

# 7

## ***AUTOMATIC FIRE SPRINKLER AND STANDPIPE SYSTEMS***

### **7.01      *Standards Established***

Ref.: IFC 903

- 7.01-1.      All automatic fire sprinkler systems and standpipe systems whether voluntary or required shall be designed, installed and tested as specified in compliance with the latest editions of International Building Code (IBC) Section 903, NFPA 25, the International Fire Code (IFC) Chapter 9 and nationally recognized standards listed in Chapter 45; and specified in the following subsections of these standards.

### **7.02      *Water Supply Information for Hydraulic Calculations***

Ref.: IFC 903.3.5

- 7.02-1.      Current water supply computer modeling obtained from the City of Bellevue Utility or the water authority having jurisdiction shall be submitted with all hydraulically engineered sprinkler and standpipe systems.
- 7.02-2      The storage tank volume must provide the net usable volume requirements of IFC 903.3.5.2 as amended by the City of Bellevue. The net usable volume is calculated based on delivering positive pressure at the pump suction flange for tanks located below the centerline of the pump or calculated based on delivering -3psi at the at the pump suction flange for tanks at or above the centerline of the pump, in accordance with NFPA 20-07, 5.14.3.1-2.

### **7.03      *Sprinkler and Standpipe Riser Materials***

Ref.: IFC 704.1

- 7.03.1.      Fire sprinkler or standpipe risers extending through more than two (2) floors and not enclosed in an approved fire-resistive shaft as specified in the Building Code, shall be constructed of approved non-combustible materials.

## **7.04 Fire Department Connections (FDC)**

Ref.: IFC 905, 912, 903-3.1, 903-3.7

7.04-1. All buildings outfitted with standpipe systems that have a water supply requirement in excess of one thousand two hundred fifty (1250) gallons per minute, or 4 standpipes, shall be outfitted with two (2) separate fire department hose connections for supply, or as otherwise approved by the Fire Department.

7.04-2. All projects that are high-rise, complexes with two or more structures above a common garage or foundation, or those which may otherwise be rendered inaccessible to the Fire Department shall be equipped with two complete Fire Department Connection points. These are generally to be located on opposite sides of the project at approved locations.

7.04-3. When required by the Fire Department the FDC shall be located adjacent to the curb cut of the main entrance of the project site or building it serves.

The FDC shall be arranged to face the street, driveway or fire apparatus access route as specified by the Fire Department.

FDCs shall be arranged so the lowest point on the inlet connection is between thirty (30) and forty-two (42) inches above finished grade at its location.

Any above grade portion of the supply piping in the fire department connection line shall be approved metallic pipe or tube. Buried portions of this piping must be metallic, conforming to Bellevue Utilities Department standards or as otherwise approved by the Fire Department.

7.04-4. The fire department hose connection shall be located not more than fifty (50) feet from the nearest fire hydrant and fifty (50) feet away from the building it protects, or as approved by the Fire Department.

7.04-5. If the Fire Department Connection is not chrome or brass the fire department hose connection and cast plate surrounding it shall be painted Rustoleum Regal Red or equal. Where yard style fire department hose connections are installed, the entire riser and hose connections above grade shall be painted as specified. Painting of the fire department hose connections shall not interfere with the operation of the swivel or cap connections.

A metal, weather resistant sign shall be affixed at the fire department hose connection. It shall be affixed securely to the building wall immediately above the fire department connection, or wrapped around the outside pipe and tack welded just below the fire department connection. It shall be 4" x 6" in size, be a red background with white, 1" block printing, and describe the type of connection as follows (sign information to be approved by the Fire Code Official):

Other methods of fire department connection identification may be required by and at the approval of the Fire Code Official.

**(Top Line)**

<b>Automatic sprinklers only:</b>	<b>“AUTO SPRK”</b>
<b>Class I or III standpipes (wet):</b>	<b>“STANDPIPES”</b>
<b>Combined, sprinklers &amp; standpipes:</b>	<b>“COMBINED”</b>
<b>Dry standpipes:</b>	<b>“DRY STANDPIPE”</b>
<b>Required Pump Pressure:</b>	<b>“PUMP AT ____ PSI”</b>
The noted pressure shall be the higher of the required pressure for hose stream at the top of the building or to overcome the highest PRV setting.	

**(Bottom Line – Information Line)**

<b>Plastic pipe:</b>	<b>“CPVC”</b>
<b>Multiple, Single Standpipes:</b>	<b>“ONE OF ___#___”</b>
<b>Basement Only:</b>	<b>“BASEMENT ONLY”</b>

**TABLE 7.04**  
***Sprinkler and Standpipe (FDC) Sign Examples:***



- 7.04-6. Where fire department hose connections (FDC) are subject to vehicular damage, they shall be protected by crash posts as specified International Fire Code Section 312.2 or the Utility Department having jurisdiction, or if not applicable, then according to 10.03 – Alternate Guard Post (BOLLARD) Specifications.
- 7.04-7. All fire department hose connections shall be outfitted with a swing check valve for each hose connection. All swing check valves shall be installed in such a way as to be accessible for service and maintenance. Automatic drainage provisions between the check valve and the hose connection must be provided.
- 7.04-8. Threaded plug-style caps for fire department hose connections are prohibited. Only approved frangible-style or quarter-turn protective covers with pins or lugs shall be used on fire department hose connections.

### **7.05 Identification Signs**

Ref.: IFC 510.1

- 7.05-1. In all buildings outfitted with fire sprinkler or wet standpipe systems, a permanent placard specifying the locations of all controlling valves shall be mounted on the door to the room with the system riser. The placard shall include a plan view and elevation view of the building showing the locations of all controlling valves and all low point drains on the respective system. The placard shall be protected from moisture and physical damage.
- 7.05-2. All sprinkler and wet standpipe system controlling valves shall be clearly marked as to the portion of the building or fire protection system they control.
- 7.05-3. A permanent hydraulic placard shall be provided at the base of each riser stating the design criteria of the system, water supply available, and other pertinent information such as occupancy/storage constraints or limitations.

### **7.06 Special Condition Sprinkler Installations**

Ref.: IFC 903.2.13

- 7.06-1. In systems designed and installed in compliance with NFPA 13, 13D, or 13-R, closets, regardless of size, containing laundry equipment, furnaces and other sources of ignition shall be sprinklered. Intermediate temperature sprinklers shall be used, except as modified by NFPA-13. The index of response shall be appropriate to the overall occupancy. Closets and bathrooms which are accessed from the egress path within a dwelling shall be sprinklered, regardless of size.
- 7.06-2. Electrical or communications equipment rooms or closets shall be provided with automatic sprinkler protection, regardless of size.

- 7.06-3. Interior soffits, valances, canopies, lights, displays or any architectural structure shall be sprinklered beneath when the condition creates an obstruction to ceiling sprinkler discharge.
- 7.06-4. Display cases constructed as parts of walls shall be sprinklered when the area of the display case exceeds ten (10) sq. ft. Enclosed, fixed, free-standing display cases need not be sprinklered if they are less than twenty (20) sq. ft. in area and not more than four (4) feet in any horizontal dimension, or have ceilings or tops that would enable adjacent ceiling sprinklers to discharge into the display cases.
- 7.06-5. Enclosed coolers or freezer display cases less than 84 inches tall and with an inside width or length less than 36" need not be sprinklered.
- 7.06-6. Non-combustible ceiling or floor cavities and similar spaces must be sprinklered unless they meet the requirements of NFPA 13-2007 Section 8.15.1.2 *Concealed Spaces Not Requiring Sprinkler Protection*. In particular, the following will require localized protection:

- 1) All cable trays
- 2) Cable rings greater than 6 inches in diameter
- 3) bundles of cabling (exceeding 20 cables)

Cables must have 24 inches of separation to be considered as a separate bundle/tray.

**NOTE 1:** *Minor quantities of combustible materials can be present in concealed spaces constructed of noncombustible materials but should not typically be viewed as requiring sprinklers. It is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. Cable trays and bundles in excess of 20 cables are considered to be beyond "minor quantities".*

**NOTE 2:** *Fuel fired units within the ceiling cavity must be protected with sprinklers in the immediate vicinity, usually from two sides.*

- 7.06-7. Emergency feeder circuit wiring shall meet one of the following conditions:
1. Be installed in spaces or areas that are fully protected by an approved automatic fire suppression system
  2. Be a listed electrical circuit protective system with a minimum 1-hour fire rating
  3. Be protected by a listed thermal barrier system for electrical system components
  4. Be protected by a fire-rated assembly listed to achieve a minimum fire rating of 1 hour
  5. Be embedded in not less than 2 in. of concrete
  6. Be a cable listed to maintain circuit integrity for not less than 1 hour when installed in accordance with the listing requirements

- 7.06-8. When sprinklers protect commercial cooking and exhaust equipment, the use of listed grease extractors shall not preclude the installation of sprinkler protection in the exhaust ducts. Water spray nozzles or sprinklers may not be used directly over deep fat fryers.
- 7.06- 9. Exterior, noncombustible canopies greater than four (4) feet in width that are used to cover parking, staging or loading areas, or spaces used for combustible storage, shall be protected by sprinklers.
- 7.06-10. Exterior, combustible eaves with enclosing soffits require sprinklering within if they are not separated from the adjacent attic with construction equaling 1/2" gypsum board (ventilation holes excluded). Such spaces, if separated from the attic, may remain unsprinklered at the Chief's discretion, if they are fire stopped with 1/2" gypsum board (at 60 ft. maximum intervals) into volumes less than 160 cubic feet, and the cross-sectional area of the space does not exceed 5 sq. ft.
- 7.06.11. When single or two-family dwellings are sprinklered due to inadequate fire flow or fire department access the sprinkler system must be designed in accordance with NFPA Standard 13D except as follows:
- a. The garage is to be [substantially] protected as well as a wet system allows.
  - b. A minimum water supply of 1" is allowed, installed per utility standards.
  - c. The FDC (1 1/2" in size) may be mounted on the building wall near the front of the building or at an alternate location as approved by the Fire Department (only required for single or two family dwellings in excess of 3,600 sq.ft.).
  - d. Attics or crawl spaces intended to be utilized for storage shall be sprinklered.
  - e. Combined service meters (domestic, fire and/or irrigation) less than 1 1/2" in size normally require the use of a domestic (hydraulic) shutoff valve. (ref.: Uniform Plumbing Code Section 610.1).
- NOTE:** *The foregoing is an approved alternate to the code requirement, which is to size the meter and service line for the **total** demand. Typically sizing the meter and service line for the total demand will result in a larger meter and service line.*
- 7.06.12. Sprinkler shop drawing submittals shall include seismic hanger and bracing calculations and supporting details as required by the 2007 edition of NFPA-13 (NFPA-13D designs).
- 7.06.13. All new fire sprinkler systems shall be tested in accordance with NFPA-13. Those systems which share hose connection piping with a standpipe

system shall be tested at 50 psi above the calculated required supply pressure of the standpipe system.

- 7.06.14. Composite wood joists require special sprinkler design considerations as outlined in NFPA 13. If they are sheathed across the bottoms, forming combustible concealed spaces, the minimum remote area of calculation must be 3,000 sq. ft. If they are unsheathed and the depth of exposed joist below noncombustible insulation exceeds 16", then each joist pocket must be sprinklered. These are important issues that must be resolved before a permit can be issued.

Composite wood joists occurring in residential occupancies do not require 3,000 sq. ft. of remote area. However, all rooms below such construction must be sprinklered, regardless of size (bathrooms and closets are not excepted).

- 7.06.15 Covered or below grade loading docks shall have a sprinkler density of 0.40 gpm/sq ft over 3,250 square (dry system area) foot area or as approved by the Fire Code Official. The use of the Extra Hazard II demand is due to the shielded combustibles in the trailers.

### **7.07 Non-Metallic Pipe or Tube Thermal Protection**

Ref.: NFPA 13, Section 1.6.2

- 7.07-1. Non-metallic sprinkler pipe or tube shall be as specified in its product listing.
- 7.07-2. Where water-filled piping is installed under an insulation blanket in a cold attic or other cavity, details of this protection must be clearly shown on the shop drawings. As a condition of occupancy, the General Contractor or Building Owner shall submit a letter certifying that it is installed in a manner that will prevent freezing. Additionally, the building inspector may inspect the insulation as a condition of occupancy.

### **7.08 Dry Pipe Performance**

Ref.: IFC 901.5

- 7.08-1. Regardless of system piping capacity, dry pipe and double interlock preaction sprinkler systems shall be capable of delivering water to the Inspectors Test Connection within sixty (60) seconds of the Inspector's Test valve being opened. Approved quick opening devices may be used to meet this requirement.

## **7.09            *Hydraulically Engineered Sprinkler Systems***

Ref.: NFPA 13 (2007) Section 11.2.3.2.1

- 7.09-1.            Hydraulically engineered sprinkler systems shall be designed and calculated so the system demand curve including hose stream allowances is at least ten (10) percent, or 10 psi, whichever is greater, below the water supply curve.
- 7.09-2.            Booster pumps do not require a generator if the city water supply can supply the sprinkler demand or a diesel driver is used.
- 7.09-3.            The intent of Amended IFC 903.3.1.4 is to ensure that the public supply, for systems utilizing a booster pump, can still supply a reasonable floor height above grade. Typically this will be interpreted by the Fire Plan Reviewer as requiring the first, second and third floors above grade to be hydraulically designed to be supplied by city pressure alone (non-boosted supply), unless otherwise approved by the Fire Code Official.
- 7.09-4.            Where quick response sprinklers are utilized, the area reduction allowed by NFPA-13 is not permitted.

## **7.10            *Sprinkler System Supervision***

Ref.: IFC 903.4

- 7.10-1.            An unsupervised shutoff valve shall not be installed upstream of the water flow pressure switch.
- 7.10-2.            Tamper security switches shall be installed on all main and auxiliary controlling valves.  
  
**EXCEPTION:** Existing control valves located outside a building and in a locked underground vault or pit need not be electronically supervised provided the valves are locked in the “open” position in a manner approved by the Fire Department.
- 7.10-3.            See Chapter 8.06 of these Standards for supervisory and water flow requirements pertaining to the fire alarm control panel.
- 7.10-4.            All sprinkler systems shall have an approved local alarm notification system including an outside audible alarm notification appliance. Off-premises supervision alone shall not be construed to meet this requirement. Local alarm must be visible from the public right-of-way or as otherwise approved by the Fire Department.
- 7.10-5.            When electronic supervision is not required, valves may be supervised by one of the following methods (**!NOTE: Removal of valve handles is not permitted**)
  - a.            Locking the valves open with 3/16-inch plated or galvanized chain or 5/16-inch 7x19 stainless or galvanized wire rope. The chain or wire rope shall be threaded through the valve wheels so they may

not turn more than one-quarter (1/4) turn. Chain or wire rope shall be locked with a padlock.

- b. Sealing valves open with approved weekly recorded inspections when the valves are within locked enclosures.

### **7.11 Elevator Machine Rooms and Hoist way Pit**

Ref.: ASME A17.1 (2000 edition)

- 7.11-1. Sprinklers installed in pits shall be arranged in such a way that the spray pattern shall not spray higher than two (2) feet above the pit floor with the spray pattern directed level and not down.
- 7.11-2. The sprinkler system shall be arranged to disconnect electrical service to the elevator main line prior to the application of water by the following method:
  - a. A fixed temperature 135 degree Fahrenheit thermal detector shall be provided within the elevator equipment room to disconnect the main line power.
  - b. Such thermal detectors shall be ceiling mounted and located within eighteen (18) inches of each sprinkler head.
  - c. Thermal detectors shall be an auxiliary function of the elevator equipment only, and shall be identified with signs reading: "**Elevator Control Only-- DO NOT TEST**". The signs shall have letters at least one-half (±) inch high on a contrasting background.
  - d. Power for the automatic disconnect control circuit shall be derived from the load side of the elevator power main disconnecting means. The disconnect control device shall be located in the elevator equipment room, and shall be provided with a sign reading "**ELEVATOR AUTOMATIC DISCONNECT.**" The sign shall have letters at least one-half (±) inch high on a contrasting background.
  - e. Automatic sprinkler heads installed in elevator pits do not require a power disconnect device. A shut-off valve shall be provided in an accessible location with the handle not more than six feet above the floor. The elevator machine room and the pit require separate control valves.
  - f. Top of elevator shaft sprinklers are not required by the City of Bellevue. If installed, the elevator machine room conditions apply.
  - g. Residential elevator equipment in one and two family residences are not permitted to be sprinklered unless shunt trip and elevator recall is provided. If shunt trip and elevator recall is not installed,

then sprinkler protection must be removed. Elevator equipment must be installed in a dedicated room, closet or space.

### **7.12 Mixed Residential Occupancy Sprinkler Systems**

Ref.: NFPA 13R, Section 3.3.6

7.12-1. In MIXED-USE residential occupancies four stories or less, residential sprinkler systems designed and installed in compliance with NFPA 13-R may be used if the following is satisfied:

1. The residential area must be the predominate use.
2. The non-residential use must have similar fire loading as compared to the residential uses.

### **7.13 Heat Trace**

Ref.: IFC 102.8

7.13-1. Rooms or areas where wet pipe systems or any sprinkler equipment is installed shall be maintained at a minimum of 40 degrees F.

**Exception:** When allowed by the Fire Code Official heat tracing tested and listed for sprinkler piping and installed in accordance with the manufacturer's specifications.

All heat tracing circuits shall be supervised by the building fire alarm system for power supply and temperature. A Special Inspection may be required by a representative of the manufacturer to verify the heat trace is installed in accordance with the manufacturer's installation instructions and the terms of the heat trace listing.

### **7.14 Sectional Floor Control Valves**

Ref.: IFC 903.4.3

7.14-1. Isolation valves shall be provided on each floor of sprinklered buildings such that an individual floor may be isolated without impairing additional floors.

**EXCEPTION:** Sprinkler systems designed and installed in compliance with NFPA Standard 13-D or for R-3 occupancies.

An alternative is to allow the top level of sprinklers below an unheated attic to be supplied from the next lower level. This is to avoid exposure of sprinkler piping to potential "attic freeze-up." A maximum floor area of 26,000 sq. ft. per sprinkler system is allowed.

7.14-2. Separate dry systems shall be provided for each floor level.

## **7.15 Standpipe Hose Station Outlets**

Ref.: IFC 905.2

7.15-1. Standpipe hose station outlets shall be provided with National Standard Threads, and the threads shall be protected by a rocker lug (pin) cap. Plastic thread protection is not acceptable.

7.15-2. Where wall-recessed cabinets are installed for hose outlets in standpipe systems, they shall have the following minimum clear dimensions to assure easy access and valve operation:

Class I Standpipe Systems:

Height: Twelve (12) inches

Width: Sixteen (16) inches

Valve handles in any position shall be not less than four (4) inches from any surface (except the back of the cabinet) in the enclosure or cabinet, and shall be arranged so a twelve (12) inch wrench can operate the valve.

7.15-3.- All hose outlet valves shall have adequate clearance around them to accommodate a fire department hose appliance having a dimension of ten (10) inches by ten (10) inches.

7.15-4. All hose outlet valves for fire department use shall be arranged so they are between thirty-six (36) and forty-eight (48) inches above finished floor, with the outlet oriented to the clear working space.

## **7.16 Standpipe Design**

Ref.: IFC 905

7.16-1. Standpipes shall be designed by hydraulic calculation, utilizing Hazen-Williams formulas and procedures described in NFPA-13, Chapter 11. The coefficient of roughness (C-factor) must be 100 for dry standpipes utilizing black steel pipe. The design of the standpipes shall meet two design points: 1) Provide 750 gpm a minimum residual pressure of 100 psi and 2) Provide 300gpm at 175psi at the outlet of the hydraulically most remote hose connection.

7.16-2. Standpipe systems without a fire pump shall be designed to operate with a Fire Department Connection (FDC) inlet pressure of 200 psi unless otherwise approved by the Fire Department.

7.16-3 The most remote portion of a sprinklered floor or story shall be within 200 feet travel distance to a protected, accessible hose connection. Travel distances in parking garages may not include travel between stalls. To qualify, the stall must remain open and be marked as "NO PARKING".

7.16-4 Where combined standpipe systems are installed or required no portion of that standpipe system may be dry

**7.17 System Testing and Inspections**

Ref.: IFC 901.6

7.17-1 All sprinkler systems shall be hydrostatically tested at 200 psi for 2 hours per NFPA 13.

**APPENDIX 7  
FIRE SPRINKLER and STANDPIPE SYSTEMS**

**BELLEVUE FIRE DEPARTMENT  
SPRINKLER PLAN REVIEW CHECKLIST**

Permit Number \_\_\_\_\_ Date \_\_\_\_\_

Project Name \_\_\_\_\_

Address \_\_\_\_\_

Permit Applicant Company \_\_\_\_\_

Certified By \_\_\_\_\_ Phone \_\_\_\_\_, Fax \_\_\_\_\_

**BASIC PROJECT INFORMATION**

- 1 NFPA OCCUPANCY/STORIES: \_\_\_\_\_
- 2 TYPES OF CONSTRUCTION: \_\_\_\_\_
- 3 Property requires sprinklers for area or height (IBC Chapter 5)? Yes No  
\_\_\_\_\_
- 4 Property requires sprinklers for other reasons? \_\_\_\_\_

**BLDG. & SPRINKLER PLAN DESCRIPTION**

Drawing #	Number Sprinklers	Location	Elev./ Level	Sprinkler Occupancy	IBC Occupancy	Sprinkler Const Type	IBC Const Type	Hydraulic Calcs Y/N

**CHECKLIST NOTES:**

- Items which are not applicable are noted "NA" in the "Yes" column.
- Items marked in the "NO" column are EXCEPTIONAL. Provide an explanation with the Permit Application.
- All references are to the 2007 NFPA-13, 8-1 or to the BFD Development Standards.

**ADEQUATE**

Yes No

**A. BASIC SHOP DRAWING INFORMATION**

1	Plans drawn to graphic scale[ff], sheets uniform size, each floor [NFPA 13, 8-1.1.1]		
2	Name of owner/occupant [a],street address [b], compass [c]		
2a	Name and address of contractor, contact and phone number [gg].		
2b	Contractor NICET Certified? {U-stamp or NICET III for underground}		
3	Plans show: partitions [e], fire walls [f], & Occupancy class of each area [g]		
4	Location and size of concealed spaces, closets, attics, and bathrooms [h]		
4a	NFPA-13R & -13D: spklr. all closets w/dry. eqpt., furnaces, etc. {6-7.07-1}		
4b	Soffits over 24" wide & Display cases protected, Fig.4-6.5.1.2(b) & {6-7.07-3}		
5	Any general unsprinklered spaces per NFPA 13, 5-13?		
6	Kitchen Hood exhaust ducts spklrd? {6-7.07-6}		
7	Total area protected by each system on each floor is OK? [n]:		
8	Existing system info is sufficient to evaluate spklr. addition proposed? [dd]		
9	Construction types fully described (roof/floor framing) [d] and cross section		

**B. SITE INFORMATION**

Yes No

1	Underground work is part of this Permit?		
2	Site Plan to scale, water mains (circulating), roads, elevations, hydrants		
3	Locations of water connection, valves, & FDC plus fire flow data		
4	NO other sources of water supply, with pressure or elevation [k].		
5	U/G pipe type, weight, joints, depth of bury [bb]?		
6	Type of valves, fittings, and valve pits (Backflow & Meter)?		
7	Thrust blocking & rod coatings		
8	Exposures within 60 ft.: distance, construction, occupancy & height [k].		

**C. VALVES, ALARMS & RELATED INFORMATION**

Yes No

1	Make, type, model, & size of alarm or dry pipe valve plus trim details [x].		
2	Make, type, model, & size of preaction or deluge valve plus trim details [y].		
3	Capacity in gallons of each dry pipe system [q].		
4	Model and location of control & check valves [w].		
4a	Floor control valves provided on 3 stories or more {6-7.16-1}		
5	Drain valves, risers, & discharge points, plus test connections {8.16.2}		
6	Backflow preventer info. (approved, mfr., size, type) [oo]		
7	Kind, location & voltage of exterior alarm bells [z].		
7a	Spklr. system shall operate inside alarm system throughout premises. {6-7.11-4}		
	Coordinated with Fire Alarm Contractor & so noted		
8	Switches: water flow, low air, pressure alarm, tamper?		
8a	Switches on galvanized trim pipe?		
9	Central station service is required (Who is responsible? _____)		
10	Air compressor detailed (power, tank size & tank pressure)? STANDPIPES: Required in this building?		
11	Standpipe type & size shown in all reqd. stairs & on roof (150' hose reach)?		
12	Pipe material, schedule, & heating provision?		
13	Control & check valves and FDC? Multiple standpipes conn. at base?		
14	Size & position of hose outlets (2.5" outlets between 36" and 48" AFF) [aa]		
15	Standpipe elevation reflecting hydraulic references and dimensions		
16	Standpipe switches: water flow & tamper? FIRE DEPT. CONNECTIONS (FDC): FDC included with this Permit?		



- length, and fittings consistency plus elevation changes [kk].
- 3 Each remote area is shown with its criteria & demand at common point?
- 4 Selected remote area demands are displayed for the hydraulic placard? [jj].
- 5 All total demands are 10% below water supply curve psi. {6-7.10}?
- 6 Drawings & Calcs reflect origin of design criteria correctly (storage criteria, room design, area-density, or UFC criteria)?
- 7 Schedule of settings for pressure-reducing valves [nn].
- 9 Plumbing fixture load or domestic demand included in calculations?


**G. MISCELLANEOUS INFORMATION**

- 1 Elevator Shaft & Machine rm. spklrs. 212°F. on listed gate valves {6-7.12-1}
- 2 135°F. fixed detector <=18" of ea. spklr. in mach. rm.?-3a}
- 3 Heat tracing & insulation used to "freeze-protect" {6-7.15-1}?
- 4 Heat trace is spklr. listed, supervised, & on standby power? {6-7.15-1}
- 5 Special hazard conditions exist or special extinguishing systems installed?

Yes	No