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14

STANDPIPE AND HOSE SYSTEMS 1976

NATIONAL FIRE PROTECTION ASSOCIATION
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Standard for the Installation of
Standpipe and Hose Systems

NFPA 14 — 1976

1976 Edition of NFPA 14

This edition of NFPA 14 supersedes the 1974 edition. It incorporates amendments recommended by the Committee on Standpipes and Outside Protection and adopted at the 1976 NFPA Annual Meeting.

Changes other than editorial are denoted by a vertical line in the margin of the pages in which they appear.

Origin and Development of NFPA 14

This standard dates from 1912 when an initial report was made by the Committee on Standpipe and Hose Systems. The report was amended in 1914 and adopted by the Association in 1915. Revisions were adopted in 1917. Next revisions were presented by the Committee on Field Practice and adopted in 1926, 1927, 1931, 1938 (included action by Board of Directors), 1941 and 1945. The Committee on Standpipes and Outside Protection recommended revisions adopted in 1949, 1952, 1963, 1968, 1969, 1970, 1971, 1973, 1974, and 1976. The 1974 edition of this standard was approved by the American National Standards Institute as an American National Standard and designated Z273.1–1974. The 1976 edition will also be submitted for similar approval.

Interpretation Procedure of the Committee on Standpipes and Outside Protection

Those desiring an interpetation shall supply the Chairman with five identical copies of a statement in which shall appear specific reference to a single problem, paragraph, or section. Such a statement shall be on the business stationery of the inquirer and shall be duly signed.

When applications involve actual field situations they shall so state and all parties involved shall be named.

The Interpretations Committee will reserve the prerogative to refuse consideration of any application that refers specifically to proprietary items of equipment or devices. Generally inquiries should be confined to interpretation of the literal text or the intent thereof.

Requests for interpretations should be addressed to the National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.

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This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.

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Standard for the Installation of

Standpipe and Hose Systems

NFPA 14 – 1976

Notice: An asterisk (*) preceding the number or letter designating a subdivision indicates explanatory material on that subdivision in Appendix A.

Chapter 1 General Information

1-1 Scope. This standard covers the minimum requirements for the installation of standpipe and hose systems for buildings and structures.

1-2 Purpose. The purpose of this standard is to provide a reasonable degree of protection for life and property from fire through installation requirements for standpipe systems based upon sound engineering principles, test data and field experience.

1-3 Definition of a Standpipe System. A standpipe system is an arrangement of piping, valves, hose outlets and allied equipment installed in a building or structure with outlets located in such a manner that water can be discharged in streams or spray patterns through hose and nozzles, attached to such hose outlets, for the purpose of extinguishing a fire and so protecting a building or structure and its contents in addition to protecting the occupants. This is accomplished by connections to water supply systems or by pumps, tanks and other equipment necessary to provide an adequate supply of water to the hose outlets.

1-4 Efficiency. Standpipe systems which are properly designed, equipped, and maintained are one of the best internal means for extinguishing fires in buildings and structures. Even in buildings equipped with automatic sprinkler systems, standpipes may be a necessary complement. The standpipe system furnishes a reliable means of obtaining effective fire streams in the shortest possible time in places such as the upper stories of high buildings or large-area, low-height buildings, and in other structures where construction, size, or other features limit the use of hose streams from the exterior.

1-5 Units. Metric units of measurement in this standard are in accordance with the modernized metric system known as the International System of Units (SI). Two units (litre and bar), outside of but recognized by SI, are commonly used in international fire protection. These units are listed in Table 1-5 with conversion factors.

1-5.1 If a value for measurement as given in this standard is followed by an equivalent value in other units, the first stated is to be regarded as the requirement. A given equivalent value may be approximate.

Table 1-5

Name of Unit	Unit Symbol	Conversion Factor
metre	m	1 ft. = 0.305 m
millimetre	mm	1 in. = 25.4 mm
litre	*l*	1 gal. = 3.785 *l*
cubic decimetre	dm^3	1 gal. = 3.785 dm^3
pascal	Pa	1 psi = 6894.757 Pa
bar	bar	1 psi = 0.0689 bar
bar	bar	1 bar = 10^5 Pa

For additional conversions and information see ANSI Z210.1–1973, Metric Practice Guide.

1-6 Class of Service.

1-6.1 Standpipe systems may be grouped into three general classes of service for the intended use in the extinguishment of fire.

1-6.1.1 Class I: For use by fire departments and those trained in handling heavy fire streams (2½-inch hose).

***1-6.1.2** Class II: For use primarily by the building occupants until the arrival of the fire department (1½-inch hose).

1-6.1.3 Class III: For use by either fire departments and those trained in handling heavy hose streams or by the building occupants.

1-6.2 Class I service shall be capable of furnishing the effective fire streams required during the more advanced stages of fire on the inside of buildings or for exposure fire protection.

1-6.3 Class II service shall afford a ready means for the control of incipient fires by the occupants of buildings during working hours, and by watchmen and those present during the nighttime and holidays.

1-6.4 Class III service shall be capable of furnishing Class I as well as Class II service.

1-6.5 Standpipe and hose systems not required by the authority having jurisdiction and not meeting the requirements of this standard shall be marked "FOR FIRE BRIGADE USE ONLY."

1-7 Type of System.

1-7.1 Standpipe systems may be of the following types subject to the approval of the authority having jurisdiction.

1-7.1.1 Wet standpipe system having supply valve open and water pressure maintained at all times.

1-7.1.2 Standpipe system so arranged through the use of approved devices as to admit water to the system automatically by opening a hose valve.

1-7.1.3 Standpipe system arranged to admit water to the system through manual operation of approved remote control devices located at each hose station.

1-7.1.4 Dry standpipe having no permanent water supply.

1-8 Combined Systems.

1-8.1 A combined system is one where the water piping serves both 2½-inch outlets for fire department use and outlets for automatic sprinklers. Such combined systems shall comply with the requirements of NFPA 13–1975, *Standard for the Installation of Sprinkler Systems*, in regard to the automatic sprinkler portions of the system, and with NFPA 14 in regard to sizing of vertical risers and water supplies. When the building is completely sprinklered, the risers may be sized by hydraulic calculations.

1-8.2 The water supply for a combined system shall comply with the requirements given in 5-3.1. When the building is completely sprinklered, the water supplies shall comply with 1-8.3.

*__1-8.3__ The minimum water supplies for a combined system for a light hazard high-rise occupancy building (completely sprinklered) shall be 500 gallons per minute (1893 *l*/min). The minimum

water supply for other types of high-rise buildings (completely sprinklered) shall be 1000 gallons per minute (3785 *l*/min).

1-8.4 In combined systems, when the building is completely sprinklered, 1½-inch hose for use by the building occupants (Class II service) may be omitted, subject to the approval of the authority having jurisdiction, provided that each standpipe outlet location is equipped with a 2½-inch hose valve, a 2½-inch by 1½-inch reducer, and a cap with attachment chain.

1-8.5 Each connection from a combined riser to the sprinkler system shall have an individual control valve of the same size as the connection.

1-9 Approved Devices. All devices and materials used in standpipe systems shall be of approved type.

1-10 Closets and Cabinets.

1-10.1 Closets and cabinets used to contain fire hose shall be of sufficient size to permit the installation of the necessary equipment at hose stations, and so designed as not to interfere with the prompt use of the hose valves, the hose, and other equipment at the time of fire. Within the cabinet, the hose valves shall be located such that there is at least 1 inch (25 mm) between any part of the cabinet and the handle of the valve when the valve is in any position from fully open to fully closed. The cabinet shall be used for fire equipment only and each shall be conspicuously identified.

1-10.2 Where a "break glass" type protective cover for a latching device is provided, the maximum area of the glass panel shall not exceed 25 square inches (0.016 m^2). The device provided to break the glass panel shall be securely attached in the immediate area of the "break glass" panel and shall be so arranged that the device cannot be used to break other glass panels in the cabinet door.

1-11 Plans and Specifications.

1-11.1 Plans showing the location, sizes and connections of the fixed portion of the standpipe system shall be furnished the authority having jurisdiction. The plans shall be drawn to scale, and shall include the details necessary to indicate clearly all of the equipment and its arrangement. The plans shall be accompanied by specifications covering the character of the material and the features relating to the installation in detail.

1-11.2 In combined systems when the building is completely sprinklered, and risers are sized by hydraulic calculations, a complete set of all calculations shall be submitted when requested by the authority having jurisdiction.

1-11.3 A complete set of "as-built" drawings and calculations shall be furnished by the installation company, when requested by the authority having jurisdiction, at the time of completion of the systems.

1-12 Experienced Workmen. The installation of standpipe systems shall be entrusted to none but fully experienced workmen. They shall be installed by responsible parties equipped to do the work under the approved detailed plans and specifications.

Chapter 2 Size and Arrangement of Standpipes

*2-1 Design Basis.

2-1.1 The size of standpipes in a given case is governed by the size and number of fire streams likely to be needed simultaneously and by the distance of the outlets from the source of water supply.

2-1.2 In standpipe systems for Class I and Class III services, each standpipe shall be sized for a minimum flow of 500 gallons per minute (1893 *l*/min). Where only one standpipe is required, its supply piping shall be sized for a minimum flow of 500 gallons per minute (1893 *l*/min). Where more than one standpipe is required, all common supply piping shall be sized for a minimum flow of 500 gallons per minute (1893 *l*/min) for the first standpipe plus 250 gallons per minute (946 *l*/min) for each additional standpipe, the total not to exceed 2500 gallons per minute (9463 *l*/min).

2-1.2.1 Standpipes not exceeding 100 feet (30.5 m) in height shall be at least 4 inches in size.

2-1.2.2 Standpipes in excess of 100 feet (30.5 m) in height shall be at least 6 inches in size.

2-1.2.3 Standpipes shall be limited to 275 feet (83.9 m) of height, and buildings in excess of 275 feet (83.9 m) of height shall be zoned accordingly except as provided for in 2-1.3.

2-1.3 Standpipe zone heights exceeding 275 feet (83.9 m) may be permitted when a listed pressure regulating device, which controls nozzle pressure under both flow and no flow conditions, is installed at each outlet and

2-1.3.1 the maximum zone height is not more than 400 feet(122 m);

2-1.3.2 the pressure regulating device is arranged to regulate pressure at the hose valve outlet to a pressure not exceeding 100 psi (6.9 bars);

2-1.3.3 the pressure on the inlet side of the pressure regulating device does not exceed working pressure rating of the device;

2-1.3.4 all other pipe fittings, and devices, on the system are rated for not less than the maximum system pressure.

2-1.4 The minimum size of risers for combined systems shall be six inches, except when the building is completely sprinklered, the risers may be hydraulically calculated (*see 1-8.1*) in accordance with Chapter 7 of NFPA 13–1975, *Standard for the Installation of Sprinkler Systems.*

2-1.5 Each zone requiring pumps shall be provided with a separate pump but this shall not preclude the use of pumps arranged in series.

2-1.6 Where pumps supplying two or more zones are located at the same level, each zone shall have separate and direct supply piping not less than 8 inches in size. Zones with two or more standpipes shall have at least two direct supply pipes at least 8 inches in size.

2-1.7 Where supply for each zone is pumped from the next lower zone, and the standpipe or standpipes in the lower zone are used to supply the higher zone, such risers shall comply with the provisions for supply lines in 2-1.6. At least two lines shall be provided between zones; one of these lines shall be arranged so that supply can be automatically delivered from the lower to the higher zone.

2-1.8 For systems with two or more zones in which portions of a second and higher zones cannot be supplied with residual pressure of 65 psi (4.5 bars) by fire department pumpers through a fire department connection, another alternate means of supply shall be provided. This may be in the form of high level water storage with additional pumping equipment or other means acceptable to the authority having jurisdiction.

2-1.9 An approved means of maintaining a positive pressure on all zones of standpipe systems shall be provided.

2-1.10 In standpipe systems for Class II service each standpipe shall be sized for a minimum flow of 100 gallons per minute (379 *l*/min). Where one or more standpipes are required, all common supply piping shall be sized for a minimum flow of 100 gallons per minute (379 *l*/min).

2-1.10.1 Standpipes not exceeding 50 feet (15.2 m) in height shall be at least 2 inches in size.

2-1.10.2 Standpipes in excess of 50 feet (15.2 m) in height shall be at least 2½ inches in size.

Chapter 3 Number and Location of Standpipes and Hose Connections

3-1 Factors Governing. The number and arrangement of standpipe equipment necessary for proper protection is governed by the local conditions such as occupancy, character and construction of building, exterior exposures and accessibility. The authority having jurisdiction shall be consulted as to special requirements.

3-2 Number of Standpipes.

*3-2.1 The number of hose stations for Class I and Class III services in each building and in each section of a building divided by fire walls shall be such that all portions of each story of the building are within 30 feet (9.2 m) of a nozzle attached to not more than 100 feet (30.5 m) of hose.

*3-2.2 The number of hose stations for Class II service in each building and each section of a building divided by fire walls shall be such that all portions of each story of the building are within 30 feet (9.2 m) of a nozzle when attached to not more than 100 feet (30.5 m) of hose.

*3-3 Location of Standpipes.

3-3.1 Where a building is within 60 ft. (18.3 m) of exposing buildings, standpipes for large streams shall be located so as to afford protection to the interior of the building from exterior exposures.

3-3.2 Standpipes shall be so located that they are protected against mechanical and fire damage.

3-3.3 Dry standpipes shall not be concealed in building walls or built into pilasters.

3-3.4 In buildings divided by numerous partitions, standpipes shall be so located that the streams can be brought to bear in any room.

3-3.5 In buildings having large areas the standpipes may be located at interior columns.

3-4 Hose Connections.

*3-4.1 Standpipes for Class I service shall be provided with 2½-inch hose connections on each floor. At least one roof outlet

shall be provided on structures having combustible roofs, or where there are structures on the roof of combustible construction or housing combustible contents, or where needed for exposure protection. When required by the authority having jurisdiction, an approved duplex gated roof outlet shall be provided for testing and maintenance.

3-4.2 Standpipes for Class II service shall be provided with 1½-inch hose connections on each floor.

3-4.3 Standpipes for Class III service shall be provided with both a 2½-inch and 1½-inch hose connection on each floor. The hose connections may be through one 2½-inch hose valve and an easily removable 2½-inch by 1½-inch adapter. At least one 2½-inch roof outlet shall be provided on structures having combustible roofs or where there are structures on the roof of combustible construction or housing combustible contents, or where needed for exposure protection. When required by the authority having jurisdiction, an approved duplex gated roof outlet shall be provided for testing and maintenance.

Chapter 4 Hose Outlets

4-1 Location of Hose.

*4-1.1 Hose outlets shall be within easy reach of a person standing on the floor and in no case shall be over six feet (1.8 m) from the floor. Hose stations shall be located conspicuously within the immediate area and where not likely to be obstructed.

4-1.2 Valves of approved indicating type shall be provided at the main riser for controlling branch lines for Class II service supplying more than one hose station so that in the event that the branch is broken during the fire, the fire department may shut off this branch, conserving the water for their use.

4-2 Hose.

4-2.1 Each hose outlet provided for use of building occupants (Class II and III services) shall be equipped with not more than 100 feet (30.5 m) of approved lined, 1½-inch fire hose attached and ready for use. (*See NFPA 196–1974, Standard for Fire Hose.*)

Exception: Unlined hose may be used on existing standpipe installations made prior to June 1976.

4-3 Hose Racks.

*4-3.1 Each station provided with 1½-inch hose shall be equipped with a listed rack or other approved storage facility.

4-3.2 Each rack for 1½-inch hose shall be provided with a label affixed to include "Fire Hose for Use by Occupants" and operating instructions.

4-4 Hose Valves.

4-4.1 An approved hose valve shall be provided at each outlet for attachment of hose.

*4-4.2 Where the pressure at any standpipe outlet exceeds 100 pounds per square inch (6.9 bars), an approved device shall be installed at the outlet to reduce the pressure with required flow at the outlet to 100 pounds per square inch (6.9 bars). For Class

I and Class III systems the approved device shall not be capable of being adjusted to provide pressures higher than 100 psi (6.9 bars) if available, unless specified by the fire department. If a pressure greater than 150 psi (10.3 bars) is available, an appropriate warning sign shall be provided.

4-4.3 Each hose valve having unlined hose shall be provided with a listed automatic drip connection so installed that any slight leakage past the valve seat will be prevented from entering the hose. (*See Exception 4-2.1.*)

4-4.4 The hose outlet at each hose valve shall have threads conforming to those used by the public fire department. American National Fire Hose Connection Screw Threads shall be used whenever they will fit existing equipment.

NOTE: See *Standard for Screw Threads and Gaskets for Fire Hose Connections*, NFPA 194–1974.

4-5 Nozzles.

4-5.1 Nozzles shall be of an approved type and have a discharge (K) coefficient not exceeding 7.5.

NOTE: K is discharge coefficient in formula $Q = K\sqrt{P}$ where Q is discharge in gpm and p is pressure in psi.

***4-5.2** Shutoff nozzles shall not be provided when the pressure at the hose valves exceeds 200 pounds per square inch (13.8 bars) unless a listed pressure regulating device which regulates pressure under both flow and no flow conditions is installed.

4-6 Dry Standpipe Identification.

4-6.1 Each hose outlet on dry standpipes shall be provided with a conspicuous, durable and permanently legible sign reading "Dry Standpipe for Fire Department Use Only."

Chapter 5 Water Supplies

5-1 Factors Governing.

5-1.1 The water supply requirements for standpipe systems are dependent upon the size and number of fire streams likely to be needed at any fire, and the length of time such streams will have to be used. Both of these factors are largely influenced by the conditions at the building or plant to be equipped and it is necessary that the probable number of standard streams for the protection of both interior and exterior of the building be carefully ascertained before the water supply is decided upon. The selection of water supplies for each installation shall be determined in cooperation with the authority having jurisdiction.

5-2 Character of Water Supplies.

5-2.1 Standpipe systems, other than dry standpipes, shall have an approved water supply. A single source of supply may be acceptable where it is capable of automatically supplying all of the fire streams required for the full protection of the property for the required period. In some cases, more than a single water supply may be necessary.

5-2.2 Acceptable water supplies may be:

5-2.2.1 Public waterworks system where pressure and discharge capacity are adequate.

5-2.2.2 Automatic fire pumps.

5-2.2.3 Manually controlled fire pumps in combination with pressure tanks.

5-2.2.4 Pressure tanks.

5-2.2.5 Gravity tanks.

5-2.2.6 Manually controlled fire pumps operated by remote control devices at each hose station. (*See 1-7.1.3.*)

NOTE: See *Standard for Water Tanks for Private Fire Protection*, NFPA 22–1976 and *Standard for the Installation of Centrifugal Fire Pumps*, NFPA 20–1976.

5-2.3 At least one water supply shall be automatic and capable of supplying the streams first operated until the secondary sources can be brought into action.

5-2.4 Supply for Class I and Class III services shall be capable of furnishing the number of streams and durations required in 5-3 and 5-5. These minimums may be increased by the authority having jurisdiction.

5-2.5 Where the system will supply sprinklers in addition to standpipes, the water supply requirements of both shall be considered.

NOTE: See also *Standard for the Installation of Sprinkler Systems*, NFPA 13–1975.

5-2.6 Where connections are made from public waterworks systems it may be necessary to guard against possible contamination of the public supply. The requirements of the public health authority shall be determined and followed.

5-3 Minimum Supply for Class I Service.

5-3.1 The minimum supply for Class I service shall be sufficient to provide 500 gallons per minute (1893 *l*/min) for a period of at least thirty (30) minutes.

Where more than one standpipe is required, the minimum supply shall be 500 gallons per minute (1893 *l*/min) for the first standpipe and 250 gallons per minute (946 *l*/min) for each additional standpipe, the total supply not to exceed 2500 gallons per minute (9463 *l*/min) for a period of at least thirty (30) minutes.

The supply shall be sufficient to maintain a residual pressure of 65 pounds per square inch (4.5 bars) at the topmost outlet of each standpipe with 500 gallons per minute (1893 *l*/min) flowing from the topmost outlet of the most remote standpipe and 250 gallons per minute (946 *l*/min) flowing from the topmost outlet of each of the other standpipes up to a maximum of 2500 gallons per minute (9463 *l*/min) flowing.

5-3.2 The minimum water supply at the hydraulically most remote hose connection shall be sufficient to provide a residual pressure of 65 pounds per square inch (4.5 bars) at the outlet with 500 gallons per minute (1893 *l*/min) flowing from the outlet.

5-4 Minimum Supply for Class II Service.

5-4.1 The minimum supply for Class II service shall be sufficient to provide 100 gallons per minute (379 *l*/min) for a period of at least thirty (30) minutes. The supply shall be sufficient to maintain a residual pressure of 65 pounds per square inch (4.5 bars) at the topmost outlet of each standpipe with 100 gallons per minute (379 *l*/min) flowing.

5-4.2 The minimum water supply at the hydraulically most remote hose connection shall be sufficient to provide a residual pressure of 65 pounds per square inch (4.5 bars) at the outlet with 100 gallons per minute (379 *l*/min) flowing from the outlet.

5-5 Minimum Supply for Class III Service.

5-5.1 The minimum supply for Class III service shall be the same as for Class I service.

5-5.2 The minimum supply for the hydraulically most remote hose connection on Class III service shall be the same as for Class I service.

5-6 Fire Department Connections.[1]

***5-6.1** A connection through which the public fire department can pump water into the standpipe system makes a desirable auxiliary supply. One or more fire department connections shall be provided for each Class I or Class III standpipe system. (*See Figure A-5-6.1.*)

5-6.2 In high-rise buildings having two or more zones, a fire department connection shall be provided for each zone. (*See Figures A-2-1B and A-2-1C.*)

5-6.3 Fire department connections shall be properly supported.

5-6.4 There shall be no shutoff valve in the fire department connection.

5-6.5 An approved straightway check valve shall be installed in each fire department connection, located as near as practicable to the point where it joins the system.

5-6.6 The pipe between the check valve and the outside hose coupling shall be equipped with an approved automatic drip, arranged to discharge to a proper place.

5-6.7 Hose connections shall be approved type and shall be equipped with standard caps, properly secured and arranged for easy removal by fire departments.

5-6.8 Hose coupling threads shall conform to those used by the local fire department. American National Fire Hose Connection Screw Threads shall be used whenever they will fit the local fire department hose threads.

NOTE: See *Standard for Screw Threads and Gaskets for Fire Hose Connections*, NFPA 194–1974.

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[1]See *Recommendations for Fire Department Operations in Properties Protected by Sprinkler and Standpipe Systems* (NFPA 13E–1973).

5-6.9 (a) Hose connections shall be on the street side of buildings and shall be located and arranged so that hose lines can be readily and conveniently attached to the inlets without interference from any nearby objects including buildings, fences, posts, or other fire department connections.

(b) Hose connections shall be designated by a sign having raised letters at least one inch in size cast on a plate or fitting, reading "STANDPIPE." If automatic sprinklers are also supplied by the hose connection the sign shall read "STANDPIPE AND AUTO. SPKR."

(c) Where a hose connection serves only a portion of a building, an appropriate and durable sign shall be attached indicating the portions of the building served.

Chapter 6 Piping, Valves and Fittings

6-1 Connections to Systems.

6-1.1 Connections from gravity tanks (on buildings) and pressure tanks (on top floor or roof) shall be made to the top of the standpipe system except where the tanks are used as a supply to standpipes in several buildings or sections of a building, in which cases they shall be made at the base of the standpipes. Such connections to standpipes for Class I and III services shall be at least 4 inches; for Class II service at least 2½ inches.

6-1.2 Where a gravity tank and a pressure tank are connected to a common riser, approved means shall be provided to prevent residual air pressure in the pressure tank (after water has been drained off from it) from holding the gravity tank check valve closed, a condition known as "air lock." Under normal conditions, "air lock" may be conveniently prevented in new equipment by connecting the gravity tank and pressure tank discharge pipes together 45 feet (13.7 m) or more below the bottom of the gravity tank and placing the gravity tank check valve at the level of this connection.

NOTE: See *Standard for Water Tanks for Private Fire Protection*, NFPA 22–1976.

***6-1.3** Connections from fire pumps and sources outside the building shall be large enough to deliver its full rated capacity without excessive friction losses.

6-1.4 Where two or more standpipes are installed in the same building or section of a building, they shall be interconnected at the bottom. Where standpipes in a single building are supplied by tanks they shall also be interconnected at the top; in such cases, check valves may be installed at the base of each riser to prevent circulation.

6-2 Isolation and Check Valves.

6-2.1 Connections to each water supply, except to fire department connections, shall be provided with an approved indicating type valve and check valve located close to the supply, as at tank, pump and in connection from waterworks system.

6-2.2 Valves shall be provided to permit isolating a standpipe riser without interrupting the supply to other risers from the same source of supply.

6-2.3 Connections to public water systems shall be controlled by indicator post valves of an approved type located at least 40 ft. (12.2 m) from the building protected. All valves shall be plainly marked to indicate the service which they control.

Exception No. 1: When the valve cannot be located at least 40 ft. (12.2 m) from the building, it shall be placed where it will be readily accessible in case of fire and not be subject to injury.

Exception No. 2: When indicator post valves cannot be used, underground valves may be used. The valve locations and directions to open and services which they control shall be plainly marked on the buildings.

6-2.4 Where the standpipes are supplied from a yard main or header in another building, the connection shall be provided with an approved indicating type valve outside at a safe distance from the building or at the header.

***6-2.5** Valves shall be of the approved extra heavy flanged pattern where the system pressure (including the pressure at shut-off as measured at the discharge flange of the permanently installed fire pump) exceeds 175 pounds per square inch (12.1 bars).

6-3 Piping.

6-3.1 Pipe and tube used in standpipe systems shall be of the materials listed in Table 6-3.1. The chemical properties, physical properties and dimensions of the materials listed in Table 6-3.1 shall conform at least to the standards cited in the Table. Pipe and tube used in standpipe systems shall be designed to withstand a working pressure of not less than 175 psi (12.1 bars).

6-3.2 Other types of pipe or tube may be used, but only those investigated and listed for this service by a nationally recognized testing and inspection agency and acceptable to the authority having jurisdiction.

Table 6-3.1

Material and Dimensions (Specifications)	Standard
Ferrous Piping	
Ductile-Iron Pipe, Centrifugally Cast, in Metal Molds or Sand-Lined Molds for Water or Other Liquids (AWWA C151–70)	ANSI A21.51–71
Welded and Seamless Steel Pipe for Ordinary Uses, Spec. for Black and Hot-Dipped Zinc Coated (Galvanized)	ASTM A 120–73*
Welded and Seamless Steel Pipe	ASTM A 53–73*
Wrought-Steel and Wrought-Iron Pipe	ANSI B36.10–70*
Copper Tube (Drawn, Seamless)	
Seamless Copper Tube	ASTM B 75–74a
Seamless Copper Water Tube	ASTM B 88–74a
General Requirements for Wrought Seamless Copper and Copper-Alloy Tube	ASTM B 251–74a
Brazing Filler Metal (Classifications BCuP-3 or BCuP-4)	AWS A 5.8–69

*"Standard wall" schedule 40 pipe permitted for pressures up to 300 psi (20.7 bars). Schedule 30 pipe acceptable in sizes 8 inch and larger.

6-3.3 Brazed joints for the connection of pipe or tube and fittings may be used. The fire hazard of the process shall be suitably safeguarded.

6-4 Fittings.

6-4.1 The fittings in the standpipe and connections shall be of the extra heavy pattern where the pressures are in excess of 175 pounds per square inch (12.1 bars) or where the pressures are likely to be in excess of this amount.

6-4.2 All piping shall be installed by means of threaded or flanged fittings or other approved means. Welding of joints may be allowed. Permission for this work shall be obtained from the authority having jurisdiction. Welding shall be done in the shop and welding fittings used. Welding fittings shall comply with ANSI Standard B16.9–1971, ANSI Standard B16.25–1972 and ASTM Designation A234–73.

Exception: Welding may be done on the premises with the approval of the authority having jurisdiction.

6-4.3 Approved expansion joints or flexible couplings shall be provided where necessary.

6-5 Pipe Hangers.

6-5.1 The pipe hangers shall be of approved type, so arranged that they will sustain the loads and retain the piping securely in position. They shall be used in sufficient number to prevent vibration in the piping when the standpipe is in use.

6-6 Pressure Gages.

***6-6.1** An approved 3½-inch (87 mm) dial spring pressure gage shall be connected with each discharge pipe from fire pump and public waterworks, at the pressure tank, at the air pump supplying pressure tank, and at the top of each standpipe. Gages shall be located in a suitable place where water will not freeze. Each gage will be controlled by a valve having arrangement for draining.

Exception: Where several standpipes are interconnected at the top, a single gage properly located may be substituted for the gages at the top of each standpipe.

6-7 Water Flow Alarms.

6-7.1 Water flow alarms shall be provided on all standpipe risers where required by the authority having jurisdiction.

Chapter 7 Tests and Inspection

7-1 Tests.

*7-1.1 All new systems including yard piping shall be tested hydrostatically at not less than 200 pounds per square inch (13.8 bars) pressure for two hours, or at 50 pounds per square inch (3.5 bars) in excess of the normal pressure when the normal pressure is in excess of 150 pounds per square inch (10.3 bars).

7-1.2 The amount of leakage in underground piping shall be measured at the specified test pressure by pumping from a calibrated container.

*7-1.3 For new underground pipe the amount of leakage at the joints shall not exceed 2 quarts per hour (1.89 *l*/h) per 100 joints, irrespective of pipe diameter.

7-1.3.1 The amount of allowable leakage specified in 7-1.3 may be increased by 1 fluid ounce per inch valve diameter per hour (30 m*l*/25mm/h) for each metal seated valve isolating the test section.

7-1.4 Piping between the fire department connection and the check valve in the inlet pipe shall be tested hydrostatically the same as the balance of the system.

7-1.4.1 Piping between the fire department connection and the check valve in the inlet pipe shall be flushed with a sufficient volume of water so as to remove all construction debris and trash which may have accumulated in this pipe prior to the completion of the system and prior to the installation of the fire department connection.

7-1.5 In a standpipe system any piping which normally remains dry shall be pressure-tested at intervals of not less than 5 years.

*7-1.6 Before restoring to service and before water is turned into it, a standpipe system which has been out of service a number of years shall be tested with air at a pressure not exceeding 25 pounds per square inch (1.7 bars) to determine its tightness.

7-2 Periodic Inspection.

7-2.1 Systematic periodic inspections of all portions of the standpipe system is essential, and personnel to whom this duty is entrusted shall be held strictly responsible for its condition.

7-2.2 The tanks shall be kept properly filled, and where pressure tanks are employed, a pressure of at least 75 pounds per square inch (5.2 bars) shall be maintained at all times. Special attention shall be given to the condition of the tanks during freezing weather.

NOTE: For further details, see *Standard for Water Tanks for Private Fire Protection*, NFPA 22–1976.

***7-2.3** The valves in the main connection to the automatic sources of water supply shall be open at all times. The hose valves shall be frequently examined to see that they are tight.

7-2.4 Inspections shall be made frequently to assure that the hose on Class II and Class III systems is in proper position on the racks, and that all of the equipment is in place and in good condition. The hose, including gaskets, shall be removed and inspected, and the hose re-racked at intervals at least annually. Where couplings are polished, care shall be taken to see that polish used does not touch fabric of hose.

NOTE: For further details, see *Care of Fire Hose*, NFPA 198–1972.

7-2.5 When a standpipe system or any portion thereof is out of service for any reason, notice shall be given to the local fire department and a sign shall be posted on each fire department connection indicating what portion of the system is out of service.

Chapter 8 Buildings under Construction

8-1 Standpipe Installations in Buildings under Construction.

8-1.1 When required by the authority having jurisdiction, in buildings under construction, a standpipe system, either temporary or permanent in nature, shall be installed in accordance with the following:

***8-1.1.1** The standpipes shall be provided with conspicuously marked siamese fire department connections on the outside of the building at the street level and shall have at least one standard hose outlet at each floor.

8-1.1.2 Pipe sizes, hose valves, hose, water supply and other details for new construction shall be in accordance with this standard.

8-1.1.3 Standpipes shall be securely supported at each alternate floor.

***8-1.1.4** At each floor level there shall be provided at least one approved hose valve for attaching fire department hose. Valves shall be kept closed at all times and guarded against mechanical injury.

8-1.1.5 All threads on hose connections shall conform to the local fire department hose thread.

***8-1.1.6** Standpipes shall be carried up with each floor and securely capped at the top.

8-1.1.7 Temporary standpipes shall remain in service until the permanent standpipe installation is complete.

Appendix A

The following notes, bearing the same number as the text of the Standard for Standpipe and Hose Systems to which they apply, contain useful explanatory material and references to standards.

This Appendix is not a part of this NFPA Standard for Standpipe and Hose Systems but is included for information purposes only.

A-1-6.1.2 Hose smaller than 1½ inch may be used with the approval of the authority having jurisdiction.

A-1-8.3 Light Hazard — Occupancies or portions of other occupancies where the quantity and/or combustibility of contents is low and fires with relatively low rates of heat release are expected. Light Hazard Occupancies include occupancies such as:

Churches	Museums
Clubs	Nursing or Convalescent Homes
Educational	Office, including Data Processing
Hospitals	Residential
Institutional	Restaurant seating areas
Libraries, except large stack rooms	Theaters and Auditoriums excluding stages and prosceniums

A-3-2.1 Equipment should be so arranged as to permit directing ing the discharge from the nozzle into all portions of important enclosures such as closets and like enclosures.

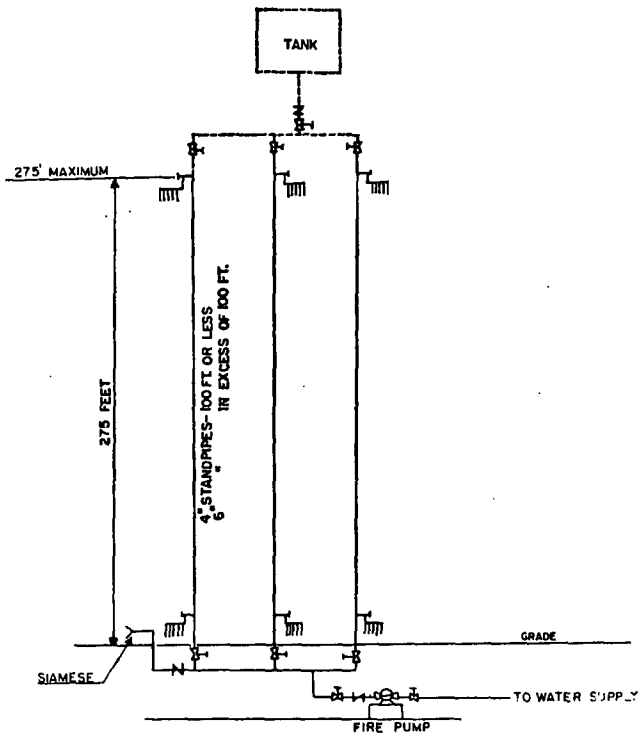
A-3-2.2 Equipment should be so arranged as to permit directing the discharge from the nozzle into all portions of important enclosures such as closets and like enclosures. When the area of the building is large, separate standpipes or branches for the small hose streams may be necessary. 1½-inch hose may be supplied from an automatic sprinkler system. (*See Standard for the Installation of Sprinkler Systems*, NFPA 13–1975.)

A-3-3 Proper safeguards should be taken to protect wet risers or portions thereof, located in unheated concealed spaces or exposed areas, from freezing.

A-3-4.1 Where a standpipe system is supplied by fire pump, one 2½-inch hose outlet for each 250 gallons per minute (946 *l*/min) pump capacity may be provided in the form of a wall outlet at the ground level from which the fire department may take water for use on exposing fires. Each outlet should be controlled by a separate valve and should be properly capped when not in use.

A-4-1.1 Hose may be located at one side of the standpipe and supplied by short lateral connections to the standpipe where necessary to avoid obstructions.

Hose outlets for Class I service should be located in a stairway enclosure, and for Class II service in the corridor or space adjacent to the stairway enclosure and connected through the wall to the standpipe. For Class III service, the outlets for 2½-inch hose should be located in a stairway enclosure, and for 1½-inch hose located in the corridor or space adjacent to the stairway enclosure. These arrangements make it possible to use 1½-inch hose streams promptly in case the stairway is filled with people escaping at the time of fire. In buildings having large areas, outlets for Class I and Class III service may be located at interior columns. (*See 3-3.5.*)



1 inch = 25.4 millimetre

1 foot = 0.305 metre

Figure A-2-1A. Typical single zone system.

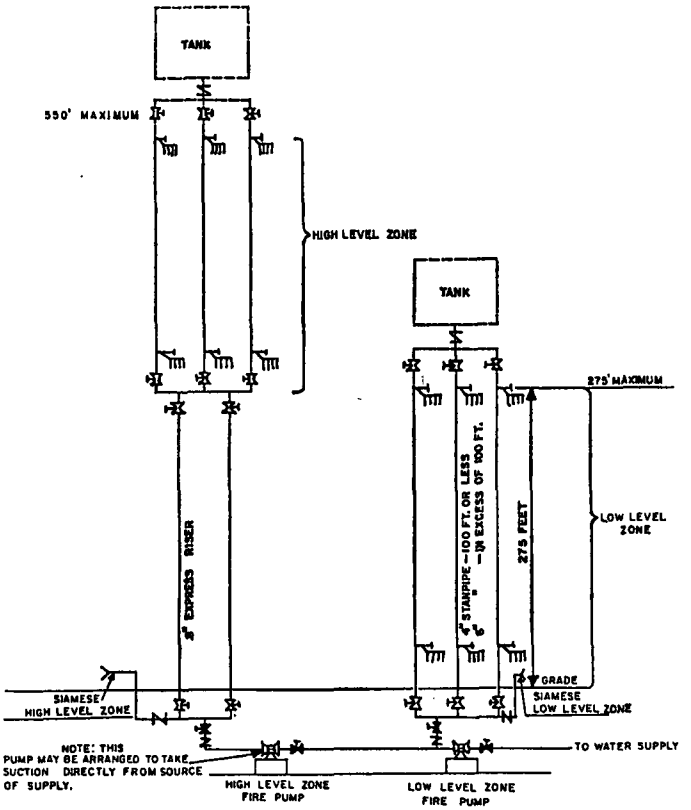


Figure A-2-1B. Typical two zone system.

1 inch = 25.4 millimetre
1 foot = 0.305 metre