STANDPIPE AND HOSE SYSTEMS

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1.0 SCOPE

FM Global has accepted and adopted NFPA Standard 14, *Standard for the Installation of Standpipe, Private Hydrant and Hose Systems, 2000 Edition.*

This data sheet addresses design and installation of Standpipe and Hose Systems as it pertains to the conservation and protection of property.

1.1 Changes

This document establishes Data Sheet 4-4N as a new and independent document to NFPA 14.

1.2 Superseded Information

This new standard supersedes all previous information in Data Sheet 4-4N.

2.0 FM GLOBAL INTERPRETATION

2.1 Introduction

Design and install standpipe and hose system in accordance with NFPA 14, Standard for the Installation of Standpipe, Private Hydrant and Hose Systems, 2000 Edition. In its application, use the following interpretations.

2.1.1 Shall versus Should

In most if not all instances, the widespread use in the text of NFPA 14, the mandatory *shall* can be replaced by the more permissive should. This is in keeping with other FM Global Standards.

2.1.2 Authority Having Jurisdiction

There are many references in the text of NFPA 14 to the authority having jurisdiction. Legally this could mean the state fire marshal, local fire department, or some other state or municipal office. In the application of this standard the reference is solely to FM Global unless the legal authority takes precedence.

2.1.3 Listed or Approved

Within the NFPA Standard, Listed means equipment approved by Factory Mutual Research and listed in the Factory Mutual Research *Approval Guide.*

Within the NFPA Standard, Approved means acceptance to the Factory Mutual Insurance Company. Factory Mutual Research Approved equipment should be used whenever possible.

2.1.4 Related NFPA Standards

There are a number of references in NFPA 14 to other NFPA standards. In most instances FM Global has its own corresponding standard. FM Global standards will generally take precedence.

2.2 Protection

2.2.1 Treat “Appendix A” material in NFPA 14 as recommended practice applicable to FM Global insured locations. (Paragraph 1-1 and Appendix A material)

2.2.2 Provide standpipes in the stair towers of buildings five or more stories high, and in windowless buildings, four or more stories high. In windowless buildings, provide standpipes just inside doors to fire escapes. (Paragraph 5-3)

2.2.3 Combined Systems. Apply Data Sheet 2-8N to the automatic sprinkler portions of combined standpipe systems. (Paragraph 5-9.1.3)

2.2.4 Plans and Specifications. Submit plans and specifications for standpipes and hose systems to FM Global. (Paragraph 6-1)

2.2.5 Use only automatic standpipe systems. (Paragraph 3-2)

2.2.6 Pump Arrangement. Design and install fire and booster pumps in accordance with Data Sheet 3-7N, *Stationary Pumps for Fire Protection (NFPA).* (Paragraph 7-1.2)

2.2.7 Do not accept series staging of fire or booster pumps to supply water for sprinkler or standpipe systems as indicated in paragraph 7-4 of NFPA 14 or shown in Figures A-5-1(b) and A-5-1(c) of NFPA 14. Install and arrange fire and booster pumps in accordance with Data Sheet 3-7N. (Paragraph 7-4)

2.2.8 Arrange for automatic starting and manual stopping when fire or booster pump units supply water for standpipes (see Data Sheet 3-7N). (Paragraph 7-1.1 and 7-1.2)

2.2.9 Figure 1 illustrates a two zone system for a building having a maximum height of 550 ft (168 m). It differs from NFPA 14 Figure A-5-1(b) in that both fire pumps take their suction directly from the water supply. If two water supplies are necessary, each zone should have the second pump in parallel or a gravity tank at the top. The gravity tank may be refilled by the fire pump for that zone or by a separate tank-filling pump. (Paragraph 5-1 and Fig. A-5-1(b))

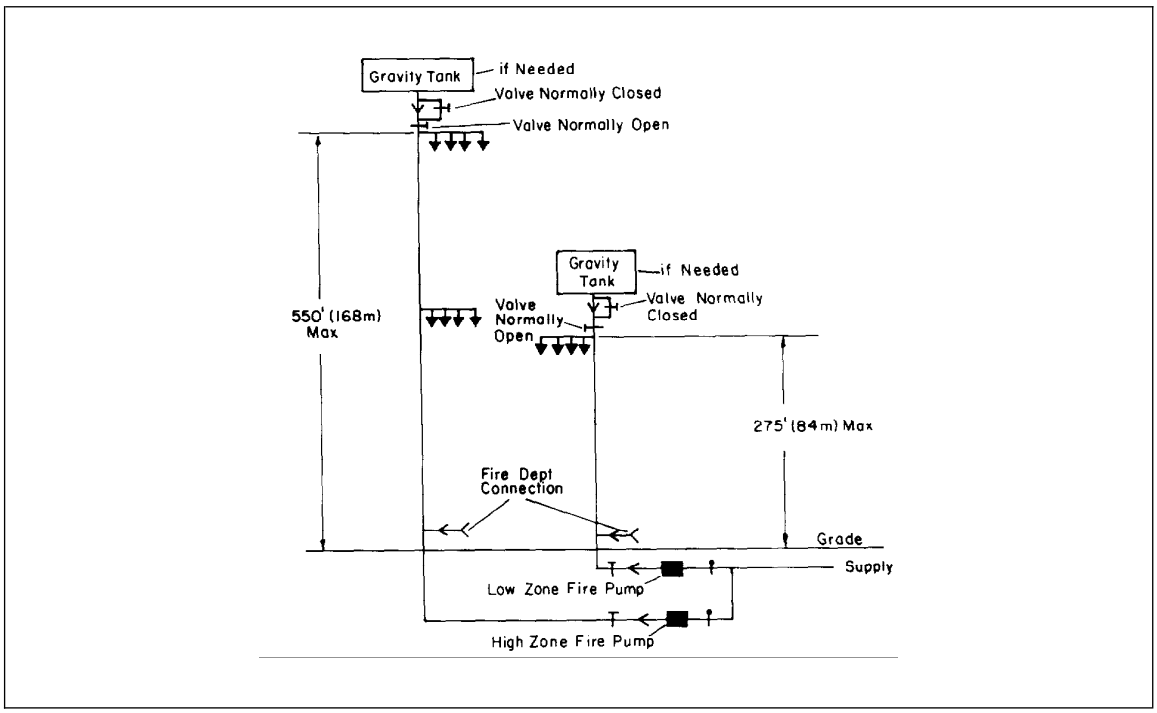

Fig. FM1. Two zone system.

2.2.10 Where gravity or water tanks are needed, design and install tanks in accordance with FM Global Data Sheet 3-2, *Water Tanks for Fire Protection.* (Paragraph 7-1.2)

2.2.11 Avoid the use of Standpipe zones exceeding 275 ft. For Buildings having three or more zones of 275 feet (84 m) each should duplicate the high zone arrangement from Figure 1 for the third and higher zones. (Paragraph 5-2)

2.2.12 Make small (hand) hose connections to sprinkler pipes preferably to sprinkler systems serving areas other than those in which the hose would be used. Otherwise, if the sprinkler system is shut off, the hand hose would be without water (see Data Sheet 2-8N). (Paragraph 5-3.3 [see also NFPA 13 paragraph 5-15.5.1.1])

2.2.13 Location of Standpipes in Unheated Areas.

Small hose protection is needed for storage areas. Many such areas are unheated, so that piping is subject to freezing in the winter. Under such conditions, the best practice is to locate the hose connection in an adjacent heated area such as an office, washroom, or dry pipe valve enclosure. If there are no heated areas in the immediate vicinity, the best arrangement is an approved remote control hose valve station.

Another acceptable method is a small approved deluge valve actuated by push buttons at each hose station. An emergency power supply should be provided for any deluge valve electrical circuitry. Drains are needed at low points. If pressure is not maintained on piping, ordinary hose valves may be used.

A less effective method is hose stations in unheated areas supplied by a small dry pipe valve separate from the dry pipe valves supplying sprinklers. Low points should have dual valves and drum drips. Hose control valves should have an automatic air maintenance device. Employees should be given special instruction in the use of these hose stations, in that they should expect air to discharge for several seconds until water reaches the hose. A pressure surge may be expected when water starts to flow.

Existing hose stations supplied on a shut-in-winter system are acceptable providing the control valve in the heated area is on the same floor. The valve should be no more than 150 ft (45.7 m) from the hose connection, well marked, and readily accessible. Employees should be thoroughly instructed and drilled in emergency operating procedures. New indoor hose connections should not use this method because of complications regarding valve arrangements and the continuing need for employee education. (Paragraph 4-1-2.3)

2.2.14 Standpipe Installations In Buildings Under Construction. Provide at least one hose valve at each floor with a connection for attaching fire department hose and an additional 1-½ inch outlet and hose for use by personnel on the site until the fire department arrives. (Paragraph 10-1)

2.3 Operation And Maintenance

2.3.1 Tests and Inspection

For new underground piping the amount of leakage at the joints is limited to a maximum of two quarts per hour (1.9 l/h) per 100 gaskets or joints irrespective of pipe diameter. The amount of allowable leakage may be increased by one fluid ounce per inch valve diameter per hour (30 ml/25 mm/h) for each metal seated valve isolating the test section. If dry barrel hydrants are tested with the main valve open, so the hydrants are under pressure, an additional five ounces per minute (150 ml/min) leakage is permitted for each hydrant. (Paragraph 9-4)

3.0 SUPPORT FOR RECOMMENDATIONS

Standpipes are used to supply water to hose outlets located throughout a building. Standpipes can be stand-alone systems, where only hose outlets are supplied or combination systems, where the standpipe system also serves to supply water to sprinkler systems. Combined standpipe systems are very common in high-rise buildings.

The use of standpipe systems is required by fire codes in the United States and the basic document for the design and installation of systems is NFPA 14.

FM Global is an active participant in the development of NFPA 14. Over the years, FM Global's position has paralleled NFPA 14 in most areas, except where noted in this standard. Major differences between NFPA and FM Global position include:

1. FM Global does not recommend the arrangement of pumps in series to supply standpipe zones. Arranging the pump in series reduces the reliability of the system since failure of one single pump may result in the loss of supply to the entire building.

2. FM Global does not recommend the use of standpipe zones exceeding 273 ft in height. Since standpipe systems are designed to achieve a minimum hose outlet pressure at the top most hose outlet, an increase in zone height translates into an increase in supply pressure at the base of the riser and the need for pressure reducing valves (PRV's) for hose outlets and sprinkler systems located in the lower portions of the zones. The PRVs are needed to prevent excessive pressures to hose outlets and sprinkler systems. PRVs are complex in design, setting, maintenance, testing and operation and their use makes the overall system more complex.

4.0 REFERENCES

4.1 FM Global

Data Sheet 2-8N, *Installation Of Sprinkler Systems (NFPA).*

Data Sheet 2-8, *Earthquake Protection for Water-Based Fire Protection Systems.*

Data Sheet 3-2, *Water Tanks for Fire Protection.*

Data Sheet 3-7N/13-4N, *Stationary Pumps for Fire Protection (NFPA).*

4.2 NFPA Standards

NFPA 14, *Standard for the Installation of Standpipe, Private Hydrant, and Hose Systems,* 2000 Edition.

APPENDIX A DOCUMENT REVISION HISTORY

Data Sheet 4-4N was created in 1978. It included the exact text of NFPA 14, 1978 edition, including appendix material, and the applicable FM Global comments in bold letters.

The 1978 version of Data Sheet 4-4N was revised in 1981 and restructured in 1998.