

NFPA

13R

1989 Edition

# SPRINKLER SYSTEMS

Residential  
Occupancies  
up to Four Stories  
in Height



**National Fire Protection  
Association**

BATTERYMARCH PARK  
QUINCY, MA 02169

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## **NFPA 13R**

# **Standard for the Installation of Sprinkler Systems in Residential Occupancies up to Four Stories in Height 1989 Edition**

This edition of NFPA 13R, *Standard for the Installation of Sprinkler Systems in Residential Occupancies up to Four Stories in Height*, was prepared by the Technical Committee on Automatic Sprinklers, released by the Correlating Committee on Water Extinguishing Systems, and acted on by the National Fire Protection Association, Inc. at its Fall Meeting held November 14-17, 1988 in Nashville, Tennessee. It was issued by the Standards Council on January 13, 1989, with an effective date of February 6, 1989.

The 1989 edition of this standard has been approved by the American National Standards Institute.

## **Origin and Development of NFPA 13R**

NFPA 13R represents a milestone in the development of sprinkler installation design standards. This first edition encompasses a combined effort of the fire protection community to develop a standard for the protection of low-rise, residential facilities.

This standard is intended to provide a higher degree of life safety and property protection to the inhabitants of low-rise, multifamily dwellings. Promulgated as a document which provides for increased levels of protection to building occupants, the document has also considered the economic aspects of a sprinklered facility as compared to an unsprinklered facility.

As the number of states and cities that implement sprinkler ordinances continues to grow, it is felt that systems for certain residential occupancies can be efficiently and effectively installed in accordance with this standard.

This document will provide requirements on system design which range from water supplies to hardware selection to positioning and location of automatic sprinklers.

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**NFPA 13R**  
**Standard for the**  
**Installation of Sprinkler Systems in**  
**Residential Occupancies up to Four Stories**  
**in Height**  
**1989 Edition**

**NOTICE:** An asterisk (\*) following the number or letter designating a paragraph indicates explanatory material on that paragraph in Appendix A.

Information on referenced publications can be found in Chapter 3 and Appendix B.

**Preface**

It is intended that this standard provide a method for those individuals wishing to install a sprinkler system for life safety and property protection. It is not the purpose of this standard to require the installation of an automatic sprinkler system. This standard assumes that one or more smoke detectors will be installed in accordance with NFPA 74, *Standard for the Installation, Maintenance, and Use of Household Fire Warning Equipment*.

**Chapter 1 General Information**

**1-1\* Scope.** This standard deals with the design and installation of automatic sprinkler systems for protection against fire hazards in residential occupancies up to four stories in height.

**1-2\* Purpose.** The purpose of this standard is to provide design and installation requirements for a sprinkler system to aid in the detection and control of fires in residential occupancies and thus provide improved protection against injury, life loss, and property damage. A sprinkler system designed and installed in accordance with this standard is expected to prevent flashover (total involvement) in the room of fire origin, when sprinklered, and to improve the chance for occupants to escape or be evacuated.

Nothing in this standard is intended to restrict new technologies or alternate arrangements, providing that the level of safety prescribed by the standard is not lowered.

**1-3 Definitions.**

**Approved.** Acceptable to the “authority having jurisdiction.”

**NOTE:** The National Fire Protection Association does not approve, inspect or certify any installations, procedures, equipment, or materials nor does it approve or evaluate testing laboratories. In determining the acceptability of installations or procedures, equipment or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure or use. The authority having jurisdiction may also refer to the listings or labeling

practices of an organization concerned with product evaluations which is in a position to determine compliance with appropriate standards for the current production of listed items.

**Authority Having Jurisdiction.** The “authority having jurisdiction” is the organization, office or individual responsible for “approving” equipment, an installation or a procedure.

**NOTE:** The phrase “authority having jurisdiction” is used in NFPA documents in a broad manner since jurisdictions and “approval” agencies vary as do their responsibilities. Where public safety is primary, the “authority having jurisdiction” may be a federal, state, local or other regional department or individual such as a fire chief, fire marshal, chief of a fire prevention bureau, labor department, health department, building official, electrical inspector, or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the “authority having jurisdiction.” In many circumstances the property owner or his designated agent assumes the role of the “authority having jurisdiction”; at government installations, the commanding officer or departmental official may be the “authority having jurisdiction.”

**Check Valve.** A valve that allows flow in one direction only.

**Control Valve.** An indicating valve employed to control (shut) a supply of water to a sprinkler system.

**Design Discharge.** Rate of water discharged by an automatic sprinkler, expressed in gallons per minute.

**Dry System.** A system employing automatic sprinklers that are attached to a piping system containing air under atmospheric or higher pressures. Loss of pressure from the opening of a sprinkler or detection of a fire condition causes the release of water into the piping system and out the opened sprinkler.

**Dwelling Unit.** One or more rooms arranged for the use of one or more individuals living together as in a single housekeeping unit, normally having cooking, living, sanitary, and sleeping facilities.

**Labeled.** Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization acceptable to the “authority having jurisdiction” and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

**Listed.** Equipment or materials included in a list published by an organization acceptable to the “authority having jurisdiction” and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials and whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

**NOTE:** The means for identifying listed equipment may vary for each organization concerned with product evaluation.



tion, some of which do not recognize equipment as listed unless it is also labeled. The "authority having jurisdiction" should utilize the system employed by the listing organization to identify a listed product.

**Multipurpose Piping Systems.** Piping systems within residential occupancies intended to serve both domestic and fire protection needs.

**Residential Occupancies.** Residential occupancies as included in the scope of this standard include the following, as defined in NFPA 101®, *Life Safety Code*®:

- (1) Apartment buildings.
- (2) Lodging and rooming houses.
- (3) Board and care facilities (slow evacuation type with 16 or less occupants and prompt evacuation type).
- (4) Hotels, motels, and dormitories.

**Residential Sprinkler.** An automatic sprinkler that has been specifically listed for use in residential occupancies.

**Shall.** Indicates a mandatory requirement.

**Should.** Indicates a recommendation or that which is advised but not required.

**Sprinkler—Automatic.** A fire suppression device that operates automatically when its heat-actuated element is heated to or above its thermal rating, allowing water to discharge over a specific area.

**Sprinkler System.** An integrated system of piping connected to a water supply, with listed sprinklers that will automatically initiate water discharge over a fire area. When required, the sprinkler system also includes a control valve and a device for actuating an alarm when the system operates.

**Standard.** A document containing only mandatory provisions using the word "shall" to indicate requirements. Explanatory material may be included only in the form of "fine print" notes, in footnotes, or in an appendix.

**Waterflow Alarm.** A sounding device activated by a waterflow detector or alarm check valve.

**Waterflow Detector.** An electric signaling indicator or alarm check valve actuated by water flow in one direction only.

**Wet System.** A system employing automatic sprinklers that are attached to a piping system containing water and connected to a water supply, so that water discharges immediately from sprinklers opened by a fire.

**1-4 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 (liter and bar), outside of but recognized by SI, are commonly used in international fire protection. These units are listed, with conversion factors, in Table 1-4.

**1-4.1** If a value for measurement as given in this standard is followed by an equivalent value in other units, the first

Table 1-4

Name of Unit	Unit Symbol	Conversion Factor
liter	L	1 gal = 3.785 L
pascal	Pa	1 psi = 6894.757 Pa
bar	bar	1 psi = 0.0689 bar
bar	bar	1 bar = 105 Pa

For additional conversions and information see ASTM E380, *Standard for Metric Practice*.

stated is to be regarded as the requirement. A given equivalent value may be approximate.

**1-4.2** The conversion procedure for the SI units has been to multiply the quantity by the conversion factor and then round the result to the appropriate number of significant digits.

### 1-5 Piping.

**1-5.1** Pipe or tube used in sprinkler systems shall be of the materials in Table 1-5.1 or in accordance with 1-5.2 through 1-5.5. The chemical properties, physical properties, and dimensions of the materials listed in Table 1-5.1 shall be at least equivalent to the standards cited in the table and designed to withstand a working pressure of not less than 175 psi (12.1 bars).

Table 1-5.1

Materials and Dimensions	Standard
Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use	ASTM A795
Specification for Welded and Seamless Steel Pipe	ASTM A53
Wrought-Steel Pipe	ANSI B36.10M
Specification for Electric-Resistance Welded Steel Pipe	ASTM A135
Copper Tube (Drawn, Seamless)	ASTM B88
Specification for Seamless Copper Tube	ASTM B88
Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube	ASTM B251
Brazing Filler Metal (Classification BCuP-3 or BCuP-4)	AWS A5.8
Specification for Solder Metal, 95-5 (Tin-Antimony-Grade 95TA)	ASTM B32

**1-5.2** Other types of pipe or tube may be used, but only those listed for this service.

**1-5.3** Whenever the word pipe is used in this standard, it shall be understood to also mean tube.

**1-5.4** Pipe joined with mechanical grooved fittings shall be joined by a listed combination of fittings, gaskets, and grooves. When grooves are cut or rolled on the pipe they shall be dimensionally compatible with the fittings.

*Exception:* Steel pipe with wall thicknesses less than Schedule 30 [in sizes 8 in. (203 mm) and larger] or Schedule 40 [in

sizes less than 8 in. (203 mm)] shall not be joined by fittings used with pipe having cut grooves.

**1-5.5** Fittings used in sprinkler systems shall be of the materials listed in Table 1-5.5 or in accordance with 1-5.7. The chemical properties, physical properties, and dimensions of the materials listed in Table 1-5.5 shall be at least equivalent to the standards cited in the table. Fittings used in sprinkler systems shall be designed to withstand the working pressures involved, but not less than 175 psi (12.1 bars) cold water pressure.

Table 1-5.5

Materials and Dimensions	Standard
Cast Iron	
Cast Iron Threaded Fittings, Class 125 and 250	ANSI B16.4
Cast Iron Pipe Flanges and Flanged Fittings	ANSI B16.1
Malleable Iron	
Malleable Iron Threaded Fittings, Class 150 and 300	ANSI B16.3
Steel	
Factory-made Threaded Fittings Class 150 and 300	ANSI B16.9
Buttwelding Ends for Pipe, Valves, Flanges, and Fittings	ANSI B16.25
Spec. for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures	ASTM A234
Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys	ANSI B16.5
Forged Steel Fittings, Socket Welded and Threaded	ANSI B16.11
Copper	
Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings	ANSI B16.22
Cast Copper Alloy Solder-Joint Pressure Fittings	ANSI B16.18

**1-5.6** Joints for the connection of copper tube shall be brazed.

*Exception: Soldered joints (95-5 solder metal) may be used for wet-pipe copper tube systems.*

**1-5.7** Other types of fittings may be used, but only those listed for this service.

## 1-6 System Types.

**1-6.1 Wet-Pipe Systems.** A wet-pipe system shall be used when all piping is installed in areas not subject to freezing.

**1-6.2** Provision shall be made to protect piping from freezing in unheated areas by use of one of the following acceptable methods:

- (a) Antifreeze system.
- (b) Dry-pipe system.

*Exception: Listed standard dry-pendent, dry upright, or dry sidewall sprinklers may be extended into unheated areas not intended for living purposes.*

**1-6.2.1** Antifreeze solutions shall be installed in accordance with 5-5.3 of NFPA 13, *Standard for the Installation of Sprinkler Systems*.

## Chapter 2 Working Plans, Design, Installation, Acceptance Tests, and Maintenance

### 2-1 Working Plans and Acceptance Tests.

#### 2-1.1 Working Plans.

**2-1.1.1** Working plans shall be submitted for approval to the authority having jurisdiction before any equipment is installed or remodeled. Deviations from approved plans will require permission of the authority having jurisdiction.

**2-1.1.2** Working plans shall be drawn to an indicated scale, on sheets of uniform size, with a plan of each floor, made so that they can be easily duplicated, and shall show the following data:

- (a) Name of owner and occupant.
- (b) Location, including street address.
- (c) Point of compass.
- (d) Ceiling construction.
- (e) Full height cross section.
- (f) Location of fire walls.
- (g) Location of partitions.
- (h) Occupancy of each area or room.
- (i) Location and size of concealed spaces, attics, closets, and bathrooms.
- (j) Any small enclosures in which no sprinklers are to be installed.
- (k) Size of city main in street, pressure and whether dead-end or circulating and, if dead-end, direction and distance to nearest circulating main, city main test results including elevation of test hydrant.
- (l) Make, manufacturer, type, heat-response element, temperature rating, and nominal orifice size of sprinkler.
- (m) Temperature rating and location of high-temperature sprinklers.
- (n) Number of sprinklers on each riser, per floor.
- (o) Kind and location of alarm bells.
- (p) Type of pipe and fittings.
- (q) Type of protection for nonmetallic pipe.
- (r) Nominal pipe size with lengths shown to scale.

**NOTE:** Where typical branch lines prevail, it will be necessary to size only one line.

- (s) Location and size of riser nipples.
- (t) Type of fittings and joints and location of all welds and bends.
- (u) Types and locations of hangers, sleeves, braces, and methods of securing sprinklers, where applicable.

(v) All control valves, check valves, drain pipes, and test connections.

(w) Underground pipe size, length, location, weight, material, point of connection to city main; the type of valves, meters, and valve pits; and the depth at which the top of the pipe is laid below grade.

(x) For hydraulically designed systems, the material to be included on the hydraulic data nameplate.

(y) Name and address of contractor.

## 2-1.2 Approval of Sprinkler Systems.

**2-1.2.1** The installer shall perform all required acceptance tests (see 2-1.3), complete the Contractor's Material and Test Certificate(s) (see Figure 2-1.2.1), and forward the certificate(s) to the authority having jurisdiction, prior to asking for approval of the installation.

**2-1.2.2** When the authority having jurisdiction desires to be present during the conducting of acceptance tests, the installer shall give advance notification of the time and date the testing will be performed.

## 2-1.3 Acceptance Tests.

### 2-1.3.1 Flushing of Underground Connections.

**2-1.3.1.1** Underground mains and lead-in connections to system risers shall be flushed before connection is made to sprinkler piping, in order to remove foreign materials that may have entered the underground piping during the course of the installation. For all systems, the flushing operation shall be continued until water is clear.

**2-1.3.1.2** Underground mains and lead-in connections shall be flushed at the hydraulically calculated water demand rate of the system.

## CONTRACTOR'S MATERIAL & TEST CERTIFICATE FOR ABOVEGROUND PIPING

### PROCEDURE

Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

PROPERTY NAME						DATE	
PROPERTY ADDRESS							
PLANS	ACCEPTED BY APPROVING AUTHORITIES (NAMES)						
	ADDRESS						
	INSTALLATION CONFORMS TO ACCEPTED PLANS <input type="checkbox"/> YES <input type="checkbox"/> NO						
	EQUIPMENT USED IS APPROVED <input type="checkbox"/> YES <input type="checkbox"/> NO IF NO, EXPLAIN DEVIATIONS						
INSTRUCTIONS	HAS PERSON IN CHARGE OF FIRE EQUIPMENT BEEN INSTRUCTED AS TO LOCATION OF CONTROL VALVES AND CARE AND MAINTENANCE OF THIS NEW EQUIPMENT? <input type="checkbox"/> YES <input type="checkbox"/> NO IF NO, EXPLAIN						
	HAVE COPIES OF THE FOLLOWING BEEN LEFT ON THE PREMISES: <input type="checkbox"/> YES <input type="checkbox"/> NO						
	1. SYSTEM COMPONENTS INSTRUCTIONS <input type="checkbox"/> YES <input type="checkbox"/> NO 2. CARE AND MAINTENANCE INSTRUCTIONS <input type="checkbox"/> YES <input type="checkbox"/> NO 3. NFPA 13A <input type="checkbox"/> YES <input type="checkbox"/> NO						
LOCATION OF SYSTEM	SUPPLIES BUILDINGS						
SPRINKLERS	MAKE	MODEL	YEAR OF MANUFACTURE	ORIFICE SIZE	QUANTITY	TEMPERATURE RATING	
PIPE AND FITTINGS	Type of Pipe						
	Type of Fittings						
ALARM VALVE OR FLOW INDICATOR	ALARM DEVICE			MAXIMUM TIME TO OPERATE THROUGH TEST CONNECTION			
	TYPE	MAKE	MODEL	MIN.		SEC.	
DRY PIPE OPERATING TEST	DRY VALVE			O.O.D.			
	MAKE	MODEL	SERIAL NO.	MAKE	MODEL	SERIAL NO.	
	TIME TO TRIP THRU TEST CONNECTION*		WATER PRESSURE	AIR PRESSURE	TRIP POINT AIR PRESSURE	TIME WATER REACHED TEST OUTLET*	
	MIN.	SEC.	PSI	PSI	PSI	MIN.	SEC.
	Without O.O.D.						
	With O.O.D.						
IF NO, EXPLAIN							

\* MEASURED FROM TIME INSPECTOR'S TEST CONNECTION IS OPENED.  
85A (10-88) PRINTED IN U.S.A.

(OVER)

Figure 2-1.2.1 Contractor's Material and Test Certificate for Aboveground Piping.

**2-1.3.1.3** To avoid property damage, provision shall be made for the disposal of water issuing from test outlets.

**2-1.3.2\*** All systems shall be tested for leakage at 50 psi (3.4 bars) above maximum system design pressure.

*Exception: When a fire department connection is provided, hydrostatic pressure tests shall be provided in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems.*

## 2-2 Design and Installation.

### 2-2.1 Devices and Materials.

**2-2.1.1\*** Only new sprinklers shall be employed in the installation of sprinkler systems.

**2-2.1.2** Only listed or approved devices and materials as indicated in this standard shall be used in sprinkler systems.

**2-2.1.3** Sprinkler systems shall be designed for a maximum working pressure of 175 psi (12.1 bars).

*Exception: Higher design pressures may be used when all system components are rated for pressures higher than 175 psi (12.1 bars).*

## 2-3 Water Supply.

**2-3.1 General Provisions.** Every automatic sprinkler system shall have at least one automatic water supply. When stored water is used as the sole source of supply, the minimum quantity shall equal the water demand rate times 30 minutes. (See 2-5.1.3.)

DELUGE & PREACTION VALVES	OPERATION					
	<input type="checkbox"/> PNEUMATIC <input type="checkbox"/> ELECTRIC <input type="checkbox"/> HYDRAULIC					
	PIPING SUPERVISED <input type="checkbox"/> YES <input type="checkbox"/> NO		DETECTING MEDIA SUPERVISED <input type="checkbox"/> YES <input type="checkbox"/> NO			
	DOES VALVE OPERATE FROM THE MANUAL TRIP AND/OR REMOTE CONTROL STATIONS <input type="checkbox"/> YES <input type="checkbox"/> NO					
TEST DESCRIPTION	IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING <input type="checkbox"/> YES <input type="checkbox"/> NO					
	MAKE		MODEL		DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM	
					DOES EACH CIRCUIT OPERATE VALVE RELEASE	
					MAXIMUM TIME TO OPERATE RELEASE	
TESTS	HYDROSTATIC: Hydrostatic tests shall be made at not less than 50 psi (3.4 bars) above design pressure for two hours. Differential dry-pipe valve		PNEUMATIC: Establish 40 psi (2.7 bars) air pressure and measure drop which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours. Test pressure			
	tanks at normal water level and air pressure and measure air pressure drop which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours.		tanks at normal water level and air pressure and measure air pressure drop which shall not exceed 1-1/2 psi (0.1 bars) in 24 hours.			
	ALL PIPING HYDROSTATICALLY TESTED AT _____ PSI FOR _____ HRS. IF NO, STATE REASON					
	DRY PIPING PNEUMATICALLY TESTED <input type="checkbox"/> YES <input type="checkbox"/> NO					
BLANK TESTING GASKETS	EQUIPMENT OPERATES PROPERLY <input type="checkbox"/> YES <input type="checkbox"/> NO					
	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT ADDITIVES AND CORROSIVE CHEMICALS, SODIUM SILICATE OR DERIVATIVES OF SODIUM SILICATE, BRINE, OR OTHER CORROSIVE CHEMICALS WERE NOT USED FOR TESTING SYSTEMS OR STOPPING LEAKS? <input type="checkbox"/> YES <input type="checkbox"/> NO					
	DRAIN / READING OF GAGE LOCATED NEAR WATER		RESIDUAL PRESSURE WITH VALVE IN TEST			
	TEST / SUPPLY TEST CONNECTION: _____ PSI		CONNECTION OPEN WIDE _____ PSI			
WELDING	UNDERGROUND MAINS AND LEAD IN CONNECTIONS TO SYSTEM RISERS FLUSHED BEFORE CONNECTION MADE TO SPRINKLER PIPING.					
	VERIFIED BY COPY OF THE U FORM NO. 858 <input type="checkbox"/> YES <input type="checkbox"/> NO		OTHER EXPLAIN			
	FLUSHED BY INSTALLER OF UNDERGROUND SPRINKLER PIPING <input type="checkbox"/> YES <input type="checkbox"/> NO					
CUTOUTS (DISCS)	NUMBER USED		LOCATIONS		NUMBER REMOVED	
	WELDED PIPING <input type="checkbox"/> YES <input type="checkbox"/> NO					
HYDRAULIC DATA NAMEPLATE	DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT WELDING PROCEDURES COMPLY WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3		<input type="checkbox"/> YES <input type="checkbox"/> NO			
	DO YOU CERTIFY THAT THE WELDING WAS PERFORMED BY WELDERS QUALIFIED IN COMPLIANCE WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3		<input type="checkbox"/> YES <input type="checkbox"/> NO			
	DO YOU CERTIFY THAT WELDING WAS CARRIED OUT IN COMPLIANCE WITH A DOCUMENTED QUALITY CONTROL PROCEDURE TO INSURE THAT ALL DISCS ARE RETRIEVED, THAT OPENINGS IN PIPING ARE SMOOTH, THAT SLAG AND OTHER WELDING RESIDUE ARE REMOVED, AND THAT THE INTERNAL DIAMETERS OF PIPING ARE NOT PENETRATED		<input type="checkbox"/> YES <input type="checkbox"/> NO			
	DO YOU CERTIFY THAT YOU HAVE A CONTROL FEATURE TO ENSURE THAT ALL CUTOUTS (DISCS) ARE RETRIEVED?		<input type="checkbox"/> YES <input type="checkbox"/> NO			
REMARKS	NAME PLATE PROVIDED <input type="checkbox"/> YES <input type="checkbox"/> NO		IF NO, EXPLAIN			
	DATE LEFT IN SERVICE WITH ALL CONTROL VALVES OPEN:					
SIGNATURES	NAME OF SPRINKLER CONTRACTOR					
	TESTS WITNESSED BY					
	FOR PROPERTY OWNER (SIGNED)		TITLE		DATE	
	FOR SPRINKLER CONTRACTOR (SIGNED)		TITLE		DATE	

ADDITIONAL EXPLANATION AND NOTES

85A BACK

Figure 2-1.2.1 (Continued) Contractor's Material and Test Certificate for Aboveground Piping.

**2-3.2\* Water Supply Sources.** The following water supply sources are acceptable:

- (a) A connection to a reliable water works system with or without a booster pump, as required.
- (b) An elevated tank.
- (c) A pressure tank installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*, and NFPA 22, *Standard for Water Tanks for Private Fire Protection*.
- (d) A stored water source with an automatically operated pump, installed in accordance with NFPA 20, *Standard for the Installation of Centrifugal Fire Pumps*.

**2-3.3 Multipurpose Piping System.**

**2-3.3.1\*** A common supply main to the building, serving both sprinklers and domestic uses, shall be acceptable when the domestic design demand is added to the sprinkler system demand.

*Exception:* Domestic design demand need not be added if provision is made to prevent flow on the domestic water system upon operation of sprinklers.

**2-3.3.2** Sprinkler systems with nonfire protection connections shall comply with Section 5-6 of NFPA 13, *Standard for the Installation of Sprinkler Systems*.

**2-4 System Components.**

**2-4.1 Valve and Drains.**

**2-4.1.1** When a common supply main is used to supply both domestic and sprinkler systems, a single listed control valve shall be provided to shut off both the domestic and sprinkler systems, and a separate shutoff valve shall be provided for the domestic system only. [See Figure A-2-3.2(a).]

*Exception:* The sprinkler system piping may have a separate control valve when supervised by one of the following methods:

- (a) Central station, proprietary, or remote station alarm service,
- (b) Local alarm service that will cause the sounding of an audible signal at a constantly attended point, or
- (c) Locking the valves open.

**2-4.1.2** Each sprinkler system shall have a 1-in. (25.4-mm) or larger drain and test connection with valve on the system side of the control valve.

**2-4.1.3** Additional ½-in. (13-mm) drains shall be installed for each trapped portion of a dry system that is subject to freezing temperatures.

**2-4.2** At least one 1½ in. (38 mm) or 2½ in. (64 mm) fire department connection shall be provided when the sprinkler system has 20 sprinklers or more.

**2-4.3 Pressure Gages.** Pressure gages shall be provided to indicate pressures on the supply and system sides of main check valves and dry-pipe valves, and to indicate pressure on water supply pressure tanks.

**2-4.4 Piping Support.** Piping hanging and bracing methods shall comply with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

**2-4.5 Sprinklers.**

**2-4.5.1** Listed residential sprinklers shall be used inside dwelling units. The basis of such a listing shall consist of tests to establish the ability of the sprinklers to control residential fires under standardized fire test conditions. The standardized room fires shall be based on a residential array of furnishings and finishes.

*Exception No. 1:* Residential sprinklers shall not be used in dry systems unless specifically listed for that purpose.

*Exception No. 2:* Other types of listed sprinklers may be installed in accordance with their listing in dwelling units meeting the definition of a compartment (as defined in 2-5.1.2.2) provided no more than four sprinklers are located in the dwelling unit and at least one smoke detector is provided in each sleeping room.

**2-4.5.2** Ordinary temperature rated sprinklers [135 to 170°F (57 to 77°C)] shall be installed where maximum ambient ceiling temperatures do not exceed 100°F (38°C).

**2-4.5.3** Intermediate temperature rated residential sprinklers [175 to 225°F (79 to 107°C)] shall be installed where maximum ambient ceiling temperatures are between 101 and 150°F (38 and 66°C).

**2-4.5.4** The following practices shall be observed when installing residential sprinklers, unless maximum expected ambient temperatures are otherwise determined.

(a) Sprinklers under glass or plastic skylights exposed to direct rays of the sun shall be of intermediate temperature classification.

(b) Sprinklers in an unventilated concealed space under an uninsulated roof, or in an unventilated attic, shall be of intermediate temperature classification.

**2-4.5.5** When residential sprinklers are installed within a compartment, as defined in 2-5.1.2.2, all sprinklers shall be from the same manufacturer and have the same heat-response element, including temperature rating.

*Exception:* Different temperature ratings are permitted when required by 2-4.5.4.

**2-4.5.6** Standard sprinklers shall be used in areas outside the dwelling unit.

*Exception No. 1:* Residential sprinklers may be used in adjoining corridors or lobbies with flat, smooth ceilings and a height not exceeding 10 ft (3.0 m).

*Exception No. 2:* Quick-response sprinklers may be used in accordance with 2-5.2, *Exception No. 1*.

**2-4.5.7** Operated or damaged sprinklers shall be replaced with sprinklers having the same performance characteristics as original equipment.

**2-4.5.8** When nonmetallic ceiling plates (escutcheons) are used, they shall be listed. Escutcheon plates used to create a recessed or flush-type sprinkler shall be part of a listed sprinkler assembly.

**2-4.5.9 Painting and Ornamental Finishes.**

**2-4.5.9.1** Sprinkler frames may be factory painted or enameled as ornamental finish in accordance with 2-4.5.9.2; otherwise, sprinklers shall not be painted and any sprinklers

that have been painted, except those with factory applied coatings, shall be replaced with new listed sprinklers.

**2-4.5.9.2\*** Ornamental finishes shall not be applied to sprinklers by anyone other than the sprinkler manufacturer, and only sprinklers listed with such finishes shall be used.

**2-4.6 Alarms.** Local waterflow alarms shall be provided on all sprinkler systems and shall be connected to the building fire alarm system, when provided.

## **2-5 System Design.**

### **2-5.1 Design Criteria—Inside Dwelling Unit.**

**2-5.1.1 Design Discharge.** The system shall provide a discharge of not less than 18 gpm (68 L/min) to any single operating sprinkler and not less than 13 gpm (49 L/min) per sprinkler to the number of design sprinklers, but not less than the listing of the sprinkler(s).

*Exception: Design discharge for sprinklers installed in accordance with Exception No. 2 of 2-4.5.1 shall be in accordance with sprinkler listing criteria.*

#### **2-5.1.2\* Number of Design Sprinklers.**

**2-5.1.2.1** The number of design sprinklers shall include all sprinklers within a compartment to a maximum of four sprinklers.

**2-5.1.2.2** The definition of compartment for use in 2-5.1.2.1 to determine the number of design sprinklers is a space that is completely enclosed by walls and a ceiling. The compartment enclosure may have openings to an adjoining space if the openings have a minimum lintel depth of 8 in. (203 mm) from the ceiling.

**2-5.1.3 Water Demand.** The water demand for the system shall be determined by multiplying the design discharge of 2-5.1.1 by the number of design sprinklers of 2-5.1.2.

#### **2-5.1.4 Sprinkler Coverage.**

**2-5.1.4.1** Residential sprinklers shall be spaced so that the maximum area protected by a single sprinkler does not exceed 144 sq ft (13.4 m<sup>2</sup>).

**2-5.1.4.2** The maximum distance between sprinklers shall not exceed 12 ft (3.7 m) and the maximum distance to a wall or partition shall not exceed 6 ft (1.8 m).

**2-5.1.4.3** The minimum distance between sprinklers within a compartment shall be 8 ft (2.4 m).

**2-5.1.5** The minimum operating pressure of any sprinkler shall be in accordance with the listing information of the sprinkler and shall provide the minimum flow rates specified in 2-5.1.1.

**2-5.1.6** Application rates, design areas, areas of coverage, and minimum design pressures other than those specified in 2-5.1.1, 2-5.1.2, 2-5.1.4, and 2-5.1.5 may be used with special sprinklers that have been listed for such specific residential installation conditions.

#### **2-5.1.7 Position of Residential Sprinklers.**

**2-5.1.7.1** Pendent and upright sprinklers shall be positioned so that the deflectors are within 1 to 4 in. (25.4 to 102 mm) from the ceiling.

*Exception: Special residential sprinklers shall be installed in accordance with the listing limitations.*

**2-5.1.7.2** Sidewall sprinklers shall be positioned so that the deflectors are within 4 to 6 in. (102 to 152 mm) from the ceiling.

*Exception: Special residential sprinklers shall be installed in accordance with the listing limitations.*

**2-5.1.7.3\*** Sprinklers shall be positioned so that the response time and discharge are not unduly affected by obstructions such as ceiling slope, beams, or light fixtures.

**2-5.2 Design Criteria—Outside Dwelling Unit.** The design discharge, number of design sprinklers, water demand of the system, sprinkler coverage, and position of sprinklers for areas to be sprinklered outside the dwelling unit shall comply with specifications in NFPA 13, *Standard for the Installation of Sprinkler Systems*.

*Exception No. 1: When compartmented into areas of 500 sq ft (46 m<sup>2</sup>) or less by 30-minute fire-rated construction, and the area is protected by standard or quick-response sprinklers not exceeding 130 sq ft (12 m<sup>2</sup>) per sprinkler, the system demand may be limited to the number of sprinklers in the compartment area, but not less than a total of four sprinklers. Openings from the compartments need not be protected provided such openings are provided with a lintel at least 8 in. (203 mm) in depth and the total area of such openings does not exceed 50 sq ft (4.6 m<sup>2</sup>) for each compartment. Discharge density shall be appropriate for the hazard classification as determined by NFPA 13.*

*Exception No. 2: Lobbies, in other than hotels and motels, foyers, corridors, and halls outside the dwelling unit, with flat, smooth ceilings and not exceeding 10 ft (3.0 m) in height, may be protected with residential sprinklers, with a maximum system demand of four sprinklers.*

**2-5.3 Pipe Sizing.** Piping shall be sized in accordance with hydraulic calculation procedures to comply with NFPA 13, *Standard for the Installation of Sprinkler Systems*.

**2-6 Location of Sprinklers.** Sprinklers shall be installed in all areas.

*Exception No. 1: Sprinklers may be omitted from bathrooms not exceeding 55 sq ft (5.1 m<sup>2</sup>) with noncombustible plumbing fixtures.*

*Exception No. 2: Sprinklers may be omitted from small clothes closets where the least dimension does not exceed 3 ft (0.9 m) and the area does not exceed 24 sq ft (2.2 m<sup>2</sup>) and the walls and ceiling are surfaced with noncombustible or limited combustible materials as defined by NFPA 220, *Standard on Types of Building Construction*.*

*Exception No. 3: Sprinklers may be omitted from open attached: porches, balconies, corridors, and stairs.*

*Exception No. 4: Sprinklers may be omitted from attics, penthouse equipment rooms, crawl spaces, floor/ceiling spaces, elevator shafts, and other concealed spaces that are not used or intended for living purposes or storage.*

**2-7\* Maintenance.** The owner is responsible for the condition of a sprinkler system and shall keep the system in normal operating condition.

### Chapter 3 Referenced Publications

**3-1** The following documents or portions thereof are referenced within this standard and shall be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

**3-1.1 NFPA Publications.** National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

NFPA 13-1989, *Standard for the Installation of Sprinkler Systems*

NFPA 20-1987, *Standard for the Installation of Centrifugal Fire Pumps*

NFPA 22-1987, *Standard for Water Tanks for Private Fire Protection*

NFPA 74-1989, *Standard for the Installation, Maintenance, and Use of Household Fire Warning Equipment*

NFPA 101®-1988, *Life Safety Code®*

NFPA 220-1985, *Standard on Types of Building Construction*.

#### 3-1.2 Other Publications.

**3-1.2.1 ANSI Publications.** American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.

ANSI B16.1-1975, *Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800*

ANSI B16.3-1985, *Malleable Iron Threaded Fittings, Class 150 and 300*

ANSI B16.4-1985, *Cast Iron Threaded Fittings, Classes 125 and 250*

ANSI B16.5-1981, *Pipe Flanges and Flanged Fittings*

ANSI B16.9-1986, *Factory-Made Wrought Steel Butt-welding Fittings*

ANSI B16.11-1980, *Forged Steel Fittings, Socket-Welding and Threaded*

ANSI B16.18-1984, *Cast Copper Alloy Solder Joint Pressure Fittings*

ANSI B16.22-1980, *Wrought Copper and Copper Alloy Solder Joint Pressure Fittings*

ANSI B16.25-1986, *Buttwelding Ends*

ANSI B36.10M-1985, *Welded and Seamless Wrought Steel Pipe*.

**3-1.2.2 ASTM Publications.** American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM A53-1987, *Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless Steel Pipe*

ASTM A135-1986, *Standard Specification for Electric-Resistance-Welded Steel Pipe*

ASTM A234-1987, *Standard Specification for Piping Fittings of Wrought-Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures*

ASTM A795-1985, *Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use*

ASTM B32-1987, *Standard Specification for Solder Metal, 95-5 (Tin-Antimony-Grade 95TA)*

ASTM B88-1986, *Standard Specification for Seamless Copper Water Tube*

ASTM B251-1987, *Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube*

ASTM E380-1986, *Standard for Metric Practice*.

**3-1.2.3 AWS Publication.** American Welding Society, 2501 N.W. 7th Street, Miami, FL 33125.

AWS A5.8-1981, *Specification for Brazing Filler Metal*.

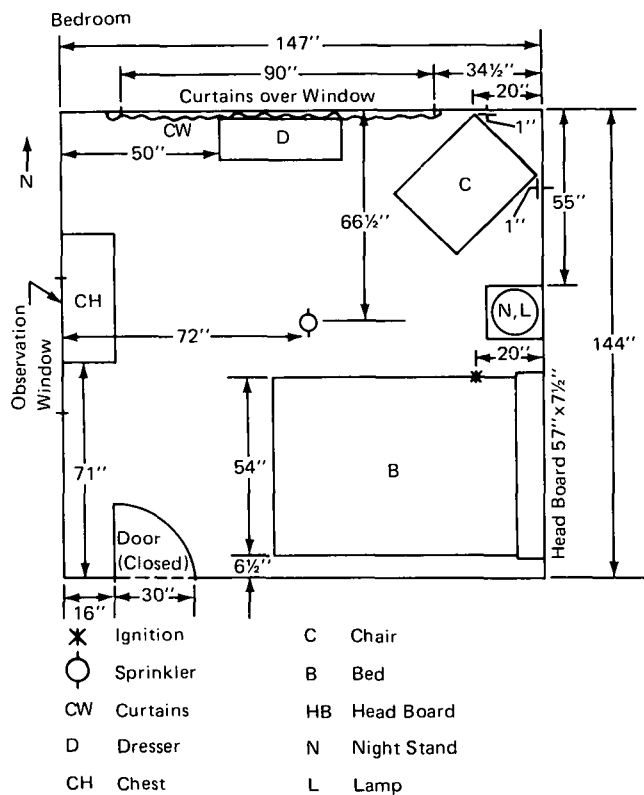
### Appendix A

*This Appendix is not a part of the requirements of this NFPA document, but is included for information purposes only.*

**A-1-1 NFPA 13R** is appropriate for use only in residential occupancies, as an option to NFPA 13, *Standard for the Installation of Sprinkler Systems*, as defined in this standard, up to four stories in height. Residential portions of any other building may be protected with residential sprinklers in accordance with 3-11.2.9 of NFPA 13, *Standard for the Installation of Sprinkler Systems*. Other portions of such sections should be protected in accordance with NFPA 13.

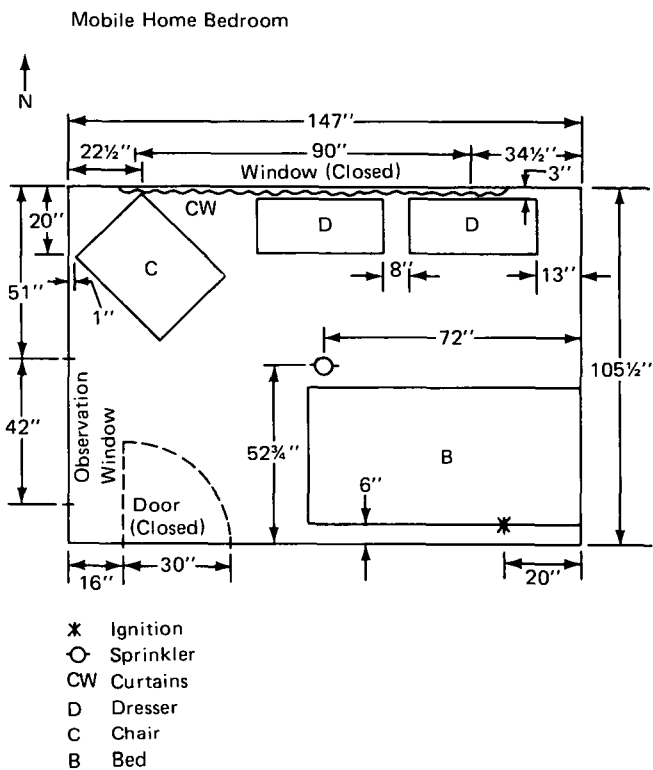
The criteria in this standard are based on full-scale fire tests of rooms containing typical furnishings found in residential living rooms, kitchens, and bedrooms. The furnishings were arranged as typically found in dwelling units in a manner similar to that shown in Figures A-1-1(a), (b), and (c). Sixty full-scale fire tests were conducted in a two-story dwelling in Los Angeles, California, and 16 tests were conducted in a 14-ft (4.3-m) wide mobile home in Charlotte, North Carolina. Sprinkler systems designed and installed according to this standard are expected to prevent flashover within the compartment of origin if sprinklers are installed in the compartment. A sprinkler system designed and installed according to this standard may not, however, be expected to control a fire involving unusually higher average fuel loads than typical for dwelling units [10 psi (0.7 bar)], configurations of fuels other than those with typical residential occupancies, or conditions where the interior finish has an unusually high flame spread rating (greater than 225).

To be effective, sprinkler systems installed in accordance with this standard must have the sprinklers closest to the fire open before the fire exceeds the ability of the sprinkler discharge to extinguish or control that fire. Conditions that allow the fire to grow beyond that point before sprinkler activation or that interfere with the quality of water distribution can produce conditions beyond the capabilities of the sprinkler system described in this standard. Unusually high ceilings or ceiling configurations that tend to divert the rising hot gases from sprinkler locations or change the sprinkler discharge pattern from its standard pattern can produce fire conditions that cannot be extinguished or controlled by the systems described in this standard.



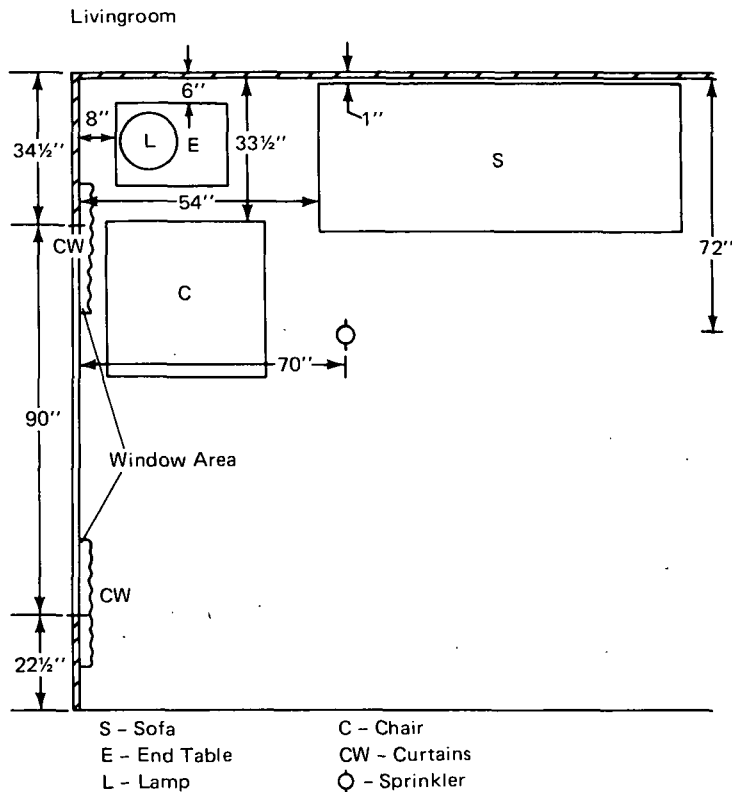
For SI Units: 1 in. = 25.4 mm.

Figure A-1-1(a) Bedroom.



For SI Units: 1 in. = 25.4 mm.

Figure A-1-1(b) Mobile Home Bedroom.



For SI Units: 1 in. = 25.4 mm.

Figure A-1-1(c) Living Room.



**Table A-1-2**  
**Annual Averages of Deaths and Injuries in Apartments**  
**1980-1984**

Fires-123,000	Civilian Deaths-930	Civilian Injuries-5,470
Area of Origin (901 Code)	Civilian Deaths (Used for Ranking)	Percentages by Area of Origin
		Fires                      Civilian Injuries
Living room, den, lounge (14)	38.5	11.3                      23.2
Bedroom (21-22)	28.7	17.4                      27.1
Kitchen (24)	9.8	35.3                      27.2
Hallway corridor (101)	4.3	3.2                        3.4
Interior stairway (03)	3.2	1.0                        1.1
Structural Area (70-79)	3.1	8.1                        3.5
[Balcony, porch (72)]	(1.2)	(1.3)                      (0.7)
[Unspecified (79)]	(1.0)	(0.5)                      (0.2)
[Ceiling/Roof assembly (74)]	(0.3)	(0.7)                      (0.3)
Lobby (05)	1.3	0.6                        0.7
Dining room (23)	1.2	0.8                        1.0
Closet (42)	1.2	1.9                        1.9
Balcony, porch (72)	1.2	1.3                        0.7
Other known single area	4.1	17.8                      8.8
[Bathroom (25)]	(0.6)	(2.1)                      (1.3)
Multiple areas (97)	1.6	0.7                        0.9
Unclassified, not applicable (98-99)	1.8	0.6                        0.5
Total:	100.0	100.0                      100.0

**A-1-2 Levels of Protection.** Various levels of sprinkler protection are available to provide life safety and property protection. The standard is designed to provide a high, but not absolute, level of life safety and a lesser level of property protection. Greater protection to both life and property could be achieved by sprinklering all areas in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*, which permits the use of residential sprinklers in residential areas.

This standard recommends, but does not require, sprinklering of all areas in the building; it permits sprinklers to be omitted in certain areas. These areas are the ones shown by NFPA statistics to be ones where the incidence of life loss from fires in residential occupancies is low. Such an approach provides a reasonable degree of fire safety to life. (See Table A-1-2 for Deaths and Injuries in Multifamily Residential Buildings.)

It should be recognized that the omission of sprinklers from certain areas could result in the development of untenable conditions in adjacent spaces. Where evacuation times may be delayed, additional sprinkler protection and other fire protection features, such as detection and compartmentation, may be necessary.

**A-2-1.3.2** Testing of a system can be accomplished by filling the system with water and checking visually for leakage at each joint or coupling.

Fire department connections are not required for all systems covered by this standard, but may be installed at the discretion of the owner. In these cases, hydrostatic tests in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*, are required.

Dry systems should also be tested by placing the system under air pressure. Any leak that results in a drop in system pressure greater than 2 psi (0.14 bar) in 24 hours should be

corrected. Check for leaks using soapy water brushed on each joint or coupling. Leaks will be shown by the presence of bubbles. This test should be made prior to concealing of piping.

**A-2-2.1.1** At least three spare sprinklers of each type, temperature rating, and orifice size used in the system should be kept on the premises. When fused sprinklers are replaced by the owner, fire department, or others, care should be taken to assure that the replacement sprinkler has the same operating characteristics.

**A-2-3.2** Connection for fire protection to city mains is often subject to local regulation concerning metering and backflow prevention requirements. Preferred and acceptable water supply arrangements are shown in Figures A-2-3.2(a), (b), and (c). When a meter must be used between the city water main and the sprinkler system supply, an acceptable arrangement is shown in Figure A-2-3.2(c). Under these circumstances, the flow characteristics of the meter must be included in the hydraulic calculation of the system. When a tank is used for both domestic and fire protection purposes, a low water alarm actuated when the water level falls below 110 percent of the minimum quantity specified in 2-3.1 should be provided.

**A-2-3.3.1** The tables on the following page can be used to determine a domestic design demand. Using Table A-2-3.3.1(a), determine the total number of water supply fixture units downstream of any point in the piping serving both sprinkler and domestic needs. Using Table A-2-3.3.1(b), determine the appropriate total flow allowance, and add this flow to the sprinkler demand at the total pressure required for the sprinkler system at that point.

**A-2-4.5.9.2** Decorative painting of a residential sprinkler is not to be confused with the temperature identification

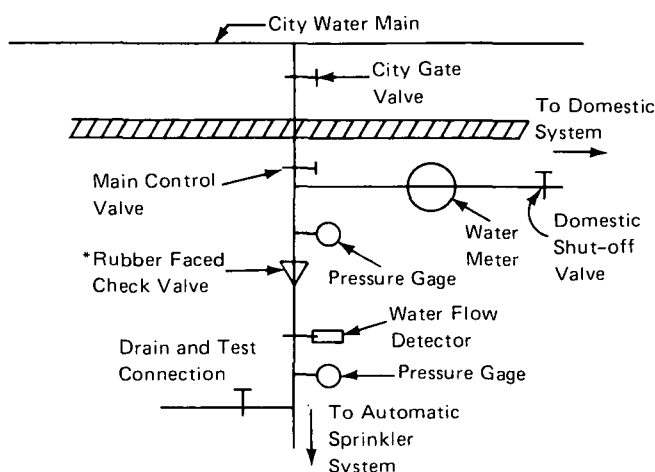


Figure A-2-3.2(a) Preferable Arrangement.

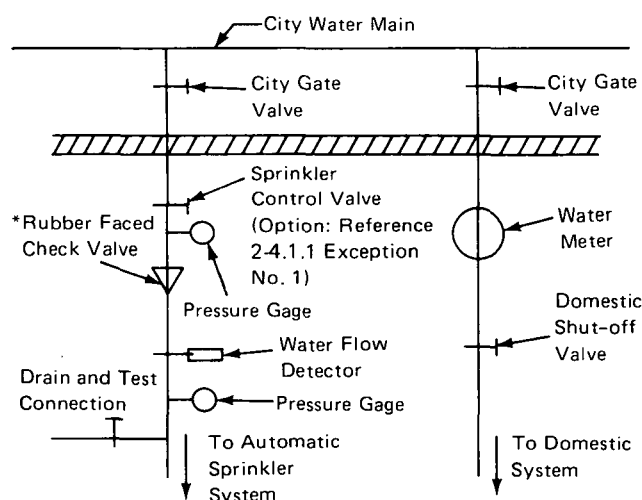
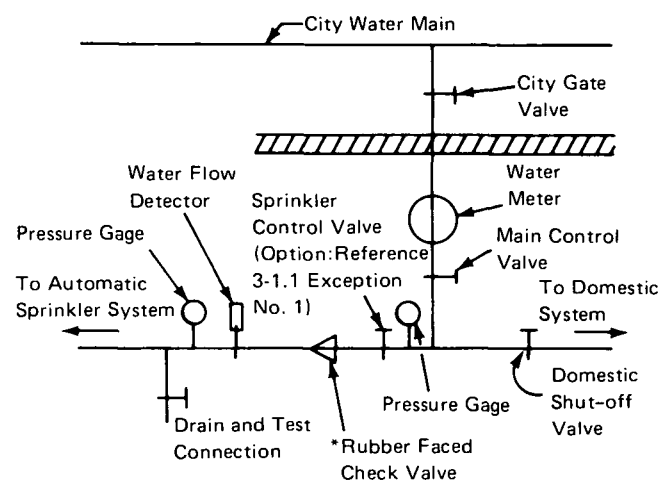


Figure A-2-3.2(b) Acceptable Arrangement with Valve Supervision. (See 2-4.1.1 Exception.)



\*Rubber Faced Check Valves Optional.

Figure A-2-3.2(c) Acceptable Arrangement with Valve Supervision. (See 2-4.1.1 Exception.)

Table A-2-3.3.1(a) Fixture Load Values

Private facilities (within individual dwelling units)	Unit
Bathroom group with flush tank (including lavatory, water closet, and bathtub with shower)	6
Bathroom group with flush valve	8
Bathtub	2
Dishwasher	1
Kitchen sink	2
Laundry trays	3
Lavatory	1
Shower stall	2
Washing machine	2
Water closet with flush valve	6
Water closet with flush tank	3
<b>Public Facilities</b>	
Bathtub	4
Drinking fountain	0
Kitchen sink	4
Lavatory	2
Service sink	3
Shower head	4
Urinal with 1 in. flush valve	10
Urinal with 3/4 in. flush valve	5
Urinal with flush tank	3
Washing machine (8 lb)	3
Washing machine (16 lb)	4
Water closet with flush valve	10
Water closet with flush tank	5

Table A-2-3.3.1(b) Total Estimated Domestic Demand

Total Fixture Load Units [from Table A-2-3.3.1(a)]	Total Demand in Gallons Per Minute For Systems with Predominantly Flush Tanks	Total Demand in Gallons Per Minute For Systems with Predominantly Flush Valves
1	3 gpm	
2	5	
5	10	15 gpm
10	15	25
20	20	35
35	25	45
50	30	50
70	35	60
100	45	70
150	55	80
200	65	90
250	75	100
350	100	125
500	125	150
750	175	175
1000	200	200
1500	275	275
2000	325	325
3500	500	500

colors as referenced in 3-11.6 of NFPA 13, *Standard for the Installation of Sprinkler Systems*.

**A-2-5.1.2** It is intended that the design area is to include up to four adjacent sprinklers producing the greatest water demand within the compartment.

**A-2-5.1.7.3** Fire testing has indicated the need to wet walls in the area protected by residential sprinklers at a level

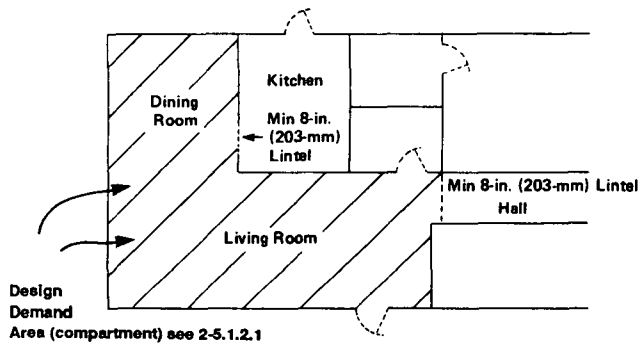


Figure A-2-5.1.2(a) Sprinkler Design Areas for Typical Residential Occupancy.

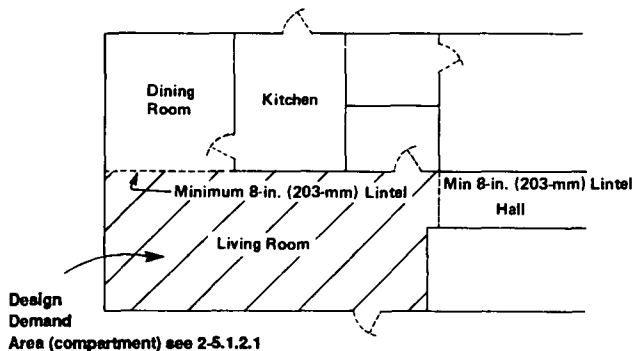


Figure A-2-5.1.2(b) Sprinkler Design Areas for Typical Residential Occupancy.

closer to the ceiling than that accomplished by standard sprinkler distribution. Where beams, light fixtures, sloped ceilings, and other obstructions occur, additional residential sprinklers may be necessary to achieve proper response and distribution, and a greater water supply may be necessary.

Table A-2-5.1.7.3 and Figure A-2-5.1.7.3 provide guidance for location of sprinklers near ceiling obstructions.

Table A-2-5.1.7.3 Maximum Distance from Sprinkler Deflector to Bottom of Ceiling Obstruction

Distance from Sprinkler to Side of Ceiling Obstruction	Maximum Distance from Sprinkler Deflector to Bottom of Ceiling Obstruction
Less than 6 in.	Not permitted
6 in. to less than 1 ft	0 in.
1 ft to less than 2 ft	1 in.
2 ft to less than 2 ft 6 in.	2 in.
2 ft 6 in. to less than 3 ft	3 in.
3 ft to less than 3 ft 6 in.	4 in.
3 ft 6 in. to less than 4 ft	6 in.
4 ft to less than 4 ft 6 in.	7 in.
4 ft 6 in. to less than 5 ft	9 in.
5 ft to less than 5 ft 6 in.	11 in.
5 ft 6 in. to less than 6 ft	14 in.

For SI Units: 1 in. = 25.4 mm; 1 ft = 0.3048 m.

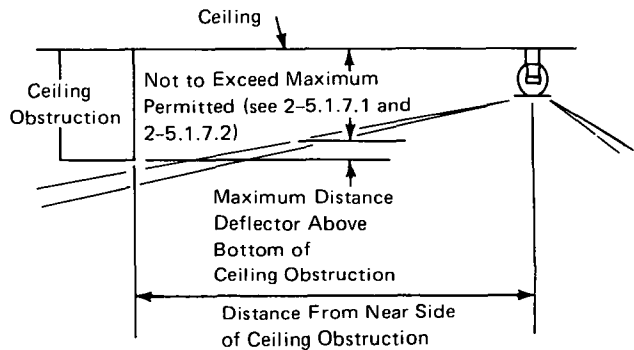


Figure A-2-5.1.7.3 Position of Deflector, Upright or Pendent, When Located Above Bottom of Ceiling Obstruction.

**A-2-7** The responsibility for properly maintaining a sprinkler system is the obligation of the owner or manager, who should understand the sprinkler system operation. A minimum monthly maintenance program should include the following:

- Visual inspection of all sprinklers to ensure against obstruction of spray.
- Inspection of all valves to assure that they are open.
- Testing of all waterflow devices.
- Testing of the alarm system, if installed.

**NOTE:** When it appears likely that the test will result in a response of the fire department, notification to the fire department should be made prior to the test.

(e) Operation of pumps, where employed, should be operated. See NFPA 20, *Standard for the Installation of Centrifugal Fire Pumps*.

- Checking of the pressure of air used with dry systems.
- Checking of water level in tanks.

Table A-2-7  
Inspection, Testing, and Maintenance Requirements

Component	Activity	Frequency	Reference
Control Valve	Inspection Maintenance	Monthly Annually	NFPA 13A, 2-7.1.4
Main Drain Valve	Flow Test	Annually	NFPA 13A, 2-6.1
Inspectors' Test Valve	Flow Test	Annually	NFPA 13A, 4-5.3, 4-7.1
Waterflow Alarm	Flow Test	Annually	NFPA 13A, 3-3.3
Sprinklers	Test	50 Yrs.	NFPA 13A, 3-3.3
Sprinklers, Res/QR	Test	20 Yrs.	NFPA 13A, 3-3.4
Pump	Flow Test	Annually	NFPA 13A, 2-4.2.5
Antifreeze Solutions	Test	Annually	NFPA 13A, 4-7.3

(h) Care should be taken to see that sprinklers are not painted either at the time of installation or during subsequent redecoration. When painting sprinkler piping or painting in areas next to sprinklers, the sprinklers may be protected by covering with a bag, which should be removed immediately after painting is finished.

For further information see NFPA 13A, *Recommended Practice for the Inspection, Testing and Maintenance of Sprinkler Systems*.

## Appendix B Referenced Publications

**B-1** The following documents or portions thereof are referenced within this standard for informational purposes only and thus are not considered part of the requirements of

this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

**B-1.1 NFPA Publications.** National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

NFPA 13-1989, *Standard for the Installation of Sprinkler Systems*

NFPA 13A-1987, *Recommended Practice for the Inspection, Testing and Maintenance of Sprinkler Systems*

NFPA 20-1987, *Standard for the Installation of Centrifugal Fire Pumps*.

## Index

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- (c) a statement of the problem and substantiation for the proposal, and
- (d) proposed text of proposal, including the wording to be added, revised (and how revised), or deleted.