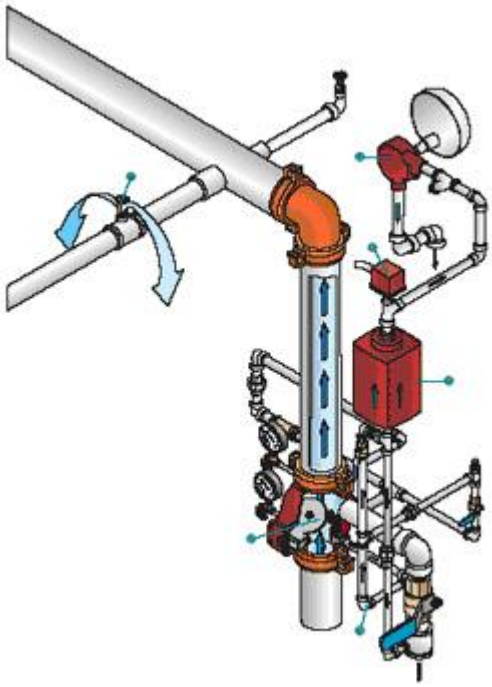
Fire Sprinkler Systems

Fire sprinklers are widely recognized as the single most effective method for fighting the spread of fires in their early stages - before fire can cause severe injury to people and damage to property.

Head Fire Sprinkler

- **Wet pipe**
- **Dry pipe**
- **Deluge**
- **Pre-action**
- **Fire pumps**
- **Hydrants**
- **Inspection and Testing**

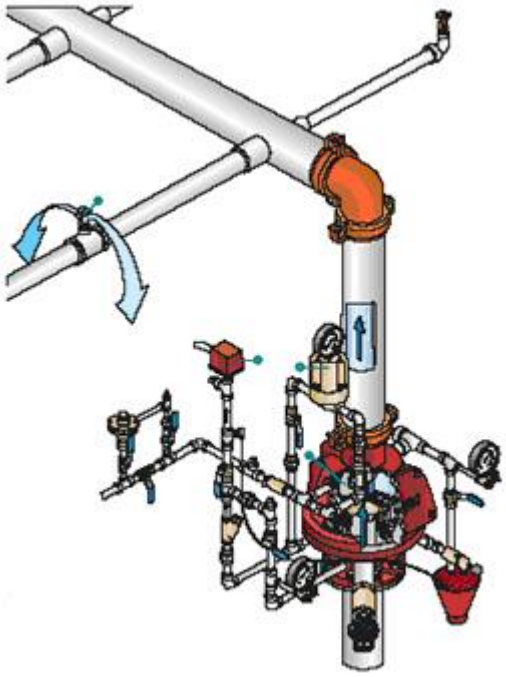
Wet Pipe Sprinkler Systems



A **wet pipe sprinkler system** is a sprinkler system employing automatic sprinkler heads attached to a piping system containing water and connected to a water supply so that water discharges immediately from sprinklers opened by heat from a fire.

Each sprinkler is activated individually when it is heated to its design temperature. Most sprinklers discharge approximately 20-25 gallons per minute (gpm), depending on the system design. Sprinklers for special applications are designed to discharge up to 100 gpm.

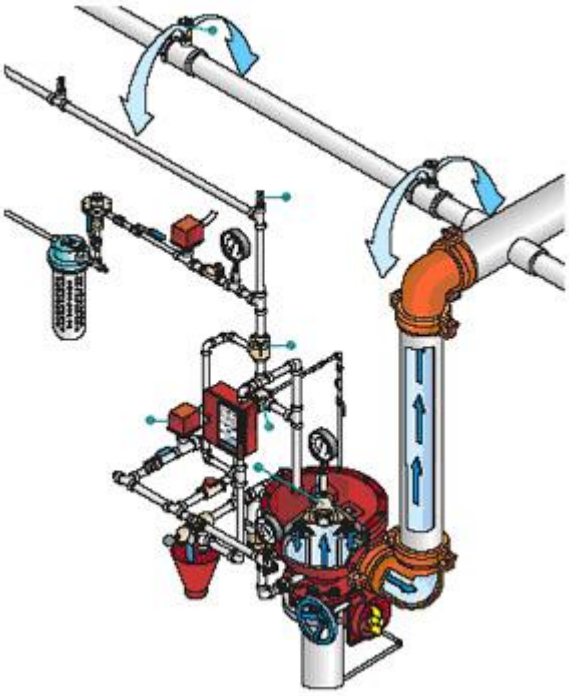
Dry Pipe Sprinkler Systems



A **dry pipe sprinkler system** is a system with automatic sprinkler heads attached to a piping system containing air or nitrogen under pressure. The release of this pressure (as from the opening of a sprinkler) permits the water pressure to open a valve known as a dry pipe valve and the water then flows into the piping system and out of the open sprinkler head.

Dry pipe sprinkler systems are installed in areas where wet pipe systems may be inappropriate such as areas where freezing temperatures might be expected.

Deluge Sprinkler Systems



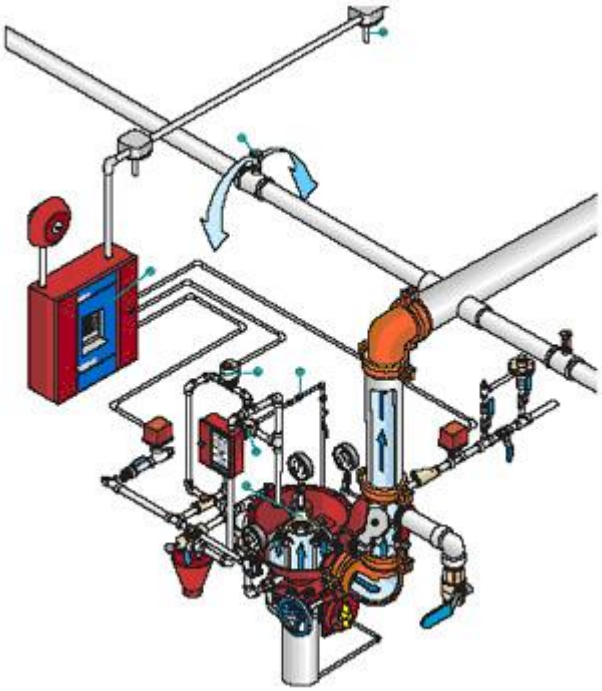
The arrangement of **deluge system** piping is similar to a wet or dry pipe system with two major differences:

A. Standard sprinklers are used, but they are all open. The activating elements have been removed so that when the control valve is opened water will flow from all of the sprinklers simultaneously and deluge the area with water.

B. The deluge valve is normally closed. The valve is opened by the activation of a separate fire detection system.

Deluge systems are used where large quantities of water are needed quickly to control a fast-developing fire. Deluge valves can be electrically, pneumatically or hydraulically operated.

Pre-action Sprinkler Systems



A **pre-action sprinkler system** is similar to a deluge sprinkler system except the sprinklers are closed. This type system is typically used in areas containing high value equipment or contents and spaces which are highly sensitive to the effects of accidental sprinkler water discharge. The pre-action valve is normally closed and is operated by a separate detection system.

Activation of a fire detector will open the pre-action valve, allowing water to enter the system piping. Water will not flow from the sprinklers until heat activates the operating element in individual sprinklers. Opening of the pre-action valve effectively converts the system to a wet pipe sprinkler system.

In a pre-action system the piping is pressurized with air or nitrogen, monitoring of this air pressure provides a means of supervising the system piping. Loss of the supervisory air pressure in the system piping results in a trouble signal at the alarm panel.

Fire Sprinkler System Maintenance & Inspection

Fire sprinkler systems are required to be inspected in accordance with NFPA 13. Our highly trained technicians can inspect and service all types of sprinkler systems. Our software system will keep a record of when inspections are due so you never have to worry about being delinquent on required inspections. We can also provide training in the proper use and maintenance of your system so in a fire situation everyone will be prepared to respond appropriately.

Sprinkler Service with Fire Alarm Service

Chances are your building has not just a fire sprinkler system, but a building fire alarm system as well. The two systems are almost always connected. STAT Fire Suppression, Inc. has the ability to inspect both systems in accordance with applicable NFPA codes. Our fire alarm and sprinkler technician teams can save you time and money by eliminating the coordination problems that arise when dealing with multiple companies to provide service on both systems.

INSPECTION

An inspection is a visual examination of a water-based fire protection system, or portion thereof to verify that it appears to be in operating condition and is free of physical damage.

TESTING

A procedure to determine the status of a system by conducting physical checks on water-based fire protection systems such as water-flow tests, fire pump tests, alarm tests, and trip tests of dry pipe, deluge, or pre-action valves. These tests follow up on the original acceptance test at intervals specified in the appropriate chapter of the standard NFPA 13.

Fire Hydrant Testing

STAT Fire Suppression, Inc. can perform the required inspection and testing of fire hydrants located on private property as required by NFPA 13 (National Fire Protection Association) and AWWA M17 (American Water Works Association manual of water supply practices). Please see the information listed below for requirements and definitions.

Hydrants shall be tested annually to ensure proper functioning. Each hydrant shall be opened fully and water flowed until all foreign material has cleared.
• Flow shall be maintained for not less than 1 minute.
• After operation, dry barrel and wall hydrants shall be observed for proper drainage from the barrel. Full drainage shall take no longer than 60 minutes.
• Where soil conditions or other factors are such that the hydrant barrel does not drain within 60 minutes, or where the groundwater level is above that of the hydrant drain, the hydrant drain shall be plugged and the water in the barrel shall be pumped out.
• Dry barrel hydrants that are located in areas subject to freezing weather and that have plugged drains shall be identified clearly as needing pumping after operation.

Flow Test

• Underground and Exposed Piping Flow Tests. Underground and exposed piping shall be flow tested to determine the internal condition of the piping at minimum 5-year intervals. (**some jurisdictions require flow tests to be performed at three year intervals, check with your local AHJ**)
• Flow tests shall be made at flows representative of those expected during a fire for the purpose of comparing the friction loss characteristics of the pipe with those expected for the particular type of pipe involved, with due consideration given to the age of the pipe and to the results of previous flow tests.
• Any flow test results that indicate deterioration of available water flow and pressure shall be investigated to the complete

satisfaction of the authority having jurisdiction to ensure that the required flow and pressure are available for fire protection.
• Where underground piping supplies individual fire sprinkler, standpipe, water spray, or foam-water sprinkler systems and there are no means to conduct full flow tests, tests generating the maximum available flows shall be permitted.

FIRE PUMPS

Fire pumps are often a forgotten element of an automatic fire protection system. If a fire pump does not work, the entire system may fail. Stringent inspection and testing requirements are designed to prevent a pump failure that could be catastrophic. Our expert installation, inspection and service capabilities include the tools and manpower to support any fire pump in operation.

All functions of the fire pump controller should also be tested at least annually. After the tests are completed, you will get a test report describing which tests were conducted and settings of all time delay devices. The report will include test results for operation of the pump, driver and controller. A trending comparison of year-by-year results can show early indication of problems before they are really serious.

Inspection and Testing Requirements for Fire Sprinkler Systems

	Sprinkler Systems	Monthly	Quarterly	Semi-annual	Annual	Other	Code	NFPA 13
	Inspection							
	Gauges - Dry, PreAction & Deluge					☑	2-2.4.2	Gauges on dry, preaction, and deluge systems shall be inspected weekly to ensure that normal air and water pressures are being maintained.
	Gauges - Wet Pipe Systems	☑					2-2.4.1	Gauges on wet pipe sprinkler systems shall be inspected monthly to ensure that they are in good condition and that normal water supply pressure is being maintained.
	Control Valves	☑				☑		(See "Valves" below)
	Alarm Devices		☑				2-2.6	Alarm devices shall be inspected quarterly to verify that they are free of physical damage.
	Hydraulic Nameplate		☑				2-2.7	The hydraulic nameplate, if

								provided, shall be inspected quarterly to verify that it is attached securely to the sprinkler riser and is legible.
	Buildings				☑		2-2.5	Annually, prior to the onset of freezing weather, buildings with wet pipe systems shall be inspected to verify that windows, skylights, doors, ventilators, other openings and closures, blind spaces, unused attics, stair towers, roof houses, and low spaces
	Hangers/Bracing				☑		2-2.3	Sprinkler pipe hangers and seismic braces shall be inspected annually from the floor level.
	Pipe & Fittings				☑		2-2.2	Sprinkler pipe and fittings shall be inspected annually from the floor level.
	Sprinkler Heads				☑		2-2.1.1	Sprinklers shall be inspected from the floor level annually.
	Spare Sprinkler Heads				☑		2-2.1.3	The supply of spare sprinklers shall be inspected annually…
	Valves (All Types)							(See "Valves" below)
	Testing							
	Alarm Devices		☑				2-3.2	Waterflow alarm devices including, but not limited to, mechanical water motor gongs, vane-type waterflow devices, and pressure switches that provide audible or visual signals shall be tested quarterly.
	Main Drain		☑					(See "Valves" below)
	Antifreeze Solution				☑		2-3.4	The freezing point of solutions in antifreeze shall be tested annually by measuring the specific gravity with a hydrometer or refractometer and adjusting the solutions if necessary.
	Gauges					☑	2-3.2	Gauges shall be replaced every 5 years or tested every 5 years by comparison with a calibrated gauge. Gauges not accurate to within 3 percent of the full scale shall be recalibrated or replaced.
	Sprinkler Heads					☑	2-3.1.1	Where sprinklers have been in service for 50 years, they shall be replaced or representative samples from one or more sample areas shall be

								submitted to a recognized testing laboratory acceptable to the authority having jurisdiction for field service test
	Sprinkler Heads - Extra High Temp					☑	2-3.1.1	Exception No. 3*: Representative samples of solder-type sprinklers with a temperature classification of extra high [325°F (163°C)] or greater that are exposed to semicontinuous to continuous maximum allowable ambient temperature conditions shall be tested
	Sprinkler Heads - Fast Response					☑	2-3.1.1	Exception No. 2: Sprinklers manufactured using fast response elements that have been in service for 20 years shall be tested. They shall be retested at 10-year intervals.
	Maintenance							
	Valves (All Types)				☑	☑		(See "Valves" below)
	Obstruction Investigation					☑	10-2.2	Systems shall be examined internally for obstructions where conditions exist that could cause obstructed piping. If the condition has not been corrected or the condition is one that could result in obstruction of piping despite any previous flushing procedures.
	Valves	Monthly	Quarterly	Semi-annual	Annual	Other		
	Inspection							
	Control Valves					☑	9-3.3.1	All valves shall be inspected weekly.
	Alarm Valves	☑					9-4.1.1	Alarm valves shall be externally inspected monthly.
	Check Valves					☑	9-4.2.1	Valves shall be inspected internally every 5 years to verify that all components operate properly, move freely, and are in good condition.
	Preaction/Deluge Valves				☑		9-4.3.1.3	The interior of the preaction or deluge valve and the condition of detection devices shall be inspected annually when the trip test is conducted.
	Dry Pipe Valves/Quick Opening Devices				☑		9-4.4.1.4	The interior of the dry pipe valve shall be inspected annually when the trip test is conducted.

	Backflow Prevention Assemblies				☑		9-6.1.2	All backflow preventers installed in fire protection system piping shall be tested annually…
	Testing							
	Main Drain		☑				9-2.6	A main drain test shall be conducted quarterly at each water-based fire protection system riser to determine whether there has been a change in the condition of the water supply piping and control valves.
	Waterflow Alarm		☑				9-2.7	All waterflow alarms shall be tested quarterly in accordance with the manufacturer's instructions.
	Control Valves				☑		9-3.4.1	Each control valve shall be operated annually through its full range and returned to its normal position.
	Preaction/Deluge Valves				☑		9-4.3.2.2	Each deluge or preaction valve shall be trip tested annually at full flow in warm weather and in accordance with the manufacturer's instructions.
	Dry Pipe Valves/Quick Opening Devices				☑		9-4.4.2.1	Each dry pipe valve shall be trip tested annually during warm weather.
	Backflow Prevention Assemblies						9-6.2.1	All backflow preventers installed in fire protection system piping shall be tested annually…
	Maintenance							
	Control Valves				☑		9-3.5	The operating stems of outside screw and yoke valves shall be lubricated annually.
	Preaction/Deluge Valves				☑		9-4.3.3.2	During the annual trip test, the interior of the preaction or deluge valve shall be cleaned thoroughly and the parts replaced or repaired as necessary.
	Dry Pipe Valves/Quick Opening Devices						9-4.4.3.2	During the annual trip test, the interior of the dry pipe valve shall be cleaned thoroughly and parts replaced or repaired as necessary