TOTALPAC2 Integrated Fire Protection System

Fail-Safe Preaction Systems

General

1. Applicable Standards

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

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

Before the installation, the contractor installing the unit shall also 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*** Surefire™ Unit has also been tested and approved by recognized laboratories and is patented under U.S. Patent No. 7,055,612. Here is the list of Listings & Approvals it meets:

- Underwriters Laboratories Inc. (UL): Preaction ***TOTALPAC2*** Surefire™ systems are UL Listed under "Special System Water Control Valves - Assembled Units, category # VKYL.EX4641" and "Assembled Units Certified for Canada, Category # VKYL7.EX4641 (C-UL)".
- Factory Mutual Research <FM>: Preaction ***TOTALPAC2*** Surefire™ systems are FM Approved under the heading: "Automatic Water Control Valves" when installed with specific components.
- NYC-MEA: Preaction ***TOTALPAC2*** Surefire™ systems are MEA Approved under New-York City's Fire Dept. Information Bulletin # 1-92 under section MEA 89-92-E, Vol. XXVI.

Note: Although most ***TOTALPAC2*** units are Listed and Approved, custom built units are sometimes supplied on request. Components in these special units maintain their individual Listings/Approvals but the cabinets 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 Surefire™ 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 as well as the condition of the air supply to the system. 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

There are two types of Surefire™ preaction systems, and both of them use closed automatic sprinklers in the sprinkler piping. A detection network is used in parallel with the automatic sprinkler system and is designed to operate before a sprinkler head fuses. This network is electric and may be actuated by manual, fixed temperature, rate-of-rise temperature, smoke or other means. Detection system operates before the sprinkler fuses and gives an alarm.

This ***TOTALPAC2*** Surefire™ integrated fire protection system by *FireFlex Systems Inc*. consists of a fail-safe preaction system trim totally pre-assembled, pre-wired and factory tested. All electrical and mechanical components of the system are contained in one single cabinet.

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 automatic sprinklers. Water is the extinguishing agent.

Fail-safe preaction systems are fully supervised. The ***TOTALPAC2*** Surefire™ system is completely supervised in order to monitor its integrity. The sprinkler piping is supervised by compressed air pressure or nitrogen. If there is a leak on the system or if a sprinkler head is accidentally broken, only an audible signal will sound.

In single and double interlocked preaction systems, no water will enter the sprinkler system because the detection system has not operated. The electrical detectors and associated wiring are also supervised.

The most common applications are very large dry systems which exceed the capacity normally permitted on a dry valve and in a system application where it is important to control accidental water discharge due to damaged sprinkler piping.

Note: Every ***TOTALPAC2*** Surefire™ Unit is identified with its unique Serial Number. This number is located on an adhesive label 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 TOT2####).

5. Features

Your ***TOTALPAC2*** Surefire™ unit is superior than many other products available on the market now and has been manufactured by the company that has introduced and

TOTALPAC2 Integrated Fire Protection System

Fail-Safe Preaction Systems

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 Deluge Valve
- Available only with an 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, C-UL Listed and FM Approved components
- Designed in accordance with NFPA Standards
- Trim is fully assembled and tested at the factory
- All trims are galvanized steel, Listed and Approved for 250 psi (1724 kPa) service maximum.
- Quick connections to water supply and drain on both sides, and sprinkler riser on top of cabinet, all available with grooved end or flanged fittings
- No open drain cup inside cabinet
- Sturdy 14 Gauge steel cabinet 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
- Separate unlocked access hatch to emergency manual release
- Key-alike locks on all cabinet doors
- Manufactured under ISO-9001 quality control procedures.

Configurations Description

TOTALPAC2 Surefire™ Preaction systems are built around the Viking EZ-Trim™ using Deluge Valves Model E-3 for 1½" (40 mm) diameter (Model E-4 is the Halar® Coated version for use in corrosive environments) and Model E-1 for 2" (50 mm) diameter and up (Model E-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) max. and are available in the following diameters:

☐ 1½" (40 mm) ☐ 2" (50 mm)

☐ 3" (80 mm) ☐ 4" (100 mm)

☐ 6" (150 mm)

TOTALPAC2 Surefire™ Preaction systems are supplied with a flange–groove Deluge Valve. Units with flange–flange Deluge Valve are also available on request.

Surefire™ Preaction systems operate in several ways and perform a variety of functions. A summary of the most common types of systems follows:

☐ **Single Interlocked.**

This preaction system requires the operation of the detection system to trip the Viking Deluge Valve and fill the system with water. Water will then be discharged on the fire when the sprinklers fuse. If the sprinkler piping or sprinkler is broken, the valve will not open. If the detection system operates due to fire, damage or malfunction, the valve will open but the water will be contained in the sprinkler piping.

If the detection system does not operate, the deluge valve will not open. Supervision is generally used since control of accidental discharge is usually desired.

The single interlocked Surefire™ preaction system is commonly used where it is desirable to have water available at the sprinkler when the sprinkler fuses and where the sprinkler piping and detectors are subject to damage. The most common applications are very large dry systems which exceeds the capacity normally permitted on a dry valve and in a system application where it is important to control accidental water discharge due to damaged sprinkler piping.

☐ **Double Interlocked.**

This preaction system utilizes a detector system and pressurized air or gas in the sprinkler piping. This system utilizes the Viking Deluge Valve and is so arranged that the valve will open only when both pressure is reduced in the sprinkler piping AND the detection system operates. If the detection system operates due to fire, damage or malfunction, the valve will not open. If the sprinkler piping is damaged or a sprinkler is broken or fused, the valve will not open.

The operation of both a sprinkler and a detector is required before the valve will open, allowing water to enter the system piping.

Since pressurized air or nitrogen gas is available in the output piping, the system is usually supervised. The double interlocked system is commonly used in freezers where flooding of the pipe can have serious consequences and in system applications where it is important to control accidental discharge of the system.

Care should be taken because Double Interlocked Preaction Systems may not produce flow from opened sprinklers as quickly as Single Interlocked Preaction Systems. Activation of a sprinkler alone will sound an alarm but will NOT cause the system to fill with water.

Surefire™ Release System

Note: Numbers indicated between brackets refer to items on the TRIM and AIR SUPPLY SCHEMATICS.

The Viking Surefire™ preaction system, available for Single and Double Interlocked, electric releases only, utilizes a Viking Model E Deluge valve *(A1),* with a PAR-3 Model B-2 Control Panel together with additional valves, devices and trim to form a unique operating system.

The system piping is pneumatically pressurized to monitor the integrity of the piping, fittings and sprinklers and act as a fail-safe emergency backup to the electrical detection system. The system piping is normally dry and may be

installed in locations subject to freezing. Built in with special features to minimize accidental water damage, unlike other systems, it can be installed where the detector and/or sprinklers are easily damaged or broken accidentally. In addition to special features that offer perfect fail-safe modes, the Viking Surefire™ Preaction Systems also provide excellent fire protection environment with or without electrical power.

Equipped with batteries that provide up to ninety (90) hours of emergency power. If the AC power fails and the battery backup power expires while the system is operating, the preaction system will "fail-safe", and continue flowing until AC power is restored or the system is manually shut-off. Refer to OPERATION SECTION for additional details.

INSTALLATION

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

1. Install the ***TOTALPAC2*** Surefire™ cabinet 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 automatic sprinkler 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.

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. Air supply must be CLOSED (see AIR SUPPLY SECTION). 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. Using the built-in contractor's hydrostatic test ports (see TRIM SCHEMATIC and AIR SUPPLY for location) fill sprinkler system with water and maintain pressure as per NFPA-13 requirements.

CAUTION ! Do not subject the air pressure gauges to hydrostatic pressures above 250 psi. Close gauge valves before proceeding with hydrostatic test.

3. Correct leaks if any before completing test. OPEN main drain valve *(D3)* completely. Completely drain the sprinklers piping.

Note: After pressure testing the system with water, make sure the air pressure gauge of the Pneumatic Actuator *(F4)* reads the same value as the air supply pressure gauge *(E3)*. If value differs, the float check valve *(E9)* may be sticking. Gently press on the plunger of the float check valve *(E9)* to un-stick. Pressure should then equilibrate. Perform same when pressurizing system with air.

4. Connect all detection and alarm audible devices according to electrical schematics (see TBA field wiring diagram in PROGRAMMING SECTION).
5. Connect the AC power for the control panel (L1) and for the optional air compressor (L2) on two separate breakers in the electric distribution panel (see TBB field wiring diagram in PROGRAMMING SECTION and CONTROLS SECTION, paragraph 6.10).

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.

Placing the system in service:

(Refer to MECHANICAL TRIM DESCRIPTION and TRIM SCHEMATIC)

1. Verify that the system has been properly drained. System Main Drain Valve *(D3)* is OPEN. Verify that the Emergency Release Valve *(B10)* is CLOSED.
2. CLOSE System Main Drain Valve *(D3).*
3. Restore supervisory pressure to sprinkler piping.
   a. On systems provided with an Air Maintenance Device (Air Option Style "B"), verify that the ½" valve *(E8)* in the Air Pressure Maintenance Device by-pass trim is CLOSED and that both ¼" valves *(E6 & E7)* are OPEN.
4. Verify that all releasing devices are set and that any Inspector's test Valve and/or auxiliary drain valves are CLOSED. OPEN Priming Valve *(B1)*.
5. Reset the Control Panel. Solenoid valve *(F1)* should close. Flow from solenoid valve to drain should stop.
6. OPEN Flow Test Valve *(B6)*.
7. PARTIALLY OPEN Main Water Supply Control Valve *(D1)*.
8. When full flow develops from the Flow Test Valve *(B6)*, CLOSE the Flow Test Valve.
   a. Verify that there is no flow from the Drip Check when the plunger is pushed.
9. FULLY OPEN the Main Water Supply Control Valve *(D1)*.

   After the Deluge 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 the release system described above. For specific trim arrangement, refer to the MECHANICAL TRIM DESCRIPTION.

10. 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).
11. Depress the plunger of the Drip Check Valve *(B7)*. No water should flow from the Drip Check when the plunger is pushed.
12. Check and repair all leaks.
13. 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 Valve. Water will flow into the sprinkler piping. Take necessary precautions to prevent damage.

14. 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.

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

IMPORTANT SETTINGS:

☐ Single Interlocked preaction systems with Surefire Release (refer to Table 1 below):

1. Factory set supervisory pressure in the closed sprinkler piping is as per Table 1 below.
2. Air Supervisory Switch *(E4)* is factory wired to activate an alarm to signal "low air" pressure condition.

Table 1: Settings for Air Supervisory Switch *(E4)*.

Water Supply PSI	System Air Normal PSI	Detection Cct Two (2) PSI	Detection Cct Four (4) PSI
0 - 100	30	15 +	25
100 - 200	40	25 +	35
200 - 250	50	35 +	45

Activation of an alarm to signal a high pressure condition may also be required. Refer to applicable installation standards and the Authority Having Jurisdiction. If such is the case, contractor must provide and install a pressure switch on the system riser, outside of the ***TOTALPAC2*** cabinet.

Alarm Pressure Switch *(C1)* should activate when pressurized to 4 to 8 psi (27 to 55 kPa) on pressure rise. Alarm Pressure Switch *(C1)* is factory wired to activate the water flow alarm.

☐ Double Interlocked preaction systems with Surefire Release (refer to Table 2 below):

1. Factory set supervisory pressure in the closed sprinkler piping is as per Table 2 below.
2. Air Supervisory Switch (E4) is factory wired to activate an alarm to signal "low air" pressure condition.

Table 2: Settings for Air Supervisory Switches

Water Supply PSI	System Air Normal PSI	Detection Cct Two (2) PSI *(E4)*	Detection Cct Four (4) PSI *(E4)*	Detection Cct Five (5) PSI *(E5)*
0 - 100	30	15 +	25	20
100 - 200	40	25 +	35	30
200 - 250	50	35 +	45	40

Note: In the Double Interlocked configuration, the Air Supervisory Switch *(E4)* is equipped with two sets of independently adjustable contacts. The second set of adjustable pressure contacts is factory set at 14 PSI (97 kPa) and is factory wired to a second zone configured for "crossed-zoned" operation.

Installation standards may allow supervisory pressures lower than those mentioned above. When using supervisory pressures lower than the recommended settings noted above, verify that air regulation equipment and air supervisory switches used are compatible with the supervisory pressures used.

3. Alarm pressure switch *(C1)* should activate when pressurized to 4 to 8 PSI (27 to 55 kPa) on pressure rise and is factory wired to activate water flow alarm.

Mechanical Trim Section

1. System Operation

In the SET condition:

System water supply pressure enters the priming chamber of the Deluge Valve *(A1)* through the priming line which includes a normally open priming valve *(B1)*, strainer *(B2)*, restricted orifice *(B3)* and spring loaded check valve *(B4)*.

Water supply pressure is trapped in the priming chamber by spring loaded check valve *(B4),* normally closed Emergency Release *(B11)*, Pneumatic Actuator *(F3)* and normally closed Solenoid Valve *(F1)*.

Water supply pressure in the priming chamber holds the clapper of the Deluge Valve *(A1)* on the seat due to the differential design of the valve pressure.

In a fire condition:

☐ Single Interlocked Preaction Systems: When the detection condition is satisfied, the PAR-3 Control Panel activates a piezo sounder and energizes normally closed Solenoid valve *(F1)* open.

Pressure is released from the priming chamber of the Deluge Valve *(A1)* to the open drain manifold faster than

it is supplied through the restricted orifice *(B3)*. Pressure is released from the priming chamber faster than it is supplied through the restricted orifice *(B3).* The Deluge 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. Water entering the system piping increases pressure on the PSOV *(B9)* which shut-off the water supply to the priming chamber, preventing the Deluge Valve *(A1)* from resetting. When a sprinkler head opens, water will flow from the system.

The Deluge Valve can only be reset after the system is taken out of service, and the outlet chamber of the deluge valve and associated trim piping is depressurized and drained.

☐ Double Interlocked Preaction Systems: When the detection condition is satisfied, the PAR-3 Control Panel activates a piezo sounder and initiates the appropriate detection alarms. No water enters the piping at this time.

When sprinkler operates, as caused by heat or fire, system supervisory air is lost, and the Low Air Pressure Switches *(E4 & E5)* are activated. Only after both indicating circuits have operated, the PAR-3 control panel energizes normally closed Solenoid valve *(F1)* open and normally open Solenoid valve *(F2)* closed. Pressure is released from the priming chamber faster than it is supplied through the restricted orifice *(B3).* The Deluge 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. Water entering the system piping increases pressure on the PSOV *(B9)* which shut-off the water supply to the priming chamber, preventing the Deluge Valve *(A1)* from resetting. When a sprinkler head opens, water will flow from the system.

Trouble conditions:

☐ Single Interlocked Preaction Systems: If the system piping and/or the sprinklers are damaged and either the AC Power and/or Standby Battery power is available, the low air supervisory switch *(E4)* will activate a trouble alarm at the PAR-3 Panel, and the normally open Release Solenoid valve *(F2)* closed to prevent water flow through any opened sprinkler(s). In the event of fire that cause any detector to operate, the normally closed solenoid valve *(F1)* will open and water will flow through any open sprinkler(s).

☐ Double Interlocked Preaction Systems: If the system piping and/or the sprinklers are damaged and either the AC Power and/or Standby Battery power is available, the low air supervisory switch *(E4)* detection circuit four (4) will activate a trouble at the PAR-3 panel, when supervisory air drops to a point just above the operation of the pneumatic actuator *(F3)*. The second pole of supervisory switch *(E4)* activates the normally open solenoid valve *(F2)* closed to prevent water flow through any opened sprinkler(s). In the event of a fire that causes the detectors to operate when air pressure drops just below the trouble air setting, the air supervisory switch *(E5)* linked to the normally closed solenoid valve *(F1)* will activate the normally closed solenoid valve *(F1).*

If the detection system is damaged or malfunctions, the PAR-3 panel will go into alarm. In the event of fire, the deluge valve *(A1)* will NOT open and the emergency release *(B11)* must be pulled in order to provide water flow through any opened sprinkler(s).

Loss of power prior to operation: If the AC power fails, the Surefire™ preaction system continues to operate on the standby batteries. Should the AC power and the standby batteries drop power to a point less than required to operate solenoid valve *(F1)*, both solenoid circuits of panel drop out, allowing normally open solenoid *(F2)* to open. Prior to the operation of the system, all alarms will be lost. As long as air pressure remains in the system piping, the Pneumatic Actuator *(F3)* will keep the Deluge valve from opening. If the system air pressure is lost, the Deluge valve *(A1)* will open, allowing water to flow into the system piping and be discharged from any open sprinkler(s).

Loss of power during operation: If the AC power fails while the system is flowing water, the normally open solenoid valve *(F2)* will open and the normally closed solenoid valve *(E1)* will close. The PSOV *(B9)* is already pressurized closed to prevent pressure in the priming chamber from building up. Water from main supply control valve *(D1)* will continue entering the system, and flow through any open sprinkler(s).

Manual operation:

Anytime the handle of the Emergency Release Valve *(B10)* is pulled, pressure is released from the priming chamber; Deluge Valve will open. Water will flow into the system piping, and alarm devices *(C1 & C2)* will operate. If a sprinkler head opens, water will flow from the system.

2. Emergency Instructions (refer to TRIM SCHEMATIC)

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 when panel is provided with this unit).

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 Deluge or Flow Control Valve is reset or taken out of service.

.3 Shut-off the air supply (refer to AIR SUPPLY SECTION).

.4 Open Flow Test Valve *(B6)*.

.5 Close Priming Valve *(B1)* (optional).

Sprinkler systems that have been subjected to a fire must be returned to service as soon as possible. The entire system must be inspected for damage, and repaired or replaced as necessary.

.6 Replace any detectors that have been damaged.

.7 Replace any sprinklers that have opened, been damaged, or have been exposed to fire conditions.

.8 Perform all maintenance procedures recommended in MAINTENANCE, describing individual components of the system that has operated.

.9 Return the system to service as soon as possible.

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

.1 Verify that the system has been properly drained. System Main Drain Valve *(D3)* is OPEN. Verify that the Emergency Release Valve *(B10)* is CLOSED.

.2 CLOSE System Main Drain Valve *(D3).*

.3 Restore supervisory pressure to sprinkler piping.
a. On systems provided with an Air Maintenance Device (Air Option Style "B"), verify that the ½" valve *(E8)* in the Air Pressure Maintenance Device by-pass trim is CLOSED and that both ¼" valves *(E6 & E7)* are OPEN.

.4 Verify that all releasing devices are set and that any Inspector's test Valve and/or auxiliary drain valves are CLOSED. OPEN Priming Valve *(B1)*.

.5 Reset the Control Panel. Solenoid valve *(F1)* should close. Flow from solenoid valve to drain should stop.

.6 OPEN Flow Test Valve *(B6)*.

.7 PARTIALLY OPEN Main Water Supply Control Valve *(D1)*.

.8 When full flow develops from the Flow Test Valve *(B6)*, CLOSE the Flow Test Valve.
a. Verify that there is no flow from the Drip Check when the plunger is pushed.

.9 FULLY OPEN the Main Water Supply Control Valve *(D1)*.

.10 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).

.11 Depress the plunger of the Drip Check Valve *(B7)*. No water should flow from the Drip Check when the plunger is pushed.

.12 Check and repair all leaks.

.13 On 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 Valve. Water will flow into the sprinkler piping. Take necessary precautions to prevent damage.

.14 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.

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

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 Preaction 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.

Low Air Pressure Alarm Test:

Quarterly testing of low air alarms is recommended.

To test Sprinkler System "Low Supervisory Air" Alarm:

.1 To prevent operation of the Deluge Valve and filling the system with water during the test, DO NOT operate the electric detection system during this test. Consider closing the Main Supply Control Valve *(D1)*.

Note: When testing a single interlocked preaction system, Main Supply Control Valve *(D1)* should be CLOSED. If the Main Water Supply Control Valve was NOT closed in Step 1, proceed directly with steps 7 & 8 below.

.2 Fully open the sprinkler system Inspectors Test Valve to simulate operation of a sprinkler.

.3 Verify that low air alarms operate within an acceptable time period and continue without interruption.

.4 Close the Inspectors Test Valve.

.5 Establish recommended pneumatic supervisory pressure to be maintained. Refer to paragraph 2, INSTALLATION.

.6 Reset System Control Panel. Alarms should stop.

When testing is complete, return the system to service following steps 1 through 8 below.

CAUTION ! This procedure applies only when done in conjunction with "Low Air" Alarm testing described above.

.7 Verify that the pressure indicated on Priming Pressure Water Gauge *(B11)* indicates that the priming chamber is pressurized with System Water Supply Pressure *(B12)*.

.8 Depress the plunger of Drip Check *(B7)*. No water should flow from the Drip Check when the plunger is pushed.

.9 Open Flow Test Valve *(B6)*.

.10 Partially open Main Water Supply Control Valve *(D1)*.

.11 When full flow develops from Flow Test Valve *(B6)*, close the Flow Test Valve.

.12 Fully open and secure the Main Water Supply Control Valve *(D1)*.

.13 Verify that the Alarm Test Valve *(B5)* and all other valves are in their NORMAL operating position.

.14 Depress the plunger of the Drip Check *(B7)*. No water should flow from the Drip Check when the plunger is pushed.

Full Flow Trip test:

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

CAUTION ! Performance of this test will cause the Deluge / Flow Control Valve to open and the sprinkler system to fill with water unless the Optional Shut-Off Valve is installed and closed prior to the test.

To Trip Test the Preaction System:

.1 Notify the Authority Having Jurisdiction and those in the area affected by the test.

.2 Close the optional Shut-Off Valve *(D5)* if installed. Trip the Deluge valve by performing option "a" or "b" below.

.a Operate a detector according to the manufacturers instructions.

.b Open the sprinkler system Inspectors Test Valve.

.c Open the door of Emergency Release Valve *(B10)* and pull the handle.

.3 The Deluge or Flow Control Valve should open, filling the sprinkler system with water and Water Flow Alarms should operate.

.3 Open the sprinkler system Inspectors Test Valve to

When trip testing is complete:

.1 Perform steps 1 through 10 of Paragraph 2 EMERGENCY INSTRUCTIONS to take the system out of service.

.2 Perform steps 1 through 11 of paragraph 3 PLACING THE SYSTEM BACK IN SERVICE to return the system to service.

.3 Notify the Authority Having Jurisdiction and those in the affected area that testing is complete.

Drain Test: All sprinkler systems 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.

Also refer to appropriate NFPA Standard for further details on drain tests.

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 dry pipe, deluge, and preaction 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 Main Drain Test (Riser Flow 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 main drain valve.

.4 Record residual pressure.

.5 Close the main drain 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:

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: Isolation valve perfect for special site condition such as freezing condition .

.3 Record indicating the date of the last trip, tripping time and name of the organization conducting the test shall be maintained 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 Interior of valves, strainers, filters and orifices.

.4 Main drain test.