Trimpac® Firecycle® III Multi-Cycle System

Technical Manual for Installation, Operation and Maintenance

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VIKING®

TECHNICAL DATA

TRIMPAC® FIRECYCLE® III MULTI-CYCLE SYSTEM

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NOTE: SPRINKLER SYSTEMS ARE ENGINEERED TO MEET THE STANDARDS OF NFPA 13, FM GLOBAL, LOSS PREVENTION COUNCIL (FOC), ASSEMBLEE PLENIERE, VERBAND DER SACHVERSICHERER (VDS) OR OTHER SIMILAR ORGANIZATIONS, AND WILL ALSO NEED TO COMPLY WITH THE PRO VISIONS OF GOVERNMENTAL CODES, ORDINANCES, AND STANDARDS WHERE APPLICABLE. THE SYSTEM MUST BE DESIGNED BY QUALIFIED DESIGN PROFESSIONALS IN CONJUNCTION WITH INSURING BODIES. THE USER IS RESPONSIBLE FOR THE DESIGN AND CONFIGURATION OF THE SYSTEM, ITS APPROPRIATENESS FOR THE USE INTENDED AND ITS COMPLIANCE WITH ALL STANDARDS, CODES AND ORDINANCES. VIKING CORPORATION DOES NOT DESIGN SYSTEMS FOR SPECIFIC INSTALLATIONS AND MAKES NO REPRESENTATION OR WARRANTY CONCERNING WHETHER ANY SPECIFIC SYSTEM INSTALLATION WILL BE SUFFICIENT FOR THE INTENDED USE OR WILL COMPLY WITH ANY STANDARD, CODE, OR ORDINANCE. ANY SYSTEM DEPICTED IN THIS MANUAL IS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.

I. SYSTEM DESCRIPTION

Viking Trimpac® Firecycle® III and Firecycle® III-OH Systems have the ability to automatically detect a fire and turn the system on, along with the added ability to sense when the fire has been controlled, and automatically turn off the water flow once a preprogrammed “Soak Timer” has been satisfied. If the fire rekindles, the Firecycle® system will initiate the sequence again. This unique cycling feature will repeat as long as power is available to the panel, helping to minimize water usage, water damage, and the danger of pollution to surrounding areas. Batteries are available to provide up to ninety (90) hours of emergency power.

Configurations: Firecycle® Systems are available configured as a cycling wet system, deluge system, single-interlock preaction system, or double interlock preaction system. Firecycle® Systems require use of a Viking flow control valve and trim kit with two electric release solenoid valves controlled by the VFR-400 Control Panel, a Viking Easy Riser® Check Valve (for preaction systems only), Firecycle® detectors, and detector cable, to form a unique operating system. In the Firecycle® III System, the valve trim box contains the solenoid valves and pressure switches, which are operated through relays in the control panel to activate the system. When a detector operates, the solenoid valve is energized open and the valve will open at the same time, causing an electric alarm to operate*. With the solenoid valve open, the priming chamber of the flow control valve is vented, allowing water to enter the system, to be discharged upon the opening of a sprinkler. With the Firecycle® wet and deluge systems, if the A.C. power fails and the battery backup power expires while the system is operating, the system will “fail-safe” until A.C. power is restored or the system is manually shut-off. The Firecycle® preaction system will operate as a dry system upon loss of power in the set position.

Trimpac® Trim Packages: Viking Firecycle® III Systems are factory assembled with Trimpac® trim packages, manufactured and factory leak tested in a metal enclosure. The standard trim normally required on a Firecycle® III and Firecycle® III-OH System has been preassembled into a single cabinet and requires only the connection to the water supply inlet, water outlet (to system), main drain, the alarm and detection connections, and the electrical power supply. The included stainless steel hoses (or field provided hard piping) from the valve body to the enclosure assembly allows the assembly to be installed remote of the sprinkler system riser.

This technical manual will cover Viking Trimpac® Firecycle® III Systems, trim parts and their functions, as well as describe the proper operation, maintenance, and repair of valves and system devices. Consult all Authorities Having Jurisdiction prior to installing a Trimpac® Firecycle® III System or before converting existing sprinkler systems to a Firecycle® System.

NOTE: Trimpac® Firecycle® III Systems are complete systems, and are listed as a unit. As such, it is normally not possible to modify the components of the system or their interrelationship without compromising the listing. For information on current approvals of Firecycle® III, contact The Viking Corporation.

*Also occurs in the double interlock preaction configuration, upon activation of Zone 2 due to low air pressure.

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II. SYSTEM APPLICATIONS

Trimpac® Firecycle® III and Firecycle® III-OH Systems are used to provide automatic cycling as needed to control a fire, while limiting water damage and preservation of limited water supply. The system is designed for proper wetting of the fire area for a set amount of time before system is allowed to cycle off. The cycling feature may limit water flow during a fire by 40% to 90% depending on the situation, so when a water containment area is required, it may greatly reduce its size and cost. Firecycle® systems are an excellent backup or alternative to gas systems. A very important feature of the multi-cycle sprinkler system is its effectiveness in reduction of the closed-valve, catastrophic fire. The manual sprinkler control valve would not have to be closed except in the very infrequent case of major maintenance involving a certain small section of the overall system.

Some typical applications are:

- Air Traffic Control Facilities
- Pharmaceutical Plants
- Libraries
- Museums and Historical Sites
- Banks
- TV Studios
- Student Housing and Hotels

III. GENERAL SYSTEM REQUIREMENTS

The following applies to all Firecycle® III System configurations (wet, deluge, and preaction). Refer to the section on the particular system used for additional requirements that apply.

Flow Control Valve

All Firecycle® III Systems utilize a Model H or J series Flow Control Valve.

Firecycle® III Trimpac® Trim Package

Firecycle® III Trimpac® packages are used with the flow control valve on all Firecycle® III Systems. The trim package includes all necessary fittings, nipples and devices shown on the Viking Firecycle® Trim Chart (includes conventional trim for the type of system configuration, plus releasing device and trim, and flexible hose kit). The standard trim normally required on a Firecycle® valve will be enclosed in a single Trimpac® cabinet. Trimpac® eliminates the installation of alarm trim piping and release trim piping at the flow control valve. The enclosure protects trim valves from inadvertent operation. The unit is rated for 250 PSI (17 bar).

Drain Package

A valve drain package is required and is ordered separately based on the flow control valve size.

Valve Rooms and Protection from Freezing

The Firecycle® Trimpac® trim assembly and flow control valve must be installed in an area not subject to freezing or physical damage. A heated enclosure may be required. NFPA 13 requires valve rooms to be lighted and heated with a permanent heat source, such as a baseboard or unit heater. Note: Heat tape is not permitted to be used in lieu of heated valve enclosures to protect the flow control valve and supply pipe against freezing.

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Corrosive Atmospheres

Request information from the owner or owner's representative regarding the system's environment. Corrosive elements may be present in the system's area, requiring a special material or protective coating

for all system components. Trimpac® trim piping and fittings and drain packages are offered brass or galvanized. The Viking Flow Control Valve is available coated inside and outside with Halar® coating consisting of ethylene chlorotrifluoroethylene (ECTFE).

Firecycle® System Piping and Fittings

System piping and fittings shall conform to NFPA 13 and shall be listed for the maximum system pressure it is to be exposed to. All system piping and fittings are metallic and shall be protected against corrosion if corrosive conditions exist. The system shall be piped (or use the stainless steel hose package) from the valve body to the Trimpac® enclosure assembly. The Trimpac® trim assembly can be installed with the furnished hose package or ½" non-corrosive metallic piping.

Hangers

The sprinkler system hangers shall conform to NFPA 13. System piping shall be substantially supported to prevent sway or thrust. The hanging of non-system components from the sprinkler piping shall be strictly prohibited. The use of non-metallic hanger materials shall be prohibited unless expressed otherwise.

Firecycle® Detectors

Detectors are required to be listed for use with the particular Firecycle® System used. Viking Model B Firecycle® Detectors are listed for use in the detection system of any Firecycle® lll System. Viking Model C-OH Firecycle® Detectors are listed for use in the detection system of Firecycle® lll-OH Systems. For proper location, spacing, and positioning of detectors, refer to NFPA 72 and the appropriate technical data pages for the Viking Firecycle® III Detectors.

Detector Cable For Firecycle® III Systems

1. Firecycle® Detector lll Cable Installed Without Conduit: Where local regulations permit, Viking detector cable part number 04632A, may be used. (Refer to technical data page 419a-b.)
2. Firecycle® Detector lll Cable Installed In Conduit: Where local regulations require installation of detector cable in conduit, Viking detector cable part number 09954, may be used. (Refer to technical data page 419d-f.)

Detectors for Firecycle® III-OH Systems

Viking Model C-OH Firecycle® Detectors are listed for use in the detection system of Firecycle® lll-OH Systems. Refer to the Model C-OH Detector technical data page and NFPA 72 (for spot type heat detectors) for specific installation instructions and maximum spacing.

Detector Cable For Firecycle® III Model C-OH Detectors

Model C-OH detectors are connected with fire-resistant detector cable in series from and to the VFR-400 Control Panel. Listed two-hour fire power limited fire alarm cable (FPL) wire must be used to wire the detection loop when using Model C-OH Detectors. Reference NEC 760-51 and NEC 760-53. When properly installed in conduit, Detector/PLFA-FPL Cable meets the requirements for use as the electrical conductor in the detection systems. A continuous loop must be created.

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Two non-stranded number 16 AWG or 18 AWG conductors will be placed on one terminal of the detection block within the VFR-400 Control Panel, ran through the detectors and terminate on the second terminal in the detection block. The FPL wire should be installed in a manner to achieve a 2-hour rating per NFPA 72, NEC and local codes. Consult with the Local Authority Having Jurisdiction on the installation of the FPL wire. Care must be taken when securing FPL wire to the detector box. Be sure not to over-tighten the wire retaining mechanism to the wire.

The detection circuit must:

- Originate from the appropriate contact in the control panel.
- Connect all detectors in series. A two-conductor cable is required.
- Terminate at the appropriate contact in the control panel.
- Comply with all applicable federal, state, and local codes and requirements.
- The maximum circuit resistance must be less than 100 Ohms. Quantity of detectors and cable length determine wire size.
- Detectors must be located and installed according to instructions provided in Viking technical data for the Model B or C-OH Detector.
- Detector boxes are equipped with ½" (15 mm) NPT Model B detectors threaded conduit connections.
- Detector/PLFA-FPL Cable must be installed in steel conduit (EMT is acceptable). When pulling Detector/PLFA-FPL Cable through conduit, the pulling radius should be at least ten times the cable diameter.

Explosion-Proof Electrical Equipment

If the system protects areas where explosive vapors may be present, explosion-proof electrical equipment is required. Check with the owner or other authorities regarding ratings.

Release Control Panel

The release panel is an essential component for system operation and is required to be listed. The VFR-400 Control Panel is listed and must be ordered separately for use with the Trimpac® Firecycle® III System. NOTE: Batteries are available for a back-up emergency power supply for the VFR-400 Control Panel. The release control panel annunciates a trouble piezo alarm for the following conditions: low system air supply, detector zone disabled, power supply absent, low battery supply, inadequate field wiring.

Solenoid Valve

Flow control valve trim design on all Firecycle® III Systems requires 2 electric solenoid valves; 1 normally open and 1 normally closed to retain the prime water pressure in the priming chamber. The 2 solenoid valves are included with all Trimpac® Firecycle® III trim packages.

Manually-Operated Release System Requirements

Manually operated release systems are usually integrated into one of the other types of release systems. NFPA 13 requires the manual release device (emergency release) to be a stand-alone arrangement to ensure operation, regardless of the potential failure of the associated detection system. An emergency release is included with Firecycle® Trimpac® packages. The Trimpac® cabinet provides access doors for the emergency release and alarm test valve for manual operation of these trim valves. Any time the handle inside emergency release is pulled, pressure is released from the priming chamber; the flow control valve will open but the water will be contained in the sprinkler piping. Water motor alarm and alarms connected to alarm pressure switch will activate. If a sprinkler head opens, water will flow from the system.

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Device Compatibility

All components of Firecycle® systems are tested to be compatible to ensure that all system components function as an integrated unit.

Alarm Test Valve and Alarm Shutoff Valve

These are required components for Firecycle® Systems and are included with the Trimpac® packages for Firecycle® Deluge and Preaction Systems.

Water Motor Alarm

An alarm is a required component of every sprinkler system having more than 20 sprinklers to sound a continuous alarm while a sprinkler system operates. The Viking Model F-2 Water Motor Alarm is listed for use with Firecycle® Systems.

Check Valve and Trim

Check valves utilized in the sprinkler system riser are required to be listed for use on fire protection systems. Supply side and system side pressure gauge connections and a main drain outlet are required in conformance with NFPA 13. Check valve and trim must be ordered for use with Firecycle® Preaction Systems. Check valve trim includes a main drain valve and an air pressure gauge. Trimpac® is equipped with priming water pressure and water supply gauge view-ports for easy monitoring of water pressures.

Fire Department Connection

A system fire department connection shall be provided on the system riser in accordance with NFPA 13. The fire department connection shall be of a brass body with an integral clapper assembly to separate flow between inlets. The fire department connection shall be installed in an area accessible for the first response unit. The fire department connection shall be listed for fire protection use.

Since Firecycle® systems are hydraulically-calculated, the static and residual water-pressure characteristics of the water supply should be obtained by conducting an on-site water-flow test. Prior water-supply data may already be available from the following sources: job specifications, consulting engineer, architect, insurance underwriter, owner, or local water department. Prior data must be applicable and may need to be verified. If a fire pump is needed, acquire a pump supply curve from the pump manufacturer. However, be sure to check with authorities having jurisdiction (approving body) regarding pump characteristics (percentage over rated capacity at percentage of rated PSI).

IV. TRIMPAC® FIRECYCLE® III WET SYSTEMS

Wet pipe systems are commonly used where it is desirable to discharge water immediately from any sprinklers that have operated. Water remains in the pipework at all times. In fire conditions, when a heat detector is activated, water flows through the open flow control valve and system piping. Water will immediately flow from any activated sprinklers. Once detectors have cooled and the Firecycle® system has ensured proper wetting, water is automatically turned off. The system cycles on and off as needed to control the fire. If damage to sprinklers or pipework occurs, a limited amount of water drains out of the system; a trouble alarm is sent. Note: When downstream water pressure exceeds water supply pressure, the flow control valve performs as a hydraulically operated check valve to prevent reverse flow.

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A. Firecycle® III Wet System Installation Requirements

(Also see section III for general requirements that apply to all Firecycle® III Systems.)

The system should be designed by qualified design professionals in conjunction with insuring bodies. Sprinkler systems are engineered to meet the standards of NFPA 13, FM Global, Loss Prevention Council (FOC), Assemblee Pleniere, Verband der Sachversicherer (VdS) or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards where applicable.

Refer to Viking technical data pages for the Firecycle® III Wet System for detailed installation requirements. Refer to NFPA 72 National Fire Alarm Code, which contains specific requirements on the design of electrical detection systems. NFPA 13-2007 also provides the installation rules and characteristics that are unique to wet systems.

Flow Control Valve

The flow control valve must be ordered and installed in accordance with Viking technical data for the wet system.

- Auxiliary components are required for specific valve functions. For complete operating trim requirements, refer to system data for the Firecyle® III Wet System.
- The valve must be trimmed according to current Viking Trim Charts and appropriate instructions for the wet system. Trim Charts are printed in the *Viking Engineering and Design Data* book, and are provided with trim packages.
- The priming line must be connected upstream of the system water supply main control valve or to a constant source of water at a pressure equal to the system water supply.

Trimpac® Trim Package

A Trimpac® Firecyle® III Wet System Trim Package must be ordered for use with the flow control valve on Firecycle® III Wet Systems.

- The Trimpac® trim assembly must be installed above the elevation of the valve (bottom of Trimpac® to top of valve cover).
- The Trimpac® trim assembly can be installed with the furnished hose package or ½” non-corrosive metallic piping.
- The maximum distance the Trimpac® may be installed away from the flow control valve is 5’-0”.
- Take care not to allow any compound, tape, or other foreign matter inside any of the nipples or openings of the valve or trim components.
- The Trimpac® trim assembly must be installed to facilitate drainage.
- Trim Note (refer also to System Data and/or Trim Chart): Discharge piping from the auxiliary drain valve, the flow test valve, and all system drains should be kept separate. DO NOT connect the outlet of the drip check to any other drain.

Drain Package

The required drain package must be installed in accordance with the trim charts in the Firecycle® Wet System data pages. Trimpac® drain packages include a waterflow and alarm switch and system main drain valve.

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B. Firecycle® III Wet System Operation

In the Normal Set Condition

The Firecycle® Wet System in the normal set condition has the main water control valve in the open position, the sprinkler piping is filled with water. System water supply pressure enters the priming chamber of the flow control valve through the 1/2" (13 mm) priming line, which includes a strainer, restricted orifice, normally open priming valve, and check valve. Normally open release solenoid valve #2 allows priming water to escape so that the flow control valve will not set, but remain open, filling the system piping with water.

In Fire Conditions

When the Firecycle® III or Firecycle® III-OH detection system operates, the VFR-400 Control Panel activates a piezo sounder and energizes normally closed release solenoid valve #1 open and normally open release solenoid valve #2 closed. Pressure continues to be released from the priming chamber faster than it is supplied through the restricted orifice. The flow control valve clapper remains fully open to allow water to flow through the system piping and to activate alarm devices, including a water flow alarm switch.

Water will immediately flow from any sprinklers attached to the system that have activated. Water flow alarm switch activates, latching normally open release solenoid valve #2 closed. Water discharges until all Firecycle® detectors have reset (cooled below their set point). After all detectors have reset, the control panel activates the "Soak Timer", allowing the system to continue discharging water for a preset time period. When the "Soak Timer" has expired, the control panel de-energizes normally closed release solenoid Valve #1, allowing it to close. (The normally open release solenoid valve #2 remains energized closed until the control panel is manually reset, or both A.C. power and battery backup have failed.) The flow control valve re-primes and closes, stopping the flow of water through the system piping.

If a Firecycle® detector goes into alarm at this time, the VFR-400 Control Panel re-energizes normally closed release solenoid valve #1 open, and the entire cycle repeats.

Manual Operation

Any time the handle inside emergency release is pulled, pressure is released from the priming chamber faster than it can be replaced through the priming line; the flow control valve will open. Water will flow into the system piping and will be discharged from any open sprinklers. After operating the emergency release, do not close the emergency release until the system is ready to be reset.

To Return the System to Normal Conditions

To return the system to "Normal" conditions, drain the system piping and replace any sprinklers that may have operated, and any Firecycle® detectors that have been damaged. Open the emergency release to allow the system pressure to return to normal. Once the pressure has stabilized, close the emergency release and press the "System Reset" button on the VFR-400 Control Panel.

C. Placing the Firecycle® III Wet System in Service

1. Verify that the system has been properly drained. Open the emergency release.
2. Open the VFR-400 Control Panel and press "RESET". Release solenoid Valve #1 should close.
3. Fully open and secure the main water supply control valve.
4. Close the emergency release.
5. Verify that all valves are secured in their normal operating position.

   CAUTION! PERFORMING A TRIP TEST RESULTS IN OPERATION OF THE FLOW CONTROL VALVE. WATER WILL FLOW INTO THE SPRINKLER PIPING. TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE.

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V. TRIMPAC® FIRECYCLE® III DELUGE SYSTEMS

Deluge systems are commonly used where it is desirable to simultaneously spray water from all open sprinklers and/or nozzles on the system when the system operates. Firecycle® Deluge Systems have several fail-safe features, some of which are not available on other deluge systems. Refer to “System Operation” for details.

A. Firecycle® III Deluge System Installation Requirements

(Also see section III for general requirements that apply to all Firecycle® III Systems.)

The system should be designed by qualified design professionals in conjunction with insuring bodies. Sprinkler systems are engineered to meet the standards of NFPA 13, FM Global, Loss Prevention Council (FOC), Assemblee Pleniere, Verband der Sachversicherer (VdS) or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards where applicable.

Refer to Viking technical data pages for the Firecycle® III Deluge System for detailed installation requirements. Refer to NFPA 72 National Fire Alarm Code, which contains specific requirements on the design of electrical detection systems. NFPA 13-2007 provides the installation rules and characteristics that are unique to deluge systems.

Flow Control Valve

The flow control valve must be ordered and installed in accordance with Viking technical data for the deluge system.

- Auxiliary components are required for specific valve functions. For complete operating trim requirements, refer to system data for the deluge system.
- The valve must be trimmed according to current Viking Trim Charts and appropriate instructions for the system used. Trim Charts are printed in the *Viking Engineering and Design Data* book, and are provided with trim packages.
- The priming line must be connected upstream of the system water supply main control valve or to a constant source of water at a pressure equal to the system water supply.

Trimpac® Trim Package

A Trimpac® Firecycle® III Deluge System Trim Package must be ordered for use with the flow control valve on Firecycle® III Deluge Systems.

- The Trimpac® trim assembly must be installed above the elevation of the drip check valve.
- The Trimpac® trim assembly can be installed with the furnished hose package or ½” non-corrosive metallic piping.
- The maximum distance the Trimpac® may be installed away from the flow control valve is 5’-0”.
- Take care not to allow any compound, tape, or other foreign matter inside any of the nipples or openings of the valve or trim components.
- The Trimpac® trim assembly must be installed to facilitate drainage.

Trim Note (refer also to System Data and/or Trim Chart): Discharge piping from the auxiliary drain valve, the flow test valve, and all system drains should be kept separate. DO NOT connect the outlet of the drip check to any other drain.

Drain Package

The required drain package must be installed in accordance with the trim charts in the Firecycle® Deluge System data page. Trimpac® drain packages include a waterflow and alarm switch and system main drain valve.

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Trimpac® drain packages for Firecycle® Deluge Systems include an auxilliary drain valve (normally closed), a drip check valve, drain cup, and flow test valve (normally closed).

Pressure Operated Relief Valve (PORV)

The Model D-1 Pressure Operated Relief Valve (PORV) is utilized in Firecycle® III Deluge Systems and is included with Trimpac® Firecycle® Deluge Trim Packages. The PORV is a positive venting, pressure operated relief valve.

Water Flow Alarm Pressure Switch

A PS102A dual SPDT alarm pressure switch is included with Trimpac® Firecycle® III Deluge Trim Packages.

B. Firecycle® III Deluge System Operation

In the Normal Set Condition

System water supply pressure enters the priming chamber of the flow control valve through the 1/2" (13 mm) priming line which includes a normally open priming valve, strainer, restricted orifice, and check valve. In the SET condition, water supply pressure is trapped in the priming chamber by check valve, normally closed emergency release, pressure operated relief valve (PORV), and normally closed release solenoid valve #1. Water supply pressure in the priming chamber holds the clapper of the flow control valve on the seat due to the differential design of the valve and spring pressure. The clapper separates the inlet chamber from the outlet chamber, keeping the outlet chamber and system piping dry.

In Fire Conditions

When the Firecycle® III detection system operates, the VFR-400 Control Panel activates the system alarm and energizes normally closed release solenoid Valve #1 open and normally open release solenoid valve #2 closed. Pressure is released from the priming chamber faster than it is supplied through restricted orifice. The flow control valve clapper opens to allow water to flow into the system piping and to alarm devices, causing alarm pressure switch to activate. Water entering the system operates and hydraulically latches the pressure operated relief valve (PORV) open.

Water will flow from any open sprinklers or nozzles. Water discharges until all Firecycle® detectors have reset (cooled below their set point). After all detectors have reset, the control panel activates the "Soak Timer", allowing the system to continue discharging water for a preset time period. When the "Soak Timer" has expired, the control panel de-energizes normally closed release solenoid valve #1, allowing it to close. (The normally open release solenoid valve #2 remains energized closed until the control panel is manually reset, or both A.C. power and battery backup have failed.) The flow control valve re-primes and closes, stopping the flow of water through the system piping.

Should a Firecycle® detector go into alarm, the VFR-400 Control Panel re-energizes normally closed release solenoid valve #1 open, and the entire cycle repeats.

To Return the System to Normal Conditions

To return the system to "Normal" conditions, drain the system piping and replace any sprinklers that may have operated. Replace any Firecycle® detectors that have been damaged. Open the VFR-400 Control Panel and press "System Reset".

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C. Placing the Firecycle® Deluge System in Service

1. Verify that the VFR-400 Control Panel, detector circuits, and detectors have been properly installed and energized according to instructions provided in Viking Technical Data and the Firecycle® III Owner's Manual.
2. Verify that the system has been properly drained. (When plunger is depressed on drip check, no water should flow.) System drain should be open. Verify that emergency release is closed. **Note:** Emergency release is closed when the handle is in-line with the pipe. This allows the door to close when the valve is in the normal position.
3. Verify that the system main water supply control valve is closed and the flow control valve is trimmed according to the Figures 3 through 12 in technical data page 254a-s.
4. Establish a normal condition on the VFR-400 Control Panel.
5. Verify that the system water supply piping is pressurized up to the closed system main water supply control valve and the priming line is pressurized up to the closed priming valve.
6. Open the priming valve.
7. Open the flow test valve.
8. Partially open the main water supply control valve.
9. When full flow develops from the flow test valve, close the flow test valve.
10. Verify that there is no flow from the open system drain.
11. Close the system drain.
12. Fully open and secure the main water supply control valve.
13. Verify that the alarm shut-off valve is open and that all other valves are in their normal operating position.
    CAUTION! PERFORMING A TRIP TEST RESULTS IN OPERATION OF THE FLOW CONTROL VALVE. WATER WILL FLOW INTO THE SPRINKLER PIPING. TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE.

VI. TRIMPAC® FIRECYCLE® III SINGLE- AND DOUBLE INTERLOCK PREACTION SYSTEMS

Preaction systems are used in water-sensitive areas, to help minimize accidental water damage and still provide fast water discharge during a fire emergency. The system piping is dry until a fire condition exists, and may be installed in locations subject to freezing. Firecycle® Preaction Systems operate as a preaction system as outlined in NFPA 13.

NFPA 13 defines the *Single Interlocked Preaction System* as follows: Admits water to sprinkler piping upon operation of detection devices only. This type of system is used where it is desirable to have water available at the sprinkler when the sprinkler fuses. If damage to sprinklers or pipework occurs, no water is discharged; the low air pressure alarm is activated, but the main water control valve does not trip and no water flows from the sprinkler system.

NFPA 13 defines the *Double Interlocked Preaction System* as follows: Admits water to sprinkler piping upon operation of both the detection devices and automatic sprinklers. This system is commonly used in freezers where flooding of the pipe can have serious consequences. This system is arranged so that the flow control valve will open only when both air pressure is reduced in the sprinkler piping and the detection system operates. If the detection system operates due to damage or malfunction, the valve will not open, but an alarm will sound. If damage to sprinklers or pipework occurs, no water is discharged; the low air pressure alarm is activated, but the main water control valve does not trip and no water flows from the sprinkler system.

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The system piping in Firecycle® III Preaction Systems is pneumatically pressurized to monitor the integrity of the piping, fittings and sprinklers and to act as a fail-safe emergency backup to the electrical detection system. After a fire condition, once detectors have cooled and the system has ensured proper wetting, water is automatically turned off. The system cycles on and off as needed to control the fire.

A. Firecycle® III Single- and Double Interlock Preaction System Installation Requirements (Also see section III for general requirements that apply to all Firecycle® III Systems.)

The system should be designed by qualified design professionals in conjunction with insuring bodies. Sprinkler systems are engineered to meet the standards of NFPA 13, FM Global, Loss Prevention Council (FOC), Assemblee Pleniere, Verband der Sachversicherer (VdS) or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards where applicable.

Refer to Viking technical data pages for Firecycle® III Preaction Systems for detailed installation requirements. Refer to NFPA 72 National Fire Alarm Code, which contains specific requirements on the design of electrical detection systems. NFPA 13-2007 provides the installation rules and characteristics that are unique to preaction systems.

Flow Control Valve

The flow control valve must be ordered and installed in accordance with Viking technical data for the preaction system.

- Auxiliary components are required for specific valve functions. For complete operating trim requirements, refer to system data for preaction systems.
- The valve must be trimmed according to current Viking Trim Charts and appropriate instructions for the preaction system. Trim Charts are printed in the *Viking Engineering and Design Data* book, and are provided with trim packages.
- The priming line must be connected upstream of the system water supply main control valve or to a constant source of water at a pressure equal to the system water supply.

Trimpac® Trim Package

The Trimpac® Firecycle® III Preaction Trim Package must be ordered for use with the flow control valve on all Firecycle® III Preaction Systems.

- The Trimpac® trim assembly must be installed above the elevation of the drip check valve.
- The Trimpac® trim assembly can be installed with the furnished hose package or ½" non-corrosive metallic piping.
- The maximum distance the Trimpac® may be installed away from the flow control valve is 5'-0".
- Take care not to allow any compound, tape, or other foreign matter inside any of the nipples or openings of the valve or trim components.
- The Trimpac® trim assembly must be installed to facilitate drainage.

Trim Note (refer also to System Data and/or Trim Chart): Discharge piping from the auxiliary drain valve, the flow test valve, and all system drains should be kept separate. DO NOT connect the outlet of the drip check to any other drain.

Drain Package

The required drain package must be installed in accordance with the trim charts in the applicable Firecycle® System data page. Trimpac® drain packages include a waterflow and alarm switch and system main drain valve. Trimpac® drain packages for Firecycle® Preaction Systems include an auxilliary drain valve (normally closed), a drip check valve, drain cup, and flow test valve (normally closed).

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Battery Back-up for Release Control Panel

Firecycle® Single-and Double Interlock Preaction Systems require a 90-hour, 17 A-H battery back-up, capable of being recharged in 48 hours.

Pneumatic Actuator

A pneumatic acuator is required for Firecycle® Preaction Systems and is included with the Trimpac® Firecycle® Preaction Trim Package. A pneumatic actuator between the air supply and the system piping is utilized for “fail safe” operation of Fireycle® III Preaction Systems.

Pressure Operated Relief Valve (PORV)

The Model D-1 Pressure Operated Relief Valve (PORV) is utilized in Firecycle® III Preaction Systems and is included with Trimpac® Firecycle® Preaction Trim Packages. The PORV is a positive venting, pressure operated relief valve.

Water Flow Alarm Pressure Switch

A PS102A dual SPDT alarm pressure switch is included with Trimpac® Firecycle® Preaction Trim Packages.

Air Pressure Supervisory Switch

A PS402A dual SPDT air pressure switch is required and included with Trimpac® Firecycle® Preaction Trim Packages.

Check Valve and Trim

Viking Model L-1 or K-1 In-Line Check Valves or Model E-1 or F-1 Easy Riser® Check Valves are used with Firecycle® Preaction Systems. These valves are NOT included with the Trimpac® Trim Packages (order separately).

Air Supply

An air supply capable of restoring system pressure within 30 minutes shall be provided. Acceptable air supply arrangements are:

A. Owner supplied air system with an air maintenance device on the supply side of the air supply inlet.
B. A tank mounted air compressor with an air maintenance device between the air compressor and the air supply inlet on the system riser.
C. A riser-mounted air compressor feeding an air reservoir. An air maintenance device shall be placed between the air reservoir and the system riser.

B. Firecycle® III Single- and Double Interlock Preaction System Operation

In the Normal Set Condition

System water supply pressure enters the priming chamber of the flow control valve through the 1/2” (13 mm) priming line which includes a normally open priming valve, strainer, restricted orifice, and check valve. In the SET condition, water supply pressure is trapped in the priming chamber by check valve, normally closed emergency release, pneumatic actuator, and normally closed release solenoid valve #1. Water supply pressure in the priming chamber holds the clapper of the flow control valve on the seat due to the differential design of the valve and spring pressure. The clapper separates the inlet chamber from the outlet chamber, keeping the outlet chamber and system piping dry.

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In Fire Conditions (for Single Interlock Systems)

When the Firecycle® III or Firecycle® III-OH detection system operates, the VFR-400 Control Panel activates the system alarm and energizes normally closed release solenoid valve #1 open and normally open release solenoid valve #2 closed. Pressure is released from the priming chamber faster than it is supplied through restricted orifice. The flow control valve clapper opens to allow water to flow into the system piping and to alarm devices, causing alarm pressure switch to activate. Water entering the system operates and hydraulically latches the pressure operated relief valve (PORV) open. Water will flow from any open sprinklers or nozzles. Water discharges until all Firecycle® detectors have reset (cooled below their set point). After all detectors have reset, the control panel activates the "Soak Timer", allowing the system to continue discharging water for a preset time period. When the "Soak Timer" has expired, the control panel de-energizes normally closed release solenoid valve #1, allowing it to close. (The normally open release solenoid valve #2 remains energized closed until the control panel is manually reset, or both A.C. power and battery backup have failed.) The flow control valve re-primes and closes, stopping the flow of water through the system piping.

Should a Firecycle® detector go into alarm, the VFR-400 Control Panel re-energizes normally closed release solenoid valve #1 open, and the entire cycle repeats.

(Note: If a sprinkler is damaged or system piping is damaged, air pressure will be lost, however, the system will NOT fill with water. Once the air pressure is low enough to initiate the "Low Air" alarm on Zone 2 of the VFR-400 Control Panel, the normally open solenoid valve will be energized closed to prevent the flow control valve from opening.)

In Fire Conditions (for Double Interlock Systems)

When the Firecycle® III or Firecycle® III-OH detection system operates, the VFR-400 Control Panel activates the system alarm. No water enters the system piping at this time. When the fire causes a sprinker to activate, normally closed release solenoid valve #1 is energized open, releasing pressure from the priming chamber and to open drain faster than it is supplied through restricted orifice. Normally open release solenoid valve #2 closes when solenoid valve #1 opens. The flow control valve clapper opens to allow water to flow into the system piping and to alarm devices, causing alarm pressure switch to activate. Water entering the system operates and hydraulically latches the pressure operated relief valve (PORV) open. Water will flow from any open sprinklers or nozzles. Water discharges until all Firecycle® detectors have reset (cooled below their set point). After all detectors have reset, the control panel activates the "Soak Timer", allowing the system to continue discharging water for a preset time period. When the "Soak Timer" has expired, the control panel de-energizes normally closed release solenoid valve #1, allowing it to close. (The normally open release solenoid valve #2 remains energized closed until the control panel is manually reset, or both A.C. power and battery backup have failed.) The flow control valve re-primes and closes, stopping the flow of water through the system piping.

Should a Firecycle® detector go into alarm, the VFR-400 Control Panel re-energizes normally closed release solenoid valve #1 open, and the entire cycle repeats.

(Note: If a sprinkler is damaged or system piping is damaged, air pressure will be lost, however, the system will NOT fill with water. Once the air pressure is low enough to initiate the "Low Air" alarm on Zone 2 of the VFR-400 Control Panel, the normally open solenoid valve will be energized closed to prevent the flow control valve from opening.)

To Return the System to Normal Conditions

To return the system to "Normal" conditions, drain the system piping and replace any sprinklers that may have operated. Relieve the pressure on the pressure operated relief valve (PORV) by draining the outlet chamber of the flow control valve. Replace any Firecycle® detectors that have been damaged and re-establish system air pressure. Press the "System Reset" button on the VFR-400 Control Panel to clear all alarms.

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C. Placing the Firecycle® III Single- and Double Interlock Preaction System in Service

1. Verify:
   a. The system main water supply control valve is closed and that the Trimpac® and required drain package is installed according to Viking trim charts and schematic drawings for the system used.
   b. The system has been properly drained.
   c. Auxiliary drain is open.
   d. The emergency release is closed. Note: Emergency release is closed when the handle is in-line with the pipe. This allows the door to close when the valve is in the normal position.
   e. 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. Open priming valve.
3. Set the release system. (VFR-400 Control Panel must be in the reset position so the normally closed solenoid valve is closed, allowing the priming chamber to become pressurized, thereby setting the valve in the closed position.)
4. Open flow test valve.
5. Partially open main water supply control valve.
6. When full flow develops from the flow test valve, close the flow test valve. Verify that there is no flow from the open auxiliary drain valve.
7. Close auxiliary drain.
8. Fully open and secure the main water supply control valve.
9. Verify that the alarm shut-off valve is open and all other valves are in their normal operating position.
10. Depress the plunger of drip check. No water should flow from the drip check when the plunger is pushed.
11. Check for and repair all leaks.
12. 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 the flow control valve data page for maintenance of the valve.

    CAUTION! PERFORMING A TRIP TEST RESULTS IN OPERATION OF THE FLOW CONTROL VALVE. WATER WILL FLOW INTO THE SPRINKLER PIPING. TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE.

VII. SYSTEM COMPONENTS INCLUDED IN TRIMPAC® TRIM PACKAGES

The standard trim normally required on a Firecycle® System is factory assembled in a metal cabinet and ordered as a single Trimpac® package. The following items are included in Firecycle® Trimpac® packages:

- Firecycle® cycling wet trim, deluge trim, or preaction trim
- Release trim
- Flexible hose kit

A. Solenoid Valve

Flow control valve trim design utilizes 2 electric solenoid valves; 1 normally open and 1 normally closed to retain the prime water pressure in the priming chamber. The solenoid valve is a two-way type with one inlet and one outlet. It is a packless, internal pilot operated valve.

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Operation

The solenoid valve is an internal pilot operated valve with pilot and bleed orifices utilizing line pressure for operation. Normally closed, de-energized valves open when energized. Power is applied to the solenoid coil, causing the solenoid core to lift, opening the pilot orifice to the outlet side of the valve. This relieves pressure on the top side of the diaphragm and allows the line pressure to open the valve. When de-energized, the solenoid core reseals the pilot orifice, allowing the line pressure to build above the diaphragm, closing the valve.

Inspections, Tests, and Maintenance

WARNING: Prior to operating the solenoid valve, be sure to close the system control valve to avoid unintentional operation of the flow control valve.

1. The valve must be operated at least monthly. The valve must open and close freely. When open, the water flow must be clear and clean at the proper flow rate. When closed, a total water shut-off must be observed. After the test, the strainer must be cleaned. Prior to cleaning the strainer, the priming line valve must be closed and the priming line depressurized. After the strainer is cleaned, the priming line valve must be reopened.
2. The valve must be inspected at least monthly for cracks, corrosion, leakage, etc., and cleaned, repaired, or replaced as necessary.
3. At least annually, the valve diaphragms and seats must be inspected and if necessary, repaired or replaced.

WARNING: Close system control valve, turn off power supply, and depressurize valve before disassembling valve. It is not necessary to remove the valve from the pipe line to make inspections.

4. When lubricating valve components, use a high grade silicone grease (Dow Corning® 111 Compound Lubricant or equal).
5. When reassembling, tighten parts to torque values indicated in Parker's maintenance instructions (packed with valve).
6. After maintenance is completed, operate the valve a few times to be sure of proper operation. A metallic "click" signifies the solenoid is operating.
7. It is recommended that the valve be replaced at seven-year intervals. Shorter intervals may be required if the valve is subject to corrosive water supplies or atmospheres.
8. All service must be performed by qualified personnel. Upon completion of inspections or replacement of the valve, the entire system must be checked for proper operation. See appropriate system description and testing instructions for additional information.

B. Emergency Release

The Viking Emergency Release operates as a manual tripping device for use on flow control valve trim. It consists of a special quick-opening, lever operated ball valve mounted in a stainless steel enclosure with a full opening door.

Operation

The special quick-opening, lever operated ball valve of the emergency release is installed on a special ½" (15 mm) NPT nipple inside a stainless steel enclosure. The valve is closed when the handle is aligned with the pipe nipple. This allows the valve to be closed during normal operation when the door of the emergency release is closed.

The following operation instructions are printed on the outside of the emergency release door:

"IN CASE OF FIRE, OPEN DOOR AND PULL LEVER"

When the door of the emergency release is opened and the handle of the special ball valve is pulled, the valve opens to relieve pressure maintained on the release system.

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After Operation

After system has been reset, return the handle to its normal operating position and close the door.

Maintenance

The Viking emergency release must be kept free of foreign matter, freezing conditions, corrosive atmospheres, contaminated water supplies, and any condition that could impair its operation or damage the device.

Inspection

1. Verify that the door of the emergency release is not obstructed and opens freely.
2. Check for signs of mechanical damage and/or corrosive activity. If detected, perform maintenance as required or, if necessary, replace the device.

Testing (Refer to technical data for the Firecycle® system used.)

1. Notify the Authority Having Jurisdiction and those in the area affected by the test.
2. Close the main water supply control valve, placing the system out of service.
3. Open the door of the emergency release and pull the handle. Air or water from the release system should discharge to open drain.
4. When testing is complete, return the handle to its normal operating position and close the door.
5. Establish normal operating pressure in the release system.
6. Refer to technical data to open the main water supply control valve and place the system back in service.
7. Notify the Authority Having Jurisdiction and those in the area affected by the test that the system is back in service.

C. Pneumatic Actuator (for Firecycle® Preaction Systems)

The Viking pneumatic actuator is a spring-loaded to open, rolling diaphragm, piston operated valve. It is used wherever a separation is required between the detection and operating systems. The pneumatic actuator is a required component on systems using pneumatic detection to provide the separation between the air in the detection system and the water in the valve operating trim. A pneumatic actuator between the air supply and the system piping is utilized for “fail safe” operation of the system.

Operation

The Viking pneumatic actuator has an inlet, outlet and priming chamber. When pressure is applied to the priming chamber, the rolling diaphragm and piston assembly moves, constricting the spring and sealing the inlet from the outlet. Pressure can then be applied to the inlet. Due to the differential design, a small amount of pressure in the priming chamber can control a higher inlet pressure. When the pressure in the priming chamber is released, the inlet pressure and spring forces the rolling diaphragm and piston assembly to move, allowing the inlet pressure to run through the angle outlet.

Maintenance

Where difficulty in performance is experienced, the valve manufacturer or his authorized representative shall be contacted if any field adjustment is to be made.

The Viking pneumatic actuator must be kept free of foreign matter and freezing conditions that could impair its operation. At regular intervals, at least annually, inspect and test the pneumatic actuator. The frequency of the inspections is dependent upon the condition of the water and release system.

NOTE: PRIOR TO PERFORMING ANY WORK ON THE PNEUMATIC ACTUATOR, REFER TO SYSTEM DESCRIPTION FOR INSTRUCTIONS AND WARNINGS REGARDING THE FIRE PROTECTION SYSTEM AND RELEASE SYSTEM.

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Inspection

1. Place the fire protection system out of service.
2. Trip the release system.
3. Drain any accumulated condensation from the release system.
4. Purge the release system of any foreign matter.
5. Place the release system back in service.
6. Establish pressure on the pneumatic actuator inlet.
7. Trip test the pneumatic actuator by activating a pneumatic release. The pneumatic actuator should release the inlet pressure through the outlet.
8. Reset the release system, then reset the fire protection system and secure all main control valves open.
9. Should the pneumatic release fail to trip or reset, remove it from service and disassemble. Clean and/or replace any dirty or worn parts and then reinstall it. Repeat the inspection procedures.

Disassembly

1. Place the fire protection system out of service.
2. Trip the release system.
3. Remove the pneumatic actuator
4. Remove the three cover screws.

   CAUTION: The assembly is under spring tension.
5. Separate the cover from the lower assembly .
6. Separate the upper diaphragm, piston, lower diaphragm, spring pad from the body.
7. Clean and/or replace dirty or worn parts.
8. If required, remove the valve seat from the body and replace (Figure 54).

Reassembly

1. Reverse the Disassembly procedure, making sure that the burr side of the spring pad is toward the spring, away from the lower diaphragm.
2. Purge all trim piping of foreign matter.
3. Reinstall the pneumatic actuator and trim piping.
4. Repeat inspection procedures.
5. Check and repair all leaks.
6. Reset the release system, then reset the fire protection system and secure all main control valves open.

D. Pressure Operated Relief Valve (PORV) (for Firecycle® Deluge and Preaction Systems)

The PORV is a positive venting, pressure operated relief valve that is included with Firecycle® Trimpac® Deluge and Preaction Systems. In Firecycle® Deluge Systems, the PORV plays a role in keeping water supply pressure trapped in the priming chamber of the flow control valve until a fire condition causes water to flow into the sprinkler system piping.

Operation

For Firecycle® Deluge Systems: When there is a fire condition and water enters the system, the water pressure operates and hydraulically latches the pressure operated relief valve (PORV) open. This will continually vent the priming chamber of the flow control valve. The PORV automatically resets when system water flow in the system is shut off and water pressure is removed from the PORV's control diaphragm.

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For Firecycle® Single Interlock Preaction Systems: In fire conditions, when the detection system operates, the VFR-400 Control Panel activates the system alarm and energizes normally closed release solenoid valve open and normally open release solenoid valve #2 closed. Pressure is released from the priming chamber faster than it is supplied through restricted orifice. The flow control valve clapper opens to allow water to flow into the system piping and to alarm devices. Water entering the system piping increases pressure on the PORV, causing it to latch open and vent the air supply to prevent the pneumatic actuator from resetting prematurely. Water will flow from any open sprinklers or nozzles. The PORV remains latched open until water stops flowing through the system.

For Firecycle® Double Interlock Preaction Systems: In fire conditions, when the detection system operates, the VFR-400 Control Panel activates the system alarm and initiates the appropriate detection alarms. No water enters the system piping at this time. When a sprinkler operates, system supervisory air is lost, and the low air pressure switch is activated. The VFR-400 Control Panel energizes normally closed release solenoid valve open, which causes normally open release solenoid valve to close. Pressure is released from the priming chamber faster than it is supplied through restricted orifice. The flow control valve clapper opens to allow water flow into the system piping and to alarm devices. Water entering the system piping increases pressure on the PORV, causing it to latch open and vent the air supply to prevent the pneumatic actuator from resetting prematurely. Water will flow from any open sprinklers or nozzles. The PORV remains latched open until water stops flowing through the system.

Firecycle® Deluge and Preaction System trim is equipped with a pressure operated relief valve (PORV) to ensure system will fail open or “fail safe” if system were to lose power during operation. If A.C. power fails and battery power expires while the system is flowing water, the already pressurized PORV latches open, continually venting the priming chamber of the flow control valve on deluge systems and the air supply on preaction systems. The cycling function of the system will not operate in this condition, and the system must be manually shut-off.

Inspections, Tests, and Maintenance

The PORV should be tested for operation annually. Where difficulty in performance is experienced, the valve manufacturer or his authorized representative shall be contacted if any field adjustment is to be made.

Disassembly

1. Place the system out of service.
2. Remove the PORV from the valve trim.
3. Remove the cover screws, and separate the cover from the body.
4. Hold the push rod with a screw driver, and remove the jam nut. Remove the washer, diaphragm and support. The push rod will come out.

Reassembly

1. Install the push rod, support, and diaphragm. Place the washer over the push rod and install the nut. Use caution to not damage the diaphragm when tightening the jam nut.
2. Rotate the assembly to align the holes in the diaphragm with the holes in the body. Install and tighten the cover screws.
3. Test operation of device after reassembly. See Annual Trip Test procedure.

E. Flexible Hose Kit

Firecycle® Trimpac® includes (4) flexible braided stainless steel hoses with steel fittings and connectors, Teflon lined. The included hoses (or field provided hard piping) from the valve body to the enclosure assembly allows the assembly to be installed remote of the sprinkler system riser.

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F. Water Flow Alarm Pressure Switch (for Firecycle® Deluge and Preaction Systems)

Firecycle® Trimpac® Deluge and Preaction Systems include the model PS102A Alarm Pressure Switch with dual SPDT snap action switches. The alarm pressure switch is equipped with ½" (15 mm) NPT pressure connections manufactured from brass to ensure mechanical strength and endurance.

Operation

Viking alarm pressure switches are electric alarm initiating devices designed to activate alarms when the sprinkler system operates. The switch may also initiate signals to annunciator panels, trip municipal fire alarm boxes, signal fire pump start-up, or any other function that can be initiated or controlled by the opening or closing of an electrical switch. When the flow control valve clapper opens to allow water to flow into the system piping and to alarm devices, this causes the alarm pressure switch to activate.

WARNING: The alarm pressure switches described in this manual are general service switches, not designed for use in explosive atmospheres. Refer to the technical data page for the Explosion-Proof/ Watertight Alarm Pressure Switch intended for use in those environments.

Refer to the current Viking trim chart for the valve used to determine the appropriate location for installing the Viking Alarm Pressure Switch on Viking trim. Viking trim sets provide:

1. An alarm connection, equipped with an alarm test valve, and an alarm shut-off valve for switches used for local alarms and,
2. A non-interruptible alarm connection, equipped with an alarm test valve, for switches used to signal electric alarm panels and remote alarms.

CAUTION: Closing any shut-off valve in the alarm piping leading to the alarm pressure switch will render the switch inoperative.

2. When installing the general service alarm pressure switch, apply Teflon tape sealant to the male threads only. Install the pressure switch in a ½" (15 mm) pipe fitting. Use a wrench applied to the wrench flats to tighten the unit. Do not over-tighten.
   a. Mount the alarm pressure switch in the upright position (threaded connection down).
3. To wire the unit proceed as follows:
   a. De-energize electrical circuits involved.
   b. Use the special wrench, supplied with the switch, to loosen and remove the tamper-resistant screws. Remove cover. Use care not to lose the rubber O-ring screw retainers.
   c. Connect conduit to the conduit opening provided. Refer to technical data page for the alarm pressure switch.
   d. Connect electrical circuitry for the alarm and any auxiliary equipment being controlled by the switch.

      Note: Wire all devices to national and local codes and requirements of the Authority Having Jurisdiction.
4. Replace cover and tighten the tamper-resistant screws.
5. Energize the circuits.
6. Test for proper operation of the device. See section INSPECTION, TESTS AND MAINTENANCE in the technical data page for the alarm pressure switch.

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G. Air Pressure Supervisory Switch (for Firecycle® Preaction Systems)

Firecycle® Trimpac® Preaction Systems include a PS402A dual SPDT switch to monitor the release system pressure. Air pressure supervisory switch should be wired to activate an alarm to signal a low air pressure condition. Firecycle® Trimpac® Preaction Systems require 35 PSI (2.4 bar) pneumatic pressure to the release system and pneumatic actuator for system water pressures of 175 PSI (12 bar) or less. Set air pressure supervisory switch to activate at 30 PSI (2.1 bar) on pressure drop for system water pressures of 175 PSI (12 bar) or less.

For system water pressures above 175 PSI, up to a maximum of 250 PSI (17 bar), provide 55 PSI (3.8 bar) pneumatic pressure to the release system and pneumatic actuator. For system water pressures above 175 PSI, up to a maximum of 250 PSI (17 bar), set the air pressure supervisory switch to activate at 50 PSI (3.4 bar) on pressure drop.

The air supervisory switch is equipped with two sets of independently adjustable contacts:

For 35 PSI (2.4 bar) supervisory pressure:

Adjust one set of contacts of air supervisory switch to activate at 30 PSI (2.1 bar) on pressure drop. These contacts should be wired to activate a “Low-Air” supervisory alarm, connected to SUP 1 on the VFR-400 Control Panel. The other set of contacts in the air supervisory switch should activate at 25 PSI (1.7 bar) on pressure drop. Wire these contacts to ZONE 2 of the VFR-400 Control Panel. Refer to the appropriate wiring diagram packed with the panel for the system being used. .

For 55 PSI (3.8 bar) supervisory pressure:

Adjust one set of contacts of air supervisory switch to activate at 50 PSI (3.4 bar) on pressure drop. These contacts should be wired to activate a “Low-Air” supervisory alarm, connected to SUP 1 on the VFR-400 Control Panel. The other set of contacts in the air supervisory switch should activate at 45 PSI (3.1 bar) on pressure drop. Wire these contacts to ZONE 2 on the VFR-400 Control Panel. Refer to the appropriate wiring diagram packed with the panel for the system being used.

Supervisory pressures other than the recommended settings noted above may affect operation of the system.

H. Water Motor Alarm

Viking Water Motor Alarms are mechanical devices actuated by a flow of water. They are designed to sound a continuous alarm while a sprinkler system operates. Water flow will activate a hydraulic powered water motor alarm by way of integral valve alarm line trim piping. The water motor alarm shall be connected to a water pressure retarding chamber to limit the propensity of unnecessary alarms. The Viking Model F-2 Water Motor Alarm is used with Firecycle® Systems and is equipped with a rear closure plate to limit the access of foreign materials or accumulation of debris.

Features and Accessories

A. The water motor alarm is tapped 3/4” NPT on the inlet and 1” NPT on the drain outlet.
B. The water motor alarm package includes a drive shaft 16-3/4” (425 mm) long for walls 14” (356 mm) thick or less. A special extension shaft is available for walls up to 30-1/4” (768 mm) thick.
C. Also included is the required 3/4” (20 mm) NPT strainer for installation on the alarm line.
D. Rated water working pressure of the Model F-2 Water Motor Alarm is 250 PSI (17.2 bar).

Accessories:

1. Extension Mounting Cup: Viking Part Number 05957B, Material: 14-Gauge Cold Rolled Steel, UNS-G10080, coated with black E-coat. The extension mounting cup is required when the wall thickness is less than 3” (76.2 mm). Refer to Installation Instructions in technical data page 711a-d.

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2. Closure Plate: For use with Model F-2 Water Motor Alarm only, Viking Part Number 05820B, Material: 16-Gauge Galvanized Steel, UNS-G10080. The closure plate is required when the Model F-2 Water Motor Alarm gong is mounted on an irregularly surfaced wall. It serves to prevent birds from entering the inside of the gong. The closure plate also serves as a mounting plate for sheet metal walls. Refer to Installation Instructions.
3. Special Extension Shaft: Viking Part Number 03312B, Material: Stainless Steel, UNS-S30400. The extension shaft is required when the F-2 Water Motor Alarm is installed on walls from 14" (356 mm) to 30-1/4" (768 mm) thick.

Operation

When a sprinkler system is activated, water flows from the alarm outlet of the valve, through the 3/4" (20 mm) strainer and alarm line piping, into the inlet of the water motor. From the 1/8" inlet orifice, the water flows through a nozzle, which restricts the flow into a pressurized stream directed onto the

impeller. Force from the water stream turns the impeller and drive shaft, causing the striker arm to rotate. The striker impacts against the gong, producing a continuous alarm.

A minimum of 5 PSI (.34 bar) is required at the nozzle to cause a continuous alarm. When properly installed, the Model F-2 Water Motor Alarm produces the required 90 decibel output. After passing through the water motor, the water is discharged through a 1" (25 mm) drain outlet in the bottom of the impeller housing. The discharged water must be piped through the wall to atmosphere or to a suitable open drain.

Maintenance

Weather-resistant materials are used in the construction of the water motor alarm. At regular intervals, examine and test the water motor to ensure that the nozzle and drain line are clean and free of obstruction, and that the alarm functions properly. Also, at regular intervals and before disassembly of the water motor, clean and inspect the alarm line strainer located at the alarm outlet of the waterflow detecting device, or the outlet of the retard chamber, if used.

Note: Some retard chambers may be equipped with a strainer built in. Before proceeding with disassembly of the water motor alarm, notify the Authority Having Jurisdiction and occupants of the area covered by the system affected. Take all appropriate precautions. The water motor alarm will be disabled during disassembly.

A. Water Motor Disassembly:

1. Isolate the water motor alarm by closing the alarm line valve in the trim of the waterflow detecting device. (Refer to appropriate technical data for the system used).
2. Remove pipe plug.
3. Remove all round head machine screws from the water motor cover.
4. Separate the cover and the gasket from the housing.
5. Remove the impeller.
6. Inspect and, if necessary, carefully clean the nozzle with a wire or pipe cleaner brush.
7. Flush the nozzle way and drain line with water or compressed air.

B. Water Motor Re-Assembly:

1. Re-install the pipe plug.
2. Re-install the impeller.
3. Replace cover gasket and attach cover by using round head machine screws.
4. Open the alarm line valve.
5. Test the water motor alarm.

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6. When test is complete and water motor alarm operation is satisfactory, place the alarm line valve in the proper “alarm” position. Reset and return the affected systems to service.

I. Water Supply Pressure Gauges

NFPA 13 requires a listed pressure gauge to be installed in each system riser. Where check valves are used, pressure gauges are to be installed above and below each system riser check valve. Note: It is common for the gauge on the system side of the valve to indicate a higher pressure due to pressure surges trapped in the system by the check valve.

Readings from these gauges can be used in recording the available pressure in the water supply, while the gauge on the supply side is used during the 2 inch (50 mm) main drain test (required by NFPA 25) for residual pressures in the water supply.

Note: Per section 5.3.2 of NFPA 25-2008 edition, gauges must be replaced every 5 years or tested every 5 years by comparison with a calibrated gauge. Gauges are required to be accurate to within 3 percent of the full scale, otherwise they must be re-calibrated or replaced.

VIII. SYSTEM COMPONENTS INCLUDED IN TRIMPAC® DRAIN PACKAGES

Trimpac® drain packages are required for the flow control valve on all Firecycle® III Systems and must be ordered separately based on the flow control valve size. All sprinkler piping and fittings must be installed so that the system can be drained, with a means for verifying water flow through the drain. Each system is required to have drain connections sized in accordance with sections 8.16.2.4-8.16.2.6 in NFPA 13 for system risers, mains, and actuation valves. Auxiliary drains must be provided where a change in piping direction prevents drainage of system piping through the main drain valve.

The drain packages must be installed in accordance with Figures 14-16 on the appropriate Firecycle® system technical data page. The following items are included in the drain packages:

- Axiliary drain valve (Firecycle® deluge and preaction systems)
- Drip check valve (Firecycle® deluge and preaction systems)
- Drain cup (Firecycle® deluge and preaction systems)
- Flow test valve (Firecycle® deluge and preaction systems)
- Water flow and alarm switch (Firecycle® wet systems)
- System main drain valve (Firecycle® wet systems)

The outlet of the flow control valve has a 1” connection to piping to a pressure operated relief valve (used on Firecycle® III deluge and preaction systems). This connection also supplies the alarm line plus a drip check valve, auxiliary drain, and associated trim.

For wet systems: Quarterly testing of water flow alarms is recommended and may be required by the Authority Having Jurisdiction and NFPA 25 described in section XI). Section 8.17.4.2 of NFPA 13-2007 edition, requires an alarm test connection at least 1” (25 mm) diameter, with flow equivalent to one sprinkler (or less) having the smallest orifice on the system. The test connection may be installed in anywhere downstream of the waterflow alarm, however, it must be readily accessible. It must discharge to the outside, to a drain connection capable of accepting full flow under system pressure, or to another location where water damage will not result. Section 5.3.3 of NFPA 25-2008 edition requires testing all connected alarm devices by opening the alarm test valve.

Section 6.9.2 of NFPA 13 requires wet systems to have a listed waterflow-detecting alarm device with the necessary attachments to give an alarm. When the flow control valve opens and water flows through the system piping, or if the piping system is siginificantly damaged, it activates alarm devices, including a water flow alarm switch.

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The Viking waterflow indicator is a vane-type waterflow switch designed to detect a sustained flow of water exceeding 10 gpm. The Model VSR-F has a built-in adjustable pneumatic retard device delays actuation of the electrical switches to reduce the possibility of false alarms caused by one or more transient flow surges. The Model VS-SP does not have a retard to prevent false alarm, therefore, it should NOT be used on systems with variable water pressure. The unit includes two single-pole double-throw snap action switches used to operate local alarms, indicate signals to annunciator panels, trip municipal fire alarm boxes, start fire pumps, or any other function that can be initiated or controlled by the opening or closing of an electrical switch. The device may be installed on the main riser to give a system waterflow signal or on branch feed mains, cross mains, or branch lines to give a waterflow signal by zone or area.

The waterflow indicator detects a flow of water exceeding 10 gpm in the piping when the flexible vane is deflected. This motion activates the field-adjustable pneumatic retard device. The pneumatic retard device delays activation of the electrical switches to reduce the possibility of false alarms caused by a single or series of transient flow surges. The retard device instantly resets during a series of surges to prevent a cumulative effect. After a sustained flow, the two switches operate to open or close electrical contacts.

Trim Note (refer also to System Data and/or Trim Chart): Discharge piping from the auxiliary drain valve, the flow test valve, and all system drains should be kept separate. DO NOT connect the outlet of the drip check to any other drain. Refer to section XI. Firecycle® System Inspections, Tests, and Maintenance for operation of these valves.

IX. REQUIRED COMPONENTS (NOT INCLUDED IN TRIMPAC® PACKAGES)

The following are integral components of Firecycle® Systems, and must be ordered separately from Trimpac® Trim Packages:

- Flow control valve (straight through or angle style)
- Trimpac® drain package
- System check valve and trim (order separately for preaction systems)
- Water supply control valve (and system water supply gauge and valve for wet systems)
- Sprinkler system main drain (for deluge systems)
- Release system (VFR-400 Control Panel, Firecycle® detectors, and Firecycle® detector cable)

A. Flow Control Valve

The Viking flow control valve is a quick opening, differential type flood valve with a spring loaded rolling diaphragm clapper. The flow control valve is constructed so that the force of the spring and the differential of the valve clapper to water seat will close the valve if detection or release system is reset. The flow control valve features field-replaceable diaphragms and a rubber seated clapper assembly and is designed to be reset without opening the valve.

The Viking flow control valve has an inlet chamber, an outlet chamber and a priming chamber. The inlet chamber and outlet chamber are separated from the priming chamber by a rolling diaphragm and clapper assembly. The rolling diaphragm consists of a piston contained in a vented space between two flexible diaphragms. The rubber seated clapper assembly is secured to lower diaphragm.

<u>In the Set Condition</u>

System pressure is supplied to the priming chamber through a restricted priming line (trim) equipped with a check valve. System water supply pressure, trapped in the priming chamber, along with pressure provided by the spring, located in the priming chamber, causes the rolling diaphragm assembly to seal the rubber seated clapper against the water seat.

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Operation

After the flow control valve is set, operation of the flow control valve requires the release of priming water from the priming chamber. For Trimpac® Firecycle® III Systems, the release of the priming water from the priming chamber will be automatically controlled by the release system installed in the hazard area.

Upon activation of the automatic release system, the normally closed solenoid will be opened in the Trimpac®, which will then relieve priming water pressure from the priming chamber. **CAUTION: OPERATION OF VIKING FLOW CONTROL VALVES BY PRESSURIZING THE PRIMING CHAMBER WITH AIR OR ANY OTHER PRESSURIZED GAS IS NOT RECOMMENDED OR APPROVED.**

Pressure is released from the priming chamber faster than it is re-supplied through the restricted priming line. Water supply pressure, in the inlet chamber, forces the clapper open allowing water to flow through the outlet and into the system and alarm devices.

B. Firecycle® III VFR-400 Control Panel

The VFR-400 Control Panel is an essential listed component for Firecycle® III System operation. The control panel is a microprocessor based multi-hazard releasing control panel that is the junction point between the detector circuit, the valve trim box, the power supply, and the alarms.

NOTE: Batteries are available for a back-up emergency power supply for the VFR-400 Control Panel. Firecycle® Single-and Double Interlock Preaction Systems require a 90-hour, 17 A-H battery back-up, capable of being recharged in 48 hours. Note about the Fail-Safe design of Firecycle® Systems: If the electrical power should fail, the system automatically goes to battery power, sounding a trouble alarm. If the battery should also fail, Firecycle® Wet Systems would operate as standard wet systems, while Firecycle® Preaction Systems would operate as standard dry systems.

Operation

The panel incorporates the relays, timer, two key type switches, alarms, and trouble lights essential to system operation. The control panel automatically starts and stops waterflow to the sprinkler system in response to the on-off cycling of the heat responsive detectors. Refer to system data for operational information and proper wiring diagram and required program.

Inspections, Tests, and Maintenance

The Viking VFR-400 Control Panel must be kept free of foreign matter and environmental conditions that could impair its operation. Refer to VFR-400 Installation and Operation Manual for appropriate testing procedures.

For minimum maintenance and inspection requirements, refer to NFPA 72 and NFPA 25. In addition the Authority Having Jurisdiction may have additional maintenance, testing and inspection requirements that must be followed.

C. Firecycle® III Detectors and Detector Cable

1. Detectors for Firecycle® III Systems

The Model B Detector is a heat sensitive, normally closed, electrical detector, which operates at a fixed temperature. It is rate compensating and features automatic recycling. The detection units are connected with fire-resistant detector cable in series from and to the VFR-400 Control Panel.

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Operation

When a detector is heated to the temperature set point, a mechanical switch opens and breaks the series circuit interrupting the flow of current. When the temperature drops below the set point, the circuit is re-established. The detectors can be mounted in any angle, however care must be taken to avoid damage to the sensing shell. The mounting box is constructed of copper free aluminum with ½" threaded connections and (2) 5/16" mounting lugs. The detector can withstand 1500 °F temperatures for short periods of time without damage.

Maximum area coverage per detector is 1,600 sq. ft. (149 sq. m) 40' x 40' (12.2 m x 12,. m) spacing under optimum conditions. Refer to the Model B Detector technical data page and NFPA 72 for specific installation instructions and maximum spacing.

Inspections, Tests and Maintenance

Perform initial and subsequent detector testing in accordance with NFPA 72. The detector should be kept clean and tested for operation annually. Detectors may be tested by the use of a heat gun directed at the shell of the detector or by immersing the probe in a container of heated water. Care should be taken to not allow water to enter the back box as this could cause a fault. When the detector operates, an Ohm-meter connected across the detector leads will indicate an open circuit.

The detector set point will be affected if the probe is dented or bent. If a detector is subject to a temperature of 300 °F (149 °C), the indicating label will turn black, and the detector must be replaced.

2. Detector Cable for Firecycle® III Systems

Firecycle® Detector III Cable Installed Without Conduit: Where local regulations permit, Viking detector cable part number 04632A, may be used. (Refer to technical data page 419a-b.)

- Outer covering consists of an aluminum sheath having a minimum thickness of 0.035".
- The detector cable does not emit toxic fumes during a fire.
- The cable is a a two-wire conductor of a gage wire of 16 AWG.
- The nominal resistance per 1,000 ft. of detector cable, at 77 °F is 2.05 Ohms when connected per Firecycle® III installation guidelines.
- The detector cable does not propagate a fire.
- The detector cable shall have the ability to cut to length in the field and spliced. Cable splicing must be made in a conduit box.

Both ends of detector loop are installed in the VFR-400 Control Panel.

Firecycle® Detector III Cable Installed In Conduit: Where local regulations require installation of detector cable in conduit, Viking detector cable part number 09954, may be used. (Refer to technical data page 419d-f.)

- Has a thermoplastic zero halogen jacket for use in conduit.
- The maximum nominal diameter of shielded detector cable is 0.305".
- The cable insulation jacket shall be constructed of Silicon rubber.
- The detector cable does not emit noxious fumes and is not toxic during a fire.
- The cable is a a two-wire conductor of a gage wire of 16 AWG bare soft copper.
- The nominal resistance per 1000 ft. of detector cable, at 68°F is 2.05 Ohms when connected per Firecycle® III installation guidelines.
- The detector cable shall not propagate a fire.
- The detector cable has the ability to cut to length in the field and spliced. Cable splicing must be made in a conduit box.

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D. Firecycle® III-OH Detectors and Detector Cable

1. Detectors for Firecycle® III-OH Systems

Viking Model C-OH Firecycle® Detectors are listed for use in the detection system of Firecycle® III-OH Systems. The Viking Model C-OH Detector is a heat sensitive, normally closed, electrical detector, which operates at a fixed temperature. It is rate compensating and features automatic recycling.

Operation

When a detector is heated to the temperature set point, a mechanical switch opens and breaks the series circuit interrupting the flow of current. When the temperature drops below the set point, the circuit is re-established. Model C-OH Detectors incorporate a wax heat activated exposure strip,

which will discolor at 300 °F indicating possible detector damage. The heat probe utilized in the heat detector is constructed of stainless steel. The resistance drop across the detector in a closed position is 0.03 Ohms. The conduit box is a 4" octagonal outlet box. Maximum area coverage per detector is 2,500 sq. ft. (232.3 sq. m) 50' x 50' (15.2 m x 15.2 m) spacing under optimum conditions. Refer to the Model C-OH Detector technical data page and NFPA 72 (for spot type heat detectors) for specific installation instructions.

Inspections, Tests and Maintenance

Perform initial and subsequent detector testing in accordance with NFPA 72. The detector should be kept clean and all units should be tested for operation annually in accordance with the requirements set forth in NFPA 72 or the Authority Having Jurisdiction. Detectors may be tested by the use of a heat gun directed at the shell of the detector or by immersing the probe in a container of heated water.

When the detector operates, an Ohm-meter connected across the detector leads will indicate an open circuit. The detector set point will be affected if the probe is dented or bent. If a detector is subject to a sustained minimum temperature of 300 °F (149 °C), the heat exposure dot will turn black. In either case, the detector should be replaced.

2. Detector Cable for Firecycle® III Model C-OH Detectors

Model C-OH detectors are connected with fire-resistant detector cable in series from and to the VFR-400 Control Panel. Listed two-hour fire power limited fire alarm cable (FPL) wire must be used to wire the detection loop when using Model C-OH Detectors. Reference NEC 760-51 and NEC 760-53. The Detector/PLFA-FPL Cable is an industrial, high temperature, fire resistant

Detector/PLFA-FPL Cable designed for use in abusive environments. (Refer to technical data page 419d-f.) When properly installed in conduit, Detector/PLFA-FPL Cable meets the requirements for use as the electrical conductor in the detection systems. A continuous loop must be created. Two non-stranded number 16 AWG or 18 AWG conductors will be placed on one terminal of the detection block within the VFR-400 Control Panel, ran through the detectors and terminate on the second terminal in the detection block. The FPL wire should be installed in a manner to achieve a 2-hour rating per NFPA 72, NEC and local codes. Consult with the Local Authority Having Jurisdiction on the installation of the FPL wire. Care must be taken when securing FPL wire to the detector box. Be sure not to over-tighten the wire retaining mechanism to the wire.

The detection circuit must:

- Originate from the appropriate contact in the control panel.
- Connect all detectors in series. A two-conductor cable is required.
- Terminate at the appropriate contact in the control panel.
- Comply with all applicable federal, state, and local codes and requirements.

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- The maximum circuit resistance must be less than 100 Ohms. Quantity of detectors and cable length determine wire size.
- Detectors must be located and installed according to instructions provided in Viking technical data for the Model B or C-OH Detector.
- Detector boxes are equipped with ½" (15 mm) NPT threaded conduit connections.
- Detector/PLFA-FPL Cable must be installed in steel conduit (EMT is acceptable, however, joints must be water proof). When pulling Detector/PLFA-FPL Cable through conduit, the pulling radius should be at least ten times the cable diameter.

E. Check Valve and Check Valve Trim (for Firecycle® Preaction Systems)

Firecycle® Preaction Systems use a 1-1/2" or 2" Model L-1, or M-1 spring loaded in-line check valve, or 2-1/2"-8" Easy Riser® Check Valve and trim on the system riser. The Viking check valves are general purpose rubber-faced check valves approved for use in fire-service systems. The removable access cover allows periodic inspection as required in NFPA 25, Standard for Inspection, Testing and Maintenance of Water-Based Fire Protection Systems. The check valves have a working water pressure of 250 PSI. The check valve may be installed vertically or horizontally.

Operation

The check valve is used to hold system supervisory air pressure in the piping above the flow control valve to monitor system integrity. The check valve is also used to facilitate draining the system piping after testing or operation. The rubber gasket forms a tight seal against brass water seat, trapping air pressure above the clapper and preventing reverse flow from the sprinkler piping. Water flowing through the Viking check valve lifts rubber-gasketed clapper off the seat and flows into the sprinkler piping. When flow through the valve stops, the clapper closes quickly.

Inspections, Tests, and Maintenance

Check valves must be kept free of foreign matter, freezing conditions (when used on wet systems), corrosive atmospheres, contaminated water supplies, and any condition that could impair operation or cause damage.

A. Five-Year Internal Inspection

Internal inspection of check valves is recommended every five years unless inspections and tests indicate more frequent inspections are required.

1. Notify the Authority Having Jurisdiction, remote station alarm monitors, and those in the area affected that the system will be taken out of service. Consideration should be given to employment of a fire patrol in the affected areas.
2. Close the water supply main control valve, placing the system out of service.
3. Open the main drain. If necessary, open the system test valve to vent and completely drain the system.

For the Model L-1 or M-1 Check Valve:

4. Remove necessary fittings and/or piping to allow visual inspection.
5. Inspect the water seat. Wipe away all contaminants, dirt, and mineral deposits. Do not use solvents or abrasives.
6. Inspect the clapper for debris. Test the clapper for freedom of movement.

   CAUTION: NEVER apply any lubricant to seats, gaskets, or any internal operating parts of the valve. Petroleum-based grease or oil will damage rubber components and may prevent proper operation.

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For the Easy Riser® Check Valve:

4. Use the appropriate wrench to loosen and remove cover screws, and remove cover/clapper assembly.
5. Inspect water seat. Wipe away all contaminants, dirt, and mineral deposits. Do NOT use solvents or abrasives.
6. Inspect cover/clapper assembly and cover gasket. Test hinged clapper for freedom of movement. Renew or replace damaged or worn parts as required.
7. When internal inspection of the Easy Riser® Check Valve is complete, perform step 6 below under Valve Maintenance, to re-install cover/clapper assembly.

B. Valve Maintenance

For Model L-1 and M-1 Check Valves:

Perform steps 1 through 5 of Five-Year Internal Inspection.

1. To remove clapper rubber:
   a. Use proper wrench and disassemble valve from system piping.
   b. Inspect the clapper and rubber from inlet end. If the clapper rubber shows signs of wear, such as cracking, cuts, or excessively deep grooves where the rubber contacts the water seat, replace the valve.

For Easy Riser® Check Valves:

1. Perform steps 1 through 5 of Five-Year Internal Inspection for the Easy Riser® Check Valve.
2. To remove clapper rubber:
   a. Use the appropriate wrenches to loosen and remove button-head socket screw, hex nut, sealing washer, and rubber retainer.
   b. Remove the clapper rubber for inspection. If the clapper rubber shows signs of wear, such as cracking, cuts, or excessively deep grooves where the rubber contacts the water seat, replace the rubber.
3. To re-install clapper rubber (refer to the figures in the technical data page for the Easy Riser® Check Valve):
   a. Place the clapper rubber over the center hub of the rubber retainer.
   b. Position the retainer (with rubber in place) against the clapper.
   c. Replace and tighten the button-head socket screw, sealing washer, and hex nut. The sealing washer must be located on the top side of the clapper as shown in the technical data page for the Easy Riser® Check Valve. DO NOT over-tighten.
4. To remove clapper, and/or hinge pin:
   a. Remove the hinge pin retaining rings to free the hinge pin for removal. After the hinge pin is removed, the clapper can be removed.
5. To re-install clapper and/or hinge pin:
   a. Verify that the clapper rubber is in good condition and that it is properly installed.
   b. Position the clapper with the elongated hinge holes aligned between the holes of the hinge bracket welded inside the cover. The system (top) side of the clapper must face the direction indicated by the flow arrow stamped inside the cover.
   c. Insert the hinge pin through the holes at one end of the hinge assembly. Continue to push the hinge pin through the holes at the remaining end of the hinge assembly.
   d. Re-install the hinge pin retaining rings.

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6. To re-install cover/clapper assembly:
   a. Verify that the cover gasket is in position and that it is in good condition.
   a. Slide the cover/clapper assembly into the Easy Riser® Swing Check Valve so the clapper rubber contacts the water seat.
   c. Replace cover screws. Use the appropriate wrench to cross-tighten all cover screws to the torque values indicated in the technical data page for the Easy Riser® Check Valve used. DO NOT over-tighten.

X. FIRECYCLE® III SYSTEM ACCESSORIES

A. Trimpac® Air Line Trim (for Firecycle® Preaction Systems)

Trimpac® air line trim is for use with Firecycle® Trimpac® Preaction Systems. The air line connects to the pneumatic sensing line of the Trimpac® cabinet and includes approximately 10 ft. of copper tubing, air gauge, an air maintenance loop (when used with a tank-mounted compressor), check valve, and fittings. Note that the Trimpac® air line trim is ordered separately from the Trimpac®. Refer to technical data pages for additional information.

B. Recommended Air Supply (for Firecycle® Preaction Systems)

Firecycle® Preaction Systems incorporate a restricted, regulated air supply to supervise the integrity of system piping network. Supervisory air is maintained at 35 PSI (2.4 bar) for system water pressures of 175 PSI (12 bar) or less. For system water pressures above 175 PSI, up to a maximum of 250 PSI (17 bar), provide 55 PSI (3.8 bar) pneumatic pressure to the release system and pneumatic actuator. Note: A pneumatic actuator between the air supply and the system piping is utilized for “fail safe” operation of the system. An air supply capable of restoring system pressure within 30 minutes shall be provided. Acceptable air supply arrangements are:

1. Owner supplied air system with an air maintenance device on the supply side of the air supply inlet.
2. A tank mounted air compressor with an air maintenance device between the air compressor and the air supply inlet on the system riser.
3. A riser-mounted air compressor feeding an air reservoir. An air maintenance device shall be placed between the air reservoir and the system riser.

Viking’s recommended air supply also includes the following devices: air maintenance device with bypass trim, and dehydrator (optional). For details on the components making up the air supply system, refer to technical data page 355a and also refer to the Preaction section of the Viking Engineering and Design Data Book.

Air Compressor

The Viking Model F-1 Maintenance Air Compressor may be used as a primary air supply source for systems with a capacity of 150 gallons or smaller. The compressed air supply must be from a source available at all times. The compressor should draw its air supply from within the operating criteria allowed by the manufacturer of the compressor. Air piping should not be attached to the intake of the compressor unless acceptable to the compressor manufacturer and installed in accordance with NFPA 13 section 7.9.2.7. Damage, air reduction, or reduced life expectancy can result if guidelines aren’t followed.

Air Maintenance Device with Bypass Trim

The Viking Model D-2 Air Maintenance device is required to automatically maintain the required air pressure on the system. The device is factory set to maintain 40 PSI, but can be field adjusted by turning the adjusting screw counterclockwise to decrease, or clockwise to increase. The permitted rate of air leakage shall be as indicated in NFPA 13 section 24.2.2.

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Release Line Dehydrator (Optional):

Due to problems that accumulated condensation can cause, especially on freezer systems, all pneumatic release systems must be provided with a properly sized and maintained air dehydrator installed on the air supply. It is important that the color of the desiccant be checked at regular intervals to ensure its drying capability.

XI. FIRECYCLE® SYSTEM INSPECTIONS, TESTS, AND MAINTENANCE

NOTICE: THE OWNER IS RESPONSIBLE FOR MAINTAINING THE FIRE-PROTECTION SYSTEM AND DEVICES IN PROPER OPERATING CONDITION. THE FLOW CONTROL VALVE MUST BE KEPT FROM FREEZING CONDITIONS AND PHYSICAL DAMAGE THAT COULD IMPAIR ITS OPERATION.

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.

It is imperative that the system be inspected and tested on a regular basis in accordance with NFPA 25. During all inspections, testing, and maintenance activities the valve, trim, piping, alarm devices, and connected equipment must be visually inspected for foreign matter, physical damage, freezing, corrosion, or other conditions that may inhibit the proper operation of the system.

The following recommendations are minimum requirements. The frequency of the inspections may vary due to contaminated or corrosive water supplies and corrosive atmospheres. In addition, the alarm devices, detection systems, or other connected trim may require more frequent inspections.

The following applies to the flow control valve. Refer to the system description, sections in this manual specifically for each component of the system, applicable codes, and the authority having jurisdiction for minimum requirements. Prior to testing the equipment, notify appropriate personnel.

Weekly visual inspection of the Viking flow control valve is recommended.

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

A. Quarterly Water Flow Alarm Test

Quarterly testing of water flow alarms and performance of a main drain test is recommended and may be required by the Authority Having Jurisdiction.

For Firecycle® Wet Systems:

1. Notify the Authority Having Jurisdiction, remote station alarm monitors, and those in the area affected by the test.

NOTE: AN ALARM SHUT-OFF VALVE IS PROVIDED TO SILENCE LOCAL ALARMS. NO SHUT-OFF VALVE IS PROVIDED FOR THE PRESSURE SWITCH CONNECTION INTENDED TO ACTIVATE ELECTRIC ALARM PANELS.

2. To test electric alarms (if provided) and/or mechanical water motor gong (if provided), OPEN the alarm test valve in the flow control valve trim.

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NOTE: USE OF THE ALARM TEST VALVE ALLOWS TESTING OF ALARMS WITHOUT REDUCING THE SYSTEM PRESSURE.

a. Electric alarm pressure switches should activate.
b. Electric local alarms should be audible.
c. The local water motor alarm should be audible.
d. Verify that remote station alarm signals (if provided) were received.

3. When testing is complete, CLOSE the alarm test valve.
4. Verify:
   a. All local alarms stop sounding and reset the VFR-400 Control Panel.
   b. All remote station alarms reset.
   c. Retard chamber and water motor alarm supply piping has drained properly (if applicable).
5. Verify that the alarm shut-off valve is OPEN, the alarm test valve is CLOSED, and all valves are in their normal operating position and appropriately secured.
6. Notify the Authority Having Jurisdiction, remote station alarm monitors, and those in the affected area that testing is complete.

For Firecycle® Deluge and Preaction Systems:

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 flow control valve trim.
   a. Electric alarm pressure switches 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:
   a. All local alarms stop sounding and reset the VFR-400 Control Panel.
   b. All remote station alarms reset.
   c. Supply piping to water motor alarm properly drains.
5. Verify that the alarm shut-off valve is OPEN, and the alarm test valve is CLOSED.
6. Verify that the outlet chamber is free of water. No water should flow from the drip check when the plunger is pushed.
7. Notify the Authority Having Jurisdiction and those in the affected area that testing is complete.

B. Quarterly Main Drain Test

At least annually, each system riser is required to have a main drain test performed per section 13.2.5 of NFPA 25-2008 edition. A main drain test is conducted any time the control valve is closed and reopened on each system riser to determine if there has been a change in the water supply piping and control valves. Note: For systems where the water supply is through a backflow preventer and/or pressure reducing valves, the main drain test of at least one system downstream of the device shall be conducted on a quarterly basis.

For Firecycle® Wet Systems:

1. Notify the Authority Having Jurisdiction, remote station alarm monitors, and those in the area affected by the test.
2. Perform monthly visual inspection.

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3. Verify that adequate drainage is provided for full flow from the main drain outlet.
4. Record pressure reading from the water supply pressure gauge.
5. Fully OPEN the main drain. (For systems with a mechanical alarm, the alarm should sound.)
6. When a full flow is developed from the main drain, record the residual pressure from the water supply pressure gauge.
7. When the test is complete, SLOWLY CLOSE the main drain.
8. Compare test results with previous flow information. If there is a 10 percent reduction in full flow pressure when compared to the original acceptance test or previously performed tests, the cause of the reduction shall be identified and appropriate steps taken to restore adequate water supply. Check the main supply line for obstructions or closed valves.
9. Open the emergency release to allow the system pressure to return to normal.
10. After the pressure has stabilized, close the emergency release.
11. Verify all alarm devices and valves are secured in normal operating position.
10. Notify the Authority Having Jurisdiction, remote station alarm monitors, and those in the area affected by the test that the test is complete. Record and/or provide notification of test results as required by the Authority Having Jurisdiction.

For Firecycle® Deluge and Preaction Systems:

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 flow control valve is free of water. No water should flow from the drip check when the plunger is pushed.
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. For normal operating position, refer to trim charts and system data for the system used.
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 FLOW CONTROL 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.

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4. Trip the system by operating the release system. Allow a full flow to pass through the flow control valve. Water flow alarms should operate.
5. When test is complete, reset the system:

   For Firecycle® Wet Systems:

   a. Open system drain to drain the system.
   b. Close system drain.
   c. Open the emergency release to allow the system pressure to return to normal.
   d. After the pressure has stabilized, close the emergency release.
   e. Open the VFR-400 Control Panel and press “System Reset”.

   For Firecycle® Deluge Systems:

   a. Open system drain to drain the system.
   b. Close system drain.
   d. Open the VFR-400 Control Panel and press “System Reset”.

For Firecycle® Single- and Double-Interlock Preaction Systems:

   a. Open system drain and drain the system.
   b. Close system drain.
   c. Relieve pressure on the PORV by draining the outlet chamber of the flow control valve.
   d. Restore system air pressure by following the steps in section VI.-C. Placing the Firecycle® Single- and Double Interlock Preaction System in Service.
   e. Open the VFR-400 Control Panel and press “System Reset”.

   NOTE: FLOW CONTROL VALVES SUPPLIED BY BRACKISH WATER, SALT WATER, FOAM, FOAM/WATER SOLUTION, OR ANY OTHER CORROSIVE WATER SUPPLY, SHOULD BE FLUSHED WITH GOOD QUALITY FRESH WATER BEFORE BEING RETURNED TO SERVICE.

6. 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.

D. Maintenance

Refer to the flow control valve data page for maintenance of the valve.

Where difficulty in performance is experienced, the valve manufacturer or his authorized representative shall be contacted if any field adjustment is to be made.

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. Flow control valves and trim that have been subjected to brackish water, salt water, foam, 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.

Semi-Annual Maintenance

1. Remove the system from service. (See release system description and technical data for additional information.)
   a. Close the main water supply control valve and priming valve.

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b. Open the auxiliary drain valve. Allow the outlet chamber of the flow control valve to drain completely.

c. Release pressure in the priming chamber by opening the emergency release valve.

2. Inspect all trim for signs of corrosion and/or blockage. Clean and/or replace as required.
3. Clean and/or replace all strainer screens. Note: The screen in the priming line strainer must be cleaned from time to time and the other devices in the priming line may need to be replaced as well. The plug on the strainer provides access to visually check the screen. The plug should not be removed while the system is under pressure.
4. Place the system in service. Refer to section IV.-C on page 10 for Firecycle® Wet Systems, section V.-C on page 13 for Firecycle® Deluge Systems, and section VI.-C on page 16 for Firecycle® Preaction Systems.

Every Fifth Year

1. Internal inspection of flow control valves is recommended every five years unless inspections and tests indicate more frequent internal inspections are required. Refer to VALVE DISASSEMBLY instructions provided below.
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.

Valve Disassembly

1. Remove the valve from service.
   a. Close the main water supply control valve and priming valve.
   b. Open the auxiliary drain valve. Verify that the system has been properly drained.
   c. Release the pressure in the priming chamber by opening the emergency release valve.
2. Disconnect and remove necessary trim from the cover and remove cap screws.
3. Lift cover from spacer.
4. Remove spring.
5. Remove spacer and rolling diaphragm and clapper assembly from the body.
6. To replace the clapper assembly, remove screw and sealing-washer assembly. Install the new clapper assembly and discard the old.
7. To replace the lower diaphragm remove screw and sealing-washer assembly, and clapper. Install the new diaphragm and discard the old.
8. To replace the upper diaphragm, remove screw and sealing-washer assembly, and clamp plate. Install the new diaphragm and discard the old.

   NOTE: PRIOR TO INSTALLING A NEW UPPER DIAPHRAGM OR LOWER DIAPHRAGM, MAKE CERTAIN THAT ALL SURFACES ARE CLEAN AND FREE OF FOREIGN MATTER. THE SEAT MUST BE SMOOTH AND FREE OF NICKS, BURRS OR INDENTATIONS.

Valve Reassembly

1. Prior to reassembly, flush the valve of all foreign matter. The valve seat must be clean and free from all marks and scratches.
2. To reassemble, reverse disassembly procedure.
3. When installing diaphragms, care must be taken to assure all bolt holes are aligned. Also, the fabric side (rough side) of the diaphragms must be positioned toward piston. Prior to tightening screws, install the clapper assembly into the spacer.

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a. Insert the upper diaphragm through the opening in spacer from the bottom surface of the spacer to the top. The clapper assembly must be toward the inlet chamber of the valve.

NOTE: THE SPACER'S OUTSIDE DIAMETER IS TAPERED. THE DIAMETER OF THE BOTTOM IS GREATER THAN THE DIAMETER OF THE TOP.

b. Align bolt holes and tighten screws.

4. Place the cover, with cap screws inserted in the holes, upside down on a work bench.
5. With the top side of the spacer and upper diaphragm toward the cover, place the clapper assembly and spacer, described in Step 3, over the threaded ends of cap screws.
   a. Upper diaphragm must be flat between the cover and spacer.
   b. The piston should protrude from the spacer, and the clapper assembly should be visible (facing up).
6. Gently roll the lower diaphragm over the protruding piston and position the bolt holes of the lower diaphragm over the threaded ends of the cap screws.
7. Taking care not to cut the diaphragm, tuck the lower diaphragm between the spacer and piston around the entire circumference of the piston while gently pushing the piston into the spacer.
8. Carefully position the cover with cap screws and piston assembly on the valve body.
9. Remove the cover with cap screws and verify that upper diaphragm is properly tucked between the spacer and piston around the entire circumference of the piston.
10. Install spring.
11. Install cover and cap screws.
    a. Lower diaphragm must be flat between the spacer and body.
    b. Cross tighten cap screws uniformly. Do not over-tighten.
12. The valve must be operated after reassembly to verify all parts function properly.

XII. REMOVING THE SYSTEM FROM SERVICE

WARNING: THE SYSTEM SHOULD BE PLACED OUT OF SERVICE ONLY FOR REPAIRS. THE WORK MUST BE COMPLETED IN A MANNER TO MINIMIZE THE TIME THAT THE SYSTEM MUST BE OUT OF SERVICE. ALL HAZARDOUS ACTIVITIES IN THE EFFECTED AREA SHALL BE TERMINATED UNTIL THE SYSTEM IS PLACED BACK IN SERVICE. ANY SYSTEM IMPAIRMENT SHALL BE COORDINATED WITH THE OWNER, LOCAL AUTHORITY HAVING JURISDICTION, AND OTHER RELATED PARTIES. PLACE A ROVING FIRE PATROL IN THE AREA COVERED BY THE SYSTEM UNTIL THE SYSTEM IS BACK IN SERVICE.

PRIOR TO TURNING OFF ANY VALVES OR ACTIVATING ANY ALARMS, NOTIFY LOCAL SECURITY GUARDS AND/OR CENTRAL ALARM STATION (IF USED) SO THAT A FALSE ALARM WILL NOT BE SIGNALLED AND RESULT IN A LOCAL FIRE DEPARTMENT RESPONSE.

NOTE: WHEN A VALVE HAS BEEN REMOVED FROM SERVICE AND IS SUBJECT TO FREEZING OR WILL BE OUT OF SERVICE FOR AN EXTENDED PERIOD OF TIME, ALL WATER MUST BE REMOVED FROM THE PRIMING CHAMBER, TRIM PIPING, WATER SUPPLY PIPING AND OTHER TRAPPED AREAS.

1. Close the water supply control valve.
2. Close the priming valve.
3. Open all auxiliary drain valves and inspector's test valve.
4. Silence alarms on the VFR-400 Control Panel (optional). To silence electric alarms controlled by pressure switch and to silence water motor alarm, close alarm shut-off valve.

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NOTE: ELECTRIC ALARMS CONTROLLED BY A PRESSURE SWITCH INSTALLED IN THE ½" (15 mm) NPT CONNECTION FOR A NON-INTERRUPTIBLE ALARM PRESSURE SWITCH CANNOT BE SHUT OFF UNTIL THE DELUGE VALVE IS RESET OR TAKEN OUT OF SERVICE.

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.

5. Replace any sprinklers and/or spray nozzles that have been damaged or exposed to fire conditions.
7. Perform all maintenance procedures recommended in technical data describing individual components of the system that has operated.
8. Return the system to service as soon as possible. Refer to section IV.-C on page 10 for Firecycle® Wet Systems, section V.-C on page 13 for Firecycle® Deluge Systems, and section VI.-C on page 16 for Firecycle® Preaction Systems.

XIII. FIRECYCLE® SYSTEM TROUBLE CONDITIONS

Detection System is Damaged

For Firecycle® Wet and Preaction Systems: If the detection system is damaged or malfunctions, the VFR-400 Control Panel will initiate the appropriate alarms, and the flow control valve will open. However, water will NOT flow from any sprinklers until a sprinkler has operated, as in a fire, or unless mechanical damage to the sprinkler piping occurs. The cycling function of the Firecycle® III or Firecycle® III-OH System will not operate in this condition, and the system must be manually shut off. All alarms will operate normally.

For Firecycle® Deluge Systems: If the detection system is damaged or malfunctions, the VFR-400 Control Panel will initiate the appropriate alarms, and the flow control valve will open. Water will flow from all sprinklers and/or spray nozzles. The cycling function of the Firecycle® III or Firecycle® III-OH System will not operate in this condition, and the system must be manually shut off. All alarms will operate normally.

Sprinkler(s) or Piping System is Damaged

For Firecycle® Wet Systems: If the piping system is damaged sufficiently to activate the water flow alarm switch, the VFR-400 Control Panel will energize normally open release solenoid valve #2 closed. If a detector has NOT gone into alarm mode, release solenoid valve #1 will remain closed. The flow control valve will re-prime and close after a short delay. If a sprinkler or the system piping is damaged, this feature ensures that the amount of discharging water is limited by the system pressure and the location of the system damage. If a Firecycle® detector detects a fire during this condition, normally closed release solenoid Valve #1 will be energized open, allowing the flow control valve to open, and water will be discharged from any sprinklers that may have operated as a result of the fire, as well as from the damaged portion of the system. The cycling function of the Firecycle® III or Firecycle® III-OH Wet System and all alarms will operate normally in this condition.

For Firecycle® Deluge Systems: If the flow control valve opens due to piping system damage, the system must be manually shut off.

For Firecycle® Preaction Systems: Piping above the riser check valve contains supervisory air pressure to monitor system integrity. If the system piping is damaged, system air supervisory pressure escapes and the low air pressure alarm is activated.
For the single interlocked system, the pneumatic actuator opens, releasing priming water to open drain. The flow control valve opens and water will continue to flow until the system is manually shut off.

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For the double interlocked system, normally open solenoid valve #2 is powered closed. The panel registers a trouble alarm, however no water flows into the piping. (If the detection system operates or is damaged during the "low air" condition, the flow control valve will open and water will flow into the system until the detector resets or until the system is manually shut off.)

Loss of Power Prior to Operation

For Firecycle® Wet Systems: If the A.C. power fails, the Firecycle® III or Firecycle® III-OH Wet System continues to operate on the stand-by batteries. The Firecycle® III Control Panel will initiate a trouble alarm. If the A.C. power and the standby batteries fail prior to the operation of the system, all alarms would be lost and the cycling function of the system will be lost. The system will operate as a typical wet system and must be manually shut-off.

For Firecycle® Deluge Systems: If the A.C. power fails and the backup battery supply expires, all alarms would be lost and the cycling function of the system will not operate. Normally closed solenoid #1 remains closed and normally open solenoid #2 remains open. Like any electrically operated deluge system, when all power fails, the system can only be operated manually by pulling the emergency release.

For Firecycle® Single and Double Interlock Preaction Systems: If the A.C. power fails, the Firecycle® III or Firecycle® III-OH Preaction System continues to operate on the stand-by batteries. The VFR-400 Control Panel will initiate a trouble alarm. If the A.C. power fails and the standby batteries expire, all alarms will be lost along with the cycling function of the system. Solenoid #1 remains closed and solenoid #2 remains open. The Firecycle® Single Interlock Preaction System will operate as a dry system upon loss of power in the set position. As long as air pressure remains in the system piping, the pneumatic actuator will keep the flow control valve from opening. If the system air pressure is reduced, the pneumatic actuator opens, releasing priming water to open drain, opening the flow control valve. Water will flow into the system piping and discharge from any open sprinklers until the system is manually shut off (or unless A.C. power is restored in the double interlock system, allowing the system to cycle off if the fire is extinguished).

Loss of Power During Operation

If all power fails while the Firecycle® System is flowing water, the system will not cycle off, and must be manually shut-off.