This TotalPac®3 integrated fire protection system by FireFlex Systems Inc. consists of a Firecycle®III 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 Firecycle®III systems are built around the Viking trim using flow control valves model J-1.

Firecycle®III single interlock preaction system uses 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 normally closed rate compensated heat detectors, or normally open manual pull station. The detection system operates before the sprinkler fuses and gives an alarm. When the detection system operates it gives an alarm and activates the flow control valve.

In addition to automatically detecting a fire and turning the system on, 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 releasing control panel will initiate the sequence again. This unique Firecycle®III 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.

A special features offer perfect fail-safe modes. Firecycle®III 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 Firecycle®III preaction system includes 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, programmed and tested under ISO-9001 standards
- Prewired to the Viking VFR-400 releasing control panel.
- Easy and compact installation
- OSHPD certification pre-approval: OSP-0341-10
- 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
- Four 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 detection system, auxiliary contacts and signaling devices. All inputs & outputs are 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, when the detection condition is satisfied, system releasing releasing 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 (A1) 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 alarm pressure switch (C1) and optional water motor alarm (C2) to activate. When a sprinkler head opens, water will flow from the system.

When the flow control valve operates, the PORV (B9) is pressurized, causing it to latch open. Water discharges until all **Firecycle® III** detectors have reset (cooled below their set point). After all detectors have reset, the **Firecycle® III** releasing 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 releasing control panel de-energizes the normally closed solenoid valve (F2), allowing it to close (the normally open solenoid valve (F1) remains energized closed until the system is manually reset or all power (both AC and batteries) is lost). The flow control valve re-primes and closes, stopping the flow of water through the piping system. Should a **Firecycle® III** detector go into alarm, the releasing control panel reenergizes the normally closed solenoid valve (F2) open, and the entire cycle repeats.

**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</th>
<th>Piping Equivalent Lengths c/w</th>
<th>Drain flow @ 250 PSIG w.p.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>shut off valve</td>
<td>shut off valve</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(m.)</td>
<td>(m.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(ft.)</td>
<td>(ft.)</td>
<td></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>19.84</td>
<td>65.1</td>
<td>23.38</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>109.15</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

Releasing control panel

- 120 VAC / 60 Hz, 165VA.
- 220 VAC / 50 Hz, 185VA.
- 12VDC / 12Ah batteries. (factory installed)
- 12VDC / 18Ah batteries. (optional)
- Single Zone detection
  (Activated by Zone 1)

The releasing control panel integrated into the TotalPac®3 cabinet is Viking's Model VFR-400. This panel includes four Class B, programmable detection zones (optional Class A); two Class B supervisory zones and four Class B, programmable output circuits (optional Class A). It is also provided with menu driven programming, including a specific program assigned at the factory.

The panel is compatible with many types of fire alarm & supervisory devices such as linear heat detectors, spot-type heat and smoke detectors, water flow and release indicators, low and high air pressure switches, manual pull stations.

The releasing control panel also includes an alphanumeric display with 2 lines of 16 characters describing all the system conditions, as well as a set of red and yellow LED lamps individually indicating each of the alarm and trouble conditions of the system.

Easy to operate control buttons are also provided to activate and operate the system's various functions.

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.

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 can be used to facilitate manual or automatic on/off control. The Viking flow control valve is an integral part of the Viking Firecycle® System.

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 flow control 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.
Standard equipment (continued)

**Preenction 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 flow control valves. The solenoid valve has floating diaphragm construction, which requires a minimum pressure drop across the valve to operate properly.

**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.

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

**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.

- OSHPD option
  Pre-approved construction, under OSP-0341-10, using specific components.
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 of TotalPac®3 system](image)
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.
Air supply

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.
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.

![Diagram](image-url)
Cabinet with main components - Configuration with releasing control panel, shown with air style "A"
Trim Components:

A2  Flow control valve
B1  Priming valve
B2  Strainer
B3  1/8" 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
F1  N.O. solenoid valve – 24Vdc
F2  N.C. solenoid valve – 24Vdc
F3  Pneumatic actuator
Field wiring diagrams, Single interlock Electric, Self-Contained:

**WIRING OF INPUT POWER SOURCE**

- **TBB**
  - 1: LINE
  - 2: NEUTRAL
  - 3: GROUND
  - 4: NEUTRAL
  - 5: GROUND
  - 6: LINE

**OPTIONAL WIRING IN CLASS A / STYLE D**

**LEGEND**

- HEAT DETECTOR
- MANUAL RELEASE
- BELL OR HORN
- DRY CONTACT
- END OF LINE RESISTOR

**NOTES:**
- Class A / Style D requires CA2Z module.
- End-of-line devices are not required for Class A / Style D wiring.

**Power Limited (supervised) Initiating Device Circuits**

- **Detection Zone 1, 2, 3, and 4.**
- Max. loop resistance: 100 ohms
- End of line: 5.1K ohms, 1/4W
- Leave ELR (provided) on all unused circuits.
- Refer to Device Compatibility in the VFR-300 Releasing control panel Manual.

**Power Limited (supervised) Notification Appliance Circuits**

- **Output Circuit 1, 2, 3, and 4**
- Maximum operating voltage: 27Vdc (ripple: 0.3Vdc)
- Maximum usable current per circuit: 1.0A
- Total current available (all circuits): 2.5A
- Polarity is reversed in supervisory condition.
- Leave ELR (provided) on all unused circuits.
- Refer to Device Compatibility in the VFR-400 Releasing control panel Manual.

**Auxiliary Power 24Vdc Regulated Source**

- Total current available: 0.2A
- Resettable for 4 wires smoke detectors.

**WARNING**

Releasing control panel shall be supplied by a dedicated circuit breaker, as per NFPA 70, Section 760 and Canadian Electrical Code, Section 32.
Optional electrical equipments

- Relay module ARM-44
  The ARM-44 is an auxiliary relay module designed to operate with the Viking VFR-400 releasing control panel to provide 4 independent form C relay outputs. The 4 output circuits each have a dedicated relay. Each relay is rated for 3 amps at 24 volts DC resistive load. The relay module mounts directly to the back of the cabinet and is connected to the main board. All of the relay terminals are wired back to the field wiring junction box. A disable switch is available for disabling the relays when the system is being tested or serviced.

- Remote Annunciator RA-4410-RC
  The RA-4410-RC remote annunciator is designed to operate with the Viking VFR-400 releasing control panel. There are 34 LED’s to indicate a change in panel status. There is a buzzer on the annunciator that sounds for any trouble or supervisory condition. The release releasing control panel supervises and communicates with the annunciator via separate connections for the RS-485 communication and the 24VDC power requirement of the RA-4410-RC. Separate cables should be used for power and communication. Shielded cable MUST be used for the RS-485 communication line.

- Class A initiating device module CA2Z
  The Model CA2Z Class A Module is designed to be used with the Viking VFR-400 releasing control panel to convert from two (Class B) initiating device circuits to two (Class A) circuits.
  The module is to be mounted in the upper right hand corner of the panel. All the connections are wired back to the field wiring junction box.

- CLASS A INDICATING APPLIANCE CIRCUIT MODULE
  The Model CAM Class A Module is designed to be used with the Viking VFR-400 releasing control panel to convert a single (Class B) indicating appliance circuit to a (Class A) circuit. After installing the CAM, the indicating circuit should be activated to ensure proper operation and connections. The module is provided with double-sided foam tape and should be mounted in the field wiring junction box so that the terminals are accessible.
**Dimensions**

Figure 1 – Cabinet dimensions:

*Dimensions are nominal and may vary ±1/4".*

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" | 2" | 1½" | 2" | 23" | 25" | 77¾" | 4" | 8¾" | 11½" | 13½" | 3½" | 2½" | 2½" | 8" | 11½" | 37½" | 44½" | 47½" | 27" | 43" | 50½" |
| 2" | 2" | 2" | 2" | 23" | 25" | 77¾" | 4" | 8¾" | 11½" | 13½" | 3½" | 2½" | 2½" | 8" | 11½" | 37½" | 45" | 47½" | 27" | 43½" | 50½" |
| 3" | 4" | 3" | 2" | 35¾" | 25" | 77¾" | 4" | 10" | 11½" | 13½" | 3½" | 2½" | 2½" | 11½" | 11½" | 44" | 47½" | 53½" | 59" | 51" | 54½" |
| 4" | 4" | 4" | 2" | 35¾" | 25" | 77¾" | 4" | 10" | 11½" | 13½" | 3½" | 2½" | 2½" | 12" | 11½" | 48½" | 53" | 59" | 39½" | 56½" | 61" |
| 6" | 6" | 6" | 2" | 46" | 25" | 77¾" | 4" | 11" | 11½" | 13½" | 3½" | 5½" | 5½" | 17½" | 11½" | 59½" | 65" | 70½" | 50" | 70½" | n/a |
| 8" | 8" | 8" | 2" | 54" | 31" | 81½" | 4" | 12" | 13¼" | 17" | 3¼" | 9" | 6½" | 27" | 13¼" | 70" | 75½" | n/a | 58" | n/a | n/a |

**SYSTEMS WEIGHTS**

<table>
<thead>
<tr>
<th>Cabinets with control panel</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Description</strong></td>
</tr>
<tr>
<td>1½&quot; Preaction cabinet unit</td>
</tr>
<tr>
<td>2&quot; Preaction cabinet unit</td>
</tr>
<tr>
<td>3&quot; Preaction cabinet unit</td>
</tr>
<tr>
<td>4&quot; Preaction cabinet unit</td>
</tr>
<tr>
<td>6&quot; Preaction cabinet unit</td>
</tr>
<tr>
<td>8&quot; Preaction cabinet unit</td>
</tr>
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</table>
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>
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<td>3”</td>
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<td>6”</td>
<td>48”</td>
<td>15”</td>
</tr>
<tr>
<td>8”</td>
<td>56”</td>
<td>21”</td>
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</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>
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<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
- 2½” Typ.
- 3¾”
- 8½”
- 3”
Figure 5: Open drain details for single unit:
(See dimensions in table below)

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

Dimension table

<table>
<thead>
<tr>
<th>Unit Size:</th>
<th>1½&quot;</th>
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<td>13¾&quot;</td>
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<tr>
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<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
<td>2&quot;</td>
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</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.