**Chapter 5 Water Supplies**

5.1 General

5.1.1 Number of Supplies

Every automatic sprinkler system shall have at least one automatic water supply.

5.1.2 Capacity

Water supplies shall be capable of providing the required flow and pressure for the remote design area determined using the requirements and procedures as specified in Chapters 19 through 26 including hose stream allowance where applicable for the required duration.

5.1.3\* Size of Fire Mains

5.1.3.1

Except as provided in 5.1.3.2 or 5.1.3.3, no pipe smaller than 6 in. (150 mm) in diameter shall be installed as a private service main.

5.1.3.2

For mains that do not supply hydrants, sizes smaller than 6 in. (150 mm) shall be permitted to be used subject to the following restrictions:

The main supplies only automatic sprinkler systems, open sprinkler systems, water spray fixed systems, foam systems, or Class II standpipe systems.

Hydraulic calculations show that the main will supply the total demand at the appropriate pressure. Systems that are not hydraulically calculated shall have a main at least as large as the system riser.

5.1.3.3

Where a single main less than 4 in. (100 mm) in diameter serves both fire systems and other uses, the non-fire demand shall be added to the hydraulic calculations for the fire system at the point of connection unless provisions have been made to automatically isolate the non-fire demand during a fire event.

5.1.4 Underground Supply Pipe

For pipe schedule systems, the underground supply pipe shall be at least as large as the system riser.

5.1.5\* Water Supply Treatment

5.1.5.1

Water supplies and environmental conditions shall be evaluated for the existence of microbes and conditions that contribute to microbiologically influenced corrosion (MIC). Where conditions are found that contribute to MIC, the owner(s) shall notify the sprinkler system installer and a plan shall be developed to treat the system using one of the following methods:

Install a water pipe that will not be affected by the MIC microbes

Treat all water that enters the system using an approved bacterial inhibitor

Implement an approved plan for monitoring the interior conditions of the pipe at established time intervals and locations

Install corrosion monitoring station and monitor at established intervals

5.1.5.2

Water supplies and environmental conditions shall be evaluated for conditions that contribute to unusual corrosive properties. Where conditions are found that contribute to unusual corrosive properties, the owner(s) shall notify the sprinkler system installer and a plan shall be developed to treat the system using one of the following methods:

Install a water pipe that is corrosion resistant.

Treat water that enters the system using a listed corrosion inhibitor.

Implement an approved plan for monitoring the interior conditions of the pipe at established intervals and locations.

Install corrosion monitoring station and monitor at established intervals.

Fill dry-pipe or preaction systems with nitrogen as a supervisory gas to mitigate against corrosion.

When using a generator, use an approved nitrogen generator.

5.1.5.3

Where listed bacterial inhibitors and/or corrosion inhibitors are used, they shall be compatible with system components. Where used together, they shall also be compatible with each other.

5.1.6 Arrangement

5.1.6.1 Connection Between Underground and Aboveground Piping

5.1.6.1.1

The connection between the system piping and underground piping shall be made with a suitable transition piece and shall be properly strapped or fastened by approved devices.

5.1.6.1.2

Where required due to specific mechanical or environmental conditions, the transition piece shall be protected against possible damage from corrosive agents, solvent attack, or mechanical damage.

5.1.6.2\* Connection Passing Through or Under Foundation Walls

When system piping pierces a foundation wall below grade or is located under the foundation wall, clearance shall be provided to prevent breakage of the piping due to building settlement.

5.1.7\* Meters

Where meters are required by other authorities, they shall be listed.

5.1.8\* Connection From Waterworks System

5.1.8.1

The requirements of the public health authority having jurisdiction shall be determined and followed.

5.1.8.2

Where equipment is installed to guard against possible contamination of the public water system, such equipment and devices shall be listed for fire protection service.

5.2 Types

5.2.1\*

Water supplies for sprinkler systems shall be one of the following or any combination:

A connection to an approved public or private waterworks system in accordance with 5.2.2

A connection including a fire pump in accordance with 5.2.3

A connection to a water storage tank at grade or below grade installed in accordance with NFPA 22 and filled from an approved source

A connection to a pressure tank in accordance with 5.2.4 and filled from an approved source

A connection to a gravity tank in accordance with 5.2.5 and filled from an approved source

A penstock, flume, river, lake, pond, or reservoir in accordance with 5.2.6

\* A source of recycled or reclaimed water where the building owner (or their agent) has analyzed the source of the water and the treatment process (if any) that the water undergoes before being made available to the sprinkler system and determined that any materials, chemicals, or contaminants in the water will not be detrimental to the components of the sprinkler system it comes in contact with

5.2.2\* Connections to Waterworks Systems

5.2.2.1

A connection to a reliable waterworks system shall be an acceptable water supply source.

5.2.2.2\*

The volume and pressure of a public water supply shall be determined from waterflow test data or other approved method.

5.2.3\* Pumps

A single automatically controlled fire pump installed in accordance with NFPA 20 shall be an acceptable water supply source.

5.2.4 Pressure Tanks

5.2.4.1 Acceptability

5.2.4.1.1

A pressure tank installed in accordance with NFPA 22 shall be an acceptable water supply source.

5.2.4.1.2

Pressure tanks shall be provided with an approved means for automatically maintaining the required air pressure.

5.2.4.1.3

Where a pressure tank is the sole water supply, an approved trouble alarm shall also be provided to indicate low air pressure and low water level with the alarm supplied from an electrical branch circuit independent of the air compressor.

5.2.4.1.4

Pressure tanks shall not be used to supply other than sprinklers and hand hose attached to sprinkler piping.

5.2.4.2 Capacity

5.2.4.2.1

In addition to the requirements of 5.1.2, the water capacity of a pressure tank shall include the extra capacity needed to fill dry pipe or preaction systems where installed.

5.2.4.2.2

The total volume shall be based on the water capacity plus the air capacity required by 5.2.4.3.

5.2.4.3\* Water Level and Air Pressure

5.2.4.3.1

Pressure tanks shall be kept with a sufficient supply of water to meet the demand of the fire protection system as calculated in Chapter 27 for the duration required by , , or .

5.2.4.3.2

The pressure shall be sufficient to push all of the water out of the tank while maintaining the necessary residual pressure (required by Chapter 27) at the top of the system.

5.2.5 Gravity Tanks

An elevated tank installed in accordance with NFPA 22 shall be an acceptable water supply source.

5.2.6 Penstocks, Flumes, Rivers, or Lakes

Water supply connections from penstocks, flumes, rivers, lakes, or reservoirs shall be arranged to avoid mud and sediment and shall be provided with approved double removable screens or approved strainers installed in an approved manner.