



NATIONAL FIRE CODES®

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7.1 General.

This chapter shall provide requirements for correct use of sprinkler system components and hardware.

7.1.1 * Listing.

7.1.1.1

Materials or devices not specifically designated by this standard shall be used in accordance with all conditions, requirements, and limitations of their special listing.

7.1.1.1.1

All special listing requirements shall be included and identified in the product submittal literature and installation instructions.

7.1.1.2

Unless the requirements of 7.1.1.3, 7.1.1.4, or 7.1.1.5 are met, all materials and devices essential to successful system operation shall be listed.

7.1.1.2.1

Valve components (including valve trim, internal parts, gaskets, and the like) shall not be required to be individually listed.

7.1.1.3

Equipment as permitted in Table 7.3.1.1 and Table 7.4.1 shall not be required to be listed.

7.1.1.3.1

Nonmetallic pipe and fittings included in Table 7.3.1.1 and Table 7.4.1 shall be listed.

7.1.1.4

Materials meeting the requirements of 17.1.2, 17.1.6.2, 17.1.6.3, and 17.1.7.3 shall not be required to be listed.

7.1.1.5 *

Components that do not affect system performance shall not be required to be listed.

7.1.2 Rated Pressure.

System components shall be rated for the maximum system working pressure to which they are exposed but shall not be rated at less than 175 psi (12 bar) for components installed above ground and 150 psi (10 bar) for components installed underground.

7.2 Sprinklers.

7.2.1 * Sprinkler Identification.

All sprinklers shall be permanently marked with one or two English uppercase alphabetic characters to identify the manufacturer, immediately followed by three or four numbers, to uniquely identify a sprinkler as to K-factor, deflector characteristic, pressure rating, and thermal sensitivity.

7.2.2 Sprinkler Discharge Characteristics.

7.2.2.1 * General.

Unless the requirements of 7.2.2.2, 7.2.2.3, or 7.2.2.4 are met, the K-factor, relative discharge, and marking identification for sprinklers having different K-factors shall be in accordance with Table 7.2.2.1.

Table 7.2.2.1 Sprinkler Discharge Characteristics Identification

Nominal K-Factor [gpm/(psi) ^{1/2}]	Nominal K-Factor [L/min/(bar) ^{1/2}]	K-Factor Range [gpm/(psi) ^{1/2}]	K-Factor Range [L/min/(bar) ^{1/2}]	Percent of Nominal K-5.6 Discharge	Thread Type
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Nominal K-Factor [gpm/(psi) ^{1/2}]	Nominal K-Factor [L/min/(bar) ^{1/2}]	K-Factor Range [gpm/(psi) ^{1/2}]	K-Factor Range [L/min/(bar) ^{1/2}]	Percent of Nominal K-5.6 Discharge	Thread Type
1.4	20	1.3–1.5	19–22	25	½ in. (15 mm) NPT
1.9	27	1.8–2.0	26–29	33.3	½ in. (15 mm) NPT
2.8	40	2.6–2.9	38–42	50	½ in. (15 mm) NPT
4.2	60	4.0–4.4	57–63	75	½ in. (15 mm) NPT
5.6	80	5.3–5.8	76–84	100	½ in. (15 mm) NPT
8.0	115	7.4–8.2	107–118	140	¾ in. (20 mm) NPT or ½ in. (15 mm) NPT
11.2	160	10.7–11.7	159–166	200	½ in. (15 mm) NPT or ¾ in. (20 mm) NPT
14.0	200	13.5–14.5	195–209	250	¾ in. (20 mm) NPT
16.8	240	16.0–17.6	231–254	300	¾ in. (20 mm) NPT
19.6	280	18.6–20.6	272–301	350	1 in. (25 mm) NPT
22.4	320	21.3–23.5	311–343	400	1 in. (25 mm) NPT
25.2	360	23.9–26.5	349–387	450	1 in. (25 mm) NPT
28.0	400	26.6–29.4	389–430	500	1 in. (25 mm) NPT
33.6	480	31.9–35.3	456–504	600	1 ¼ in. (32 mm) NPT

Note: The nominal K-factor for dry-type sprinklers are used for sprinkler selection. See 28.2.4.10.3 for use of adjusted dry-type sprinkler K-factors for hydraulic calculation purposes.

7.2.2.2 Pipe Threads.

Listed sprinklers having pipe threads different from those shown in Table 7.2.2.1 shall be permitted.

7.2.2.3 K-Factors Greater than K-28.0 (400).

Sprinklers listed with nominal K-factors greater than K-28.0 (400) shall increase the flow by 100 percent increments when compared with a nominal K-5.6 (80) sprinkler.

7.2.2.4 Residential Sprinklers.

Residential sprinklers shall be permitted with K-factors other than those specified in Table 7.2.2.1.

7.2.2.5 CMSA and ESFR K-Factors.

Control mode specific application (CMSA) and early suppression fast-response (ESFR) sprinklers shall have a minimum nominal K-factor of K-11.2 (160).

7.2.2.6 ESFR K-Factor.

ESFR sprinkler K-factor shall be selected as appropriate for the hazard. (See Chapter 20.)

7.2.3 Occupancy Limitations.

Unless the requirements of 7.2.3.1 or 7.2.3.2 are met, sprinklers shall not be listed for protection of a portion of an occupancy classification.

7.2.3.1 Residential Sprinklers.

Residential sprinklers shall be permitted to be listed for portions of residential occupancies as defined in 12.1.1.

7.2.3.2 Special Sprinklers.

Special sprinklers shall be permitted to be listed for protection of a specific construction feature in a portion of an occupancy classification. (See Section 15.2.)

7.2.4 * Temperature Characteristics.

7.2.4.1 *

Automatic sprinklers shall have their frame arms, deflector, coating material, or liquid bulb colored in accordance with the requirements of Table 7.2.4.1(a) and Table 7.2.4.1(b) or the requirements of 7.2.4.2, 7.2.4.3, 7.2.4.4, or 7.2.4.5.

Table 7.2.4.1(a) Temperature Ratings, Classifications, and Color Codings for Glass Bulbs

Maximum Ceiling Temperature		Temperature Rating		Temperature Classification	Glass Bulb Colors
°F	°C	°F	°C		
100	38	135	57	Ordinary	Orange
120	49	155	68	Ordinary	Red
150	66	175	79	Intermediate	Yellow
150	66	200	93	Intermediate	Green
225	107	250–300	121–149	High	Blue
300	149	325–375	163–191	Extra high	Purple
375	191	400–475	204–246	Very extra high	Black
475	246	500–575	260–302	Ultra high	Black
625	329	650	343	Ultra high	Black

Table 7.2.4.1(b) Temperature Ratings, Classifications, and Color Codings for Fusible Links

Maximum Ceiling Temperature		Temperature Rating		Temperature Classification	Color Code
°F	°C	°F	°C		
100	38	135–170	57–77	Ordinary	Uncolored or black
150	66	175–225	79–107	Intermediate	White
225	107	250–300	121–149	High	Blue
300	149	325–375	163–191	Extra high	Red
375	191	400–475	204–246	Very extra high	Green
475	246	500–575	260–302	Ultra high	Orange
625	329	650	343	Ultra high	Orange

7.2.4.2

A dot on the top of the deflector, the color of the coating material, or colored frame arms shall be permitted for color identification of corrosion-resistant sprinklers.

7.2.4.3

Color identification shall not be required for ornamental sprinklers such as factory-plated or factory-painted sprinklers or for recessed, flush, or concealed sprinklers.

7.2.4.4

The frame arms of bulb-type sprinklers shall not be required to be color coded.

7.2.4.5

The liquid in bulb-type sprinklers shall be color coded in accordance with Table 7.2.4.1(a).

7.2.5 Special Coatings.

7.2.5.1 * Corrosion Resistant.

7.2.5.1.1

Listed corrosion-resistant sprinklers shall be installed in locations where chemicals, moisture, or other corrosive vapors sufficient to cause corrosion of such devices exist.

7.2.5.1.2 *

Unless the requirements of 7.2.5.1.3 are met, corrosion-resistant coatings shall be applied only by the manufacturer of the sprinkler and in accordance with the requirements of 7.2.5.1.3.

7.2.5.1.3

Any damage to the protective coating occurring at the time of installation shall be repaired at once using only the coating of the manufacturer of the sprinkler in the approved manner so that no part of the sprinkler will be exposed after installation has been completed.

7.2.5.2 * Painting.

Sprinklers shall only be painted by the sprinkler manufacturer.

7.2.5.3 Ornamental Finishes.

7.2.5.3.1

Ornamental finishes shall only be applied to sprinklers and, if applicable, their concealed cover plates, by the sprinkler manufacturer.

7.2.5.3.2

Sprinklers with ornamental finishes shall be specifically listed.

7.2.6 Escutcheons and Cover Plates.

7.2.6.1

Plates, escutcheons, or other devices used to cover the annular space around a sprinkler shall be metallic or listed for use around a sprinkler.

7.2.6.2 *

Escutcheons used with recessed or flush-type sprinklers shall be part of a listed sprinkler assembly.

7.2.6.3

Cover plates used with concealed sprinklers shall be part of the listed sprinkler assembly.

7.3 Aboveground Pipe and Tube.

7.3.1 General.

7.3.1.1

Pipe or tube shall meet or exceed one of the standards in Table 7.3.1.1 or be in accordance with 7.3.3.

Table 7.3.1.1 Pipe or Tube Materials and Dimensions

Materials and Dimensions	Standard
Ferrous Piping (Welded and Seamless)	

Materials and Dimensions	Standard
<i>Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use</i>	ASTM A795/A795M
<i>Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless</i>	ASTM A53/A53M
<i>Welded and Seamless Wrought Steel Pipe</i>	ASME B36.10M
<i>Standard Specification for Electric-Resistance-Welded Steel Pipe</i>	ASTM A135/A135M
Copper Tube (Drawn, Seamless)	
<i>Standard Specification for Seamless Copper Tube</i>	ASTM B75/B75M
<i>Standard Specification for Seamless Copper Water Tube</i>	ASTM B88
<i>Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube</i>	ASTM B251
<i>Standard Specification for Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube</i>	ASTM B813
<i>Specification for Filler Metals for Brazing and Braze Welding (Classification BCuP-3 or BCuP-4)</i>	AWS A5.8M/A5.8
<i>Standard Specification for Solder Metal, Section 1: Solder Alloys Containing Less Than 0.2% Lead and Having Solidus Temperatures Greater than 400°F</i>	ASTM B32
<i>Alloy Materials</i>	ASTM B446
CPVC	
<i>Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)</i>	ASTM F442/F442M
Brass Pipe	
<i>Standard Specification for Seamless Red Brass Pipe, Standard Sizes</i>	ASTM B43
Stainless Steel	
<i>Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes</i>	ASTM A312/A312M

7.3.2 * Nonmetallic Pipe and Tubing.

7.3.2.1

Nonmetallic pipe in accordance with Table 7.3.1.1 shall be investigated for suitability in automatic sprinkler installations and listed for this service.

7.3.2.1.1

Other types of nonmetallic pipe or tube investigated for suitability in automatic sprinkler installations and listed for this service, including but not limited to CPVC, and differing from that provided in Table 7.3.1.1 shall be permitted where installed in accordance with their listing limitations.

7.3.2.1.2

Manufacturer's installation instructions shall include its listing limitations.

7.3.2.2

Nonmetallic pipe shall not be listed for portions of an occupancy classification.

7.3.3 * Listed Metallic Pipe and Tubing.

7.3.3.1

Other types of pipe or tube investigated for suitability in automatic sprinkler installations and listed for this service, including steel, and differing from that provided in Table 7.3.1.1 shall be permitted where installed in accordance with their listing limitations, including installation instructions.

7.3.3.2

Pipe or tube shall not be listed for portions of an occupancy classification.

7.3.4 Pipe and Tube Identification.

7.3.4.1 *

All pipe shall be marked along its length by the manufacturer in such a way as to properly identify the type of pipe.

7.3.4.2

The marking shall be visible on every piece of pipe over 2 ft (600 mm) long.

7.3.4.3

Pipe identification shall include the manufacturer's name, model designation, or schedule.

7.4 Fittings.

7.4.1

Fittings used in sprinkler systems shall meet or exceed the standards in Table 7.4.1 or be in accordance with 7.4.2 or 7.4.4.

Table 7.4.1 Fittings Materials and Dimensions

Materials and Dimensions	Standard
Cast Iron	
<i>Gray Iron Threaded Fittings, Classes 125 and 250</i>	ASME B16.4
<i>Gray Iron Pipe Flanges and Flanged Fittings, Classes 25, 125, and 250</i>	ASME B16.1
Malleable Iron	
<i>Malleable Iron Threaded Fittings, Classes 150 and 300</i>	ASME B16.3
Steel	
<i>Factory-Made Wrought Buttwelding Fittings</i>	ASME B16.9
<i>Buttwelding Ends</i>	ASME B16.25
<i>Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service</i>	ASTM A234/A234M
<i>Pipe Flanges and Flanged Fittings, NPS ½ through NPS 24 Metric/Inch Standard</i>	ASME B16.5
<i>Forged Fittings, Socket-Welding and Threaded</i>	ASME B16.11
Copper	
<i>Wrought Copper and Copper Alloy Solder Joint Pressure Fittings</i>	ASME B16.22
<i>Cast Copper Alloy Solder Joint Pressure Fittings</i>	ASME B16.18
CPVC	
<i>Standard Specification for Threaded Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80</i>	ASTM F437
<i>Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40</i>	ASTM F438
<i>Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80</i>	ASTM F439
Bronze Fittings	
<i>Cast Copper Alloy Threaded Fittings, Classes 125 and 250</i>	ASME B16.15
Stainless Steel	
<i>Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings</i>	ASTM A403/A403M

7.4.2

In addition to the standards in Table 7.4.1, nonmetallic fittings shall also be in accordance with 7.4.4.

7.4.3 Nonmetallic Fittings.

Nonmetallic fittings in accordance with Table 7.4.1 shall be investigated for suitability in automatic sprinkler installations and listed for this service. Listed nonmetallic fittings shall be installed in accordance with their listing limitations, including installation instructions.

7.4.4 *

Other types of fittings investigated for suitability in automatic sprinkler installations and listed for this service, including but not limited to CPVC and steel, and differing from that provided in Table 7.4.1 shall be permitted when installed in accordance with their listing limitations, including installation instructions.

7.4.5 Flexible Sprinkler Hose Fittings.

Listed flexible sprinkler hose fittings and their anchoring components intended for use in installations connecting the sprinkler system piping to a sprinkler shall be installed in accordance with their listing and manufacturer's instructions.

7.5 Joining of Pipe and Fittings.

7.5.1 Threaded Pipe and Fittings.

7.5.1.1

All threaded pipe and fittings shall have threads cut to ASME B1.20.1, *Pipe Threads, General Purpose, Inch*.

7.5.1.2 *

Steel pipe with wall thicknesses less than Schedule 30 [in sizes 8 in. (200 mm) and larger] or Schedule 40 [in sizes less than 8 in. (200 mm)] shall only be permitted to be joined by threaded fittings where the threaded assembly is investigated for suitability in automatic sprinkler installations and listed for this service.

7.5.1.3

Joint compound or tape shall be applied only to male threads.

7.5.2 Welded Pipe and Fittings.

7.5.2.1 General.

7.5.2.1.1

Welding shall be permitted as a means of joining sprinkler piping in accordance with 7.5.2.2 through 7.5.2.6.

7.5.2.2 * Fabrication.

7.5.2.2.1

When welding sprinkler pipe, the pipe shall be shop welded unless the requirements of 7.5.2.2 or 7.5.2.3 are met.

7.5.2.2.1.1

Repair of weld leaks on site shall be permitted provided the repairs are performed in accordance with 7.5.2.2.2 and 7.5.2.5.

7.5.2.2.2

Where the design specifications require any part of the piping system to be welded in place, welding of sprinkler piping shall be permitted where the welding process is performed in accordance with NFPA 51B and the fittings required by Section 16.6 are provided.

7.5.2.2.3

Tabs for longitudinal earthquake bracing shall be permitted to be welded to in-place piping where the welding process is performed in accordance with NFPA 51B.

7.5.2.2.4

Welding shall not be performed where there is impingement of rain, snow, sleet, or high wind on the weld area of the pipe product.

7.5.2.3 Fittings.

7.5.2.3.1 *

Welded fittings used to join pipe shall be listed fabricated fittings or manufactured in accordance with Table 7.4.1.

7.5.2.3.2

Fittings referenced in 7.5.2.3.1 shall be joined in conformance with a qualified welding procedure as set forth in this section and shall be an acceptable product under this standard, provided that materials and wall thickness are compatible with other sections of this standard.

7.5.2.3.3

Fittings shall not be required where pipe ends are butt welded in accordance with the requirements of 7.5.2.4.3.

7.5.2.3.4

When the pipe size in a run of piping is reduced, a reducing fitting designed for that purpose shall be used in accordance with the requirements of 7.5.2.3.1.

7.5.2.4 Welding Requirements.

7.5.2.4.1 *

Welds between pipe and welding outlet fittings shall be permitted to be attached by full penetration welds, partial penetration groove welds, or fillet welds.

7.5.2.4.2 *

Where fillet welded joints are used, the minimum throat thickness shall be not less than the thickness of the pipe, the thickness of the welding fitting, or $\frac{3}{16}$ in. (5 mm), whichever is least.

7.5.2.4.3 *

Circumferential butt joints shall be cut, beveled, and fit so that full penetration is achievable.

7.5.2.4.4

Full penetration welding shall not be required.

7.5.2.4.5

Where slip-on flanges are welded to pipe with a single fillet weld, the weld shall be on the hub side of the flange and the minimum throat weld thickness shall not be less than 1.25 times the pipe wall thickness or the hub thickness, whichever is less.

7.5.2.4.6

Face welds on the internal face of the flange shall be permitted as a water seal in addition to the hub weld required in 7.5.2.4.5.

7.5.2.4.7

Tabs for longitudinal earthquake bracing shall have minimum throat weld thickness not less than 1.25 times the pipe wall thickness and welded on both sides of the longest dimension.

7.5.2.4.8 *

When welding is performed, the following shall apply:

- (1) Holes in piping for outlets shall not be less than the full inside diameter of fittings prior to welding in place of the fittings.
- (2) Coupons shall be retrieved.
- (3) Openings cut into piping shall be smooth bore, and all internal slag and welding residue shall be removed.
- (4) Fittings shall not penetrate the internal diameter of the piping.
- (5) Steel plates shall not be welded to the ends of piping or fittings.
- (6) Fittings shall not be modified.
- (7) Nuts, clips, eye rods, angle brackets, or other fasteners shall not be welded to pipe or fittings, except as permitted in 7.5.2.2.3 and 7.5.2.4.7.
- (8) Completed welds shall be free from cracks, incomplete fusion, surface porosity greater than $\frac{1}{16}$ in. (1.6 mm) diameter, and undercut deeper than 25 percent of the wall thickness or $\frac{1}{32}$ in. (0.8 mm), whichever is less.
- (9) Completed circumferential butt weld reinforcement shall not exceed $\frac{3}{32}$ in. (2 mm).
- (10) After completion of the weld for fittings directly connected to a sprinkler, the inside diameter of the entrance from the pipe into the weld shall not be less than the inside diameter of the fitting.

7.5.2.5 Qualifications.

7.5.2.5.1

A welding procedure shall be prepared and qualified by the contractor or fabricator before any welding is done.

7.5.2.5.2

Qualification of the welding procedure to be used and the performance of all welders and welding operators shall be required and shall meet or exceed the requirements of AWS B2.1/B2.1M, *Specification for Welding Procedure and Performance Qualification*; ASME *Boiler and Pressure Vessel Code*, Section IX, "Welding, Brazing, and Fusing Qualifications"; or other applicable qualification standard as required by the authority having jurisdiction, except as permitted by 7.5.2.5.3.

7.5.2.5.3

Successful procedure qualification of complete joint penetration groove welds shall qualify partial joint penetration (groove/fillet) welds and fillet welds in accordance with the provisions of this standard.

7.5.2.5.4

Welding procedures qualified under standards recognized by previous editions of this standard shall be permitted to be continued in use.

7.5.2.5.5

Contractors or fabricators shall be responsible for all welding they produce.

7.5.2.5.6

Each contractor or fabricator shall have available to the authority having jurisdiction an established written quality assurance procedure ensuring compliance with the requirements of 7.5.2.4.

7.5.2.6 Records.**7.5.2.6.1**

Welders or welding machine operators shall, upon completion of each welded pipe, place their identifiable mark or label onto each piece adjacent to a weld.

7.5.2.6.2

Contractors or fabricators shall maintain certified records, which shall be available to the authority having jurisdiction, of the procedures used and the welders or welding machine operators employed by them, along with their welding identification.

7.5.2.6.3

Records shall show the date and the results of procedure and performance qualifications.

7.5.3 Groove Joining Methods.**7.5.3.1 ***

Pipe, fittings, valves, and devices to be joined with grooved couplings shall contain cut, rolled, or cast grooves that are dimensionally compatible with the couplings.

7.5.3.1.1 *

Pipe, fittings, valves, devices, and couplings that conform with or are listed in compliance with standardized groove specifications shall be considered compatible.

7.5.3.1.2

Other groove dimensions and grooving methods shall be acceptable in accordance with 7.5.5.1.

7.5.3.2

Grooved couplings, including gaskets used on dry pipe, preaction, and deluge systems, shall be listed for dry service.

7.5.4 * Brazed and Soldered Joints.**7.5.4.1**

Solder joints, where permitted, shall be fabricated in accordance with the methods and procedures listed in ASTM B828, *Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings*.

7.5.4.2

Unless the requirements of 7.5.4.3 or 7.5.4.4 are met, joints for the connection of copper tube shall be brazed.

7.5.4.3

Solder joints shall be permitted for exposed wet pipe systems in light hazard occupancies where the temperature classification of the installed sprinklers is of the ordinary- or intermediate-temperature classification.

7.5.4.4

Solder joints shall be permitted for wet pipe systems in light hazard and ordinary hazard (Group 1) occupancies where the piping is concealed, irrespective of sprinkler temperature ratings.

7.5.4.5 *

Soldering fluxes shall be in accordance with Table 7.3.1.1.

7.5.4.6

Brazing fluxes, if used, shall not be of a highly corrosive type.

7.5.5 Other Joining Methods.**7.5.5.1**

Other joining methods investigated for suitability in sprinkler installations and listed for this service shall be permitted where installed in accordance with their listing limitations, including installation instructions.

7.5.5.2 Outlet Fittings.

Rubber-gasketed outlet fittings that are used on sprinkler systems shall meet the following requirements:

- (1) Be installed in accordance with the listing and manufacturer's installation instructions
- (2) Have all coupons retrieved
- (3) Have smooth bores cut into the pipe, with all cutting residue removed
- (4) Not be modified

7.5.6 End Treatment.**7.5.6.1**

After cutting, pipe ends shall have burrs and fins removed.

7.5.6.2

Pipe used with listed fittings and its end treatment shall be in accordance with the fitting manufacturer's installation instructions and the fitting's listing.

7.6 Valves.**7.6.1 Valve Closure Time.**

Listed indicating control valves shall not close in less than 5 seconds when operated at maximum possible speed from the fully open position.

7.6.2 Automated Valves.

A listed indicating control valve with automated controls shall be permitted.

7.6.2.1

A listed automated water control valve assembly with a reliable position indication connected to a remote supervisory station shall be permitted.

7.6.2.2

An automated water control valve shall be able to be operated manually as well as automatically.

7.6.3 * Automatic Breach Control Valves.

Automatic breach control valves shall not be installed on any sprinkler system.

7.7 Waterflow Alarm Devices.**7.7.1 ***

Mechanical waterflow alarm devices shall be listed for the service and so constructed and installed that any flow of water from a sprinkler system equal to or greater than that from a single automatic sprinkler of the smallest K-factor installed on the system will result in an audible alarm on the premises within 5 minutes after such flow begins and until such flow stops.

7.7.2 *

Electrical waterflow alarm devices shall be listed for the service and so constructed and installed that any flow of water from a sprinkler system equal to or greater than that from a single automatic sprinkler of the smallest K-factor installed on the system will result in an audible alarm on the premises within 100 seconds after such flow begins and until such flow stops.

7.8 Additives and Coatings.

7.8.1

Additives to the water supply intended for control of microbiological or other corrosion shall be listed for use within fire sprinkler systems.

7.8.2

Internal pipe coatings, excluding galvanizing, intended for control of microbiological or other corrosion shall be listed for use within fire sprinkler systems.

7.8.3 *

Additives to the air supply for control of corrosion shall be listed for use within fire sprinkler systems.

7.9 Automated Inspection and Testing Devices and Equipment.

7.9.1

Automated inspection devices and equipment shall be shown to be as effective as a manual examination.

7.9.2

Automated testing devices and equipment shall produce the same action required by this standard and NFPA 25 to test a device.

7.9.2.1

The installation of testing device or component shall be arranged to discharge water where required by this standard and NFPA 25.

7.9.3

Failure of automated inspection and testing devices and equipment shall not impair the operation of the system unless indicated by an audible and visual supervisory signal in accordance with *NFPA 72* or other approved fire alarm code.

7.9.4

Failure of a system or component to pass automated inspection and testing devices and equipment shall result in an audible and visual supervisory signal in accordance with *NFPA 72* or other approved fire alarm code.

7.9.5

Failure of automated inspection and testing devices and equipment shall result in an audible and visual trouble signal in accordance with *NFPA 72* or other approved fire alarm code.

7.10 Air Supplies.

Where an air compressor is dedicated for the sprinkler system, the air compressor shall be listed for fire protection.