



Deluge Systems

NFPA 13: 2019 Edition
NFPA 25: 2020 Edition



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2. Attendee must attend the entire online session (monitored by polling and the host)
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Portfolio of Flagship Brands



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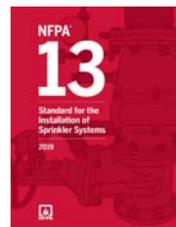
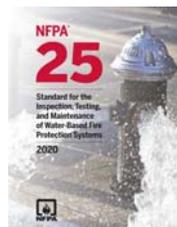
Objectives

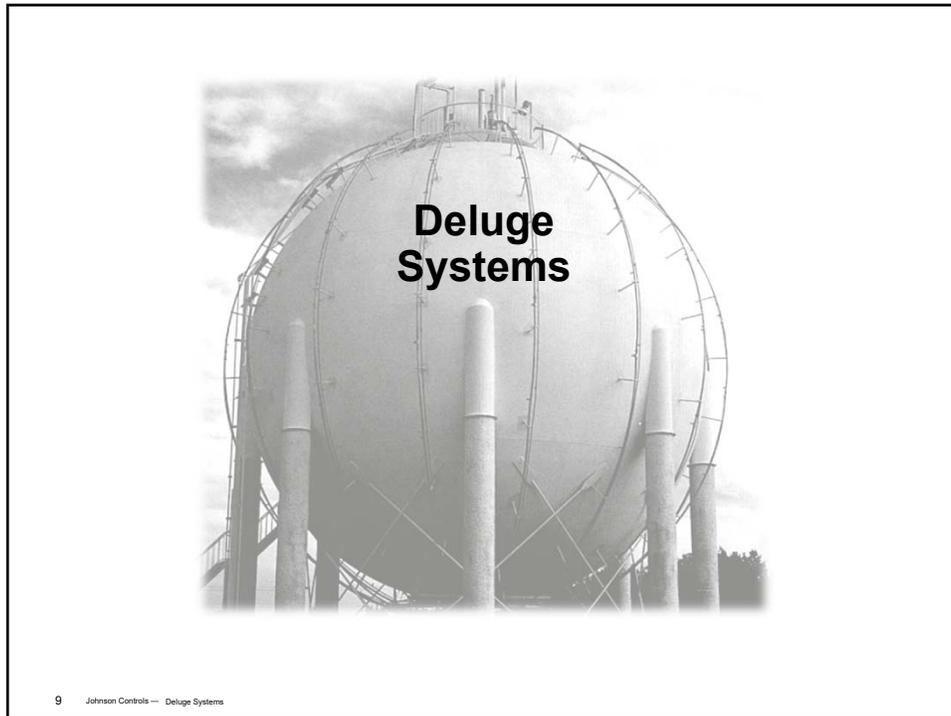
- Identify the components of a deluge system and recognize the differences from other systems.
- Explain the importance of proper inspection, testing, and maintenance.
- Describe the sequence of events for a deluge system to operate.
- Identify and describe the equipment and installation requirements, as they relate to operation and maintenance.

Introduction

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Deluge System Definition

- 3.6.4.2 Deluge Sprinkler System.** A sprinkler system employing open sprinklers or nozzles that are attached to a piping system that is connected to a water supply through a valve that is opened by the operation of a detection system installed in the same areas as the sprinklers or nozzles. When this valve opens, water flows into the piping system and discharges from all sprinklers or nozzles attached thereto. [13, 2019]



When are Deluge Systems Used?

- Deluge systems are used for special hazards where there are easily ignitable and fast burning substances which promote rapid fire development.
 - Extinguishment
 - Control of Burning
 - Exposure Protection
 - Containment of Heat



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What makes a Deluge System?

- By definition, a deluge system usually requires:
 - Deluge Valve
 - Supplemental Detection System
 - Open Sprinklers or Nozzles



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Traditional Deluge Valves



Diaphragm Style
Deluge Valve

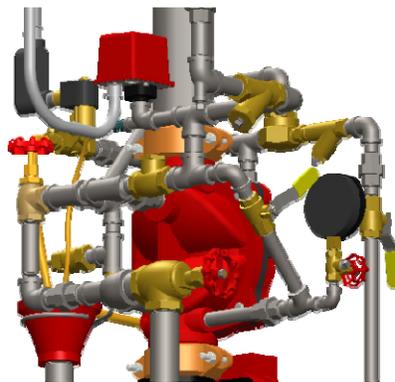


Mechanical Latching
Deluge Valve

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Deluge Valve Trim Piping

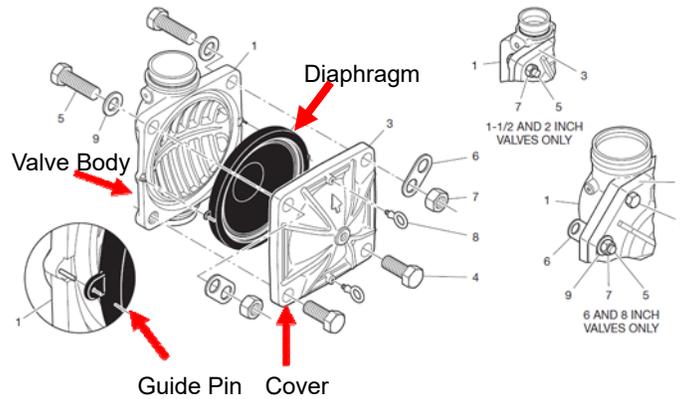


Trim Piping includes required pipe nipples, fittings, and devices that allow the valve to function as designed

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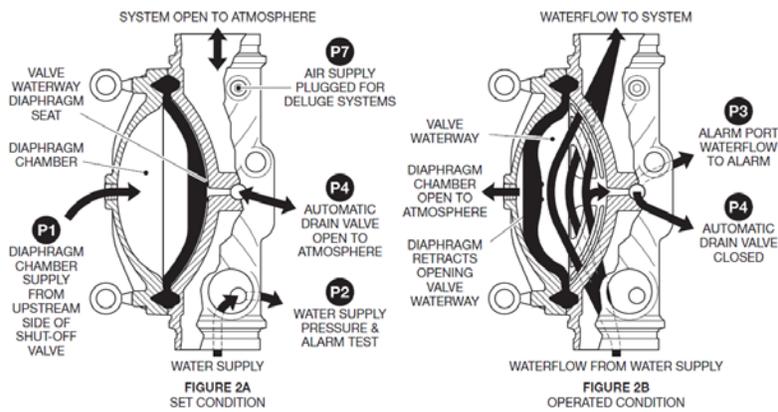
DV-5A Diaphragm Deluge Valve



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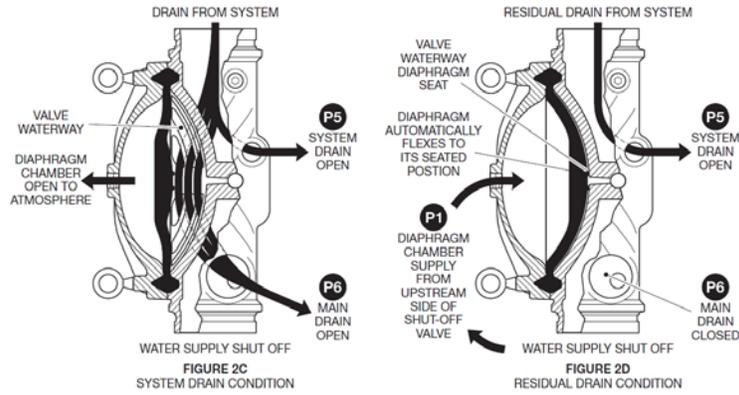
DV-5A Operation



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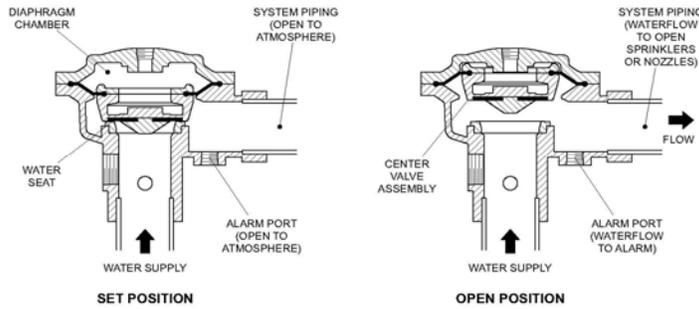
DV-5A Operation



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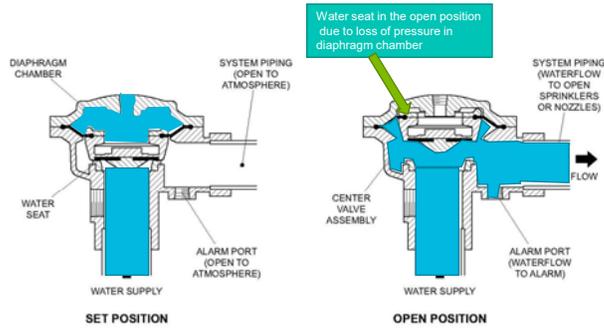
Diaphragm Deluge Valve



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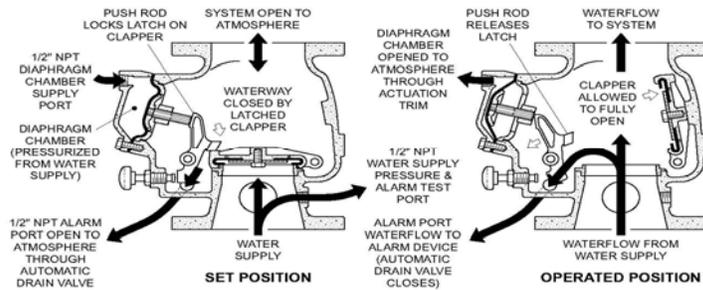
Diaphragm Deluge Valve



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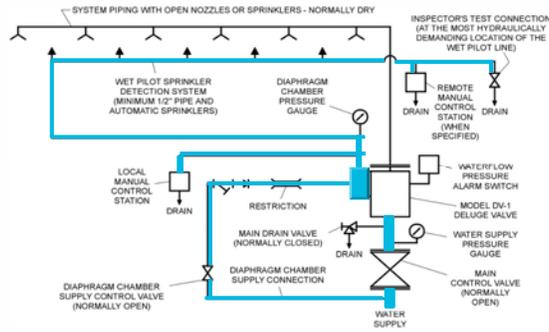
Mechanical Latching Deluge Valve



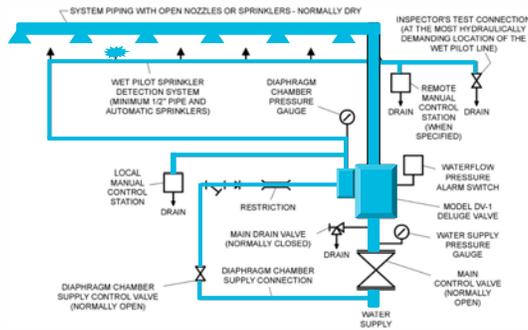
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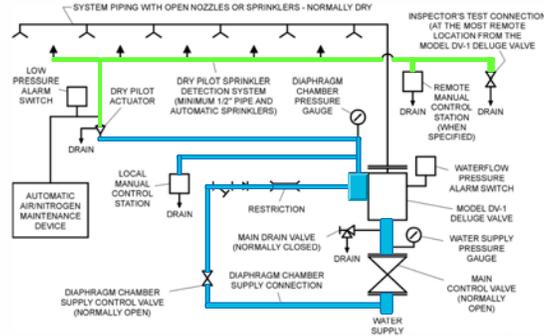
Wet Pilot Actuation



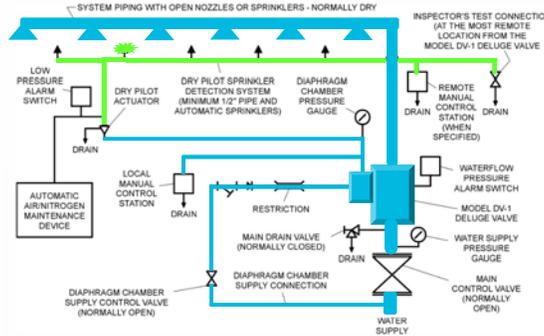
Wet Pilot Actuation



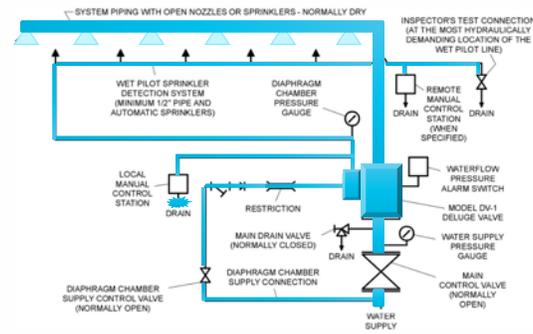
Dry Pilot Actuation



Dry Pilot Actuation



Manual Actuation



Dry Pilot and Electronic Actuation Trip Test Demonstration

Poll #1

What is a pilot line?

- A. Supplemental Fire Protection
- B. Mechanical Detection that Actuates the Deluge Valve
- C. Manual Means to Operate the System



NFPA 25 Chapter 13 Requirements

Inspection of Deluge Systems

- **4.1.2.5** Valve enclosures for deluge valves subject to freezing shall be inspected daily during cold weather to verify a minimum temperature of 40°F (4°C).
- **4.1.2.5.1** Valve enclosures equipped with low temperature alarms shall be inspected weekly.



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Inspection of Deluge Systems

- **4.1.2.5.2** Low temperature alarms, if installed in valve enclosures, shall be inspected annually at the beginning of the heating season to verify they are free of physical damage.



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Inspection of Deluge Systems

- **13.2.5.1.2** Gauges monitoring water pressure shall be inspected quarterly to verify that normal water supply pressure is being maintained.
- **13.2.5.1.3** Gauges monitoring air or nitrogen pressure shall be inspected monthly to verify that normal air or nitrogen pressure are being maintained.



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Inspection of Deluge Systems

- **13.4.4.1.1** The deluge valve shall be externally inspected monthly to verify the following:
 - The valve is free from physical damage.
 - All trim valves are in the appropriate open or closed position.
 - The valve seat is not leaking.
 - Electrical components are in service.



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Inspection of Deluge Systems

- **13.4.4.1.2** The interior of the deluge valve and the condition of detection devices shall be inspected annually when the trip test is conducted..

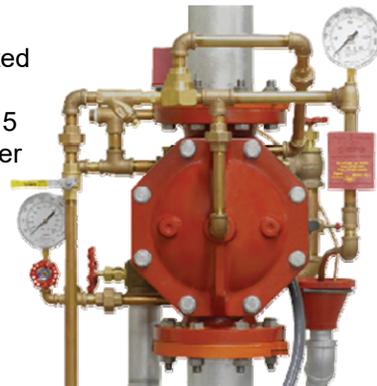


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Inspection of Deluge Systems

- **13.4.4.1.3** Strainers, filters, restricted orifices, and diaphragm chambers shall be inspected internally every 5 years unless tests indicate a greater frequency is necessary.



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Testing of Deluge Systems

- **13.4.4.2.1** Deluge valve flow tests shall incorporate full functionality of the system as a unit, including automatic and manual activation.
- **13.4.4.2.2** Protection shall be provided for any devices or equipment subject to damage by system discharge during flow tests.

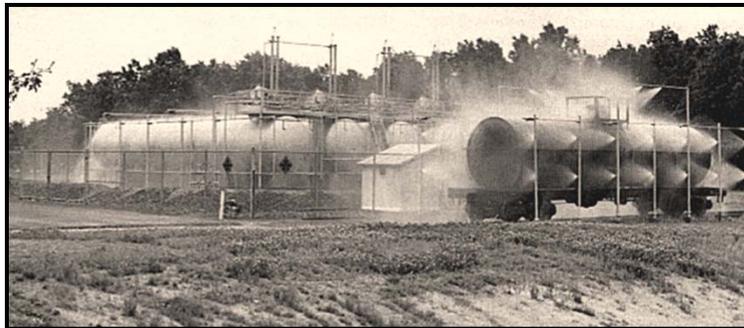


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Testing of Deluge Systems

- **13.4.4.2.3.1*** Where the nature of the protected property is such that water cannot be discharged for test purposes, an annual trip test shall be permitted to be conducted in a manner that does not necessitate discharge in the protected area.



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Testing of Deluge Systems

- **13.4.4.2.3.2** Where the nature of the protected property is such that water cannot be discharged unless protected equipment is shut down (e.g., energized electrical equipment), a full flow system test shall be conducted at the next scheduled shutdown.
- **13.4.4.2.3.3** For full flow tests in accordance with 13.4.4.2.3.2, the test frequency shall not exceed 3 years.



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Testing of Deluge Systems

- **13.4.4.2.4** During the annual full flow test, the water discharge patterns from all of the open spray nozzles or sprinklers shall be observed to ensure that patterns are not impeded by plugged nozzles, that nozzles are correctly positioned, and that obstructions do not prevent discharge patterns from wetting surfaces to be protected.



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HV and D-3 Nozzle Spray and Inspection

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Poll #2

How often is an internal valve inspection required for an externally resetting deluge valve?

- A. Monthly
- B. Quarterly
- C. Annually
- D. Every five years

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Testing of Deluge Systems

- **13.4.4.2.7.1** Pressure readings shall be recorded at the hydraulically most remote nozzle or sprinkler.
- **13.4.4.2.7.2** A second pressure reading shall be recorded at the deluge valve.
- **13.4.4.2.7.3** These readings shall be compared to the hydraulic design pressures to ensure the original system design requirements are met by the water supply.



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Testing of Deluge Systems

- **13.4.4.2.8** The maximum number of systems expected to operate in case of fire shall be tested simultaneously to check the adequacy of the water supply.
- **13.4.4.2.9** Manual actuation devices shall be operated annually.



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Testing of Deluge Systems

- **13.4.4.2.13** Low air pressure supervisory devices, if provided on the detection system, shall be tested quarterly in accordance with the manufacturer's instructions.
- **13.4.4.2.14** Low temperature alarms, if installed in valve enclosures, shall be tested annually at the beginning of the heating season.

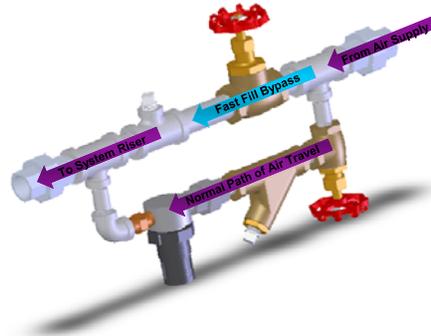


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Testing of Deluge Systems

- **13.4.4.2.15** Automatic air pressure maintenance devices, if provided on the detection system, shall be tested yearly at the time of the annual deluge valve trip test, in accordance with the manufacturer's instructions.



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Testing of Deluge Systems

- **13.4.4.2.10** After the annual trip test, the deluge system shall be returned to service in accordance with the manufacturer's instructions.



Testing of Deluge Systems

- **13.4.4.2.11** Grease or other sealing materials shall not be applied to the seating surfaces of deluge valves.



Maintenance of Deluge Systems

- **13.4.4.3.1** Leaks causing drops in supervisory pressure sufficient to sound warning alarms, and electrical malfunctions causing alarms to sound, shall be located and repaired.



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Maintenance of Deluge Systems

- **13.4.4.3.2** During the annual trip test, the interior of the deluge valve shall be cleaned thoroughly, and the parts replaced or repaired, as necessary.
- **13.4.4.3.2.1** Interior cleaning and parts replacement or repair shall be permitted every 5 years for valves that can be reset without removal of a faceplate.



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Maintenance of Deluge Systems

- **13.4.4.3*** Auxiliary drains in deluge systems shall be operated after each system operation and before the onset of freezing conditions (and thereafter as needed).
- **13.4.4.3.4** Additional maintenance as required by the manufacturer's instructions shall be provided.



51 Johnson Controls — Deluge Systems



Poll #3

How often is a trip test of a deluge system required?

- A. Monthly
- B. Quarterly
- C. Annually
- D. Every five years

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Questions?



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