



OPERATING POLICY 2 AUTOMATIC SPRINKLER AND STANDPIPE SYSTEMS



Kirkland Fire/Building Department • 123 Fifth Avenue, Kirkland, WA 98033 • (425) 587-3650

I. SCOPE

The purpose of this policy is to provide information regarding the City of Kirkland's requirements for automatic sprinkler systems. This includes, but is not limited to, design, approval, installation and testing of such systems.

The following documents shall be used in conjunction with this policy for reference and information:

- *International Fire Code* (including Appendix B "Fire Flow Requirements for Buildings")
- *International Building Code; International Residential Code*
- Washington State Amendments 51-54
- Kirkland Municipal Code Chapter 21.33
- NFPA 13, 13R, and 13D *Automatic Sprinkler Systems*
- NFPA 24 *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*
- NFPA 25 *Standard for the Inspection, Testing, and Maintenance of Water Based Fire Protection Systems*

The most recent edition of the *International Codes* as adopted by the City of Kirkland shall be used. The most recent edition of the NFPA standards may be used, as long as all design elements are taken from the same edition.

II. WHERE REQUIRED

The following requirements apply only to newly constructed buildings and additions to existing buildings. For buildings undergoing a change in use or occupancy, the requirements of the *International Building Code* for sprinklers shall apply.

(Informational note: For purposes of sprinkler requirements by occupancy, the requirements of the *International Building Code* and *International Fire Code* are identical and the terms are interchangeable.)

A. Sprinkler systems shall be installed in buildings within the City of Kirkland as outlined below:

1. **ALL NEWLY CONSTRUCTED BUILDINGS** with a gross floor area of five thousand (5,000) square feet or greater, regardless if type or use. Included are single family homes, duplexes, and zero lot line townhouses where the aggregate area of all connected townhouses is greater than 5,000 square feet. For the purposes of this policy, **gross floor area** is defined as follows:

Gross floor area is the floor area whether above or below grade within the inside perimeter of the exterior walls of the building, exclusive of vent shafts and courts, without deduction for corridors, stairways, closets, the thickness of the interior walls, columns or other features. The floor area of a building, or portion thereof, not provided with surrounding exterior walls shall be the usable area under the horizontal projection of the roof or floor above. The gross floor area shall not include shafts with no openings or interior courts. Gross floor area shall also not include limited access areas such as vented crawl spaces and attics.

2. **ALL A-2 OCCUPANCIES**, where the fire area exceeds 5,000 square feet; the fire area has an occupant load of 100 or more; or the fire area is located on a floor other than the level of exit discharge.

3. **ALL BUILDINGS** where fire flow or access is not adequate. For fire flow requirements, see Operating Policy 4. For access requirements, see Operating Policy No. 6.

4. **ALL BUILDINGS** or structures supported by piers or pilings which extend over water.

EXCEPTION: Any one-story structure used solely for the moorage of boats or having Type I FR or II FR construction throughout

5. **EDUCATIONAL OCCUPANCIES** as required by Washington State Amendments 51-50-0903

NOTE: Prior to December 2011, a one-time sprinkler exception was allowed for additions to existing buildings which, if new, would be required to be sprinklered. This exception has been repealed, effective December 19, 2011. Any existing building required to install an automatic sprinkler system under the provisions of this section shall install such system throughout the entire building. Subject to the approval of the fire chief, a phasing plan of up to five years is permitted.

III. GENERAL DESIGN REQUIREMENTS

A. All systems shall be designed and the plans stamped by a registered professional fire protection engineer licensed in the State of Washington or an individual in possession of a State of Washington Certificate of Competency with a Level I, II, or III certification, whichever is applicable. Design of the system shall also include the underground water supply from the source to the riser inside the building.

B. Densities for residential occupancies shall be as follows:

- NFPA 13 – 0.10 gpm per square foot
- NFPA 13R – 0.10 gpm per square foot
- NFPA 13D – 0.05 gpm per square foot

When an existing R1 occupancy of combustible construction is remodeled, the density for the area shall be upgraded to 0.10.

C. The safety margin for calculated demand shall be 10 percent or 10 psi, whichever is larger

D. Quick response heads shall be installed as required by IFC 903.3.2. When a designer of a tenant improvement intends to take advantage of IBC sprinkler advantages, QR sprinklers are required throughout that tenant space, or whole floor if a corridor is involved.

E. Permissible sprinkler omissions are as listed in IFC 903.3.1.1.1. and as noted in the appropriate NFPA document for areas such as bathrooms, closets, and balconies. For bathrooms over 55 square feet, in which the toilet room is separated from the rest of the bathroom area, see "compartment" in the definitions of 13D and 13R to determine whether sprinklers are allowed to be omitted.

F. Alternative fire extinguishing systems such as FM200 may be used in conjunction with the building sprinkler system, but are not considered a substitute.

G. Underground sprinkler supply piping shall not run under buildings other than the minimum amount required to reach the interior of the building. Risers shall be located as close as practical to exterior walls to minimize underground piping under the building.

H. An exterior "Post-Indicator Valve" shall be provided. This may be either a yard or wall type. The PIV shall be located in an area that is visible and free from any obstructions.

EXCEPTION: If an exterior door provides direct access to the fire sprinkler room, a PIV is not required.

I. All sprinkler systems shall be provided with at least one Fire Department connection unless otherwise approved by the fire code official. The following requirements apply:

- Desired distance to a hydrant is 30 – 50 feet; the referenced hydrant should be adjacent to Fire Department access
- The FDC shall be located remote from the building (outside the building collapse zone if possible) and adjacent to Fire Department access or public right-of-way.
- The FDC shall not be allowed on the building without specific approval of the fire code official; such approval shall be on a case-by-case basis and due to special circumstances such as difficult terrain or zero lot line buildings
- Each FDC shall be labeled appropriately as to what it serves.
- A ball drip shall be installed at the base of the vertical pipe or in a location so the pipe will drain automatically. If necessary, the ball drip shall be installed in an exterior valve box so that it is easily accessible for system maintenance and testing purposes. It shall not be installed in the dirt.

J. A double check valve is required on all systems, with the exception of 13D systems which are flow-through type. If approved by the appropriate water purveyor, it may be installed in the building.

K. Combination domestic water/fire sprinkler systems are not allowed.

EXCEPTION: Single family residential systems

L. All 13D systems with an attached garage shall have one dry sidewall sprinkler head installed from the heated area into the garage (preferably above the door leading into the garage).

IV. ZONING, ALARM NOTIFICATION, AND MONITORING REQUIREMENTS

A. Individual flow switches are required for each floor on buildings four stories or greater in height.

B. Each sprinkler riser shall indicate as a separate water flow zone on the fire alarm panel.

C. For buildings 2 stories or more, floor control valves shall be provided at the point of connection to the riser on each floor

EXCEPTION: When approved by the fire code official on NFPA 13 D and 13R systems, and NFPA 13 systems on small buildings (this shall be determined on a case-by-case basis).

D. All control valves shall be monitored for tamper.

EXCEPTIONS:

- Double check valves in vaults
- Double check valves on systems in single family residences
- Indicating valves for sprinkler lines for elevator pits, spray booths, and similar applications where fewer than 10 sprinkler heads are involved. Such valves shall be secured in the open position in an approved manner.

E. Low air pressure shall be monitored on dry systems

F. All sprinkler systems shall be monitored by a UL-listed central station.

EXCEPTION: Single family residences

G. All buildings shall be equipped with an exterior alarm strobe in a location approved by the Fire Department.

EXCEPTION: For single family residences, the exterior alarm may be audible only.

H. A local alarm is required to provide audibility in all areas of the building at 15 decibels above ambient or 60 decibels, whichever is greater.

V. STANDPIPE REQUIREMENTS

- A. Standpipes shall be provided and installed as required in the IFC 905
- B. In sprinklered buildings, the standpipe system may be combined with the sprinkler system.
- C. There shall be at least one outlet above the roof line when the roof has a slope of less than 4 units vertical in 12 units horizontal (33.3% slope).
- D. Hose outlets shall be installed on intermediate landings whenever possible.

VI. PERMITS

- A. A permit is required from the Fire Department prior to installing any portion of a sprinkler system (including the underground), standpipe system, or for ANY revision to an existing system. Such work is not included under the building permit.
- B. A permit for installation of the sprinkler underground may be applied for separately from the permit for the interior system. Work shall not begin on any part of the system prior to obtaining a permit. The civil drawings associated with the building permit do not constitute a permit to begin fire sprinkler underground work.

VII. INSPECTIONS

A. COMMERCIAL OR MULTIFAMILY INSTALLATIONS

- 1. Supply piping
 - a. All underground sprinkler supply piping shall be installed by a Washington State licensed sprinkler contractor or a utility contractor holding a Washington State Certificate of Competency with a Level "U" certification.
 - b. Supervision of the utility contractor by another licensed sprinkler contractor is not allowed as a substitute. Failure to comply with this Washington State regulation is a gross misdemeanor.
 - c. All piping and fittings shall be UL listed for fire sprinkler mains.
 - d. Underground sprinkler piping shall be properly restrained. Acceptable methods of restraint include thrust blocks, rods, and mechanical joint restraints (such as Megalug). At least two methods of restraint shall be used for each project and shall be inspected by the fire code official prior to cover.
 - e. The piping shall be a direct connection to the City water main. The portion of pipe which is in a public right-of-way shall be ductile iron or copper. Plastic pipe is not allowed.
 - f. The connection to the City main shall be inspected and approved by the Public Works inspector; the remaining portion of the underground system shall be inspected and approved by the fire code official. Required inspections include cover, hydrostatic test, and flushing. A purity test by Public Works is required to be completed prior to Fire Department hydro or flush test.
 - g. If the supply piping passing through a portion of a building to the sprinkler valve is subject to freezing, it must be protected. If there is no other means of protecting the pipe, heat tape may be used under the following conditions:
 - The pipe must be located in a concrete structure.
 - The heat tape must be connected to a dedicated common building electrical circuit.
 - The heat tape shall be connected to a fire alarm panel so upon any power loss to the tape the panel shall indicate a trouble condition on a separate zone marked "Heat Tape".
 - The pipe shall be insulated.
- 2. Interior Piping – New Systems
 - a. A hydrostatic test of all sprinkler and/or standpipe piping (200 psi for 2 hours) must be witnessed by the Fire Department.
 - b. An inspection of all piping is required prior to ceiling cover.

c. Final inspection includes a trip test of both wet and dry systems as well as ensuring all trim has been installed

3. Interior Piping – Existing Systems

a. A hydrostatic test is not required on additions to existing systems except for pipe larger than 2 inches in diameter.

b. An inspection of all sprinkler piping is required prior to ceiling cover.

c. A final inspection is required to ensure all trim has been installed.

B. SINGLE FAMILY RESIDENTIAL INSTALLATIONS (Includes Duplexes and Townhomes as designed and built under the *International Residential Code*)

13D fire sprinkler systems shall be designed and stamped by a person holding a State of Washington Certificate of Competency. Installation of 13D systems shall be performed by a fire sprinkler contractor having the appropriate level of state certification.

Exception: A homeowner is allowed to install a 13D system in a home which is being built for his/her own occupancy. A contractor who is building a home for later sale does not qualify for this exception.

1. Supply piping

a. The underground supply shall be flushed prior to connection to the interior system. This flush shall be witnessed by the fire code official.

2. Interior piping

a. A leakage test at normal system operating pressure is required. Testing can be accomplished by filling the system with water and checking visually for leakage at each joint of coupling.

b. A cover inspection is required prior to tenting of the piping.

c. A flow test shall be conducted at the most remote area indicated on the hydraulic calculations. The test shall prove the calculations by flowing 2 heads for 30 seconds. The amount of water in each container shall meet the minimum design GPM at the indicated minimum pressure. Averaging the total amount of water collected is not allowed.

d. The valve handles on the double check valve shall be removed at final inspection.

VIII. SUBMITTAL REQUIREMENTS

A. Three sets of plans, drawn to scale, and hydraulic calculations shall be submitted to the Fire Department for approval along with a permit application.

B. Plans shall include all design criteria including equipment specifications.

Policy Approved 5/24/2011

Grace A. Stuart, Fire Marshal

Kirkland Fire Department

(Revised December 19, 2011)