1. Introduction

The ProGuard FR Series automatic backflushing filter is specifically designed for the robust requirements of refinery streams. The filter is designed to minimize the backflush volumes while effectively removing contaminants.

Features

- Used in hydrocarbon refining, process water, coke cutting water
- Continuous filtration with automatic self cleaning
- Large filter surface area from pleated mesh filter elements
- Wedge wire elements are also available
- Low backflush rates and optimal cleaning of the filter elements improve filtration efficiency
- Easy to service
- Modular design to accommodate wide range of process flow rates
- Filter ratings from 25 micron absolute and larger
- ASME Code, Section VIII, Division 1
- Optional CE or CRN certification available
- Worldwide network of distribution and service agents
2. Operating principle

- The medium being filtered flows via the inlet nozzle (1) into the filter housing and into the filter insert, which is open at the bottom (2). The medium passes through the filter element from the inside to the outside. During this process, contaminants are trapped on the inner side of the wire cloth.

- The filter housing contains a filter element with pleated wire cloth through which the medium flows and where contaminants are trapped (2).

- The fully automatic backflush process starts when a defined differential pressure is reached or after a pre-set time interval. In order for the backflushing process to be efficient, there must be an operating overpressure on the outlet side (clean side) of the filter (3).

- When the differential pressure or the pre-set time interval triggers an automatic backflush process, the flush valve (5) opens and the gear motor (4) starts to turn the flushing nozzle (6), which is located in the filter element. Thereby the whole filter surface (2) passes the flushing nozzle.

- The process medium that has already been filtered flows at high speed in the opposite direction through the vertical slot (7), which is located directly on the filter element. The trapped contaminants (7) are discharged from the system via the flush pipe.

- The flush valve closes again when the filter element has been turned approximately 400°, so that the backflush process is completed in only a few seconds.

- Operation is not interrupted during the cleaning cycle.

3. Technical data

- Connection: ANSI 4" to ANSI 6"
- Flange: 150# & 300# ANSI B16.5
- Material: 316 Stainless Steel / Carbon Steel
- Std. Max. operating pressure: 350 psi
- Std. Max. operating temp: 450 °F
- Filter element: Screen basket with pleated wire cloth or optional wedge wire 25 to 1000 μm absolute
- Filter rating: 
- Code Standards (optional): ASME Section VIII, Division 1 CE, CRN

CAPACITIES vs. SIZE and RATING

<table>
<thead>
<tr>
<th>Housing Model</th>
<th>Nozzle Size (in)</th>
<th>Area (ft²)</th>
<th>Micron Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>FR12</td>
<td>4</td>
<td>8.5</td>
<td>400</td>
</tr>
<tr>
<td>FR20</td>
<td>4</td>
<td>18.3</td>
<td>400</td>
</tr>
<tr>
<td>FR20</td>
<td>6</td>
<td>18.3</td>
<td>900</td>
</tr>
<tr>
<td>FR30</td>
<td>6</td>
<td>44.1</td>
<td>900</td>
</tr>
</tbody>
</table>

Process Water = 100% listed flow
Diesel = 60% listed flow
Gas Oil = 50% listed flow
Note: Flow may be limited by nozzle size
4. Dimensions

<table>
<thead>
<tr>
<th>Housing Model</th>
<th>Mesh Area (ft²)</th>
<th>Inlet/Outlet Size</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>FR12</td>
<td>8.5</td>
<td>4” Flanged</td>
<td>10”</td>
<td>10”</td>
<td>3”</td>
<td>12”</td>
<td>44”</td>
</tr>
<tr>
<td>FR20</td>
<td>18.3</td>
<td>4” or 6’ Flanged</td>
<td>22.5</td>
<td>14”</td>
<td>6”</td>
<td>20”</td>
<td>69”</td>
</tr>
<tr>
<td>FR30</td>
<td>44.1</td>
<td>6” Flanged</td>
<td>27”</td>
<td>18”</td>
<td>7.5”</td>
<td>30”</td>
<td>91”</td>
</tr>
</tbody>
</table>

All dimensions are in inches unless otherwise noted. All dimensions are subject to change without notice.

5. Design and application

The ProGuard FR Series automatic backflushing filter offers continuous filtration even during the backwash cycle. The steps for operation are described below:

- The filter comprises a housing with a cover and a gear motor.
- The housing contains a vent port, a drain port and a filter element.
- The filter must be filled and vented before placed into service. An empty filter must not be operated at full pump flow.
- Turn on the filter controller and start the flushing process with the hand release. Allow the filter to attain normal service temperature before switching on the controller.
- Operating overpressure is required during backflush cycle on the outlet side of the filter. Recommended minimum pressure is 45 psig (3 kg/cm2).
- Backflushing starts automatically on time or at a preset maximum differential pressure. If the differential pressure exceeds 45 psid, the filter must be removed from service and cleaned.
- When the backflushing cycle starts, the gear motor is switched on and the flush valve for the flushing medium outlet opens. The backflush fluid flows from the clean side through the filter element and into the internal nozzle as the nozzle is turned by the gear motor.
- The backflush fluid (typically filtered feed) flows through the wire cloth at high speed, so trapped contaminants are removed and discharged via the flushing outlet.
- The PLC controller is programmed to close the flush valve after a 400° turn of the flushing nozzle.
- For periodic maintenance: remove the gear motor, loosen the cover bolting, and remove the cover vertically with the filter element attached. The complete filter element can be lifted vertically out of the filter.
- To clean the element, manually spray it with steam, compressed air or water (if compatible) from the outside to the inside. Pretreat the element with a suitable solvent if the contaminant cannot be removed easily. It may be required to dismantle the pleated wire cloth cylinder.