T E C H N I C A L N O T E

SPRINKLER AIR AND NITROGEN REQUIREMENTS IN NFPA STANDARDS

UNITED Fire Systems has received numerous inquiries on what the requirements are at present for the use of nitrogen in preaction sprinkler systems. This Technical Note provides information on the sections of the relevant NFPA Standards that may be applicable.

IMPORTANT

UNITED Fire Systems is providing this Technical Note for information only. Consult with a fire protection professional regarding all requirements for any particular application. **UNITED Fire Systems** assumes no responsibility for this information's suitability for any particular purpose.

All references in this Technical Note are taken from:

NFPA 13-2016, *Standard for the Installation of Sprinkler Systems*

Chapter 7 System Requirements; **7.2** Dry-Pipe Systems and **7.3** Preaction Systems and Deluge Systems
Chapter 25 Systems Acceptance; **25.2** Acceptance Requirements

NFPA 25-2017, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*

Chapter 13 Common Components and Valves; **13.4** System Valves

COMMON INQUIRIES	Standard	Paragraph
Requirements for Pressure Supervision of a Preaction Sprinkler System	**NFPA 13-2016**	**7.3.2.4.2**

7.3.2.4.2 Except as permitted by **7.3.2.4.3**, air or nitrogen supervising pressure for preaction systems shall be installed in conformance with the dry pipe system air pressure and supply rules of **7.2.6**.

7.3.2.4.3 The relief valves required by **7.2.6** shall be permitted to be omitted for the type of preaction system described in **7.3.2.1(1)** when the air pressure is supplied from a source that is not capable of developing pressures in excess of 15 psi (1.0 bar).

7.3.2.1 Preaction systems shall be one of the following types:

(1) A single interlock system, which admits water to sprinkler piping upon operation of detection devices

Requirement to Restore Nitrogen Pressure within 30 Minutes	**NFPA 13-2016**	**7.2.6.3.2 and A.7.2.6.3.2**

7.2.6.3.2 The air supply shall have a capacity capable of restoring normal air pressure in the system within 30 minutes.

(A.7.2.6.3.2) When a single compressor serves multiple dry-pipe systems, the 30-minute fill time is based on the single largest system.

Listed Automatic Air Maintenance Device	**NFPA 13-2016**	**7.2.6.6.1 and A.7.2.6.6.1**

7.2.6.6.1 Unless the requirements of **7.2.6.6.2** are met, where the air supply to a dry pipe system is maintained automatically, the air supply shall be from a dependable plant system or an air compressor with an air receiver, and shall utilize an air maintenance device specifically listed for such service and capable of controlling the required air pressure on, and maximum airflow to, the dry pipe system.

A.7.2.6.6.1 Air maintenance devices are unique components within the air supply and need to be listed for use. Compressors are not air maintenance devices and this section does not require air compressors to be listed.

7.2.6.6.2 Where the air compressor supplying the dry pipe system has a capacity less than 5.5 ft^3/min (160 L/min) at 10 psi (0.7 bar), an air receiver or air maintenance device shall not be required.

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TECHNICAL NOTE

COMMON INQUIRIES (Continued)	Standard	Paragraph
Requirement for Each System to Have its Own Air Maintenance Device	NFPA 13-2016	7.2.6.6.3 and 7.2.6.6.3.1

7.2.6.6.3 The automatic air supply to more than one dry pipe system shall be connected to enable individual maintenance of air pressure in each system.

7.2.6.6.3.1 Each dry pipe system shall have a dedicated air maintenance device.

Requirement for Check Valves	NFPA 13-2016	7.2.6.6.4

7.2.6.6.4 A check valve or other positive backflow prevention device shall be installed in the air supply to each system to prevent airflow or waterflow from one system to another.

Minimum Nitrogen Pressure	NFPA 13-2016	7.2.6.7.1 and 7.3.2.4.4

7.2.6.7.1 The system air pressure shall be maintained in accordance with the instruction sheet furnished with the dry pipe valve, or shall be 20 psi (1.4 bar) in excess of the calculated trip pressure of the dry pipe valve, based on the highest normal water pressure of the system supply.

7.3.2.4.4 All preaction system types described in 7.3.2.1(2) and 7.3.2.1(3) shall maintain a minimum supervising air or nitrogen pressure of 7 psi (0.5 bar).

7.3.2.1 Preaction systems shall be one of the following types:

(1) A single interlock system, which admits water to sprinkler piping upon operation of detection devices.
(2) A non-interlock system, which admits water to sprinkler piping upon operation of detection devices or automatic sprinklers.
(3) A double interlock system, which admits water to sprinkler piping upon operation of both detection devices and automatic sprinklers

Installation Acceptance – Permissible Maximum Leakage Rate	NFPA 13-2016	7.2.6.7.2 and 25.2.2

7.2.6.7.2 The permitted rate of air leakage shall be as specified in **25.2.2**.

25.2.2 Dry Pipe and Double Interlock Preaction System(s) Air Test

25.2.2.1 In addition to the standard hydrostatic test, an air pressure leakage test at 40 psi (2.7 bar) shall be conducted for 24 hours. Any leakage that results in a loss of pressure in excess of 1 $^1/_2$ psi (0.1 bar) for the 24 hours shall be corrected.

25.2.2.1.1 Modifications to existing systems shall be tested for air leakage using one of the following test methods:

(1) An air pressure test at 40 psi (2.7 bar) shall be performed for 2 hours.
  (a) The system shall be permitted to lose up to 3 psi (0.2 bar) during the duration of the test.
  (b) With the system at normal system air pressure, the air source shall be shut off for 4 hours. If the low pressure alarm goes off within this period, the leaks shall be addressed.

Periodic Testing of Systems for Pressure Leakage	NFPA 25-2017	13.4.3.2.5

13.4.3.2.5 Preaction systems shall be tested once every 3 years for air leakage, using one of the following test methods:

(1) Perform a pressure test at 40 psi (3.2 bar) for 2 hours. The system shall be permitted to lose up to 3 psi (0.2 bar) during the duration of the test. Air leaks shall be addressed if the system loses more than 3 psi (0.2 bar) during this test.
(2) With the system at normal system pressure, shut off the air source (compressor or shop air) for 4 hours. If the low air pressure alarm goes off within this period, the air leaks shall be addressed.

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