TECHNICAL DATA

MODEL VXD DELUGE SYSTEM WITH PNEUMATIC RELEASE

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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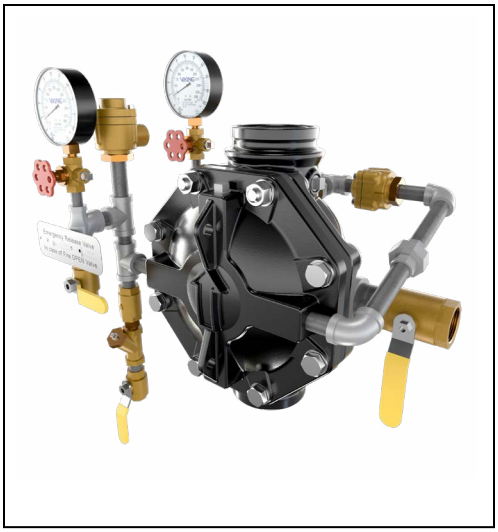
1. INTRODUCTION

Viking VXD Deluge Systems utilize a Viking Model VXD Deluge Valve to control the water supply to system piping equipped with open sprinklers and/or spray nozzles. The system piping remains empty until the deluge valve is activated by operation of the release system. Deluge systems are commonly used where it is desirable to simultaneously spray water from all open sprinklers and/or nozzles on the system when it operates.

Pneumatically controlled deluge systems require a pneumatic release system, equipped with thermostatic (rate-of-rise) releases and/or fixed-temperature releases, and/or pilot sprinkler heads. Release trim for the pneumatically controlled deluge valve includes a pneumatic actuator normally held closed by the air pressure maintained in the pneumatic release system.

In fire conditions, operation of the pneumatic release system causes the deluge valve to open and allows water to enter the system piping. Water will flow from any open sprinklers and/or spray nozzles on the system.



WARNING: Cancer and Reproductive Harm- www.P65Warnings.ca.gov

2. LISTINGS AND APPROVALS

cULus Listed - Categories VLFT and VLFT7

FM Approved

3. ORDERING INFORMATION

Table 1: Available Sizes for Model VXD Deluge System with Pneumatic Release (Vertical)

Nominal Size	Part Number		
	Loose trim[1] Galvanized	Loose trim[1] Brass	Pre-trimmed[2] Galvanized
1-½	23548-1	23548-2	23549
2	23580-1	23580-2	23581
2½	23601-1	23601-2	23602
3	23622-1	23622-2	23623
4	23643-1	23643-2	23644
6	23665-1	23665-2	23666
8	23686-1	23686-2	23687
10	23747-1	23747-2	23748

1. Loose trim packages do not include the deluge valve. Refer to the Model VXD Deluge Valve Techinca Data Page for available options.
2. Pre-trimmed packages are only available with galvanized pipe and groove/groove valves.

Table 2: Additional System Component Information

Component	Scan, click or tap	Component	Scan, click or tap
Pressure Operated Relief Valve (PORV)		Pneumatic actuator	

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4. SYSTEM COMPONENTS

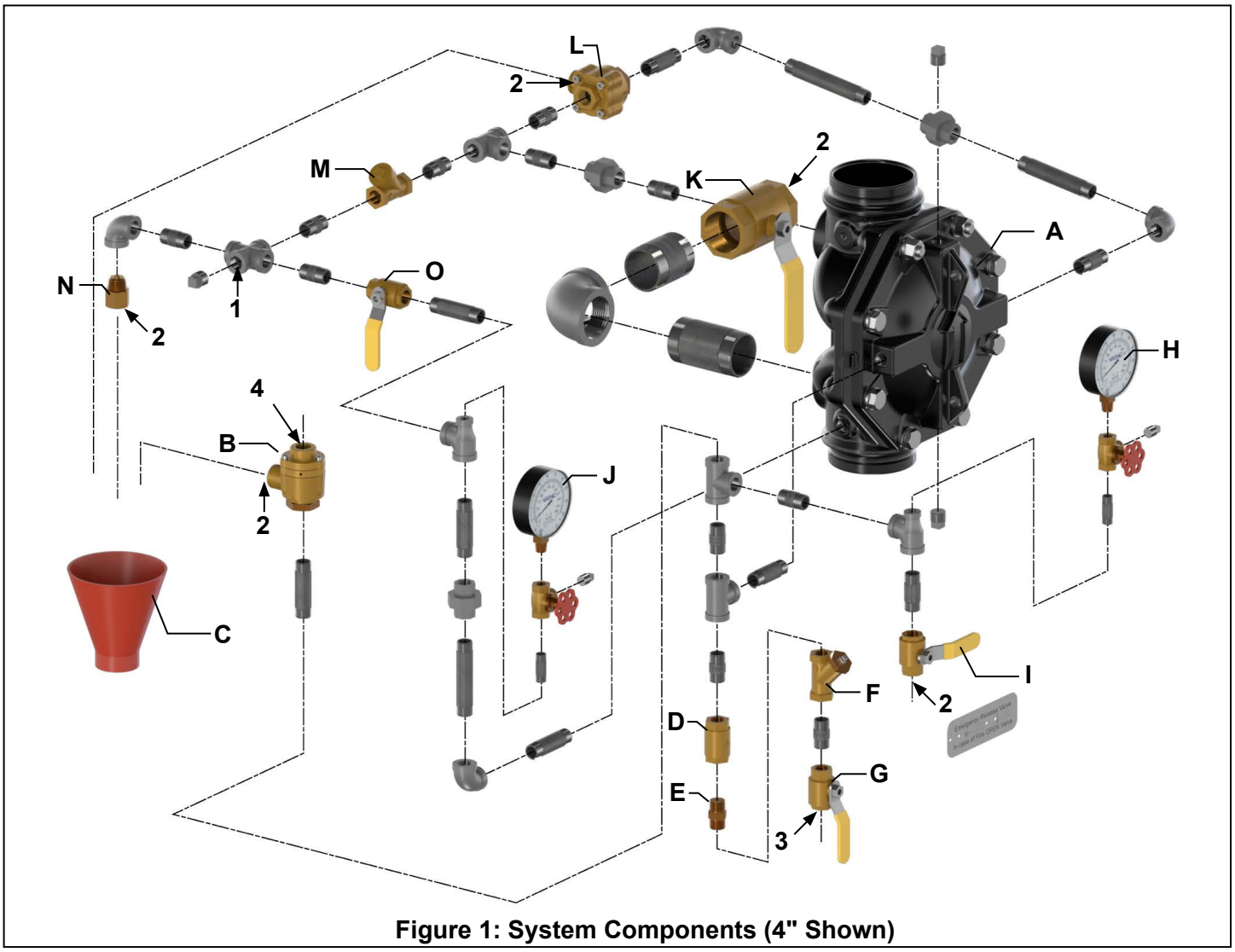

Figure 1: System Components (4" Shown)

Item	Description	Item	Description	Item	Description
A	Deluge valve	I	Emergency release valve (normally closed)	1	Water flow alarm (example: PS-10) connection point (device purchased separately)
B	Pneumatic Actuator	J	Water supply pressure gauge		
C	Drain cup	K	Flow test valve (normally closed)	2	Drain connection point (piping not provided)
D	In-line check valve	L	Pressure Operated Relief Valve (P.O.R.V.)		
E	1/8" Restricted orifice	M	Swing check valve	3	Prime supply connection point (must be piped to upstream of main water supply valve; piping not provided)
F	Y-strainer	N	1/8" Restricted orifice		
G	Priming valve (normally open)	O	Alarm test valve (normally closed)		
H	Prime pressure gauge	NOTE: Piping shown for reference only.		4	Air supply or Low Air switch (example: PS-40) connection point (devices purchased separately)

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5. SYSTEM OPERATION

5.1 In the SET condition:

System water supply pressure enters the priming chamber of the deluge valve through the priming line, which includes a normally open priming valve (A), strainer (B), restricted orifice (not shown), check valve (C) and also stops at the inlet of the normally closed PORV (D). In the SET condition, water supply pressure is trapped in the priming chamber by check valve (C), pneumatic actuator (E), and the emergency release (F). The pneumatic actuator is held closed by the pressure maintained in the pneumatic release system (not shown). The pressure in the priming chamber holds the Deluge Valve clapper closed, keeping the outlet chamber and system piping dry.

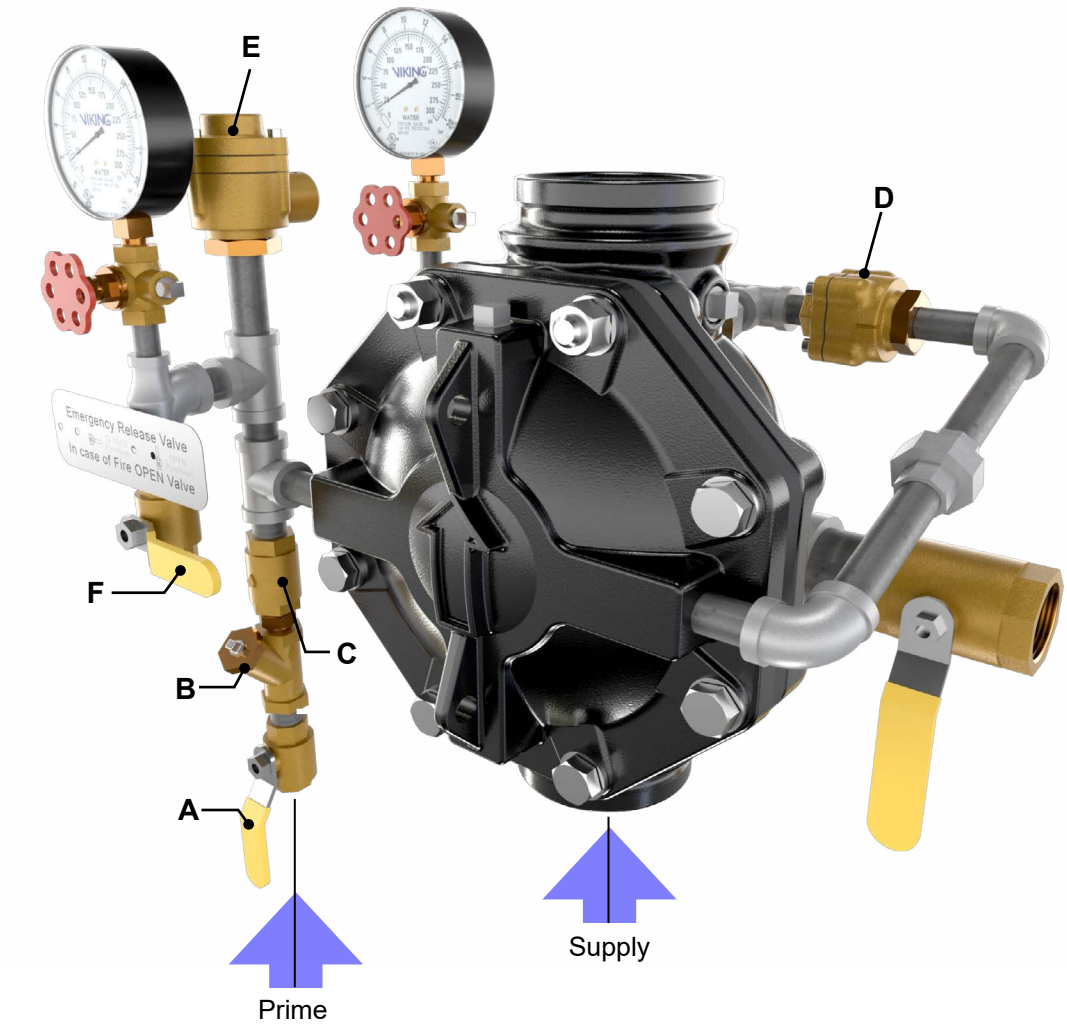

Figure 2: Operational Components

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5.2 In fire conditions:

When a releasing device operates, pressure in the pneumatic release system escapes, causing alarms controlled by the air supervisory switch to activate and the pneumatic actuator (E) to open. Pressure is released from the priming chamber faster than it is supplied through restricted orifice. The Deluge Valve diaphragm opens to allow water to flow into the system piping and alarm devices, causing the water motor alarm and/or water flow alarms connected to the alarm pressure switch (not shown) to activate. Water will flow from any open sprinklers and/or spray nozzles on the system. When the deluge valve operates, water is drained from the PORV inlet. When the 10:1 differential is overcome, the push rod opens, allowing the prime water to drain. If a release resets, priming water will continue to escape through the PORV, allowing the deluge valve to continue to operate until the system is reset. The Deluge Valve can only be reset after the system is taken out of service, and the outlet chamber of the deluge valve and associated trim piping are de-pressurized and drained.

5.3 In trouble conditions:

In the event of an air supply failure and slow leakage of air from the pneumatic release system, alarms connected to air supervisory switch (not shown) will signal a low air pressure condition. Failure to restore air supply to the pneumatic release system will result in operation of the pneumatic actuator (E) and the deluge valve will open. Similarly, if the release system operates due to mechanical damage or malfunction, the deluge valve will open. Water will flow from any open sprinklers and/or spray nozzles on the system. The water motor alarm (not shown) and alarms connected to alarm pressure switch will activate.

5.4 Manual operation:

Anytime the emergency release is pulled, pressure is released from the priming chamber and the deluge valve will open. Water will flow into the system piping and alarm devices. Water will flow from any open sprinklers and/or spray nozzles on the system.

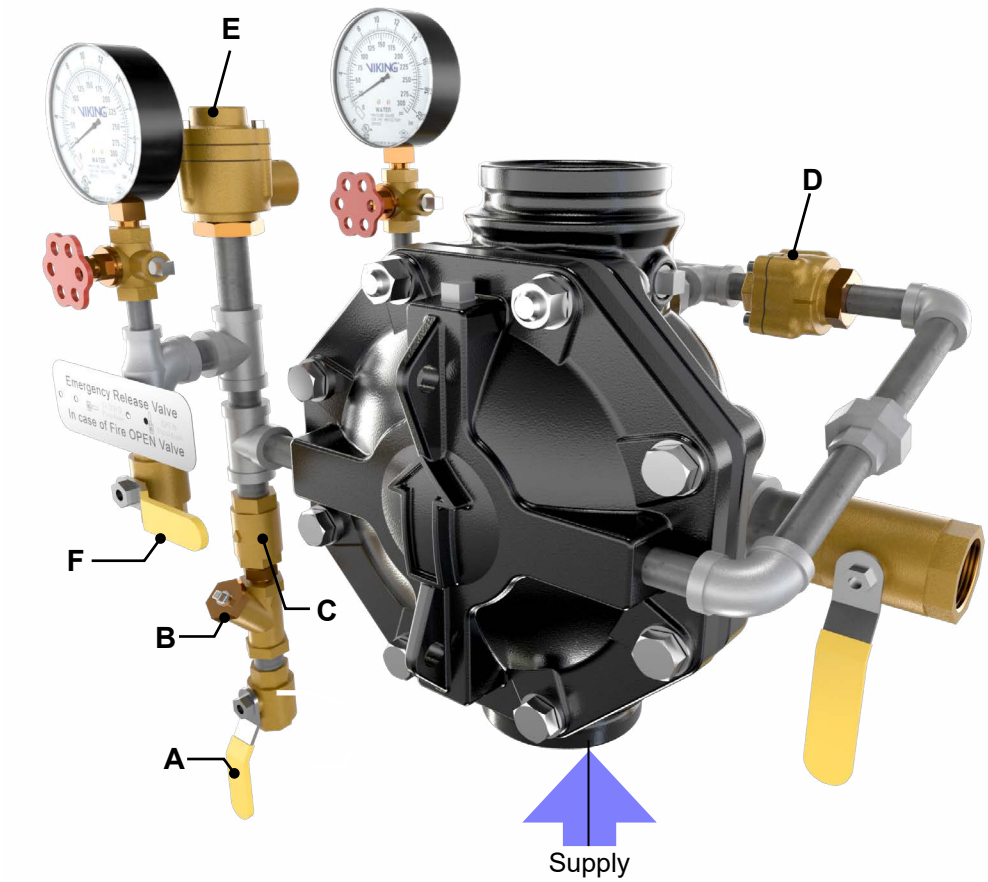

Figure 3: Fire Conditions

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6. INSTALLATION

Refer to current Viking Technical Data describing individual components of the Viking VXD Deluge System. Also, refer to applicable installation standards, codes, and Authorities Having Jurisdiction.

6.1 Important Settings

1. Minimum Pneumatic Pressure supplied to the pilot line and pneumatic actuator:
   a. For systems with water pressure 175 PSI (12 bar) or less:
      30 PSI (2 bar) with air pressure supervisory activation at 25 PSI (1.7 bar)
   b. For systems with water pressure greater than 175 PSI (12 bar) and up to 250 PSI (17.2 bar):
      50 PSI (3.4 bar) with air pressure supervisory activation at 45 PSI (3.1 bar)
2. Alarm pressure switch should activate when pressurized to 4 to 8 PSI (.3 to .6 bar) on pressure rise. Alarm pressure switch should be wired to activate the waterflow alarm.

6.2 Air Supply Design

The air supply compressor should be sized to establish total required air pressure in 30 minutes. The air supply must be regulated, restricted, and maintained automatically.

The air supply must be regulated to maintain the pressure desired in the release system. Pressure settings other than the pressure settings recommended in section 6.1 above may affect operation of the system. The air supply must be restricted to ensure that the automatic air supply cannot replace air as fast as it escapes when a releasing device operates.

It is recommended practice to provide an inspectors test connection on the pneumatic release system. The inspectors test connection should be equipped with a ball valve (normally locked closed) capable of being opened to simulate the opening of a releasing device. Locate the connection and valve at the highest, most demanding location of the release system. Test connections provided on pneumatic release systems should terminate in an orifice equal to the smallest orifice of the releasing devices provided. The inspectors test connection may be used to verify that the automatic air supply cannot replace air as fast as it escapes when a releasing device operates. Refer to section 9. INSPECTIONS, TESTS, AND MAINTENANCE.

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7. PLACING THE SYSTEM IN SERVICE

Placing the Valve in Service:

1. Verify the following:
   - The system main water supply control valve (not shown) is closed.
   - The system has been properly drained.
   - The emergency release (F) is closed.
   - The system water supply piping is pressurized up to the closed main water supply control valve and the priming line is pressurized up to the closed priming valve.
2. Restore pneumatic pressure to release system. Maintain 30 PSI (2 bar) or 50 PSI (3.4 bar) as required by the pneumatic actuator. Refer to section 6.1: Important Settings.
3. Prime pressure will be restored to the priming chamber of the deluge valve.
4. Slowly and partially open main water supply control valve (not shown).
   NOTE: Opening the main water supply valve too quickly can create excessive pressure causing the valve to trip.
5. When full flow develops from the flow test valve (G), close the valve. Verify that there is no flow from the open orifice.
6. Fully open and secure the main water supply control valve.
7. Verify that all valves are in their normal operating position.
8. Verify that no water is discharging into the drain cup.
9. Check for, and repair all leaks.
10. On new installations, those systems that have been placed out of service, or where new equipment has been installed, trip test the system to verify that all equipment functions properly. Refer to Annual Trip Tests, section 9.2.C.
11. After completing a trip test, perform semi-annual maintenance. Refer to section 9.3.B.

⚠ CAUTION

Performing a trip test results in operation of the Deluge Valve. Water will flow into the sprinkler piping. Take necessary precautions to prevent damage.

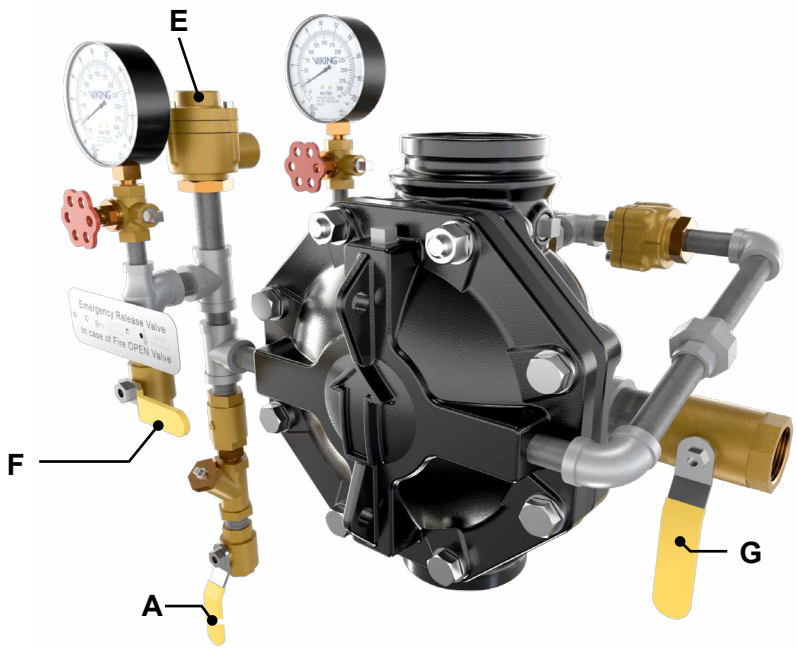

Figure 4: Placing the System in Service

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8. EMERGENCY INSTRUCTIONS

To take system out of service (Refer to Figure 4):

⚠ WARNING

WARNING: Placing a control valve or detection system out of service may eliminate the fire protection capabilities of the system. Prior to proceeding, notify all Authorities Having Jurisdiction (AHJ). Consideration should be given to employment of a fire patrol in the affected areas.
Refer to the appropriate technical data page and NFPA standards for complete care, handling, installation, and maintenance instructions. For additional product and system information, Viking data pages and installation instructions are available on the Viking Web site at www.vikinggroupinc.com.

After a fire, verify that the fire is OUT and that placing the system out of service has been authorized by the appropriate Authority Having Jurisdiction.

1. Close the water supply control valve (not shown).
   NOTE: Sprinkler systems that have been subjected to a fire must be returned to service as soon as possible. The entire system must be inspected for damage, and repaired or replaced as necessary.
2. Close the priming valve (A).
3. Replace any release devices, sprinklers and/or spray nozzles that have been damaged or have been exposed to fire conditions.
4. Perform all maintenance procedures recommended in Technical Data describing individual components of the system that has operated.
5. Return the system to service as soon as possible. Refer to section 7: Placing the System In Service.

9. INSPECTIONS, TESTS, AND MAINTENANCE

⚠ WARNING

Any system maintenance that involves placing a control valve or detection system out of service may eliminate the fire protection capabilities of that system. Prior to proceeding, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the affected areas.

NOTICE

The owner is responsible for maintaining the fire protection system and devices in proper operating condition.

It is imperative that the system be inspected and tested on a regular basis in accordance with NFPA 25. Refer to current Viking Technical Data describing individual components.

The frequency of the inspections may vary due to contaminated water supplies, corrosive water supplies, corrosive atmospheres, as well as the condition of the air supply to the system. For minimum maintenance and inspection requirements, refer to NFPA 25. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.

9.1 Inspection

Weekly - Viking recommends a weekly visual inspection; check the following items.

- Verify that the main water supply control valve is open and that all other valves are in their normal operating position and appropriately secured. (refer to Figure 1)
- Check for signs of mechanical damage, leakage, and/or corrosive activity. If detected, perform maintenance as required. If necessary, replace the device.
- Verify that the valve and trim are adequately heated and protected from freezing and physical damage.
  NOTE: For normal operating position, refer to Figure 1.

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9.2 Periodic System Tests

A. Quarterly Water Flow Alarm Test

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. To test the local electric alarm (if provided) and/or mechanical water motor alarm (if provided), OPEN the alarm test valve in the Deluge Valve trim.
   a. Electric alarm pressure switches (if provided) should activate.
   b. Electric local alarms should be audible.
   c. The local water motor gong should be audible.
   d. If equipped with remote station alarm signaling devices, verify that alarm signals were received.
3. When testing is complete, CLOSE the Alarm Test Valve.
4. Verify the following:
   a. All local alarms stop sounding and alarm panels (if provided) reset.
   b. All remote station alarms reset.
   c. Supply piping to water motor alarm properly drains.
5. Verify that the Alarm Test Valve is CLOSED.
6. Verify that the outlet chamber is free of water. No water should flow from the alarm drain line.
7. Notify the Authority Having Jurisdiction and those in the affected area that testing is complete.

B. Quarterly Main Drain Test

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Record pressure reading from the water supply pressure gauge.
3. Verify that the outlet chamber of the Deluge Valve is free of water. No water should flow from the alarm drain line.
4. Fully OPEN the Flow Test Valve.
5. When a full flow is developed from the Flow Test Valve, record the residual pressure from the water supply pressure gauge.
6. When the test is complete, SLOWLY CLOSE the Flow Test Valve.
7. Compare test results with previous flow information. If deterioration of the water supply is detected, take appropriate steps to restore adequate water supply.
8. Verify:
   a. Normal water supply pressure has been restored to the inlet chamber, the priming chamber, and the release system. The pressure on the priming chamber water pressure gauge should equal the system water supply pressure.
   b. All alarm devices and valves are secured in normal operating position (refer to Figure 1).
9. Notify the Authority Having Jurisdiction that the test is complete. Record and/or provide notification of test results as required by the Authority Having Jurisdiction.

C. Annual Trip Test

⚠ CAUTION

Performing this test results in operation of the Deluge Valve. Water will flow into the sprinkler piping and from any open sprinklers and/or nozzles. Take necessary precautions to prevent damage.

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Fully open the Flow Test Valve to flush away any accumulation of foreign material.
3. Close the Flow Test Valve.
4. Trip the system by operating the test connection on the release system. Allow a full flow to pass through the Deluge Valve. Water flow alarms should operate.
5. When test is complete:
   a. Close the Main Water Supply Control Valve.
   b. Close the Priming Valve.
   c. Open all system main drains. Allow the system to drain completely.
6. Perform semi-annual maintenance. Refer to section 9.3.B: Semi-Annual Maintenance.
7. Place the system in service. Refer to section 7: Placing the System in Service.
8. Notify the Authority Having Jurisdiction that the test is complete. Record and/or provide notification of test results as required by the Authority Having Jurisdiction.

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D. "Low Air" Alarm Test:

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Close the main water supply valve.
   NOTE: Closing the main water supply valve prevents operation of the deluge valve during the test.
3. Fully OPEN the test valve to simulate operation of a releasing device.
4. Verify that the low air alarms operate within an acceptable time period and continue without interruption.
5. Close the test valve.
6. Establish recommended pneumatic pressure to be maintained. Refer to section 6.1. Alarms should stop at after the pressure has been established.
7. Open the priming valve.
8. Return the system to service. Refer to section 7 Placing the System in Service.

9.3 Maintenance

A. After Each Operation:

1. Sprinkler systems that have been subjected to a fire must be returned to service as soon as possible. The entire system must be inspected for damage, and repaired or replaced as necessary.
2. Deluge Valves and trim that have been subjected to brackish water, salt water, foam/water solution, or any other corrosive water supply, should be flushed with good quality fresh water before being returned to service.
3. Perform semi-annual maintenance after every operation.

B. Semi-Annually:

1. Remove the system from service.
2. Close the Main Water Supply Control Valve and Priming Valve.
3. Relieve pressure in the priming chamber by opening the emergency release Valve.
4. Inspect all trim for signs of corrosion and/or blockage. Clean and/or replace as required.
5. Clean and/or replace all strainer screens.
6. Refer to section 7: Placing the System in Service.

C. Every Fifth Year:

1. Internal inspection of Deluge Valves is recommended every five years unless inspections and tests indicate more frequent internal inspections are required. Refer to the Model VXD Valve Technical Data Page.
2. Internal inspection of strainers, and restricted orifices is recommended every five years unless inspections and tests indicate more frequent internal inspections are required.
3. Record and provide notification of inspection results as required by the Authority Having Jurisdiction.

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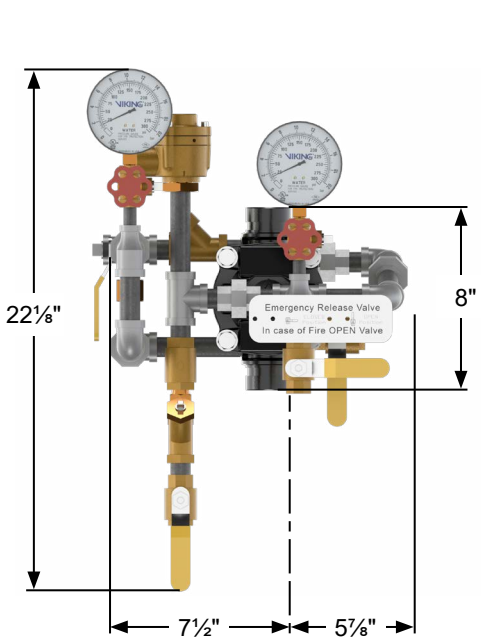
10. DIMENSIONS



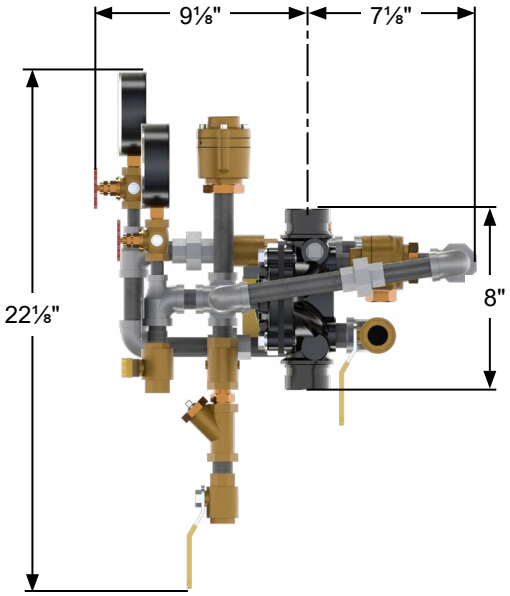
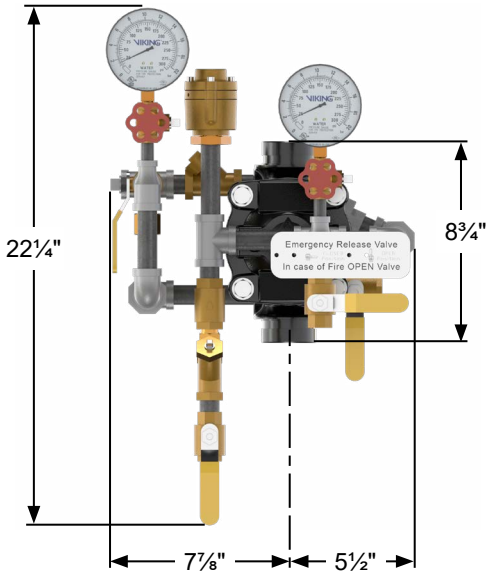


Figure 5: Dimensions - 1-½"

Not to scale.
All dimensions are approximate.



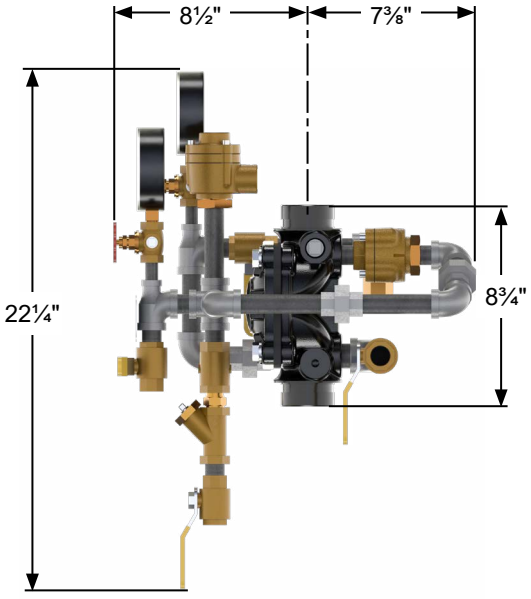


Figure 6: Dimensions - 2"

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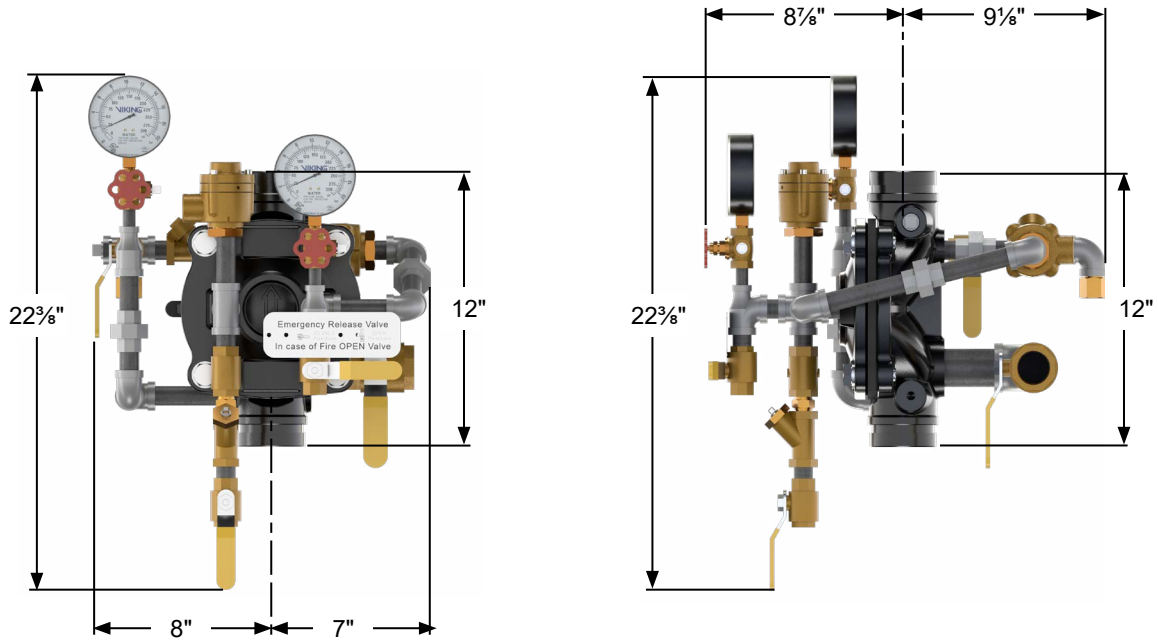

Figure 7: Dimensions - 2.5"

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All dimensions are approximate.

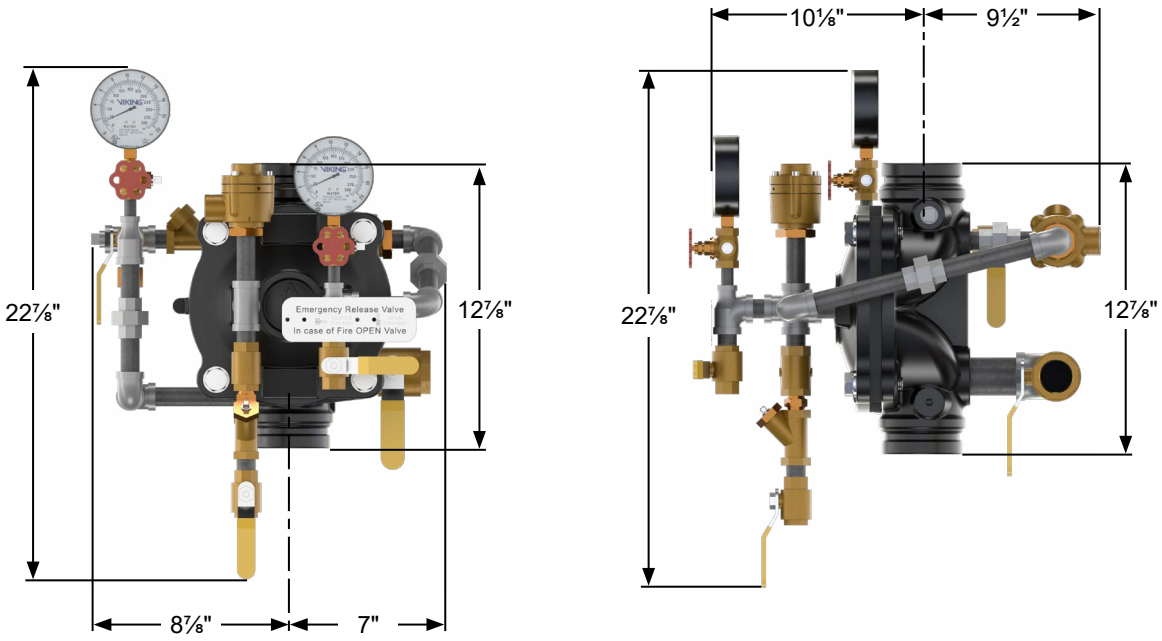

Figure 8: Dimensions - 3"

Not to scale.
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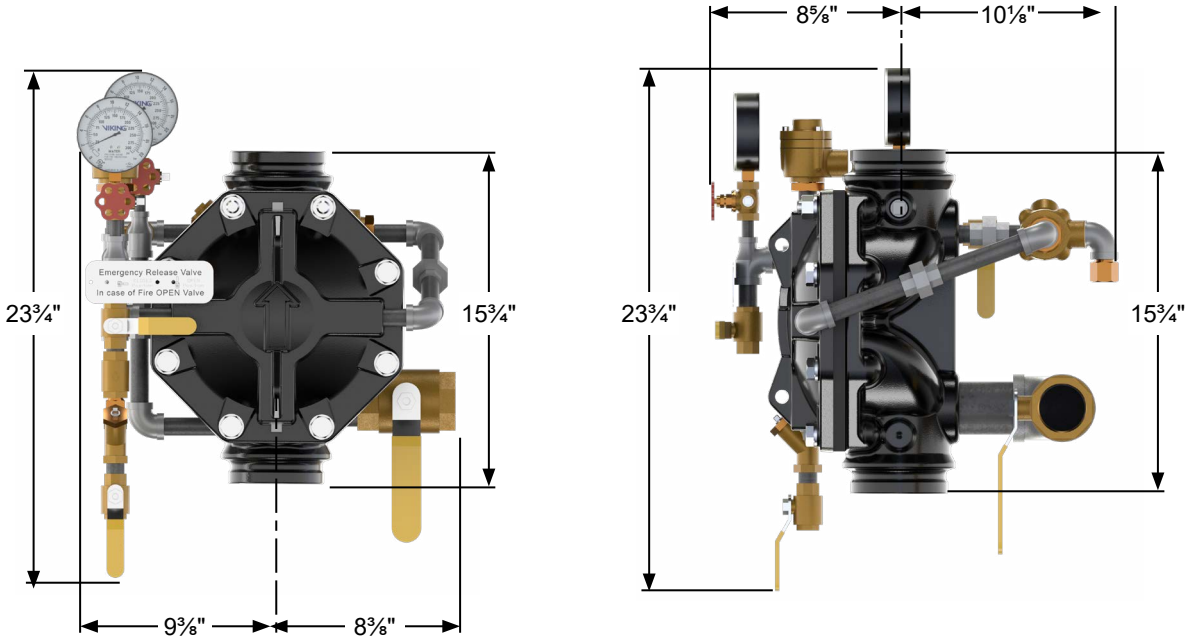

Figure 9: Dimensions - 4"

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All dimensions are approximate.

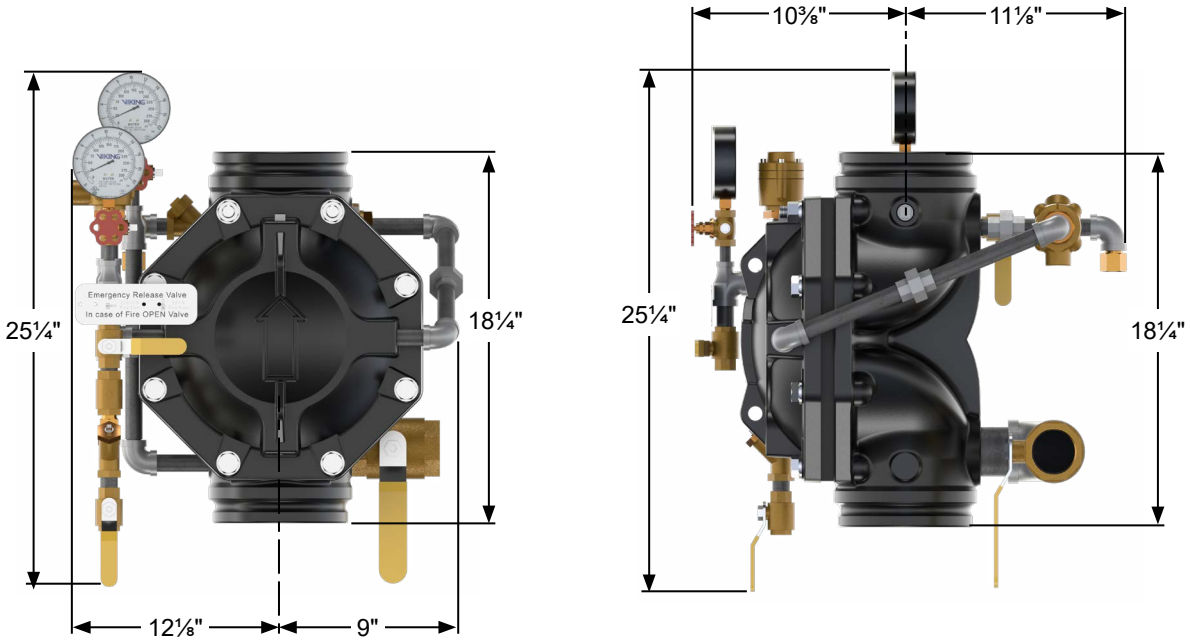

Figure 9: Dimensions - 6"

Not to scale.
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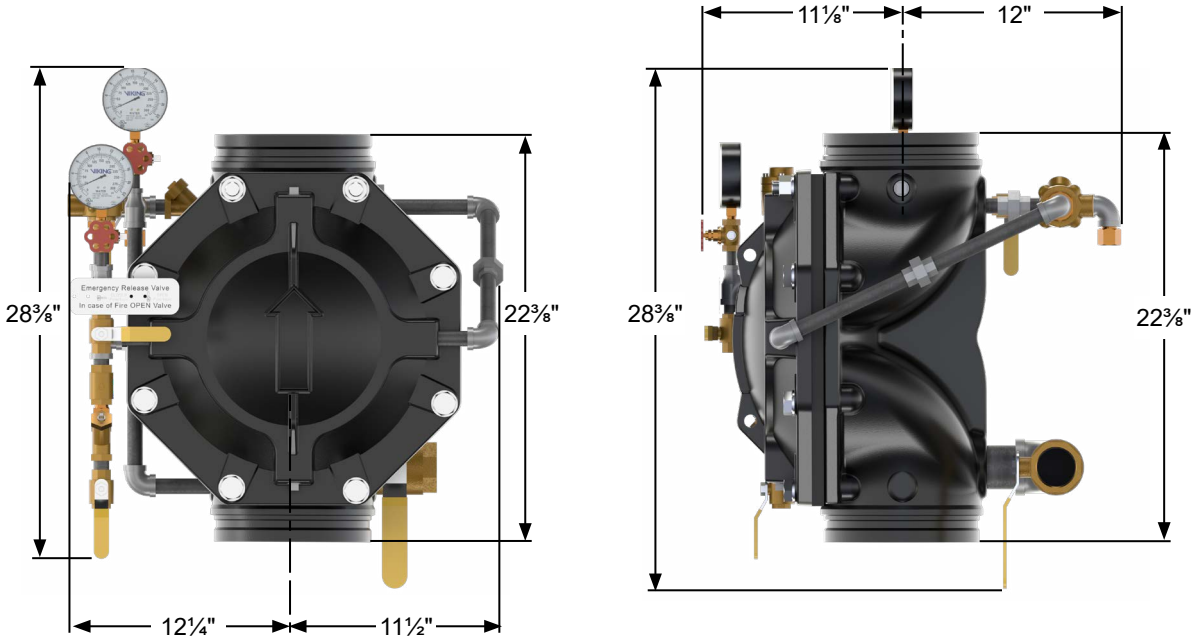

Figure 10: Dimensions - 8"

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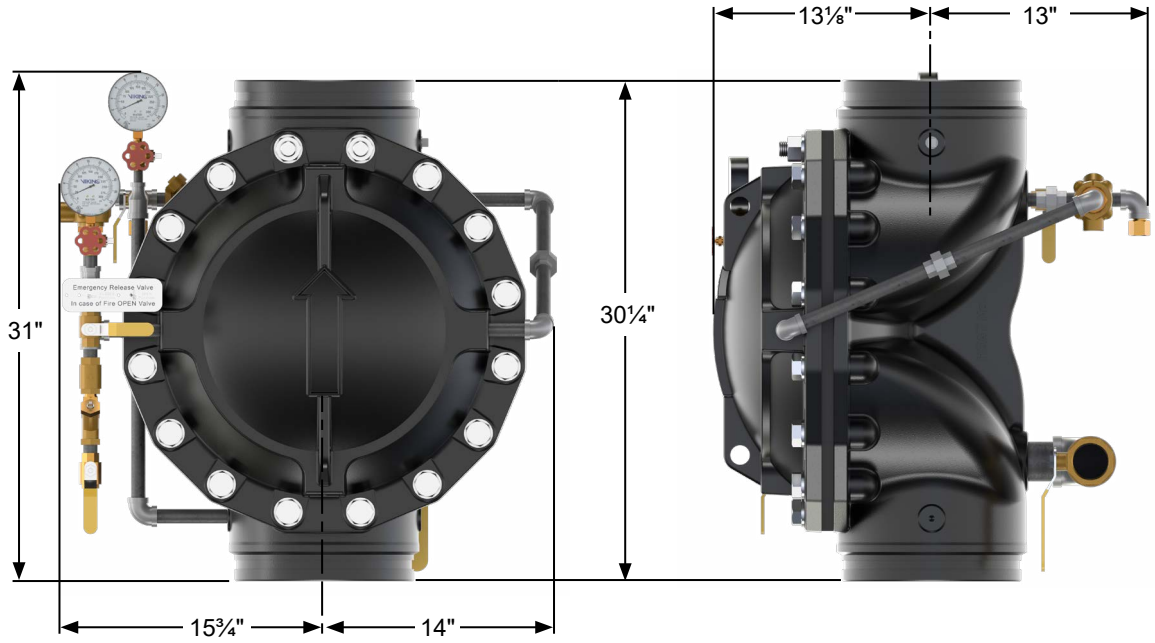

Figure 11: Dimensions - 10"

Not to scale.
All dimensions are approximate.