VIKING®

TECHNICAL DATA

SINGLE INTERLOCKED PRE-PRIMED PREACTION SYSTEM CONTROLLED BY ELECTRIC RELEASE

1. SYSTEM DESCRIPTION

(Refer to Figure 1.)

Viking supervised, single interlocked preaction pre-primed systems utilize a Viking Deluge Valve (A.1) and a hydraulically pressurized automatic sprinkler system. The system piping is hydraulically pressurized with water for supervisory purposes and preprime requirements of NFPA. If acceptable by the authority having jurisdiction, this feature allows the system to be applied as a wet system and serve to prevent undetected leaks. If the system piping or a sprinkler is damaged, supervisory pressure is reduced and a supervisory alarm is activated.

Electrically controlled preaction systems require an electric Solenoid Valve (F.2) controlled by an approved System Control Panel (F.3) with compatible detection system (F.4) that meets the application. Detection system must actuate prior to or at the same time as sprinklers.

In fire conditions, when the detection system (F.4) operates, System Control Panel (F.3) energizes Solenoid valve (F.2) open, causing Deluge Valve (A.1) to open. The riser piping fills with water, pressurizing already existing water. If any sprinklers have opened, water will flow from the system. If sprinklers have not opened, pressurized water will be in the sprinkler system piping when the sprinkler operates. A sprinkler head must open before water flows from the system.

Single interlocked pre-primed preaction systems are commonly used where the sprinkler system piping and/or sprinkler may be subject to damage or systems must be wet type. The most common applications are in system applications where it is important to use wet pipe systems and limit accidental water discharge due to damaged sprinklers or piping.

2. SYSTEM OPERATION

(Refer to Figure 1.)

A. In the SET condition:

System water supply pressure enters the priming chamber of the Deluge Valve (A.1) through the 1/4" (8 mm) priming line which includes a normally open priming valve (B.1), strainer (B.2), restricted orifice (B.3) and check valve (B.4). In the SET condition, water supply pressure is trapped in the priming chamber by check valve (B.4) and normally closed Solenoid Valve (F.2). The pressure in the priming chamber holds the deluge valve clapper closed, keeping the outlet chamber dry.

B. In a fire condition:

In a fire condition, when the detection system (F.4) operates, System Control Panel (F.3) activates an alarm and energizes normally closed Solenoid Valve (F.2) open. Pressure is released from the priming chamber to open Drain Cup (B.14) faster than it is supplied through restricted orifice (B.3). The deluge valve clapper opens to allow water to flow into the riser piping and alarm devices, causing Water Motor Alarm (C.2) and water flow alarms connected to Alarm Pressure Switch (C.1) to activate. When a sprinkler head opens, water will flow from the system. Since the system is already pre-primed with water, no delay in filling system occurs.

C. For Conventional Deluge Valve Trim:

When the deluge valve (A.1) operates, the sensing end of PORV (B.10) is pressurized, causing the PORV (B.10) to operate. When the PORV (B.10) operates, it continually vents the priming chamber to prevent the deluge valve (A.1) from resetting even if the open releasing devices close. The deluge valve (A.1) can only be reset after the system has been taken out of service, and the outlet chamber of the deluge valve (A.1) and associated trim piping are depressurized and drained.

D. Trouble conditions:

If a sprinkler opens prior to operation of the detection system (F.4), OR ANY TIME SUPERVISORY PRESSURE IN THE SPRINKLER PIPING IS LOST, alarms connected to Supervisory Switch (E.1) will signal a low pressure condition but the deluge valve (A.1) will NOT open.

If the detection system operates due to mechanical damage or malfunction, the deluge valve (A.1) will open but the water will be contained in the sprinkler piping. Water Motor Alarm (C.2) and alarms connected to Alarm Pressure Switch (C.1) will activate.

E. Manual Operation:

Any time the handle inside Emergency Release (B.11) is pulled, pressure is released from the priming chamber; the deluge valve (A.1) will open. Water will flow into the riser piping, and alarm devices (C.1 and C.2). If a sprinkler head opens, water will flow from the system.

3. INSTALLATION

Refer to current Viking Technical Data describing individual components of the Viking

For Technical Data, Installation, Maintenance and Testing Instructions for individual system components, refer to current Viking Technical Data describing individual components of the Preaction System used.

Viking Technical Data may be found on The Viking Corporation's Web site at http://www.vikinggroupinc.com. The Web site may include a more recent edition of this Technical Data page.

Single Interlocked Pre-primed Preaction System. Technical Data describing the Viking Deluge Valve, and other system components are packed with product and can be found on the applicable data sheets.
Also, refer to applicable installation standards, codes, and Authorities Having Jurisdiction.

A. Important Settings:

1. Recommended supervisory water pressure in the closed sprinkler piping is 50 PSI (346 kPa) maximum.
   a: Where supervisory pressure is maintained at 50 PSI (346 kPa), set Supervisory Switch (E.1) to activate at 35 PSI (241 kPa) on pressure drop.
   b: Supervisory Switch (E.1) should be wired to activate an alarm to signal a low pressure condition at 25 PSI (172 kPa). Activation of an alarm to signal a high pressure condition may be required. Refer to applicable installation standards and the Authority Having Jurisdiction.
   c. Supervisory pressure will vary with temperature cycling. Make sure to compensate with regulated supply pressure to the sprinkler piping.
2. Alarm Pressure Switch (C.1) should activate when pressurized to 4 to 8 PSI (27 to 55 kPa) on pressure rise and should be wired to activate the water flow alarm.

B. Supervisory Supply Design:

The supervisory supply should be sized to establish total required water pressure. The supervisory supply must be regulated, restricted and maintained automatically. All air shall be bled from the system piping above the check valve.
The supervisory supply must be regulated to maintain the supervisory pressure desired in the sprinkler piping. Pressures other than the pressure settings recommended in paragraph **3. Important Settings**, will affect operation of the system.
The supervisory supply must be shut off in a fire condition.
It is recommended practice to provide an Inspectors Test Connection on the supervised sprinkler piping.
Sprinkler system Inspectors Test Connections should terminate in an orifice equal to the smallest sprinkler orifice provided.
Inspectors Test Connections should be equipped with a ball valve (normally locked closed) capable of being opened to simulate the opening of a sprinkler and should be installed at the most hydraulically demanding location of the system.
Inspectors Test Connections may be used to verify that the automatic supervisory water supply cannot be replaced as fast as it escapes when a sprinkler operates. Refer to paragraph 4. INSPECTIONS, TESTS AND MAINTENANCE.

C. Emergency Instructions

(Refer to Figure 1.)

To Take System Out of Service:

⚠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. Consideration should be given to employment of a Fire Patrol in the affected areas.

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 Water Supply Valve (D.1).
2. Open system Main Drain (G.5).
3. Silence alarms (optional).
   a: To silence electric alarms controlled by the VFR400 Release Control Panel (F.3): Open panel and press “BUZZER SILENCE”
   b: To silence electric alarms controlled by pressure switch (C.1) and to silence Water Motor Alarm (C.2): Close Alarm Shut-Off Valve (B.9).

Note: Electric alarms controlled by a pressure switch installed in the 1/2” (15 mm) NPT connection for a Non-interuptable Alarm Pressure Switch cannot be shut off until the deluge valve (A.1) is reset or taken out of service.

4. Shut off the supervisory supply (optional).
5. Open Auxiliary Drain Valve (B.6).
6. Close Priming Valve (B.1) (optional). 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.
7. Replace any detectors (F.4) that have been damaged.
8. Replace any sprinklers that have opened, been damaged, or have been exposed to fire conditions.
9. Perform all maintenance procedures recommended in Technical Data describing individual components of the system that has operated.
10. Return the system to service as soon as possible. Refer to 3-D Placing The System In Service.

D. Placing The System In Service

(Refer to Figure 1.)

Note: Refer to instructions provided in Technical Data describing the Viking Deluge Valve, and other system components.

To Return the System to Service:

1. Verify that the system has been properly drained. System Main Drain (G.5) and Auxiliary Drain Valve (B.6) should be open. Verify that Emergency Release (B.11) is closed.
2. Close the system Main Drain (G.5).
3. Restore supervisory pressure to sprinkler piping.
4. Open Priming Valve (B.1).
5. Reset the System Control Panel (F.3). For the VFR400 Release Control Panel: Open panel and press “RESET”. Solenoid Valve (F.2) should close. Flow from Solenoid Valve (F.2) to drain cup (B.14) should stop.
6. Open Flow Test Valve (B.15).
7. Partially open Main Water Supply Control Valve (D.1).
8. When full flow develops from Flow Test Valve (B.15), close the Flow Test Valve (B.15).
   a: Verify that there is no flow from open Auxiliary Drain Valve (B.6).
9. Close Auxiliary Drain Valve (B.6).
10. Fully open and secure the Main Water Supply Control Valve (D.1).
11. Verify that the Alarm Shut-off Valve (B.9) is open and that all other valves are in their normal operating position.
12. Depress the plunger of drip check valve (B.7). No water should flow from the drip check valve (B.7) when the plunger is pushed.

4. INSPECTIONS, TESTS AND MAINTENANCE

It is imperative that the system be inspected and tested on a regular basis.

Refer to INSPECTIONS, TESTS AND MAINTENANCE recommended in current Viking Technical Data describing individual components of the Viking Single Interlocked Pre-primed Preaction System used.

The frequency of the inspections may vary due to contaminated water supplies, corrosive water supplies, corrosive atmospheres as well as the condition of the supervisory supply to the system. For minimum maintenance and inspection requirements, refer to the National Fire Protection Association Pamphlet that describes care and maintenance of sprinkler systems. In addition, the Authority Having Jurisdiction may have additional maintenance, testing, and inspection requirements which must be followed.

⚠ WARNING

Any system maintenance which 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.

4-A Low Supervisory Pressure AlarmTest

Quarterly testing of low supervisory alarms is recommended.

To Test Sprinkler System “Low Supervisory Supervisory” Alarm:

1. To prevent operation of the deluge valve (A.1) and filling the system with water during the test, do NOT operate the electric detection system during this test. Consider closing the Main Water Supply Control Valve (D.1).
2. Fully open the sprinkler system Inspectors Test Valve to simulate operation of a sprinkler.
3. Verify that low supervisory alarms operate within an acceptable time period and continue without interruption.
4. Close the Inspectors Test Valve.
5. Establish recommended hydraulic supervisory pressure to be maintained. Refer to paragraph 3. INSTALLATION.
6. Open the System Control Panel (F.3) and press RESET. Alarms should stop.
   When testing is complete, return the system to service following steps 1 through 9 below.

⚠ CAUTION

This procedure applies only when done in conjunction with “Low Supervisory Pressure” Alarm testing described above.

1. Verify that the pressure indicated on Priming Pressure Water Gauge (B.12) indicates that the priming chamber is pressurized with system water supply pressure.
2. Depress the plunger of Drip check. No water should flow from the Drip Check when the plunger is pushed.
   If the Main Water Supply Control Valve (D.1) was NOT closed in step 1, proceed to step 8 below.
   If the Main Water Supply Control Valve (D.1) WAS closed in step 1, proceed with steps 3 through 9 below.
3. Open Flow Test Valve (B.15) and Auxiliary Drain Valve (B.6).

4. Partially open Main Water Supply Control Valve (D.1)
5. When full flow develops from Flow Test Valve (B.15), close the Flow Test Valve (B.15).
   a: Verify that there is no flow from open Auxiliary Drain Valve (B.6).
6. Close Auxiliary Drain Valve (B.6).
7. Fully open and secure the Main Water Supply Control Valve (D.1).
8. Verify that the Alarm Shut-off Valve (B.9) is open and that all other valves are in their normal operating position.
9. Depress the plunger of drip check valve (B.7). No water should flow from the drip check valve (B.7) when the plunger is pushed.

4-B Full Flow Trip test

Performance of a Trip Test is recommended annually during warm weather. Consider coordinating this test with operation testing of the detectors.

⚠ CAUTION

Performance of this test will cause the deluge valve (A.1) to open.

To Trip Test the Electrically Controlled Single Interlocked pre-primed Preaction System:

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Trip the deluge valve (A.1) by performing option “a” or “b” below.
   a: Operate a detector according to the manufacturers instructions.
   b: Open the door of Emergency Release (B.11) and pull the handle.
3. The deluge valve (A.1) should open.
   a: Water flow alarms should operate.
4. Open the sprinkler system Inspectors Test Valve to verify adequate flow.

When Trip Testing is complete:

5. Perform steps 1 through 10 of paragraph 3-C EMERGENCY INSTRUCTIONS to take the system out of service.
6. Perform steps 1 through 12 of paragraph 3-D PLACING THE SYSTEM IN SERVICE to return the system to service.
7. Notify the Authority Having Jurisdiction and those in the affected area affected that testing is complete.

4-C Maintenance

NOTICE

The owner is responsible for maintaining the fire protection system and devices in proper operating condition.
Refer to the MAINTENANCE INSTRUCTIONS provided in current Viking Technical Data describing individual components of the Viking Single Interlocked pre-primed Preaction System used.
Where difficulty in performance is experienced, the valve manufacturer or his authorized representative shall be contacted if any field adjustment is to be made.

5. AVAILABILITY AND SERVICE

The Viking Deluge Valve and accessories are available through a network of Domestic, Canadian, and International Distributors. See the Viking Corp. Web site for closest distributor or contact The Viking Corporation.

6. GUARANTEES

For details of warranty, refer to Viking’s current list price schedule or contact Viking directly.

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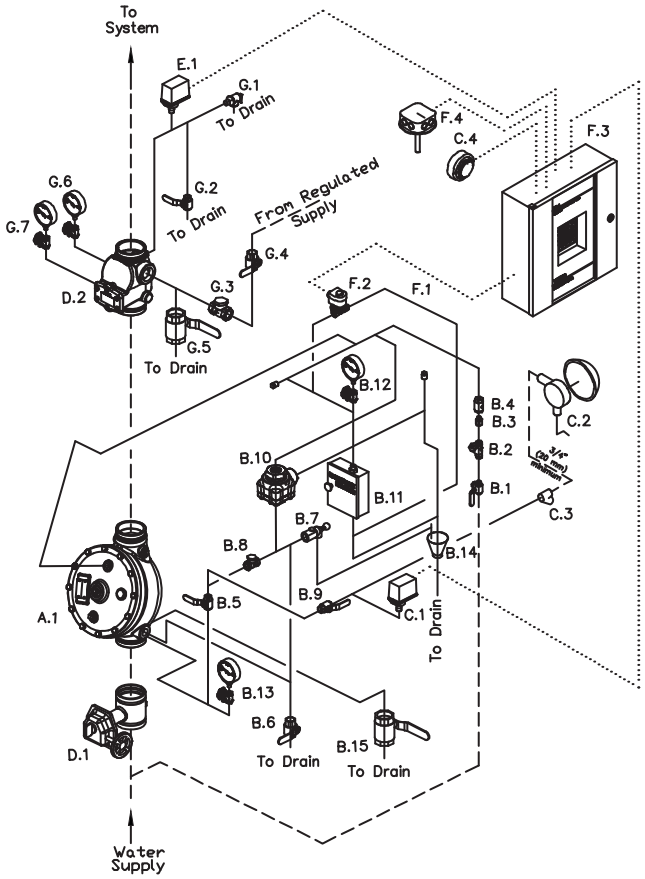
— — Dashed lines indicate pipe required but not included with Deluge Valve Conventional Trim and Easy Riser™ Check Valve Trim Packages.

····· Dotted lines indicate electrical detection system wiring required but not included with the "System Components". For additional wiring requirements refer to technical data for components used.

* Viking Deluge Valve Trim Packages contain items B.1 through B.15 and associated nipples. Viking Accessory Package for Conventional Deluge Valve Trim contains B.2 through B.5, B.7 through B.11, and B.14.



A SUPERVISED SINGLE–INTERLOCKED
PRE–PRIMED PRE–ACTION SYSTEM
CONTROLLED BY ELECTRIC RELEASE

SYSTEM COMPONENTS

A. Valve
- A.1 Deluge Valve

B. Deluge Valve Conventional Trim*
(See Deluge Valve Conventional Trim Charts)
- B.1 Priming Valve (Normally Open)
- B.2 Strainer
- B.3 1/16" Restriction
- B.4 Spring Loaded Check Valve
- B.5 Alarm Test Valve (Normally Closed)
- B.6 Auxiliary Drain Valve (Normally Closed)
- B.7 Drip Check Valve
- B.8 Drain Check Valve
- B.9 Alarm Shut-Off Valve (Normally Open)
- B.10 Pressure Operated Relief Valve (P.O.R.V.)
- B.11 Emergency Release
- B.12 Priming Pressure Water Gauge and Valve
- B.13 Water Supply Pressure Gauge and Valve
- B.14 Drain cup
- B.15 Flow Test Valve (Normally Closed)

C. Water Flow Alarm Equipment
- C.1 Alarm Pressure Switch and/or
- C.2 Water Motor Alarm (Strainer Required)
- C.3 Strainer
- C.4 Electric Alarm Bell

D. Riser
- D.1 Water Supply Control Valve
- D.2 Easy Riser™ Check Valve or rubber seated check valve

E. Supervisory Circuit
- E.1 Pressure Supervisory Switch

F. Release System
- F.1 Electric Release Module (See Electric Release Module Trim Chart)
- F.2 Solenoid Valve
- F.3 System Control Panel configured for Single Interlocked Preaction operation.
- F.4 Electric Detection System. Heat Detector shown for clarity.

G. Easy Riser Valve Wet Preaction Trim
- G.1 Pressure Relief Valve
- G.2 Supervisory Alarm Test Valve
- G.3 Supply Check Valve
- G.4 Supply Isolation Valve
- G.5 System Main Drain Valve
- G.6 System Pressure Gauge and Valve
- G.7 Pressure Gauge and Valve

Figure 1