided and marked in an approved manner.
4. Plan shall graphically depict the building and smoke control system zones
5. The status of each zone shall be indicated by lamp and appropriate legend
6. Devices, switches and indicators shall bear plain English labels in 12-point Helvetica Bold or equivalent font
7. Indicator lamp color codes shall be approved by the Fire Code Official
8. Provision for testing of the pilot lamp on FCP shall be provided
9. Fault status shall be indicated by pulsing of function indicator lamp
10. Control actions and priorities shall be listed at the FCP

Control Diagrams
1. Diagrams showing the location of all devices in system, location and function shall be maintained as current and kept on-site (noted on a drawing or plan at the FCP location)

Acceptance Testing
1. System component operational and acceptance testing shall be conducted and response times documented prior to system approval as per IFC 909.20.6.3
2. An acceptance testing report shall be provided to the Fire Code Official upon completion.

All construction documents shall be submitted in paper or electronic format.
The North Carolina Building Code requires buildings with certain types of exit configurations to have Area of Rescue Assistance (ARA). Location and construction of ARAs shall be in accordance with the North Carolina Building Code. Plans shall be submitted to the Building Inspections Department and submittals shall include the following:

1. If ARAs are required, plans shall indicate proposed location and construction of Areas of Rescue Assistance including wall hourly ratings.
2. When required, an approved 2-way intercom system meeting the requirements of the Code shall be installed at all ARA locations.
3. Submittals shall include specification and cut sheets of all proposed communication devices. Plans shall also indicate ARA Intercom locations and installation heights.
4. A transmitter/receiver master intercom shall be installed at the building’s primary entrance or at a constantly attended location approved by the Fire Code Official.
5. The master intercom panel shall be labeled with each ARA intercom location. Each ARA station shall be labeled with the ARA’s Location and number (Ex. Stairwell #1-ARA).
6. Installation height and location of all communication devices shall be approved by the Fire Code Official.
7. The 2-way communication system shall have an independent source of power and when required, shall be connected to the building’s standby power, light and emergency system.
8. An instructional sign meeting the requirements of Section 6.3.2.5.2 of the NC Accessibility Code shall be posted at all ARAs. Submittal shall include ARA Sign Specifications.
9. All construction documents shall be submitted in paper or electronic format.
Chapter 7 – Above and Below Ground Tanks

For above and below ground tank installation (including generator base and day tanks), the following information must be submitted to and approved by the Winston-Salem Fire Department and the Winston-Salem/Forsyth County Building/Zoning Inspections Department, *(Building Permit Must Be Obtained)* prior to any installation per section 901.2 of the North Carolina State Fire Prevention Code and the Winston-Salem Fire Official’s office:

1. Submit **one** set of plans to plans@cityofwsfire.org or mailed to:
   Winston-Salem Fire Department Plans Review
   Bryce A. Stuart Municipal Building
   Suite 328, 100 East First Street, Winston-Salem, NC 27101

2. Provide a cover letter with the following information:
   - Project name and complete project address
   - Installation company name and address
   - Contact name, phone and fax numbers and email address
   - W-S building permit number

3. Payment of the plan review fee of $200.00. Payment may be made by cash or check made payable to “City of Winston-Salem” or by credit/debit card at www.cityofwsfire.org MasterCard, Visa and Discover are accepted.

4. Two sets of scaled and detailed plans with the system designer indicated and the date of design. All plans must be sealed by a North Carolina registered Professional Engineer (PE). At the discretion of the Fire Official, the PE seal requirement may be waived for simplistic systems of 300 gallons capacity or less. *(These plans must be submitted to and approved by the Winston-Salem/Forsyth County Zoning Inspector prior to the Fire Department review.)*

5. The method of storage must be indicated.

6. The method of dispensing must be indicated.

7. The quantities and types of materials to be stored must be indicated.

8. The distances from other tanks, dispensers, property lines, and buildings must be indicated.

9. Vehicle access and all type and number of collision barriers must be indicated.

10. All fire appliances must be indicated. This includes the location, type, and size of all portable fire extinguishers.

11. The design and construction of the tank.

12. The UL Listing of the tank, dispenser and related equipment.

13. Tank supports and seismic design of the supports including bedding to be used for underground tanks.

14. All secondary containment and leak detection.

15. All normal and emergency tank venting.


17. All emergency controls.
18. All overfill prevention.
19. All signage to be used including emergency directions and normal operating instructions.

**Codes used in the review process:**
North Carolina State Fire Prevention
Applicable National Fire Protection Association Standards

NOTE – Additional information may be required prior to approval of the submitted plans. The above requested information is not all-inclusive.
8.1 - Building permit and fire code requirements:

As per North Carolina Administrative Code Sections 106.2 and 106.3, all buildings to be up-fitted shall meet all volumes of the current North Carolina Building Code. All buildings to be up-fitted shall meet the fire alarm requirements as referenced by the Building and/or Fire Code.

The change of use of a building requires the building to be re-evaluated for the proposed use and how it will affect the components of the building such as, but not limited to, exiting, fire protection systems, occupancy load, etc. The Building Inspections office offers a “Change of Use” inspection to have your property evaluated by all of the different trades/inspectors to see if the change is feasible or not due to cost and/or efforts. This is typically the best route to take before the process begins.

No one is allowed to move in or occupy a building that involves the change of use without first obtaining a permit from the Building Inspections Office.

Up-fit plans shall be submitted and a building permit obtained prior to any occupancy and/or work being commenced on the building. All required inspections of the Building Code shall be performed and a Certificate of Compliance will be obtained prior to the building being occupied.

Some highlights of the requirements of the current code are as follows:

1. Any existing fire alarm systems shall be upgraded to meet the edition of NFPA 72 as referenced in the current NCFC;
2. Pull stations shall be located at each marked exit door (Exception: A single pull station is required if the building is fully sprinklered.);
3. Combination horn/ strobe signaling devices shall be placed throughout the entire building. The required number depends on the building layout and occupants’ ability to hear the fire alarm. Strobe-only devices are permitted where ambient noise levels make it impossible to hear the fire alarm or in bathroom facilities;
4. Smoke detectors shall be installed in the elevator lobby and at the alarm panel;
5. The initiation of the fire alarm shall distinguish on the alarm panel which device and/or zone (detector, pull station or sprinkler system) has been activated;
6. The fire alarm system shall be supervised and monitored in accordance with the Building Code;
7. A Knox Box shall be installed on each building with keys that access all parts of the building and include elevator keys when applicable.
8. Fire extinguishers are required to be installed in all buildings, the appropriate type and number required will depend upon the use of the building; the minimum rating of fire extinguishers shall be 3A:40B:C (10 pound).
9. The appropriate number of emergency exits and rated emergency exit corridors shall be installed as required by the Building Code.
10 Emergency lighting fixtures shall be installed in all buildings as required by the Fire Code;
11 The appropriate type and number of self-illuminated emergency exit signs shall be installed in all buildings as required by the North Carolina State Fire Code. Interior and exterior emergency lighting may also be required;
13 A building permit must be obtained and approved prior to the commencement of any new construction, demolition, and/or installation of any fire protection devices;
14 If a building is to be used for storage, the commodity classification of the materials to be stored shall be determined prior to the issuance of the building permit;
15 Based on the commodity classification the existing sprinkler may have to be up-fitted to meet the appropriate sprinkler density required by the code;
16 If installed, sprinkler system protection shall be extended to the spray booths, ovens or any other areas inhibiting the ability of the existing system to operate as designed.
17 If installed, spray booth operation shall be integrated with the fire alarm system;
18 All occupancy separation shall be as required by the Building Code;
19 The building’s electrical system shall be up-fitted to meet the Electrical Code;
20 All HVAC systems shall be installed to meet the Mechanical and Gas Codes;
21 All plumbing piping, fixtures and sewer piping shall be installed to meet the Plumbing Code;
22 All construction documents shall be submitted in paper or electronic formats.
Section 42-153 (a) (15) of the Winston-Salem Municipal Code:

It shall be prohibited for any person to stop, stand or park a vehicle, except when necessary to avoid conflict with other traffic or in compliance with law or the directions of a police officer or traffic control device, in any of the following places:

Within a public or private alley or driveway in such a manner as to obstruct the free passage of city fire and sanitation vehicles, where properly signposted. For purposes of this subsection, appropriate signs shall be posted at the discretion of the fire chief or assistant city manager/public works.

See the examples pictured below:
Fire Lane Pavement Marking Specification

Marking: All designated fire lanes shall be marked accordingly. The perimeter of the fire lanes shall be designated by the Fire Official. All stripes shall be 5" in width. The interior of this area shall be marked with 5" yellow stripes at 45 degree angles to the perimeter strip and be 4-feet on center. All Letters shall be 1' tall and have a 2" stroke.
Sign Specifications:

NO PARKING

FIRE LANE

$50 Fine

18"

12"

2' - 5'

7' Minimum

Face of Curb

Grade Level
Chapter 10 - Gated Community Gate Inspection

Plans and specifications for electric gate systems shall be submitted to Building Inspections and the Winston-Salem Fire Department for review and approval prior to installing or requesting a gate inspection. For review/permit questions please call 336-734-1290.

All gates limiting access will be required to provide emergency access controls for fire department entry. The best method is to install a key box at the gate that either is equipped with a switch (mechanical gates) inside of a key box or an approved padlock and chain for manual gates. Check with the Fire Code Official before installation.

The gates shall be designed so that the access roadway or turning radius of 55 feet shall not be obstructed by the operation of the gate. Minimum set back from the public streets shall be a distance determined by the Fire Code Official and allow the emergency vehicle the ability to safely operate the lock box or panel. Turning radius from the public street shall be 55 feet.

Clear width of the roadway shall be a minimum of twenty feet clear width on all entrances. Exit roadways shall be a minimum of sixteen feet clear width or larger on all exits, unless otherwise approved by the Fire Code Official.

Subdivisions may have a divided entrance and exit gates. The entrance side shall have a clearance of twenty feet clear width, the exit side sixteen feet clear width.

Operation at the gate shall be by preemption device (siren from emergency vehicle), key switch, access code or audible.

The lock box, or key switch must be a model approved by the Fire Code Official’s Office. Call 336-734-1290 for an order form.

Plans and device specifications shall be submitted to the Fire Code Official’s office for approval prior to installation.

Gates must fully open within 15 seconds of activation and remain in the open position until closed by operation of the electrical control device.

Battery backup for all motorized gates is required, unless the gate fail safe (open) in the event of a power failure.
Chapter 11 - Fire Protection Equipment and Room Identification Signs

The owner, contractor or person in charge of the building shall ensure that all required labels and room identification signs are installed and visible for fire and other emergencies that could impact the operations of his/her building/business. The following items should be designed and installed in compliance with the following.

11.1 - Fire Code - Interior Signs

In existing construction, the following signs, if required, shall be installed in accordance with the appropriate Code sections.

310.3 “NO SMOKING” Signs. The Fire Code Official is authorized to order the posting of “NO SMOKING” signs in a conspicuous location in each structure or location in which smoking is prohibited. The content, lettering, size, color and locations of required “NO SMOKING” signs shall be approved.

316 HAZARDS TO FIREFIGHTERS. Interior and exterior access to shaftways – doors, windows and other devices that open into a shaftway communicating between 2 or more floors shall be plainly marked with the words SHAFTWAY in red letters at least 6” high on a white background. Such warning signs shall be placed so as to be readily discernible.

509.1 FIRE PROTECTION EQUIPMENT ROOMS. Interior rooms that house fire protection equipment including but not limited to the following: Fire Alarm Control Panel, Sprinkler System Riser Room, Fire Command Center and Emergency Generators. These rooms shall have approved signs required to identify fire protection equipment and their location, and shall be constructed of durable materials, permanently installed and readily visible. These signs shall state the specific equipment inside as listed above. “FACP” for fire alarm control room. “RISER ROOM” for sprinkler riser rooms. “FIRE COMMAND CENTER” for rooms containing Fire Command Center telephones and associated equipment. “EMERGENCY GENERATOR” for rooms containing emergency generators and associated equipment. Rooms with multiple fire protection equipment installed shall be identified by “FIRE PROTECTION EQUIPMENT”.

All rooms shall be identified by a sign located on the exterior side of the door. It shall be installed with its horizontal centerline 5’ above the finished floor on the strike jamb/latch side of the door. If no wall space is available, then it shall be placed on the nearest wall adjacent to it or centered on the door face at 5’ above finished floor. Signs shall be red in color and have white 3-inch letters.
605.3.1 ELECTRICAL ROOMS. Rooms that contain any electrical equipment including but not limited to the following: electrical control panels, disconnects, transformers, feeder/branch circuit switchboards, electrical panel boards and troughs or other electrical control equipment. These rooms shall be marked with a plainly visible and legible sign stating “ELECTRICAL ROOM”.

606 MECHANICAL REFRIGERATION. Emergency control boxes shall be provided with a permanent label on the outside cover reading: FIRE DEPARTMENT USE ONLY-REFRIGERANT CONTROL BOX, and including the name of the refrigerant in the system.

607.2 ELEVATOR RECALL. Emergency signs shall have a pictorial sign of a standardized design posted adjacent to each elevator call station on all floors instructing occupants to use the exit stairways and not to use the elevators in case of fire. The sign shall read: IN FIRE EMERGENCY, DO NOT USE ELEVATOR. USE EXIT STAIRS.

608.7.1 STATIONARY LEAD-ACID BATTERY SYSTEMS. Doors into rooms containing these battery systems shall be provided with signs that state the room contains lead-acid battery systems, that the battery room contains energized electrical circuits and that the battery electrolyte solutions are corrosive liquids.

703.2.1 FIRE DOORS. If necessary, rated fire doors that are designed to be kept normally open shall read: FIRE DOOR-DO NOT BLOCK

If necessary, rated fire doors that are designed to be kept normally closed shall read FIRE DOOR-KEEP CLOSED

907.5.2.4 MANUAL FIRE ALARM BOXES. Where fire alarm systems are not monitored by a supervising station, an approved permanent sign shall be installed that reads: WHEN ALARM SOUNDS-CALL FIRE DEPARTMENT. Such signs shall be installed adjacent to each manual fire alarm box. Note: All new fire alarms are required to be monitored.

11.2 - Fire Code - Exterior Signs

505.1 ADDRESS. New and existing buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Numbers shall be Arabic or alphabetical letters and shall be a minimum of 6 inches high. A larger size is always better. Where access is by means of a private road and the building cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure.
912.2.2 FIRE DEPARTMENT CONNECTION. On existing buildings, wherever the fire department connection is not visible to approaching fire apparatus, the fire department connection shall be indicated by an approved sign mounted on the street front or on the side of the building. All signs shall be red in color and have 6-inch white letters reading “FDC” or an arrow indicating the location. All such signs shall be subject to the approval of the Fire Code Official.
11.3 - Fire Department Sign Templates:

FDC:

6"

1" Letter Stroke
Fire Sprinkler Riser Room Sign:

- Sign to be 4x20 inches in size and red in color with white reflective 3-inch letters
Carbon Dioxide Drink System Exterior Signs:

Exterior signs to be located adjacent to rear/side maintenance door.

NFPA 704 Sign to be 15x15 inches minimum with 4-inch numbers and/or symbols.

Numbers on sign will be determined by the Fire Official.

CO2 letters to be mounted on exterior tank fill connection protective door. CO2 Letters to be 3-inches in size (Subscript size for number 2 is optional). Letters shall contrast with background.
Fire Alarm Control Panel Room Sign:

1/2" Letter Stroke

Sign to be 4" in height, red in color with white reflective 3-inch letters.

Fire Suppression System Component Numbers:

Numbers to be 3-inches in height, contrasting in color and be placed on firing cabinet, hood (paint booth, etc) and at pull station(s). Each system shall be numbered separately.
Chapter 12 - Key Box Program

The Knox Box system used by the City of Winston-Salem Fire Department is a program designed to expedite entry and eliminate property damage caused by the forcible entry required for evaluation of an emergency situation, and allows the Fire Department to secure the building when leaving.

A key box is a highly secure, UL-listed, nearly impenetrable steel vault used for the storage of entry keys, and alarm panel or mechanical system keys for use by the Fire Department. The keys to access the Knox Boxes are located in locked boxes inside of the emergency response apparatus and are carried by district and new construction inspectors and cannot be duplicated.

The boxes are required for all newly-constructed buildings, major up fits and extended response times by key holders. The Winston-Salem Fire Department has used the Knox Box system for many years.

Please contact the Winston-Salem Fire Code Official’s office at (336) 734-1290 to obtain a Knox Box order form. A Fire Code Official’s authorized signature on the filled-out order form will be required before Knox will process the order.

Door stickers that come with the box should be placed on the main entrance door near the locking device. Additional stickers can be obtained if necessary.
IMPORTANT

YOUR KNOX BOX SHALL BE INSTALLED AS DESIGNATED ON YOUR FIRE DEPARTMENT APPROVED PLANS. IF THE LOCATION OF THE KNOX BOX IS NOT INDICATED ON THE APPROVED PLANS, HAVE THE FIRE CODE OFFICIAL APPROVE THE LOCATION PRIOR TO INSTALLATION. THIS CAN BE DONE AT THE TIME OF THE FINAL INSPECTION.

THE KNOX BOX SHALL BE INSTALLED BETWEEN 4 to 5 FEET FROM THE GROUND UNLESS OTHERWISE APPROVED BY THE FIRE CODE OFFICIAL. THE KNOX BOX SHALL NOT BE BLOCKED FROM PLAIN VIEW BY ANY OBSTRUCTIONS (LANDSCAPING, ETC.).

IF YOU ARE UNSURE OR HAVE QUESTIONS, CALL 336-734-1290 PRIOR TO INSTALLING THE KNOX BOX.

ONCE THE KNOX BOX IS MOUNTED AND YOU ARE READY TO LOCK THE KEY IN, CALL 336-734-1290 TO REQUEST A FIRE CODE OFFICIAL TO COME PUT THE KEY IN THE KNOX BOX AND LOCK IT.

CALL 336-734-1290 TO OBTAIN KEY BOX FORMS
**Chapter 13 – City of Winston-Salem Adopted Fees, Rates and Charges**

**Plans Review/Inspection Fees/Permit Fees**

<table>
<thead>
<tr>
<th>Plan Type</th>
<th>Fee*</th>
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<tbody>
<tr>
<td>Fire Sprinkler</td>
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<tr>
<td>Fire Alarm</td>
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<tr>
<td>Extinguishing System</td>
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<tr>
<td>Storage Tank Installation</td>
<td>$200.00</td>
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<tr>
<td>Performance Tests</td>
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*Fee must be paid at time of submission

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<thead>
<tr>
<th>Permit Type</th>
<th>Application Fee**</th>
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<tbody>
<tr>
<td>Foster Home, Adoption, Adult Care, Group Home, Residential Care Home, AFL etc.</td>
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<tr>
<td>Day Care</td>
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<td>Tents</td>
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<td>Cooking Events</td>
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<td>Blasting Operation</td>
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<td>ABC License Application Inspection</td>
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<td>Gasoline-Powered Equipment in Building</td>
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<tr>
<td>Open Flame Producing Device</td>
<td>$100.00</td>
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<tr>
<td>Bonfire/Open Burning</td>
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<tr>
<td>Haunted Houses</td>
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<tr>
<td>Flammable or Combustible Liquid Tank Removal/Abandonment</td>
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</tr>
<tr>
<td>Pyrotechnics Display ***</td>
<td>$100.00</td>
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**Fee must be paid at time of application

*** In addition to the permit application fee listed above, Pyrotechnics Display permit requires a fire department standby, consisting of a Class A pumper staffed by state-certified Winston-Salem firefighters. The cost of this service is $250.00 for a minimum 2-hour period. After the initial 2-hour period, the cost is $250.00 for the next 2-hour period or portion thereof, etc.

If you have any questions about plans submissions or the fee schedule, please contact us at 336-734-1290 or 336-773-7900.
City of Winston-Salem Permit Process
APPENDIX - Required Fire Inspections for New Construction and Up-fit Projects

The Winston-Salem Fire Department requires the following inspections be conducted on all new construction and applicable up-fit projects:

Underground Fire Line Inspection
Underground Flush
Rough In Fire Sprinkler Piping Inspection
Final Fire Sprinkler Inspection
Final Fire Alarm Inspection
Fixed Pipe Extinguishing System Final Inspection
Final Fire Building & Site Inspection
Lock Keys in Knox Box
Gated Community Inspection
Fire Hydrant (New Subdivisions and Projects)
Tank Installation and all components

All inspections must be requested by the installing contractor and be made at least 24 (twenty-four) hours in advance of the inspection date. The contractor must provide all equipment and materials to conduct the inspection and/or test.

PLEASE PRE-TEST ALL SYSTEMS TO BE SURE THEY ARE FUNCTIONING PROPERLY
APPENDIX A - Underground Fire Line and FDC Inspection and Flush

Fire department jurisdiction over underground piping installations pertains only to fire line water supply piping and the inspection authority begins at the termination of the back-flow prevention valves.

During a fire department underground fire line and FDC inspection and flush inspection, the Fire Code Official shall verify the following:

- Underground Contractor’s Material and Test Certificate. This Certificate shall be provided to the Fire Code Official prior to flush inspection. Flush inspection shall not be conducted without this documentation.

- Consult the approved plans and verify;
  - Size of piping.
  - Type of piping.
  - Depth of piping.
  - Proper pipe configuration of:
    - Thrust blocks (See next page for detail) and pipe bracing.
    - Protective wrap (polywrap) of piping. (Applies to ductile only.)
    - Direction changes.
    - Location of:
      - Backflow Device
        - Proper Size.
        - Correct Direction.
        - Monitored tamper switches installed on OS&Y control valves.
        - If in aboveground vaults (“hot box”), verify heater installed & operational.

- Verify fire department hose connection is installed in accordance with Section 2.3 of this manual.
- Verify all fire hydrants are installed in accordance with Section 2.2 of this manual.
- Verify all valves are open in the system (including fire hydrant sectional valves).
- Observe hydrostatic test of all piping at 150 psi for 2 hours or 50 psi in excess of system working pressure whichever is greater.
- Relieve pressure after hydrostatic test and confirm the test gauge returns to zero. (A gauge that does not return to zero could be an indication that the gauge was pegged.)
- Observe flushing of all piping with city water until clear.
APPENDIX B - Rough-In Fire Sprinkler Piping Instruction

1. The fire sprinkler contractor shall schedule rough-in inspection.
2. Consult the approved plans. Verify;
   a. Proper type of piping.
   b. Backflow device (if installed in building) for size, type, and direction.
   c. Confirm the installation of the piping does not have excessive change of directions that are not indicated on approved plans. (Excessive use of extra fittings, such as elbows may affect hydraulic calculations).
   d. Proper size of piping.
   e. All piping penetrations through fire-rated assemblies have been properly sealed by an approved method.
   f. Proper piping hangers and supports with correct spacing.
   g. Sway bracing is installed per NFPA Code requirements. Sway bracing is required at top of fire riser, turn of directions, and every forty feet on main piping only.
   h. Proper type and temperature of sprinkler heads.
   i. Proper clearance of sprinkler heads from obstructions.
   j. Check for correct distances between sprinkler heads, off of walls, maximum coverage per sprinkler heads, suspended ceilings and distance below roof deck.
   k. Check for installation of orifice in inspector’s test. (Orifice shall be the same size as the smallest orifice installed in the system.)
   l. Check to ensure fire sprinklers are not painted. Painted fire sprinklers shall be replaced, they shall not be cleaned.
   m. All control, auxiliary, and inspector’s test valves shall not be located more than seven feet above finish floor or grade.
   n. Minimum 12” x 36” Access panels shall be provided for all valves located inside a wall or concealed space. Signage shall be provided on the outside of access panel indicating type of valve that is concealed within.
3. The standpipe contractor shall provide all hose, gauges and associated equipment to perform all tests.
4. Observe hydrostatic test of all piping at 200 psi for 2 hours or 50 psi in excess of system working pressure whichever is greater. Testing shall include all FDC piping.
5. Relieve pressure after hydrostatic test and confirm the test gauge returns to zero. (A gauge that does not return to zero could be an indication that the gauge was pegged.)
6. Verify all signage is in place. (Examples: control valves, inspectors test, and main drain.)
7. Verify that spare sprinkler head cabinet is installed in an area that will not exceed 100 degrees Fahrenheit and has inside the correct number of spare sprinkler heads, sprinkler wrench, and NFPA 25.

8. Verify fire department hose connection is installed in accordance with Section 2.3 of this manual.
APPENDIX C - Final Fire Sprinkler Inspection

The fire sprinkler contractor shall schedule the inspection, if this is the only work taking place. If this is a final inspection for the project, the general contractor should schedule the inspection with the Fire Code Official and should then coordinate the subcontractors.

The fire sprinkler contractor shall provide an Aboveground Contractor Material and Test Certificate and a certification letter for each system installed. Final fire inspection shall not be conducted without this documentation.

Consult approved plans. Verify proper components are installed and functioning on the sprinkler system riser.
   a. Tamper switch
   b. Water flow switch

The standpipe contractor shall provide all hose, gauges and associated equipment to perform all tests.

Observe a main drain test and verify the residual pressure at the base of the riser meets or exceeds the required system demand pressure listed in the approved hydraulic calculations.
   a. Test shall be performed at peak water demand
   b. Test must flow for at least two minutes

Document static and residual pressures listed on the calculation plate.

Verify proper signage on riser components.
   a. Main drain
   b. Access panels shall be provided for all valves located inside a wall or concealed space
   c. Signage shall be provided on the outside of access panel indicating type of valve that is concealed within
   d. Control valve
   e. Inspectors test
   f. Hydraulic Calculation Plate (If sign is on a fire riser located outside or in an area exposed to corrosion then sign shall be metal and engraved or stamped.)
Verify that spare sprinkler head cabinet is installed in an area that will not exceed 100 degrees, contains the appropriate number of spare sprinklers, a sprinkler wrench, and NFPA 25.

Verify floor is sealed where riser penetrates the building.

Walk through building to verify:
  a. Proper placement, type, and temperature of sprinkler heads
  b. Sprinkler heads are free of obstructions by building elements (i.e. light fixtures, ceiling fans, decorations, etc.)
  c. Check to ensure fire sprinklers are not painted. Painted fire sprinklers shall be replaced, they shall not be cleaned.
  d. Check to ensure fire sprinkler escutcheons are properly installed.

Observe activation test of fire alarm notification appliances, including electric bell on fire sprinkler system water flow through inspector's test valve. Alarms shall activate in 60 seconds or less with the flow switch adjustment setting on or greater than “B”.

Document time alarms activated.
APPENDIX D - Rough-In Standpipe Piping Inspection

The standpipe contractor shall schedule the inspection.

Consult the approved plans. Verify:

a. Proper type of piping
b. Backflow device (if installed in building) for size, type, and direction
c. Confirm that installation of the piping does not have excessive change of directions that are not indicated on approved plans. (Excessive use of extra fittings, such as elbows may affect hydraulic calculations).
d. Proper size of piping
e. All piping penetrations through fire rated assemblies have been properly sealed by an approved method.
f. Proper piping hangers and supports with correct spacing
g. Sway bracing is installed per NFPA Code requirements. Sway bracing is required at top of fire riser, turn of directions, and every forty feet on main piping only.
h. Proper type of discharge outlets (2½, 1½ with caps) and Winston-Salem Hose threads (2-1/2 outlets only).

The standpipe contractor shall provide all hose, gauges and associated equipment to perform all tests

Observe hydrostatic test of all piping at 200 psi for 2 hours or 50 psi in excess of system working pressure whichever is greater. Testing shall include all FDC piping.

Relieve pressure after hydrostatic test and confirm the test gauge returns to zero. (A gauge that does not return to zero could be an indication that the gauge was pegged.)

Verify all signage is in place. (Examples: control valves, drains and main drain.)

Verify fire department hose connection is installed in accordance with Section 2.3 of this manual.
APPENDIX E - Final Standpipe Inspection

The standpipe contractor shall schedule the inspection if this is the only work taking place. If this is a final inspection for the project, the general contractor should schedule the inspection with the Fire Code Official and then coordinate with the subcontractors.

Standpipe contractor shall provide an Aboveground Contractor Material and Test Certificate and certification letter for each system installed. Final fire inspection shall not be conducted without this documentation.

Consult approved plans

Verify proper components are installed and functioning on the standpipe system:
   a. Tamper switch
   b. Water flow switch

The standpipe contractor shall provide all hose, gauges and associated equipment to perform all tests.

Test of manual standpipes:
   a. For a manual standpipe, a fire department pumper or portable pump of a capacity to provide required flow and pressure shall be used to verify the system design by pumping into the fire department connection.
   b. A flow test shall be conducted at each roof outlet to verify that the required pressure is available at the required flow.
   c. The maximum flow to be demonstrated from a single hose connection shall be (946 L/min) 250 gpm for a (65-mm) 2-inch connection and (379 L/min) 100 gpm for (40-mm) 1-inch connection with a minimum flow pressure of 100 PSI at the discharge valve.

Testing of automatic and semiautomatic-dry systems:
   a. Automatic- and semiautomatic-dry systems shall be tested by initiating a flow of water from the hydraulically most remote hose connection.
   b. The system shall deliver a minimum of (946 L/min) 250 gpm at the hose connection within 3 minutes of opening the hose valve with a minimum flow pressure of 100 PSI at the discharge valve.
   c. Each remote control device for operating a semiautomatic system shall be tested in accordance with the manufacturer's instructions.
Verify floor is sealed where riser penetrates the building.

All valves, pressure-regulating devices and associated equipment shall be tested to ensure proper working order. Pressure and gravity tanks shall be filled and tested for leakage and proper flow. Pumps shall be tested and deliver the system’s intended flow and pressure.

Observe activation test of fire alarm notification devices. Alarms shall activate in 60 seconds or less with the flow switch adjustment setting on or greater than “B”. Document time alarms activated.

All flow pressures including fire department pump pressures shall be documented.

The installing contractor shall provide the owner with the following:
1. All literature and instructions provided by the manufacturer describing the proper operation and maintenance of equipment and devices installed
APPENDIX F - Final Fire Alarm System Inspection

Provide NFPA 72 Record of Completion. Report shall be completed and faxed to Fire Code Official’s office at 336-727-2792 prior to scheduling final fire alarm inspection. Final fire inspection shall not be conducted without this documentation.

Consult approved plans. Verify the proper location and type of all fire alarm devices

Observe fire alarm system functional tests of all fire alarm devices, including duct detectors

Observe activation test of fire alarm notification appliances, including electric bell on fire sprinkler system water flow through inspector’s test valve. Alarms shall activate in 60 seconds or less with the flow switch adjustment setting on or greater than “B”.

Observe activation test of fire sprinkler control valve tamper switches. On activation of the tamper switch a supervisory signal shall be sent to the fire alarm control panel.

Observe activation test of fire alarm notification appliances on kitchen hood suppression system activation, if applicable.

Verify the following from all tests:
  a. Decibel levels shall be in compliance with the following section of the code:
     907.6.2.1.1 Average sound pressure. The audible alarm notification appliances shall provide a sound pressure level of 15 decibels (dBA) above the average ambient sound level or 5 dBA above the maximum sound level having a duration of at least 60 seconds, whichever is greater, in every occupiable space within the building. The minimum sound pressure levels shall be: 75 dBA in occupancies in Groups R and I-1; 90 dBA in mechanical equipment rooms; and 60 dBA in other occupancies.
  b. Verify proper voltage drop, if required.
  c. A listed circuit breaker lock shall be installed.
  d. Verify the proper size of the batteries.
  e. Verify duct detectors provide the following; HVAC unit shuts down on activation of the duct detector, upon activation of the duct detector, a supervisory alarm signal shall be sent to the fire alarm panel and a ceiling remote annunciator is installed with a LED provided at ceiling level that lights up when the duct detector is activated.
f. Observe a twenty-four stand by battery power test. Electrical breaker that provides power to the fire alarm control panel shall be turned off twenty-four hours prior to this test. At the end of the twenty-four hours an audible test shall be conducted for five minutes.

g. Verify that all signals are received at the fire alarm control panel.

h. Verify that all signals are received at the annunciator, if applicable.

i. Verify that all signals were received at the off-site monitoring agency.

Fire alarm Zone maps shall be located at each FACP and if necessary, at all remote annunciator locations. Maps shall include:

a. Floor plan of the occupancy being protected by the fire alarm.

b. All detection device locations.

c. Indicate type of detection device.

d. Indicate detection device zone assignment or “Address”.

e. The map shall be properly mounted to the wall and measures shall be taken to protect the map from damage or vandalism.
APPENDIX G - Automatic Extinguishing Systems
(Kitchen Hoods, Paint Spray Booths, etc.)

The kitchen hood suppression system contractor shall schedule inspection if this is the only work being done. If this is part of a larger project, the general contractor should schedule the inspection with Fire Code Official and then coordinate with the subcontractors.

Consult approved plans to verify the following:

a. Location of manual pull stations
b. Signage of manual pull stations
c. Location, size, and type of extinguishing agent
d. Proper pipe size
e. Proper pipe support
f. Proper nozzle type
g. Nozzle location
h. Observe air movement through all system nozzles
i. Observe test of fusible link
j. Observe activation of manual pull stations
k. Observe deactivation of all fuel sources under hood during all tests (electric and gas).
l. Observe deactivation of “make up air” on test activation of system (Exhaust air shall remain working.).
m. Observe activation of fire alarm notification appliances upon kitchen hood suppression system activation.

n. For kitchen hood extinguishing systems, verify proper placement of Class “K” fire extinguisher. Class “K” fire extinguisher shall be located within thirty feet of cooking equipment. **NOTE**: For paint spray booths, 3A40BC extinguishers are required.
o. Indicate total number of flow points per system and flow points used.
p. Verify 3-inch system numbers installed at pull station(s), firing cabinet and hood locations to coordinate system component locations.
q. If applicable, verify HVAC unit shut down.
r. In buildings without a fire alarm system, a horn/strobe shall be installed. Activation of the system shall activate the horn/strobe. The location of the horn/strobe shall be at the discretion of the Fire Official.
s. A sign reading “If Horn Activates, Call 911” shall be installed at the horn/strobe location.

The inspection should be scheduled to minimize disruption to the operating business.
APPENDIX H - Final Fire Building and Site Inspection

1. Verify building address size and location.
   a. 6" minimum (or comparable) letters/numbers; City Zoning also requires 6".
   b. Address characters shall be visible from street or road fronting the property and, if required, on all fire department approaches.

2. Verify proper location of Knox Box(es).
   a. Knox boxes shall be installed approximately sixty inches above finish grade.
   b. Keys to all doors and padlocks shall be placed inside Knox Box at final inspection.
   c. Call 336-734-1290 to lock up keys “every time” the locks are changed.

3. Verify the placement of fire extinguishers
   a. Verify correct type (Example: 3A:40B:C)
   b. Proper location. Fire extinguishers shall be installed for a maximum travel distance of 50 feet.
   c. All fire extinguishers shall be installed a maximum of five feet to the top of the fire extinguisher above finish floor or grade and shall be unobstructed from access or view. Provide signage as required.

4. Verify building door signage.
   a. Provide the letters “FACP” on all unobvious doors that give access to the fire alarm control panel. This can be accomplished with self-adhesive letters, stencil, or a sign with minimum three-inch high letters in contrast to the door colors.
   b. Provide the letters “RISER ROOM” on all doors that give access to the riser. This can be accomplished with self-adhesive letters, stencil, or a sign with minimum three-inch high letters in contrast to the door colors.
   c. Provide on the suite front doors the “SUITE NUMBER OR LETTER”. This can be accomplished with self-adhesive characters, stencil, or a sign with minimum 6-inch high characters in contrast to the door colors.
   d. Provide on the suite back or side doors the “SUITE NUMBER OR LETTER” and “BUILDING ADDRESS NUMBERS”. This can be accomplished with self-adhesive characters, stencil, or a sign with minimum 6-inch high characters in contrast to the door colors.

5. Verify fire lanes are appropriately marked.
   a. Where designated, fire lanes shall not be less than twenty (20) feet wide at any point, and curves and corners shall be wide enough to permit the passage or operation of all fire equipment owned by the city. The surface of the fire lanes shall be an all-weather surface and shall be of sufficient strength to support all firefighting apparatus used by the fire department (75,000 pounds).
b. All fire lanes and access roads must be maintained by the property owner, which includes painting pavement and placing permanent (NO PARKING FIRE LANE) signs.

c. Outlining or painting the fire lane on the roadway surfaces shall be done in red with white letters that read "NO PARKING -- FIRE LANE - " at fifty (50) foot intervals or as otherwise directed by the fire department.

d. Fire lanes shall be marked with permanent "NO PARKING FIRE LANE - $50 FINE" signs.

e. Signs shall be placed along the fire lane at intervals not to exceed two hundred (200) feet.

f. Signs shall measure twelve (12) by eighteen (18) inches; have red letters on a white reflective background.

g. Signs must be metal construction only, plastic or wooden signs are not acceptable.

h. The bottom of the sign should be seven (7) feet from grade.

i. The post should be at least 18" from the curb but not more than 24" from the curb.

j. The sign should be mounted at an approximate 45-degree angle.

k. The City will erect the signs on public right-of-way. Property owners are responsible for erecting signs on private property.

l. To be legally enforceable, the request for a fire lane must be submitted to the Fire Prevention Bureau for review and approval. The Police Department will also participate in the review.

m. Any NO PARKING – FIRE LANE sign posted without proper approval must be removed by the property owner.
APPENDIX I - Turning Performance of a Sutphen 252" WB Custom Chassis

OUTSIDE TURNING RADIUS:
(MEASURED TO THE CENTERLINE OF THE OUTSIDE TIRES)

INSIDE TURNING RADIUS:
(MEASURED TO THE CENTERLINE OF THE INSIDE TIRES)

CURB TO CURB TURNING RADIUS:
(CALCULATED FOR A 9.50 INCH CURB HEIGHT)

WALL TO WALL TURNING RADIUS:
(MEASURED USING AN AXLE TO BUMPER DIMENSION OF 77")

WALL TO WALL TURNING RADIUS:
(MEASURED USING AN AXLE TO BUMPER DIMENSION OF 85")

ITa = INSIDE WHEEL TURNING ANGLE
OTa = OUTSIDE WHEEL TURNING ANGLE
PC = DISTANCE BETWEEN KNUCKLE PIVOT CENTERS
MEASURED AT THE GROUND
DS = OFFSET DISTANCE FROM PC TO E OF TIRE
WB = WHEEL BASE
BA = BUMPER TO AXLE DIMENSION
CV = CAD WIDTH
V = VERTICAL DISTANCE FROM TURNING CENTER TO OUTSIDE PIVOT CENTER
R = KINGPIN SPACING = 69"
K = KINGPIN OFFSET = 5"
RS = ROLLING RADIUS OF TIRE = 20.3"
TV = TIRE WIDTH = 11"
C = CURB CONTACT LENGTH = 36"

WHERE:

ITa = INSIDE WHEEL TURNING ANGLE
OTa = OUTSIDE WHEEL TURNING ANGLE
PC = DISTANCE BETWEEN KNUCKLE PIVOT CENTERS
MEASURED AT THE GROUND
DS = OFFSET DISTANCE FROM PC TO E OF TIRE
WB = WHEEL BASE
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SUTPHEN CORPORATION
7000 COLUMBUS AVENUE, BLOOMINGTON, IN 47402

DRAWN BY: DSH
PRINTED BY DWA
DATE: 02-17-92
SCALE: 1/16
REVISION: A

SUTPHEN CUSTOM CHASSIS

252TR-1
OUTSIDE CURB TO CURB TURNING RADIUS
Input wheelbase? 190
Input front wheel INSIDE turn angle? 50
Input offset from kingpin to outside of wheel 12.35

Turn radius is 28.88 ft.

WALL TO WALL TURNING RADIUS
Input wheelbase? 190
Input length of extension? 21
Input width of extension? 101
Input front wheel INSIDE turn angle? 50
Input radius at front corner? 12

Turn radius is 33.24 ft.
NFPA 72

Building Permit Number: ______________________

Project Name: ____________________________________________________________

Street Address: ____________________________________________________________

Plans Submitted By: (Contact Person) __________________________________________

Company Name: ____________________________________________________________

Street Address: ____________________________________________________________

City: State: Zip: ____________________________________________________________

Phone Number (include area code): _____________________________________________

Fax Number (include area code): _______________________________________________

Email Address: _____________________________________________________________

Building Owner/Tenant (Name): _______________________________________________

Building Owner/Tenant Contact Information: _________________________________
General:

New building, new fire alarm system     _____Yes     _____No
Existing building, new retrofit fire alarm system     _____Yes     _____No
Existing building, modifications to existing fire alarm     _____Yes     _____No
Other

Square footage of the project: __________________________________________

Construction type:
_____Fire Resistive   _____Non-Combustible   _____Ordinary
_____Heavy Timber   _____Wood Frame   _____Mixed

Is there storage over 12 ft?     _____Yes     _____No

Building use and occupancy classification:
Applicable Building Code          Edition
_____NFPA 72, National Fire Alarm Code   Edition
_____NFPA 70, National Electrical Code   Edition
Other

_____Fire Alarm System Required by Building or Fire Code
_____Fire Alarm System Required by Local Ordinances
_____Fire Alarm System Required for Equivalency, Alternative Level or Protection, etc.
_____Fire Alarm System Not Required, Property Owner Voluntary Safety Improvements
_____Other

Fire sprinkler occupancy hazard classification:
_____Light Hazard   _____Ordinary Hazard Group I
_____Ordinary Hazard Group II   _____Extra Hazard Group I
_____Extra Hazard Group II   _____Special Occupancy
_____Storage

Are there special occupancy requirements for the system?     _____Yes     _____No
(Flammable/Combustible Liquids, Aircraft Hangers, Oxidizers, etc.)
Commodity classification if this is a storage occupancy:

- Class I
- Class II
- Class III
- Class IV
- Group A
- Group B
- Group C

Special use and occupancy:

- Covered Mall Building:
  - Number of tenant spaces
  - Number of anchor stores

- High-Rise Building:
  - Levels above ground
  - Levels below ground

- Other

Multiple Mixed Use Building
Description of use groups or special use groups within mixed use buildings

Alarm System Type:

- Manual system
- Automatic smoke and fire detection
- Manual and automatic detection
- Addressable system
- Point addressable system
- Analog addressable system
- Conventional zone system
- Wireless system
- Initiating device circuit Class Style
- Signaling line circuit Class Style
- Notification appliance circuit Class Style
- Other

Alarm Signal:

- Pre-alarm notification signal
- Pre-recorded voice emergency notification
### Automatic Fire Alarm Systems Plan Review Checklist

**Page 4**

- Manual paging emergency notification
- Automatic visual alarm signal
- Other

### Alarm systems supervision - fire department notification:

- Central station system
- Remote station system
- Proprietary system
- Auxiliary system
- Other

### Name of monitoring station:

- Contact: ____________________________
- Address: ____________________________
- Phone: _____________________________  Fax: ____________________________
- Email: _____________________________

### Alarm annunciation, power equipment at premises:

- Fire alarm control panel: Location:__________________________
- Remote annunciator(s): Location:__________________________
- Graphic panel: Location:__________________________
- AC power source circuit breaker: Location:__________________________
- Emergency generator: Location:__________________________

### Fire alarm equipment description, product literature and specifications:

- Fire alarm control panel
- Remote annunciator
- Alarm, supervisory and trouble condition re-transmission equipment

#### Manual pull-box
- Single action
- Double action
- Protective cover
- Smoke detection
- Photoelectric
- Ionization
- Verification features
- Yes
- No
- Other features

#### Beam (type) smoke detection

#### Heat detection

#### Linear heat detection

#### HVAC duct smoke detection

#### Remote test devices
Automatic Fire Alarm Systems Plan Review Checklist

Page 5

_____ LED devices
_____ Notification (audible) devices
________ Signal tone
________ Speaker
________ Combination signal/speaker
_____ Notification (visual) devices
________ Wall mounted
________ Ceiling mounted
   Candela rating

_____ Exterior notification (audible-visual) devices
_____ Sprinkler water flow (vane type) switch
________ Adjustable retardant features
_____ Sprinkler water flow (pressure type) switch
_____ High-low water pressure switch
_____ High-low air pressure switch
_____ Sprinkler control value tamper switch
_____ Fire pump (system) controller supervision
________ Pump running
________ Loss of a/c power
________ Phase reversal
_____ Relays
_____ Control modules
_____ Standby batteries
_____ Power boosters
_____ Power supplies
_____ Voltage drop calculations
_____ Standby battery calculations
_____ Power supply calculations
_____ System wiring type
________ Plenum rated
________ Conduits
________ Fire rated
________ Other

Fire protection and life safety systems integration with fire alarm system:

_____ Automatic wet sprinkler
_____ Automatic dry pipe
_____ Automatic pre-action
_____ Automatic deluge
_____ Automatic standpipe
_____ Automatic sprinkler/standpipe supervision
_____ Municipal water supply supervision
_____ Private water supply supervision
_____ Fire pump
_____ Clean agent suppression
_____ Kitchen suppression
_____ Smoke control exhaust
_____ Smoke control stairway pressurization
_____ Door hold open release
_____ Delayed egress unlocking devices
_____ Elevator automatic recall
_____ HVAC equipment
_____ Emergency generator supervision
_____ Fire shutter hold open release devices
_____ Other
## Automatic Fire Alarm Systems Plan Review Checklist

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Plans, construction documents:

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<td>System integration features</td>
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<tr>
<td>Fire department communication</td>
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</tr>
</tbody>
</table>

Fire department communication system:

- Dedicated telephone
- Dedicated phone jacks and portable handsets
- Bi-directional antenna (repeater) system, fire department (portable) radios
- Other

System operation:

- Building occupant evacuation description provided
- Fire alarm system operational sequence description provided

Emergency response:

- Fire alarm control panel and annunciators located and accessible to emergency response personnel:
  - Building entry
  - Rear entry
  - Other
- Exterior notification devices located and visible to emergency response personnel
- Building access devices (keys/lock-box) provided, located and accessible to emergency response personnel
City of Winston-Salem, North Carolina
Fire Department - Fire Prevention Bureau
Automatic Extinguishing System Pre-Installation Information Data

Building Permit Number: ______________________

Project Name: ________________________________

Street Address: ______________________________

Plans Submitted By (Contact Person): ______________

Company Name: ______________________________

Street Address: ______________________________

City: State: Zip: ______________________________

Phone Number (include Area Code): ______________

Fax Number (include Area Code): ______________

Email Address: ________________________________

Building Owner/Tenant (Name): _____________________

Building Owner/Tenant Contact Information: ______________

Installer/Repairman: ______________________________

Certification: ________________________________

Hazard to be Protected: ______________________________
Automatic Extinguishing System Pre-Installation Information Data
Page 2

Exhaust Ducts:
   Number: ____________________________

   Description:__________________________________________________________

   Dimensions:___________________________________________________________

Hoods:
   Number: ____________________________

   Description:__________________________________________________________

   Dimensions:___________________________________________________________

Plenums:
   Number: ____________________________

   Description:__________________________________________________________

   Dimensions:___________________________________________________________

Type of Protection Equipment:__________________________________________

Name of Manufacturer:__________________________________________________

Underwriter’s Listing Date:______________________________________________

Manufacturer’s Training School Last Attended:______________________________

   Designer Name:___________________________ Date:_____________________

Type of Extinguishing Agent:___________________________________________

   Cylinder Size:______________________________________________________

Chemical Cylinder(s) Location (ambient temperature between 32 and 120 F):

   Location(s):_______________________________________________________
Detection, Fusible Link/Thermostat:

Location(s): ____________________________
Number: ________________________________
Temperature Rating: ______________________

Duct Nozzles:

Location(s): ____________________________
Number: ________________________________
Height: _________________________________

Plenum Nozzles:

Location(s): ____________________________
Number: ________________________________
Height: _________________________________

Appliance Nozzles:

Location(s): ____________________________
Number: ________________________________
Height: _________________________________

Type of Fuel Shut-offs (Electrical and/or Gas):

Type:
Manual Re-Set Switch? YES _______ NO _______
Gas Main Size: ____________________________

Manual Pull Stations:

   Number: ________________________________

   Location(s): ____________________________________________

Number of Portable Fire Extinguishers in Kitchen (min. 20BC): ____________________________

Cooking Appliances Requiring Protection:

   Description: ___________________________________________

   Dimensions: ____________________________________________

   Fuel Source(s): __________________________________________

Before placing the system in operation, the system must be tested and checked for proper operation of the control head(s) and attached auxiliary equipment.

   How will this be accomplished? ________________________________

   ________________________________

   ________________________________

Is your Company under contract to provide routine maintenance for the system?

   YES_______   NO_______

   If YES, what is the Service Frequency? ________________________________

   ________________________________

   ________________________________

- Electrical shut-off must be wired and checked before testing the system.
- Show Piping Diagram on Plans
- The hood must be approved by the Heating Inspector prior to scheduling a date/time to test the system.
City of Winston-Salem, North Carolina
Fire Department – Fire Prevention Bureau
Automatic Sprinkler Systems Plan Review Checklist

NFPA 13

Building Permit Number: _______________________________

Project Name: ________________________________________________________________________________

Street Address: ________________________________________________________________________________

Plans Submitted By: (Contact Person) __________________________________________________________________

Company Name: ________________________________________________________________________________

Street Address: ________________________________________________________________________________

City: State: Zip: ________________________________________________________________________________

Phone Number (include area code): __________________________________________________________________

Fax Number (include area code): __________________________________________________________________

Email Address: ________________________________________________________________________________

Building Owner/Tenant (Name): __________________________________________________________________

Building Owner/Tenant Contact Information: __________________________________________________________________

New system or change to an existing system:

_________ New system  _________ Change to Existing System

Square footage of the project: _________________
Automatic Sprinkler Systems Plan Review Checklist
Page 2

Construction type:
- Fire Resistive
- Non-Combustible
- Ordinary
- Heavy Timber
- Wood Frame
- Mixed

Fire sprinkler occupancy hazard classification (5.1):
- Light Hazard
- Ordinary Hazard Group I
- Ordinary Hazard Group II
- Extra Hazard Group I
- Extra Hazard Group II
- Special Occupancy
- Storage

Special occupancy requirements for the system: Yes No
(Flammable/Combustible Liquids, Aircraft hangers, Oxidizers, etc.)

Commodity classification, if this is a storage occupancy (5.6):
- Class I
- Class II
- Class III
- Class IV
- Group A
- Group B
- Group C

Is there storage over 12 ft.? Yes No

General Plans Information:

The following information is clearly indicated on the plans:

- Name of owner or occupant (22.1.3(1))
- Location, including street address (22.1.3(2))
- Point of compass (22.1.3(3))
- Full height cross section, or schematic diagram, including structural member information, ceiling construction and method of protection for non-metallic pipe (22.1.3(4))
- Location of partitions (22.1.3(5))
- Location of fire walls (22.1.3(6))
- Occupancy class of each area or room (22.1.3(7))
- Location and size of concealed spaces, closets, attics and bathrooms (22.1.3(8))
- Small enclosures in which no sprinklers are to be installed (22.1.3(9))
- The scale used on all plans (22.1.3(32))
- Name and address of contractor (22.1.3(33))
Automatic Sprinkler Systems Plan Review Checklist

Page 3

Water supply:

The following information is clearly indicated on the plans.

- Water flow test location and date (22.2.1)
- Static, residual pressure and flow (22.2.1)
- Flow test ‘conducted by’ contact information (22.2.1)
- Size of main (22.1.3(28))
  - Dead-end main
  - Looped main

Other sources of water supply, with pressure or elevation (22.2.1(9)): ____________________________

Private fire service mains:

The following information is clearly indicated on the plans:

- Size, length and location of main (22.1.3(28))
- Weights (22.1.3(28))
- Pipe and fitting materials (10.1.1 / 10.2.1)
- Point of connection to city main (22.1.3(28))
- Size, type, and location of valves (22.1.3(28))
- Size, type, and location of valve indicators (22.1.3(28))
- Size, type, and location of meters (23.1.7)
- Size, type, and location of valve pits (8.16.1.4)
- Depth of top of pipe laid below grade (10.4)
- Size and location of all thrust blocks (10.8.2)
- Size and location of hydrants (showing size and number of outlets and whether outlets to be equipped with independent gate valves) (22.1.3(43))
- Whether hose houses and equipment are to be provided, and by whom (22.1.3(43))

Fire pump:

- Electric
- Diesel
- Steam
- NA

Rated Capacity: ____________________________

The pump layout complies with NFPA 20
Water tank:

_____Steel  _____Wood  _____Concrete  _____Fiberglass  _____NA

Capacity is verified at _____gpm for a duration of _____ hours for a total capacity of _____ gallons (11.2.3.1.2)

Sprinkler system type and coverage:
Type of sprinkler system:  

_____ Wet (7.1)  

_____ Dry (7.2)  

_____ Pre-action (7.3)  

_____ Deluge (7.3)

Are sprinklers omitted in any areas?  

_____ Yes  

_____ No (8.1.1)

If yes, are omissions allowed for NFPA 13?  

_____ Yes  

_____ No

_____ N/A (8.15)

Area of coverage (8.1.1(1):

_____ Total  

_____ Partial  

_____ Special hazard  

_____ Other

_____ All wet piping is in areas that can be maintained above 40° F (8.16.4.1)

Sprinkler system components:

The following sprinkler component information is clearly indicated on plans/specifications:

_____ Product data is included in the shop drawing submittal

_____ Make, type, model, nominal K-factor of sprinklers, and sprinkler identification number (6.2)

_____ Temperature rating and location of high-temperature sprinklers (6.2.5.1 / 8.3.2)

_____ Number of sprinklers on each riser per floor (22.1.3(15))

_____ Pipe type and schedule of wall thickness (6.3.1.1 / 22.1.3(18))

_____ Nominal pipe size and cutting lengths of pipe (or center-to-center dimensions) (22.1.3(19))

_____ Location and size of riser nipples (22.1.3(20))

_____ Type of fittings and joints and location of all welds and bends (6.4.1)

_____ Specifications of any sections to be shop welded and type of fittings or formations to be used (6.5.2)
Automatic Sprinkler Systems Plan Review Checklist

Page 5

_____ Type and location of hangers, sleeves, braces, and methods of securing sprinklers when applicable (9.1)
_____ All control valves and check valves (6.7)
_____ Make, type, model, and size of alarm, dry pipe, pre-action, or deluge valves (7.1 / 7.2 / 7.3)
_____ Size and location of standpipe risers, hose outlets, hand hose, monitor nozzles, and related equipment (8.17.5)
_____ Calculation of loads for sizing and details of sway bracing (9.3)
_____ Setting for pressure-reducing valves (8.16.1.2)
_____ Manufacturer, size, type of backflow preventers (8.17.4.6)
_____ Type and amount of antifreeze solution used (7.6.2)
_____ A pressure gauge on the system and the supply (7.1.1)

Design:

The following design information is clearly indicated on plans/specifications:

_____ Total area protected by each system on each floor (8.2 / 22.1.3(14))
_____ Sprinkler spacing and location has been verified (8.5)
_____ Spray patterns are free of obstruction (8.7.5)
_____ Total number of sprinklers on each dry pipe, pre-action, combined dry pipe-pre-action, or deluge system (22.1.3(16))
_____ Approximate capacity (in gallons) of each dry pipe system (7.2.3 / 22.1.3(17))
_____ Pitch of pipe for dry pipe, pre-action, combined dry pipe-pre-action, or deluge system (8.16.2.3.1)
_____ Size and capacity for air compressor (where provided) for dry pipe, pre-action, combined dry pipe-pre-action, or deluge system (7.2.6.6)
_____ Details of air supply connections for other types of air supply (7.2.6)
_____ Piping provisions for flushing (8.16.3)
_____ Size, location and arrangement of all auxiliary drain connections (8.16.2.5)
_____ Where equipment is to be installed as an addition to an existing system, enough detail of the existing system indicated to make all conditions clear (22.1.3)
_____ Hydraulic data nameplate (for hydraulically designed systems) (24.5)
_____ Size, location, thread type and piping arrangement of fire department connections (6.8 / 8.17.2)
_____ Size, location and arrangement of inspectors test connection (8.17.4.2)
_____ Location of main drain connection (8.17.4.1)
Hydraulic design specifications:

The following information has been clearly indicated on plans/specifications/hydraulic calculations:

- Type of System: Hydraulically calculated (22.4) Pipe Schedule (22.5)
- Design area and water application rate (11.2.3.1.1)
- Minimum rate of water application (density) (11.2.3.2)
- Area per sprinkler (8.5.2.1)
- Total water requirements as calculated, including allowance for inside hose, outside hydrants, and water curtain and exposure sprinklers (22.3.4)
- Allowance for in-rack sprinklers provided (where required) (12.3.2)
- Limitations (dimension, flow, and pressure) on extended coverage or other listed special sprinklers specified (8.8 / 8.9)
- Most demanding area is calculated (22.4.4.1.1)
- Hydraulic reference points shown on the plan that correspond with comparable reference points on the hydraulic calculations sheets (22.4.2.4)
- Pipe sizes and lengths shown on the plan correspond with the sizes and lengths shown on the hydraulic calculations sheets (22.1.3(34))
- Total quantity of water and pressure required noted at a common reference point for each system (22.3.4(2))
- Relative elevations of sprinklers, junction points, and supply or reference points (22.3.3)
- All unprotected wall openings throughout the floor protected for room design method where permitted (11.2.3.3)
- Pressure loss for backflow preventer, meter and/or other devices included in hydraulic calculations (22.4.3.3)

Alarms:

The following alarm connections are clearly indicated on plans/specifications:

- Type and location of alarm bells (8.17.1.5)
- Fire alarm system connection (8.16.1.6)
- Type and location of water flow switch / pressure switch (8.17.1)
Type and locations of low air pressure switch (7.2.6.3)
Type and location of all tamper switches (8.16.1.1.2.1)
Application For Tent Permit

Date: _______________________________ Tent Size _____ x _______ Sides Y / N

Date/Time Inspection Requested: _______________ Purpose: _______________________

Date of Event _______________ Purpose: _______________________

Fax completed form to: Winston-Salem Fire Department – 336-727-2792 or email to: plans@cityofwsfire.org  Payment may be made at www.cityofwsfire.org by credit/debit card. Visa, MasterCard or Discover accepted; or in person at 100 E First St., Suite 328, Winston-Salem, NC 27101

Applicant Information
Name: (Print): _____________________________________________________________

Address: __________________________________________________________________

Contact Number: ( _____ ) _______ - ____________ (Extension: ____________ )

Signature: __________________________________________________________________

Contractor Responsibility Information
Company Name: _____________________________________________________________

Address: __________________________________________________________________

Contact Person: __________________________________________________________________

Contact Number: ( _____ ) _______ - ____________ (Extension: ____________ )

Location of Job __________________________________________________________________

Signature: (If applicable) __________________________________________________________________
CITY OF WINSTON-Salem, NORTH CAROLINA
FIRE DEPARTMENT
FIRE PREVENTION BUREAU

Application for a Blasting Permit

Application is hereby made to use the following materials:

in conducting a

blasting operation to be held at

(Location Name/Address)

This operation is to begin at a.m./p.m. on , and

should be completed by a.m./p.m. on

I, the undersigned applicant, have read the appropriate ordinances of the City of Winston-Salem pertaining to this operation within the City Limits, and I am responsible for any damage or liability which may occur from such operation.

I understand and consent to the conditions listed below upon which this permit is granted.

Phone Number

Signed: 

Date: 

Address:

==========================================================================

Permit is granted subject to the following conditions:

1. Warning signs must be posted 1000 feet from blasting site if electric detonators are used.
2. Sign must contain warning to turn off portable radios.
3. Adequate security must be maintained and spectators kept at least 250 feet away, or more, if deemed necessary, from blasting site.
4. Allow "NO SMOKING" at blasting site or at explosives storage area.
5. If explosives are stored on site, they must be stored in approved magazine with proper clearance.
6. ALL blasting holes must be covered with blasting mats.
7. Blasting may NOT be done on holidays or weekends.
8. Notify public utility representatives at least 24 hours before blasting, specifying location and time of such blasting, if blasting is in vicinity of public utility equipment. Notify the Police Communications Center at (336) 773-7748 before each blast.
9. Seismographic readings must be taken during blasting.
10. Notify surrounding businesses and residences about blasting before beginning blasting activities.
12. Traffic must be stopped on surrounding streets during blasting.
13. NO above-ground blasting (such as rock, boulders, etc.)
14. Blasting is permitted between the hours of 8:00 a.m. and 5:00 p.m. ONLY.

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CITY OF WINSTON-SALEM, NORTH CAROLINA
FIRE DEPARTMENT
FIRE PREVENTION BUREAU

Application for a Burn/Bonfire Permit

Application is hereby made to use the following materials:

______________________________________________________ in conducting a burn/bonfire to be held at ____________________________________________

______________________________________________________  

(Location Name/Address)

This operation is to begin at ___________ a.m./p.m. on ________________, and should be completed by ___________ a.m./p.m. on ________________.

I, the undersigned applicant, have read the appropriate ordinances of the City of Winston-Salem pertaining to this operation within the City Limits, and I am responsible for any damage or liability which may occur from such operation. I understand and consent to the conditions listed below upon which this permit is granted.

Phone Number____________________ Signed: _______________________

Date: __________________________ Address:

Permit is granted subject to the following conditions:

1. If a windy condition exists at the time for the event, this permit is invalid and the burn/bonfire may not be conducted.
2. Only Class A materials, such as split wood, may be burned. NO WEATHER TREATED WOOD MAY BE BURNED.
3. Fire must be at least 25 feet from buildings, vehicles, and wooded areas.
4. A charged water hose must be maintained at burn/bonfire site and accessible during event.
5. Maintain adequate security around burn/bonfire for safety purposes.
6. No flammable liquid may be used in conjunction with burn/bonfire.
7. Fire must be completely extinguished at conclusion of event.
8. If burn/bonfire event becomes a nuisance, then the fire will be extinguished immediately.
9. If a state wide Burning Ban is in place, this PERMIT IS INVALID.

Fax completed form to: Winston-Salem Fire Department – 336-727-2792 or email to: plans@cityofwsfire.org  Payment may be made at www.cityofwsfire.org by credit/debit card. Visa, MasterCard or Discover accepted; or in person at 100 E First St., Suite 328, Winston-Salem, NC 27101
Application for an Open Flame Permit

Application is hereby made to burn the following materials:

_________________________________________________________________________ in conducting an open flame event to be held at _________________________________

_________________________________________________________________________ (Location Name/Address)

This operation is to begin at ___________ a.m./p.m. on ____________________________, and should be completed by ___________ a.m./p.m. on ____________________________

I, the undersigned applicant, have read the appropriate ordinances of the City of Winston-Salem pertaining to this operation within the City Limits, and I am responsible for any damage or liability which may occur from such operation. I understand and consent to the conditions upon which this permit is granted.

Phone Number_________________________________ Signed:__________________________

Date:____________________________________ Address:___________________________

Permit is granted subject to the following conditions:

1. Open flames shall not be located on or near decorative materials or similar combustible materials
2. Maintain a Safety Zone of at least 10’ in between the designated work area and the audience
3. Maintain a 3A/40 BC rated portable fire extinguisher on-site with a Trained Operator
4. Adequate safety precautions shall be taken to prevent the ignition of combustible materials or injury to occupants
5. Maintain a Safety Officer to ensure the overall scene safety
6. Fuel shall be in approved containers, sealed, and stored in a safe manner.

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CITY OF WINSTON-SALEM, NORTH CAROLINA
FIRE DEPARTMENT
FIRE PREVENTION BUREAU

Application to Place a Gasoline-Powered Vehicle in a Building

Application is hereby made by ____________________________________________

(Company Name)/(Contact Name/Phone Number)

to display the following gasoline powered vehicle(s) ______________________________________

________________________________________

(Description of vehicle(s))

in the ________________________________________________

(Location Name)

in conjunction with the ______________________________________

(Name of Event)

This operation is to begin at __________ AM/PM on (Date) ______________________________

and should be completed by __________ AM/PM on (Date) ______________________________

I, the undersigned applicant, have read the appropriate ordinances of the City of Winston-Salem pertaining
to this operation within the city limits, and I am responsible for any damage or liability which may occur
from such operation. I understand and consent to the stipulated conditions listed below upon which this
permit is granted.

Date __________________________ Signed __________________________

Phone No. __________________________ Address __________________________

Permit is granted subject to the following conditions:

1. Provide a 3A40BC fire extinguisher at display.
2. Vehicle parked for display purposes only.
3. Fuel tank must contain less than ¼ tank capacity or 5 gallons, whichever is less.
4. Fuel cap must be taped shut or locked.
5. Hot leads of battery must be disconnected or taped. OR The master power switch shall be secured in
   the “off” position at all times. OR The battery cables shall be disconnected and taped at all times.
6. All aisle ways, exits, and fire protection devices/equipment must be left free of ALL obstructions.
7. This permit shall remain on site at all times.

Fax completed form to: Winston-Salem Fire Department – 336-727-2792 or email to: plans@cityofwsfire.org
Payment may be made at www.cityofwsfire.org by credit/debit card. Visa, MasterCard or Discover
accepted; or in person at 100 E First St., Suite 328, Winston-Salem, NC 27101
City of Winston-Salem, North Carolina  
Fire Department  
Fire Prevention Bureau

Application for a Tank Removal Permit

Application is hereby made by: ____________________________ to: ____________________________

_______  Remove underground tank
_______  Render tank “temporarily out of service”
_______  Abandon underground tank in place

at ____________________________. This operation is to begin

(Location)

at ____________________________ a.m./p.m. on ____________________________ and should be

(Time)  (Date)

completed by ____________________________ a.m./p.m. on ____________________________

(Time)  (Date)

1.  Tank Size ______________  Gallons of ____________________________
2.  Tank Size ______________  Gallons of ____________________________
3.  Tank Size ______________  Gallons of ____________________________
4.  Tank Size ______________  Gallons of ____________________________

I, the undersigned applicant, have read the appropriate ordinance of the City of Winston-Salem pertaining to this operation with the city limits, and I am responsible for any damage or liability which may occur from such operation. I understand and consent to the stipulated conditions listed below upon which this permit is granted.

Date: ____________________________  Phone Number ____________________________

Name of Responsible Person ____________________________  Address ____________________________

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