

Sprinkler System Components and Standpipes

- Explain the role of sprinkler system components other than the riser
- Distinguish between different types of valves and how they operate
- Describe the different types of standpipes and their role in buildings



System Components

- An automatic sprinkler systems typically has:
 - Sprinklers
 - Water supply and riser
 - **Pipes** and hangers
 - Cross mains
 - Branch lines
 - **Valves**
 - **Standpipes**
 - **Fire department connection (FDC)**

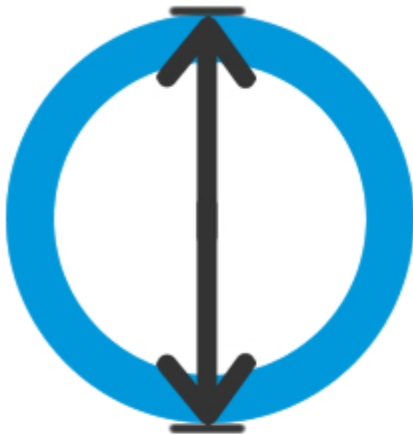


Pipe materials

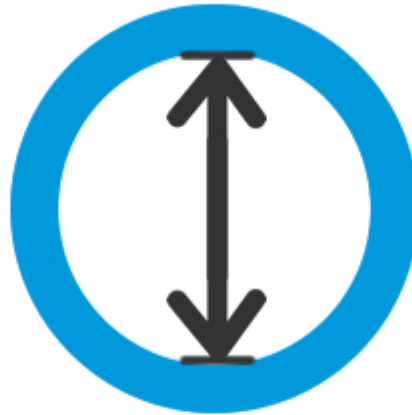
- Pipes come in several types and sizes
- They can be divided into three main categories:
 - Metallic pipes
 - Steel pipes, galvanized iron pipes and cast iron pipes
 - Cement pipes
 - Concrete cement pipes and asbestos cement
 - Plastic pipes
 - Plasticized polyvinyl chloride (PVC) pipes



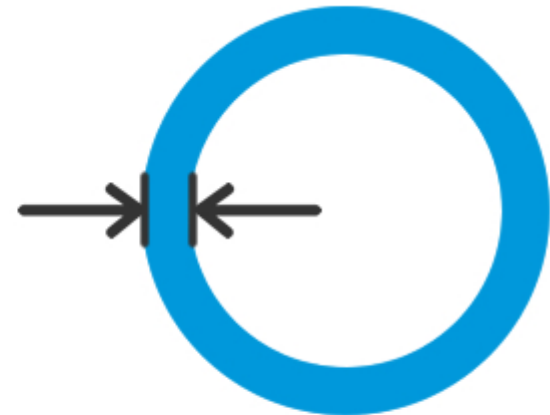
Pipe Information



Actual OD
Actual Outside Diameter



Average ID
Average Inside Diameter



Wall Thickness
Pipe Wall Width



Pipe Wall Thickness

- Pipe Schedule

- Thickness of the wall of a pipe



Pipe Schedule

Pipe		<u>Schedule</u> <u>10</u> **		<u>Schedule</u> <u>40</u> **		<u>Schedule</u> <u>80</u> **		<u>Schedule 160</u> <u>**</u>	
Size	Nom. OD	ID	Wall Thick	ID	Wall Thick	ID	Wall Thick.	ID	Wall Thick.
(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)	(in)
1/8	0.405	0.31	0.049	0.27	0.068	0.22	0.095		
1/4	0.54	0.41	0.065	0.36	0.088	0.3	0.119		
3/8	0.675	0.55	0.083	0.49	0.091	0.42	0.126		
1/2	0.84	0.67	0.083	0.62	0.109	0.55	0.147	0.47	0.187
3/4	1.05	0.88	0.109	0.82	0.113	0.74	0.154	0.61	0.218
1	1.315	1.1	0.109	1.05	0.133	0.96	0.179	0.82	0.25
1 1/4	1.66	1.44	0.109	1.38	0.14	1.28	0.191	1.16	0.25
1 1/2	1.9	1.68	0.109	1.61	0.145	1.5	0.2	1.34	0.281
2	2.375	2.16	0.109	2.07	0.154	1.94	0.218	1.69	0.343
2 1/2	2.875	2.64	0.12	2.47	0.203	2.32	0.276	2.13	0.375
3	3.5	3.26	0.12	3.07	0.216	2.9	0.3	2.63	0.437
4	4.5	4.26	0.12	4.03	0.237	3.83	0.337	3.44	0.531
5	5.563	5.3	0.134	5.05	0.258	4.81	0.375	4.31	0.625
6	6.625	6.36	0.134	6.07	0.28	5.76	0.432	5.19	0.718
8	8.625	8.33	0.148	7.98	0.322	7.63	0.5	6.81	0.906

Schedule Differences

- Higher schedule = higher cost
- Higher schedule = higher pressure rating
- Higher schedule = higher weight per foot
 - Schedule 10 0.1863 lbs/foot
 - Schedule 80 0.3145 lbs/foot
 - 1.68 time heavier

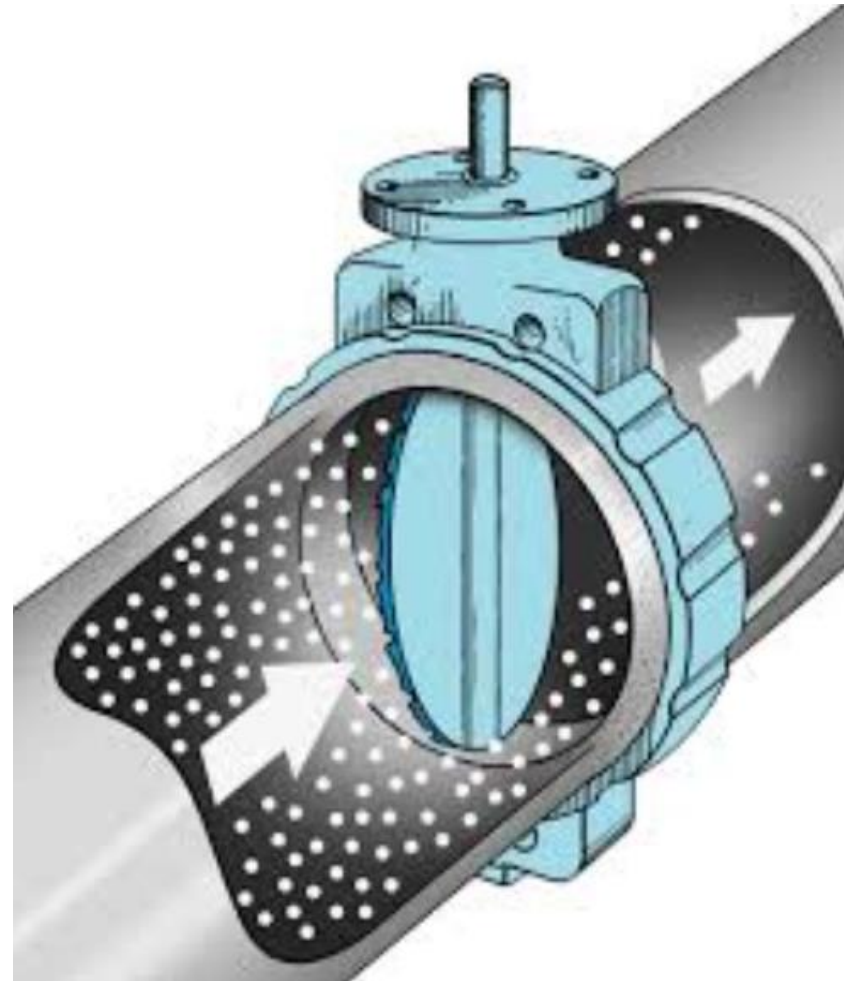


Valves

- All valves are either indicating or non-indicating
- Typical types
 - Check valve
 - PIV valve
 - OS&Y valve
 - Butterfly valve
 - Globe valve
 - Ball valve



Indicating or Non-indicating?



Indicating or Non-indicating?



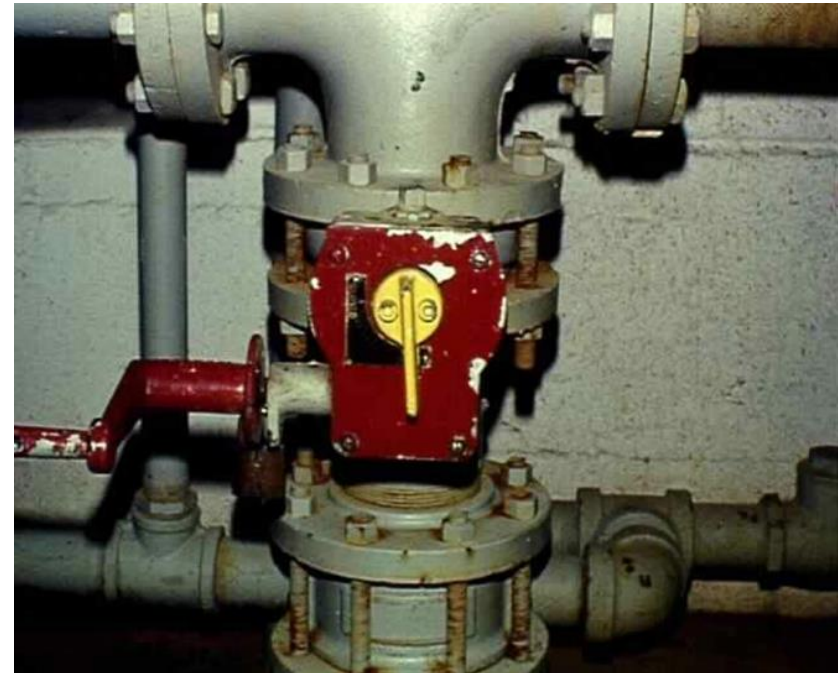
- What type of valve is it?



?



- Indicating or non-indicating?
- Open or closed?
- What type of valve?



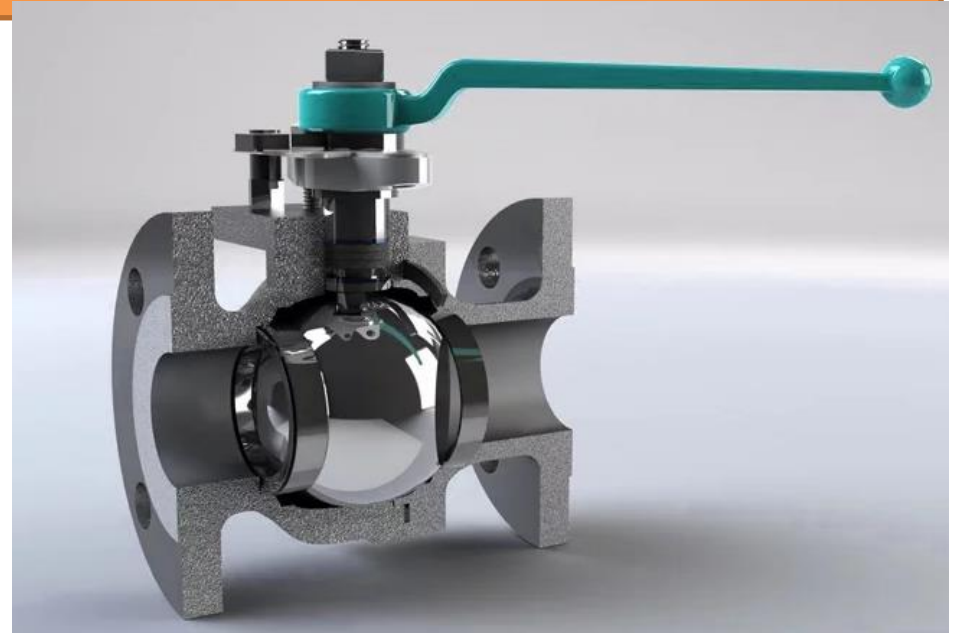
OS&Y

<https://www.youtube.com/watch?v=D8KKW1fR7u4>

- General style is known as a gate valve

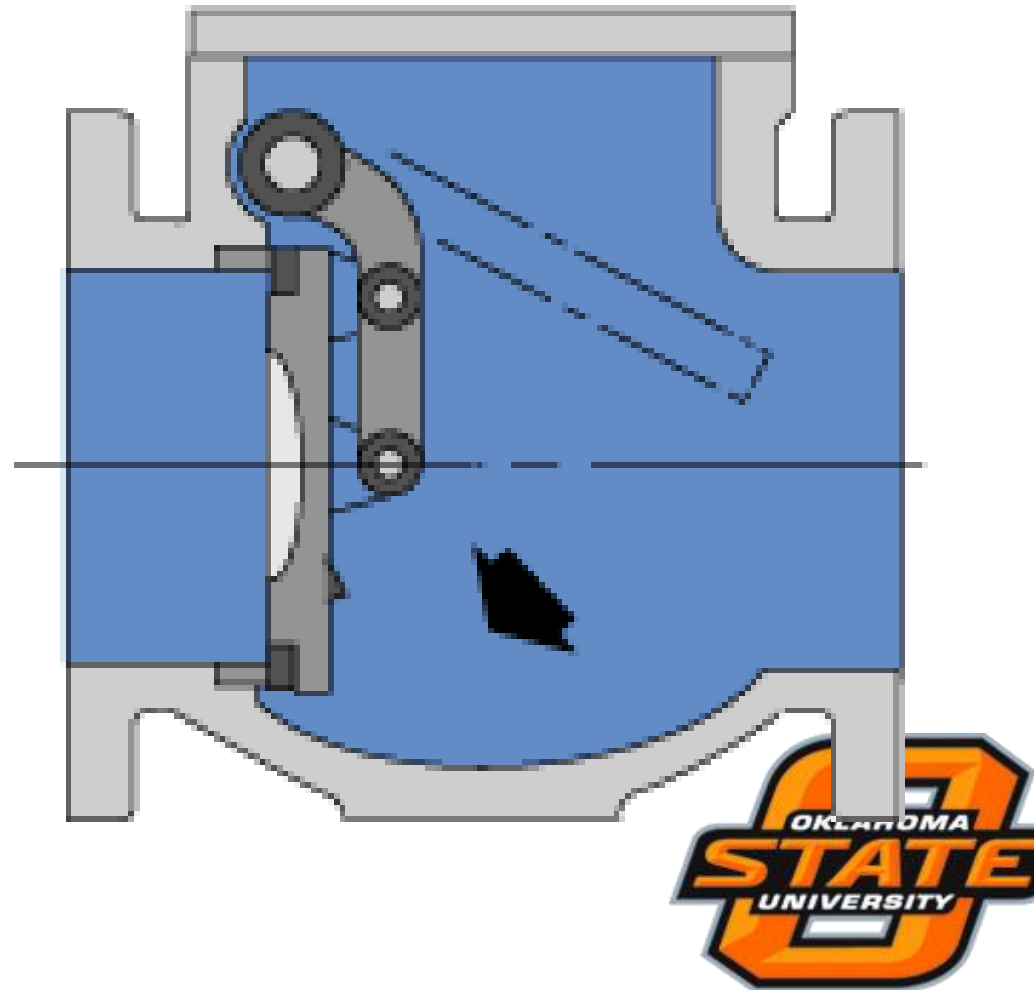


Ball Valve



Check Valve

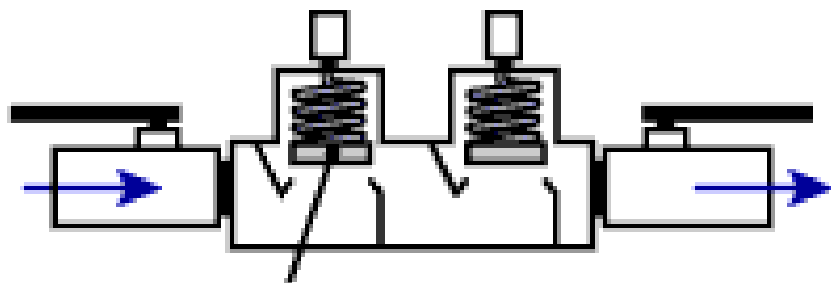
- A valve that normally allows fluid to flow through it in only one direction



Double Check Valve

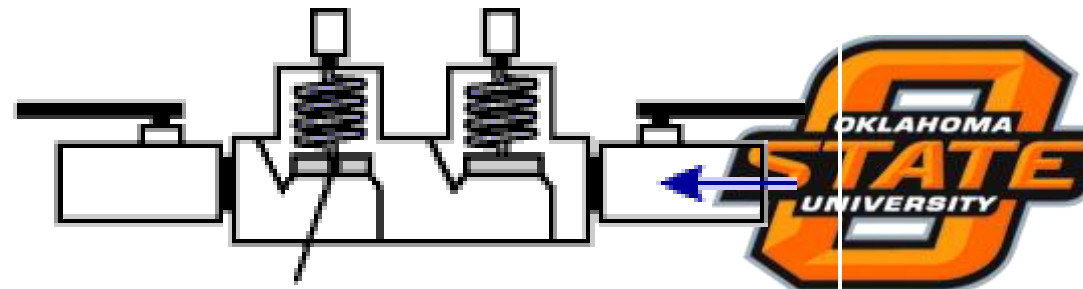


Normal Flow



Spring Loaded Check Valve
Open During Normal Flow

Reverse Flow



Spring Loaded Check Valve
Closed During Reverse Flow

Valves

[https://www.youtube.com/watch?v=X14nww4wuA](https://www.youtube.com/watch?v=X14nww4wuAk)
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Classes of Standpipe Systems

- Class I : 2.5” valves and hose connections
 - Full scale fire fighting
- Class II : 1.5” valves and hose lines
 - First-aid fire fighting
 - Concerns
 - Expecting occupants to use it
 - Prone to poor maintenance
 - Firefighters will not use a Class II system
- Class III: combination of both I and II
 - ‘Combined’ systems (with sprinklers)



Classes of Standpipe Systems



Types of Standpipe Systems

- Automatic-wet
 - Always contains water
- Automatic-dry
 - Contains pressurized air
 - Works in conjunction with a dry pipe valve
- Semiautomatic-dry
 - Requires activation of a remote manual device
 - Works in conjunction with a deluge valve
- Manual-dry
 - Pipes empty at atmospheric pressure. Only water source is fire apparatus attached to the FDC
- Manual-wet
 - Contains water but pressure must be boosted by fire apparatus attached to the FDC



Hose Connection Locations

- “Actual Length” method
 - Within 130 feet of a connection everywhere
 - 100’ of hose
 - 30’ of spray
 - Used only for Class II and III systems



Hose Connection Locations

- “Exit Locations” method
 - Standpipes are located by exits because of their spacing requirements dictated by code
 - Used only for Class I and III
 - P.16-193



Fire Department Connections

- Purpose of FDC?
 - Allow fire department a place to connect to the sprinkler loop and/or standpipe system
- Located within 100 feet of a fire hydrant
 - Must be visible and accessible



Fire Department Connections

- Required for Class I and III standpipes
 - At least 1 FDC
 - FDC is the only water supply for a manual standpipe system
 - FDC is an auxiliary water supply for a automatic and semi-automatic standpipe systems

