Fire Prevention Development Standards

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Preface

The Kernersville Fire Department Fire Protection 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.

Additional requirements included in this document are references to Town of Kernersville 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 Town of Kernersville. The omission of any code requirement in this document does not excuse the requirement.

Chapter 1 – Plan Review Process

Plans review and inspections are conducted through the Fire Prevention Bureau of the Kernersville Fire Rescue Department. The plan reviewers' office is located at the Fire Station located at 316 West Bodenhamer Street, Kernersville, NC 27284. The telephone number is (336) 996-4885.

For all commercial, multi-family and Industrial building projects inside the town limits of Kernersville and in the Kernersville ETJ (excluding WS/FC Schools), the Town of Kernersville Community Development Division will forward a set of construction plans to the Kernersville Fire Rescue Department for review. The Kernersville Fire Rescue Department will contact the person, indicated on the plans as the contact person, to discuss Fire Code requirements for the project. A permit will not be signed off by the Kernersville Fire Rescue Department Plan Review Section, if further information or a resubmittal of the plans is required.

Construction documents for fire detection and protection systems shall be submitted for review and approval <u>prior</u> to any system installation.

Section 1.1 - Plan Review

The Plan Review section of the fire department 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 located in this document. Once the plans have been approved, notification will be sent 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 Town of Kernersville has implemented a plan review fee. Fee is listed on the Town of Kernersville Schedule of Fees.

Upon approval of the plans, confirmation will be issued for the installation of the particular system. When requesting a final inspection from the Kernersville Fire Rescue Department, you must submit a **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 336-996-4885 if you have any questions regarding these requirements.

Section 1.2 - 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 Kernersville Fire Rescue 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 1.3 - 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 Town of Kernersville of Kernersville Ordinances, North Carolina Fire Prevention Code requirements and applicable NFPA and other Standards.

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

1. Fire lane locations and pavement marking specifications
2. Fire hydrant locations with associated water lines, location, and size
3. Fire department connection (5" 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:

Section 2.1- Emergency Vehicle Access Requirements
Section 2.2 - Fire Hydrants
Section 2.3 - Confirmation of Acknowledgement and Acceptance

Section 2.1 – 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. Proper access allows 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.

Access to buildings shall be designed and maintained in accordance with Section 503 and Appendix D of the North Carolina Fire Prevention Code and the Town of Kernersville Design and Construction Specifications Manual.

The Kernersville Fire Rescue Department has approved the following:

N.C. Fire Prevention Code (2018) 503.2.4 Turning Radius

The turning radius for fire apparatus access roads shall be within the limits established by the Fire Code Official based on the Kernersville Fire Department's apparatus. Turning radius for Fire Engine and Ladder Truck are provided in the Appendix.

N.C. Fire Prevention Code (2018) 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. Dead-end fire apparatus access road turnarounds shall be installed as approved by the Town of Kernersville Community Development Department and the Fire Code Official. Turnarounds approved by the Town of Kernersville Community Development Department:

- Temporary T Turnaround
- Permanent T Turnaround
- Cul-de-Sac

N.C. Fire Prevention Code (2018) 503.2.7 - Grade

Individual site conditions will be evaluated by the Fire Department for suitable access by fire apparatus; grades shall not exceed eight percent (8%) without Fire Department approval.

N.C. Fire Prevention Code (2018) 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 Kernersville Fire Department's apparatus.
The maximum angle of approach and departure angle are indicated in Appendix B.

N.C. Fire Prevention Code (2018) 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.

The Town of Kernersville has adopted an **Emergency Access to Gated Properties and Developments** ordinance. The ordinance is located in Chapter 9 of this document. The Knox® Rapid Access System is the standard means of emergency access used by the Fire Department.

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.

All newly-installed fire hydrants shall be installed per Section 507 and Appendix C of the N.C. Fire Prevention Code.

Section 2.2.1 – Main Size

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.

Section 2.2.2 - Testing and Acceptance

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

All newly installed private fire hydrants shall be tested and certified by the fire protection contractor and inspected by the fire department.

Section 2.2.3 - Hydrant Specifications

Public Hydrants

All public fire hydrants installed within the Town of Kernersville shall meet the specifications of the Winston Salem/Forsyth County Utilities.

- Max hydrant spacing for single family is 700-ft, preferably at intersections and dead-ends
- 500-ft spacing may be required in high density single family developments
- Max hydrant spacing for multifamily is 500-ft, preferably at intersections and dead-ends

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 operating nut and cap nuts shall be pentagon-shaped, 1 ½" measured point to flat. The main valve shall be a compression type valve with a valve opening of 5 ¼". Each hydrant will have two hose nozzles and one steamer nozzle. The 2 ½" hose nozzles shall have national standard threads. The steamer nozzle shall have a 5" integral Storz connection. 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 or the Alpha connection by American Flow Control 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 the Engineer. Yellow paint shall be Rust-Oleum 7446, Rust-Oleum V2148, Kimball Midwest 80-942, or manufacturer's standard equivalent. 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:

(1) Super Centurion 250, manufactured by Mueller Company

(2) B-84-B-5, manufactured by American Flow Control

(3) K-81D Guardian, manufactured by Kennedy Valve Company

(4) Medallion, manufactured by Clow Valve Company

Source: Technical Specifications and Detail Drawings for Water Line and Sanitary Sewer Line Construction

For more information visit:

WSFC Utilities Plan Review

WSFC Backflow Prevention

Private Hydrants

All private fire hydrants installed within the Town of Kernersville shall meet the specifications of the Town of Kernersville Fire Department. 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 operating nut and cap nuts shall be pentagon-shaped, 1 ½" measured point to flat. The main valve shall be a compression type valve with a valve opening of 5 ¼". Each hydrant will have two hose nozzles and one steamer nozzle. The 2 ½" hose nozzles shall have national standard threads. The steamer nozzle shall have a 5" integral Storz connection. 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 or the Alpha connection by American Flow Control 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 red to the satisfaction of the Fire Department. Red paint shall be Rust-Oleum Fire Hydrant Red 245385, Kimball Midwest 80-887, or manufacturer's standard equivalent. 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. Private hydrants accepted by the Fire Department are as follows:

(1) Super Centurion 250, manufactured by Mueller Company

(2) B-84-B-5, manufactured by American Flow Control

(3) K-81D Guardian, manufactured by Kennedy Valve Company

(4) Medallion, manufactured by Clow Valve Company

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 Fire Prevention Code.

Kernersville Fire Rescue Department has approved the following:

N.C. Fire Prevention Code (2018) 912.1 - Installation

- Standard FDC connection in the Town of Kernersville is a Storz 5" connection with a 30-degree downturn.

N.C. Fire Prevention Code (2018) 912.2 - Location

- Hydrant locations shall be taken into consideration before installing Fire Department Connections.

N.C. Fire Prevention Code (2018) 912.6 - Backflow protection

- The potable water supply to automatic sprinkler and standpipe systems shall be protected against backflow as required by the North Carolina Plumbing Code and the Winston-Salem/ Forsyth County Utilities Division.

Section 2.4 – Town of Kernersville Unified Development Ordinance / Fire Protection Equipment

The Unified Development Ordinance (UDO) contains the growth management regulations of the Town of Kernersville. The UDO can be found on the town website http://toknc.com/wp-content/uploads/2016/08/UDO-3.pdf

Landscaping 3-4.2(L)

- A minimum five (5) foot radius containing no plant materials or structural elements other than groundcover plants shall be maintained around all fire protection equipment, including fire hydrants, post indicator valves, and siamese connectors. Obvious sight lines to the fire protection equipment shall be maintained at all times.

Public or Private Utilities 4(B)(3)(a)(i-iii)

- 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 Kernersville Fire Rescue 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 Kernersville Fire Rescue Department.

Chapter 3 - Building Plan Submittal Requirements

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

Section 3.1 – Building Plan Submittal

Building plan submittals shall contain, among other items, the following information for fire department plan review:

1. Building floor plan with an Appendix B.
2. Intended occupancy use classifications and secondary uses.
3. Building elevations and topography.
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.
    a. Plans shall include drawings, diagrams and specifications on rack storage arrangements.
10. Kitchen hood installation locations and specifications.
    a. Refer to Section 4.3 of this document for fire suppression system plan submittal requirements.
11. Paint spray booths and associated system locations and specifications;
    a. Refer to Section 4.3 of this document for fire suppression system plan submittal requirements.
12. Flammable/Combustible liquid storage rooms, hazardous materials storage rooms and clean room locations and specifications;
    a. Special agent protection systems – Refer to Section 4.3 of this document for 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; see the following sections for additional information pertaining to building plan requirements:
    Section 4.1 - Fire Alarm Submittal Requirements
    Section 4.2 - Fire Sprinkler/Standpipe System Plan Submittal Requirements
    Section 4.3 – Fire Sprinkler “Small Job” Requirements
    Section 4.4 - Fire Suppression System Plan Submittal Requirements
16. Any other items requiring Kernersville Fire Rescue Department consideration.
17. Drawings shall be scaled.
18. A Kernersville Fire Rescue Department approved set of plans shall be maintained on the project site at all times while the project is under construction.

Chapter 4 - Fire Detection and Protection Plan Submittal Requirements

Section 4.1 - Fire Alarm System Plan Submittal

The following information must be submitted to and approved by the Kernersville Fire Department Fire Code Official prior to any modification or installation per section 901.2 and 907.1.1 of the North Carolina State Fire Prevention Code. If adding less than five devices, no plan is required, but a field acceptance testing is required. If replacing a fire alarm control panel, cut sheets and a review with acceptance test is required. Plan approval does not release the contractor or property owner from responsibility of full compliance with all applicable codes and ordinances relating to the construction project.

1. Submit a permit application and **ONE** set of plans via the Town Kernersville Online Permitting System
2. Plans shall be .pdf format.
3. A Kernersville Fire Rescue Department Fire Alarm Systems Plan Review Checklist must be submitted with automatic extinguishing system plans. The checklist can be found at the end of this document.
4. Battery calculation needs to be included in the plans.
5. 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. If PE signed fire alarm plans are included in the electrical plans for building plan submittal, shop drawings will suffice.
6. 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.
7. The locations of all the initiating and notification devices must be clearly indicated along with the candela rating of all strobes.
8. Details of ceiling height and construction.
9. Alarm control/panel location.
10. Annunciation of the system and location of annunciator panel.
11. Power connection; electrical breaker controlling the alarm panel must be equipped with a breaker lock.
12. Battery and voltage drop calculations for the entire system. The total number and amperage of the batteries to be utilized must be clearly indicated.

13. Electrical wiring diagram, type and size.
14. Manufacturers, model numbers, and listing information for all the equipment, devices, and materials to be installed.
15. The interface of all fire safety control functions.
16. 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 Code
- North Carolina State Building Code
- 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 Kernersville Fire Rescue 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 Kernersville Fire Rescue Department for re- approval.

Section 4.2 - Fire Sprinkler/Standpipe System Plan Submittal Requirements

The following information must be submitted to and approved by the Kernersville Fire Rescue Department Fire Code Official prior to any installation per section 901.2 of the North Carolina State Fire Prevention Code. Plan approval does not release the contractor or property owner from responsibility of full compliance with all applicable codes and ordinances relating to the construction project.

1. Submit a permit application and **ONE** set of plans via the Town Kernersville Online Permitting System
2. Plans shall be .pdf format.
3. A Kernersville Fire Rescue Department Automatic Sprinkler Systems Plan Review Checklist must be submitted with automatic extinguishing system plans. The checklist can be found at the end of this document.
4. 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.
5. 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.
6. The square footage of each riser's protection area and clear notations of any non-sprinkled areas must be indicated.
7. Descriptions and specifications for all the system's components including pipe sizes and sprinkler heads.
8. Hydraulic calculations for the system; this shall include hydraulic calculations for any modifications to a previously hydraulically calculated system.
9. Type of system being installed (ex – Class I Standpipe, NFPA 13 Wet-pipe Sprinkler).
10. Standpipe hose thread patterns must be National Standard 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.
11. 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.
12. The FDC must be a Storz 5" x 5" coupling with a 30-degree downturn.
13. 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 Code
- North Carolina State Building Code
- 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.

Section 4.3 - Sprinkler System "Small Job" Requirements

Plan approval does not release the contractor or property owner from responsibility of full compliance with all applicable codes and ordinances relating to the construction project. The following describes a "small job":

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

The following must be submitted for "**small jobs**":

1. Submit a permit application via the Town Kernersville Online Permitting System
2. No calculations are required.
3. Hydrostatic report (working pressure only), and letter of certification at the time of the inspection will be required.

Section 4.4 - Fire Suppression System Plan Submittal Requirements (Fixed-Pipe Kitchen Systems, Paint Spray Booths, etc.)

Plan approval does not release the contractor or property owner from responsibility of full compliance with all applicable codes and ordinances relating to the construction project. The following information must be submitted to and approved by the Kernersville Fire Department prior to any installation per Section 901.2 of the North Carolina State Fire Prevention Code and the Kernersville Fire Marshal's Office:

1. Submit a permit application and **ONE** set of plans via the Town Kernersville Online Permitting System
2. Plans shall be .pdf format.
3. A Kernersville Fire Rescue Department Automatic Extinguishing Systems Plan Review Checklist must be submitted with automatic extinguishing system plans. The checklist can be found in the Appendix of this document.
4. 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.
5. The type of system being installed including the manufacturer's model number, UL listing date and total flow points available.
6. The installer's name, certification, and date of the last manufacturer's training school attended; also include a copy of your certificate.
7. Clearly indicate all of the systems components including a piping diagram.
8. Number and dimensions of all exhaust ducts including the location, number, and height of all protection nozzles.
9. Number and dimensions of all plenums including the location, number, and height of all protection nozzles.
10. Number, description, and dimensions of all appliances being protected including the location, number, and height of all protection nozzles.
11. Number, location, and temperature rating of all detection devices.
12. Number and location of all manual activation devices.
13. Type of fuel being utilized and type of shutoffs provided.
14. Location, type, and size of all portable fire extinguishers.
15. The method of annunciation must be indicated (must activate building fire alarm system, if present)

16. Booth specifications and UL Listing information if applicable.
17. Ventilation specifications and CFM calculations if applicable.
18. Make-up air system shall shut down when the system activates.

Codes used in the review process:

- North Carolina State Fire Prevention Code
- North Carolina State Building Code
- North Carolina State Mechanical Code
- 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.

Section 4.5 - Spray Booths

Plan approval does not release the contractor or property owner from responsibility of full compliance with all applicable codes and ordinances relating to the construction project. The following information must be submitted to and approved by the Kernersville Fire Department Fire Code Official prior to any installation:

1. Submit a permit application and **ONE** set of plans via the Town Kernersville Online Permitting System
2. Plans shall be .pdf format.
3. A Kernersville Fire Rescue Department Automatic Extinguishing Systems Plan Review Checklist must be submitted with automatic extinguishing system plans. The checklist can be found at the end of this document
4. 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.
5. If the booth is pre-engineered, submit all manufacturer's documentation including specifications and UL listing information.
6. The installer's name, certification, and date of the last manufacturer's training school attended; also include a copy of the certificate
7. Construction of the spray booth must comply with Section 2404.3.2 of the 2018 North Carolina Fire Prevention Code and applicable provisions of NFPA 33.

Codes used in the review process:

- North Carolina State Fire Prevention Code
- Manufacturer's Requirements / Manual
- Applicable National Fire Protection Association Standards

Note:

- 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.

Chapter 5 - Smoke Control System Plan Submittal Requirements

Section 909 of the 2018 North Carolina Fire Prevention 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:

The following information must be submitted to and approved by the Kernersville Fire Rescue Department Fire Code Official prior to any installation per the North Carolina State Fire Prevention Code. Permit approval does not release the contractor or property owner from responsibility of full compliance with all applicable codes and ordinances relating to the construction project.

1. Submit a permit application and **ONE** set of plans via the Town Kernersville Online Permitting System
2. Plans shall be .pdf format.
3. The construction documents shall include sufficient information and detail to describe adequately the elements of the design necessary for the proper implementation of the smoke control systems. These documents shall be accompanied with sufficient information and analysis to demonstrate compliance with these provisions.
4. The design submission accompanying the construction documents shall clearly detail procedures and methods to be used and the items subject to such inspections and tests.
5. A rational analysis performed by the registered design professional and approved by the fire code official supporting the types of smoke control systems to be employed, the methods of their operations, the systems supporting them and the methods of construction to be utilized shall accompany the construction documents submission and include, but not be limited to, the items indicated in Sections 909.4.1 through 909.4.7 of the 2018 North Carolina Fire Prevention Code.

Chapter 6 - Required Fire Inspections for New Construction and Up-fit Projects

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

- Fire Hydrant (New Subdivisions and Projects)
- Underground Fire Line Inspection / Underground Flush
- Fire Sprinkler Piping Inspection – Rough In
- Fire Sprinkler Inspection - Final
- Fire Alarm Inspection - Final
- Fixed Pipe Extinguishing System Inspection - Final
- Building & Site Inspection – Fire Trade Final
- Tank Installation and all Components
- Emergency Access Inspection (Key Vaults, Gated Communities)

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.

ALL SYSTEMS SHOULD BE PRE-TESTED TO BE SURE THEY ARE FUNCTIONING PROPERLY

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. An Underground Contractor's Material and Test Certificate shall be provided to the Fire Code Official prior to flush inspection. Flush inspection shall not be conducted without this documentation. During a fire department underground fire line and FDC inspection and flush inspection, the Fire Code Official shall verify the following:

1. Consult the approved plans and verify;
   a. Size of piping.
   b. Type of piping.
   c. Depth of piping.
   d. 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.
   e. Location of:
      - Backflow Device; for size, type, and direction.
   f. Monitored tamper switches installed on OS&Y control valves.
   g. If in aboveground vaults ("hot box"), verify heater installed & operational
   h. Verify fire department hose connection is installed in accordance with Section 2.3 of this manual.
   i. Verify all fire hydrants are installed in accordance with Section 2.2 of this manual.
   j. Verify all valves are open in the system (including fire hydrant sectional valves).
2. Observe hydrostatic test of all piping at 150 psi for 2 hours or 50 psi in excess of system working pressure whichever is greater.
3. 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.)
4. Observe flushing of all piping with city water until clear.

Fire Sprinkler Piping – Rough-In Inspection

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.

Fire Sprinkler Piping – Rough-In Inspection (cont'd)

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.

Fire Sprinkler - Final 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.

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

1. Consult approved plans. Verify proper components are installed and functioning on the sprinkler system riser.
   a. Tamper switch
   b. Water flow switch
2. 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
3. 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.)
4. 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.

Fire Sprinkler - Final Inspection (cont'd)

5. Verify floor is sealed where riser penetrates the building.
6. 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.
7. 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".
8. Document time alarms activated.

Standpipe Inspection – Rough-In

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

1. 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 Kernersville Hose threads (2-1/2 outlets only).
2. 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.
3. 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.)
4. Verify all signage is in place. (Examples: control valves, drains and main drain.)
5. Verify fire department hose connection is installed in accordance with Section 2.3 of this manual.

Standpipe Inspection - Final

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

1. Consult approved plans. Verify proper components are installed and functioning on the standpipe system:
   a. Tamper switch
   b. Water flow switch
2. 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.
3. 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.

Standpipe Inspection – Final (cont'd)

4. Verify floor is sealed where riser penetrates the building.
5. 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.
6. 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.
7. All flow pressures including fire department pump pressures shall be documented.
8. The installing contractor shall provide the owner with the following:
    a. All literature and instructions provided by the manufacturer describing the proper operation and maintenance of equipment and devices installed
    b. A copy of NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

Fire Alarm System - Final Inspection

A NFPA 72 Record of Completion Report shall be attached to the online permit application prior to scheduling final fire alarm inspection. Final fire inspection will not be conducted without this documentation.

1. Consult approved plans. Verify the proper location and type of all fire alarm devices.
2. Observe fire alarm system functional tests of all fire alarm devices, including duct detectors
3. 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".
4. 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.
5. Observe activation test of fire alarm notification appliances on kitchen hood suppression system activation, if applicable.
6. 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.

Fire Alarm System - Final Inspection (cont'd)

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

7. 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.

Automatic Extinguishing Systems – Final Inspection

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.

1. 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
2. Observe air movement through all system nozzles
3. Observe test of fusible link
4. Observe activation of manual pull stations
5. Observe deactivation of all fuel sources under hood during all tests (electric and gas).
6. Observe deactivation of “make up air” on test activation of system (Exhaust air shall remain working.).
7. Observe activation of fire alarm notification appliances upon kitchen hood suppression system activation.
8. 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, 3A:40BC extinguishers are required.
9. Indicate total number of flow points per system and flow points used.
10. Verify 3-inch system numbers installed at pull station(s), firing cabinet and hood locations to coordinate system component locations.If applicable, verify HVAC unit shut down.
11. 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. A sign reading “If Horn Activates, Call 911” shall be installed at the horn/strobe location.

Building and Site – Final Inspection

1. Verify building address size and location.
    a. 6” minimum (or comparable) letters/numbers;
    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) 996-4885 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 75 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.

Building and Site – Final Inspection (cont'd)

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 comers 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 Town 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.
    n. If a re-inspection is required for a Certificate of Occupancy there will be a $50.00 charge.

Chapter 7 – Above and Below Ground Tank(s) Installation

Plan approval does not release the contractor or property owner from responsibility of full compliance with all applicable codes and ordinances relating to the construction project. For above and below ground tank installation (including generator base and day tanks), the following information must be submitted to and approved by the Kernersville Fire Rescue Department prior to any installation per section 901.2 of the North Carolina State Fire Prevention Code and the Kernersville Fire Rescue Department Fire Official's office:

1. Submit a permit application and **ONE** set of plans via the Town Kernersville Online Permitting System
2. Plans shall be .pdf format.
3. Plan must be scaled and detailed 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.
4. The method of storage must be indicated.
5. The method of dispensing must be indicated.
6. The quantities and types of materials to be stored must be indicated.
7. The distances from other tanks, dispensers, property lines, and buildings must be indicated.
8. Vehicle access and all type and number of collision barriers must be indicated.
9. All fire appliances must be indicated. This includes the location, type, and size of all portable fire extinguishers.
10. The design and construction of the tank.
11. The UL Listing of the tank, dispenser and related equipment.
12. Tank supports and seismic design of the supports including bedding to be used for underground tanks.
13. All secondary containment and leak detection.
14. All normal and emergency tank venting.
16. Any vapor recovery provisions.
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 Code
- 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.

Chapter 8 – Fire Lane Ordinance

Town of Kernersville Municipal Code: Section 9-41 – Fire Lane

(a) Fire lanes may be designated on public property from time to time as deemed necessary by the Fire Marshal.

(b) Fire lanes shall be required in accordance with the provisions of this section on private property used for assemblage, commercially, educationally, industrially, institutionally, or as multifamily dwellings as designated from time to time by the Fire Marshal. No fire lanes shall be established upon private property developed prior to the date of adoption of this section, upon which identified parking spaces are deleted, without prior approval of the Board of Aldermen.

(c) Fire lanes shall be designated in accordance with the provisions of the State of North Carolina Fire Prevention Code, Chapter 5, Section 503 Fire Apparatus Access Roads and amendments thereto or other stated references therein and the Fire Marshal's office.

(d) Fire lanes shall be located where necessary to provide fire protection to all proximately located buildings and property, including buildings and property located upon the parcel of land where the fire lane is located, and also any buildings or property located on adjacent property.

(e) 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 Town. 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 Rescue Department of the Town.

(f) No parking shall be permitted at any time on any fire lane, and no parking shall be permitted at any location which would prevent immediate access to any fire lane, fire hydrant, fire department sprinkler connection and/or control valve, or any other device used by the Fire Rescue Department.

(g) Signage shall be placed at the fire lane indicating the beginning, end and continuance of the fire lane. Signage shall either contain the words "No Parking" or utilize the "No Parking" symbol and contain the words "Fire Lane," and indicating arrows, the fine amount or "Tow Away Zone", to warn persons against parking or blocking accesses or lanes at any time. No owner, manager nor tenant of any premises shall permit any person to park any vehicle or permit any vehicle to stand on any part of any fire lane at any time.

(h) The owner of any private area where a fire lane is required shall post approved signs in accordance with Fire Rescue Department guidelines. The Town shall post approved signs indicating fire lanes on public property in accordance with the Fire Rescue Department guidelines.

(i) Approved signs shall comply with the standards set forth by the Fire Rescue Department and adopted by policy of the Fire Rescue Department and regularly used by the Town in its traffic control. Such policy and signage information shall be available at the office of the Fire Rescue Chief.

(j) Private property owners shall remove snow and/or ice from any fire lane as soon as reasonably possible upon any accumulation. The Town shall remove snow and ice from public area fire lanes as soon as reasonably possible upon any accumulation.

(k) Any person violating any provision of this section shall be subject to a civil penalty as prescribed in the Schedule of Fees and Charges adopted by the Board of Aldermen pursuant to a citation issued either by the office of the Fire Marshal or by the Police Department. Any violation of this section shall also constitute a general misdemeanor. Any violation of the "No Parking" requirements set forth herein in this section shall subject the vehicle to be towed in accordance with the provisions of sections 20-162 of the General Statutes and the procedures of the Police Department.

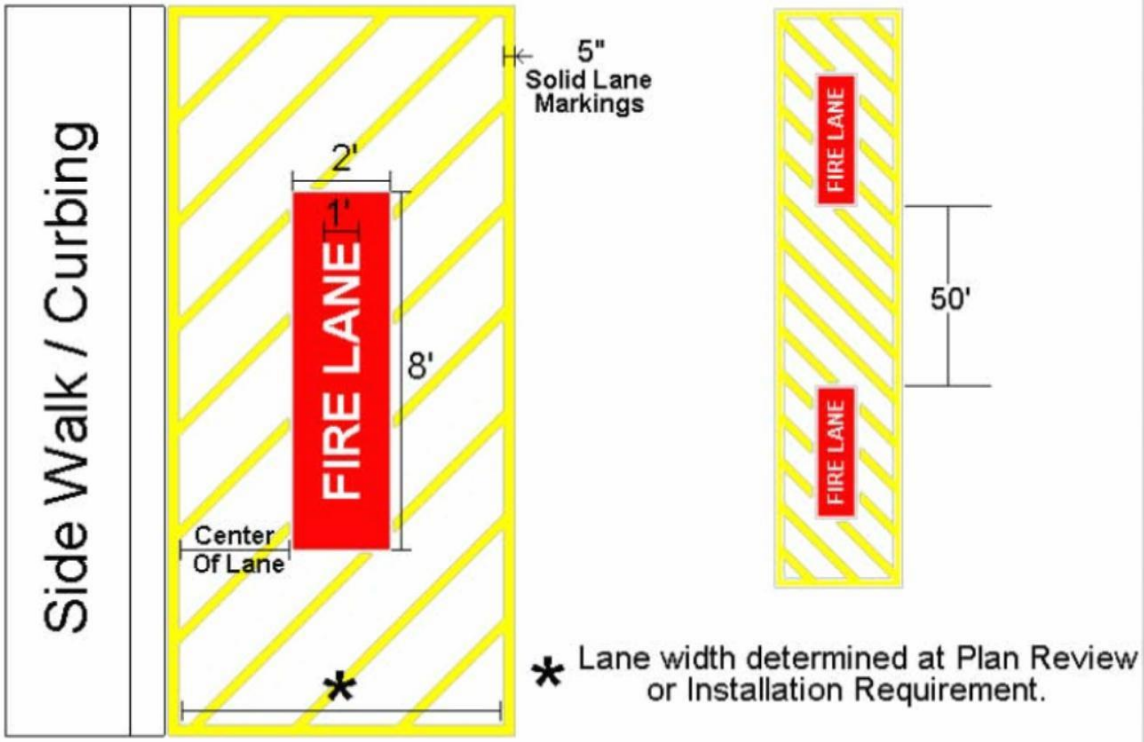
(Ord. No. 2011-06, §§ 1, 2, 3-1-2011; Ord. No. O-2014-33, § 4, 12-2-2014).

See the examples pictured below:

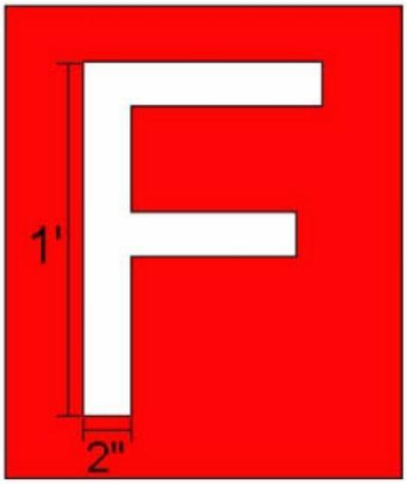

FIRE LANE


FIRE LANE

Fire Lane Pavement Marking Specification

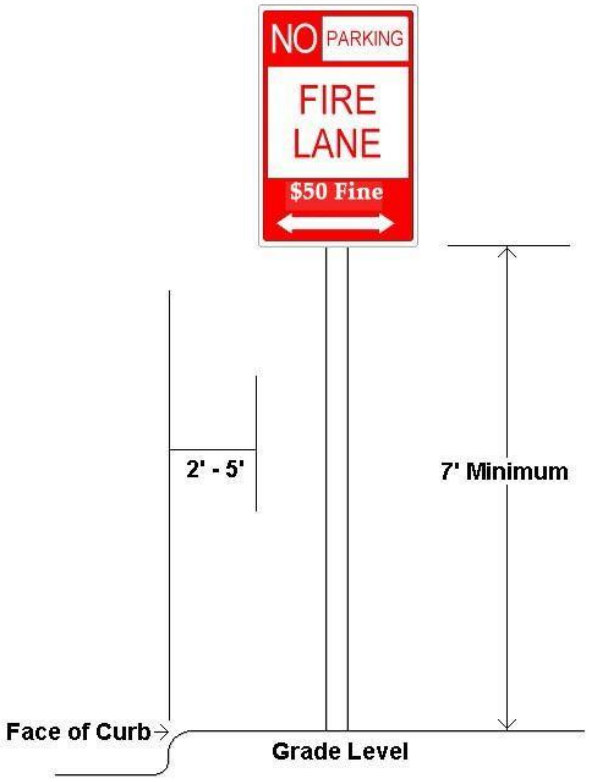


* Lane width determined at Plan Review or Installation Requirement.



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 with. 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.

Fire Lane Sign Specifications:



Chapter 9 – Emergency Access to Gated Properties and Developments

The Town of Kernersville has adopted an ordinance regarding emergency access to gated properties and developments. Prior to the installation of any gate or device that will obstruct the access of emergency vehicles or emergency personnel, plans and specifications shall be submitted to the Town of Kernersville Community Development Department, Fire Rescue Department and Police department for permit issuance and plan approval.

The fire department uses the Knox® Rapid Access System as a standardized means for emergency access to gated properties and developments. More information regarding this system can be found in the Appendix of this document.

Town of Kernersville Ordinance

Sec. 7-101. - Permit required.

Prior to the installation of any gate or other device that will obstruct the access of emergency vehicles or emergency personnel, to commercial, residential areas, or open space/undeveloped areas, plans and specifications shall be submitted to the Town Fire Rescue Department, Community Development Department, and Police Department for permit issuance and plan approval.

(Ord. No. O-2009-26, § 1, 11-10-2009)

Sec. 7-102. - Access requirements.

(a) All vehicular access ways through a gated entrance or exit shall be required to provide not less than fourteen (14) feet of overhead clearance and fourteen (14) feet of horizontal clearance.

(b) All gates shall open in a manner to ensure that the opening clearance required herein is fully available and is not in any way obstructed by the gate.

(c) The following gate design standards and guidelines shall be required:

(1) All gated community developments, commercial and residential properties shall have gates that are electrical in operation. All electrical vehicular gates shall be provided with access control using a radio transceiver for public safety and authorized users. This transceiver will allow emergency vehicles to open the gate from a mobile or portable radio and shall be as required by the Fire Rescue Department to ensure conformity and ease of operation during emergency response.

(2) A lock box shall be installed to allow emergency personnel access through pedestrian

gates. Emergency personnel must be able to access manual backup controls.

(3) All electrical vehicular gates must be provided with a fail-open device to open it during power failures. These devices shall restore the gate(s) to the closed position after the power is restored.

(4) If a gate is secured with a chain and lock, the Town shall not be held liable for repairs to such chain or lock necessitated by emergency entrance onto the property. Usage of a chain and lock shall only be permitted on commercial or industrial properties when there are no employees or members of the public within the fenced area.

(5) If there are two (2) or more gates in any single development, all gates must be operated in the same fashion.

(6) A manual override shall be provided for use in the event of malfunction of any gate required to be opened electrically.

(7) Gate activation shall not be altered or placed out of service without prior notification to the Fire Rescue Department and police dispatch. Where prior approved activation gates become worn or inoperative, the approved radio transceiver shall replace them.

(8) The maintenance and upkeep of all gates, including the power and phone utility to operate the gates, shall be the responsibility of the property owner, homeowners' association, or occupants of a gated community. All gates must be serviced on at least an annual basis and a copy of the annual service performed shall be submitted to the Town Fire Rescue Department.

(9) All automatic gate opening devices shall include a timing device that will hold the gate open for the amount of time specified by the Town emergency service providers.

(10) Upon application for exemption, and approval by the Town Fire Department, an exemption from the requirements of this Ordinance shall be granted for the following uses, so long as an acceptable emergency response plan is agreed to by the Town and the property owner:

a. Security sensitive facilities including, but not limited to, law enforcement detention centers, prisons or jails, juvenile detention centers, public utilities and similar properties, or

b. Areas secured for the purpose of protecting equipment, vehicles machinery, goods, products, vacant or undeveloped property, or similar uses which are neither open to public access nor occupied or inhabited by any resident or employee.

(11) Any existing gate that does not conform to the requirements of this section shall either be retrofitted with the approved opening devices or removed no later than six (6) months following the adoption of this article.

(d) If gates are guarded on a twenty-four-hour, seven-day per week basis, the gate access control design standards and guidelines of subsection (c)(1) and (c)(9) are not applicable. All such guarded gates shall be promptly opened by the guard or attendant upon the approach of an emergency vehicle.

(Ord. No. O-2009-26, § 1, 11-10-2009)

Chapter 10 - Fire Protection and Equipment 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.

Section 10.1 - Interior Signs

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

Kernersville Fire Rescue Department has approved the following:

N.C. State Fire Prevention Code (2018) 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.

N.C. State Fire Prevention Code (2018) 316 – Hazards to Firefighters

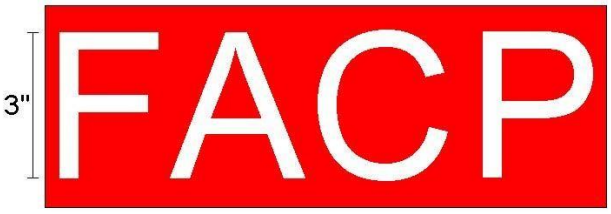
Interior and exterior access to shaftways – doors, windows and other devices that open into a shaftway communicating between 2 or more floors shall be plainly marked with the words SHAFTWAY in red letters at least 6" high on a white background. Such warning signs shall be placed so as to be readily discernible.

N.C. State Fire Prevention Code (2018) 509.1 – Fire Protection Rooms

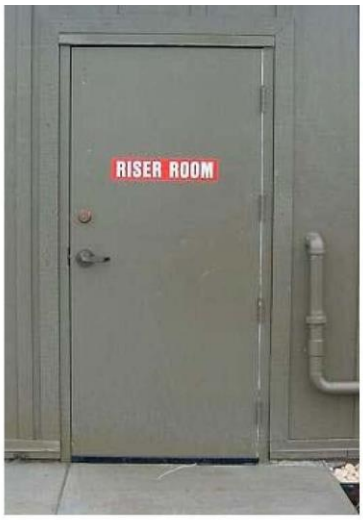
Interior rooms that house fire protection equipment including but not limited to the following: Fire Alarm Control Panel, Sprinkler System Riser Room, Fire Command Center and Emergency Generators. These rooms shall have approved signs required to identify fire protection equipment and their location, 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 with a ½” letter stroke.



1/2" Letter Stroke



N.C. State Fire Prevention Code (2018) 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”.

N.C. State Fire Prevention Code (2018) 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.

N.C. State Fire Prevention Code (2018) 607.3 – Elevator Recall

An approved pictorial sign of a standardized design shall be 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. Exceptions:

1. The emergency sign shall not be required for elevators that are part of an accessible means of egress complying with Section 1009.4.
2. The emergency sign shall not be required for elevators that are used for occupant self-evacuation in accordance with Section 3008 of the International Building Code.

N.C. State Fire Prevention Code (2018) 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.

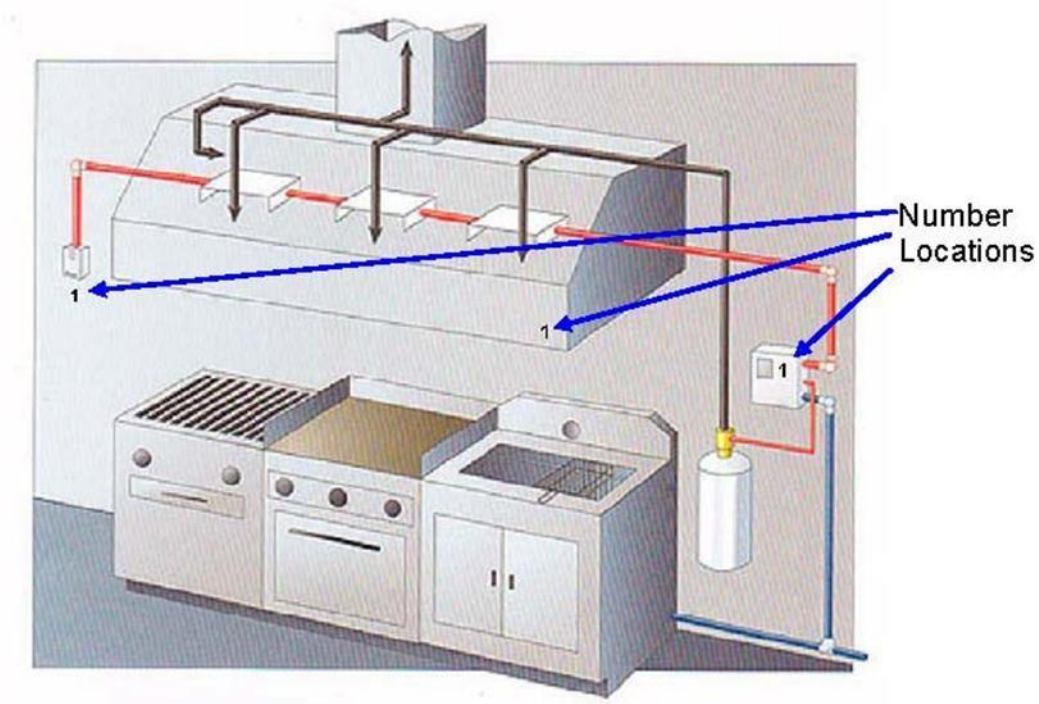
N.C. State Fire Prevention Code (2018) 703.2.1 – Fire Doors

Where required by the fire code official, a sign shall be permanently displayed on or near each fire door in letters not less than 1 inch (25 mm) high to read as follows:

1. For doors designed to be kept normally open: FIRE DOOR—DO NOT BLOCK.
2. For doors designed to be kept normally closed: FIRE DOOR—KEEP CLOSED.

Fire Suppression System Component Numbers

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



Section 10.2 - Exterior Signs

N.C. State Fire Prevention Code (2018) 505.1 - Address

New and existing buildings shall be provided with approved address identification. The address identification shall be legible and placed in a position that is visible from the street or road fronting the property. Address identification characters shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall not be spelled out. Each character shall be not less than 6 inches (153 mm) high with a minimum stroke width of 3/4 inch (20 mm). Where required by the fire code official, address identification shall be provided in additional approved locations to facilitate emergency response. 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. Address identification shall be maintained.

N.C. State Fire Prevention Code (2018) 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.

N.C. State Fire Prevention Code (2018) 5003.5 – Hazard Identification Signs

This document is to provide guidelines for the marking of buildings and stationary tanks with NFPA 704 Signs. The enforcement of this standard is in conjunction with Section 2703.5 (Hazard Identification Signs) of the North Carolina Fire Code.

This standard, in conjunction with NFPA Pamphlet 704 latest edition, shall address the health, flammability, instability, and related hazards that are presented by short term, acute exposure to a material under conditions of fire, spill, or similar emergencies.

The purpose of this standard is to provide identification of fire hazard and to placard all businesses that have storage where certain minimum quantity of hazard material exists.

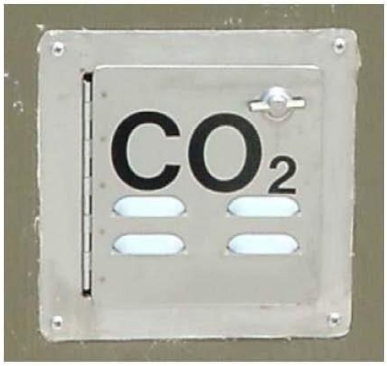
Location:

1. The identification placard shall be located on the outside of buildings and/or storage tanks in locations deemed appropriate by fire department staff. Inside placarding shall be required when chemicals are segregated into separate areas.
2. The material safety data sheet (MSDS) should have the information on hazard ratings to be used for each material. Emergency Management staff shall approve the placard numbering.
3. The number or symbol indication in each colored category shall reflect the most severe hazard associated with any hazardous materials at the business or in the area indicated by the posting.
4. If the property is fenced, all access points must be posted immediately adjacent to the gate. Posting on fences shall be plainly visible and readable from the nearest public access point.
5. Gasoline stations that handle only motor vehicle fuels stored in underground storage tanks are exempt from posting.
6. Businesses that contain Bulk Liquefied Carbon Dioxide tanks for soda fountains shall be enforced by this guideline. Businesses that contain vaporous Carbon Dioxide gas and no other hazardous materials are exempt from posting signs.
7. Any business with a NFPA 704 rating of 2-3-3 or above will be required to install an approved key vault and document cabinet on the premises, which would contain business keys and a business plan.

See Appendix C for additional NFPA 704 warning placard requirements

Carbon Dioxide Drink System Exterior Signs:

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



Chapter 11 – Emergency Responder Radio Coverage System

Section 11.1 - General

The North Carolina Fire Code require that the Public Safety Radio System be fully operable in the interior of most new buildings and in some remodeled structures. Some modern energy-efficient construction techniques and materials (such as Low-E glass, cementitious coatings, and steel roofs) tend to attenuate the radio signals penetrating the exterior of some new buildings. Per North Carolina 2018 Fire Code Section 510, all new buildings constructed after January 1, 2019 (except for one- and two-family residences) are required to ensure that the Public Safety Radio System has sufficient radio signal strength to be fully operable throughout the interior of the building.

New building owners subject to the NC 2018 Fire Code Section 510 are required to submit a Radio Signal Strength Study that demonstrates that the existing Radio System signal levels meet the Code or they will be required to install an Emergency Responder Radio Coverage System (**ERRCS**) to boost the radio signals up to the required levels. Section 510 of the 2018 NC Fire Code for new construction is attached as **Appendix A** at the end of this document. All owners of new and remodeled buildings, as well as their general contractors and ERRCS vendors/installers, should be familiar with all provisions of the relevant codes and standards. This guide augments those documents with further clarification as to how the codes and standards are implemented in The Town of Kernersville.

Section 11.2 – Pre-Planning

Because the Radio Signal Strength study cannot be performed until the building is nearly complete, and because of the lead time in procuring and installing an ERRCS, building owners/managers are well advised to consider the strong possibility that accommodating an ERRCS installation late in the building process may well delay final building acceptance and add cost beyond what would have been required for a pre-planned ERRCS. Some steps may be taken during building design and early construction that can help alleviate some of the delays and expense should an ERRCS be required. Such steps would include pre-planning a roof penetration and conduits for the coax cable feeding the roof-top donor antenna as well as ceiling conduits for the interior DAS cabling. Building owners are encouraged to make sure their building designers are aware early-on of the possibility of the need for an ERRCS installation and plan accordingly.

Section 11.3 - Forsyth County and Town of Kernersville Public Safety Radio Systems

The Kernersville Fire Rescue Department Utilizes two radio systems, Forsyth County and Town of Kernersville Public Safety Radio Systems. Section 510.4.2.2 of the NC 2018 Fire Code requires that the Emergency Communication System maintain a document providing specific technical information for the Public Safety Radio System. The necessary technical information is found below for each radio system.

An asterisk denotes the primary control channel, which should be continuously active. All other channels will be sporadically active with voice traffic.

		Forsyth County	
		Receive	**Transmit**
*	1	853.6750	808.6750
*	2	853.5625	808.5625
*	3	853.2750	808.2750
*	4	853.2000	808.2000
	5	853.0750	808.0750
	6	852.8250	807.8250
	7	852.6750	807.6750
	8	852.4250	807.4250
	9	852.2750	807.2750
	10	852.1750	807.1750
	11	851.9250	806.9250
	12	851.7125	806.7125
	13	851.6625	806.6625
	14	851.4250	806.4250
	15	851.2125	806.2125

	Kernersville		
		Receive	**Transmit**
	1	853.4250	808.4250
	2	853.1375	808.1375
	3	852.8750	807.8750
	4	852.7000	807.7000
	5	852.2500	807.2500
	6	851.6375	806.6375
	7	851.1375	806.1375
	8	853.3375	808.3375
*	9	852.7500	807.7500
	10	851.8750	806.8750

	Mutual Aid	
	Receive	**Transmit**
8Call90	851.0125	806.1250
8Tac91D	851.5125	806.5125
8Tac93	852.5125	807.5125
FireVR	770.9625	PL 156.7

Towers	**Location**	
Forsyth	36.110058	-80.076803
Town of Kernersville	36.110058	-80.076803

Section 11.4 – Radio Signal Strength Studies

Any builder owner wishing to demonstrate that the existing radio signal levels inside the building meet the minimum criteria as specified in NC 2018 Fire Code Section 510.4.1 will be required to submit a Radio Signal Strength Study. Such studies will be performed by a suitably qualified engineer or technician with an FCC General Radio Operator's License or acceptable alternative qualifications. Acceptance of alternative technical qualifications will be done on a case by case basis by the Fire Marshal's Office (**FMO**).

Signal studies can only be conducted once the building is closed-in, i.e. all windows, doors, dry wall, exterior coatings, racking and roof in place.

Radio Signal Strength Studies shall be conducted in compliance with the 20-grid method for each floor as outlined in NC 2018 Fire Code Section 510.5.3. In addition to showing one measurement in the center of each grid, the study must also show the signal levels as measured in each Critical Area. Critical Areas (as defined in 2013 NFPA 72 Section 24.5.2.2.1) are fire command centers, fire pump rooms, exit stairs, exit passageways, elevator lobbies, standpipe cabinets, and sprinkler valve locations. Critical Areas will be required to have 99% floor area radio coverage. Documentation submitted shall include a 20-grid floor plan for each floor with signal levels annotated on each grid of the floor plan as well as for all critical areas. Since the Public Safety Radio System is a multi-site simulcast system, multipath fluctuations can use the instantaneously measured signal levels to bounce up and down within a range of 5-10 dBm. Personnel conducting signal surveys are encouraged to not use instantaneous signal level readings, but rather sample and average the signal levels for a period of several seconds before recording the signal level for each grid.

For exceptionally large floor areas such as schools and shopping malls, where dividing a large number of square feet into 20 grids creates unreasonably large grids, building owners/managers are strongly encouraged to work with FMO personnel to develop a sampling strategy that does not leave large areas untested. The FMO will work with the owner/manager of such buildings on a case by case basis.

All signal measurements will be conducted using an approved professional-grade spectrum analyzer that has been calibrated within 12 months of the date of the study. A copy of the most recent spectrum analyzer calibration certificate shall be included with the Radio Signal Strength Study.

After submission of the study the building owner will know as to whether the results were accepted or whether an ERRCS will be required. The FMO reserves the right of do its own signal level spot checks to verify study results.

Radio Signal Strength Study results do not need to be submitted if the building owner has already determined that an ERRCS will be required.

Section 11.5 - ERRCS Installation

For buildings that fail to meet the criteria for sufficient radio signal levels, an ERRCS will be required. An ERRCS captures the radio signal at the rooftop level through an outdoor donor antenna and carries that signal to the interior of the building where it can be amplified by a Bi-directional Amplifier (BDA), also known as a signal booster. The amplified signal output of the BDA will normally be redistributed within the building via a Distributed Antenna System (DAS). In some case, it may be necessary to distribute the amplified signal by a "leaky" coaxial cable method. The amplified signal distributed inside the building should not radiate beyond the perimeter of the building or generate any interference to any licensed radio service.

Per NC 2018 Fire Code section 510.5.1, no ERRCS shall be installed without prior coordination and approval of the FMO. All ERRCS installation plans shall be submitted to FMO approval. Upon approval, the building owner/manager will be issued a "Letter of Authorization to Retransmit" for radio frequencies licensed to the Forsyth County and Town of Kernersville Public Safety Radio Systems. (see also Section 6-FCC requirements).

As specified in Section 510.3 of the NC 2018 Fire Code for new construction, a construction permit is required for any installation or modification of an ERRCS. An ERRCS permit shall be obtained from the FMO once the installation plan has been approved. Fees will apply. Installation of all ERRCS, to include rooftop antenna components and all required electrical wiring, antenna cables, conduits, bonding, grounding, and lightning protection, will be in compliance with all applicable NC building and fire codes.

Section 11.6 – Alarm System Interface

Per NC 2018 Fire Code Section 510.4.2.4.3, all ERRCS and backup battery systems shall be electrically supervised and monitored by an alarm service. Functions typically available for monitoring from most ERRCS include donor antenna failure, BDA failure, AC power failure, battery failure, and battery charger failure. These fault modes should normally be transmitted to the fire alarm system and displayed on the annunciator panel. The panel display should indicate clearly that the fault is an ERRCS failure and also identify the specific ERRCS fault mode.

When faults have been rectified, the alarm panel display should automatically reset. ERRCS failures should be monitored by the alarm service and reported to the building owner/manager or the ERRCS vendor so that restoration of radio service can occur as quickly as possible. The alarm monitoring company should **not** notify the 911 center for a fire response solely because of an ERRCS failure alarm.

The FMO need not be notified for an ERRCS failure unless the outage lasts more than 24 hours. In the event of an outage of more than 24 hours, the Kernersville Fire Rescue Department should be notified of the outage and asked to pass the message on to the Fire Marshal. The same procedure should be used to notify the Fire Marshal when the ERRCS system has been restored. The business line for the Kernersville Fire Rescue Department is (336) 996-4885.

In installations where the ERRCS enclosure is not co-located with the fire alarm panel, the fire alarm panel room will be outfitted with a Knox key switch that can remotely shutdown the ERRCS in the event of a radio interference issue. FMO assistance will be required to procure a Knox switch keyed for Kernersville Fire Rescue Department.

Section 11.7 - FCC Requirements

Beyond the provisions of the NC code, the Federal Communications Commission (**FCC**) imposes additional rules and regulations on the installation of any ERRCS. All ERRCS designers and installers should be familiar with the provisions of FCC Title 47, Part 90, Section §90.219 (Use of Signal Boosters).

All ERRCS systems shall use only boosters (also known at BDAs) that are type-certified by the FCC.

Per §90.219, the FCC requires that specific documentation be issued to an ERRCS operator that allows the ERRCS system to operate on radio frequencies licensed to Forsyth County and Town of Kernersville Public Safety Radio Systems. As noted above in Section 4, once the ERRCS installation plan has been approved by DSD, a Letter of Authorization to Retransmit will be issued to the building owner/manager to cover this requirement. This Letter of Authorization should be stored or displayed prominently on or near the ERRCS enclosure. The Authorization Letters are valid for one year and must be re-issued for each annual re-inspection (see Section 10 - Annual Re-inspections).

In addition, the FCC requires that all Class B ERRCS systems be registered in the FCC Signal Booster Data Base, which can be accessed online at:

www.fcc.gov/signal-boosters/registration

The ERRCS installer is responsible for entering any Class B ERRCS installed in The Town of Kernersville into the FCC Signal Booster Database. An FCC Registration Number (**FRN**) is required to enter boosters into the database. If the installer does not already have an FRN, one can be obtained from the FCC CORES system online at: https://apps.fcc.gov/coresWeb/publicHome.do

Once the Class B ERRCS has been registered in the data base, a Booster ID will be issued by the FCC to the applicant. A copy of the Class B booster registration, including the Booster ID, shall be forwarded to the FMO. There is no FCC requirement for registration of Class A boosters.

No ERRCS shall transmit on any Forsyth County and Town of Kernersville Public Safety Radio System frequencies until the Letter of Authorization to Retransmit has been issued. Additionally for any Class B ERRCS, the ERRCS shall not transmit on any frequencies until the ERRCS has been registered in the FCC database and the Booster ID number reported to the FMO.

Section 11.8 – Minimum Qualification Requirements

Minimum qualification for the ERRCS system designer and lead installer are specified in NC 2018 Fire Code Section 510.5.2. Any waiver of these requirements will be done on a case-by-case basis by the FMO.

Section 11.9 – Acceptance Testing

Acceptance testing for installed ERRCS shall be conducted by FMO personnel using Fire Department radios in accordance with NC 2018 Fire Code Section 510.5.3. An ERRCS acceptance test can only be conducted once the building is closed-in, i.e. all windows, doors, drywall, roofs, racking and exterior coatings in place. The building owner can contact the FMO to request an ERRCS acceptance test and final inspection once the installation is complete and all alarm panel interfaces duly tested.

A set of floor plans shall be prepared by the installer with the 20 grids marked off for each floor. The plans should already be annotated with the installer's own spectrum analyzer measurements for all 20 grids on each floor. In buildings with exceptionally large floor areas such as schools and shopping malls, where dividing a large number of square feet into 20 grids creates unreasonably large grids, building owners/managers are strongly encouraged to work with FMO personnel to develop a strategy that does not leave large areas untested.

The FMO will work with the owner/manager of such buildings on a case by case basis. In addition to showing one measurement in the center of each grid, the test must also show the signal level as measured in each Critical Area. Critical Areas are defined as fire command centers, fire pump rooms, exit stairs, exit passageways, elevator lobbies, standpipe cabinets, and sprinkler valve locations. Critical Areas will be required to have 99% floor area radio coverage. The annotated plans will be presented to the FMO personnel conducting the acceptance test at the time of the test (or before the test if possible).

Acceptance testing will also include demonstration of the alarm panel interface, to include simulations of all possible fault modes, as well as the function of the Knox key switch if installed. Final acceptance testing will also include an electrical inspection to ensure compliance with all NC electrical codes, to include electrical wiring, conduits, antenna cabling, grounding, bonding, and lightning protection.

Section 11.10 – Labeling

All ERRCS systems should be labeled at the BDA enclosure. The enclosure should be labeled with the words "ERRCS - Emergency Responder Radio Coverage System." In addition, instructions should be posted for how to completely disable the ERRCS in case of radio interference issues. If used, the Knox cutoff switch should be clearly labeled with the words "ERRCS Remote Cutoff Switch."

Section 11.11 – Annual Re-inspections

Annual re-inspection and re-testing of all ERRCS is required in accordance with NC 2018 Fire Code Section 510.6.1 and is the responsibility of the builder owner/manager. Results of the annual re-inspection and test shall be submitted to the FMO at the time of the annual inspection. A renewed Letter of Authorization to Retransmit on Forsyth County and Town of Kernersville Public Safety Radio System frequencies should be requested by the builder owner/manager at the time of the annual re-inspection. The renewed Letter of Authorization will then be sent to the builder owner/manager and should be posted at the location of the ERRCS system enclosure.

Section 11.12 - ERRCS Service Providers

Building owner/managers are allowed to use any vendor or contractor they wish to perform Radio Signal Strength studies or to install ERRCS equipment, assuming they meet the minimum qualifications as outlined above. Kernersville Fire Rescue Department does not provide a specific list of approved vendors.

APPENDIX A - Knox Rapid Entry System

Knox® Rapid Access System

Version: November 15, 2018

The Knox® Rapid Access System used by the Kernersville Fire Rescue Department is designed to expedite entry and eliminate property damage caused by the forcible entry required for evaluation of an emergency, and allows the Fire Department to secure a gate or building when leaving.

There are three components to the Knox® Rapid Access System used by the Kernersville Fire Rescue Department:

- KNOX-BOX® Key Vault
- KNOX® Elevator Box
- KNOX® Document Cabinet
- KNOX® Key Switches and KNOX® Padlocks
- KNOX® FDC Plugs and Caps

KNOX-BOX® Key Vault

A KNOX-BOX® Key Vault is a highly secure, 1037 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. KNOX-BOX® Key Vault are required for all buildings with a fire suppression or fire detection system, and locations where there may be extended response times by key holders.

Knox® Rapid Access System (cont'd)

KNOX® Elevator Box

Allows first responders to manually open elevator landing doors by providing access to elevator drop keys. The Knox Elevator Box also stores interior keys to open doors within the building.

KNOX® Document Cabinet

Built for large buildings, enable rapid access throughout the facility by storing up to 231 keys, floorplans, Haz-Mat data, critical documents, evacuation plans, and more.

Knox® Rapid Access System (cont'd)

KNOX® Key Switches and KNOX® Padlocks

KNOX® Key Switches and KNOX® Padlocks are the Kernersville Fire Rescue Department approved and standardized means for gates and overhead door access. The KNOX® Key Switch overrides electronic gates and roll up doors. KNOX® Padlocks allow access through manual and mechanical gates. KNOX® Key Switches and KNOX® Padlocks are required on any gates in the Town of Kernersville as indicated in the Emergency Access to Gated Properties and Developments Ordinance.

A special key, to access KNOX-BOX® Key Vaults, KNOX-BOX® Key Vault, KNOX® Key Switches and KNOX® Padlocks, is located securely inside of fire department apparatus.

KNOX® FDC Plugs and Caps

KNOX® FDC Plugs and Caps protect fire department connections and hydrants. A special key, carried on fire department apparatus, is required to remove the cap or plug to access the fire department connection or hydrant. KNOX® FDC Plugs and Caps may be required by the department in locations where the FDC connection or hydrant(s) have been or may be subject to, vandalism or improper use. This determination is made by the fire code official.

Knox® Rapid Access System (cont'd)

The Kernersville Fire Rescue Department has used the Knox® Rapid Access System for many years. Knox Box(es), key switches and locks may be ordered online.

To order key vaults, elevator box, document cabinet or FDC caps/plugs visit: www.knoxbox.com/8174

To order key switches and pad locks visit: www.knoxbox.com/21753

Please contact the Kernersville Fire Rescue Department / Fire Marshal's office at (336) 996-4885 if ordering assistance is needed.

Important Installation Information:

A KNOX-BOX® Key Vault shall be installed in an approved location by the fire department. The key vault shall be installed between 4' – 5' from the ground unless otherwise approved by the code official. The key vault shall not be blocked from plain view by any obstructions (Landscaping, etc.) More than one key vault may be required depending on the size of the building/complex. Identification stickers that come with a key vault should be placed on the main entrance door near the locking device.

Additional stickers can be obtained if necessary. Once a KNOX-BOX® Key Vault is mounted, call (336) 996-4885 to request a fire code official to come out and put facility keys in the key vault and lock it.

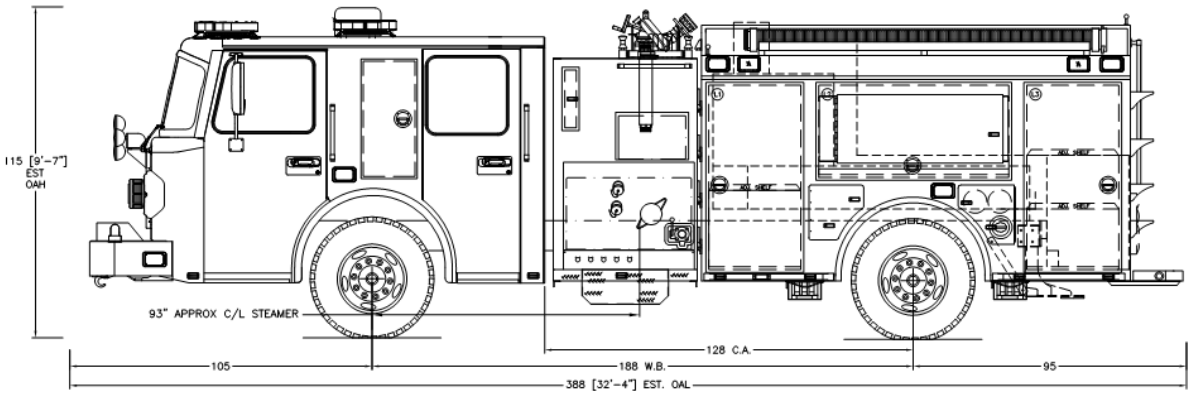
A KNOX® Key Switch shall be installed in an approved location by the fire department. This may be on or adjacent to access control panels or other locations near the gate, as determined by the fire code official. The key switch shall be installed between 4' – 5' from the ground unless otherwise approved by the fire code official. Identification stickers that come with a KNOX® Key Switch should be placed next to the switch. Additional stickers can be obtained if necessary. Once a KNOX-BOX® Key Switch is installed, call (336) 996-4885 to request a fire code official to come out test the switch.

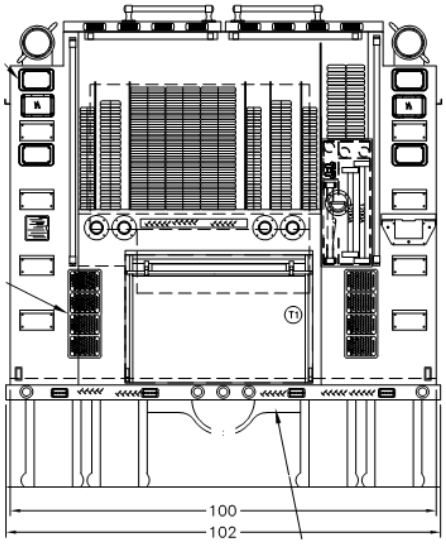
Contact Kernersville Fire Rescue Department to request a fire code official to install KNOX® Padlocks and KNOX® FDC Plugs and Caps.

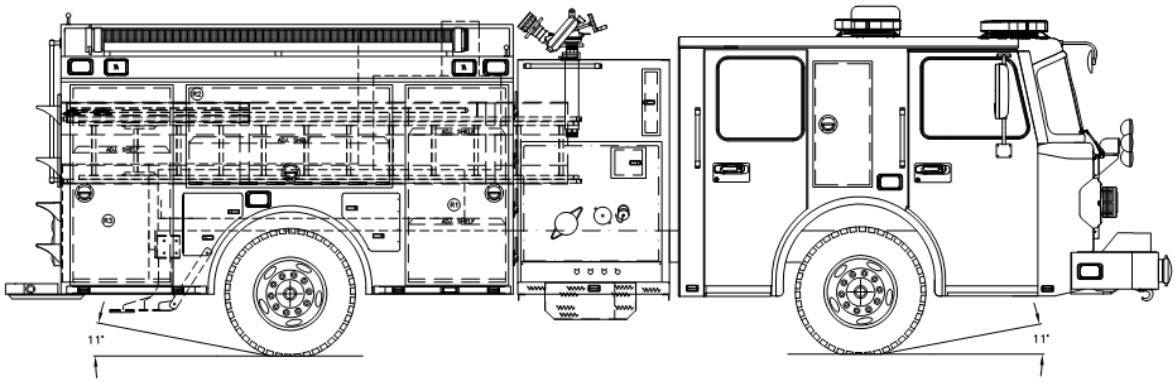
If you are unsure or have questions, call (336) 996-4885.

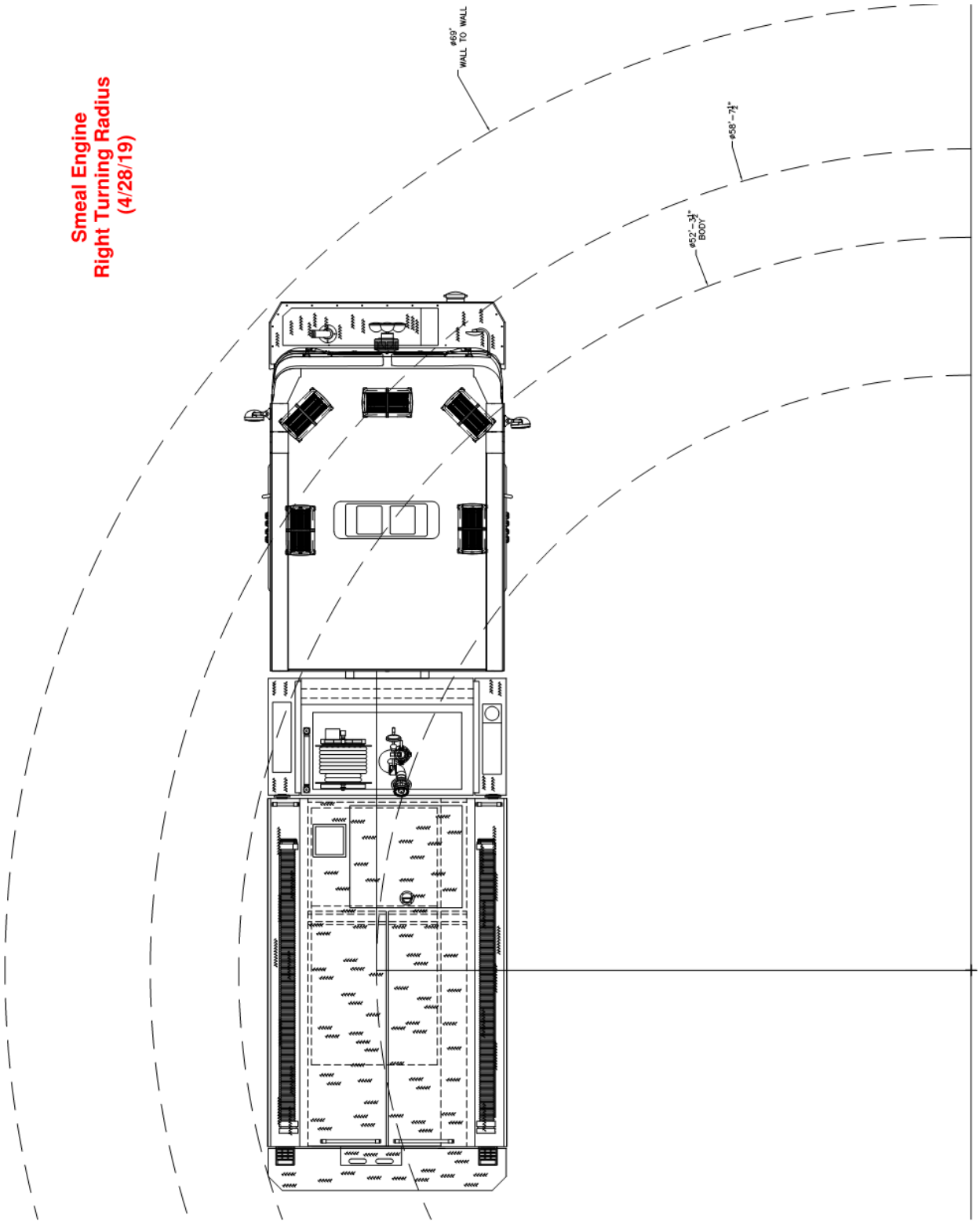
APPENDIX B - Fire Apparatus Turning Radius

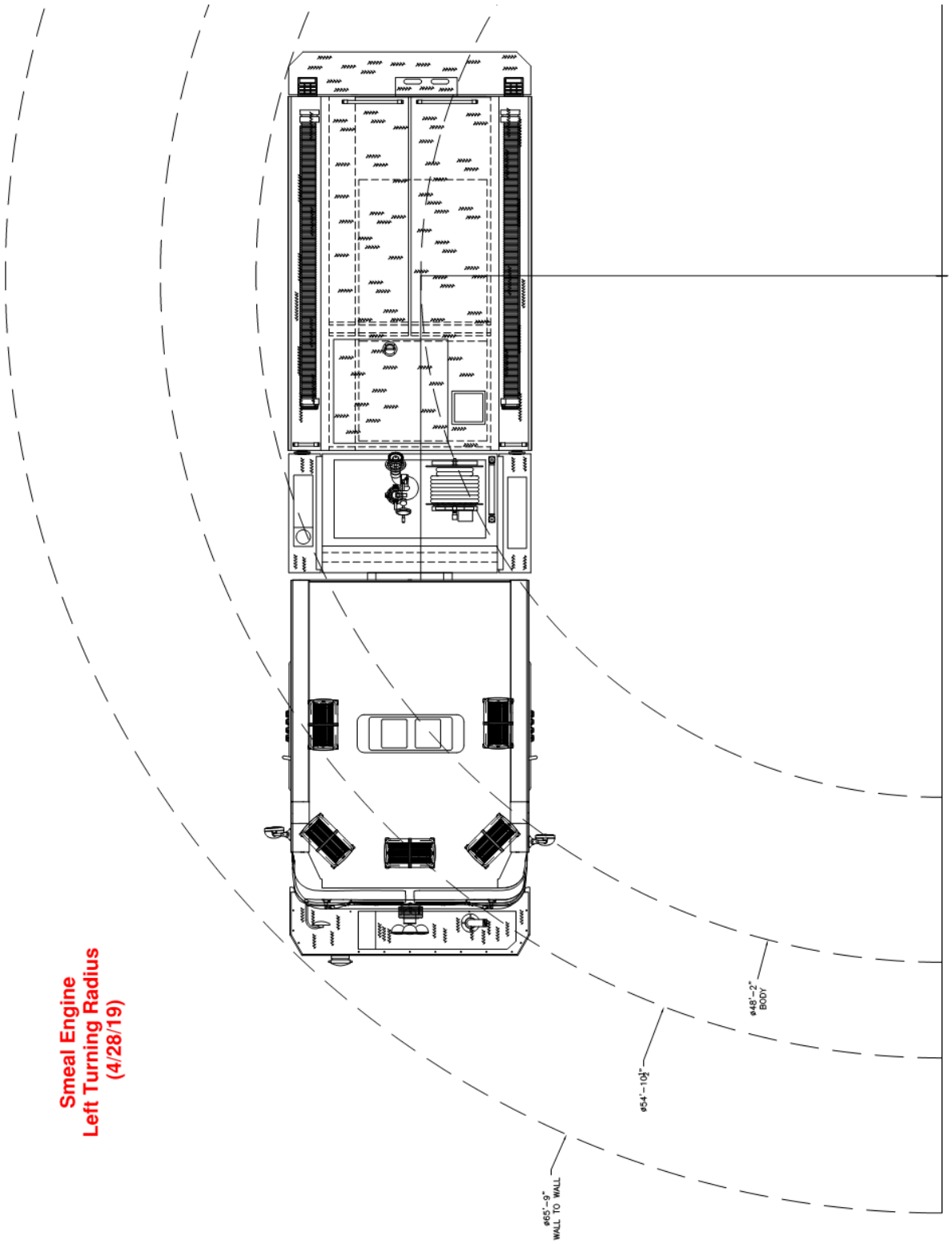
Smeal Engine Length and Height Specifications (4/28/19)

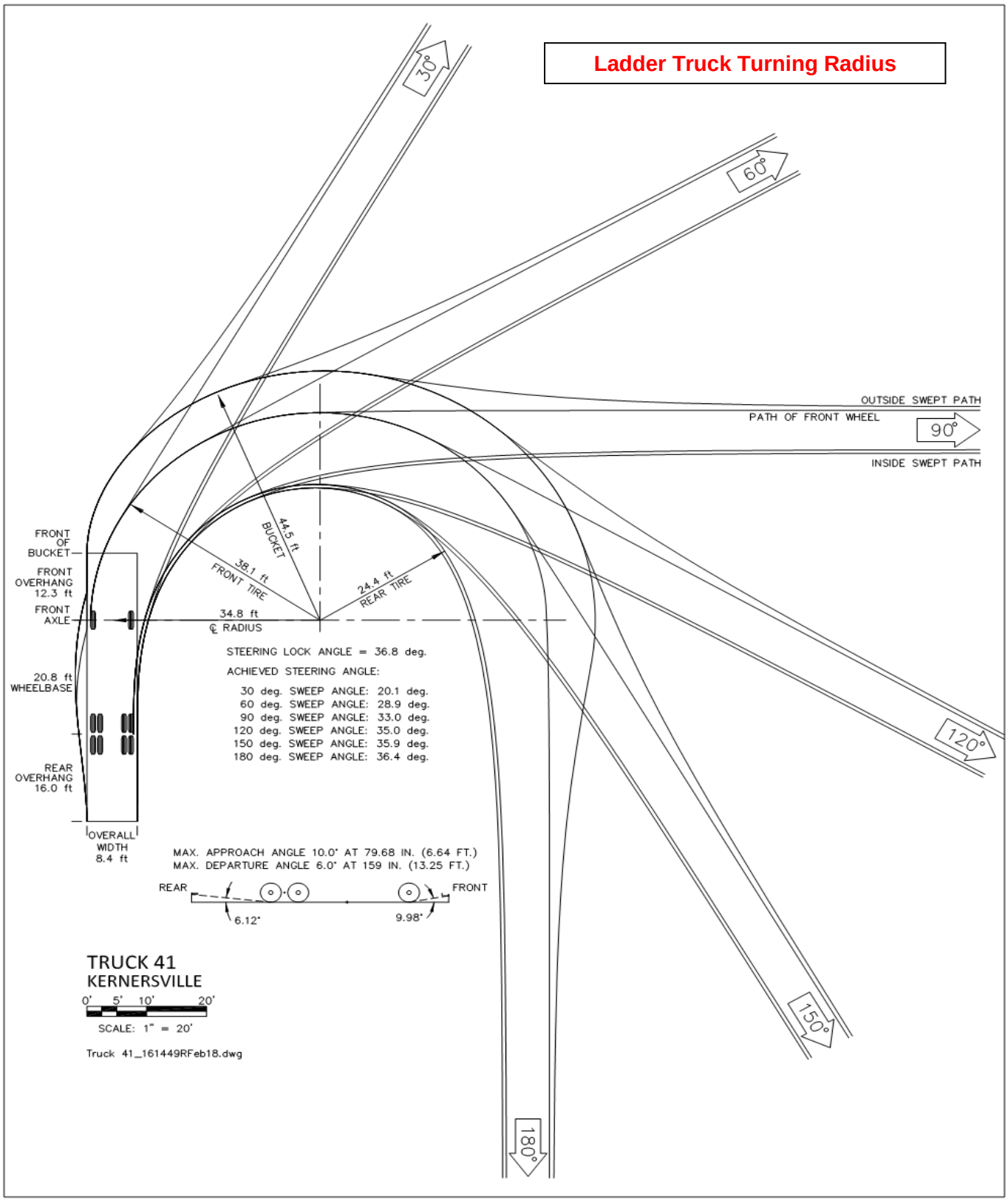







Smeal Engine
Right Turning Radius
(4/28/19)
ø69'
WALL TO WALL
ø58'-7½"
ø52'-3½"
BODY


Smeal Engine
Left Turning Radius
(4/28/19)
ø48'-2"
BODY
ø54'-10"
ø55'-5"
WALL TO WALL


Ladder Truck Turning Radius
30°
60°
90°
120°
150°
180°
OUTSIDE SWEPT PATH
PATH OF FRONT WHEEL
INSIDE SWEPT PATH
FRONT OF BUCKET
FRONT OVERHANG 12.3 ft
FRONT AXLE
20.8 ft WHEELBASE
REAR OVERHANG 16.0 ft
OVERALL WIDTH 8.4 ft
44.5 ft BUCKET
38.1 ft FRONT TIRE
24.4 ft REAR TIRE
34.8 ft ℄ RADIUS
STEERING LOCK ANGLE = 36.8 deg.
ACHIEVED STEERING ANGLE:
30 deg. SWEEP ANGLE: 20.1 deg.
60 deg. SWEEP ANGLE: 28.9 deg.
90 deg. SWEEP ANGLE: 33.0 deg.
120 deg. SWEEP ANGLE: 35.0 deg.
150 deg. SWEEP ANGLE: 35.9 deg.
180 deg. SWEEP ANGLE: 36.4 deg.
MAX. APPROACH ANGLE 10.0° AT 79.68 IN. (6.64 FT.)
MAX. DEPARTURE ANGLE 6.0° AT 159 IN. (13.25 FT.)
REAR
FRONT
6.12°
9.98°
TRUCK 41
KERNERSVILLE
0' 5' 10' 20'
SCALE: 1" = 20'
Truck 41_161449RFeb18.dwg

APPENDIX C – NFPA 704 Warning Placard Requirements

NFPA 704 Warning Placard Requirements

Introduction

Whenever large amounts of hazardous materials are being stored and used, warning placards are required. These placards act as an immediate warning system for emergency service personnel, helping them identify the kinds of materials present and the dangers they pose[1].

[1] *The placard design is based on the hazard identification system described in Recommended System for the Identification of the Fire Hazards of Materials, National Fire Protection Association (NFPA) 704.*

Hazard Categories

The diamond-shaped placards use these four color-coded categories to give at a glance a general idea of the hazards present:

- Health: blue, at the left. Injury hazard from burning materials
- Flammability: red, at the top. Susceptibility of materials to burning
- Reactivity: yellow, at the right. Susceptibility of materials to release energy
- Special hazards: white, at the bottom for hazards important to emergency response personnel; additional special hazards in rectangular white boxes below the placard

Hazard Rankings

The numbers in each box give the order of severity in emergency conditions such as spills, leaks, and fires, from four, indicating severe hazard or extreme danger, to zero, indicating no required warning.

Determining Warning System Placarding Requirements

Follow these steps to determine whether placards are required.

Step One: Select Rating Numbers

Determine each material stored or used at the facility and its warning system category and rating. Refer to the material safety data sheets (MSDS) for your building/facility. Use these criteria:

Hazard Category	Rating Number	Description
Health (Blue)	4	Materials that under emergency conditions can be lethal
	3	Materials that under emergency conditions can cause serious injury
	2	Materials that under emergency conditions can cause temporary incapacitation or residual injury
	1	Materials that under emergency conditions can cause significant irritation
	0	Materials that offer no hazard beyond that of ordinary combustible material
Flammability (Red)	4	All liquids and gases with a flash point below 73F and a boiling point below 100F
	3	All liquids and gases with flash points at or below 73F and a boiling point at or above 100F and those liquids having flash point at or above 73F and below 100F
	2	All liquids with a flash at or above 100F and below 200F or solids that readily give off vapors
	1	All liquids, solids, and semi solids with flash points at or above 200F
	0	Materials that will not burn, including any material that will not burn in air when exposed to a temperature of 1500 for a period of 5 minutes
Reactivity (Yellow)	4	Materials readily capable of detonation or explosive reaction at normal temperatures and pressures. Includes materials that are very sensitive to heat, shock, or light. Examples would include explosives A & B and organic peroxides
	3	Materials which when heated and under confinement are capable of detonation and which may react violently with water. A "W" should appear as a special hazard if an explosive reaction with water can be expected. Examples would include blasting agents, fireworks, and ammonium nitrate fertilizer
	2	Materials which will undergo a violent chemical change at elevated temperatures and pressures but do not detonate. A "W" should appear as a special hazard if contact with water may cause a violent reaction or may cause potentially explosive mixtures to be formed. Examples would include combustible metals and water reactive corrosive materials
	1	Materials which are normally stable but may become unstable in combination with other materials or at elevated temperatures and pressures. A "W" should appear as a special hazard if a vigorous but not violent reaction with water may take place. Examples would include most common corrosive and oxidizing materials
	0	Materials that in themselves are normally stable, even under fire conditions
Special Hazards (White)		Note: Refer to the MSDS for the NFPA symbol for each hazard category. Special hazard symbols, such as W (water reactive), OXY (oxidizing material), CRY (cryogenic material), COR (corrosive material), POI (poisonous material), or the radiation warning symbol, must be added to the white bottom section of the placard when available information indicates that one of these special hazards exist. When multiple special hazards exist, add white panels below the placard to list the additional special hazards that apply.

Special Hazards

Step Two: Determine the Need for Placards

Compare the total amount of materials with the same hazard category number to the amount requiring placards for each hazard category number. ***Note: Placards will not be required for underground storage of motor fuel***

Building/Facility Placards

Facility and building placards identify the highest hazard rating in each category based on the combined materials in a category rating exceeding threshold quantities. Placards will be required when the following amounts of materials are stored or used at a facility:

Hazard Category	Rating Number	Amount Requiring Placarding on a Building or within a Facility (Aggregate Totals of Weight or Volume)
Health (Blue)	4	> 100 lbs or 10 gals or 50 cu ft
	3	> 100 lbs or 10 gals or 50 cu ft
	2	> 500 lbs or 55 gals or 1000 cu ft
	1	> 1000 lbs or 110 gals or 200 cu ft
Flammability (Red)	4	> 500 lbs or 55 gals or 1000 cu ft
	3	> 500 lbs or 55 gals or 1000 cu ft
	2	> 1000 lbs or 110 gals or 2000 cu ft
	1	> 2000 lbs or 220 gals or 4000 cu ft
Reactivity (Yellow)	4	> 100 lbs or 10 gals or 50 cu ft
	3	> 100 lbs or 10 gals or 50 cu ft
	2	> 500 lbs or 55 gals or 1000 cu ft
	1	> 500 lbs or 55 gals or 1000 cu ft

Subdivision Placards

Subdivisions (rooms or compartments) of buildings or areas within a facility will be placarded to indicate the greatest possible hazards within those subdivisions. Placards will be required when the following amounts of materials are stored or used in a subdivision:

Hazard Category	Rating Number	Amount Requiring Placarding on a Building or within a Facility (Aggregate Totals of Weight or Volume)
Health (Blue)	4	Any amount
	3	Any amount
	2	> 100 lbs or 10 gals or 50 cu ft
	1	> 500 lbs or 55 gals or 1000 cu ft
Flammability (Red)	4	> 100 lbs or 10 gals or 50 cu ft
	3	> 100 lbs or 10 gals or 50 cu ft
	2	> 500 lbs or 55 gals or 1000 cu ft
	1	> 1000 lbs or 110 gals or 2000 cu ft
Reactivity (Yellow)	4	Any amount
	3	Any amount
	2	Any amount
	1	Any amount

Step Three: Make and Place the Placards

Building facility placards must be 15 inches by 15 inches, with each category diamond 7.5 inches by 7.5 inches. Each category diamond on the placard must have the proper background color. The numbers must be 6.0 inches in height with a 0.75-inch stroke, and the number must be centered within its diamond. The numbers may be either white or black, providing sufficient contrast is made against the background color in each category. Subdivision placards may be smaller, typically 8.0 x 8.0 inches.

Placards shall be affixed to buildings or areas within the facility on each side where entry can be made at an appropriate height to be easily seen from approaching emergency equipment. A placard must be placed at the property line on a facility gate or post if a placarded building or area within a facility cannot be easily seen when approaching the property. Affix subdivision placards next to access points into the subdivisions. These placards must be visible when doors into subdivisions are opened or closed.