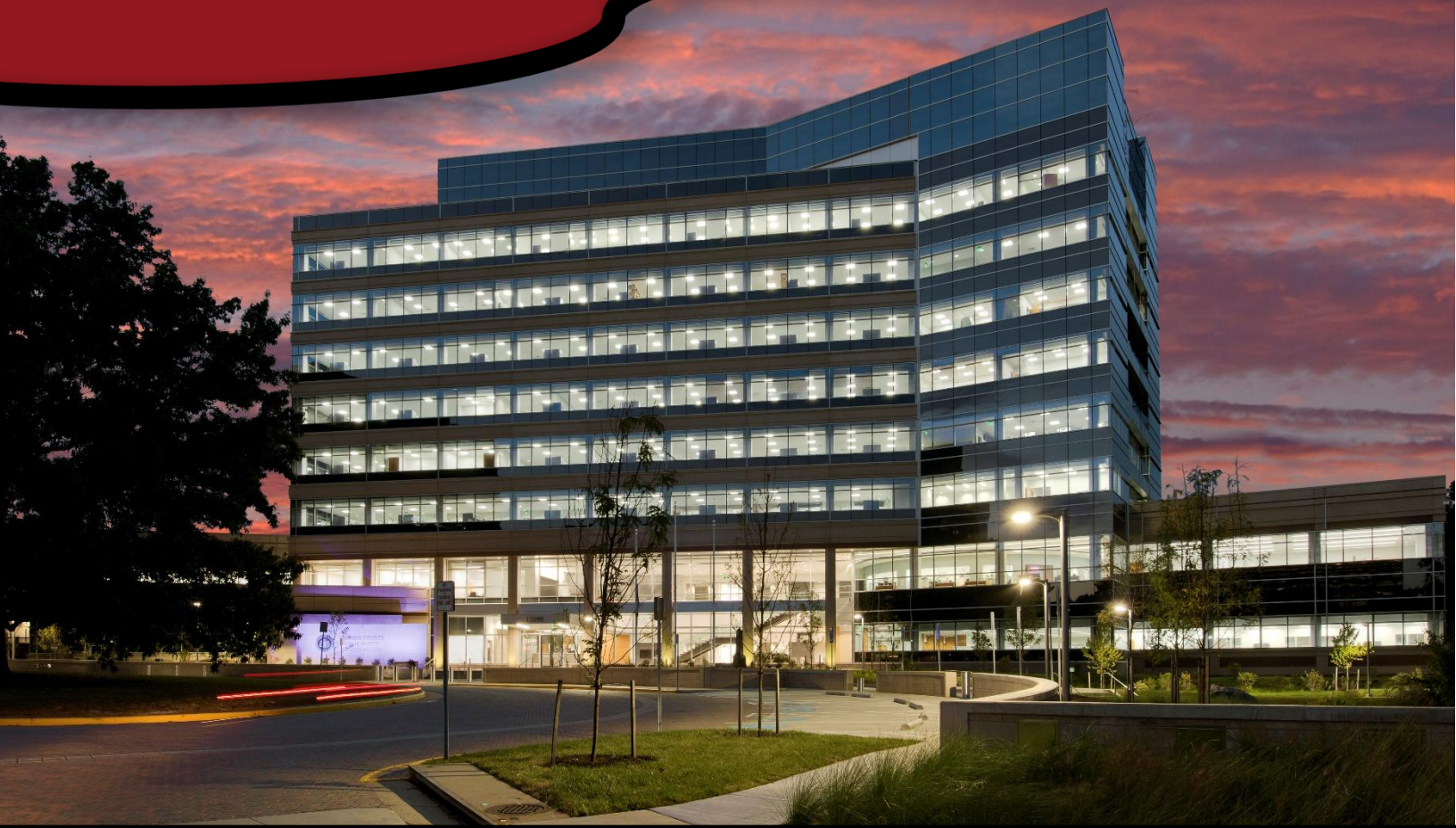




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# CODE REFERENCE PACKAGE (CRP) FOR THE 2018 VIRGINIA UNIFORM STATEWIDE BUILDING CODE (USBC) AND REFERENCED NFPA STANDARDS

Version 2, February 2024



Public Safety Headquarters

Office of the Fire Marshal  
Engineering Plans Review Branch  
12099 Government Center Parkway, 3<sup>rd</sup> floor  
Fairfax, VA 22035  
Tel: 703-246-4806, TTY 711  
Fax: 703-246-6043  
Email: [fire.engplansreview@fairfaxcounty.gov](mailto:fire.engplansreview@fairfaxcounty.gov)  
OFM Homepage – <https://www.fairfaxcounty.gov/fire-ems/fire-marshal>



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# CODES AND STANDARDS IN FORCE

## SUMMARY

Effective July 1, 2025

**NOTICE:** ALL PERSONS ARE REQUIRED TO CONSULT AND COMPLY WITH THE CODES. USE OF THE CODE REFERENCE PACKAGE (CRP) DOES NOT EXEMPT THE USER FROM DIRECT USE OF THE CODES.

1. **Fairfax County Public Facilities Manual (PFM)** current edition, see especially Chapter 9. The PFM is continuously updated.
2. **Virginia Construction Code (VCC)** 2021 edition, incorporating International Building Code (IBC), published by the International Code Council, Inc. (ICC) 2021 with emendations.

ICC International Fire Code 2021 (IFC)  
ICC International Existing Building Code 2021 (IEBC)  
ICC International Mechanical Code 2021 (IMC)  
ICC International Plumbing Code 2021 (IPC)  
National Electrical Code 2020 (NEC)

3. **Fairfax County Fire Prevention Code**, incorporating the International Fire Code with emendations, and incorporating VA Statewide Fire Prevention Code (SFPC) 2021 (effective January 18, 2024)
4. **Elevator Code** ASME A17.1-2019, Safety Code for Elevators and Escalators
5. **Accessibility Code** ICC A117.1-2017, Accessible and Usable Buildings and Facilities
6. **Referenced Standards:** The following are the principal National Fire Protection Association (NFPA) standards used by Fairfax County. This list is not exhaustive of the NFPA standards referenced by the VCC and the SFPC. Please refer to Chapter 35 of the VCC and Chapter 80 of the SFPC for the complete list of referenced NFPA standards.

NFPA 10 (2018) Portable Fire Extinguishers

NFPA 13 (2019) Installation of Sprinkler Systems

NFPA 13D (2019) Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes

NFPA 13R(2019) Installation of Sprinkler Systems in Low-Rise Residential Occupancies

NFPA 14 (2019) Installation of Standpipe and Hose Systems

NFPA 17 (2021) Dry Chemical Extinguishing Systems

NFPA 17A(2021) Wet Chemical Extinguishing Systems

NFPA 20 (2019) Installation of Stationary Pumps for Fire Protection

NFPA 22 (2018) Water Tanks for Private Fire Protection

NFPA 24 (2019) Installation of Private Fire Service Mains and Their Appurtenances

NFPA 25 (2020) Inspection, Testing & Maintenance of Water-Based Fire Protection Systems

NFPA 30 (2021) Flammable and Combustible Liquids Code

NFPA 30A(2021) Code for Motor Fuel Dispensing Facilities and Repair Garages

NFPA 30B	(2019)	Manufacture and Storage of Aerosol Products
NFPA 33	(2018)	Spray Application Using Flammable or Combustible Materials
NFPA 58	(2020)	Liquefied Petroleum Gas Code
NFPA 70	(2020)	National Electrical Code (NEC)
NFPA 72	(2019)	National Fire Alarm and Signaling Code
NFPA 80	(2019)	Fire Doors and Other Opening Protectives
NFPA 92	(2018)	Smoke Control Systems
NFPA 241	(2019)	Safeguarding Construction, Alteration, and Demolition Operations
NFPA 2001	(2018)	Clean Agent Fire Extinguishing Systems

## PERMIT REQUIREMENT RESOURCES FOR MISCELLANEOUS ITEMS

The following table has been provided for reference purposes regarding code compliance that do not otherwise appear in this document:

ITEM	PRIMARY CODE REFERENCE	FURTHER REFERENCE
Assembly Occupancies	SFPC Section 403.2	<a href="#">Fire Marshal Requirements</a>
Barbeque Grills	SFPC Section 308.1.4	<a href="#">Code Compliance Guideline – Charcoal Burners &amp; Outdoor Barbeque Grills</a>
Bonfires	SFPC Section 307	<a href="#">Code Compliance Guideline – Bonfires</a>
Candles & Open Flame Decorations	SFPC Section 308.3	<a href="#">Code Compliance Guideline – Candles, Oil Lamps, Decorative Torches &amp; Gas Lights</a>
Carnivals & Fairs/Festivals	SFPC Section 108.1	<a href="#">Code Compliance Guidelines and Outdoor Public Assemblages 500 + Persons</a>
Controlled Burning	SFPC Section 307.2	<a href="#">Code Compliance Guideline – Controlled Burning</a>
Evacuation Planning	Dependent on Occupancy Type	<a href="#">Code Compliance Guideline – Emergency Planning &amp; Preparedness</a>
Fireworks	SFPC Section 108.1.1	<a href="#">Code Compliance Guideline – Fireworks and Pyrotechnics</a>
High-piled Storage	SFPC Chapter 32	<a href="#">Code Compliance Guideline – High-Piled Combustible Storage</a>
Indoor Vehicle Displays	SFPC Section 314.4	<a href="#">Code Compliance Guideline – Gas-and Liquid-Fueled Vehicles</a>
Non-Residential Use Permit (NonRUP)	Fairfax County Zoning Ordinance Section 18-701	<a href="#">Code Compliance Guideline – Nonresidential Use Permits (NonRUP)</a>
Portable Fireplaces <sup>1</sup>	SFPC Section 307.4.3	<a href="#">Code Compliance Guideline – Chimineas, Fire Pits, &amp; Similar Outdoor Solid-Fuel Burns Devices</a>
Recreational Fires <sup>1</sup>	SFPC Section 307	<a href="#">Code Compliance Guideline – Recreational Fires</a>
Temporary Tents	SFPC Chapter 31	<a href="#">Code Compliance Guideline – Temporary Tents and Membrane Structures 901+ Square Feet / 50+ Persons</a>

**FEES:** All fees are calculated per the fee schedule in Chapters 61 and 62 of the Code of the County of Fairfax Virginia. This includes work done in the Engineering Plans Review, Systems Testing, and Inspections Branches. The billing rate is per the published fee schedule.

<sup>1</sup> SFPC provides a list of requirements, but no specific permit is required.

# GENERAL GUIDELINES FOR PLAN SUBMITTALS AND DOCUMENTS

**All Plans and Documents Submitted for Permit which Detail Fire Protection Systems**, as required by Chapter 9 of the Virginia Construction Code (VCC), must be prepared in accordance with the following guidelines:

1. Submitted plans drawn to a scale less than  $1/8" = 1"$  foot will not be accepted.
2. For all plans, symbols and texts must be clearly legible and scaled appropriately for the size of the plan sheet. Any plans that are cluttered and not legible by the reviewer will be returned.
3. Submitted plans shall be in black and white only. Hard copies of plans for use in the field must be printed in color.
4. When executing the application for a permit, an applicant must provide a cogent, succinct description of work that captures the proposed scope accurately and quantitatively. "Fire alarm work" or "Modification of sprinkler system" is not considered an acceptable description of the proposed work. "Modification to an existing fire alarm system, relocating x-number of devices and adding x-number of new devices" is a best example.
5. Data packages must have an integral cover sheet using the installing contractors' letterhead noting the project address, complete scope of work narrative, and any other pertinent information. This requirement is particularly important for work that does not require a plan or shop drawing.
6. A building "key plan" must be provided on drawings to pinpoint the location in the building of the area shown on that drawing sheet.
7. When submitting revised or as built (amended) plans the applicant must provide one set of the previously approved plans (to be returned). All revisions on all pages/sheets must be "clouded," tagged with a delta designation noting the revision date, and include an updated revision block, or plans cannot be reviewed.
8. When submitting as-built (amended) plans, any comments from this office (Office of Fire Marshal [OFM] green mark-ups) on the approved original plans must be incorporated on the as-built (amended) plans.
9. When resubmitting plans that have been rejected, the designer or responsible party must submit a narrative noting corrective action taken to address each rejection comment issued by the (OFM) plans examiner, or plans cannot be reviewed.
10. All plans must include the designer's full name, email, and phone number.

**NOTE:** The [Appendix](#) contains all forms referenced throughout this document, as well as checklists which may aid in plan submission preparations.

# SITE PLAN/SUBDIVISION REVIEW CHECKLIST

The following checklist is provided to serve as a general guideline for the purpose of identifying major items of review by the Engineering Plans Review Branch of the Fairfax County Office of the Fire Marshal as required by the Fairfax County Public Facilities Manual, current edition, Chapter 9, Parts 1 and 2.

Public Facilities Manual, Current Edition (PFM 2018)  
Virginia Construction Code, 2021 Edition (VCC)  
Virginia Statewide Fire Prevention Code, 2021 Edition (SFPC)  
Fairfax County Fire Prevention Code, Current Edition (FXCO FPC)

## BUILDING DATA

1. Submitter name, address, telephone in full..... VCC 109.2
2. Building name, address in full ..... VCC 109.2
3. County site plan number (LDS Tracking Requirement for Plan Control)
4. Type of construction – VCC classification..... PFM 9-0202.2 C(2)
5. Use Group – VCC classification..... PFM 9-0202.2 C(1)
6. Number of stories..... PFM 9-0202.2 C(10)
7. Building height in feet..... PFM 9-0202.2 C(10)
8. Footprint area of building ..... PFM 9-0202.2 C(12)
9. Gross floor area of building..... PFM 9-0202.2 C(12)
10. If fire walls are to be built, label on plan with hour rating..... PFM 9-0202.2 C(11)
11. State on plan if building is to be sprinklered, in full or partial ..... PFM 9-0202.2 C(7)
12. If sprinklered, show Siamese/Fire Department Connection(s) (FDC),  
fire line locations, and size of pipe (with correct valve arrangement).. PFM 9-0202.2 C(8),(9)
13. Fire hydrants to be shown on site plan, water mains to be shown,  
and size of pipe labeled. .... PFM 9-0202.2 C(5), C(4), PFM STD FH-1,2,3,4,5
14. Provide available fire flow at 20 psi and state source of  
information ..... PFM 9-0202.2 C(6), 9-0202.2 F

## EMERGENCY VEHICLE ACCESS

1. Adequate emergency vehicle access, turning radii .....SFPC 503.2.4
2. Fire lanes to be labeled for curb painting and signage..... SFPC 503.3
3. Buildings more than five stories or 50 ft. need aerial ladder truck access. PFM 9-0202.2 I (1)
4. Dead-end fire lanes greater than 100 ft. require a turnaround ..... PFM 9-0202.2 I (5)
5. Emergency vehicle access to within 100 ft. of main entrance to every  
building ..... PFM 9-0202.2 I
6. Swimming pool access – to be within 50 ft. of edge of pool via 12 ft. wide  
access lane (must be posted fire lane) with 8 ft. wide personnel gates  
(exception for rooftop pools and pools interior to buildings)..... PFM 9-0202.2 I (6)
7. Height restrictions blocking emergency access (low overhead-like canopy)  
Minimum clearance required 13'-6" .....SFPC 503.2.1

8. Multi-story parking structure obstructions to access, also design live load to carry weight of fire department vehicles (80,800 pounds) ..... PFM 9-0202.2 I (8)

#### FIRE HYDRANT (FH) COVERAGE AND LOCATION

1. Minimum of 50 ft. distance from FH to any structure..... PFM 9-0202.1F
2. Maximum 100 ft. from FH to Siamese/FDC ..... PFM 9-0202.1H
3. FH coverage: Measured from the hydrant to the most remote point of vehicular access on the site, via the vehicular path ..... PFM 9-0202.1I
  - Industrial building and warehouse ..... 250'
  - Schools, day care centers ..... 300'
  - Offices, commercial, church, hospital, nursing home ..... 350'
  - Apartments, multi-family dwellings ..... 350'
  - Single family dwellings ..... 500'
4. Dead-end water main to FH distance:
  - 6" (150 mm.) line ..... 380 ft. max. distance
  - 8" (200 mm.) line ..... 1550 ft. max. distance
  - 10" (250 mm.) line ..... 4600 ft. max. distance
  - 12" (300 mm.) line ..... 11,150 ft. max. distance
5. No obstructions of FH within 4 ft. (plantings, fences retaining wall, etc.) or of Siamese/FDC within 10 ft. .... PFM 9-0202.1G
6. All fire water mains located in or on parking structures shall be protected from freezing ..... NFPA 24,12.2.3
7. FH location for single family dwellings: ..... PFM 9-0103.12
  - a. lot line and/or
  - b. curve of pavement
8. Siamese/FDC located on street front, address side of building ..... PFM 9-0202.1K
9. Siamese/FDC visible, accessible (within 10 ft.) ..... PFM 9-0202.1G, K
10. Water supply must be available as soon as combustibles are present on site ..... VCC 3313.1

#### HEIGHT AND AREA CHECK

1. VCC Table 503, height, and area check ..... VCC 503

#### FIRE FLOW

1. Adequate fire flow (at 20 psi) to be available on-site..... PFM 9-0202.2 C(6), 9-0202.2 F
2. Fire line properly sized ..... PFM 9-0202.2 C(8)

#### FIRE LANE DESIGNATION

1. Appropriate signage and curb markings indicated on all plans ..... FXCO FPC 503 (all)

# FIRE LANES STANDARDS FOR PLANS REVIEW AND SITE INSTALLATION

Posting and marking of fire lanes was required as of July 1986 for all sites regardless of Use Group classification. Under Section F503.1 of the Fairfax County Fire Prevention Code, the Office of the Fire Marshal is authorized to designate fire lanes on public streets and on private property where necessary. This is to prevent parking in front of or adjacent to fire hydrants and provide access for firefighting equipment. Additional areas may be designated as fire lanes as conditions warrant. Markings and signs are to be provided by the owner or agent of the property involved. Parking or otherwise obstructing such areas is prohibited.

FOR EXISTING PROJECTS, fire lanes will be designated at the request of the property owner, or agent, or if conditions warrant. The owner will be required to submit scaled site plan drawings for designation by the Office of the Fire Marshal.

FOR NEW PROJECTS, fire lanes will be designated during site plan approval. All fire lane information must be applied in a clear and orderly manner to the original mylar. All fire lanes must be shown on a site plan that is part of the site plan submittal set, and all sets must have the fire lane plan included. The site plan scale can be no smaller than 1 inch = 30 feet. Street names and building addresses are to be shown. Plans submitted must indicate fire lanes designated in accordance with Fire Prevention criteria. A summary of the information necessary to create fire lanes acceptable to Fairfax County Fire and Rescue follows.

## I. FIRE LANES

### A. General

1. Fire lanes shall be installed where required by the Office of the Fire Marshal.
2. Fire lanes shall be marked with both sign and curb delineation per headings V and VI below. All fire lane markings, locations, types of signs, etc., shall be subject to approval by the Office of the Fire Marshal.
3. Parking and traffic flow patterns shall be required as follows:

TABLE 503.2.1.1

STREET WIDTH	PARKING	FIRE LANE MARKINGS
< 28 feet	No parking allowed on either side	Both sides marked as fire lanes
28 to 36 feet	Parallel parking allowed on one side as determined by the fire official	One side marked as a fire lane
> 36 feet	Parallel parking allowed on both sides	No fire lane markings required Exception: Required access to pools, fire department apparatus access roads, and similar areas shall be marked as fire lanes

## II. HYDRANTS

### A. General

1. Parking is prohibited within 15' of a fire hydrant located along the curb line or edge of any public or private roadway. No special curb marking is required for enforcement.
2. Fire hydrants installed in parking lots are to be located within a fire lane. Curb and/or roadway markings are required in accordance with Headings V and VI below.

## III. FIRE LANE PLANS REVIEW CHECKLIST

The following checklist is provided to serve as a general guideline for the purpose of identifying major items of review by the Engineering Plans Review Branch of the Fairfax County Office of the Fire Marshal as required by the Fairfax County Public Facilities Manual, current edition, Chapter 9, Parts 1 and 2.

PFM = Public Facilities Manual, Current Edition  
VCC = Virginia Construction Code, 2021 Edition  
SFPC = Virginia Statewide Fire Prevention Code, 2021 Edition  
CRP = 2021 Code Reference Package, Current Version

### A. Fire Lane Designation

1. Appropriate signage and curb markings indicated on all plans.

PFM 9-0202 (FH-7)

## IV. NOTICES TO APPEAR ON SITE PLANS

### A. The following notices must appear on the site plans:

1. Fire Marshal field inspection is necessary for final approval of fire lanes. Fire lanes must have final approval prior to request for occupancy permit.
2. Owner shall notify the Office of the Fire Marshal, Fire Lanes Unit, 12099 Government Center Pkwy, 3<sup>rd</sup> Floor, Fairfax, Virginia 22015, 703-246-4849, TTY 711, when fire lanes have been installed.

### B. The following notices will be shown on the site plans as required:

1. To be an all-weather surface designed to support fire department vehicles.
2. To be identified as a fire lane at entrance.
3. To be maintained clear and accessible all year.
4. To have a mountable curb at entrance.
5. Provide manufacturer's specifications and installation instruction for items used in access lanes to the Office of the Fire Marshal for approval prior to installation.
6. Installation of access areas must be witnessed by the Office of the Fire Marshal. Please call for an appointment.
7. Provide approximately four feet high bollards, with steel chain locked between, at curbside entrances to access lanes.
8. Access lanes must be clearly delineated for entire length, and at ends by shrubs, lights, etc.

**V. SIGN SPECIFICATIONS**

**A. Approved fire lane signs must meet the following specifications:**

1. Sign Details
  - a. Metal construction 12 inches by 18 inches.
  - b. Red letters on reflective white background with 3/8-inch red trim strip around entire outer edge of sign. Lettering on sign to read: "NO PARKING OR STANDING FIRE LANE".
  - c. There shall be a 1/2-inch space after the line that reads "NO", a 1-inch space after the lines that read "PARKING" and "OR", and a 1 1/2-inch space after the line that reads "STANDING". Lettering size to be as follows:

**STANDARD WORDING**

"NO"	(2 inches)
"PARKING"	(2 inches)
"OR"	(1 inch)
"STANDING"	(2 inches)
"FIRE LANE"	(2 1/2 inches)

- d. Arrow (if required) shall be 1 inch by 6 inches with a solid head 1 1/2 inches wide by 2 inches deep.

2. Sign Types

**SIGN TYPE "A"**



**Figure 503.3.1.2.1**

**SIGN TYPE "C"**



**Figure 503.3.1.2.2**

**SIGN TYPE "D"**



**Figure 503.3.1.2.3**

<p>Standard wording with an arrow at bottom pointing to the right. One sign mounted parallel to the line of curbing or pavement edge at the end of the painted area.</p> <p><b>See Figure 503.3.1.2.1 above.</b></p>	<p>Standard wording with an arrow at bottom pointing to the left. One sign mounted parallel to the line of curbing or pavement edge at the end of the painted area.</p> <p><b>See Figure 503.3.1.2.2 above.</b></p>	<p>Standard wording with no arrow. Two signs mounted back-to-back perpendicular to line of curbing or edge of pavement. To be seen from either side and located every 100 feet in long stretches of a marked, painted fire lane.</p> <p><b>See Figure 503.3.1.2.3 above.</b></p>
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3. Sign Posts
  - a. Posts for fire lane signs shall be metal and securely mounted.
  - b. Signs shall be located and spaced as shown on the approved plans.
  - c. In long stretches, the maximum distance between fire lane signs shall be 100 feet.
  - d. Fire lane signs are to be mounted seven feet above the finished grade to the bottom of the sign.

## **VI. CURBS AND PAINTING**

### **A. All curbs or paved spaces designated as fire lanes:**

1. Shall be indicated by yellow (highway grade) paint as approved by the fire official.
2. In areas without curbing, a 6-inch-wide yellow stripe shall be applied to the edge of the pavement.
3. The property owner or designee shall repaint whenever the paint begins to fade or when directed by the fire official.

## **VII. EMERGENCY OPERATION FOR GATES AND BARRICADES**

### **A. Gates and barricades must meet the following specifications:**

1. In accordance with SFPC 503.6, gates and barricades that are installed across a fire apparatus access road that is normally intended for vehicular traffic shall be installed with a fire department access system which has an emergency override fire department master key switch as approved by the fire official.
2. Gates and barricades shall always be operational.

## DOOR LOCKS, EXITS, AND SECURITY

The increased focus on security over the past several years has risen. Conflicts occur between security to prevent intruders from entering the building and occupants exiting quickly in an emergency. While locking outside doors to prevent unauthorized people from entering the building is permissible under the published building code requirements, inhibiting free egress is not. Code requires, in general, that every person within the building must be able to exit all doors in the egress path to the outside without “the use of a key, or special knowledge, or effort” from the egress side.

This guideline is provided to assist the contractor, owner, and/or developer/builder with assembling a comprehensive set of plans that will result in their project moving smoothly through the building review process in the least amount of time. This checklist contains the *minimum* standard information required for a project submitted for the plan review of access control, door locks, special locks, and security.

Plans sets submitted without the minimum information listed below cannot be accepted for review. This publication does not replace, nor supersede, any provisions of the Fire Prevention Code or other codes and/or ordinances adopted by Fairfax County.

Then, the following code sections apply:

- A. All Special Locks (including those installed by or for tenants in tenant areas):** (see also VCC 1010.2.4 for main exterior egress door), VCC 1010.2.11, VCC 1010.2.12, and VCC 1010.2.13. Any special locking device installed under the above codes must meet one of the max options of these sections, known as the “push-bar option” or the “motion sensor option.” The code must be consulted for the list of all items under each of these sections which must be complied with. Do not attempt to submit any special lock plan which does not list all items found under these sections in its sequence of operation. If omission of any one element, plans cannot be approved. For I-2 special areas, see VCC 407.4.1.1.
- B. Any Exit Stairwell Door:** VCC 1010.2.7, 403.5.3. In addition to the items under item A above, VCC 1010.2.7 states that “all interior stairway means of egress doors shall be openable from both sides without the use of a key or special knowledge or effort.” An exception is “doors arranged in accordance with VCC 403.5.3.” VCC 403.5.3 applies to any building in which the stairwell doors are proposed to be locked and mandates that there be a stairwell door unlock key switch at the main annunciator panel location in the building. In addition, VCC 403.5.3.1 mandates that there be an emergency (call-out) phone for use by anyone trapped in the stairwell. Thus, any time special locks are provided on a stairwell door, the override and call-out phone (call-out phone for stairs five levels or more) must be arranged.
- C. Positive Latching:** Stairwell doors are fire-rated doors and as such (see NFPA 80, Section 6.4.4.3) require positive latching. This means that normal electric strikes in which the strike plate retracts away cannot be used in fire-rated door assemblies. There are certain exceptions to NFPA 80, Section 6.4.4.3 which provide that “in a fire emergency, the door becomes positively latched.” Thus, positive latching on a fire door must be provided.
- D. Hardware:** Rated doors (all exit stairwell doors are rated; other doors may carry a rating as well). All rated doors must have rated hardware. If there is not rated hardware on a rated door, then plans cannot be approved. If the cut sheets for the proposed hardware to be installed do not show explicitly that the hardware is rated, then it cannot be installed on a rated door. Common places where rated doors occur are stairwells, horizontal exits, fire separations, dwelling unit separations, rated corridors, etc. Fire doors modified with any installed special locks must also meet the UL listing for fire exit hardware.

1. **Builders Hardware:** Per UL category, as found in the Underwriters Laboratories Fire Resistance Directory, Volume 3, “Builders hardware for swinging fire doors of the composite, hollow-metal, metal clad, sheet metal, and wood-core types are listed in the following categories: auxiliary locks, electric strikes, fire exit hardware, automatic type flush or surface bolts, manual type flush or surface bolts, self-latching type flush or surface bolts, single point locks or latches, electrically controlled single-point locks or latches, electrically controlled single-point locks or latches, and two or three-point locks or latches.”
2. **Fire Exit Hardware:** If a door is both a fire-rated door and an exit door that requires panic hardware (see VCC 1010.2.9), then fire exit hardware must be provided on this door. Any installed special locks must also meet the UL listing for fire exit hardware.
3. **Non-Rated Doors:** Must meet VCC 1010.2.12 and 1010.2.13, or VCC 1010.2.11. Hardware must be listed for the exiting purpose but does not have to carry a fire rating.
4. **Mounting Height:** Must meet VCC 1010.2.3 which requires 48” A.F.F. max to 34” A.F.F. min.

**E. In Buildings with Required Fire Alarm.** (NFPA 72, Section 21.10, “Electrically Locked Doors”)

1. **21.10.1:** Electrically locked doors in a required means of egress shall unlock in the direction of egress where required by other laws, codes, and governing standards.
2. **21.10.2:** For all means of egress doors connected in accordance with 21.10.1 where fire alarm control unit batteries are used, they shall comply with 10.6.7.
3. **21.10.3:** Fire alarm control unit batteries shall not be utilized to maintain means of egress doors in the locked condition unless the fire alarm control unit is arranged with circuitry and sufficient secondary power to ensure the means of egress doors will unlock within 10 minutes of loss of primary power.
4. **21.10.4:** Locks powered by independent power supplies dedicated to lock power and access control functions, and that unlock upon loss of power, shall not be required to comply with 21.10.2.
5. **21.10.5:** If means of egress doors are unlocked by the fire alarm system, the unlocking function shall occur prior to, or concurrent with, activation of any public-mode notification appliances in the area(s) served by the normally locked means of egress doors.
6. **21.10.6:** All doors that are required to be unlocked by the fire alarm system in accordance with 21.10.1 shall remain unlocked until the fire alarm condition is manually reset.

**F. Reminders:**

1. **Flush and surface bolts are prohibited** by VCC 1010.2.5.
2. **Every floor area must be provided with two remote exits** (see VCC 1007.1). There are some exceptions to this, but caution should be taken with invoking them. Elevator lobbies, for example, need two ways out. Main corridors of individual floors must provide access to two remote exits.
3. **Listings are found in the following locations:** UL Fire Resistance Directory, Vol. 3; Fire Door Accessories (Categories GVUW), Hardware (GWGR), and Builders Hardware (GWTZ).
4. Underwriters Laboratories (UL) provides categories of listed hardware in the above-named directories. Other listing agencies may also provide listed hardware if they are “nationally recognized testing laboratories.” The four-letter designations are attached by UL to indicate the precise category under which a specific product or item is listed.

**NOTE:** The building code will not recognize any other standards regarding exiting.

Hence, design of secure areas and secure facilities must provide for exiting procedures as discussed in the building code sections cited above. Security design should therefore be premised on the identification of the secure perimeters to be maintained, the entry controls which are to be put in place, and technical means for providing response to intruders which simultaneously complies with VCC 2021 (all), and other provisions mentioned above. Particular attention must be placed on the total movement pathway geometry for all occupants of the building. A detailed egress analysis must form part of any reasonable security design. For federally owned (not leased) facilities, see [41 CFR 102-80.85](#).

## DOOR LOCKS, EXITS, AND SECURITY

### CONTROLLED EGRESS SYSTEM SUBMITTAL REQUIREMENTS

**A. General (All submissions shall include, but are not limited to, the following):**

1. All drawings must be accompanied by supporting data with the permit application. Submitted plans shall be black and white only. Color submittal drawings will not be accepted. Hard copies of plans for use in the field shall be printed in color.
2. Full floor plan, showing all doors and devices to be installed, with enough detail to indicate which side and at what height each device is to be installed, with reference to the door. An approved life safety plan or electrical drawings showing the complete floor exit signage shall be provided with the submittal.
3. A complete symbols list must be shown on the plans, with accurate device names and part numbers for each item to be provided in the installation. Along with a door list, showing ratings and sizes of the doors on which devices are to be installed, number each door and show the list of devices to be at that door.
4. Complete building address, floor number, tenant space name and number, contractor and submitter name, address, phone, occupant load, and occupancy designation (use group) of the space and floor.
5. Materials list: All parts, components, or wiring, with complete cut sheets verifying the UL listing of each item.
6. Sequence of operation: Must conform to 2021 VCC 1010.2.11, 1010.2.12, 1010.2.13, 407.4.1.1, and 403.5.3. Incomplete or erroneous sequence of operation is unacceptable. The code section applicable to the proposed locking instance must be noted on plans or in the sequence of operation narrative.
7. Wiring diagram, including details of any and all interfaces with the fire alarm system, including which modules of the existing system will be utilized for interconnection and type of wire per NEC 760.
8. Power supplies: Any power supplies associated with the installation, showing how they will drop out (fail safe) properly, if necessary.
9. The stair door unlocking switch location and details if provided (see VCC 1010.2.7). New stair door unlocking switches to be an approved Fire Department key system.
10. Signage details, with full dimensioned text of required lettering, 1" in height and location relative to the door shown, including height above finish floor, and offset from the door (elevation views).
11. Location of existing or proposed stairwell call-out phones.
12. Controlled egress door locks license requirements: ELE (Electrical) or FAS (Fire Alarm systems). A DCJS license is not an acceptable license.
13. On the full floor plan where the new access control door locks are to be provided, show all existing access control door locks in the suite and between the suite and required exits on the floor with sufficient detail.
14. All existing and installation of new electrical strikes shall be shown on the shop drawings.
15. All rooms must be identified on the plans.

16. All fail-safe and fail-secure locking arrangements must be clearly stated.
17. All plans shall indicate the Use group of the space.
18. All controlled egress plans showing delayed egress locks must have an approved building or tenant alteration plan showing all delayed egress locks prior to submission of the controlled egress plans to the Office of the Fire Marshal.

## ACCEPTANCE TESTING

### **A. Mag-Lock/Push Bar Test**

1. Magnetic locks will be tested.

### **B. Doors Controlled by Locks Installed Under VCC 1010.2.12.**

1. Sensor release of electronically locked egress doors shall be arranged to unlock:
  - a. Due to loss of power to the motion sensor
  - b. Due to loss of power to the lock
  - c. Due to loss of power to the locking system

### **C. Acceptance testing performed for locks installed in accordance with the requirements of VCC 1010.2.12 Sensor Release of Electronically Locked Egress Doors shall demonstrate that doors will unlock by independently:**

1. Removing power to the motion sensor
2. Removing power to the lock
3. Removing power to the locking system

### **D. Connection to Fire Alarm System:**

1. Activation of the building fire alarm or automatic sprinkler system, where provided, shall automatically unlock the doors. In addition, they shall remain unlocked until the fire alarm system is reset.

**NOTE:** The installing contractor will be responsible for having all tools, ladders, and/or other necessary equipment on hand and available at the time of the acceptance test in order to accomplish the foregoing as directed by the inspector.

# UNDERGROUND FIRE MAINS / FIRE LINES

## STANDARDS FOR INSTALLATION AND TESTING

The provision of adequate water supplies and distribution systems for fire suppression is the basic component of risk reduction. The purpose of this guideline is to provide the basic information necessary to meet minimum requirements for the design and installation of private hydrant and/or sprinkler supply underground piping in accordance with the provisions of the 2021 Virginia Statewide Fire Prevention Code (SFPC), the 2021 Uniform Statewide Building Code (VUSBC), and the 2019 editions of NFPA 24, NFPA 13, NFPA 13R, and locally adopted amendments to these codes. This guideline is not applicable to underground piping serving fire sprinkler systems designed in accordance with 2019 NFPA 13D and some systems designed in accordance with 2019 NFPA 13R.

This guideline is provided to assist the contractor, owner, and/or developer/builder with assembling a comprehensive set of plans that will result in their project moving smoothly through the building review process in the least amount of time. This checklist contains the minimum standard information required for a project submitted for the plan review of Fire Service Mains.

Plans sets submitted without the minimum information listed below cannot be accepted for review. This publication does not replace, nor supersede, any provisions of the Fire Prevention Code or other codes and/or ordinances adopted by Fairfax County.

### UG FIRE MAIN & LINES SUBMITTAL REQUIREMENTS

#### **A. General (All submissions shall include, but are not limited to, the following):**

1. Drawings with all supporting data shall be provided with the permit application for review and approval prior to installation of the system.
2. All installation and testing shall be conducted per NFPA 24 and NFPA 13.
3. Provide a copy of the approved stamped OFM site plan showing the location of the fire line.
4. The project name and address shall be clearly indicated on all plans.
5. Provide Designer and Company name with phone number.
6. Provide data cut sheets of all piping material per NFPA 24, Section 10.1.
7. Provide data cut sheets of joining of piping and fittings per NFPA 24, Section 10.3.
8. Show on the drawing all joint restraints per NFPA 24, Section 10.6. Restraint is required on all tees, plugs, caps, bends, reducers, valves, and hydrant branches per NFPA 24, Section 10.6.2.
9. Provide detailed diagram of the restrained joint system, per NFPA 24, Section 10.6.2.
10. Provide detailed diagram and calculations for thrust blocks per NFPA 24, Section 10.6.1. See appendix 10.6.1 for details.
11. Plans shall clearly indicate the method of providing corrosion protection for bolted/threaded assemblies, retaining rods, clamps, and other restraining devices, per NFPA 24, Section 10.4.1.1
12. Provide detail of rods used for restraint, shall be sized in accordance with NFPA 24, Section 10.6.2.1.2.

13. Specific detail(s) shall be provided for pipe material transitions, changes in pipe connections (slip joint, fixed flange, mechanical joints, mega-lug joints) per NFPA 24, Section 4.1.3.
14. Provide a detail showing connection to the fire protection system per NFPA 24, Figure A 10.6.2.
15. Pipe shall not be run under buildings per NFPA 24, Section 10.4.3, unless exceptions are met per NFPA 24. Provide illustration where pipe must be run under buildings, special precautions shall be taken, including the following arching the foundation walls over the pipe, running pipe in covered trenches, or providing valve to isolate sections of pipe under buildings.
16. Electrical ground wires shall not be connected to underground fire line, per NFPA 24, Section 10.5.1.
17. Illustrate the depth of cover of the fire lines from the top of the pipe in accordance with NFPA 24, Section 10.4.2.
18. Multiple underground Fire Lines/FDC: Each Underground/Fire Line shall be labelled in numerical sequence (Underground/Fire Line 1, Underground/Fire Line 2, etc.) and each Siamese/FDC shall be labelled in a similar numerical sequence (Siamese/FDC 1, Siamese/FDC 2, etc.).

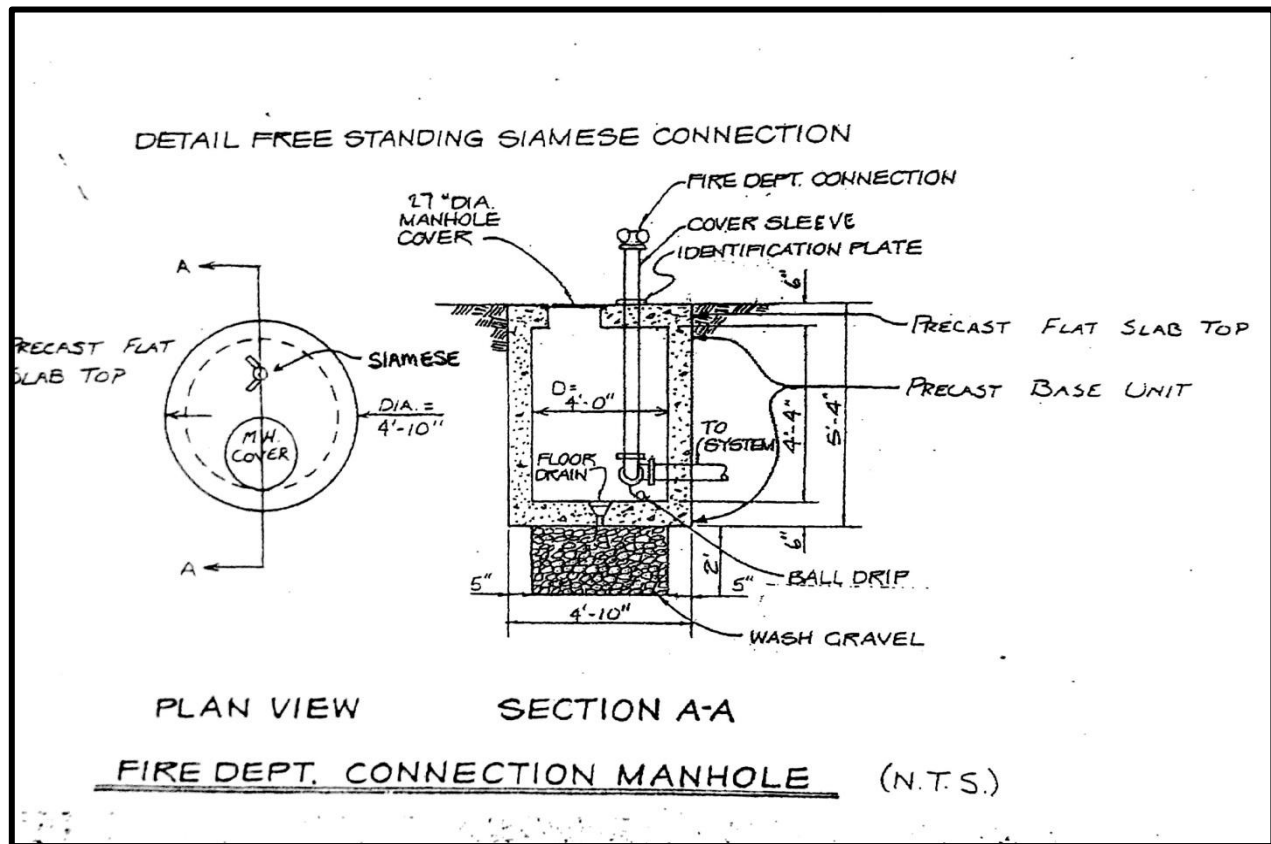
## **B. Aboveground Pipe and Fittings**

1. Aboveground pipe and fittings shall comply with the applicable sections of Chapters 7 of NFPA 13 that address pipe, fittings, joining methods, hangers, and installation, per NFPA 24, Section 12.1.
2. Aboveground piping for private fire service mains shall not pass through hazardous areas and shall be located so that it is protected from mechanical, and fire damage, per NFPA 24, Section 12.2.1.
3. Aboveground piping shall be permitted to be in hazardous areas protected by an automatic sprinkler system, per NFPA 24, Section 12.2.2.
4. Where aboveground water-filled supply pipes, risers, system risers, or feed mains pass through open areas, cold rooms, passageways, or other areas exposed to freezing temperatures, the pipe shall be protected against freezing by the following, per NFPA 24, Section 12.2.3:
  - a. Insulating coverings
  - b. Frostproof casings
  - c. Other reliable means capable of maintaining a minimum temperature between 40°F and 120°F (4°C and 48.9°C)
5. Where corrosive conditions exist or piping is exposed to weather corrosion-resistant types of pipes, fittings, and hangers or protective corrosion-resistant coatings shall be used, per NFPA 24, Section 12.2.4.
6. To minimize or prevent pipe breakage, where subject to earthquakes, aboveground pipe shall be protected in accordance with the seismic requirements of NFPA 13, Section 24 and Section 12.2.5.
7. Mains that pass-through walls, floors, and ceilings shall be provided with clearances in accordance with NFPA 13.

### C. Fire Department Connection (FDC)

1. A fire department connection (FDC) is required for all standpipe systems and most NFPA 13 and 13R automatic sprinkler systems. They are not required for automatic sprinkler systems complying with NFPA 13D protecting one- and two-family dwellings.

Unless the requirements of Section 16.12.2 are met, a fire department connection shall be provided as described in NFPA 13, Section 16.12. (See Detail for Free Standing/Fire Department Connection).



2. All underground FDC piping shall be ductile iron (DI) unless otherwise approved on a case-by-case basis by the Office of the Fire Marshal.

### D. Underground Fire Lines and Other Utilities

In order to maintain proper physical clearances between underground fire lines and other utilities, the following physical distances are necessary:

1. All underground fire lines are to be a minimum of 4 feet underground (below finished grade) to the top of pipe, per FXCO PFM, Chapter 9, 9-0102.3B. The [Fairfax Water Design Practice Manual](#) states, "four (4) feet of cover" exactly. The maximum cover allowed for a water main, or fire line (DIP) is 7.5 feet to the top of pipe.
2. Fire Line – Storm Sewer crossings (90 degrees more or less): If fire line is above storm, then 6-inch clearance is required. If fire line is below storm, then 12-inch clearance is required.
3. Fire Line – Sanitary Sewer crossing (90 degrees more or less): If a fire line is above sewer, 18-inch clearance is required and must meet Virginia Health Code.

4. Fire Line – Gas Main crossings (90 degrees more or less): 12-inch clearance above or below.
5. Fire Line – Electrical Service Entrance Conductor: 12 inches. Fire line is below electrical service, and maximum depth of electrical service is no greater than 36 inches. The minimum depth of electrical service is 24 inches.
6. All other electrical underground wiring (cable TV, fiber, etc.) is to be treated as in item 5 above.

**NOTE:** Other utilities are not to run in the fire line trench. At crossings, where other utility is above, intervening fill is to be compacted granular material, 90 percent Standard Proctor, AASHTO T-99, per DIPRA, Installation guide for DIP.

**E. Summary Table of Crossing Clearances**

Fire Line to Storm	6 inches if fire line is above; 12 inches if fire line is below storm
Fire Line to Sanitary Sewer	18 inches, sanitary must be below fire line (unless all health code requirements are met)
Fire Line to Gas Main	12 inches, above or below
Fire Line to Electrical Service	12 inches, electrical above, fire line below

1. The following factors shall be considered in providing adequate separation of water mains and sewers: Virginia General Assembly ([12VAC5-590-1150](#)) in the Legislative Information System.
2. A visual inspection by the Office of the Fire Marshal shall be made before any pipe is covered. An appointment for a visual inspection can be made by emailing the Fire Alarm, Door Lock, & Alternative Fire Extinguishing System at [Fire.AcceptanceTesting@fairfaxcounty.gov](mailto:Fire.AcceptanceTesting@fairfaxcounty.gov) or calling 703-246-4821.
3. Backfill shall be well tamped, free of rocks, and free of corrosives, per NFPA 24, Section 10.9.
4. A hydrostatic test of 200 pounds or 50 pounds over static pressure, whichever is greater, shall be conducted for two hours, per NFPA 24, Section 10.10.2.2.

**F. Other Means of Hydrostatic Test**

1. If approved, a hydrostatic test may be permitted to be completed in accordance with the requirements of NFPA 24, Section 10.10.2.3. The test pressure and duration requirements mentioned above are still required. Prior approval is required before scheduling the test.
2. Gauges used in performing acceptance tests on fire suppression systems witnessed by the Office of the Fire Marshal must meet the following criteria:
  - a. The gauge shall be appropriate for the type of test (air gauge for an air pressure test, a water gauge for a hydrostatic test, etc.).

- b. Air gauges shall have increment markings of two pounds or less. Water gauges must have increment marking of ten pounds or less.
  - c. The gauge shall be capable of registering pressures above the minimum pressure required during the test.  
The pressure registered during the actual test shall be at least the minimum required for the test and less than the maximum of the gauge register.
  - d. Gauges must be marked as accepted by UL and/or FM testing laboratories.
3. Any valves installed in the fire line between the street valve at water main and OS&Y valve inside of the building shall comply with NFPA 24.
  4. Domestic water line take-off shall be connected at least five feet outside of the building with a 200-pound shut off valve on the domestic water line only.
  5. All fire lines shall be flushed with not less than a 4-inch opening in accordance with NFPA 24, Section 10.10.2.1. The flush shall be witnessed by the Office of the Fire Marshal.
  6. Site plans approved by this office showing size and location of pipe shall be on the job site accompanied with the underground shop drawings and cut sheets before the inspection or test is performed. The cover sheet and site plan page shall have an original OFM stamp by the original approved reviewer.

**G. Galvanized Spool Piece (Potable Water)**

1. The procedure for installing a galvanized pipe between the ductile iron fire line and the OS&Y valve is as follows:
  - a. If a spool piece is used between the fire line stub and the OS&Y valve to raise the valve off the fire line stub, then it shall be galvanized pipe or rated per AWWA C104, C110 for potable water. This spool piece may be hydrostatically tested as part of the underground or sprinkler riser.

OR

  - b. If the OS&Y valve is rated by the AWWA as suitable for connection to a potable water system, this valve is a suitable transition piece between the fire line stub and the check valve. This OS&Y valve may be attached directly to the fire line stub if there is adequate clearance for proper operation of the valve, and then no galvanized pipe is required.
2. The above items shall be inspected by the Office of the Fire Marshal prior to any backfill.
3. Any valves installed in the fire line between the street valve at the water main and the OS&Y valve inside the building shall comply with NFPA 24.
4. All test and permit fees shall be paid before an inspection or test is performed. Questions can be directed to the Engineering Plans Review Branch or Systems Acceptance Testing at 703-246-4821 or via email at [Fire.AcceptanceTesting@fairfaxcounty.gov](mailto:Fire.AcceptanceTesting@fairfaxcounty.gov).

# AUTOMATIC FIRE SPRINKLERS

## SUBMITTAL REQUIREMENTS FOR FIRE SPRINKLER SYSTEMS

All submitted automatic sprinkler system plans must show and/or note all information applicable to the submitted design as detailed in 2019 NFPA 13, Section 27.1.3 items 1 through 47. In addition, the following specific information must be show and/or noted on all plans:

1. Sprinkler head locations/spacing in areas with no gridded ceiling or exposed structure must be fully dimensioned. Fully dimensioned is defined as dimensions from walls to sprinklers (both directions), dimensions between sprinklers on branch lines and dimensions between branch lines. Center-to-center or pipe cutting dimensions may be provided but are not acceptable alternatives to full dimensioning.
2. All areas with exposed construction (no ceiling) must clearly show the location of all structural steel or concrete elements. The size/depth must be clearly noted for each element in addition to the top of the joist/beam, joist bearing, or top of the concrete slab elevation relative to the floor/level.
3. All areas with exposed construction (no ceiling) must clearly show the location of all mechanical duct work/plumbing pipe, electrical conduit/cable trays, and lights. The size, diameter, depth, and/or width must be clearly noted for each element in addition to the finished top or bottom elevation for each relative to the floor/level.
4. Finished ceiling articulation must be captured clearly through notation on the floor plan and/or section views where necessary. Of note will be ceiling elevation differences, any ceiling openings, and “cloud ceilings.” Sprinklers protecting areas with cloud ceilings must have two levels of sprinklers calculated simultaneously, or the design shall comply with 2019 NFPA 13 Section 9.2.7, *Cloud Ceilings*.
5. Sprinkler relocates shall be piped from existing original branch line tee outlets or branch line weld-o-lets. Compound relocates (new relocate piped from existing relocate piping) are not permitted without supporting hydraulic calculations.
6. Unless approved in base calculations, where new flexible drops are proposed to supply added or relocated sprinklers, the designer must submit hydraulic calculation supporting that the system demand is met.
7. For plastic pipe hydraulic calculations, friction loss for flow through tees must be included in all calculations if this loss is shown on the manufacturer’s data sheet.
8. The maximum flow allowed through any 2-1/2” inlet of an FDC connection shall be 250 gpm.

## REQUIREMENTS FOR HYDRAULIC CALCULATIONS

1. Generally, sprinkler installations/modifications in areas built-out with “cloud ceilings” will require hydraulic remote area calculation support showing sprinklers above and below the cloud ceiling flowing simultaneously. In order to avoid unnecessary construction delays where “cloud ceilings” are encountered, the designer should contact the OFM Engineering Plans Review Branch prior to the submission of plans to determine whether hydraulic calculation will be required for each instance. The OFM will accept emailed PDF format plans of the area in question and will effort a response within two business days, workload dependent. Email [fire.EngPlansReview@fairfaxcounty.gov](mailto:fire.EngPlansReview@fairfaxcounty.gov).
2. Each submitted floor plan for all new construction (includes tenant fit-ups) requiring hydraulic calculation must be annotated with a finished floor elevation provided on

approved architectural plans or an elevation in feet relative to (above or below) a “zero” elevation at the finished floor where the water service enters the building.

### TENANT PLAN FIRE SPRINKLER REQUIREMENTS

Each submitted plan sheets for tenant modifications to existing automatic sprinkler systems must be annotated using the following information boxes:

<b>BASE BUILDING REFERENCE DRAWING</b>
<b>Plan Bag Designation:</b> SP1808
<b>Plan Bag Number:</b> 1 of 2
<b>Original Contractor:</b> ABC Sprinkler, Inc.
<b>Drawing Sheet Number:</b> 2 of 6
<b>Drawing Sheet Title:</b> Second Floor Piping Plan
<b>Drawing Sheet Date/Approval Date:</b> 5-29-1978/6-23-1978

(NOTE: Information shown in boxes is for example only.)

<b>BASE BUILDING SYSTEM HYDRAULIC DESIGN</b>
<b>Design Standard   Year:</b> NFPA 13   1976
<b>Hazard Classification:</b> Light
<b>Design Density   Remote Area:</b> .10   1500 sf
<b>Calculated Spacing and Minimum Flow:</b> 196 sf   19.6 gpm
<b>Sprinkler Type and Response:</b> Recessed Pendent   Standard Response
<b>Sprinkler K Factor:</b> 5.6
<b>Calculated Line Sizing:</b> 1" - 1" - 1¼" - 1¼" - 1½"
<b>Tie-In   Feed Main Sizing:</b> 2½" 2"
<b>Calculated Safety Factor:</b> 11.5 psi

(NOTE: Information shown in boxes is for example only.)

Failure to provide these boxes will not constitute a rejection. If, however, an archived approved base building plan of the commensurate area cannot be located within one-half hour to verify the submitted design, the submission will be rejected, and the designer will be required to provide ALL the information shown above.

## WATER SUPPLIES FORE WATER-BASED SYSTEMS

All automatic sprinkler hydraulic designs submitted to this office shall provide:

1. One copy of the flow test data and hydrant map for an on-site hydrant which is connected to the water supply main for the building's sprinkler system and is provided by and attested to by the water supplier to the site concerned, with the date of the flow information. If an on-site hydrant is not available for the test, the closest available hydrant (whether existing or proposed) shall be used. The copy shall be a print-out of the email from the water supplier. In addition to this copy, the flow test data and the adjusted water supply information must be shown on the sprinkler drawings.
2. Elevation, tax map number, and street location of the test hydrant.
3. An adjusted water supply curve for the test hydrant based on the low hydraulic grade line (HGL) as provided by the water supplier. High and low hydraulic grade lines shall be obtained from the water supplier and referenced to a specific date. Adjustment of the water supply curve at the test hydrant by use of the low hydraulic grade shall consist of adjusting the entire water supply curve by subtracting the elevation of the test hydrant from the low hydraulic grade, converting the difference to psi, and if the psi values obtained from the flow test (static and residual) are greater than the low hydraulic grade, dropping the test hydrant water supply curve to the level of the low hydraulic grade.

### WATER SUPPLY CALCULATION EXAMPLE

Flow Test: Static (S) = 97 psi, Residual (R) = 30 psi, Flow (Q) = 800 gpm,

Test elev. = 400 ft

Low HGL = 600 ft

$600 \text{ ft} - 400 \text{ ft} = 200 \text{ ft} (0.433) = 86.6 \text{ or } 87 \text{ psi (adjusted S)}$

$97 \text{ psi} - 87 \text{ psi} = 10 \text{ psi (pressure difference)}$

$30 \text{ psi} - 10 \text{ psi} = 20 \text{ psi (adjusted R)}$

Hence use S = 87 psi, R = 20 psi, Q = 800 gpm as the adjusted water supply curve at the test hydrant location

**NOTE:** For all new construction with a fire pump, flow test data must also be adjusted to show the maximum expected pressure using the High HGL elevation reported by the water supplier.

4. For water authorities that do not provide the low HGL (e.g., Town of Herndon), the designer is to include a 10 psi drop in the static and residual pressures. This is in addition to other safety factor requirements in items 6 and 7 below.
5. A hydraulic graph of the water supply for new construction with a fire pump must be included with the calculations. This graph must include a plot of the flow test results, the adjusted water supply curve (based on low HGL), the fire pump curve, and the fire pump combined discharge graph based on the adjusted water supply.

6. The safety factor below the adjusted water supply curve for new sprinkler systems shall be as follows:
  - a. Buildings with occupancy classifications of Assembly Group **A**, Business Group **B**, Factory Group **F**, Mercantile Group **M**, or Storage Group **S** without a fire pump: 15 psi minimum.
  - b. Buildings with occupancy classifications of Assembly Group **A**, Business Group **B**, Factory Group **F**, Mercantile Group **M**, or Storage Group **S** with a fire pump: 20 psi minimum.
  - c. Buildings of all other occupancy classifications without a fire pump: 10 psi minimum.
  - d. Buildings of all other occupancy classifications with a fire pump: 15 psi minimum.
  - e. One- & Two-Family Dwellings with NFPA 13D systems, and NFPA 13R systems protecting a single townhouse with a dedicated water supply, a minimum 5 psi is required.
  - f. The safety factor below the adjusted water supply curve for all modifications to existing sprinkler systems (tenant work) within buildings shall be 5 psi minimum.

**NOTE:** The additional 5 psi for fire pump supplied installations will account for requirements in NFPA 25 (2020 Edition) allowing fire pump performance to drop to 95% of the fire pump rated pressure at the rated flow.

At the discretion of the Chief Engineer, lower safety factors will be considered on a case-by-case basis for occupancies that will not be subjected to alterations.

These safety factors may not necessarily accommodate all potential increases in water supply requirements due to tenant fit outs. Final responsibility for long-term and short-term system adequacy rests with the designer/contractor/installer.

## FIRE PUMP CALCULATIONS

In all new buildings and/or tenant spaces requiring fire pumps, the sprinkler and/or standpipe system demands shall not exceed 120% of the fire pump rated capacity. Hydraulic calculations shall be submitted to prove that sufficient pressure will be available at the time of the fire pump test. The calculation shall prove that not less than 20 psi is available at supply tap while the pump is operating at 150% of its rated capacity, per Virginia Department of Health Capacity of Waterworks 12VAC5-590-640 requirements for public water supply. Fire pump calculations must account for the low hydraulic grade line for the site and demonstrate the safety factor requirements for Sprinkler System Water Supplies detailed in this package have been met.

Hydraulic calculations shall be submitted for all fire pumps installed in buildings over 150' in height to demonstrate that minimum pressure and flow rates will be achieved in accordance with the requirements of VCC 905 and NFPA 14, when applicable, as detailed in this package.

Where pressure reducing/regulating valves (PRVs) are installed, the high hydraulic grade line must also be accounted for when performing hydraulic calculations.

## INTERCONNECTION OF SPRINKLER/STANDPIPE RISERS AND HYDRAULIC CALCULATIONS

It remains the policy of the Fairfax County Office of the Fire Marshal that, where standpipe systems are installed in accordance with VCC 905, automatic sprinkler piping systems on each floor must be supplied by at least two standpipe risers through the floor control assemblies. Exceptions to this practice will be considered on a per case basis for structures where fire or smoke divisions are required by code; and therefore, alarm annunciation zoning for the Fire Department is the primary issue.

Hydraulic calculations for all systems should consider only a single, most remote riser and shall calculate the full sprinkler (and/or standpipe) demand back to water supply test via that riser and associated bulk piping. Dual riser feeds should not be calculated for simultaneous supply of a given remote design area. The above practice ensures the adequacy of protection in all structures if one standpipe riser is shut down for maintenance, repair, or tenant work. If the owner chooses not to interconnect risers and calculate all floors from a single riser, this office will need on file a notarized letter from the owner stating that he will comply with SFPC 901.7 whenever any single standpipe riser is out of service for any reason. Unless such a letter is on file, review of sprinkler plans cannot be undertaken.

### STANDPIPE CALCULATIONS & FIRE HOSE VALVE LOCATION

Standpipe calculations must be performed in accordance with the requirements of VCC 905 and NFPA 14:

1. In all buildings where standpipes are required, two sets of calculations are necessary to size riser piping, supply piping, and the water service piping.
2. Calculations for sizing the supply piping to standpipes must be performed in accordance with NFPA 14, Section 7.10.1.1 and Section 7.10.1.2. A minimum flow of 500 gpm is required for the first riser and 250 gpm for each additional riser up to 1250 gpm. (1,000 gpm is required for fully sprinklered buildings.)
3. A minimum residual pressure of 100 psi must be maintained at the outlet of the hydraulically most remote 2½" hose connection on each standpipe riser while flowing the minimum quantities of water required in NFPA 14, Section 7.10.1.1 and Section 7.10.1.2. The fire department's hose is to be supplied by the pumper with the following pressures and flows at the fire department connection (FDC): 200 psi @ 0 gpm, 199 psi @ 750 gpm, 150 psi @ 1250 gpm. Standpipe calculations must be provided for all buildings using the FDC, even when the on-site fire pump is supplying the standpipe demand. For buildings over 150' in height, standpipes must also be supplied by the on-site fire pump in compliance with VCC 905.2 and calculations provided showing this. Where pressures more than 175 psi are encountered at any point in the system, plans and specifications must show the use of listed high-pressure fittings.
4. A minimum safety factor of 5 psi is required for standpipe calculations to the FDC, and when calculated to the on-site fire pump, the minimum safety factor shall be 5% of the rated pump pressure plus 5 psi.
5. Sprinkler and standpipe calculations must account for the low hydraulic grade line for the site, generate a total demand within the limits of the water supply curve, and comply with requirements for Sprinkler System Water Supplies detailed in this package.
6. Fire Hose Valves (FHV) shall be located at an intermediate floor level landing between floors as allowed in VCC 905.4 such that, when seen from the main floor landing above, the FHV is seen in the corner of the intermediate landing below. Hose lay measurements shall be made along the wall.

7. When Fire Hose Valves (FHV) are required to serve the roof, all portions of the roof shall be located within 400 feet of an FHV.
8. Base of riser isolation shut-off valves must be located no higher than the grade level floor and within ten feet of, or located in, the stair enclosure housing the standpipe riser which the valve serves.
9. Standpipe systems shall be flow tested in accordance with the 2019 NFPA 14, sections 11.5 and A.11.5.2.

## PRESSURE-REGULATING DEVICES FOR STANDPIPE HOSE OUTLETS

The following policy is adopted to define the type of fire hose pressure reducing valves to be installed in Fairfax County, per NFPA 14, Section 7.2.3.2.

Pressure reducing/regulating fire hose valves shall be capable of delivering a residual flow pressure between 100 psi to 175 psi, at 250 gpm. This standard shall be applied to all Class I and III systems.

Pressure reducing/regulating fire hose valves shall be capable of external adjustment to higher pressures by the fire department. The external mechanism for reducing or regulating shall be capable of being removed completely, allowing the fire hose valve to function fully open. Installation of pressure reducing/regulating valves shall not occur until:

1. Approved by the Engineering Plans Review Branch of the Office of the Fire Marshal.
2. Certification is received from the manufacturer on testing and pressure settings using 1¾" hose with a 100-psi tip pressure.
3. Valves are tested on site by the installation contractor and witnessed by the systems testing personnel from the Office of the Fire Marshal.
4. Valves, once adjusted and approved, shall be fixed with a plastic break-away seal. This seal shall contain the date of the test, valve identification, and contractor conducting test. Once installation has occurred, the installing contractor shall forward a report to the Office of the Fire Marshal with valve identification (i.e., numbering system), set points, location, and floor level.
5. Valves shall be inspected visually each year to ensure that the settings have not changed and there is no damage to the valves. A flow test is required every five years per NFPA 25. If there is a question due to damage, change of settings, missing tag, etc., the valve shall be retested. Documentation of the flow test shall be provided by email to [fire.inspections@fairfaxcounty.gov](mailto:fire.inspections@fairfaxcounty.gov).

**NOTE:** All Fire hose PRVs shall be tagged.

## ELEVATOR HOISTWAY / MACHINE ROOM FIRE PROTECTION REQUIREMENTS

The following discussion is intended to clarify requirements for removing electrical power from elevator machinery prior to automatic sprinkler activation. In the interest of brevity, this discussion assumes that automatic sprinkler protection is required and has been installed in the elevator pit, elevator hoistway, and elevator machine room.

### I. APPLICABLE CODES AND STANDARDS

1. Virginia Construction Code (VCC) 2021 Edition, 3005.5 and 3005.7
2. ASME A17.1 2019 Edition
3. NFPA 13 2019 Edition, Section 9.3.6
4. NFPA 72 2019 Edition, Section 21.4.1, Section 21.4.2, Section 21.4.4, and Section 21.4.5

### II. AUTOMATIC SPRINKLER PROTECTION

1. Provide and install intermediate temperature standard response sprinklers in the elevator pit, at the top of the hoistway, and in the elevator machine room.

### III. FIRE ALARM PROTECTION

#### A. Heat Detectors

1. Provide and install a listed 130° fixed temperature heat detector within 24 inches of each sprinkler installed in the elevator pit, at the top of the hoistway, and in the machine room.
2. These heat detectors are part of the building fire alarm system and will be connected directly to the shunt trip disconnect(s) to the affected elevator(s).
3. Activation of these heat detectors will disconnect power to the affected elevator(s).  
**NOTE:** The fire alarm system supervises the elevator power circuit as well as the initiating device circuit.

#### B. Smoke Detectors

1. Provide and install listed smoke detectors in the elevator machine room, control space, or control room.
2. Provide and install listed smoke detectors in the elevator hoistway only when automatic sprinklers are present, or the smoke detector is used to activate a hoistway vent.

#### C. Additional Notes

1. See NFPA 13, Section 9.3.6.2 and Section 9.3.6.6 which allow omission of automatic sprinkler protection at the bottom of the elevator hoistway (pit) and the top of the elevator hoistway respectively.
2. In no case shall automatic sprinkler or fire alarm protection be omitted from elevator machine rooms.
3. Machine-room-less elevator installations (elevator machine is located within the elevator hoistway) shall be protected with automatic sprinklers as a machine room in accordance with VCC 3005.7.

## HIGH-RISE BUILDINGS ≥ 200 FT, SPRINKLER MEETING REQUIRED

For all new sprinkler/standpipe systems to be installed within buildings where the highest floor level is 200 feet or greater above the lowest level of the fire department vehicle access, the sprinkler contractor must schedule a preliminary meeting with the Office of the Fire Marshal – Engineering Plans Review Branch at least four weeks prior to submitting for a sprinkler system permit plans review.

## SPRINKLER HAZARD CLASSIFICATION FOR CERTAIN OCCUPANCIES

1. For gymnasiums and athletic facilities, sprinkler hazard classification shall be a minimum Ordinary Hazard Group 1, unless a different hazard is approved by the OFM Engineering Plans Review Branch.
2. For all loading docks, sprinkler hazard classification shall be a minimum of Ordinary Hazard Group 2.
3. For all parking garages, sprinkler hazard classification shall be a minimum of Ordinary Hazard Group 2.

## SPECIAL PROVISIONS FOR IN WAREHOUSES AND STORAGE AREAS

All new sprinkler systems to be installed in undetermined warehouses and storage areas with an available ceiling/deck height greater than 16 feet shall comply with the following minimum requirements:

1. The maximum floor area on any one floor to be protected by sprinklers supplied by any one sprinkler system riser shall be 40,000 sq. ft.
2. The sprinkler system must be designed for a minimum Class IV commodity, non-encapsulated, with 15 feet storage height.
3. If a fire pump is being installed as a part of the new sprinkler system, the sprinkler system flow demand shall not exceed the fire pump rated capacity, and the minimum design area shall be the hydraulically remote 2,000 sq. ft. with a minimum sprinkler density of 0.25 gpm/sq. ft.

In lieu of complying with items 1 through 3 above, a letter from the building owner stating that there will be no storage above ten feet in height will be acceptable to this office. The owner must also acknowledge that any sprinkler system designed and installed to the 12-foot storage height limitation may have to be fully replaced if future storage commodity, arrangement, and height is modified.

## HYDROSTATIC TESTING OF SPRINKLER TENANT WORK

### **A. Hydrostatic testing shall be performed where automatic sprinkler tenant work consists of:**

1. Modifications affecting 20 or fewer sprinklers shall require testing at system working pressure for two hours.
2. Where addition or modification is made to an existing system affecting more than 20 sprinklers, the new portion shall be isolated and tested at not less than 200 psi (13.8 bar) for two hours.
3. Modifications that cannot be isolated, such as relocated drops, shall not require testing in excess of system working pressure.

The installing contractor shall remain on site in occupied buildings during the hydrostatic test. All work falling within items 1 – 3 above shall require a visual inspection prior to any close-in.

**ATTENTION:** Any piping system that may be isolated by closing a control valve (floor, zone, etc.) shall require a separate hydrostatic test.

**B. Gauges used in performing acceptance tests on fire suppression systems witnessed by the Office of the Fire Marshal must meet the following criteria:**

1. The gauge shall be appropriate for the type of test; i.e., air gauge for an air pressure test, a water gauge for a hydrostatic test.
2. Air gauges shall have increment markings of two pounds or less. Water gauges must have increment marking of ten pounds or less.
3. The gauge shall be capable of registering pressures above the minimum pressures required during the test. The pressure registered during the actual test shall be at least the minimum required for the test and less than the maximum of the gauge register.
4. Gauges must be marked as accepted by UL and/or FM testing laboratories.
5. Only one gauge, per test appointment, per inspector, will be permitted.
  - a. All new piping shall be hydrostatically tested.
  - b. All standpipes shall be flushed (prior to charging or connection to floor system).
6. Where sprinkler heads only have been replaced, visual inspection with approved cut sheets is the only requirement, i.e., defective, corroded ordinary heads that have been replaced with quick response heads.

**C. Annual Maintenance**

1. Each fire sprinkler system shall be tested in accordance with NFPA 25-20, and a sprinkler system test card/tag that shows the date and results of the test and the name of the person and organization conducting the test shall be attached to the sprinkler system valve/riser.
2. Annually, testing shall include a main drain test or fire pump flow test to determine whether there has been a change in the condition of the water supply piping and associated control valves. The results of the test shall be recorded on the sprinkler system test card/tag attached to the sprinkler system valve/riser.
3. Dry sprinkler system valves shall be partially tripped each year and fully tripped every three years during warm weather. Preaction and deluge sprinkler system valves should only be partially tripped every year. The valve trip times, and the type of trip test (full or partial) shall be recorded on the sprinkler system test card/tag attached to the sprinkler system valve/riser.

**FIRE PUMP/STANDPIPE TESTING AND RETESTING**

**A. Fire Pump/Standpipe Testing and Retesting**

1. All fire pumps will be acceptance tested in accordance with NFPA 20. All controllers shall be signed off by the electrical inspector per NFPA 20, Section 14.2.3 and NEC 695 prior to the acceptance test. Fire pump retesting will be conducted in accordance with NFPA 25.
2. Prior to the fire pump acceptance test, all hydrostatic tests for shell building piping shall be completed.
3. All fire pump test gauges shall be approved (UL/FM) type or on-site documentation of calibration must be provided, per NFPA 20, Section 14.2.6.1.2.
4. Standpipe flow test will be done in those buildings having standpipes at the time of fire pump acceptance testing. Gauge must be provided at the top of the standpipe riser per NFPA 14, Section 5.5.1. It is the responsibility of the contractor to provide all hoses and

equipment needed and make acceptable arrangements for disposal of the water released.

**B. Annual Maintenance**

1. The property owner is responsible for answering that the fire and life safety systems are always maintained in an operable condition in accordance with NFPA 25.
2. A written record of tests/maintenance shall be maintained and made available to the code official on request.

**RECALLED SPRINKLER HEADS**

(REF SFPC 901.10)

The following procedure will outline the process for replacing recalled sprinkler heads. This procedure is for “one for one” sprinkler head replacement only. Any other changes to a fire protection system must go through the normal plans review process.

1. The County will require a permit be issued but will not charge for it.
2. The sprinkler contractor must provide one copy of the old and new manufacturer’s data sheets for the sprinkler heads and one copy of a previously approved sprinkler plans showing the location of the sprinkler to be replaced. A copy of the previously approved plan may be obtained from our office through a FOIA request. The charge for review is at the normal rate.
3. Upon completion of the sprinkler head replacement, the contractor will call Systems Acceptance Testing at 703-246-4821 or email [fire.AcceptanceTesting@fairfaxcounty.gov](mailto:fire.AcceptanceTesting@fairfaxcounty.gov) to schedule a free inspection of the replaced heads.

# FIRE ALARM DEVICES AND SYSTEMS

## CODE REQUIREMENTS GUIDE

**NOTE:** This list does not replace the requirement to consult and comply with the code.

Codes and Standards key:

Virginia Construction Code 2021 (VCC)  
Virginia Statewide Fire Prevention Code 2021 (SFPC)  
International Mechanical Code 2021 (IMC)  
ASME A17.1 2019 Edition  
NFPA 20 and 72 2019 Edition  
NFPA 70 2020 Edition

### I. INSPECTIONS, TESTS AND MAINTENANCE

**A. Acceptance Tests** – ALL COMPONENTS, ALL FIRE ALARM DEVICES/SYSTEMS  
(VCC 907.7)

#### B. Regular Inspection/Tests

Device	Frequency	Code Reference
1. Flow Switch	Quarterly	NFPA 25, Section 13.2.4
2. Fire Pump	Weekly	NFPA 25, Section 8.3.1.1.1
3. Manual Pulls	Semi-Annual	NFPA 72, Table 14.3.1
4. Most Automatic Devices	Semi-Annual	NFPA 72, Table 14.3.1
5. Smoke Control System	Semi-Annual	SFPC 909.22.4

### II. DEVICES: ALARM & SUPERVISION REQUIREMENTS UNDER VIRGINIA CONSTRUCTION CODE, 2021 EDITION

A. Item/Device	Code Section	Comment
1. Central Station Hookup	VCC 901.6	Spk + unrated corridors A,B,E,F,M,U uses; suppression system in A,B,E,I,M,R uses; any required system; high-rise buildings
2. S.D.'s, Hospitals	VCC 907.2.6.2	Corridors
3. Automatic Sys., H-Use	VCC 908	
4. Sprinkler Flow Alarm and Supervision	VCC 901.6.1, 903.4 VCC 903.4.2; NFPA 72, 23.3.3.1	Exterior required, Dry pipe hi/lo air, etc.
5. Duct Detectors	IMC 606; VCC 907.6.5	Return ducts over 2,000 CFM, supervision required, access required
6. Visual Alarms (and Accessible)	VCC 907.5.2.3; ICC A117.1, 1106	To meet UL 1971 and ANSI/NFPA 72, Chapter 18
7. Audible Alarms	VCC 907.5.2.1	Audibility required in all spaces
8. Fire Pump	NFPA 20,10.4.7 NFPA 72, 23.8.5.9	

<b>A. Item/Device</b>	<b>Code Section</b>	<b>Comment</b>
9. Elevator Lobby/Hoistway Machine Room S.D.	NFPA 72, 23.15.1 ASME A17.1	Verification required Dedicated loop required
10. Voice Alarms	VCC 907.5.2.2, 907.2.1.1, 907.2.1.2, 907.2.12.3, 907.2.14, 907.2.19, 907.2.20	High-rise; any building with atrium and of A, E, or M use, mall >50,000 sq. ft.; Underground buildings
11. Atrium S.D.'s	VCC 907.2.14	Any Atrium with smoke exhaust/control
12. Damper Control	VCC 717.3.1, 717.3.3.2	UL 555S type dampers w/ S.D.'s
13. Sleeping Area S.D.'s	VCC 907.2.11	
14. Releasing S.D., H.D.	NFPA 72, 23.11	Connected to building alarm (VCC 904.3.5) (i.e., halon, dry/wet chemical)
15. Refrigerant Detector	VMC 1105, IFC 608.9	

### **III. OCCUPANCIES (USE GROUPS) REQUIRING ALARM SYSTEMS - (SEE CODE FOR SOME EXCEPTIONS)**

<b>A. Fire Alarm System</b>	<b>Code Section</b>	<b>Comment</b>
1. Manual System	VCC 907	A>300; B>500 or >100 above/below grade; schools, F=> 2 stories with 500, M-Use with 500 or >100 above/below grade. I Uses, hotels, motels, apartments 3 stories & up
2. Automatic System	VCC 907	I-Use; hotels, motels, all high-rises, special amusement building
3. Smoke Control	VCC 909; IMC 513	Malls, atriums

### **IV. POWER SUPPLY REQUIREMENTS**

<b>A. Item/Device</b>	<b>Code Section</b>	<b>Comment</b>
1. Emergency and Standby Power Systems	VCC 2702	
2. Fire Alarm Power Supply	NFPA 72, 10.6	

### **V. WIRING REQUIREMENTS**

<b>A. Item/Device</b>	<b>Code Section</b>	<b>Comment</b>
1. Circuits and Pathways	NFPA 70, Article 760 NFPA 72, Chapter 12	

## SUBMITTAL REQUIREMENTS FOR FIRE ALARM SYSTEMS

1. All information required by 2019 NFPA 72 section 7.2.1 must appear on submitted plans or in technical documents. Failure to provide this minimum information will result in a rejection. Point-to-point wiring must be shown on all fire alarm drawings.
2. All submitted fire alarm system plans must be drawn to  $\frac{1}{8}'' = 1'$  scale. Submitted fire alarm plans drawn to a scale other than  $\frac{1}{8}'' = 1'$  will not allow the engineers to perform the visible alarm notification coverage assessment using templates and will therefore incur additional fees as all visible alarm notification coverage areas will need to be "scaled."
3. Submission of building permit electrical drawings versus dedicated fire alarm shop drawings will not be accepted.
4. Use the following output voltage value for calculating the NAC: Voltage drop calculations required by NFPA 72 shall use 20.4 VDC as the supply/starting voltage. NFPA 72 and UL require a power supply – even secondary power – to deliver no less than 85% of the nominal voltage. Therefore,  $VDC = 0.85 \times 24 = 20.4$  VDC, per NFPA 72, 10.3.5.
5. A wide variety of voltage drop calculation formats (and results) are submitted for review.

### TENANT FIRE ALARM PANELS IN SINGLE STORY FULLY SPRINKLERED BUILDINGS

In order to mitigate confusion caused by multiple central station calls to the McConnell Public Safety Transportation and Operations Center (MPSTOC) the following policy is to be implemented in the case of single-story, fully sprinklered buildings with central station monitoring per VCC 903.4 and tenant fire alarm systems. See item 6 below for buildings with a base building fire alarm throughout.

1. Sprinkler flow and tamper are to be handled by the base building Digital Alarm Communicator Transmitter (DACT), with signals transmitted directly to the central station per VCC 903.4.
2. Tenant fire alarm panels can pick up a signal from the base building flow switch as an input to their panel. This signal can be used, along with other inputs, to provide an evacuation alarm for that tenant space. Tenant panels are not to retransmit the base building flow or tamper signal to their central station, unless they direct their central station that this signal is not for retransmission to the MPSTOC. For the case in which only a local alarm is sought by the tenant, this is not an issue. In the case of those tenants who have their own central station, they must partition the signals sent to that station by device, such that retransmission by their central station to the MPSTOC does not occur in the case of a signal picked up from the base building flow or tamper.
3. If the tenant space has an individual flow switch or pressure switch, it is assumed that the water flow alarm will be sent out by the base building DACT, as picked up by the base building flow switch. This assumes that the tenant space does not have an individual water supply separate from the base building. Again, this individual tenant flow switch or pressure switch can be used to activate an evacuation signal for that tenant space only but will not be retransmitted to the central station responsible for calling the Fire Department, as that will have already been done by the base building DACT.
4. Additional devices attached to the tenant fire alarm panel (or DACT), such as smoke detectors (including elevator recall detectors for a mezzanine elevator, for example), manual stations, and duct detectors, can be used to:
  - a. Evacuate the individual tenant space by means of code compliant notification appliances and/or

- b. Transmit a signal to a listed central station used by the tenant, in order to report the tenant address to MPSTOC. **NOTE:** The tenant address must be distinguishable in some fashion from the base building address for this to be allowed.
5. Reviewers must be aware of the base building DACT, its location, and capabilities, at the time of tenant review, for the above to function. Fire alarm tenant plans that do not have adequate information about the base building and the context of the tenant fire alarm proposed will have to be immediately rejected and returned to the submitter to provide the necessary information.
6. If the base building has a fire alarm system (as opposed to only sprinkler monitoring) with notification appliances, then the base building alarm system initiating devices (i.e., sprinkler flow, other initiating device, etc.) must notify all tenants and occupants of the building. The tenant panel signal must show up as a satellite panel activation at the base building panel. The base building panel must then activate all notification appliances throughout. The retransmission to MPSTOC must be handled by the base building fire alarm panel's central station. The tenant central station is not to retransmit to MPSTOC (in order to avoid confusion). This is the same procedure used for computer room satellite panels in any building with a fire alarm system. This requires proper interconnection of base building and satellite panels.

## NON-HIGH-RISE ANNUNCIATOR PANEL LAYOUT

<u>THIS IS A SAMPLE ONLY</u> (Revised January 2003)				
POWER ON ○ (Green)				
MANUAL STATION	○ (RED)	PENTHOUSE	(RED)	○
SMOKE DETECTOR	○ (RED)	5TH. FLOOR	(RED)	○
(Spare)	(RED)	4TH. FLOOR	(RED)	○
HEAT DETECTOR	○ (RED)	3RD. FLOOR	(RED)	○
ATRIUM SMOKE DETECTOR	○ (RED)	2ND. FLOOR	(RED)	○
ELEVATOR LOBBY/MACHINE ROOM	○ (RED)	1ST. FLOOR	(RED)	○
SMOKE DETECTOR	○ (RED)	CELLAR	(RED)	○
SPRINKLER FLOW	○ (RED)	GARAGE #1 LEVEL	(RED)	○
STANDPIPE FLOW	○ (RED)	GARAGE #2 LEVEL	(RED)	○
FIRE SERVICE LINE	○ (RED)	STAIRWAY A	(RED)	○
CLEAN AGENT OR PRE-ACTION SYSTEM	○ (RED)	STAIRWAY B	(RED)	○
KITCHEN HOOD	○ (RED)	STAIRWAY C	(RED)	○
DUCT DETECTOR	○ (AMBER)			
CARBON MONOXIDE	○ (AMBER)	STAIRWAY D	(RED)	○
ELEVATOR SHUNT TRIP	○ (AMBER)			
VALVE TAMPER	○ (AMBER)			
DRY PIPE HI/LO AIR	○ (AMBER)			
FIRE PUMP RUN	○ (GREEN)	GENERATOR RUN	(GREEN)	○
FIRE PUMP FAULT	○ (AMBER)	GENERATOR FAULT	(AMBER)	○
TRouble	TRouble	TRouble	RESET	TEST
○ (AMBER)	□	○ (KEYED)	○ (KEYED)	○ (KEYED)
LIGHT	BZZER	SWITCH	SWITCH	BUTTON
Stair door locks	Locked (RED)	Unlocked (Green)		
○ (KEYED)				
SWITCH				

**The above drawing is a sample.** Number of floors, garage levels, etc. may vary. Certain lights may be omitted, or additional ones may be needed. This sample is not for a high-rise building.

1. Panel to be located at main lobby.
2. Annunciator shall indicate type of alarm received by device and floor level. Sub-zoning required when the floor area exceeds 22,500 sq. ft.
3. The layout of building will be required for zoning purposes and identification of areas/stairways/risers.
4. Submit a set of plans, riser diagrams, cut sheets, and annunciator panel diagram for approval.
5. Ring back required on trouble and reset switch (if it is not a momentary switch).
6. Sprinkler annunciation shall be by floor and device (sprinkler flow) only. Exceptions:
  - a. If sprinkler system piping is separated into zones and not cross-connected between zones, and
  - b. Sprinkler system zones coincide exactly with graphic fire alarm zoning.

7. A graphic layout of the building is required at the location of the Fire Alarm Annunciator and Fire Alarm Control Panel.

**NOTE:** Generators are not mandatory on low-rise buildings. If present, they shall annunciate as above.

#### FIRE ALARM TESTING OF NON-HIGH-RISE BUILDINGS

1. Prior to installation of fire alarm systems, one set of complete fire alarm system plans shall be submitted for approval to the Office of the Fire Marshal. The submittal shall contain electrical floor plans, manufacturer's cut sheets for *all* devices, wiring riser diagrams, operational description of system, any mechanical risers or floor plans necessary to evaluate controls and status indicators, and an annunciator panel diagram including status indicators and controls for mechanical equipment where necessary. All submittals shall contain verification of the listing of all components.
2. Every fire alarm system shall be pre-tested by the installing contractor or his representative before the Fire Marshal's acceptance test begins. This will help to alleviate multiple retesting and free up more appointment times for other tests to be held.
3. To set up fire alarm acceptance tests, please call the Office of the Fire Marshal at 703-246-4821 at least 14 days prior to the test.
4. All fire alarm annunciator panels, control panels, and associated equipment are to be "buttoned up" with no loose wire hanging before the Fire Marshal's acceptance test will be conducted. Test area shall have completed painting, carpeting, etc., in final form. Areas with smoke detectors shall be free of dirt, dust, and sanding residue.
5. During testing of the fire alarm systems, the following installers or representatives should be present to assist in testing the fire alarm systems, if applicable:
  - a. Fire alarm installer
  - b. Sprinkler installer
  - c. Elevator installer
  - d. Air handling unit(s) installer (duct smoke detector)
  - e. Fire alarm control panel representative
  - f. Fire alarm panel programmer
6. The acceptance test will *not* be conducted without Office of the Fire Marshal fire alarm approved plans (cut sheets and electrical floor plans, fire alarm sequence of operation, etc.) on site.
7. All permit fees shall be paid before the test.
8. The Fire Marshal's acceptance test will include but is not limited to the following:
  - a. All smoke detectors will be tested with smoke.
  - b. All heat detectors will be tested.
  - c. All pull stations will be tested.
  - d. All flow switches (i.e., sprinkler, standpipe, and main fire line) will be tested by actual flowing of water. Sprinkler flows will be tested through a test orifice equal in size to the smallest sprinkler orifice in the system. Sprinkler flow retard switch shall be adjusted to no less than 20 seconds retard to avoid false alarms due to water hammer.
  - e. All duct smoke detectors will be tested. Air handling units are to be "running" during duct smoke detector test to witness "shut down" of unit when duct smoke detector activates.

- f. All smoke removal system reports tested by Special Inspector per VCC/IFC 1704 shall be approved by the Office of the Fire Marshal. See [Fairfax County Guidelines for Smoke Control Systems Manual](#) on the Engineering Plans Review Web page.
  - g. Trouble circuits will be “spot checked” periodically during the tests, and the alarm system will be checked with the system in “trouble.”
  - h. Any concealed detector must have a remote, readily visible, red LED light and descriptive label, as close as possible to the actual device location.
  - i. Floor call buttons for an elevator shall be tested while the elevator is in Phase I and Phase II emergency operation. Elevator inspector approval must be obtained before testing by Office of the Fire Marshal acceptance inspectors.
  - j. If the sprinkler system is divided by zone, annunciation of sprinklers will be by floor, device (sprinkler flow), and proper zone. If the system is zoned, the sprinkler zones shall correspond with fire alarm zones. If the sprinkler is a “looped” system covering an entire floor, no zone annunciation will be accepted. Only floor level and device (sprinkler flow) shall annunciate.
  - k. A high/low air pressure condition in the dry sprinkler system shall set off a trouble light and a buzzer on the annunciator panel. A separate circuit shall be on the control panel showing high/low air pressure.
  - l. All suppression and detection devices and equipment in the building shall be tied to the alarm system and tested.
  - m. All Digital Alarm Communication Transmitters (Dialers) shall be tested. Approved DACT plans shall be on site for test. UL/FM central station listing documentation is required. Central station shall be online with no alarms or troubles for 24 hours prior to the test.
  - n. Generator (if present) shall show fault when turned off or when load side breaker to building is open or experiences any condition that would cause failure under emergency operation, per NFPA 110, Section 5.6.5.2.
  - o. All ceiling tile, floor covering, and interior finish shall be in place for testing of audibility and visibility. Visual appliance coverage shall be complete. For shell building tests, interior walls shall be prime coated and floors broom swept. When fire alarm tests are to be conducted in occupied buildings, the building shall be posted 24 hours prior to the test to notify the occupants.
  - p. Detection devices shall not be installed until after construction clean-up of all trades is complete. Detectors that are contaminated shall be cleaned or replaced. See NFPA 72, Section 17.7.1.12.
9. All testing equipment (smoke machines, etc.) shall be supplied by the contractor. Where required, UL approved Central Station shall be online and part of the Fire Alarm System. Central Station documentation (listing, etc.) is required. The sequence of operation/installation manual shall be maintained on site for the life of the system for inspection by the fire official.
- For further assistance, please call the Office of the Fire Marshal, Monday through Friday, from 8 a.m. to 4:30 p.m. at 703-246-4821 or email [fire.AcceptanceTesting@fairfaxcounty.gov](mailto:fire.AcceptanceTesting@fairfaxcounty.gov).
10. The name, telephone number, and account number of the current central station monitoring company shall be posted and maintained inside the locked Fire Alarm Control Panel (FACP). If the fire alarm system is not monitored, that fact shall be posted inside the locked FACP.

# HIGH-RISE ANNUNCIATOR PANEL LAYOUT

## THIS IS A SAMPLE ONLY

### DEVICE

(RED)

- Manual Station
- Smoke Detector
- Heat Detector
- Atrium Smoke Detector
- Elevator Lobby/ Machine Room Smoke Detector
- Sprinkler Flow
- Clean Agent (or) Pre-Action System
- Kitchen Hood

### LOCATION

(RED)

- PH
- 20th Floor \*
- 10th Floor \*
- \* \*
- 1st Floor
- Atrium
- Basement
- Cellar
- Garage Level P1
- Garage Level P2

(YELLOW)

- Duct Detector
- Standpipe Flow
- Stair A
- Stair B
- Stair C
- Fire Service Line
- Valve Tamper
- Dry Pipe Hi/Lo Air
- Carbon Monoxide
- Elevator Shunt Trip

- System Trouble (with buzzer)

- Trouble Silence

- Reset
- Lamp Test

Fire Pump

Remote Start

- ON (GREEN) ○ Fire Pump Run
- AUTO (YELLOW) ○ Fire Pump Fault

Stair

- Door  Unlocked (GREEN)
- Locks Locked (RED)

Generator

Remote Start

- ON (GREEN) ○ Generator Run
- AUTO (YELLOW) ○ Generator Fault

### LEGEND

- = Keyed Switch
- = Annunciation Light

1. **The above drawing is a sample.** Fan control panel must be adjacent to this panel and both, plus FACP and VOICE/PAGING/FIREFIGHTER'S PHONE panels, must be in 1-hour rated fire control room at the main lobby. See VCC 911 for all equipment, including elevator panel.
2. Maximum annunciation zone size = 22,500 sq. ft. (VCC 907.6.4). Sprinklers zoned by floor only, except for atriums. All sprinklers in atrium must annunciate as atrium sprinklers.
3. Floor, zone, and type of device must annunciate, except see item 2 above.
4. Ring back required on trouble and reset, if not a momentary (spring loaded) switch.

**I. DEFINITION**

- A.** In all buildings having floors used for human occupancy which are greater than 75 feet above the lowest level of Fire Department vehicle access. VCC Chapter 2

**II. FIRE ALARM AND DETECTION SYSTEMS**

- A.** All fire alarm and detection systems, fire and life safety system controls, and system supervision shall conform to the “High-rise Buildings” section of the current Virginia Construction Code (VCC) and the referenced editions of applicable NFPA documents, including but not limited to NFPA 13, 14, 20, 37, 70, 72, and 110.

**III. FIRE CONTROL ROOM (Fire Command Station) VCC 403.4.6, 911**

- A. Construction and Size** — minimum 96 sq. ft. & minimum 8 feet in any direction. See also exceptions, up to 200 sq. ft. VCC 911.1.3
1. One hour rated enclosure with 1 hour “B” label door, VCC 911.1.2
  2. Sized to allow minimum of 3 feet working clearance to front of panels. NEC, Section 110.26
  3. Clearance at rear and top of panels per equipment manufacturer’s recommendations. NEC, Section 110.26
  4. Provided with adequate ventilation necessary for removal of heat generated by equipment.
  5. Electrical, mechanical, or plumbing equipment other than those associated with the system shall not be in the Fire Control Room.
  6. One copy of approved building and fire protection system plans to be in Fire Control Room.
  7. Must be sprinklered.
  8. Provide smoke detector.
  9. Layout must be approved.
  10. Provide 15 sets of master keys in the room.
  11. Direct callout phone.
- B. Location** VCC 911.1.1
1. Located at the main lobby entrance with direct access from lobby.
  2. Preferably located on an outside wall.
  3. Not located next to or adjacent to boiler rooms, transformer rooms, etc.
  4. Bulk piping is not to be run through Fire Control Room.

**IV. SHOP DRAWINGS AND SPECIFICATIONS**

- A. General** (All submissions shall include, but are not limited to the following):
1. A minimum of one set of drawings and specifications shall be submitted for review and approval.

2. All equipment shall be listed by a recognized testing authority for its intended use. The submittal shall include the following:
  - a. Quantity, manufacturer, model number, etc. of each device to be installed (materials list)
  - b. Engineering cut sheets and specifications for each type of device
  - c. Specifications on the type of wire to be used NEC 760; NFPA 72, Chapter 12
  - d. Wiring diagrams, annunciator panel detail, fan control panel detail, voice/paging panel detail
  - e. Floor plans showing the location of each device including legend.
  - f. Operational description of system, including overall program matrix
  - g. Any mechanical reference sheets (i.e., riser diagrams, fan schedules, etc.) pertaining to the system.
  - h. A complete operational description, including volume calculations, for all smoke control and pressurization systems, including a proposed test protocol and testing measurement locations.
  - i. Provide generator load breakdown/summary, and battery calculations.
  - j. Where detectors are required to be installed within the immediate vicinity, detectors shall not be more than 5 feet from the center of the opening.
3. Submittal of smoke control design and sequences shall be submitted with building permit drawings. The contractor's shop drawings shall reflect the design intent of the approved smoke design.

## **V. CENTRAL CONTROL STATION: ALARM DETECTION, COMMUNICATION, AND STATUS INDICATION**

### **A. Receive Fire Alarm Indication and Annunciation from:**

1. Manual fire alarm stations NFPA 72, Section 23.8.5.2 and Section 17.4
2. Heat detectors
3. Smoke detectors (by location and zone). Elevator lobby detectors and atrium detectors to be on individual zones. NFPA 72, Section 21.3; VCC 3003.2, 907.2.13.1.1
4. Duct detectors Virginia Mechanical Code (VMC) 606; VCC 907.2.13.1.2
5. Sprinkler flow switches (atrium sprinkler to be on separate zone) NFPA 72, Section 17.13 and Section 23.8.5.5

### **B. Receive or Transmit Communications from:**

1. Firefighter's two-way telephone (dedicated phones, NOT jacks) VCC 911, 907.2.13.2
2. Public telephone – in Fire Control Room, line direct to outside VCC 911.1.6
3. Voice Alarm and Public Address Systems VCC 907.5.2.2

### **C. Receive Status Indication from:**

1. Fire pump (run or fault) NFPA 20, Section 10.4.7.
2. Emergency power system (run or fault) VCC 911.1.6(9)

3. Elevators (recalled or not) (status and location) VCC 911.1.6(4)
4. Stairway pressurization system (on, off) VCC 911.1.6(6)
5. Smoke control systems (on, off) VCC 911.1.6(6)
6. Air handling systems (on, off) VCC 911.1.6(5)
7. Stairway doors unlock (open=green, locked=red) VCC 911.1.6(7)
8. The above shall be provided with a status indicator light as follows: ON (green); OFF (red); Elevator emergency recall (yellow)

**D. Receive and Annunciate Supervisory and/or Trouble Indications:**

1. Tamper switches on sprinkler, fire pump, and standpipe water control valves (supervisory) NFPA 72.
2. Duct detectors Virginia Mechanical Code (VMC) 606; VCC 907.2.13.1.2
3. Electrical circuits and wiring
4. See sections A, B, and C above, except public telephone.
5. Voice alarm system and all components
6. Standpipe flow switch (trouble light)
7. Fire pump flow switch (trouble light)
8. Generator (trouble light)
9. Hi/Lo air pressure for dry pipe systems (supervisory signal)

**E. Operational Controls**

1. Operational controls shall be provided for and located in the Fire Control Room for the following: VCC 911
  - a. Voice Alarm and Public Address System
  - b. Firefighter's two-way communications system
  - c. Fire pump (ON, auto only)
  - d. Emergency generator (ON, auto)
  - e. Stairwell pressurization system (separate controls for each stairwell required) (H-O-A)
  - f. Smoke control systems (H-O-A) (separate controls required for each system, on a per floor basis)
  - g. Off normal conditions on H-O-As shall sound a trouble buzzer
  - h. Air handling systems (separate controls required for each system, on a per floor basis (H-O-A)
  - i. Elevators

**VI. OPERATIONAL REQUIREMENTS**

**A. Receipt of Any Alarm Signal Shall:**

1. Initiate a signal to an approved supervising station. VCC 907.6.6
2. Activate the voice alarm system and the visual fire alarm indicators on the floor level where the alarm was initiated, the floor directly above and below, and the elevator car and stairwell speakers. VCC 907.5.2.2

3. Activate the stairwell pressurization system. VCC 909.20.5
4. Activate mechanical smoke control (if provided) on the fire floor, except if signal originates from a manual pull station. (**NOTE:** Per floor smoke control is often not found today; AHU controls are still necessary.)
5. If the signal originates from an elevator machine room or elevator lobby smoke detector, activate the elevator recall system. If the primary floor level of return is the floor of alarm origin, the elevators shall be automatically directed to the secondary floor level of return. ASME A17.1; VCC 3003.2; NFPA 72, Section 21.3

## **B. Design and Installation**

1. Voice Alarm and Public Address System
  - a. The alarm and communication system shall be designed and installed so damage to any terminal unit or speaker will not render more than one zone of the system inoperative. VCC 907.6.4.2; NFPA 72, Section 24.4.8.6.1
  - b. The system shall be continuously electrically supervised against component failure of the audio path including amplifiers, speaker wiring, switches, and electrical contacts and shall detect opens, shorts, and grounds which might impair the function of the system. Both a visual and audible trouble signal shall operate at a location as indicated in heading VI, section A.1 above. NFPA 72, Section 10.18
  - c. All wiring shall be installed in metallic tubing or approved equivalent. The installation shall be in a manner which will afford the maximum protection against the effects of fire, and which will facilitate repair or replacement. NEC 760; NFPA 72, Chapter 12
  - d. The system shall be installed so trouble can be readily detected by floor and device.
  - e. There shall be a maintained contact push button and visual indicator for each floor level or zone. An "all call" position is also required. Operation shall be by selective basis (i.e., one zone, any combination of zones, or by all zones). One set of maintained push buttons for the fire alarm system and one set for the public address system is required. NFPA 72, Section 24.4.8.2.
  - f. Zones shall be limited to a maximum of 22,500 sq. ft. In no instance shall a zone encompass more than one floor level. Floors shall alarm on a per floor basis and alarms shall annunciate by floor, zone, and device. VCC 907.6.4.
  - g. Speakers shall be installed in the following locations: elevators, elevator lobbies, corridors, exit stairwells at every 3<sup>rd</sup> level, rooms or tenant spaces exceeding 1,000 sq. ft., dwelling units in apartments, and hotel guest rooms or suites. **NOTE:** Speakers in elevators, stairs, and cabs. NFPA 72, Section 23.8.6.2, Section 18.4.9, Section 18.4.10, and Section 18.4.11
  - h. Speakers shall be listed by a recognized testing authority for fire alarm use. Speakers shall provide the sound levels specified in NFPA 72 at all locations in the structure. VCC 907.5.2.1; NFPA 72, Section 23.9, Section 18.4.1, Section 18.4.2, Section 18.4.7, Section 24.3.1, Section 24.4.2
  - i. Wall mounted speakers shall be installed so sound reproduction is in one direction only. In no instance shall corridor speakers be installed so sound reproduction is directed towards the opposite wall. NFPA 72, Section 18.4 (all)

- j. Speaker spacing shall be in accordance with the recommendation of the manufacturer, the listing authority, and above all, to provide the required sound reproduction listed under item h above.
  - k. The pre-taped message shall be, "There is a fire emergency in the building. You are to leave the building by the nearest exit or exit stair. Do not use the elevators." Visual indication that the message is being delivered to the required zones shall be installed at the control panel.
  - l. Failure of the pre-taped message for any reason shall cause the fire alarm signal to sound continuously in the required zones until the system has been restored to normal or is silenced at the control panel.
  - m. The alarm signal shall be the slow whoop signal. The alarm signal shall sound for a maximum of 15 seconds followed by the pre-taped message. Both shall sound alternately in sequence until silenced at the control panel or when the fire alarm panel is restored to normal. There shall be no more than a five second pause between the alarm signal and the pre-taped message for each revolution.
  - n. Upon activation of any manual alarm or automatic fire detection or suppression device, the fire alarm system shall operate on the floor level of origin, the floor levels directly above and below, in all elevators and in all stairwells. Atriums shall be alarmed as one space, including all levels open to the atrium.
  - o. The system shall be designed so the fire alarm signal and pre-taped message may be transmitted to any floor while voice messages are being transmitted to other floors. If the voice instructions are required to be transmitted to any floor, the fire alarm signal and pre-taped message shall automatically restart or continue in the required sequence after the voice transmission is completed.
  - p. The microphone for the transmission of voice messages shall be hand-held type with a 5-foot cable. The cable shall be permanently connected at both ends with the microphone hanger mounted on the front of the panel.
  - q. Alarm tone generators, preamplifiers, power amplifiers, and power supplies shall be continuously supervised. Backup units shall automatically provide the required signaling in the event of component failure. NFPA 72, Section 10.19
2. Fire Department Communication System
- a. Fixed telephones (NOT jacks) shall be located at the following locations: Each elevator car, elevator lobbies, and the entry inside the stair enclosure at each floor level (also Fire Pump Room and Elevator Machine Room). VCC 911, 907.2.13.2; NFPA 72, Section 24.8
  - b. Telephone shall be of the press-to-talk type and located in a locked telephone cabinet with breakaway safety glass or plexiglass panel. Cabinets may be wall mounted or recessed. Cable shall be capable of withstanding elevated temperatures.
  - c. Each cabinet shall be provided with an engraved or permanently attached sign reading: "FIREFIGHTER'S TELEPHONE – FIREFIGHTER'S USE ONLY." Letters shall be a minimum of 1/2" block letters on a contrasting background. Mounting height 3'-5' A.F.F.

- d. The phone at the Fire Control Room shall be mounted on the front of the control panel without any enclosure.
  - e. Removal of any telephone from its cradle will activate an audible and visual indicator which shall remain lit until the telephone is returned to the cradle in a normal position. The firefighter's telephone shall be annunciated by floor level and zone. See above heading VI, section B.1, item f, "Voice Alarm and Public Address Systems."
  - f. The control unit and all wiring for the system shall be continuously supervised for power failure and open, shorted, or grounded conditions which would affect the intended operation or performance. Detection of any fault in the system shall activate an audible and visual trouble signal. NFPA 72, Section 10.19
  - g. The system shall be designed to provide power for the simultaneous use of five telephones while maintaining an audible level of communication. NFPA 72, Section 24.8.6
  - h. There shall be provided a minimum of 25 keys to the telephone cabinets which shall be in the Fire Control Room. Locks shall be uniform and require the use of one key to unlock any telephone cabinet.
3. Fire Detection and Alarm System Annunciator Panels – Sprinkler Valve and Water Flow Detector Panels
- a. Panels may be the graphic annunciator type or labeled device type with adjacent fixed building diagram. VCC 907.6.3
  - b. Annunciator panel or individual device panels shall clearly indicate the type of initiating device, the floor level of the alarm, and the zone. See above heading VI, section B 1, item f, "Voice Alarm and Public Address Systems" VCC 907.6.3
  - c. Stairwells shall be clearly shown and labeled on graphic or building diagram. A "YOU ARE HERE" indicator shall be shown and labeled on graphic or diagram. If stairs discharge at other than entrance level, so indicate.
  - d. All manual or automatic fire detection or suppression devices shall be annunciated including the following: fire alarm manual stations, smoke detectors, heat detectors, elevator lobby smoke detectors, duct smoke detectors, atrium smoke detectors, sprinkler flow switches, standpipe flow switches (one required at the base of each standpipe riser), fire pump flow switch, and tamper switches. VCC 907.6.3
  - e. Activation of any of the above listed devices, with the exception of the standpipe flow switches, duct detectors, fire pump flow switch, or tamper switches, shall cause the activation of the stairwell pressurization systems, the fire alarm signal and pre-taped message to the required zones.
  - f. Activation of the standpipe flow switches, fire pump flow switch, or tamper switches shall initiate an audible and visual supervisory signal at the Fire Control Panel and to a central station or continuously staffed station.
  - g. All wiring and power supply shall be continuously supervised. Detection of any fault shall initiate a visual and audible trouble signal at the control panel and to a location (as indicated above, heading V, section D, "Receive and Annunciate Supervisory and/or Trouble Indications").

- h. The system shall be designed and installed so trouble conditions may be readily detected by floor level and/or zone. Visual trouble indicators at the control panel shall indicate the type of device.
4. Status Indicator for Elevators
- a. Status indicators shall be provided for each elevator car. A green light for normal operations, red light for power off, and a yellow light for emergency recall shall be provided. VCC 911.1.6(4), VCC 3003
  - b. Activation of any elevator lobby smoke detector shall initiate elevator recall (Machine Room Detector included). NFPA 72, Section 21.3
  - c. The elevator emergency recall system shall be programmed to return all elevators to the main lobby floor level of return. There shall be a secondary floor level of return in the event the primary floor is in alarm. The secondary floor shall be as directed by the Fire Marshal.
  - d. The elevator emergency controls are to be located at the main lobby. This shall be a three-position switch – normal operation – manual override – emergency recall. It is recommended that an additional control be in the Fire Control Room which shall have a permanently attached key.
  - e. Fire Service Access Elevator status, including location within the hoistway, direction of travel, and whether the elevator(s) are occupied shall be displayed on the building fire alarm system annunciator. Temperature and presence of smoke in associated lobbies, machine rooms, control rooms, machinery spaces, or control spaces shall be continuously monitored and displayed on the building fire alarm system annunciator located in the fire command center. NFPA 72, 21.5, *Fire Service Access Elevators*.
5. Status Indicators and Controls for the Fire Pump, Emergency Generator, Air Handling Systems, Smoke Removal Systems, Stairwell Pressurization Systems. VCC 911
- a. Status indicators, green light – on, red light – off, and operational controls, shall be provided for each of the above in the Fire Control Room.
  - b. Where there is more than one system, i.e., air-handling systems, smoke removal systems, or stairwell pressurization systems, status indicators and controls shall be provided for each separately, on a per floor basis (H-O-A's) or per stair basis. Labeling shall clearly show any system integrated with smoke control.
6. Stairway Door Unlocking Systems
- a. Controls shall be provided to unlock all stairwell doors simultaneously from the Fire Control Room. No door may be locked in the direction of egress travel except under provisions of VCC 1010 and VCC 403.5.3.
  - b. Call-out telephones shall be provided inside the stairwell at a minimum of every fifth floor for occupant use. They shall provide direct communication to a constantly attended approved emergency monitoring service. VCC 403.5.3.1
  - c. Telephone communication wiring and power supplies shall be continuously supervised for open, short, or ground conditions. Detection of any trouble fault shall initiate a visual and audible trouble signal at the control panel and at the central station.

7. Public Telephone
  - a. A public telephone shall be provided inside the Fire Control Room. The telephone shall not be coin operated. It is suggested that the telephone be an extension of the building owner or management telephone rather than a separate telephone number. VCC 911.1.6(10)

## **VII. EMERGENCY POWER REQUIREMENTS**

### **A. Standby Power**

1. The following systems or equipment shall be connected to the standby power system and supplied with standby power within 60 seconds of loss of primary power: VCC 2702.2.17, 403.4.7, 403.4.8
  - a. Ventilation and automatic fire detection equipment for smokeproof enclosures
  - b. Elevators
  - c. Stairwell pressurization systems
  - d. Atrium and floor opening smoke control VCC 404.7

### **B. Emergency Systems**

1. Egress lighting, exit signs, elevator car lighting, emergency voice, fire pump, fire alarm, and door unlocking are emergency systems and shall be supplied with backup power within 10 seconds of primary power failure. VCC 403.4.8; NFPA 72, Section 10.6.6

**NOTE:** Neither standby nor emergency power for a high-rise building may be provided by connection ahead of the main disconnect. Both are Level 1, Class 2 systems per NFPA 110. VCC 2702; NFPA 110, Section 4.1

## **VIII. TEST AND INSPECTION REQUIREMENTS**

### **A. General**

1. No inspection or tests shall be made without OFM approved and stamped plans and all submittals on the job site.
2. Tests and inspections shall be made by appointment only.
3. Each component shall be tested.
4. Spot checks of the system shall be made while operating on the emergency power system.
5. A representative of the equipment supplier shall be present during all tests and inspections of the system.
6. A sound pressure level meter shall be provided by the contractor for use in testing the system.
7. The system shall be pre-tested by the contractor to ensure proper operation prior to requesting inspection by the Office of the Fire Marshal.
8. Tests and inspections of the system should commence no later than 30 days prior to anticipated or desired occupancy. Past experience indicates the time required to complete inspections and tests takes four inspectors approximately one week.
9. The supplier shall furnish complete operating instructions and personnel necessary to instruct and train fire department personnel in the operation of the system.
10. Areas with smoke detectors shall be free of dirt, dust, and sanding residue.

## MARKING OF MULTI-FLOOR BUILDING STAIRWELLS AND FLOORS

The Fire Prevention Code (as amended by Fairfax County) permits the fire official to issue regulations which require the owner, lessor, or management agent of buildings to post signs where, in the professional judgment of the fire official, such signs are deemed to be effective in minimizing the danger to persons and property in case of fire. Therefore, all buildings with stairways located in Fairfax County and the towns of Clifton, Herndon, and Vienna shall have signs posted as follows.

### A. Stairway Identification Signs (See [Sample 1](#) following this section):

1. **Stairway Identification Signs.** Signs shall be provided at each floor landing in exit enclosures and stairways. Signs shall comply with the following requirements:
  - a. **Stair and Floor Designation.** Signs shall identify the stairway with a letter of the alphabet and indicate the floor number. Letters and numbers shall be a minimum of 5 inches in height and shall be in the center of the top half of the sign with stairway letter(s) positioned to the left of the floor number. All stairway lettering shall correspond with the stairway location schematic described below.
  - b. **Assignment of Stairway Letters.** The assignment of stairway designation letters shall start with the stairway next to the main entrance with the letter "A" and continue in a clockwise or left to right pattern.
  - c. **Lettering Height.** Except for stairway designation letters and floor numbers being at least 5 inches in height, all other signage lettering and numbers shall be a minimum of 1 inch in height.
  - d. **Exit Discharge.** Signs shall identify the floor level or story of and the direction to the exit discharge.
  - e. **Roof Access.** Signs shall indicate the availability of roof access from the stairway. The stairway shall be marked "ACCESS TO ROOF" at street and floor levels indicating that the stairway has access to the roof. Stairways without roof access shall be marked "NO ACCESS TO ROOF."
  - f. **Stairway Terminus.** Signs shall identify the terminus of the top and bottom of the stairway.
  - g. **Minimum Sign Size.** The signs shall be a minimum size of 18" x 12"; however, stairway identification information may be stenciled directly onto the wall provided other requirements are met.
  - h. **Location and Visibility of Signs.** The sign shall be located 5 feet above the floor landing in a position that is readily visible when the doors are in the open and closed positions.
  - i. **Non-Glare Finish.** Characters and their background shall have a non-glare finish. Characters shall contrast with their background, with either light characters on a dark background, or with dark characters on a light background.
  - j. **Uniformity.** Placement and dimensions of stairway identification signs shall be consistent and uniform throughout the same exit enclosure or stairway.
  - k. **Tactile Signs.** Where required by the VCC, floor level identification signs in tactile characters complying with ICC A117.1 shall be located at each floor level landing adjacent to the door leading from the enclosure into the corridor to identify the floor level.

- I. **Luminous Signs.** When signs are installed in interior exit enclosures of buildings subject to VCC 1025 “Luminous Egress Path Markings,” the signs shall be made of the same materials as required by VCC 1025.4.
- B. **Stairway Location Schematic** (See [Sample 2](#) following this section):
  1. A simplified schematic of the building footprint showing the building’s exterior and general layout of the first floor or lobby level floor shall be displayed in the main entrance lobby and/or fire control room.
  2. All stairway designation letters shall be illustrated on the schematic and shall correspond with each stairway.
  3. Stairway identification signs and location schematics can significantly assist fire and rescue personnel manage fire emergencies in multi-story buildings.
- C. **Elevator Labeling Schematic:**
  1. Elevator cars shall be labeled with numbers in a clockwise fashion from the main point of entrance beginning from viewer’s left.
  2. Destination dispatch elevators can use lettering designation.

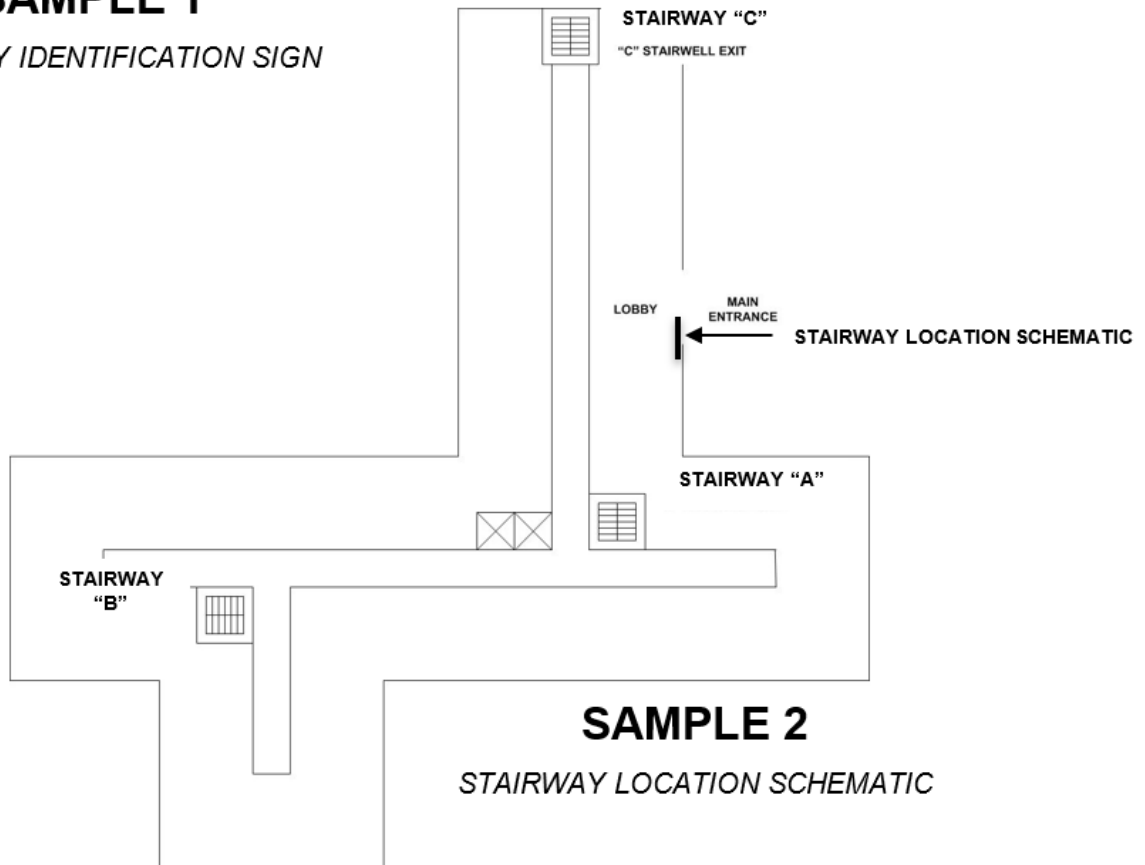
For any questions about these requirements, please contact the Fire Inspections Branch at 703-246-4849 or email [fire.Inspections@fairfaxcounty.gov](mailto:fire.Inspections@fairfaxcounty.gov).

STAIRWAY SIGN SAMPLES



**SAMPLE 1**

*STAIRWAY IDENTIFICATION SIGN*



## FIRE DEPARTMENT KEY BOXES

- A. Access to Structures.** In accordance with Section 506.1 of the Fire Prevention Code, where access to or within a structure or an area is restricted because of secured openings or where immediate access is necessary for lifesaving or fire-fighting purposes, the fire official is authorized to require a key box to be installed in an approved location. The key box shall be of an approved type listed in accordance with UL 1037 and shall contain keys to gain necessary access as required by the fire official. The only exception to the key box listing requirement applies to existing key boxes which are not required to be listed in accordance with UL 1037 unless replaced.
- B. Structures Requiring Key Boxes.** In Fairfax County and the towns of Clifton, Herndon, and Vienna, all buildings with the exception of single-family dwellings shall provide a fire department building access system (i.e., key box with the proper inventory of building entry keys) as approved by the Fire Marshal. The types of boxes typically installed include surface-mounted and recessed key boxes, as well as MSDS repository cabinets when required.
- C. Approved Key Boxes.** The following brands of fire department key boxes are approved for use in Fairfax County and the towns of Clifton, Herndon, and Vienna:

**Knox-Box® Rapid Entry System by Knox Company**  
**SupraSafe™ Rapid Entry System by UTC Fire and Security**

Literature on the key boxes can be obtained by calling 703-246-4803, and is also available online at the [Fire Department Key Boxes](#) area of the Office of the Fire Marshal website.

- D. Installation - Buildings and Structures.** Fire department key boxes shall be installed in an approved manner in accordance with the following requirements:
1. Key boxes must be installed at the primary fire department entrance (main entrance or entrance nearest to the fire control room).
  2. Key boxes must be visible and accessible.
  3. Key boxes must be installed 42" – 54" above finished grade.
  4. For new or renovated buildings, fire department key boxes must be installed prior to occupancy.
- E. Installation - Gates and Barricades.** In accordance with Section 503.6 of the Fire Prevention Code (as amended by Fairfax County), gates and barricades that are installed across a fire apparatus access road that is normally intended for vehicular traffic should be installed with a fire department access system which has an emergency override fire department master key switch. This will improve fire department response time. This may require that an approved fire department key box be installed at gates or similar barriers that impede fire department apparatus access.
- F. Number and Types of Keys Required.** In accordance with Section 506.3 of the Fire Prevention Code (as amended by Fairfax County), the following number and types of keys shall be provided:
1. In buildings with Fire Command Centers (Fire Control Rooms), 15 sets of common keys shall be provided for access to building services and systems regulated by Chapter 6 of the Fire Prevention Code, and to all storage, trash and utility rooms, roof access doors, and doors to other secured areas.

2. In all other buildings required to provide fire department access, three sets of common keys shall be provided.
3. Individual keys shall be clearly labeled as to function and each set of keys shall be tagged.

# WET CHEMICAL EXTINGUISHING SYSTEMS

## PLAN SUBMITTAL REQUIREMENTS

### A. General (All submissions shall include, but are not limited to, the following):

1. One copy of drawings, a key plan showing the location of the building, kitchen equipment layout, and hood, tank, and pull station locations. One manufacturer's technical design manual and complete submittal data product sheets for all cooking appliances shall be provided with the permit application for review and approval prior to installation of the system. Provide all necessary calculations for the installation, rehabilitation, or modification of any fire protection system. Construction documents for fire protection systems shall be submitted for review and approval prior to system installation. The permit application shall clearly designate the system as being required for compliance with VCC.
2. Provide the name, address, email, and telephone number of designer of fire suppression/detection system. NFPA 17A, Section 7.3
3. Provide the building name and address on all drawings. NFPA 17A, Section 7.3
4. New installations are required to meet the testing requirements of UL-300 and shall be listed and labeled for the application. VCC 904.5, 904.13
5. The submitted plans are to be of uniform size and drawn to a recognized scale or fully dimensioned. NFPA 17A, Section 7.3.1
  - a. A scaled front elevation and isometric view shall be included.
6. The submitted plans shall contain enough detail to evaluate the protection of the hazard. Provide the manufacturer's data sheet for all cooking appliances. NFPA 17A, Section 7.3.2
7. The submitted plans shall contain sufficient detail to evaluate the protection of the hazard(s), provide a floor plan and elevation views indicating the location of the hood(s), all appliances that will be or are required to be under the hood(s), the location of the pull station, and the location of all appliances with nozzle location, including required height above the hazard surface.
8. The submitted plans shall show a detail of the hood and associated ductwork and dimensions of the hood and associated duct work. NFPA 17A, Section 7.3.2
9. The submitted plans shall show the location of all appliances indicating which appliances require protection, their arrangement under the hood, and the hazard area of each appliance. NFPA 17A, Section 7.3.2
10. The submitted plans shall include the size, type, brand, length, and arrangement of all connected piping. Indicate maximum flow points available for the system, the flow point(s) of each nozzle type, the number of each nozzle type utilized, and the total flow points utilized. NFPA 17A, Section 7.3.3
  - a. Tank size and flow point count must be noted on the plans.
11. The submitted details of the system shall include the location and function of detection devices, operating devices, auxiliary equipment, and electrical circuitry. NFPA 17A, Section 7.3.4

12. The submitted plans shall indicate that systems protecting two or more hoods or plenums, or both, that meet the requirements of 5.1.2.2, shall be installed to ensure the simultaneous operation of all systems. NFPA 17A, Section 5.6.
13. Fusible links or heat detectors shall be provided within each exhaust duct opening and above each protected cooking appliance in accordance with the manufacturer's listing. The submitted plans shall indicate the specific temperature rating of the fusible links or heat detectors utilized. NFPA 17A, Sections 5.6.1.4, 5.6.1.5, 5.6.1.6
14. At least one manual system actuator or pull station shall be provided for each system and be located not more than 4 feet and not less than 42 inches above the finished floor. NFPA 17A, Section 5.2.1.10
15. The manual system actuating device shall be a minimum of 10 feet and a maximum of 20 feet from the kitchen exhaust system, and be conveniently and easily accessible always, including at the time of a fire. VCC 904.13.1
16. An automatic means shall be provided to ensure the shutoff of fuel or power sources to the protected appliances that are located under ventilating equipment protected by the extinguishing system, upon system actuation. NFPA 17A, Section 4.4.4; VCC 904.13.2
17. An audible or visual alarm shall be provided to show that the system has operated. NFPA 17A, Section 5.2.1.8; VCC 904.3.4
18. If a fire alarm system is provided in the building, the extinguishing system shall be connected to the fire alarm panel in accordance with the requirements of NFPA 72 "The National Fire Alarm Code." The actuation of the extinguishing system will sound the building fire alarm as well as provide the function of the extinguishing system. NFPA 17A, Section 5.2.1.9; VCC 904.3.5
19. Multiple systems that are protecting back-to-back or adjacent non-separated hoods shall be installed to ensure the simultaneous operation of all systems protecting the hoods. NFPA 17A, Section 5.1.2.2
20. Hoods within 10 feet of each other shall simultaneously operate the fire extinguishing system. NFPA 17A, Section 5.1.2.2
21. Automatic fire suppression shall be provided for all portions of a common exhaust duct. NFPA 17A, Section 5.6.2
22. A specifically listed "K" type fire extinguisher shall be provided in accordance with the International Fire Code. The portable extinguisher shall be compatible with the extinguishing agent utilized for the fire suppression system and shall be within 30 feet of the cooking equipment. VCC Section 906.4 and SFPC Sections 906.1, Item 2, 906.4.1 and 906.4.2
23. Where movable cooking equipment is to be installed, a means shall be provided to ensure the cooking equipment is properly repositioned, after movement for cleaning or servicing, in relation to the appliance discharge nozzle. Permanent floor rails or guides and permanent floor markings or other suitable means of marking the correct cooking equipment location, as acceptable to the Authority Having Jurisdiction, shall be provided. NFPA 17A, Section 5.6.4
24. Provide sequence of operations, including actuation of building fire alarm system or hood suppression fire alarm and/or simultaneous operations of multiple hazards, if applicable.

25. A pamphlet (owner's guide) containing the manufacturer's recommendations for the proper inspection and operation of the extinguishing system. NFPA 17A, Section 3.3.10.2, 7.4.10.4
26. Design and installation of systems shall be performed only by persons properly trained and qualified to design and/or install the specific system being provided. The installer shall provide certification to the authority having jurisdiction that the installation is in complete agreement with the terms of the listing and the manufacturer's instructions and/or approved design. NFPA 17A, Section 7.2
27. Where plans are required, the responsibility for their preparation shall be entrusted only to trained persons. NFPA 17A, Section 7.3
28. Where appliances are not identified in the manufacturer's design manual, provide manufacturer's recommendation on how to protect the appliance.

# DRY CHEMICAL EXTINGUISHING SYSTEMS

## PLAN SUBMITTAL REQUIREMENTS

The following information is provided to assist the contractor, owner, and/or developer/builder with assembling a comprehensive set of plans that will result in their project moving smoothly through the building review process in the least amount of time. The material contained within this checklist will aid in both the predictability and timeliness of the plan review process and eventual installation of the project. This checklist contains the minimum standard information required for a project submitted for the plan review of Dry Chemical Extinguishing Systems. Plan sets submitted without the minimum information listed below cannot be reviewed for compliance. This publication does not replace, nor supersede, any provisions of the Virginia Fire Prevention Code or other codes and/or ordinances adopted by Fairfax County.

### **A. General (All submissions shall include the following but not limited to):**

1. One copy of drawings, a key plan showing the location of the space in the building, chemical extinguishing equipment layout, one manufacturer's technical design manual, and complete submittal data product sheets for all listed equipment shall be provided with the permit application for review and approval prior to installation of the system. Provide all necessary calculations for the installation and rehabilitation or modification of any fire protection system. Construction documents for fire protection systems shall be submitted for review and approval prior to system installation. The permit application shall clearly designate the system as being required for compliance with the VCC.
2. Provide the building name and address on all drawings.
3. Provide the name, address, and telephone number of fire suppression/detection system designer on all drawings.
4. Plans shall be prepared by qualified persons trained in the design and application of these systems. Provide copy of certification.
5. Plans submitted for approval shall be working plans for the system installation and drawn to scale. The scale for floor plans shall not be less than  $\frac{1}{8}'' = 1'$ .
6. Provide a legend showing all symbols, device descriptions, and size and type of pipes on all plans.
7. Note NFPA Standard (including edition) that the installation will comply with on all plans.
8. For pre-engineered local application or total flooding systems, submit a manufacturer's installation manual.
9. For engineered systems, a statement reading "There Shall Be No Deviations from the Plans without Approval from the Authority Having Jurisdiction" shall be provided on all plans.
10. Provide on the plan a sequence of operations, including actuation of building fire alarm system or dry system suppression fire alarm and/or simultaneous operations of multiple hazards, if applicable.
11. A three-dimensional representation of hazard to be protected, including volume of enclosure if applicable, shall be provided. Permanently mounted equipment, structural or architectural features, or structures that materially reduce the volume, shall be identified, and computed.

12. The submitted plans shall be drawn to scale and include a plan view of the protected area showing the enclosure partitions, full and partial height, the agent distribution piping system including the location of the agent storage containers and amount of agent, piping, and nozzle types, types of pipe hangers and rigid pipe supports, the detection system, and the alarm device locations and mounting height. The plans shall also indicate the control system including all devices and schematic drawings of the wiring interconnection between the devices; the end of line resistors and their location; location of the controlled devices such as dampers and shutters; and the location of the instructional signage. NFPA 17, Section 10.2.1, Section 10.2.3, Section 10.2.3.2
13. The submitted plans shall include an isometric view of the agent distribution system indicating the length and diameter of each pipe segment, the flow calculations, and the fittings including reducers, strainers, and the nozzles including the make, model, and size of each item. NFPA 17, Section 10.2.3
14. The submitted plans shall indicate the flow rates of the nozzles for engineered systems. NFPA 17, Section 10.2.3.1
15. Automatic equipment interlocks with fuel shutoffs, ventilation controls, door closers, window shutters, conveyor openings, smoke and heat vents, and other features necessary for proper operation of the fire-extinguishing system shall be provided as required by the design and installation standard utilized for the hazard. VCC Section 904.3.3
16. Documentation shall be provided to show/note all emergency shut-off systems are fail-safe and require manual reset. The shut-off systems shall not reset without the dry chemical fire suppression system being restored to service. NFPA 17, Sections 5.5.4 and 5.5.5
17. If common exhaust ducts are utilized, the plans shall show fire protection of the common ducts in accordance with NFPA 17, Section 9.3.4.1.
18. Alarms and warning signs. Where alarms are required to indicate the operation of automatic fire-extinguishing systems, distinctive audible and visible alarms and warning signs shall be provided to warn of impending agent discharge. Where exposure to automatic-extinguishing agents poses a hazard to persons and a delay is required to ensure the evacuation of occupants before agent discharge, a separate warning signal shall be provided to alert occupants once agent discharge has begun. Audible signals shall be in accordance with VCC 907.5.2 and 904.3.4., NFPA 17, 9.5
19. Ventilation systems, within the spray area, room, or booth, shall be shut down upon system activation and/or additional dry chemical agent shall be provided and calculated for the unenclosed opening(s) based on the percentage of the unenclosed opening. NFPA 17, Sections 6.2.1 through 6.2.1.4 and Section 6.2.2.2
20. The submitted plans and data shall provide details of the electrical/mechanical equipment that is interfaced with the fire suppression system to initiate performance of control function(s) in accordance with the fire suppression system manufacturer's requirements. VCC 904.3.3; NFPA 17, Section 5.5.2 and 5.5.4
21. The submitted plans shall indicate the location, mounting height, and method for manual activation of the fire suppression system. NFPA 17, Sections 5.7.1.5, 5.7.1.7, 5.7.1.7.1, and 5.7.1.9

# CLEAN AGENT FIRE EXTINGUISHING SYSTEMS

## PLAN SUBMITTAL REQUIREMENTS

Our goal is to assist the contractor, owner, and/or developer/builder with assembling a comprehensive set of plans that will result in their project moving smoothly through the building review process in the least amount of time. The material contained within this checklist will aid in both the predictability and timeliness of the plan review process and eventual installation of the project. This checklist contains the minimum standard information required for a project submitted for the plan review of Clean Agent Fire Extinguishing Systems. Plan sets submitted without the minimum information listed below cannot be accepted for review.

This publication does not replace, nor supersede, any provisions of the Fire Prevention Code or other codes and/or ordinances adopted by Fairfax County.

### **A. General (All submissions shall include the following):**

1. One copy of drawings with all supporting data shall be provided with the permit application for review and approval prior to installation of the system. Properly assembled and labeled. If they are not, they cannot be reviewed. The Plans Review staff cannot be responsible for assembling or collating your submittal materials.
2. Provide the name and address of the project or tenant where the system will be installed on all drawings. NFPA 2001, Section 5.1.2.2
3. The plans shall be drawn to a uniform size and not less than 1/8"=1' scale. NFPA 2001, Section 5.1.2.2
4. The applicant must provide a single copy of the manufacturer's design, installation, operation, and maintenance manual with the submission. The copy will be returned with the approved package for use by field inspectors.
5. The protected enclosure location within the building must be shown with a key plan or floor plan.
6. Indicate the location and the construction of the protected enclosure walls and partitions. Identify fire walls. NFPA 2001, Section 5.1.2.2
7. Provide an enclosure cross section, full height, or schematic diagram, including the location and the construction of building floor/ceiling assemblies above and below, the raised access floor, and the suspended ceiling. The location of all equipment, furniture, cabinets, etc. within the protected closure must be shown on the floor plan with finished top dimensions noted. NFPA 2001, Section 5.1.2.2
8. Indicate the type of clean agent being used by its brand name and its chemical nomenclature. NFPA 2001, Section 5.1.2.2
9. Provide a description of the occupancies and the hazards being protected, designating whether or not the enclosure is normally occupied. NFPA 2001, Section 5.1.2.2
10. Provide a description of the adjacent exposures and occupancies surrounding the enclosure. NFPA 2001, Section 5.1.2.2
11. Provide the description of the agent storage containers used including the internal volume, recommended storage pressure, and nominal capacity expressed in units

- of agent mass or volume at standard conditions of temperature and pressure. NFPA 2001, Section 5.1.2.2
12. Provide a description of nozzle(s) being used including the size, the orifice port configuration, and the equivalent orifice area. NFPA 2001, Section 5.1.2.2
  13. Provide a description of the pipe and fittings used including the material specifications, the grade, and the pressure rating. NFPA 2001, Section 5.1.2.2
  14. Provide a description of the wire or cable used including the classification gauge (AWG), shielding, number of strands in conductor, conductor material, and color-coding schedule. The segregation requirements of various system conductors shall be clearly indicated. The required method of making the wire terminations shall be detailed. NFPA 2001, Section 5.1.2.2
  15. Provide a detail of the method of the detector mounting. NFPA 2001, Section 5.1.2.2
  16. Submitted plans shall provide a plan view of protected area showing the enclosure partitions, full and partial height, the agent distribution system including the agent storage containers, piping, and nozzles, the type of pipe hangers and rigid pipe supports, the detection, alarm, and control system including all devices and a schematic of the wiring interconnection between them, the end-of-line device locations; the location of controlled devices such as dampers and shutters, and location of instructional signage. NFPA 2001, Section 5.1.2.2
  17. Provide an isometric view of agent distribution system showing the length and the diameter of each pipe segment; the node reference numbers relating to the flow calculations, the fittings including reducers and strainers, and the orientation of tees and nozzles including the size, orifice port configuration, flow rate, and equivalent orifice area. NFPA 2001, Section 5.1.2.2
  18. Scaled drawings shall be provided showing the layout of the annunciator panel graphics. NFPA 2001, Section 5.1.2.2
  19. Provide details of each unique rigid pipe support configuration showing the method for securement to the pipe to the building structure. NFPA 2001, Section 5.1.2.2
  20. Provide details of the method for the container securement showing the method of securement to the container and to the building structure. NFPA 2001, Section 5.1.2.2
  21. Provide a complete set of calculations to verify the enclosure volume and determine the quantity of clean agent required. NFPA 2001, Section 5.1.2.2
  22. Provide a complete step-by-step description of the system sequence of operations including the function of abort and the maintenance switches, delay timers, and emergency power shutdown. NFPA 2001, Section 5.1.2.2
  23. The submitted plans shall include a point-to-point wiring schematic diagram(s) in a plan view and a system riser diagram showing all the circuit connections to the system control panel and the graphic annunciator panel. This is to include any external or add-on relays. NFPA 2001, Section 5.1.2.2
  24. Indicate the method used to determine the number and location of audible and visual indicating devices and the number and location of the detectors. NFPA 2001, Section 5.1.2.2
  25. Provide a complete set of back up battery calculations and voltage drop calculations for the detection system. NFPA 2001, Section 5.1.2.2

26. The submitted plans shall include the flow calculations for the system. The version of the flow calculation program shall be identified on the computer calculation printout. NFPA 2001, Section 5.1.2.5.1
27. The system flow calculations shall be performed using a calculation method listed or approved for the agent by the authority having jurisdiction. The system design shall be within the manufacturer's listed limitations. NFPA 2001, Section 5.2.1
28. Warning and instruction signs shall be noted on the plans. Warning and instruction signs at entrances to and inside protected areas shall be provided. Warning and safety instruction signs shall be located outside each entrance to clean agent cylinder storage rooms. The safety sign format and color and the letter style of the signal words shall be in accordance with ANSI Z535. NFPA 2001, Section 4.3.5.5.2
29. Provide manufacturer's data sheets for the following: Agent Cylinder and Valve Assemblies Agent Cylinder Data, Agent Valve Outlet Adapters, Agent Discharge Nozzles, Agent Release Control Heads, Agent System Release Control Panels Suppression System, Abort Devices, Agent Manual Release Stations, Initiating Devices Notification, Appliances Conductor Wire, Relays, and Interface Modules.

# LIQUID STORAGE TANKS REFERENCE TABLE

For complete online information related storage tanks, visit:

<https://www.fairfaxcounty.gov/plan2build/fuel-storage-tanks>

Fuel Tank Type	Installation Site	Activity	Fire Prevention Code			Virginia Construction Code		
			Permit	Plans	Insp.	Permit	Plans	Insp.
<b>Liquified Petroleum Gas (LPG-Propane)</b>	Commercial <sup>1</sup>	Installation	Yes	Yes	Yes	No	No	No
	Commercial <sup>2</sup>	Removal	No	No	No	No	No	No
	Residential <sup>3</sup>	Installation	No	No	No	Yes	No	Yes
	Residential <sup>2</sup>	Removal	No	No	No	No	No	No
<b>Diesel Fuel or Gasoline</b>	Commercial <sup>1,4</sup>	Installation	Yes	Yes	Yes	No	No	No
	Commercial <sup>4,5</sup>	Abandonment or Removal	Yes	No	Yes	No	No	No
	Residential <sup>4</sup>	Installation	Yes	Yes	Yes	No	No	No
	Residential <sup>4</sup>	Abandonment or Removal	Yes	No	Yes	No	No	No
<b>Fuel Oil</b>	Commercial <sup>1,6</sup>	Installation	Yes	Yes	Yes	No	No	No
	Commercial	Abandonment or Removal	Yes	No	Yes	No	No	No
	Residential	Installation	No	No	No	Yes	No	Yes
	Residential <sup>7</sup>	Abandonment or Removal	Yes	No	Yes	No	No	No

<sup>1</sup> Plans, permits (plumbing/mechanical/electrical), and inspections shall be required from Land Development Services for service piping, branch line piping, and equipment served. Contact **703-222-0801, TTY 711** (Permit Application Center), **703-631-5101, TTY 711** (Building Plan Review), or **703-631-5101, TTY 711** (Commercial Inspections).

<sup>2</sup> The Fire Prevention Division shall be notified at **703-246-4849, TTY 711**, at least 48 hours in advance of removal. Permit fees and plan reviews may apply.

<sup>3</sup> Tank(s) capacity of 500 gallons or greater, and all underground tanks of any capacity, to be located on property with well and/or septic will require the permit applicant to contact the Health Department at **703-246-2201, TTY 711**. Permit fees and plan reviews may apply.

<sup>4</sup> State Water Control Board Department of Environmental Quality regulations shall apply for aboveground storage tanks greater than 660 gallons and underground storage tanks greater than 110 gallons.

<sup>5</sup> Owner is required to submit the results of a soil sampling to the State Water Control Board for evaluation after the removal/closure of the tank.

<sup>6</sup> Aboveground tanks greater than 660 gallons shall be registered in accordance with the State Water Control Board regulations. Aggregate aboveground storage in excess of 5,000 gallons shall comply with Pollution Prevention requirements of the State Water Control Board regulations.

<sup>7</sup> No permit is required for abandonment or removal if the fuel oil tank is aboveground and is 60 gallons or less.

# FLAMMABLE AND COMBUSTIBLE LIQUID STORAGE TANKS

## INSTALLATION, ABANDONMENT, REMOVAL, AND TESTING PROCEDURES

Under the provisions of Title 36, Chapter 6 of the Code of Virginia, underground storage tank installation, removal, closure, and testing shall be performed in accordance with the Virginia Construction Code (VCC). Section 414.6.2 of the VCC requires that the installation, upgrade, or closure of any underground storage tank containing an accumulation of regulated substances shall be in accordance with underground storage tank regulations adopted by the Virginia State Water Control Board.

Aboveground storage tank installations shall comply with VCC 414.6.2, International Fire Code (IFC) and Virginia Statewide Fire Prevention Code (SFPC) 5704.

**WARNING:** NO PRODUCT SHALL BE INTRODUCED INTO TANKS OR PRODUCT LINES UNTIL A REPRESENTATIVE FROM THE OFFICE OF THE FIRE MARSHAL HAS WITNESSED THE REQUIRED TEST(S) OR INSPECTION(S) AND GRANTED WRITTEN APPROVAL.

**A. Pre-Installation Requirements of New Aboveground or Underground Storage Tanks** shall be in accordance with the following procedures. Submit to the Engineering Plans Review Branch of the Office of the Fire Marshal:

1. One copy of the completed site plan for review and approval, showing the location of the tank(s), distances from the tank(s) to all above or underground structures, monitor well locations, and location and layout of all piping and dispensing units associated with the tank(s).
2. One copy of complete elevation plans of the tank(s) shall also be submitted, showing depth of burial, fill material, overtop slab if present, ballast slab if present, fill and vent piping, and vapor recovery. Tank specifications including manufacturer's cut sheets shall also be included. Information on spill and overflow protection shall be shown. For aboveground tanks, complete plans of tank and supporting structure shall be provided. Include details and cut sheets for leak detection where required.
3. One copy of buoyancy calculations from the tank manufacturer or submitter (for underground tanks).

Petroleum storage tank and distribution piping system plans review fee are per the published fee schedule.

**B. Installation Requirements of New Aboveground or Underground Storage Tanks.**

Only after the above plans have been reviewed and approved can the installation of tanks, product lines, and equipment begin. Prior to pit closure and covering of product lines, the following steps shall be taken by the installer.

1. A strength test (by manufacturer) – a label on the tank to verify ASME, UL, API, or ULC. An air test (before placing in pit for underground tanks, or for aboveground tanks, before any product is introduced) at 5 psig.
2. A visual inspection witnessed by an Office of the Fire Marshal inspector of the hold down pad or deadman anchors, bedding, and straps is required prior to backfilling the pit.
3. An air test of the tank(s) after placing in pit or after mounting on its foundation, prior to introduction of product – 10 inches by mercury gauge or 5 psig (gauge shall have a maximum reading of 15 psi and be graduated in 1 psi increments) for a minimum of 60 minutes.

If applicable, the interstice on double-walled tanks shall be tested as per the manufacturer's instructions for a minimum of 60 minutes. These shall be witnessed by an Office of the Fire Marshal inspector.

4. A hydrostatic test – when static head on bottom of tank is over 10 psig.
5. An air test of the product lines (suction system) shall be done when the tank is air tested. Product lines shall be installed to the tank and capped off at connection to the device.
6. An air test of the product lines (with day tank) – 5 psig every ten feet of elevation for a minimum of ten minutes witnessed by an Office of the Fire Marshal inspector.
7. An air test of the product lines (submersible systems) – 50 psig for a minimum of ten minutes witnessed by an Office of the Fire Marshal inspector.
8. An air test of secondary containment piping – 5 psig for a minimum of ten minutes witnessed by an Office of the Fire Marshal inspector.
9. A visual inspection, witnessed by an Office of the Fire Marshal inspector, of the product line trenches is required when the backfill is even with the top of the product lines.

New petroleum storage tank inspection fee(s) per visit, per tank and piping distribution system are per the published fee schedule.

**NOTE:** Multiple tank installations located on the same site which can be tested simultaneously will be counted as one tank for fee charge purposes.

The installer shall call the Office of the Fire Marshal Inspections Section at 703-246-4849 to schedule an inspection appointment at least 24 hours in advance.

Aboveground Storage Tanks (AST's) for dispensing shall be Fire-Resistive Tanks or Tanks in Vaults. See NFPA 30A-21, 4.3.3, and 4.3.5(All) and IFC 5704.2.7(All) and 2306.2.4.

**C. Pre-Installation/Replacement Requirements for New Product Lines Only** shall be in accordance with the following procedures. Submit to the Engineering Plans Review Branch of the Office of the Fire Marshal:

1. One copy of the completed site plan for our review and approval, showing the location of the tank(s), distances from the tank(s) to all above or underground structures, and location and layout of all piping and dispensing units associated with the tank(s); and including manufacturer's cut sheets for non-metallic piping.
2. One copy of complete elevation plans showing depth of burial and fill material.

**D. Installation/Replacement Requirements for New Product Lines Only.** After the above procedures have been reviewed and approved can the installation of product lines begin. Prior to covering the lines, the following steps shall be taken by the installer.

1. Suction Systems – Air test of 5 psig for a minimum of ten minutes shall be witnessed by an Office of the Fire Marshal inspector.
2. Submersible Systems – Air test of 50 psig for a minimum of ten minutes shall be witnessed by an Office of the Fire Marshal inspector.
3. Secondary Containment Piping – Air test of 5 psig for a minimum of ten minutes witnessed by an Office of the Fire Marshal inspector.

New product lines inspection fee(s) per visit are per the published fee schedule.

**NOTE:** Multiple line installations located on the same site which can be tested simultaneously will be counted as one tank for fee charge purposes.

The installer shall call the Office of the Fire Marshal Inspections Section at 703-246-4849 to schedule an inspection appointment at least 48 hours in advance.

All new installations shall meet NFPA 30, 30A, 31, and 407, Chapter 57 of the SFPC, and the County of Fairfax Fire Prevention Code, as amended.

**E. Removal or Closure of Underground Storage Tanks** shall be in accordance with the following:

1. Compliance with DEQ's requirement for [Underground Storage Tanks](#).
2. All requests for abandonment in place need to be justified with a letter and site diagram. A site inspection will be conducted before approval of abandonment.
3. A Fire Prevention Code Permit shall be obtained from this office for Section 5704.2.13 – Abandonment, and status of tanks. The permit may be applied for online. [Click here](#) for directions on applying for the permit.
4. One site drawing shall be submitted showing the location of the tank(s) in relationship to buildings, lot lines, and underground utilities.
5. All tanks and tank pits shall be inspected by an Office of the Fire Marshal inspector after tank removal or permanent closure. Call the Inspections Branch at 703-246-4849 to schedule an inspection appointment at least 48 hours prior to closure or removal of the tank(s).
6. A minimum of two soil samples shall be taken from each tank pit for analysis by a certified laboratory. The results of the analysis, along with the tank closure form, shall be submitted to the [Virginia Department of Environmental Quality \(DEQ\)](#).
7. The pit(s) may be backfilled for safety reasons with the understanding that the DEQ may order the pit(s) to be reopened and cleaned out if tests show gross contamination of the soil. Soil remediation shall comply with the Department of Environmental Quality, Department of Waste Management, and Department of Air Pollution Control regulations.
8. Tanks permanently closed in ground shall comply with the following:
  - a. All liquids shall be removed from the tank lines.
  - b. Tanks shall be thoroughly cleaned to remove any vapors or sludge.
  - c. Suction, inlet, gauge, and vent lines disconnected.
  - d. Fill pipe removed.
  - e. Tank shall be filled with a solid inert material.
9. The tank(s) and contaminated soil shall be disposed of at a site for such waste. Consult the yellow pages of your local telephone directory under "Scrap Metal."

Testing and recordkeeping of underground and aboveground storage tanks shall be in accordance with regulations adopted by the Department of Environmental Quality, Chapter 57 of the SFPC, and the County of Fairfax Fire Prevention Code, as amended.

For questions, contact the Inspections Branch of the Office of the Fire Marshal Monday through Friday during the hours of 8:00 a.m. to 4:30 p.m. at 703-246-4849 or email [fire.inspections@fairfaxcounty.gov](mailto:fire.inspections@fairfaxcounty.gov).

# TANKS FOR LIQUEFIED PETROLEUM GASES (LP-GAS)

## INSTALLATION, ABANDONMENT, REMOVAL, AND TESTING PROCEDURES

**A. Storage, Handling, and Transportation of Liquefied Petroleum Gas (LP-gas) and the Installation of LP-Gas Equipment** pertinent to systems for such uses shall comply with Chapter 61 of the Virginia Statewide Fire Prevention Code (SFPC) 2021 and NFPA 58-20, "Liquefied Petroleum Gas Code."

1. Permits shall be required as set forth in the SFPC.
2. Distributors shall not fill an LP-gas container for which a permit is required unless a permit for installation has been issued for that location by the Office of the Fire Marshal, except when the container is for temporary use on construction sites.
3. Where a single LP-gas container is more than 2,000 gallons in water capacity or the aggregate water capacity of the LP-gas containers is more than 4,000 gallons, the installer shall submit construction documents for such installation.

**B. General Requirements**

This guideline is provided to assist the contractor, owner, and/or developer/builder with assembling a comprehensive set of plans that will result in their project moving smoothly through the building review process in the least amount of time.

This checklist contains the minimum standard information required for a project submitted for the plan review of LP-gas containers. Plan sets submitted without the minimum information listed below cannot be accepted for review. This publication does not replace, nor supersede, any provisions of the SFPC or other codes and/or ordinances adopted by Fairfax County.

**All submissions shall include but are not limited to the following:**

1. One complete copy of drawings with all supporting data shall be provided with the permit application for review and approval prior to installation of the system. All must be properly assembled and labeled. If they are not, they cannot be reviewed. The Plans Review staff cannot be responsible for assembling or collating your submittal materials.
2. Complete site address, contractor and submitter name, address, phone, and email.
3. Site plan showing the location and dimensions of the LP-gas container(s).
4. Submitted site plans shall provide a plan view of the area. Provide on the plans the separation distance from any building, property lines, any other containers, and other combustible materials.
5. Materials list: All parts and components with complete cut sheets.
6. Provide the size (water capacity in gallons) of the LP-gas container(s).
7. Provide signage details, with full dimensioned text of required lettering. "NO SMOKING" signs shall be posted and comply with the SFPC, Section 310.
8. Provide details of vehicle protection. All storage locations for LP-gas must be protected against accidental impact from vehicles. Impact protection must be in accordance with the SFPC, Section 312.

## LP-GAS CYLINDER EXCHANGE FOR RESALE

The most common type of LP-gas container is the propane cylinder, commonly known as a bottle. Cylinders range widely in size and use. Most people are familiar with propane bottles as the source of fuel for their gas grills. Industrial LP-gas consumers are also familiar with them, as forklifts are commonly powered by propane and use cylinders as a portable gas supply source. Cylinders fall into two groups of propane service - liquid and vapor. Cylinders in liquid service are commonly found on forklifts, while bottles in vapor service are easily spotted fueling a gas grill.

This guideline is provided to assist the contractor, owner, and/or developer/builder with assembling a comprehensive set of plans that will result in their project moving smoothly through the building review process in the least amount of time. This checklist contains the minimum standard of information required for a project submitted for the plan review of LP-gas cylinder exchange for resale.

Plans sets submitted without the minimum information listed below cannot be accepted for review. This publication does not replace, nor supersede, any provisions of the Fire Prevention Code or other codes and/or ordinances adopted by Fairfax County.

### **A. General (All submissions shall include, but are not limited to, the following):**

1. One complete set of installation documents shall be submitted with the permit application for evaluation of the system prior to installation. Each installation document set must be individually collated, bound, and labeled. If they are not, they cannot be reviewed. The Engineering Plans Review Branch staff cannot be responsible for assembling submitted materials. Each installation document package must contain the following:
  - a. Full site plan, showing the location of the building.
  - b. The complete building address, tenant space name and number, contractor and submitter name, address, phone, and email, space occupant, use group of space, and floor shall be noted in clear legible fashion on the site plan.
  - c. Site plan shall show the location of the LP-gas cylinder exchange cabinet.
  - d. A detailed plan view of the immediate area where the LP-gas cylinder exchange cabinet will be located shall be shown on the submitted plan. Clearly show the separation distance from the building, doorway or openings, combustible materials, motor vehicle fuel dispenser, and property lines.
  - e. Provide a photo of the area where the proposed LP-gas cylinder exchange cabinet is to be located.
  - f. Submit a materials list along with complete manufacturer listing and technical specification "cut sheets" for the LP-gas cylinder exchange cabinet, all parts, components, devices, and assemblies that will be part of the completed installation.
  - g. Provide the number and size of LP-gas cylinders being stored in the gas cabinet.
  - h. Cylinders shall be secured in a lockable, ventilated metal cabinet or other approved enclosure.
  - i. Cylinders shall be accessible only by authorized personnel or by use of automated exchange system in accordance with the SFPC Section 6109.15.
  - j. Provide signage details, with full dimensioned text of required lettering.

A sign shall be posted on the entry door of the business operating the cylinder exchange stating "DO NOT BRING LP-GAS CYLINDERS INTO THE BUILDING" or similar approved wording.

- k. An emergency contact information sign shall be posted within ten feet of the cylinder storage cabinet. The content, lettering, size, color, and location of the required sign shall be as required by the fire official.
- l. Provide details of vehicle protection. All storage locations for LP-gas must be protected against accidental impact from vehicles. Impact protection must be in accordance with SFPC Section 6109.13.

# OCCUPANCY REQUIREMENTS (NON-RUP)

## NEW BUILDINGS

### A. Prior to occupancy, the following must be completed:

1. The standpipes shall go up with each floor. A standpipe with valves having N.S.T. and 2½" x 1½" caps shall not be more than one floor below the highest forms or staging. There shall be a fire department connection at the first-floor level. This connection shall be marked so it can always be readily and easily accessible.
2. Submit one set of plans to the Office of the Fire Marshal for approval of all fire detection, fire suppression systems, and special locks. All fire protection systems must have approved plans and permits before installation is started.
3. All permits and plans review fees shall be paid before the test is scheduled.
4. Approved plans and complete submittals with original notes, stamps, and signature shall be on the job site before any tests are conducted (including site plans with approval and original signature from the Office of the Fire Marshal).
5. No piping shall be covered up or otherwise made inaccessible for inspection before systems are tested.
6. All systems shall be pre-tested by the contractor before the witnessing of the final test by an Office of the Fire Marshal inspector.
7. The following inspections and tests are required. All tests shall be set up with the Office of the Fire Marshal Fire Protection Systems Branch at least 10 working days before the desired date. Call Systems Acceptance Testing at 703-246-4821 or email [fire.AcceptanceTesting@fairfaxcounty.gov](mailto:fire.AcceptanceTesting@fairfaxcounty.gov) to arrange a scheduled appointment time.
  - a. A visual inspection of an underground fire line is required before it is covered. If the line is covered before the hydrostatic test is performed, there shall be no drop in pressure during the test. Original, signed, approved site plans must be on the job for this test to be witnessed.
  - b. A 200 psi hydrostatic test on underground fire lines. Approved site plan must be on the job.
  - c. A flush test of an underground fire line, witnessed by the Office of the Fire Marshal, before it is connected to the fire suppression system, using at least a 4-inch flushing line.
  - d. All fire alarms, sprinklers, special locks, and other systems must be tested with the test witnessed by an Office of the Fire Marshal inspector. Smoke control systems must have testing completed by a Special Inspector per VCC 1705. A special inspection report for smoke control must be approved by the Office of the Fire Marshal.
  - e. Test stairwell pressurization in high-rise buildings.
  - f. All elevators must be tested for recall and firefighter's use, Phase I and Phase II, using normal and if present (high-rise, backup power sources, etc.).
8. Fire lanes shall be installed per Fairfax County standards and approved by the Office of the Fire Marshal.

9. All fire protection systems must be tested and approved before final occupancy inspection is requested.
10. An occupancy inspection request is to be made to the Office of the Fire Marshal Inspections Branch after all the above has been completed. Call the Inspections Branch at 703-246-4849 to schedule an appointment.

**I. REQUIREMENTS FOR ISSUANCE OF A BUILDING SHELL NON-RESIDENTIAL USE PERMIT (NON-RUP)**

- A.** Initial tenant occupancy cannot take place until shell approval has been obtained.
- B.** A building shell occupancy inspection and approval is required by all inspection disciplines including building, electrical, mechanical, plumbing and fire prevention. A Health Department inspection is required for food service establishments, medical buildings, etc.
- C.** The following building shell fire and life safety features must be completed, inspected, and approved prior to the issuance of the Shell Non-residential Use Permit (Non-RUP) and before first tenant occupancy:
  - 1. Exit stairs
  - 2. Grade exit lobbies
  - 3. Grade exit corridors or passageways
  - 4. Elevator shaft enclosures
  - 5. Mechanical shaft enclosures
  - 6. Required exit lights and emergency lighting
  - 7. Elevator emergency recall system or elevators must be locked out of service
  - 8. Required fire proofing of structural members in the core and occupied areas must be completed
  - 9. Fire stopping of wiring, piping or other penetrations, both vertical and horizontal, floors, ceilings, and walls
  - 10. Combustible tank and construction debris must be removed
  - 11. Storage shall comply with Section II, items A1 through 4 below
  - 12. Firefighting, fire detection, and suppression systems shall follow Section II, item C below
  - 13. Fire department access key box in place
  - 14. Fire department access and fire lanes must be approved

**II. REQUIREMENTS FOR ISSUANCE OF A TENANT NON-RESIDENTIAL USE PERMIT (NON-RUP)**

The following building fire and life safety feature procedures shall be implemented after the first tenant occupancy.

**A. Construction Material Storage**

- 1. Non-combustible storage (see definition) shall be unlimited; however, storage shall not exceed the structural load design of the floor.
- 2. Combustible storage (see "Definition Examples" below) shall be limited to 2,500 cubic feet or 10 percent of the floor area. Storage exceeding 2,500 cubic feet will require a Fire Prevention Code Permit in accordance with the Fire Prevention Code.

3. Storage, combustible or noncombustible, shall be arranged in neat piles with the floor kept broom clean and free of trash and construction debris. Storage shall be kept to a minimum of two feet below ceilings or the lowest member of the floor/ceiling or roof/ceiling assembly.
4. Combustible storage areas located on an occupied floor shall be separated from the occupied areas by a 1-hour fire-rated partition.

<b>DEFINITION EXAMPLES</b>	
<b>NONCOMBUSTIBLE STORAGE</b>	<b>COMBUSTIBLE STORAGE</b>
Dry Wall	Hollow core wood doors
Metal Studs or Fire-retardant lumber	Wood studs, paneling, and other wood products
Steel or Other Metal Doors	Carpet and padding
Solid Core Wood Doors including package aids without voids	VCT and Base
Sheet Metal Duct	Insulation with Combustible Vapor Facing
Masonry Products	Flammable/Combustible liquids
Noncombustible insulation	Adhesives and Paints, etc.
Plumbing Fixtures Light Fixtures Wrapped in light plastic	Any item of "noncombustible storage" where the quantity of combustible packaging or storage aids are deemed excessive by the building or fire official.

**B. Sprinkler Requirements**

1. In fully sprinklered buildings, sprinkler protection shall always be maintained.
2. In non-sprinklered buildings, an approved limited area sprinkler system shall be provided for combustible storage if an adequate water supply is available, i.e., standpipe system.
3. Sprinkler heads shall be located within 12 inches of the underneath side of the floor or roof deck above, in either the pendent or upright position. If the ceiling grid and tile are in place, the sprinkler shall be installed in the pendent position at the ceiling level.
4. The use of commercial rapid response sprinkler heads, located at the future ceiling line without tiles in place, except at the sprinkler head location, will be considered as an acceptable alternative to item 3 above, on a case-by-case basis. Minimum 2' x 2' tile must be in place at head location.
5. Where, in the opinion of LDS Building Inspections or the Office of the Fire Marshal, the type or quantity of combustible storage exceeds the limitations of the existing sprinkler design, the sprinkler system in these areas shall be modified to conform with the fire hazard posed by the combustible storage.

### **C. Operational Maintenance of Fire Protection Systems, Exit Ways, and Occupancy Permit Requirements**

1. Except for residential apartments and condominiums, the Office of the Fire Marshal occupancy inspection occurs *after* tenant move-in. In buildings of Use Groups A, E, H and I, occupancy inspections must be performed prior to issuance of the Non-Residential Use Permit (occupancy permit) by the Zoning Administration Division.
2. In all other Use Groups, the Non-Residential Use Permit (Non-RUP) may be issued prior to the Office of the Fire Marshal occupancy inspection. The following approvals must be obtained prior to issuance of the Non-RUP:
  - a. Building Final, Electrical Final, Plumbing Final, Mechanical Final
  - b. Health Final (if applicable)
  - c. Fire Protection Systems Final
3. Occupancy inspections must be scheduled by calling the Office of the Fire Marshal Inspections Branch at 703-246-4849 within five days of the issuance of the Non-RUP.
4. No inspections will be made unless the approved construction drawings are on the job site for all inspection disciplines. This includes Office of the Fire Marshal approved shop drawings for any sprinkler, fire alarm, or other fire protection system.
5. The entire core, including exit corridors, passageways, stairs and elevator shafts and doors must be maintained throughout the building. Any work required in any part of the exit way system, after the first tenant move-in, shall be conducted after normal business hours or the building will be ordered evacuated.
6. The McConnell Public Safety and Transportation Operations Center (MPSTOC) shall be notified when any fire suppression, detection, or firefighting system is placed out of service and when placed back in service. The telephone number for making these notifications is 703-691-2131.
7. All sprinklers, standpipes, fire alarm systems, and other required fire suppression or firefighting systems shall be activated throughout the entire structure for first tenant occupancy. Under no conditions shall any fire suppression or firefighting system be shut off to any occupied area unless the valve or other activation control mechanism is continuously staffed, during the period the system(s) are shut off. If this provision is deemed unworkable, any work shall be done after normal business hours. A documented fire watch shall be instituted during the time any fire suppression or firefighting system is out of service. Call the Office of the Fire Marshal Fire Protection Systems Branch at 703-246-4821 for fire watch procedures.
8. See heading II, sections A and B above for construction materials storage requirements.
9. If any system must be taken out of service during normal business hours, a documented fire watch shall be instituted during this time period. See item 6 above. The number of persons required will be such that the entire building can be checked every hour with the exception of Residential (Use Groups R-1 or R-2), Institutional (Use Groups I-1, I-2, and I-3), and Education (Use Group E) which must be checked every half hour. A written record, including date, time, and the person(s) conducting the fire watch is required.

The criteria set forth in this document should cover most field conditions. It is conceivable that individual situations may arise which must be evaluated for compliance on a case-by-case basis. Please call the Office of the Fire Marshal Inspections Branch for any related questions at 703-246-4849 or email [fire.Inspections@fairfaxcounty.gov](mailto:fire.Inspections@fairfaxcounty.gov).

# BUILDINGS UNDER CONSTRUCTION AND RENOVATION

## FIRE PROTECTION SYSTEMS

- A. During any construction or remodeling operation, it is important that the fire protection systems remain operable.
- B. An existing system scheduled for removal shall not be removed until the new system is installed, tested, and approved.
- C. When it becomes necessary to disable any system, it shall only be allowed after normal business hours and under the following conditions.
  - 1. The McConnell Public Safety and Transportation Operations Center (MPSTOC) dispatcher at 703-691-2131 shall be notified prior to disabling any system. The following information will be provided:
    - a. The name of the person calling
    - b. A telephone number where they can be reached
    - c. The reason the system is disabled
    - d. The anticipated time and date the system will be returned to service
  - 2. Establishment of a documented fire watch (call 703-246-4821, or MPSTOC after hours) which will tour the building continuously, recording the date, time, and area checked in a notebook that can be visually inspected.
  - 3. Notification to the MPSTOC dispatcher when the system is returned to service.
  - 4. Repairs or modifications to existing systems in individual tenant spaces will be allowed during normal business hours, provided there are supervised control valves for each space and there is no combustible storage in that space. In addition, responsible personnel shall remain in that area until the system is restored to service. Exceptions to the above shall be allowed for emergency repairs only, and those repairs shall be diligently pursued.

For complete requirements see VCC 2021, Chapter 33 Safeguards During Construction, IFC 2021 Chapter 33 Fire Safety During Construction and Demolition, and NFPA 241 2019 Standard for Safeguarding Construction, Alteration, and Demolition Operations.

## APPENDIX OF REFERENCED FORMS

1. [Building Tenant Plan Review Checklist](#)
2. [Warehouse Storage Limits Agreement](#)