Office of University Building Official

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WATER-BASED

FIRE SPRINKLER & STANDPIPE SYSTEMS SUBMISSION REQUIREMENTS

Code Requirements

The currently adopted codes and standards relevant to these submission requirements are as follows:

Virginia Construction Code (2018 Edition)
International Fire Code (2018 Edition)
NFPA 13 (2016 Edition)
NFPA 13R (2016 Edition)
NFPA 13D (2016 Edition)
NFPA 14 (2016 Edition)
NFPA 25 (2017 Edition)
George Mason University Higher Education Capital Outlay Manual
(GMU HECOM – 2023 Edition)
George Mason University Design Manual (2013 Edition)

General Requirements

A. **Designer Information.** All working drawings (plan drawings, product selection and hydraulic calculations, etc.) shall be prepared and signed/dated by a designer who is either a Virginia Registered Design Professional (RDP) **or** a NICET Level III or NICET Level IV certified designer. The designer of the system shall be clearly identified on the documents. Sprinkler system designs seeking an equivalent approach in accordance with the Uniform Statewide Building Code (USBC) sections 106.3, 1112.2, 112.3 and NFPA 13 section 1.5 must be prepared by a Registered Design Professional (RDP), per VUSBC section 111.1.

B. **Design Process.** All shop submissions (working plans, product data, calculations) are to be reviewed by the A/E of Record for compliance with project contract documents and the applicable code provisions. At the conclusion of the shop drawing review, the A/E of record must:

1. Verify the Underwriters Laboratories (UL) listings and classifications for the materials, components and equipment provided for this project result in a code compliant fire suppression system.

2. Provide a “sealed” statement, attached to the reviewed shop drawings indicating that the fire suppression shop drawings (working plans, product data and calculations) satisfy the requirements of the project contract documents and the code (cite the applicable NFPA Sections).

3. Provide the regional office of the State Fire Marshal a copy(s) of the approved complete fire suppression shop drawings (Capital Projects only, unless otherwise directed by the OUBO).

4. Provide OUBO a copy of the “sealed” statement and a copy of the transmittal to the regional office of the State Fire Marshal (Capital Projects only, unless otherwise directed by the OUBO).

C. **Application of Requirements.** The full extent of these submission requirements is not required for “Minor Fire Protection Project,” unless otherwise required by the OUBO. “Minor Fire Protection Project,” for fire sprinkler systems are defined by the OUBO as any work involving the addition or relocation of less than 6 sprinklers (refer also to IBC 903.3.8 for light and ordinary hazard systems) on renovation projects, or new systems designed as “Limited Area Sprinkler Systems” in accordance with the Virginia Construction Code (VCC) section 903.3.5.1.1 Work related to small projects cannot have an adverse effect on the integrity of the existing fire protection system, including hydraulic design. All materials and equipment installed must be listed. A full plan review is not required for small projects, unless the OUBO requires a full submittal.

A “Minor Fire Protection Project” statement (i.e., separate letter or on construction drawings documentation) prepared by the A/E of Record, must include the following information: Project name, address, project scope of work, number of sprinklers, and indicate there will be no adverse hydraulic effects on the existing system’s remote area or demand. Typically, the submission of hydraulic calculations and equipment specification sheets for projects with less than 6 sprinklers **is not required**, but further consideration is at the discretion of the OUBO (refer also to table listed below); additionally, where 6 – 19 sprinklers are involved in renovation/alteration work and calculations are provided during A/E design phase (refer to 8.8.7 of the GMU HECOM for additional information), a shop submission will not also be required. All installations require OUBO rough-in (including hydro-static testing) and final inspection regardless of the number of sprinklers altered or installed. Contractors are required to schedule inspections prior to work being covered. This excludes minor repairs and maintenance issues (refer to NFPA 25 for additional information) associated with existing systems.

	Permit Application	Full Shop Submittal Required	Hydraulic Calculations Required	Minor Fire Protection Project Statement	Minor Fire Protection Project Drawing (Details provided only on A/E Construction Documents only)
New Fire sprinkler System	**X**	**X**	**X**		
20 or More Sprinklers (alteration, relocation or additions)	**X**	**X**	**X**		
6 to 19 Sprinklers (alteration, relocation or additions)	**X**		**X**[1]	**X**	**X**
Minor Fire Protection Alterations (5 or fewer sprinkler alterations, or additions)	**X**			**X**	**X**
Limited Area Systems (19 or fewer new sprinklers for domestic system only – VUSBC 903.3.5.1.1)	**X**			**X**	**X**

1. Calculations provided by A/E during production of Working Drawings are permissible in lieu of shop drawings and calculations prepared by installing contractor (Refer to 8.8.7 of the GMU HECOM).

PART II. PERMIT DOCUMENTS

Permit application to include the following:
- Complete set of plans
- Equipment specification sheets
- Hydraulic calculations

All Working Plan Submittals Shall Contain Relevant Information as Listed In 2016 NFPA 13 Section 23.1.3 and NFPA 14 Section 8.1. Items of Particular Concern that Should Be identified In the Submission Include:

A. Water Supply Information: Working plans shall include static pressure (psi), residual pressure (psi), flow (gpm), date of test, name of organization who conducted test or supplied information. Fire flow testing utilized for the purpose of design review shall be conducted no more than 12 months prior to working plan submittal (2016 NFPA 13:23.2.1.1). Location of the fire hydrants utilized for the fire flow test must be accepted by the OUBO. Flow tests completed by the contractor may be required to be witnessed by the OUBO at their discretion. For renovations, refer to the A/E drawings for current fire pump test data where applicable. Refer to GMU HECO Manual, 2023 section 8.8.7 for additional information.

B. Water Supply Graph: Included with the working drawing submission must be a graph sheet(s), plotted on semi-logarithmic graph paper, showing water supply curves and system requirements. The first curve shall indicate actual water flow information. A second curve shall visually represent a safety factor reduction (where applicable). This curve shall be separate and distinguishable from the

actual water flow curve and have a slope equal to or greater than the actual water flow curve. The hydraulic design shall be below the adjusted water supply curve.

C. Omitted Coverage Areas: Note location and size of concealed spaces, closets, attics, bathrooms, small enclosures, balconies, canopies, etc. that do not contain proposed fire sprinkler coverage. List applicable code section on plans where omissions are permissible under NFPA 13. Areas covered by alternative fire protection equipment should also be noted (i.e. clean agent system, etc.).

D. Underground: Each set of plans shall accurately indicate locations and dimensions of water mains, test hydrant, flow hydrant, fire lines, and any other applicable information. Hydraulic calculations should be completed all the way back to the fire hydrant or other water source where the fire flow test was conducted.

E. Equipment Specification Sheets: Equipment utilized in the design shall be clearly identifiable in the submitted specification sheets by either highlight or marking.

F. Owner's Certificate: A signed copy of the owner's certificate shall be submitted with all new full plan submittals and submittals involving occupancy change of use (2016 NFPA 13:23.1.4)

G. Working Plan Re-Submittals: If a re-submittal is required, MINOR plan information revisions shall be submitted with changes clouded. Changes involving a complete system re-design need not be clouded. Changes in other documents shall be clearly identified.

H. Non-Required Systems: All proposed non-required fire sprinkler systems shall meet the same requirements for required systems and meet state amended codes (i.e., Virginia Construction Code, Virginia Existing Building Code, NFPA 13, etc.). The "Non-Required" fire sprinkler system shall be submitted for review and acceptance to the OUBO (2018 IFC SEC. 901.4.2).

I. Freezing Conditions: It is the designer's responsibility to provide the building's owner with a system design that will continue to function reliably even under adverse temperature conditions. The sprinkler contractor must be conscious of field conditions that may affect the performance of the system and make corrections as required. It is the owner's responsibility to ensure adequate heat is provided to the building.

J. Flex Connections: Systems utilizing flexible sprinkler head connections shall be listed and approved for use by the AHJ regardless of the project scope of work and installed in accordance with manufacturer specifications. The amount of bends in the flexible connections shall correspond to manufacturer's requirements. Bend tools and manufacturer directions are to remain on site.

K. Shop drawings, scaled to 1/8” or 1/4" per foot. Design, layout, and installation is to be done in accordance with the current edition of the Uniform Statewide Building Code (USBC) and all applicable adopted standards. **Information on shop drawings should include all of the following applicable items (this is not considered exhaustive, but representative of typical submissions – refer to NFPA 13 and 14 referenced above for complete working drawing submission requirements):**

1. A signed copy of the completed owner’s certificate shall be attached to each set of plans in accordance with Section 23.1.4 and Figure A22.1 (b). This requirement is applicable for all buildings (new or existing) where there is a change of occupancy, change in commodity classification, increase or decrease in hydraulic density, or change in type of protection
2. Dimensioned site plan showing entire building and indicating area served by system. Point of compass (i.e., direction of north)
3. Ceiling construction (this is essential where upright sprinklers are installed)
4. Full height cross section
5. Location of all fire walls and partitions
6. Complete floor plan indicating occupancy of each room or area
7. Any questionable spaces, e.g., concealed spaces, etc., where no sprinklers are installed
8. Size of water main in street
9. Alternate/Additional water supply showing pressure and elevation
10. Make, type, and nominal orifice size of all sprinklers
11. Temperature rating and location of all various temperature type sprinklers
12. Number of sprinklers on each riser and on each system by floors and total area by each system on each floor
13. Type and location of alarm bell and supervisory method
14. Pipe material and schedule to be used
15. Type and location of hangers, sleeves, braces and methods of securing sprinklers**
16. Underground pipe size, length, location, weight, material, point of connection to main, type of valves, meters, valve pits, and depth to top of pipe
17. When the equipment is installed as an addition to an existing system, enough of existing system shall be indicated on plans to make all corrections clear and indicate the effect, if any, on existing remote areas

18. Name, address, and phone number of the sprinkler contractor
19. System design criteria showing the minimum rate of water application (density), the design area of water application and the water required for hose streams both inside and outside
20. FDC location(s) in accordance with approved civil drawings.
21. The setting for pressure-reducing and pressure-restricting devices (where applicable)

L. Information on calculations should include all of the following applicable items:

1. Location, name of owner/occupant, name of designer and address, and building identification
2. Description of hazard*
3. Hazard/Commodity classification*
4. Design area of water application
5. Minimum rate of water application i.e., density
6. Area of sprinkler coverage
7. Building height/Storage height
8. Storage method
9. Total water requirements, as calculated, including allowance for hose demand water supply information
10. Location and elevation of static and residual test gage with relation to the riser reference point
11. Hydraulic reference points are to be shown by a number and/or letter designation

*Owner's certificate must be included with submittal. Due to the complexity of some hazards, an engineering analysis of hazards and storage methods, conducted by a registered design professional, may be required at the discretion of this office.
**Piping hanging supports in areas with a seismic design category of other than A or B must be reviewed and approved by the registered structural design professional in accordance with IBC section 1613 and ASCE 7, section 9.6.