

**TOTALPAC2 Integrated Fire Protection System****Cycling Deluge Systems****General****1. Applicable Standards**

The **TOTALPAC2** complies with the following standards:

- NFPA-13 Sprinkler Systems;
- NFPA-15 Water Spray Fixed Systems;
- NFPA-16 Foam-Water Deluge and Foam-Water Spray Systems;
- NFPA-72 Fire Alarm Systems.

Before the installation, the contractor installing the unit shall be familiar with the following documents and standards:

- Applicable Local & State Building Codes
- Any additional requirements of the Local Authority Having Jurisdiction.

**2. Listings and Approvals**

In addition to being fabricated under tight ISO-9001 manufacturing and quality control procedures, your **TOTALPAC2** Unit has also been tested and approved by recognized laboratories:

Underwriters Laboratories Inc. (UL):

- Special System Water Control Valves - Assembled Units, category # VKYL.EX4641".

**Note:** Although most **TOTALPAC2** units are Listed, custom built units are sometimes supplied on request. Components in these special units maintain their individual Listings/Approvals but the units are not Listed as an assembled unit.

**CAUTION !** Any unauthorized modification or addition made on-site to a factory built Listed Unit will void this Listing. Such modifications or additions may void the unit's warranty as well. Consult your nearest FireFlex Systems Authorized Distributor before proceeding with such modifications or additions.

**3. Environment**

**TOTALPAC2** units shall be installed in a dry and clean location. Verify that all equipment is properly heated and protected to prevent freezing and physical damage.

The unit and it's components 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 components.

The frequency of the inspections and maintenance will vary depending on these environmental conditions. The owner is responsible for maintaining the fire protection system and devices in proper operating condition.

Refer to CONFIGURATION DESCRIPTION for maintenance instructions.

**4. General Description**

The cycling deluge system uses open type sprinklers and / or spray nozzles in the sprinkler piping which totally flood an area with pressurized water. A detection network is used in parallel with the open type sprinkler / nozzles system. This network is electric and may be actuated by manual and rate-compensated temperature. When the detection system operates it gives an alarm and activate the Flow Control valve. Because deluge systems are often used in extra-hazard occupancies, electrical detection systems are by far the most common.

The **TOTALPAC2** integrated fire protection system by *FireFlex Systems Inc.* consists of a cycling deluge system trim totally pre-assembled, pre-wired and factory tested. All electrical and mechanical components of the system are contained in one single unit.

The only connections required for installation are the water supply inlet, water discharge outlet, main drain, and the electrical detection and alarm connections. The discharge outlet is connected to a fixed piping system of open sprinklers and or nozzles. Water is the extinguishing agent.

Cycling Deluge systems are usually supervised. The **TOTALPAC2** system is supervised in order to monitor its integrity. The electrical detectors and associated wiring are also supervised.

The most common applications are protection of extra-hazard occupancies by creating a fire buffer zone or by cooling surfaces to prevent deformation or structural collapse. Examples: storage or process areas containing substances having a low flash point; areas in which fire may spread rapidly; tanks containing combustible solutions, transformers, equipment pits or product handling systems.

Systems should be designed by qualified fire-protection engineers in conjunction with the appropriate Authority Having Jurisdiction.

**Note:** Each **TOTALPAC2** Unit is identified with it's unique Serial Number. This number is located on a sticker inside the main door panel and is used to maintain a record in our computerized data base. Have this Serial Number handy when calling for information on your unit (format is TOT#####).

**TOTALPAC2 Integrated Fire Protection System****Cycling Deluge Systems****5. Features**

Your **TOTALPAC2** unit is superior than many other products available on the market now and has been manufactured by the company that has introduced and developed the concept of integrated fire protection systems in the market.

Main features are:

- Trouble free design for safe and easy application
- Available in 5 sizes from 1½" to 6" diameter
- Uses the Viking Flow Control Valve
- Integrated Control Panel
- Compact, aesthetic and easy to move
- User-friendly standardized owner's manual with every unit
- Unique serial number on every unit
- Uses only UL, ULC Listed and FM Approved components
- Designed in accordance with NFPA Standards
- Trim is fully assembled and tested at the factory
- Water supply and drain connections on both sides, available both with grooved end or flanged fittings
- Sturdy 14 Gauge steel cabinet or skid painted fire red with oven baked polyester powder on phosphate base
- Textured rust proof finish
- Neoprene gasket on all doors to eliminate vibrations
- Easily removable doors for ease of access
- Key-alike locks on all cabinet doors
- Manufactured under ISO-9001 quality control procedures.

**Configuration Description**

A Deluge system is a fixed fire-protection system which totally floods an area with pressurized water through a system piping of open nozzles or sprinklers. The system piping is empty until the Flow Control Valve is activated by an electric or manual release system.

**TOTALPAC2** Cycling Deluge systems are built around the Viking Trim using Flow Control Valves Model H-3 for 1½" (40 mm) diameter (Model H-4 is the Halar® Coated version for use in corrosive environments) or Model H-1 for 2" (50 mm) diameter and up (Model H-2 is the Halar® Coated version for use in corrosive environments).

All the valves are rated up to a maximum of 250 psi WWP (1724 kPa) and are available in the following diameters:

- |                                      |                                      |
|--------------------------------------|--------------------------------------|
| <input type="checkbox"/> 1½" (40 mm) | <input type="checkbox"/> 2" (50 mm)  |
| <input type="checkbox"/> 3" (80 mm)  | <input type="checkbox"/> 4" (100 mm) |
| <input type="checkbox"/> 6" (150 mm) |                                      |

Cycling **TOTALPAC2** Deluge systems are supplied with flange-groove Flow Control Valves. Units with flange-flange Valves are also available on request.

**Release System**

The Viking Firecycle® III cycling deluge system utilizes a Viking Flow Control Valve (A2) in lieu of the Deluge Valve and a Firecycle® III Model E-2 Control Panel, together with additional valves, devices and trim to form a unique operating system.

In fire condition, when the detection condition is satisfied the system Control Panel energizes both Solenoid valves (F1 & F2) , causing the Flow Control Valve (A2) to open allowing water to enter the system piping. Water will flow from any open sprinklers and/or spray nozzles on the system.

In addition, Firecycle® III has 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. Should the fire rekindle, the Firecycle® III 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. Firecycle® III systems are also "Fail-Safe".

**Note:** **TOTALPAC2** Firecycle® III Deluge Systems are available with electrical type release and the integrated Firecycle® III Model E-2 Control panel. They are not FM Approved.

The system piping is normally dry and may be installed in locations subject to freezing.

The Firecycle® III Cycling System has several "Fail-Safe" features, some of which are not available on other deluge systems. Refer to SYSTEM OPERATION for more details.

**INSTALLATION**

**TOTALPAC2** Units must be installed in an area not subject to freezing temperatures or physical damage.

1. Install the **TOTALPAC2** unit and connect the system according to instruction manual and technical data supplied.

**Note:** The drain collector shall be connected to an open drain. Do not restrict or reduce drain piping.

2. Install the open sprinklers/nozzles piping, detection and signaling circuits in accordance with applicable NFPA standards.
3. Conform to local municipal or other codes regarding installations of fire protection systems.
4. Perform preliminary inspection outlined below prior to putting system in service.
5. Put the system into operation as outlined below.
6. Perform the annual inspection sequence and test each detector and alarm unit.
7. If the system does not operate as it should, make the necessary corrections according to manuals issued or consult your distributor or *FireFlex Systems Inc.*
8. Make sure that building owner or a delegated representative has received instructions regarding the operation of the system.

**TOTALPac2 Integrated Fire Protection System****Cycling Deluge Systems****PRELIMINARY INSPECTION BEFORE  
PLACING THE SYSTEM IN SERVICE**

1. Open door to mechanical section. Main Water Supply Control Valve (D1) should be CLOSED. Priming valve (B1) must be CLOSED. Flow Test Valve (B6) and main drain valve (D3) must be CLOSED. Alarm test valve (B5) must be CLOSED. All gauges (B11, B12 and E3) should show 0 psi pressure.
2. Connect all detection and alarm audible devices according to electrical schematics (see TBA field wiring diagram in PROGRAMMING SECTION).
3. Connect the AC power for the control panel (L1) on a separate breaker in the electric distribution panel (see TBB field wiring diagram in PROGRAMMING SECTION).

**Note:** Do not use these circuit breakers for other parallel applications. If necessary, equip each circuit breaker with a security seal in order to avoid accidental closing.

4. After the Flow Control Valve is set, operation of the valve requires the release of priming water from the priming chamber. This may be by automatic or manual operation of one of the release systems described above. For specific trim arrangement, refer to the MECHANICAL TRIM DESCRIPTION.

**Note:** Electric Release: Solenoid valves, system control panels and electrical detectors must be compatible. Consult the CONTROLS SECTION for compatibility charts.

**PLACING THE SYSTEM IN SERVICE:**

(Refer to mechanical trim description and TRIM SCHEMATIC)

1. Verify the following:
  - a) The system Main Water Supply Control Valve (D1) is CLOSED.
  - b) The system has been properly drained.
  - c) Flow Test Valve (B6) is OPEN.
  - d) The Emergency Release Valve (B10) is CLOSED.
  - e) The system water supply piping is pressurized up to the CLOSED Main Water Supply Valve (D1) and the priming line is pressurized up to the CLOSED Priming Valve (B1).
2. Verify that all releasing devices are set and that any Inspector's test Valve and/or auxiliary drain valves are CLOSED.
  - a) OPEN Priming Valve (B1).
3. OPEN Flow Test Valve (B6).
4. PARTIALLY OPEN Main Water Supply Control Valve (D1).
5. When full flow develops from the Flow Test Valve (B6), CLOSE the Flow Test Valve.
  - a) Verify that there is no flow from the open Flow Test Valve (B6).
6. CLOSE Flow Test Valve (B6).
7. FULLY OPEN and secure the Main Water Supply Control Valve (D1).

8. Verify that the Alarm Test Valve (B5) is CLOSED and that all other valves are in their "normal" operating position (Refer to TRIM SCHEMATIC for details).
9. Depress the plunger of the Drip Check Valve (B7). No water should flow from the Drip Check when the plunger is pushed.
10. Check and repair any leaks.
11. On new installations, systems that have been placed out of service, or where new equipment has been installed, trip test system to verify that all equipment functions properly. Refer to MAINTENANCE – ANNUALLY for instructions.

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

12. After completing the trip test, perform MAINTENANCE – SEMI-ANNUALLY.

**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 any other trapped areas.

13. Notify the Authority Having Jurisdiction, remote station alarm monitors, and those in the affected area that the system is in service.

**MECHANICAL TRIM SECTION****1. System Operation****In the SET condition:**

System water supply pressure enters the priming chamber of the Flow Control Valve (A2) through the priming line which includes a normally open priming valve (B1), strainer (B2), restricted orifice (B3) and spring loaded check valve (B4).

System water supply pressure enters the priming chamber of the Flow Control Valve. In the SET condition, water supply pressure is trapped in the priming chamber by a spring loaded check valve (B4) and normally closed Solenoid valve (F2). The pressure in the priming chamber holds the Flow Control Valve clapper closed, keeping the outlet chamber and system piping dry.

**In a fire condition:**

When the detection condition is satisfied, system Control Panel activates an alarm and energizes normally closed Solenoid valve (F2) open and normally open solenoid valve (F1) closed.

Pressure is released from the priming chamber of the Flow Control Valve (A2) to the open drain manifold faster than it is supplied through the restricted orifice (B3). The Flow Control Valve clapper opens to allow water to flow into the system piping and alarm devices, causing the optional Water Motor Alarm (C2) and water flow alarms connected to the Alarm Pressure Switch (C1) to activate.

When the Flow Control valve operates, the PORV (B14) is pressurized, causing it to latch open.

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Water discharges until all Firecycle® detectors have reset (cooled below their set point). After all detectors have reset, the Firecycle® III control panel activates the Soak Timer, allowing the system to flow water for a pre-determined period of time. When the Soak Timer has elapsed, the control panel de-energizes the normally closed Solenoid valve (F2), allowing it to close (the normally open solenoid (F1) remains energized closed until the system is manually reset or all power (both AC and batteries) is lost).

The Flow Control Valve re-primers and closes, stopping the flow of water through the piping system. Should a Firecycle® detector go into alarm, the control panel re-energizes the normally closed solenoid valve (F2) open, and the entire cycle repeats.

**Trouble conditions:**

If the detection system is damaged or malfunctions, the Firecycle® III Control panel will go into alarm and the Flow Control Valve (A2) will open. Water will flow from any open sprinklers and/or other opening in the sprinkler piping. The cycling function of the Firecycle® III will not operate in this condition. All alarms will operate normally.

If the AC power fails, the Firecycle® III System continues to operate on the standby batteries. Should both AC and batteries fail prior to the operation of the system, all alarms will be lost and the system will need to be manually actuated. The cycling function of the system will not operate in this condition, and the system must be manually shut-off.

If power fails while the system is flowing water, the normally open Release Solenoid (F1) will fail open. The PORV (B14) is already pressurized open, continually venting the priming chamber of the Flow Control Valve (A2). The cycling function of the system will not operate in this condition, and the system must be manually shut-off.

**Manual operation:**

Anytime the handle of the Emergency Release (B10) is pulled, pressure is released from the priming chamber; Flow Control Valve (A2) will open. Water will flow from any open sprinklers and/or other opening in the sprinkler piping and alarm devices (C1 & C2) will operate. The cycling function of the Firecycle III® will not operate in this condition due to the open Emergency Release (B10).

**2. Emergency Instructions** (refer to piping diagram provided)**To take system Out of Service:**

**Warning !** Placing a control valve or detection system out of service may eliminate the Fire Protection capabilities of the system. Prior to proceeding, notify all Authorities Having Jurisdiction. Consideration should be given to employ a fire patrol in the affected areas.

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

- .1 Open system Main Drain Valve (D3).

- .2 Silence alarms (refer to CONTROL PANEL SECTION for additional details).

**Note:** Electric alarms controlled by a pressure switch installed in the ½" (15mm) NPT connection (C2) for a Non-interruptible Alarm Pressure Switch cannot be shut-off until the Flow Control Valve (A2) is reset or taken out of service.

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.

- .4 Replace any detectors that have been damaged.
- .5 Replace any sprinklers and/or spray nozzles that have been damaged, or have been exposed to fire conditions.
- .6 Perform all maintenance procedures recommended in MAINTENANCE, describing individual components of the system that has operated.
- .7 Return the system to service as soon as possible.

**3. Placing the system back in service after operation:** (refer to TRIM SCHEMATIC)

- .1 Both the Main Water Supply Control Valve (D1) and the Priming Valve (B1) should remain open.
- .2 System Main Drain Valve (D3) should be OPEN. Verify that Emergency Release (B10) is CLOSED. Verify that the system has been properly drained.
- .3 Reset control panel. Alarm devices should stop. N.O. release solenoid valve (F1) is de-energized.
- .4 Close the System Main Drain Valve (D3).
- .5 Make sure the Main Water Supply Control Valve (D1) is fully open.
- .6 Verify that the Alarm Test Valve (B5) and all other valves are at their NORMAL operating position.
- .7 Depress the plunger of Drip Check (B7). No water should flow from the Drip Check when the plunger is pushed.

**TOTALPAC2 Integrated Fire Protection System****Cycling Deluge Systems****INSPECTIONS & TESTS**

It is imperative that the system be inspected on a regular basis. Refer to INSPECTIONS and TESTS recommended in current Viking technical Data describing individual components of the Viking Deluge System used.

The frequency of the inspections may vary due to contaminated water supplies, corrosive or humid atmospheres as well as the condition of the air supply to the system. In addition to the instructions herewith, local Authority Having Jurisdiction may have additional maintenance, testing and inspection requirements which must be followed.

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

**Full Flow Trip test:**

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

**CAUTION !** Performing this test will cause the Flow Control Valve to open. Water will flow into the sprinkler piping and from any open sprinkler and/or nozzles unless the Optional Shut-Off Valve is installed and closed prior to the test. Take necessary precautions to prevent damage.

**Drain Test:**

All sprinkler system trims need to be properly drained and this is no different for the **TOTALPAC2** units. In order to avoid back pressure in the trim, the drain manifold outlet shall be piped to an open drain.

**MAINTENANCE**

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

Refer to MAINTENANCE INSTRUCTIONS provided in current Viking Technical Data describing individual components of the Viking Preaction System used.

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

The following requirements are based upon NFPA-25:

**Records.**

Records of inspections, tests, and maintenance of the system and its components shall be made available to the authority having jurisdiction upon request. Typical records include, but are not limited to, valve inspections; flow, drain, and pump tests; and trip tests of flow control valves.

Acceptance test records should be retained for the life of the system or its special components. Subsequent test records

should be retained for a period of 1 year after the next test. The comparison determines deterioration of system performance or condition and the need for further testing or maintenance.

**Monthly:**

- .1 Inspection of gauges (water supply and system pressure) to ensure good condition and normal water supply pressure.
- .2 Control valve shall be externally inspected. The valve inspection shall verify the following:
  - .a The gauges indicate that normal supply water pressure is being maintained.
  - .b The valve is free of physical damage.
  - .c All valves are in the appropriate open or closed position.
  - .d There is no leakage from the alarm drains.

**Quarterly:**

- .1 Alarm Device (pressure or flow switch). (**Testing by opening the inspector's test connection**).
- .2 Full flow trip test: to determine if change in water supply or control valve position.

**Test procedure:**

- .1 Record the pressure indicated by the supply water gauge.
- .2 Close the alarm control valve.
- .3 Fully open the flow test valve.
- .4 Record residual pressure.
- .5 Close the flow test valve slowly.
- .6 Record the time taken for supply water pressure to return to the original pressure.
- .7 Open the alarm control valve
- .8 Low air pressure alarm switch

**Semi-Annually:**

- .1 Valve supervisory switch shall be tested to verify the operation of the switch upon movement of the hand wheel.

**Annually:**

- .1 Manual Pull station test
- .2 Full trip test.
- .3 Deluge system shall also be tested for flow pattern.
- .4 Record indicating the date of the last trip, tripping time and name of organization conducting the test shall be maintain at a location available for review by the Authority having Jurisdiction.

**Every 5 years:**

- .1 Test on gauge (gauge precision required: less than 3% of the full scale)
- .2 Test on control valves operation.
- .3 Main drain test.

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