GE Oil & Gas

Flexflo* Surge Relievers
Fast, reliable pipeline protection

imagination at work
A transient pressure surge develops when there is a change in liquid flow velocity. The greater the change in flow velocity, the higher the pressure will rise. These pressure surges can travel through a pipeline at sonic velocities, and if left unabated, can cause serious damage and costly inspection of the line.
**Surge Sources Include**
- Valves opening and closing
- Pumps starting or stopping
- ESD devices engaging
- Check valves actuating
- Sudden demand variation

GE Flexflo Surge Relievers and regulators have been protecting pipelines all around the world for over 40 years. Flexflo Surge Relievers are durable, reliable, and extremely fast acting.

When loaded with nitrogen, Flexflo valves are capable of relieving fast acting transient surges. For overpressure conditions where pressure is building steadily, or in cases with less demanding speed requirements, some models can be operated with a pilot and process fluid. A variety of materials are available to match each individual application.

**Applications for the Flexflo Line Include**
- Loading/unloading terminals
- Tank farms
- Refineries
- Storage
- Floating production, storage, and offloading (FPSO)
- Offshore platform
- Mining
- Transmission and distribution pipelines
- Power plants

**Principles of Operation**
Flexflo valves share a common basic principle of operation.

They consist of a slotted core, around which a tube is stretched. This tube is the Flexflo Surge Reliever's only moving part. The process fluid expands the tube and passes through the upstream slots in the core, around the center barrier, and out through the downstream slots. Process fluid or nitrogen (the green area in the illustrations below) is loaded outside the tube to maintain a bubble tight seal while not in operation.
PRODUCT OVERVIEW AND APPLICATIONS
The Flexflo Surge Reliever Model 887 was designed specifically to protect against damage from high-speed transient pressure surges. It is the fastest acting valve in the Flexflo line and is a nitrogen-loaded device, typically operated with a GE control panel.

FEATURES AND BENEFITS
- Initial opening in under 100 milliseconds, and as low as 20 milliseconds to relieve the fastest system surges
- Single moving part for simple operation and maintenance
- Can relieve minor surges without any fluid flow, which means less fluid into a relief tank
- Achieves bubble tight seal even with small debris or dirt present to prevent leaking
- Controlled closing prevents secondary surges
- Can perform maintenance without taking flanges out of line

SPECIFICATIONS
Sizes (inches)\(^1\) 4", 6", 8", 10", 12"
Sizes (DN) 100, 150, 200, 250, 300
Body Materials Carbon Steel
End Connections Raised Face Flange 150, 300, 600 ANSI ASME/ANSI B16.10
Working Temperature\(^1\) -40°F to 212°F (-40°C to 100°C)
Max Operating Differential\(^1\) 1200 psig (83 bar)
Max Emergency Differential\(^1\) 1480 psig (102 bar)
Control Range\(^1\) 0-1480 psig (102 bar)

\(^1\)Limited by Flexflo tube selection and control system selection.
\(^2\)16" flanges available.

CAPACITY TABLE
<table>
<thead>
<tr>
<th>Valve Size</th>
<th>Class</th>
<th>Performance Curve Slope ((C_s)) (gsm)</th>
<th>Maximum Flow Factor ((C_v)) (gpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>150/300 600</td>
<td>2.42 1.46</td>
<td>240 161</td>
</tr>
<tr>
<td>6</td>
<td>150/300 600</td>
<td>4.84 3.21</td>
<td>479 352</td>
</tr>
<tr>
<td>8</td>
<td>150/300 600</td>
<td>8.59 6.67</td>
<td>850 731</td>
</tr>
<tr>
<td>10</td>
<td>150/300 600</td>
<td>11.9 8.25</td>
<td>1177 905</td>
</tr>
<tr>
<td>12</td>
<td>150/300 600</td>
<td>17.39 11.94</td>
<td>1720 1309</td>
</tr>
</tbody>
</table>
PRODUCT OVERVIEW AND APPLICATIONS
The Flexflo Model 80 is used as a liquid, surge reliever, a backpressure control device and pressure reducing regulator for liquids and gas. The Model 80 does not have the annular space around the tube and core that the Model 887 has, and therefore is not as fast as the Model 887. The Model 80 can be operated with a Mooney Series 20 pilot or with a nitrogen source.

FEATURES AND BENEFITS
- Millisecond speed of response – initial response typically under 200 milliseconds to relieve system surges
- One moving part (tube) for simple operation and maintenance
- Rugged design
- Bubble tight seal to prevent leaking
- Low noise
- Controlled closing prevents secondary surges
- Can relieve minor surges without any fluid flow, which means less fluid into a relief tank

SPECIFICATIONS
Sizes (inches)  4", 6", 8", 10", 12"
Sizes (DN)  100, 150, 200, 250, 300
Body Materials  Carbon Steel
End Connections  Raised Face Flange 150, 300, 600 ANSI ASME/ANSI B16.10
Working Temperature\(^1\)  -40°F to 212°F (-40°C to 100°C)
Max Operating Differential\(^1\)  1200 psid (83 bar)
Max Emergency Differential\(^1\)  1480 psid (102 bar)
Control Range\(^1\)  0-1480 psig (102 bar)

\(^1\)Limited by Flexflo tube selection and control system selection.

CAPACITY TABLE

<table>
<thead>
<tr>
<th>Working Pressure</th>
<th>Size</th>
<th>Cv (W Body)</th>
<th>Cp (N Body)</th>
<th>Xt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 150</td>
<td>4</td>
<td>283</td>
<td>230</td>
<td>0.357</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>564</td>
<td>528</td>
<td>0.395</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>1000</td>
<td>910</td>
<td>0.385</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>1385</td>
<td>1145</td>
<td>0.400</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>2020</td>
<td>1610</td>
<td>0.400</td>
</tr>
<tr>
<td>Class 300</td>
<td>4</td>
<td>283</td>
<td>245</td>
<td>0.365</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>564</td>
<td>528</td>
<td>0.393</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>1000</td>
<td>910</td>
<td>0.385</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>1385</td>
<td>1145</td>
<td>0.499</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>2020</td>
<td>1610</td>
<td>0.400</td>
</tr>
<tr>
<td>Class 600</td>
<td>4</td>
<td>121</td>
<td>95</td>
<td>0.365</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>262</td>
<td>207</td>
<td>0.360</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>742</td>
<td>642</td>
<td>0.390</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>990</td>
<td>742</td>
<td>0.395</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>1437</td>
<td>1072</td>
<td>0.400</td>
</tr>
</tbody>
</table>

THE ORIGINAL FLEXIBLE ELEMENT REGULATOR

Through a global network of skid partners, GE can design and fabricate your entire surge relief system.
**PRODUCT OVERVIEW AND APPLICATIONS**
When gas-loaded, the Flexflo Model 900TE can act as a surge reliever. When operated with a pilot, the Model 900TE is used for backpressure control, pressure reduction, differential pressure control, and relief valve applications in liquid and gas. Its top entry design allows for extremely simple in-line maintenance.

**FEATURES AND BENEFITS**
- Top entry design for easy in-line maintenance
- Single moving part for ease of operation and maintenance
- Low noise
- Rugged design for a long service life

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Sizes (inches)</th>
<th>2&quot;, 3&quot;, 4&quot;, 6&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sizes (DN)</td>
<td>50, 80, 100, 150</td>
</tr>
<tr>
<td>Body Materials</td>
<td>Carbon Steel</td>
</tr>
<tr>
<td>End Connections</td>
<td>Raised Face Flange, 150, 300, 600 ANSI ASME/ANSI B16.10</td>
</tr>
<tr>
<td>Working Temperature(^1)</td>
<td>-40°F to 212°F (-40°C to 100°C)</td>
</tr>
<tr>
<td>Max Operating Differential(^1)</td>
<td>1200 psid (83 bar)</td>
</tr>
<tr>
<td>Max Emergency Differential(^1)</td>
<td>1480 psid (102 bar)</td>
</tr>
<tr>
<td>Control Range(^1)</td>
<td>0-1480 psig (102 bar)</td>
</tr>
</tbody>
</table>

\(^1\) Limited by Flexflo tube selection and control system selection.

**CAPACITY TABLE**

<table>
<thead>
<tr>
<th></th>
<th>2&quot;</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>6&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cv (Full Open)</td>
<td>58</td>
<td>94</td>
<td>128.5</td>
<td>304</td>
</tr>
<tr>
<td>Xr (Gas)</td>
<td>0.46</td>
<td>0.5</td>
<td>0.46</td>
<td>0.55</td>
</tr>
<tr>
<td>FL (Liquid)</td>
<td>0.74</td>
<td>0.77</td>
<td>0.73</td>
<td>0.81</td>
</tr>
<tr>
<td>Max Q(^<em>)</em> (GPM)</td>
<td>300</td>
<td>660</td>
<td>1175</td>
<td>2644</td>
</tr>
</tbody>
</table>

\(^*\) Max Q based on velocity of 30 ft./sec. for optimal tube life. To adjust Max Q, divide by √g.
PRODUCT OVERVIEW AND APPLICATIONS
When gas-loaded, the Model 83 can act as a surge reliever. When operated with a pilot, the Model 83 is used for backpressure control, pressure reduction, differential pressure control, and relief valve applications in liquid and gas. Its stainless steel construction makes it ideal for corrosive environments.

FEATURES AND BENEFITS
• Single moving part for ease of operation and reliability
• Stainless steel construction for corrosive service
• Compact size
• Rugged design for a long service life
• Low noise

SPECIFICATIONS
Sizes (inches)  1", 1.5", 2", 3", 4", 6"
Sizes (DN)  25, 40, 50, 80, 100, 150
Body Materials  Stainless Steel
End Connections  1” Screwed End NPT Connection
  1.5”-6”: Raised Face Flangeless
Working Temperature\(^1\)  -40°F to 212°F (-40°C to 100°C)
Max Operating Differential\(^1\)  1200 psid (83 bar)
Max Emergency Differential\(^1\)  1480 psid (102 bar)
Control Range\(^1\)  0-1480 psig (102 bar)
\(^1\)Limited by Flexflo tube selection and control system selection.

CAPACITY TABLE
<table>
<thead>
<tr>
<th></th>
<th>1”</th>
<th>1.5“</th>
<th>2”</th>
<th>3”</th>
<th>4”</th>
<th>6”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cv (Full Open)</td>
<td>12</td>
<td>47</td>
<td>77</td>
<td>155</td>
<td>234</td>
<td>390</td>
</tr>
<tr>
<td>Xt (Gas)</td>
<td>0.5</td>
<td>0.64</td>
<td>0.56</td>
<td>0.46</td>
<td>0.5</td>
<td>0.47</td>
</tr>
<tr>
<td>FL (Liquid)</td>
<td>NA</td>
<td>0.87</td>
<td>0.82</td>
<td>0.74</td>
<td>0.77</td>
<td>0.75</td>
</tr>
<tr>
<td>Max Q** (GPM)</td>
<td>75</td>
<td>400</td>
<td>750</td>
<td>1500</td>
<td>2250</td>
<td>3800</td>
</tr>
</tbody>
</table>

**Max Q based on velocity of 30 ft./sec. for optimal tube life. To adjust Max Q, divide by \(\sqrt{g}\).
CONTROL OPTIONS

PILOT OPERATED
Pilot operated systems use process fluid to control the valve.

LOADING BLOCK
A loading block loads the jacket of the valve with nitrogen at a set point.

CONTROL PANEL
A control panel loads nitrogen, compensates for temperature changes and alerts the user when the nitrogen supply is low.

CAPACITY BOOSTING PANEL
A capacity boosting panel works as a control panel until a certain overpressure amount is reached. At that point, it allows nitrogen to escape the jacket so the tube can open more, increasing capacity at that overpressure percentage. This control device can also feature alarm and test functions.

A Trusted Business Partner

A name synonymous with quality, GE is a trusted global partner for companies around the world. With a broad range of products and services, GE Oil and Gas’ integrated solutions and unique expertise help manage and overcome important challenges in an ever-evolving industry, while ensuring the responsible and sustainable resource savings our customers have come to expect. Through innovation, breakthrough technology and dedicated teams of global experts, we help you successfully compete—and win—in today’s natural gas and industrial landscape.