

The background of the slide features a close-up, slightly blurred photograph of a fire sprinkler head. The sprinkler is mounted on a metal ceiling with a diamond-plate texture. A red fire hose is visible, running vertically through the center of the image, passing behind the sprinkler head. The lighting is dramatic, with strong highlights and shadows, emphasizing the industrial nature of the scene.

NEW BRITAIN BOARD OF WATER COMMISSIONERS

FIRE PROTECTION

DEFINITIONS,

STANDARDS

and

EXAMPLES



FIRE PROTECTION

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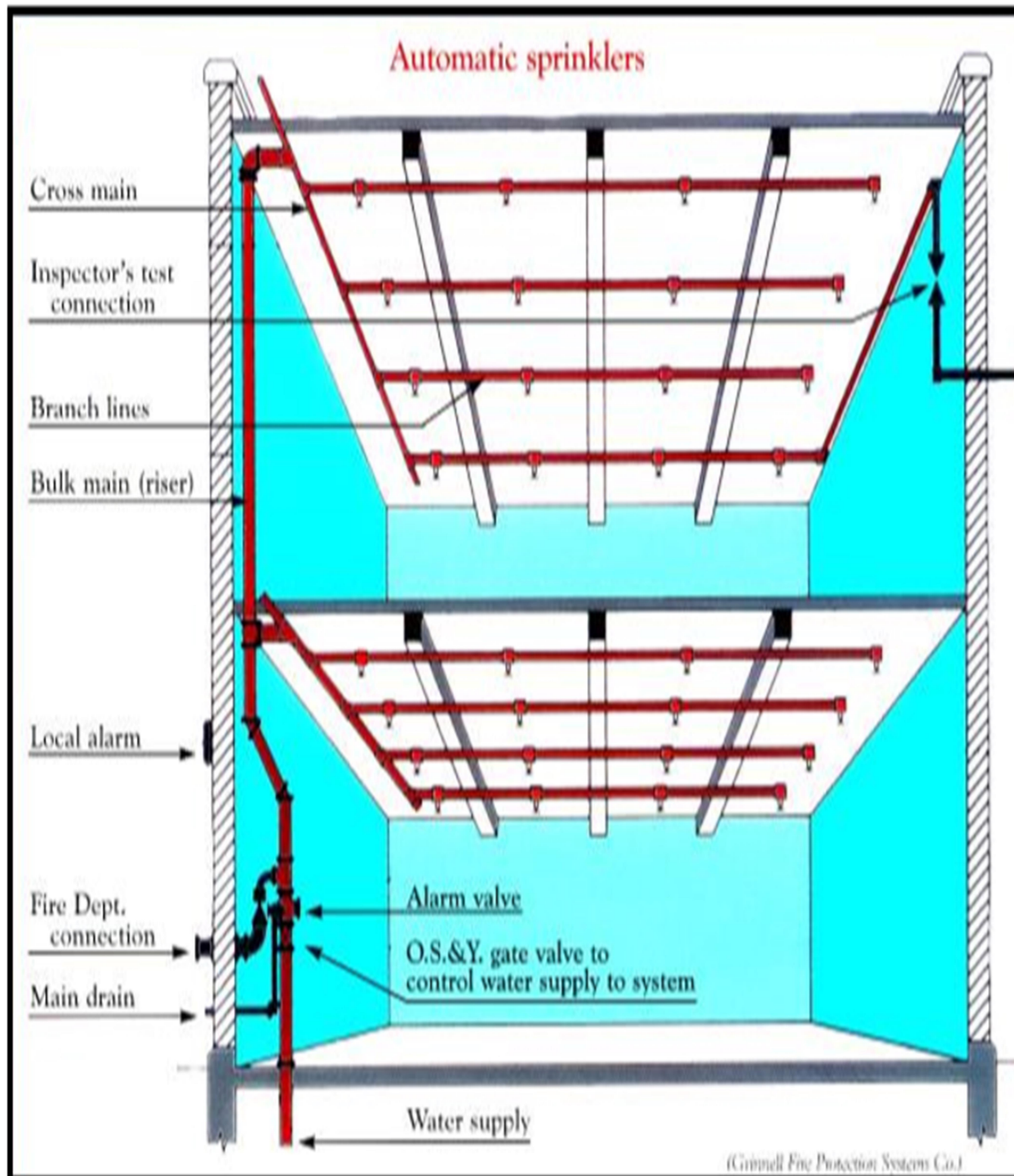
EXAMPLES OF FIRE PROTECTION SYSTEMS

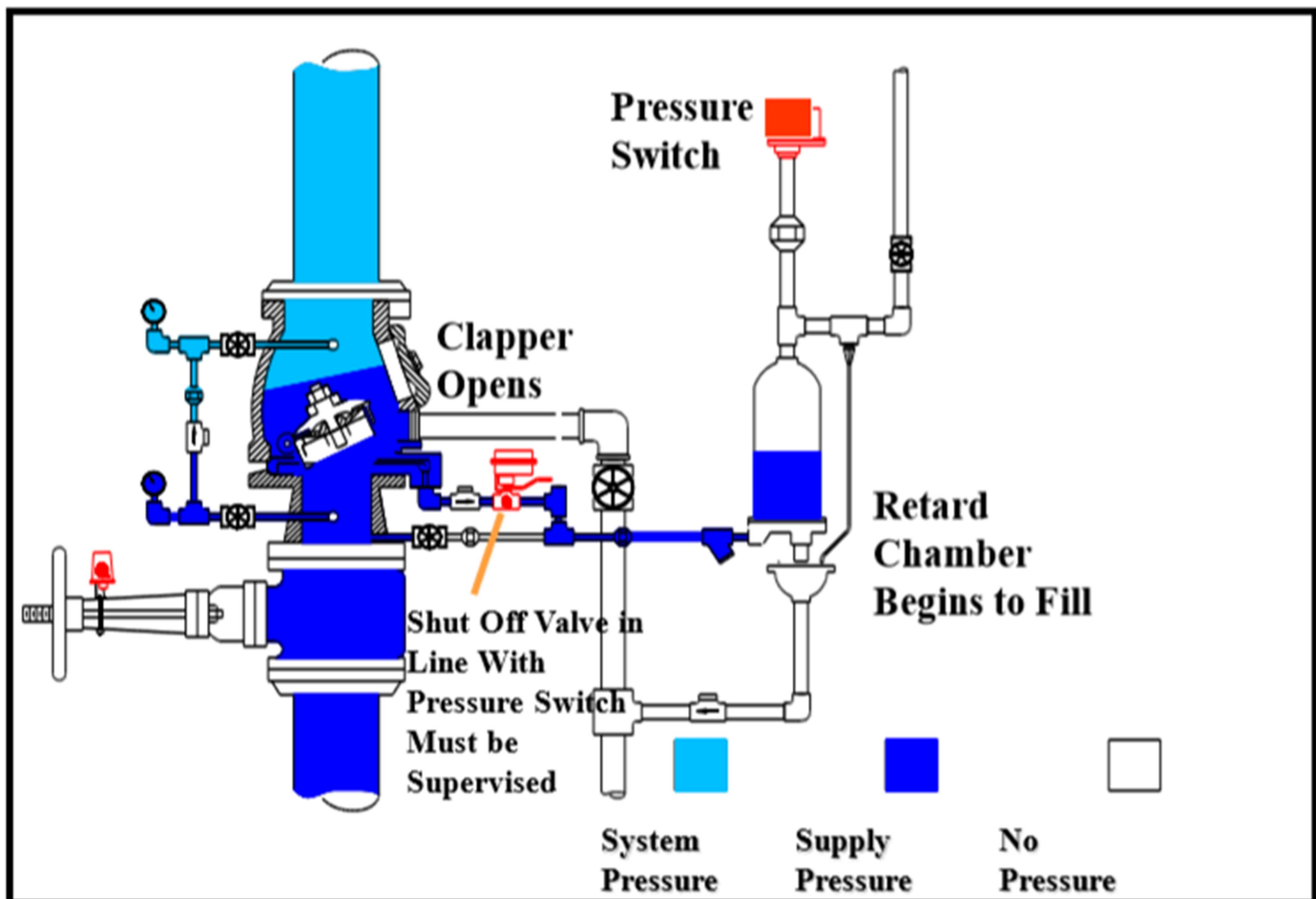
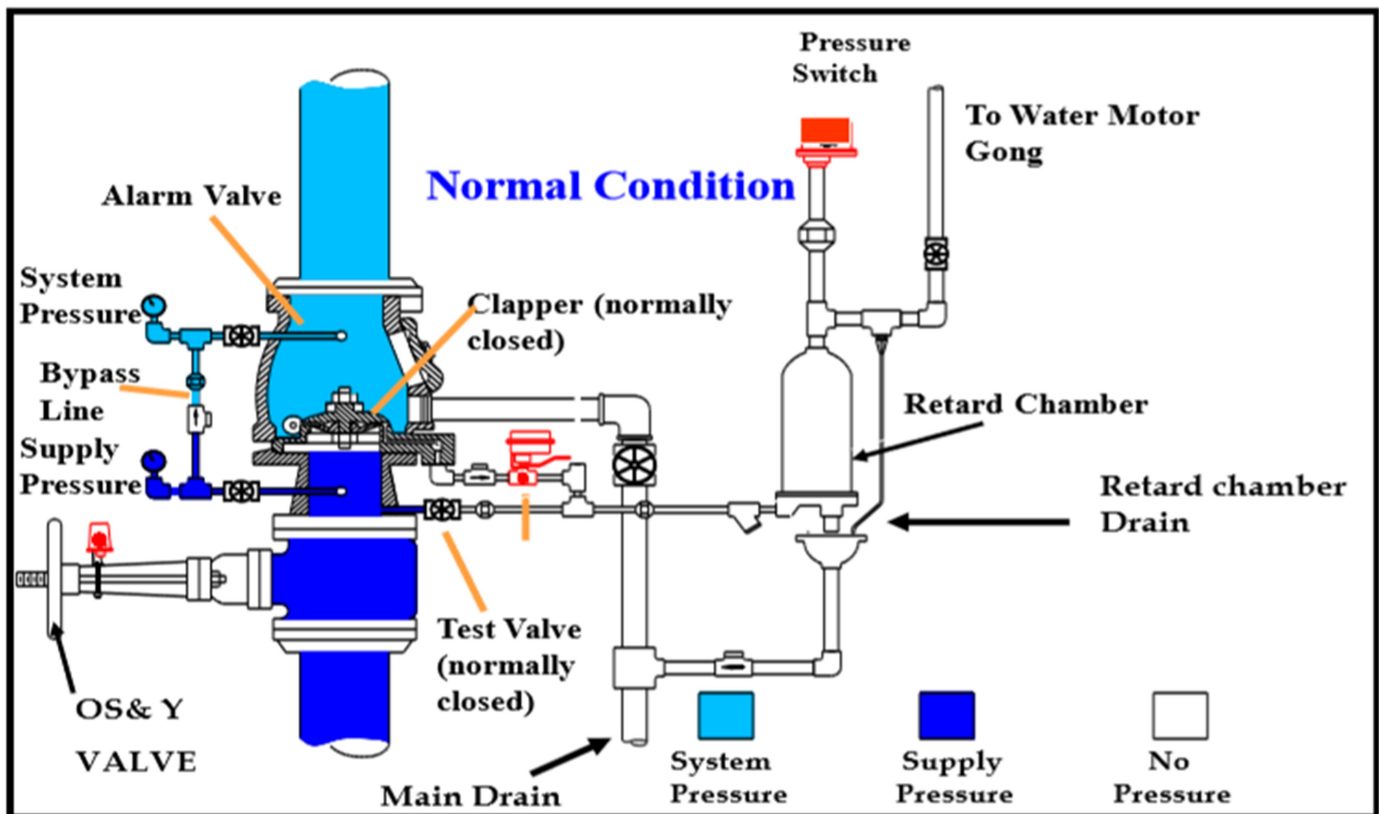
What are “passive” and “active” fire protection systems?



- Passive systems do not rely on automatic or manual operation to work.
 - Examples
 - » Fire doors
 - » Fire walls
- Active systems rely on moving parts
 - Examples
 - » Fire Sprinkler Systems
 - » Fire Detection/Alarm Systems.

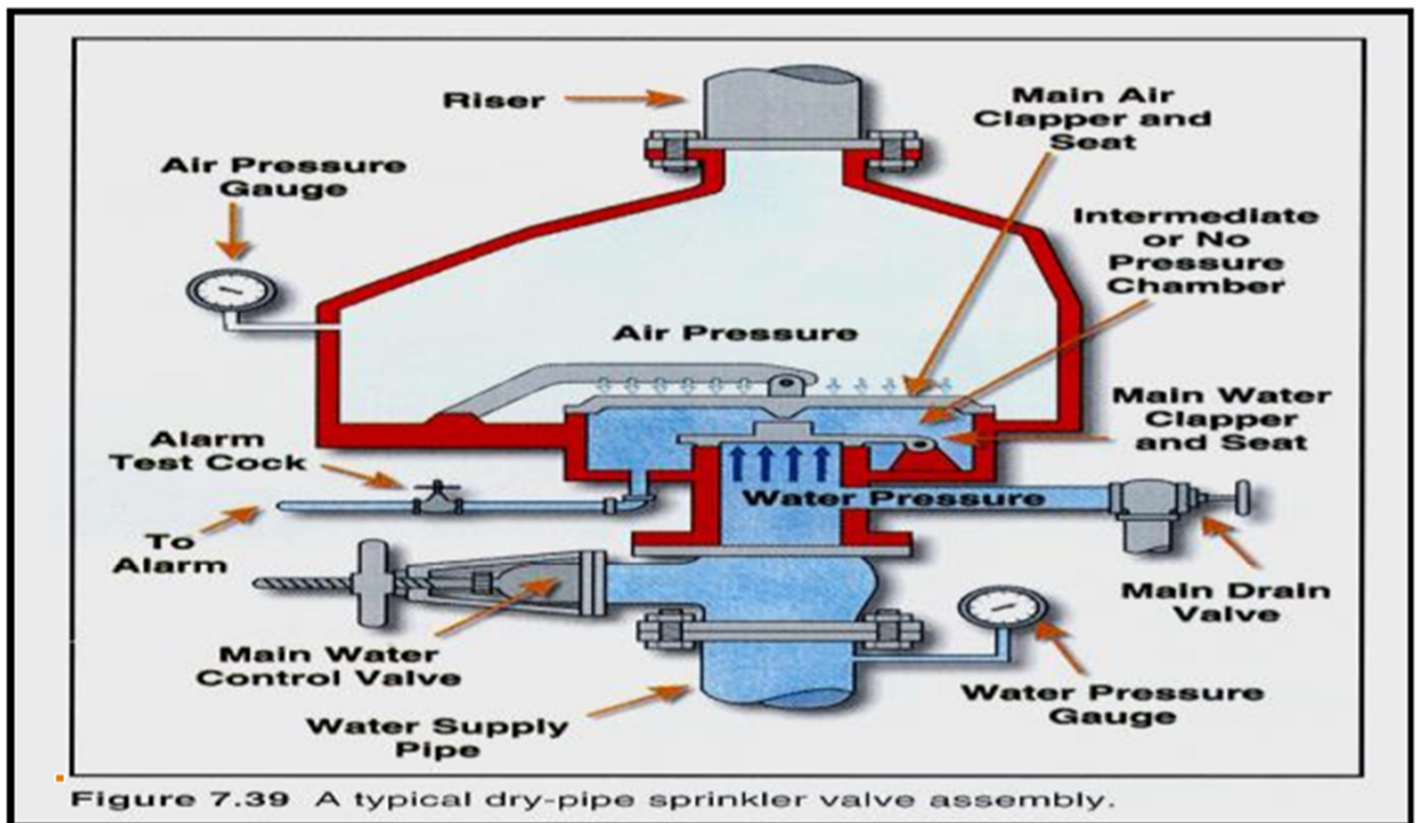
1. Wet Pipe System

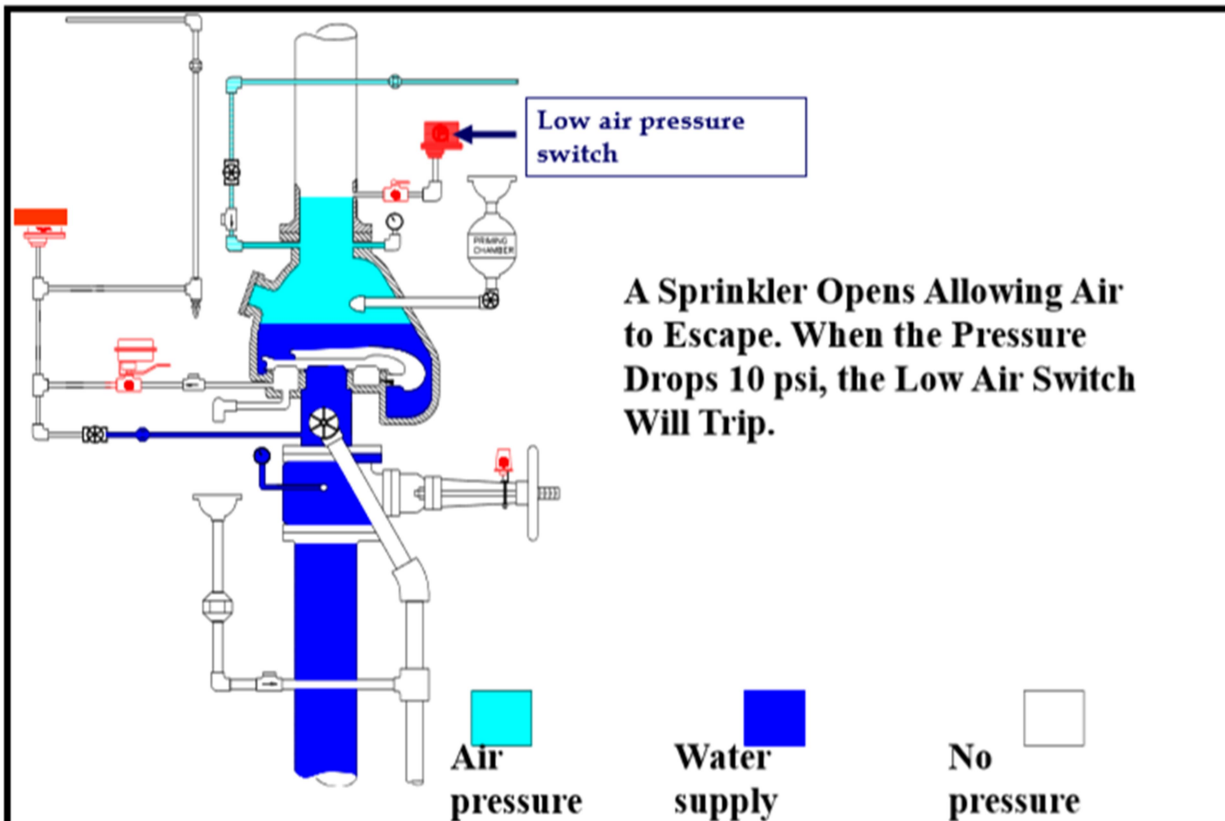
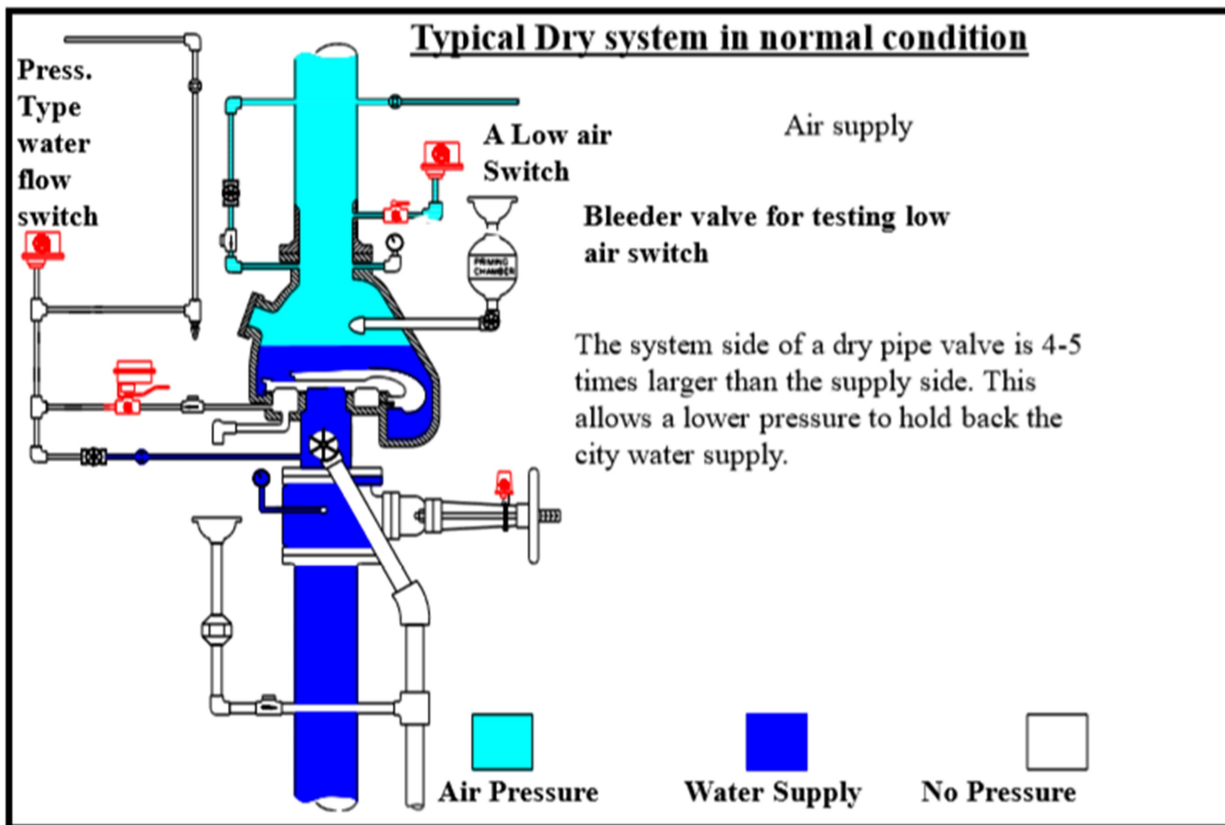


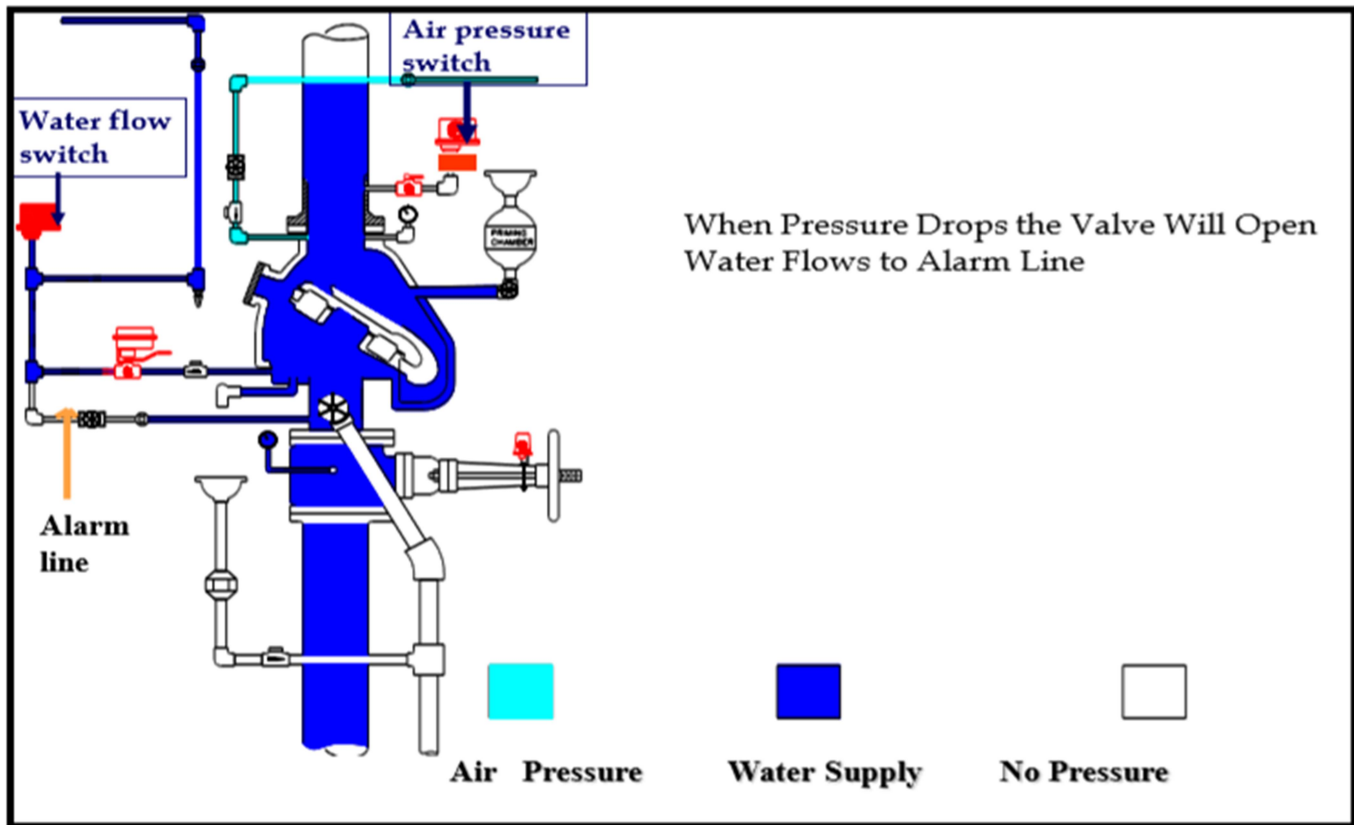


2. Dry Pipe System

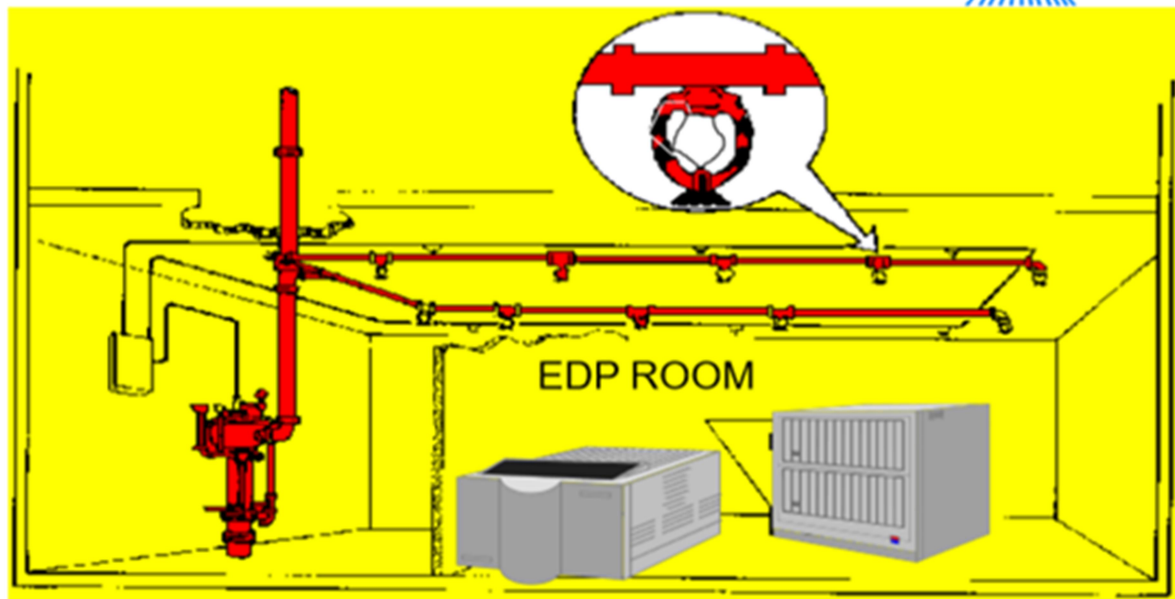
- Automatic Suppression
- Pipes pressurized with air
- Equipped with an automatic water supply
- Water is retained by a dry pipe valve
 - Air pressure holding valve closed
- Sprinkler head opens, releases air pressure causing dry pipe valve to open and water flows







3. Pre-Action Sprinkler System

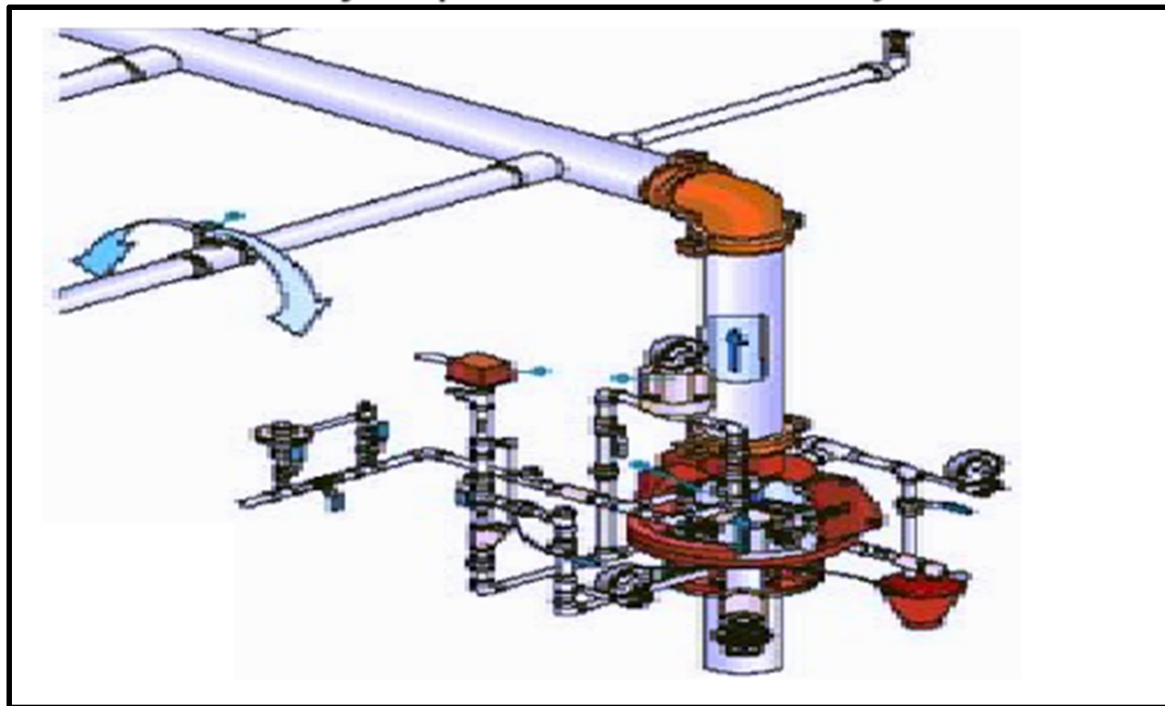


A Preaction Sprinkler System is a system which employs automatic and closed-type sprinkler heads connected to a piping system that contains air (either pressurized or non-pressurized), with a supplemental

system of detection serving the same area as the sprinklers. The systems are typically used in applications where the accidental discharge of water would be catastrophic to the usage of occupancy.

Preaction Sprinkler Systems are similar to Dry Pipe Systems in that the water is kept from entering the piping valve, in the case a Preaction valve. This valve is held closed electrically, only being released by the activation of the detection system (heat or smoke detectors mainly) when an electrical signal is sent to the releasing solenoid valve. The water then fills the pipe, ready for the activation of the sprinkler heads. Preaction systems can be arranged to be activated by only one detection device type, or many.

4. Combined Dry Pipe – Preaction System



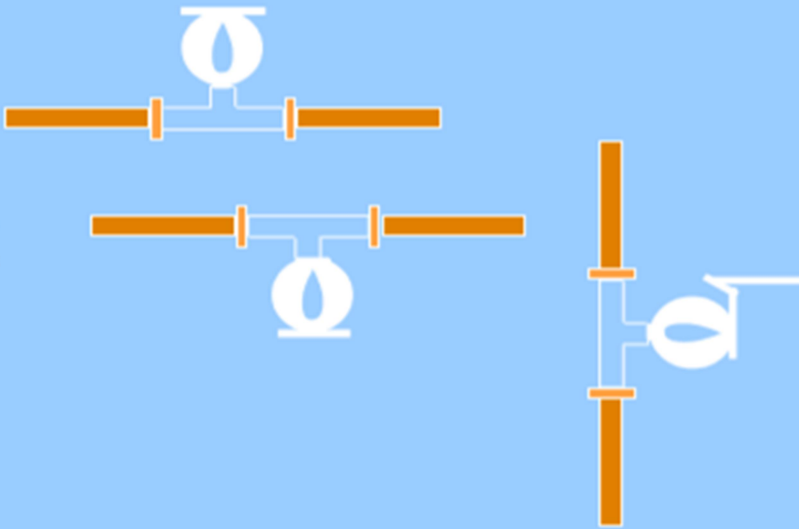
A Preaction system can also be combined with a Dry-Pipe system, for use in areas that are unheated, or areas where the occupant requires that water not enter the system prior to the activation of a sprinkler head. This is called a Double-Interlocked Preaction system. This system functions much like a dry-pipe system, however the release water also depends on the activation of the detection devices.

Common installations include computer rooms, process control rooms, data storage and telecommunications rooms.

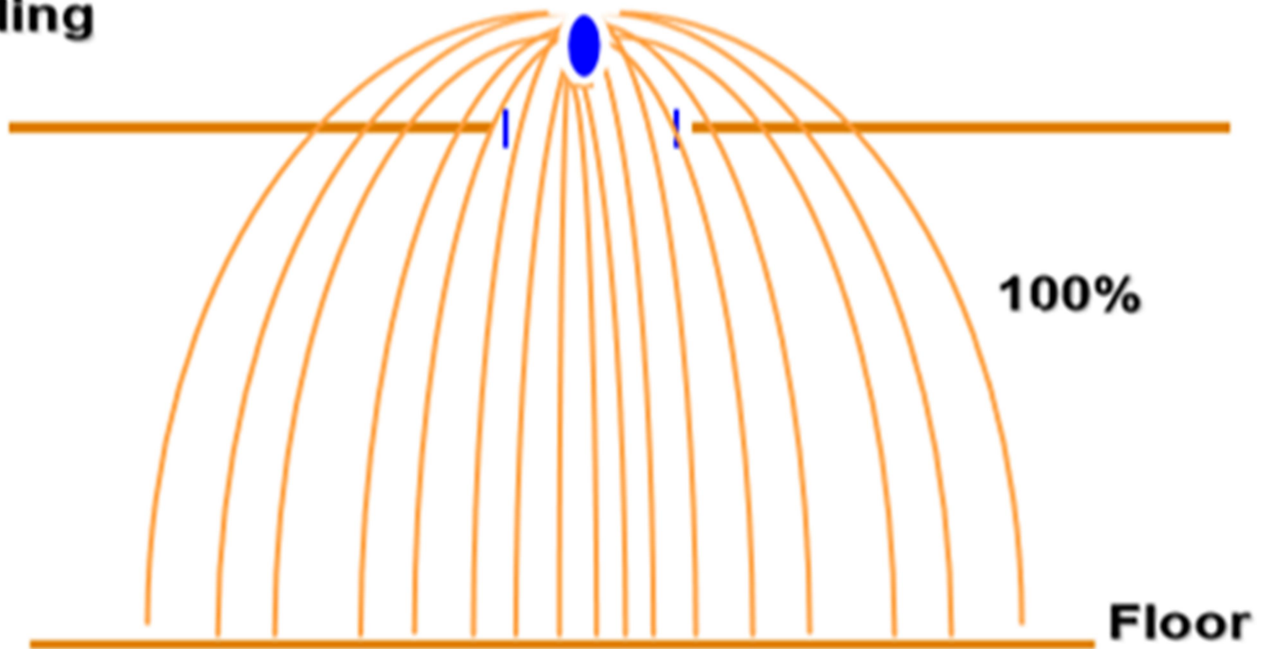
5. Deluge System

FIRE SPRINKLERS

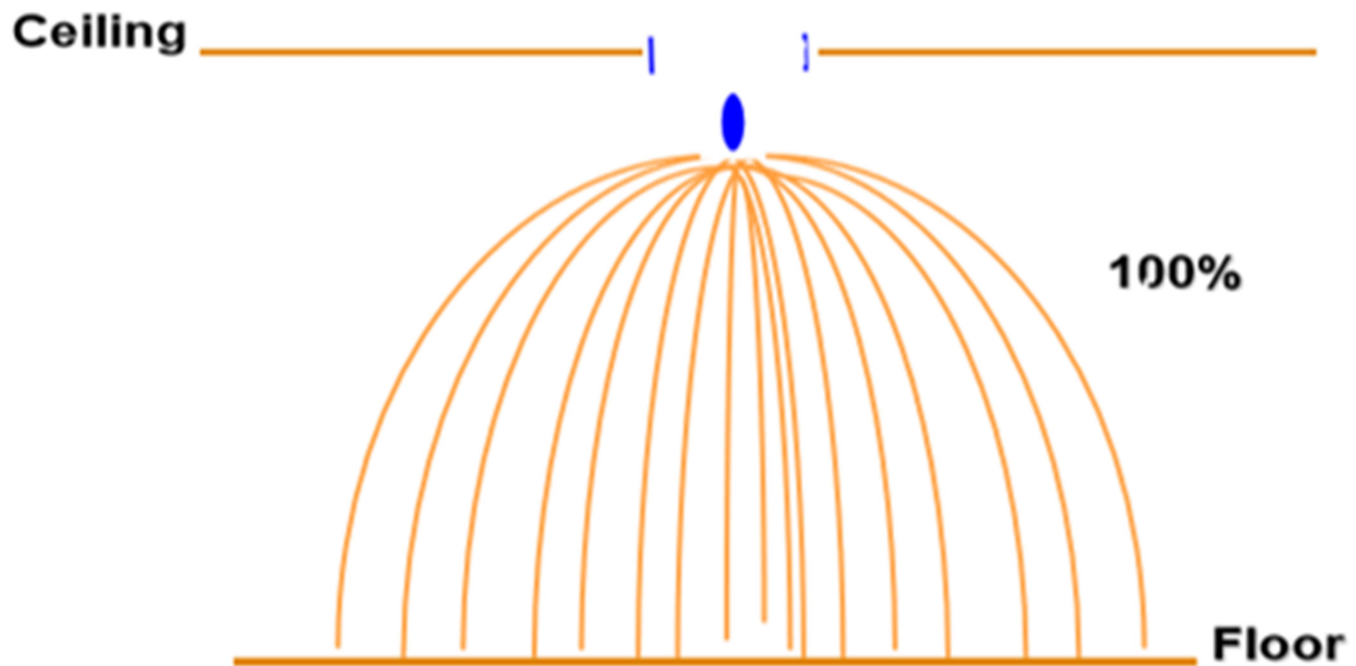
- Upright
- Pendent
- Sidewall



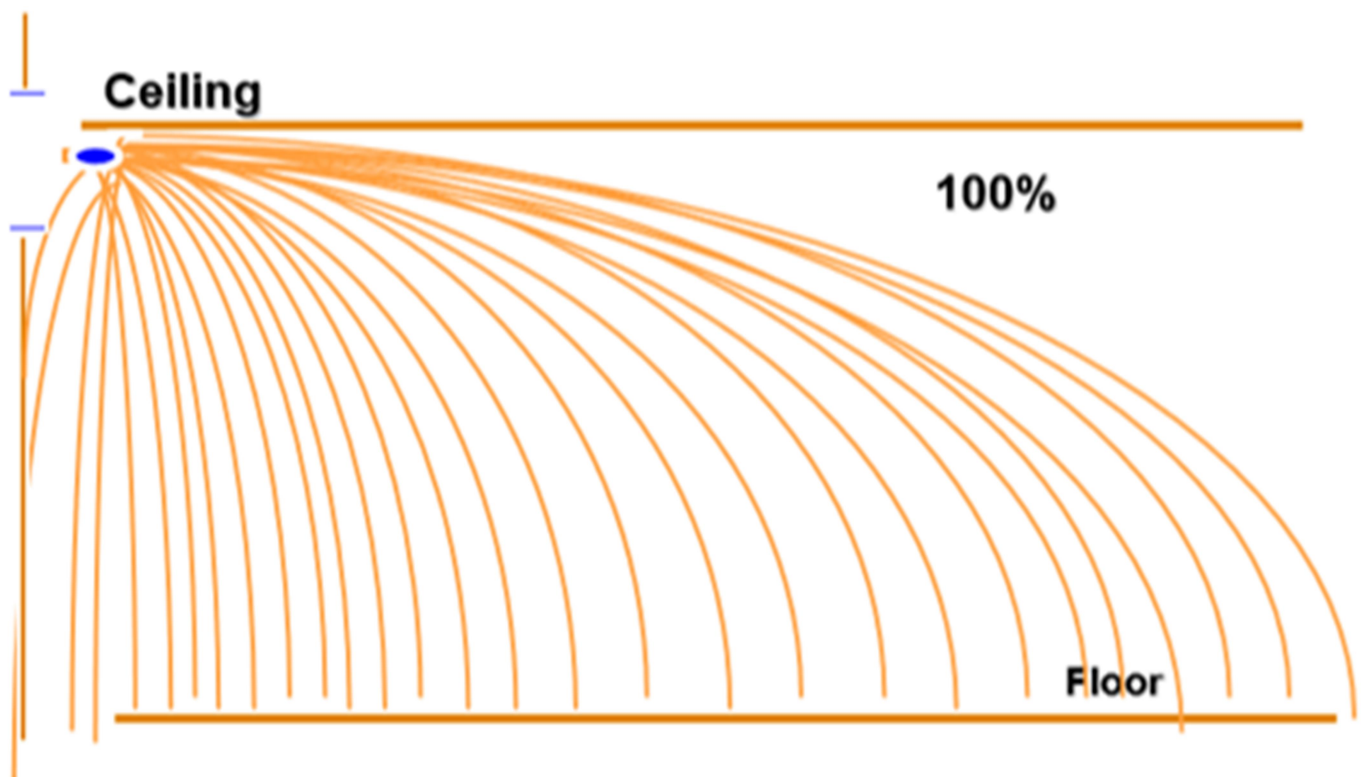
Ceiling



Upright Sprinkler

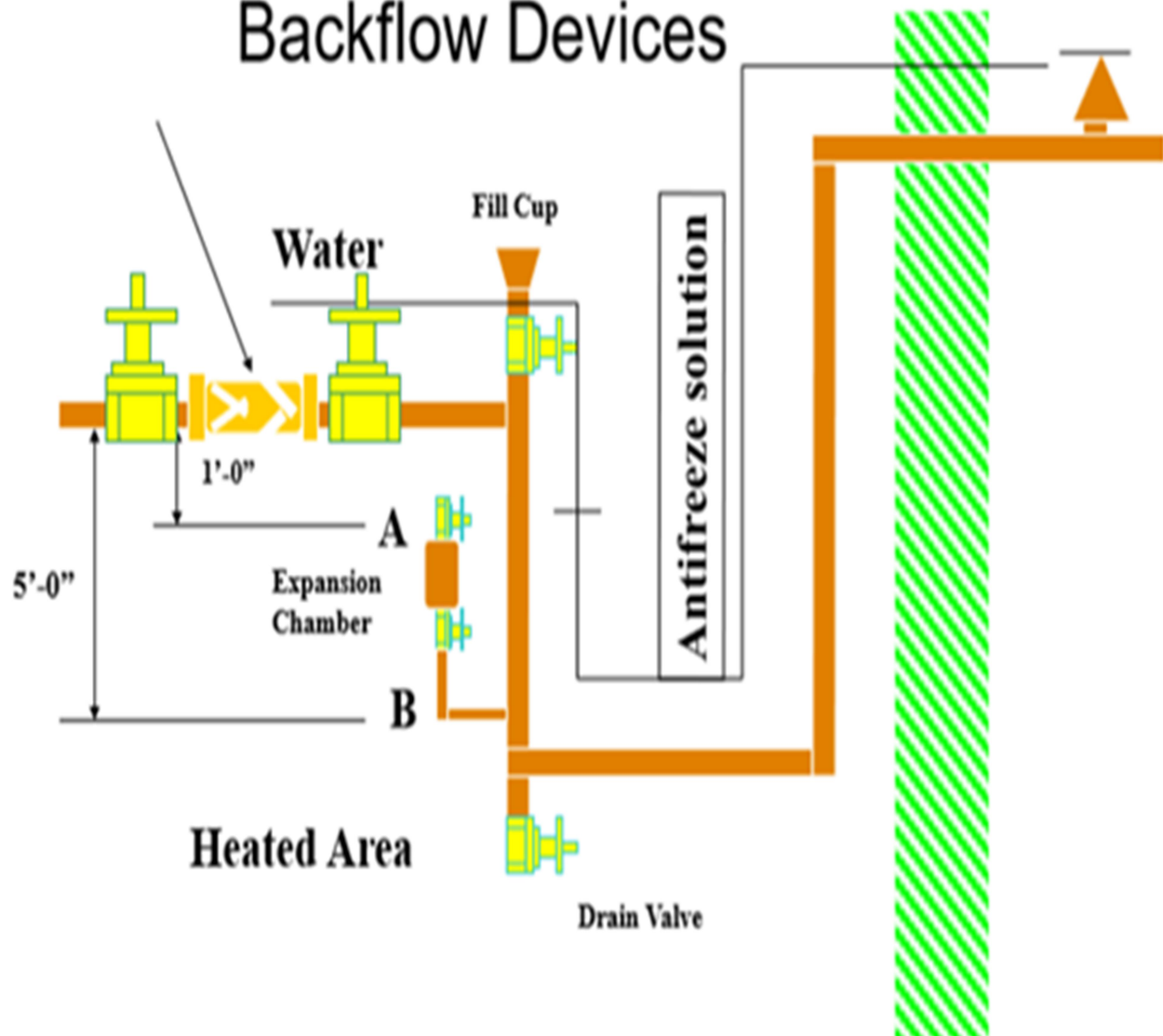


Pendent Sprinkler



Sidewall Sprinkler

6. Antifreeze Systems With Backflow Devices



7. Types of Valves needed for Sprinkler Systems

- Control Valves
- Directional Valves
- Check Valves
- Double Check Valve Assemblies
- Backflow Prevention Assembly

Valves Controlling Connections to Water Supplies

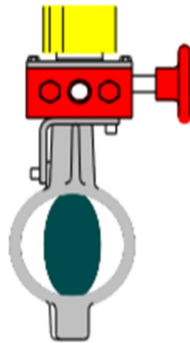
- Must be Listed Type
- Must be Indicating Type
- Shall Not Close in Less Than 5 Seconds
- Number of Valves Required
 - 1 per system
 - 1 per floor if system is attached to hose valves for FD use
- Control valves installed overhead must have indicator, visible from floor level

Sprinkler Riser Control Valves

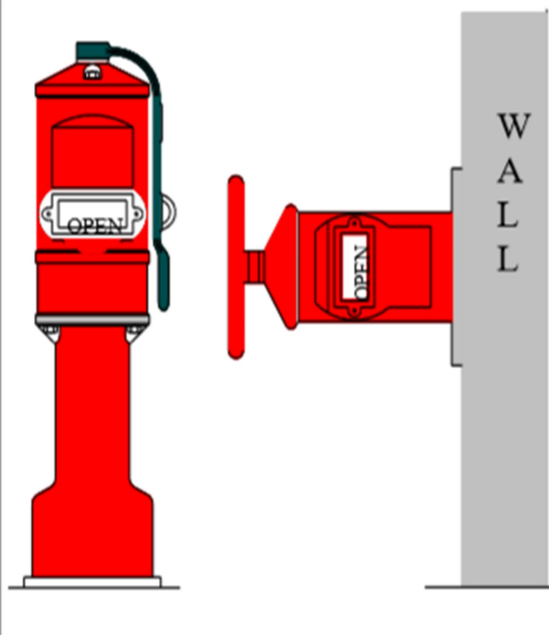
OS&Y



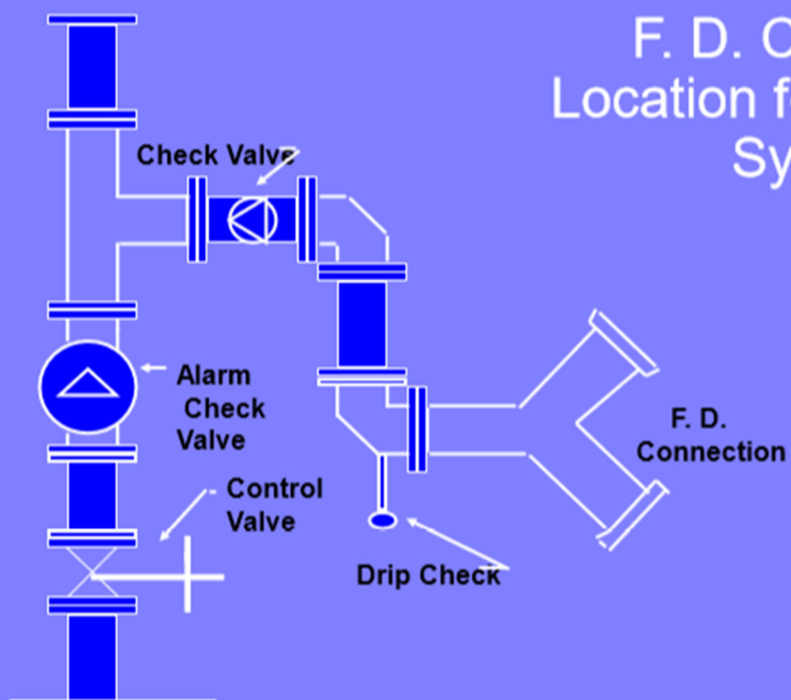
Butterfly



Post Indicator - Yard or Wall type



F. D. Connection Location for Single Wet Systems



8. Alarm Systems

Water Based Fire Protection Systems – NFPA 25

Chapter 4 General Requirements

Responsibilities of the Owner or Occupant:

- Shall provide ready accessibility to components.
- Properly maintain system.
- Notify AHJ, fire department, and the alarm receiving facility before testing or shutting down a system, and when system is back in service.
- Corrections and repairs shall be performed by qualified personnel.

Inspection, Testing, Maintenance

- Components shall be inspected at intervals according to appropriate chapters.
- All components & systems shall be tested to verify they function as intended.
- Test results shall be compared with original acceptance test & most recent test results.
- When a major component or subsystem is rebuilt or replaced, it shall be tested in accordance with the original acceptance test.
- All documentation such as drawings, original acceptance test records, manufacturer's maintenance bulletins shall be retained

Chapter 5 Sprinkler Systems

5.1 General. This chapter pertains to the general requirements for inspection, testing and maintenance of sprinkler systems. Table 5.1 shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

Chapter 12 Valves, Valve Components, and Trim

12.1 General. This chapter shall provide the minimum requirements for the routine inspection, testing, and maintenance of valves, valve components, and trim. Table 12.1 shall be used to determine the minimum required frequencies for inspection, testing, and maintenance.

Why do sprinkler systems fail?

53.4% of sprinkler system failures were due to inadequate inspection, testing and maintenance of the system.

Based on numbers from NFPA studies

What are some leading reasons for failure of a sprinkler system?

- 30% caused by closed valves.
- Lack of Maintenance.
- Design for the wrong hazard. • Change from the last inspection?
- Obstructions.
- Improper installation • You should have caught this at the acceptance test!!!!

Testing Section 5.3

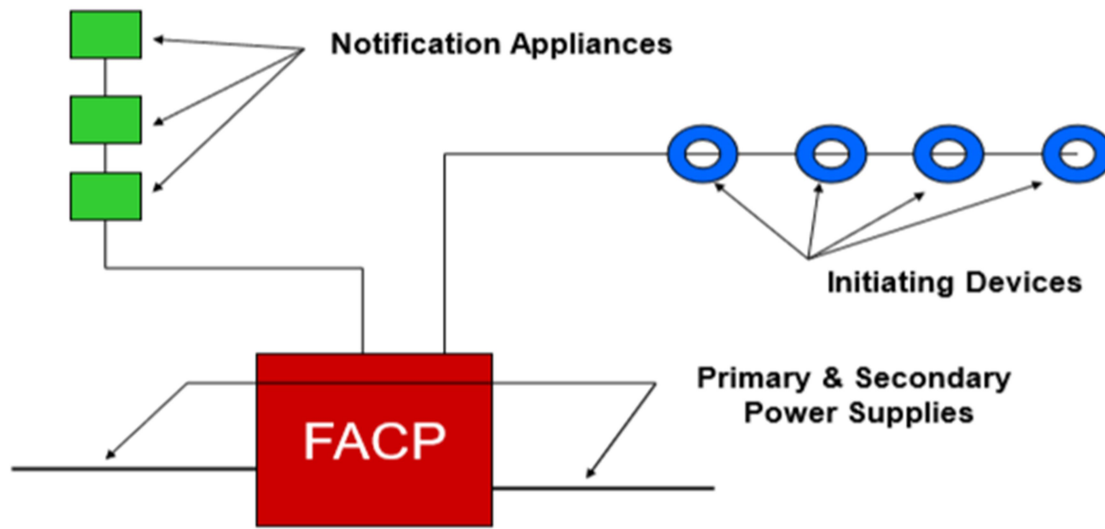
- Sprinklers – • More than 50 yrs old, replace or sample areas tested every 10 years • Prior to 1920 shall be replaced. • Sprinklers more than 75 yrs., replaced or sample areas tested every 5 years
- Gauges- Replaced or tested every 5 years.
- Alarm Devices - Vain-type waterflow devices, pressure switches, and water motor gongs shall all be tested at certain intervals.
- Antifreeze Systems - Antifreeze tested for specific gravity and solution adjusted if needed, yearly. Antifreeze solutions are found on tables 5.3.4.1(a) & (b).
- Hose Connections - Tested according to chapters 6 and 12.

FIRE ALARM SYSTEM OPERATION

- The primary function of a fire alarm system is for the protection of life and property. • It must perform the following functions:

- ✓ Detect.....
- ✓ Notify..
- ✓ Operate
- ✓ Notify

Basic Fire Alarm System



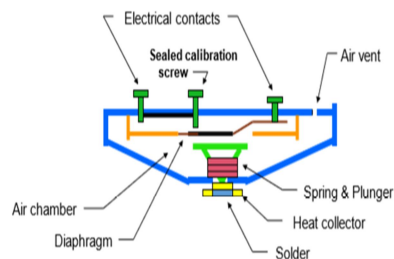
Initiating Devices

- Automatic fire detection devices
- Sprinkler water flow detectors
- Manually activated fire alarm stations
- Supervisory signal-initiating devices




- Manual Pull Stations
- Automatic Smoke Detectors
- Heat Detectors
- Fixed Temperature Heat Detectors
- Combination Detectors

RATE-OF-RISE / FIXED TEMPERATURE DETECTOR



- Rate-of-Rise Compensated Fixed Temperature Detectors
- Smoke Detectors
- Ionization Smoke Detectors
- Photoelectric Smoke Detectors

A device that detects visible or invisible particles of combustion and transmits a signal to the FACP

- Photoelectric Beam Smoke Detectors
- 2-Wire Smoke Detectors 
- 4-Wire Smoke Detectors
- Air-Duct Type Smoke Detectors
- Automatic Sprinkler Systems
- Water-flow Switches
- Sprinkler System Control Valves
- Supervisory Switches