DESCRIPTION

This TotalPac®3 integrated fire protection system by FireFlex Systems Inc. consists of a SUREFIRE® system trim totally pre-assembled, pre-wired and factory tested. All electrical and mechanical components of the system are contained in one single unit.

TotalPac®3 preaction systems are built around the Viking trim using deluge valves model F-1.

SUREFIRE® double interlock preaction systems use pneumatic supervision of the automatic sprinkler system, and an electric detection system. The deluge valve release trim uses a normally closed electric solenoid valve controlled by an approved system releasing control panel (supplied by others) with two initiating circuits configured for “cross-zoned” operation. One initiating circuit is connected to the electric detection system, the other to a “Low-air” alarm switch. Both the electric detection system AND “Low-air” alarm switch shall be actuated before the system releasing control panel energizes the solenoid valve open, causing the deluge valve to open. Water will flow from any open sprinklers and any other opening in the sprinkler system piping. Activation of a releasing device alone or operation of a sprinkler alone will sound an alarm but will NOT cause the system to fill with water.

A special features offer perfect fail-safe modes, SUREFIRE® preaction systems provide protection with or without electrical power. If a condition occurs that removes both the primary and secondary power supplies, the pneumatic actuator becomes the release mechanism and the system will operate as a dry pipe system.

The SUREFIRE® preaction system requires a VIKING VFR-400 releasing control panel.

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)
- 8” (200 mm)

Standard features

- cULus Listed & FM Approved as an assembled unit
- Factory assembled and tested under ISO-9001 standards
- Prewired to a terminal block
- Easy and compact installation
- Viking conventional trim rated at 250 psi (1724 kPa)
- Galvanized trim piping
- Serial number for easy reference
- Corrosion resistant cabinet with flush type handle and lock
- No open drain cup inside the unit
- Numerous modular options to meet the most demanding jobsite requirements
- Three styles of modular air supply options
- Inlet & outlet hydrostatic test ports
- User-friendly standardized operation & installation manual
- Free interactive simulator
Cabinet

The **TotalPac®3** cabinets are made of sturdy 14 gauge steel, they are available in four (4) sizes;
23” x 25” x 77” (58.4 x 63.5 x 195.6 cm) for 1½”, and 2” systems,
36” x 25” x 77” (91.4 x 63.5 x 195.6 cm) for 3” and 4” system,
46” x 25” x 77” (116.8 x 63.5 x 195.6 cm) for 6” system
54” x 31” x 81” (137.2 x 78.7 x 205.7 cm) for 8” system

All surfaces are rust proof coated, inside and outside, with fire red, oven baked polyester powder on phosphate base. Cabinet is provided with one or two doors, all provided with a neoprene gasket to absorb vibrations.

A field wiring electrical junction boxes is integrated with the cabinet for connection of all electrical components in the trim. Pressure switches, supervisory switches, etc. are all factory wired to a terminal strip (TBA) for contractor's field wiring.

Gauges to indicate air, water supply pressure and priming water pressure are all visible through clear Lexan windows.

**IMPORTANT:** **TotalPac®3** units are NOT designed to be installed where they will be subjected to outdoors and/or freezing conditions. Refer to environmental data for additional details. Subjecting the unit to conditions outside these limitations might tamper the normal operation of the system.

Cabinet doors are provided with hinges that can easily be disassembled on site to remove the door assemblies for servicing. The cabinet assembly is pre-assembled, pre-wired, and factory tested under ISO-9001 conditions.

Multiple unit installations are easily achieved by manifolding units together at their water inlets but drains shall remain separate and open.

**Sequence of operation (see trim diagram)**

In a fire condition, operation of the detection system activates the first initiating circuit in the system releasing control panel (supplied by others), causing an alarm to activate. When a sprinkler operates, air pressure escapes from the sprinkler piping. The low air alarm switch activates the second initiating circuit in system releasing control panel. When BOTH initiating circuits have been activated, system releasing control panel energizes 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). The deluge valve clapper opens to allow water to flow into the system piping and alarm devices, causing the alarm pressure switch (C1) and optional water motor alarm (C2) to activate. Water will flow from any open sprinklers and/or other opening in the sprinkler piping.

When the deluge valve operates, the sensing end of the PORV (B9) is pressurized, causing the PORV to open. When the PORV opens, it drains the priming water pressure to the priming chamber, preventing the deluge valve (A1) from resetting, even if the open releasing devices close. The deluge valve can only be reset after the system is taken out of service, and the outlet

**Systems hydraulic limitations**

**WARNING** The information contained herewith is for estimation and evaluation purposes only. Its use remains the responsibility of the designer. Designers should refer to the appropriate NFPA Standards and any other applicable codes for their final design. Also refer to FireFlex Systems Inc. appropriate user manuals and to manufacturer's data sheets for additional details. Systems limitations indicated below are nominal flow limitations.

<table>
<thead>
<tr>
<th>System size (in.)</th>
<th>Usage Range (gpm)</th>
<th>Piping Equivalent Lengths w/o shut off valve</th>
<th>Piping Equivalent Lengths c/w shut off valve</th>
<th>Drain flow @ 250 PSIG w.p.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(m.)</td>
<td>(ft.)</td>
<td>(m.)</td>
</tr>
<tr>
<td>1½</td>
<td>0 – 210</td>
<td>8.3</td>
<td>27.2</td>
<td>8.5</td>
</tr>
<tr>
<td>2</td>
<td>0 – 360</td>
<td>11.65</td>
<td>38.2</td>
<td>11.85</td>
</tr>
<tr>
<td>3</td>
<td>100 – 700</td>
<td>16.8</td>
<td>55.1</td>
<td>20.33</td>
</tr>
<tr>
<td>4</td>
<td>200 – 1400</td>
<td>21.89</td>
<td>71.8</td>
<td>25.33</td>
</tr>
<tr>
<td>6</td>
<td>400 – 3500</td>
<td>33.28</td>
<td>108.15</td>
<td>37.28</td>
</tr>
<tr>
<td>8</td>
<td>750 – 5250</td>
<td>41.15</td>
<td>135</td>
<td>44.71</td>
</tr>
</tbody>
</table>
Standard equipment

Deluge valve
The Viking Model deluge valve is a quick-opening, differential diaphragm, flood valve with one moving mechanism. The deluge valve is used to control water flow in deluge and preaction sprinkler systems. The valve is held closed by system water pressure trapped in the priming chamber, keeping the outlet chamber and system piping dry. In fire conditions, when the releasing system operates, pressure is released from the priming chamber. The deluge valve clapper opens to allow water to flow into the system piping.

Water supply control valve
The water inlet control valve is a supervised, indicating butterfly valve. Purpose of this valve is to manually shutoff the preaction system.

Preaction riser check valve
The Viking spring loaded In-Line check valve is a general purpose rubber-faced check valve approved for use in fire-service systems. The Spring Loaded In-Line check valve is manufactured with a brass body, brass seat, and a rubber-faced clapper assembly.

The Viking Easy Riser® Swing check valve is a general purpose rubber-faced check valve approved for use in fire service systems. The valve is for use in preaction system risers.

Solenoid valve
The high pressure solenoid valve is a two-way type with one inlet and one outlet. It is a packless, internal pilot operated valve, suitable for use in releasing water pressure from the priming chamber of Viking deluge valves. The solenoid valve has floating diaphragm construction, which requires a minimum pressure drop across the valve to operate properly.
Standard equipment (continued)

Releasing circuit disable switch
The releasing circuit disable switch is used to disable the releasing solenoid. When the key is set to “Disable”, the releasing solenoid will be disconnected from the control panel’s releasing circuit, causing a trouble signal and preventing accidental discharge during maintenance or inspection.

Alarm pressure switch
The alarm pressure switch monitors the water flow within the sprinkler piping. Should the Deluge Valve clapper opens to allow water to flow into the sprinkler piping. The alarm pressure switch will activate, indicating a water flow signal.

Pneumatic actuator
Used in conjunction with the solenoid valve, the Viking Pneumatic Actuator is a spring loaded, rolling diaphragm and piston operated valve. It is used wherever a combination is required between the detection and system’s loss of air.

Low air supervisory switch
The low pressure switches monitors the pressure within the sprinkler piping should a loss pressure of the air below 25PSI occurs, the pressure switch contacts transfer indicating low air supervisory signal. Should a loss pressure of the air below 23PSI occurs, the pressure switch contacts transfer indicating low air alarm signal.
Optional mechanical equipment

- **Shut-off valve & sight glass option**
  The Shut-off valve & sight glass option is intended to be used for applications where testing of the system operation without filling the sprinkler piping network is desirable and where it is critical that all functions of the preaction system be tested under actual discharge conditions. Examples of such applications are freezers, ovens, museums, data processing and other hazards where the possibility of water leaking from the piping system is to be avoided at all costs.

  **Warning:** Shut-off valve & sight glass option is **not available** on 8" systems.

- **Fire department connection**
  The fire department connection option consists of a grooved tee fitting installed at the outlet of the deluge valve (A1). An access hole of the proper diameter is factory pre-drilled on the side of the **TOTALPac®3** enclosures for connection of the piping going to the fire department connection.

  **Note:** The fire department connection hardware itself (drain, Siamese, etc.) is NOT provided with this option and shall be provided by the installing contractor. Refer to NFPA-13 Standard for additional information about the equipment layout and installation.

  **Warning:** Fire department connection is **not available** on 8" systems.

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**Diagram:**

- Main Drain Valve (D3)
- Supervised Shut-off Valve (D4)
- Sight Glass Assembly (D5)
- Supervised Water Supply Control Valve (D1)
- Grooved Tee Fitting with Coupling & Cap
- To Fire Dept Connection (hardware by Contractor)
Optional mechanical equipment (continued)

- **Semi and full flanged option**
  When required by the user, TOTALPAC®3 units can be provided in either a semi-flanged or full flanged configuration.
  The semi flanged option provides flanged fittings only on the water inlet pipe (side needs to be specified at the time of order) and on the system riser outlet. The drain manifold is then provided with a threaded end that also needs to have its side specified (left or right). The rest of the fittings are the same as usual with the main components being provided in the standard grooved-grooved configuration.
  The full flanged option is the same as above but goes a step further with the main components being also provided with a flanged-flanged configuration.
  When provided, the face of the flanges will always be situated 6 inches from the outside face of the mounting base or cabinet surface.

- **Anti-column device option**
  The model LD-1 anti-column device is an optional trim component designed for use with preaction sprinkler systems. The anti-column device automatically prevents an unwanted water column from establishing within the system riser. On preaction sprinkler systems the anti-column device prevents water from columning downstream of the easy riser check valve.

- **OSHPD option**
  Pre-approved construction, under OSP-0341-10, using specific components.
Direct air compressor (Style “A”)

Used only for the sprinkler piping network of the preaction system. Air supply style “A” includes the air compressor mounted inside the TotalPac®3 cabinets with its supervisory trim and options. Compressors are of the tankless, oilless piston type and are factory piped to the sprinkler system riser, all within the TotalPac®3 cabinets.

Compressors are available in six (6) sizes:
- 1/6HP
- 1/3HP
- 1/2HP
- 1HP
- 1-1/2HP
- 2HP

WARNING 1-1/2HP and 2HP air compressors are only available for 8" system.

Compressor Service Factor Amp (S.F.A) rating

<table>
<thead>
<tr>
<th>Compressor Size (HP)</th>
<th>115Vac / 60Hz</th>
<th>230Vac / 60Hz</th>
<th>220Vac / 50Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/6</td>
<td>5.0 Amp.</td>
<td>2.5 Amp.</td>
<td>1.3 Amp.</td>
</tr>
<tr>
<td>1/3</td>
<td>7.4 Amp.</td>
<td>3.7 Amp.</td>
<td>2.5 Amp.</td>
</tr>
<tr>
<td>1/2</td>
<td>10.0 Amp.</td>
<td>5.0 Amp.</td>
<td>4.0 Amp.</td>
</tr>
<tr>
<td>1</td>
<td>18.0 Amp.</td>
<td>9.0 Amp.</td>
<td>6.0 Amp.</td>
</tr>
<tr>
<td>1-1/2</td>
<td>16.6 Amp.</td>
<td>8.3 Amp.</td>
<td>6.3 Amp.</td>
</tr>
<tr>
<td>2</td>
<td>N/A</td>
<td>11.0 Amp.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

115 / 230 Vac – 60Hz air compressor selection Table:

<table>
<thead>
<tr>
<th>H.P</th>
<th>CMF @ 40 PSI</th>
<th>System capacity to fill system to 35 PSI in 30 minutes *</th>
<th>System capacity to fill system to 55 PSI in 30 minutes **</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/6</td>
<td>1.33</td>
<td>142 gal.</td>
<td>90 gal.</td>
</tr>
<tr>
<td>1/3</td>
<td>2.61</td>
<td>285 gal.</td>
<td>181 gal.</td>
</tr>
<tr>
<td>1/2</td>
<td>4.06</td>
<td>417 gal.</td>
<td>265 gal.</td>
</tr>
<tr>
<td>1</td>
<td>7.40</td>
<td>702 gal.</td>
<td>447 gal.</td>
</tr>
<tr>
<td>1-1/2</td>
<td>7.40</td>
<td>1045 gal.</td>
<td>665 gal.</td>
</tr>
<tr>
<td>2</td>
<td>7.40</td>
<td>1400 gal.</td>
<td>890 gal.</td>
</tr>
</tbody>
</table>

220 / 240 Vac – 50Hz air compressor selection Table:

<table>
<thead>
<tr>
<th>H.P</th>
<th>LPM @ 40 PSI</th>
<th>System capacity to fill system to 35 PSI in 30 minutes *</th>
<th>System capacity to fill system to 55 PSI in 30 minutes **</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/6</td>
<td>35.4</td>
<td>442 L</td>
<td>268 L</td>
</tr>
<tr>
<td>1/3</td>
<td>68</td>
<td>855 L</td>
<td>545 L</td>
</tr>
<tr>
<td>1/2</td>
<td>4.06</td>
<td>1302 L</td>
<td>825 L</td>
</tr>
<tr>
<td>1</td>
<td>7.40</td>
<td>2244 L</td>
<td>1427 L</td>
</tr>
<tr>
<td>1-1/2</td>
<td>7.40</td>
<td>3278 L</td>
<td>2085 L</td>
</tr>
</tbody>
</table>

* For systems with maximum water supply pressure of 175 PSI (1206 kPa)

** For systems with water supply pressure between 175 PSI (1207 kPa) and 250 PSI (1724 kPa)

WARNING The information contained herewith is for estimation and evaluation purposes only. Its use remains the responsibility of the designer.
Air supply (continued)

- **Air Pressure Maintenance Device (Style “B”)**
  Used only for the sprinkler piping network of the preaction system, when an external air supply is provided by others (tank mounted compressor, plant air or dry nitrogen cylinders) and piped to the air inlet port of the unit. Air supply style "B" provides an Air Pressure Maintenance Device (APMD) trim, factory mounted in the TOTALPAC®3 cabinets.

- **Direct air, external compressor (Style “D”)**
  Mainly used with Preaction systems protecting refrigerated spaces and freezers, where a special dry external air supply unit is piped directly to the system riser inside the freezer itself, as shown in NFPA-13. Air supply Style "D" provides only an air supervisory and shut-off trim.

**Warning:** When air supplies style "B" or "D" is selected, the air supply should be provided and installed by the sprinkler contractor OUTSIDE of the TOTALPAC®3 cabinet. It is NOT provided with the unit.
**Optional air supply equipments**

- **Dehydrator option**
  The Viking Dehydrator is a manually regenerated desiccant-type air dryer. The desiccant acts as a moisture indicator by changing color, and is visible through the required bowl guard and transparent plastic bowl. The Dehydrator directs the incoming air down through the silica gel desiccant. The silica gel absorbs the moisture without physically changing. As the relative humidity increases, the silica gel begins to change color from dark blue to light pink, indicating the desiccant must be replaced.
Details & field wiring diagrams

Cabinet with main components - Configuration without releasing control panel, shown with air style "A"
Trim Components:

A1 Deluge valve
B1 Priming valve
B2 Strainer
B3 1/16" Restricted orifice
B4 Spring loaded check valve
B5 Alarm test valve
B6 Flow test valve
B7 Drip check valve
B8 Drain check valve
B9 Pressure operated relief valve (PORV)
B10 Emergency release valve
B11 Priming pressure water gauge & valve
B12 Water supply pressure gauge & valve
B13 Clapper check valve

C1 Alarm pressure switch
C2 Connection to water motor gong (strainer supplied by contractor)
D1 Water supply control valve
D2 Riser check valve
D3 Main drain valve
E1 Air supervisory pressure switch
E2 Float-check assembly
E3 N.C. Solenoid valve – 24Vdc
E4 N.O. Solenoid valve – 24Vdc
F1 Pneumatic actuator
F2 Pneumatic actuator pressure gauge
F3 5/64" Restricted orifice
Field wiring diagrams:

SOLENOID VALVE ELECTRICAL RATINGS

<table>
<thead>
<tr>
<th>Viking P/N</th>
<th>Description (De-energized)</th>
<th>Voltage</th>
<th>Watts</th>
<th>DC Amps</th>
<th>Pressure Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>11591</td>
<td>NC</td>
<td>24 VDC</td>
<td>10.0</td>
<td>416 mA</td>
<td>300 psi (2,068 kPa)</td>
</tr>
<tr>
<td>11595</td>
<td>NO</td>
<td>24 VDC</td>
<td>10.0</td>
<td>416 mA</td>
<td>300 psi (2,068 kPa)</td>
</tr>
</tbody>
</table>

Notes:
1. Solenoid Valve is UL Listed as Fire Protection Special System Water Control Release Service (UL 429A Product category VLTR).
2. Voltage Drop: For proper operation, make sure that voltage at the solenoid valve is at least 85% of nameplate rating.

Note: This unit has been provided without the Integrated Release Releasing control panel. Due to Listings and Approvals specific to the SUREFIRE® System, no other release releasing control panel other than the Model VFR-400 Releasing control panel can be used with this unit. Use of any other releasing control panel is not recommended and will void the unit’s Listings & Approvals and may prevent the system from operating normally.
Figure 1 – Cabinet dimensions:

Dimensions are nominal and may vary ±¼".

Dimensions V and W are with the optional Fire Department Connection

| System Size | A | B | C | D | E | F | G | H | J | K | L | M | N | P | Q | R | S | T | U | V | W |
| 1½” Preaction cabinet unit | 470 | 213 |
| 2” Preaction cabinet unit | 457 | 207 |
| 3” Preaction cabinet unit | 750 | 340 |
| 4” Preaction cabinet unit | 765 | 347 |
| 6” Preaction cabinet unit | 1045 | 474 |
| 8” Preaction cabinet unit | 1495 | 678 |
Figure 2 – Anchoring dimensions:

<table>
<thead>
<tr>
<th>System Size</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1½”</td>
<td>25”</td>
<td>15”</td>
</tr>
<tr>
<td>2”</td>
<td>25”</td>
<td>15”</td>
</tr>
<tr>
<td>3”</td>
<td>37¾”</td>
<td>15”</td>
</tr>
<tr>
<td>4”</td>
<td>37¾”</td>
<td>15”</td>
</tr>
<tr>
<td>6”</td>
<td>48”</td>
<td>15”</td>
</tr>
<tr>
<td>8”</td>
<td>56”</td>
<td>21”</td>
</tr>
</tbody>
</table>

Figure 3 – Cabinet clearance dimensions:

<table>
<thead>
<tr>
<th>System Size</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1½”</td>
<td>24”</td>
<td>12”</td>
</tr>
<tr>
<td>2”</td>
<td>24”</td>
<td>12”</td>
</tr>
<tr>
<td>3”</td>
<td>24”</td>
<td>12”</td>
</tr>
<tr>
<td>4”</td>
<td>24”</td>
<td>12”</td>
</tr>
<tr>
<td>6”</td>
<td>24”</td>
<td>12”</td>
</tr>
<tr>
<td>8”</td>
<td>32”</td>
<td>12”</td>
</tr>
</tbody>
</table>

Figure 4 – Knockouts detail:

Top of Cabinet

- High voltage
- Low voltage

8½”

3¾”

2½” Typ.
Figure 5: Open drain details for single unit:
(See dimensions in table below)

![Single Unit Detail Diagram]

Figure 6: Open drain details for multiple units:
(See dimensions in table below)

![Multiple Units Detail Diagram]

Dimension table

<table>
<thead>
<tr>
<th>Unit Size:</th>
<th>1½&quot;</th>
<th>2&quot;</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>6&quot;</th>
<th>8&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>8¾&quot;</td>
<td>8¾&quot;</td>
<td>10&quot;</td>
<td>10&quot;</td>
<td>11&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>B</td>
<td>13¾&quot;</td>
<td>13¾&quot;</td>
<td>13¾&quot;</td>
<td>13¾&quot;</td>
<td>13¾&quot;</td>
<td>17&quot;</td>
</tr>
<tr>
<td>C</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

Notes:
1. Supply and drain pipes can be connected on either sides of cabinet.
2. All pipes and fittings should meet applicable codes.
3. Actual drain collector diameter shall be determined with detailed hydraulic calculations and is the responsibility of the system designer.