Series RGX

PRODUCT HIGHLIGHTS

Four Functions in one:

* Initial air release
* Continuous air release
* Vacuum Break
* Surge protection / anti-shock

Full port design for maximum pipeline protection under vacuum condition

Stainless steel construction, HDPE floats

No maintenance required

10 year warranty
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Series RGX

OPERATION

PIPELINE FILLING
(SUB CRITICAL SEWAGE/ EFFLUENT APPROACH VELOCITY)

Air/gas flows through the annular area around the control float assembly and to atmosphere through the large orifice.

PIPELINE FILLING
(EXCESSIVE SEWAGE/ EFFLUENT APPROACH VELOCITY)

In reaction to an increase in air/gas flow, the “Anti - Surge” float closes the large orifice and air/gas is forced through the “Anti -Surge” Orifice resulting in a deceleration of the approaching liquid due to the resistance of rising air/gas pressure in the valve.

PRESSURIZED AIR/ GAS RELEASE - PIPELINE OPERATING

The volume of disentrained air/gas increases in the valve and displaces the sewage/ effluent to the lower, normal operating level (small orifice control float buoyancy level). Any additional lowering of the sewage/effluent level, as would occur when more air/gas enters the valve, will result in the control float dropping away from the small orifice through which pressurized air/gas is then being discharged to atmosphere.

The control float will close the small orifice when sufficient air/gas has been released to restore the sewage effluent to the normal operating level. The considerable sewage/ effluent free area obviates the possibility of leaks that could otherwise be caused by solids entering the sealing areas.

VACUUM RELIEF (AIR INTAKE) - PIPELINE DRAINING

When the internal pipeline pressure reduces to atmosphere the “Anti - Surge” mechanism and control float assembly drops, opens the large orifice and allows the pipeline to take in air to displace the draining media so as to prevent undesirable low negative pressure*. The hollow, smooth side float design discourages adherence of solids and viscous substances which, therefore, tend to withdraw from the valve into the pipeline when draining occurs.
**NOTE:**

1. Pipe Tee or Air Accumulator should be 1/2 the Diameter of the Pipeline. eg. 12” Pipeline should utilize a 12”x6” Pipe Tee installed below the Isolation and Air Valve.

2. Air Vent diameter should be greater than or equal to the size of the Air Valve to ensure full valve performance and prevent restrictions.

3. Manhole Access - Multiple means of access can assist in serviceability. eg. (1) Larger Manhole access for human entry to the vault, (2) Smaller Manhole to access the valve from the surface.
Series RGX

COMPONENT DESCRIPTION & MATERIAL SPECIFICATIONS
THREADED 2” & STUDDED INLET - 3” TO 12”

Type:
Series RGX - Double Orifice (Small & Large Orifice) with “Anti-Surge” Mechanism.

Nominal Sizes:
2” - 12”

End Connection:
Flange with Threaded NPT Male - 2” valves
Flange with Screwed Studs - 3” to 12” valves

Model No’s:
RGX 1021
RGX 1031

Pressure Ratings:
145 psi

Operating Pressure Range - psi :
145 psi Max

Function:
i) High volume air/gas discharge - pipeline filling
ii) High volume air intake - pipeline draining
iii) Pressurized air/gas discharge - pipeline filled
iv) Surge dampening - high velocity air/gas discharge, liquid column separation & liquid oscillation

Flange Materials of Construction:
Stainless Steel AISI 304
Stainless Steel AISI 316

Standard Factory Tests:
i) Hydrostatic - 1.5 x max. rated working pressure
ii) Small orifice function at max. rated working pressure (minimum 1 valve in 10)

Top Cover
Stainless Steel AISI 304

Screen Mesh
Stainless Steel AISI 316

O - Ring Seal
EPDM Rubber

Flush/Drain Port

Body
Stainless Steel AISI 304L

Anti-Surge Orifice Float
High Density Polyethylene

Nozzle Float
High Density Polyethylene

Nozzle
Stainless Steel AISI 316

Nozzle Seat
EPDM Rubber

Lower Float
High Density Polyethylene

NOTE: 2” Threaded NPT Male Inlet Valves are available in AISI 316L on request
Series RGX

COMPONENT DESCRIPTION & MATERIAL SPECIFICATIONS
THREADED 2” & STUDDED INLET - 3” TO 12” EXPANDED BODY

Type:
Series RGX - Double Orifice (Small & Large Orifice) with “Anti-Surge” Mechanism.

Nominal Sizes:
2” - 12”

End Connection:
Flange with Threaded NPT Male - 2” valves
Flange with Screwed Studs - 3” to 12” valves

Model No’s:
RGX 1621
RGX 1631

Pressure Ratings:
232 psi

Operating Pressure Range - psi:
232 psi Max

Function:
i) High volume air/gas discharge - pipeline filling
ii) High volume air intake - pipeline draining
iii) Pressurized air/gas discharge - pipeline filled
iv) Surge dampening - high velocity air/gas discharge, liquid column separation & liquid oscillation

Flange Materials of Construction:
Stainless Steel AISI 304
Stainless Steel AISI 316

Standard Factory Tests:
i) Hydrostatic - 1.5 x max. rated working pressure
ii) Small orifice function at max. rated working pressure (minimum 1 valve in 10)

NOTE: 2” Threaded NPT Male Inlet Valves are available in AISI 316L on request

Diagram showing component parts and materials.
Series RGX
TEST SPECIFICATIONS

All air release valves supplied shall be subjected to the following testing procedures in the order laid down:

(A) A high pressure strength and leak test whereby the valve is filled with water and pressurized to 1.5 times the rated working pressure which shall be held for a period of 2 minutes. Any leaking, weeping or sweating shall be reason for rejection.

(B) A low head leak test whereby the valve is filled with water and pressurized to a visible water column connected to the test rig. The valve shall be rejected if leak tightness is not maintained for 2 minutes.

(C) Every tenth air release valve of the same size and pressure rating must be subjected to a small orifice function test - “DROP TEST” - whereby the valve is filled with water, pressurized to above rated working pressure and isolated from the test rig by closure of an isolating valve. A chamber in the test rig immediately prior to the isolating valve must be filled with compressed air at a pressure equal to that being maintained in the air release valve. The isolating valve is then opened so as to allow the air to rise in the air release valve without the pressure dropping lower than 29 - 44 psi above rated working pressure of the air release valve. The “DROP TEST” is then carried out by slowly bleeding off the pressure through a suitable cock until rated working pressure is reached and the float drops away from the orifice to allow discharge. Failure of the air release valve to function in the manner described will be reason for rejection.

On request the manufacturer shall provide batch certificates of test compliance which shall be cross referenced to serial numbers indelibly marked onto the identity label of each valve.

IMPORTANT NOTE: It is impossible to inject air into an incompressible liquid, air injection can only be achieved if the liquid can be displaced which implies that the pressure in the test rig must be reduced to atmospheric, and absolutely nothing is proven by discharge through the small orifice of the air release valve at atmospheric pressure. “DROP TESTING” in this manner is not acceptable.
Valves can be made to meet American Iron & Steel (AIS), Buy America, and Buy American upon request.

**Series RGX**

**ORDERING GUIDE**

<table>
<thead>
<tr>
<th>VALVE SIZE</th>
<th>SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2”</td>
<td>050</td>
</tr>
<tr>
<td>3”</td>
<td>080</td>
</tr>
<tr>
<td>4”</td>
<td>110</td>
</tr>
<tr>
<td>6”</td>
<td>150</td>
</tr>
<tr>
<td>8”</td>
<td>200</td>
</tr>
<tr>
<td>10”</td>
<td>250</td>
</tr>
<tr>
<td>12”</td>
<td>300</td>
</tr>
</tbody>
</table>

**OPTIONS:** (choose all that apply)
- _ - STANDARD
- s - FLANGED OUTLET
- b - BIAS ANTI-SHOCK MODE VALVE PRESSURE RATING
- v - VENT ONLY OPERATION

*see page 15

**MATERIALS OF CONSTRUCTION:**
- S4 - FULL 304 S/S CONSTRUCTION
- S6 - FULL 316 S/S CONSTRUCTION

**VALVE TYPE:**
- 1 - DOUBLE ACTING

**VALVE INLET CONNECTION:**
- 2 - SCREWED - NPT
- 3 - STUDDED - ANSI 150#

**VALVE PRESSURE RATING:**
- 10 - 10 bar (145 psi)
- 16 - 16 bar (232 psi)

**INLET CONNECTIONS**

2 - SCREWED NPT

3 - STUDDED ANSI B16.5 CLASS 150#

**NOTES:**
The options, materials, pressures, and configurations listed above are the most common. More options, materials, pressures, and configurations are available.
### Series RGX

**DIMENSIONS & WEIGHTS**

**THREADED 2” & STUDDED INLET - 3” TO 8” OVERALL DIMENSIONS & WEIGHTS**

<table>
<thead>
<tr>
<th>VALVE SIZE in.</th>
<th>MODEL No.</th>
<th>PRESSURE RATING</th>
<th>A in.</th>
<th>B in.</th>
<th>C in.</th>
<th>D in.</th>
<th>E in.</th>
<th>F in.</th>
<th>WEIGHT lbs. / Kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>050 RGX 1021</td>
<td>145 psi</td>
<td>8 ½</td>
<td>30 %</td>
<td>N/A</td>
<td>5</td>
<td>2</td>
<td>1 ½</td>
<td>39.7 / 18.01</td>
</tr>
<tr>
<td>3</td>
<td>080 RGX 1031</td>
<td>145 psi</td>
<td>11 ¼</td>
<td>30 ¾</td>
<td>2 ½</td>
<td>7 ½</td>
<td>3</td>
<td>N/A</td>
<td>80.5 / 36.51</td>
</tr>
<tr>
<td>4</td>
<td>100 RGX 1031</td>
<td>145 psi</td>
<td>11 ¼</td>
<td>30 ¾</td>
<td>2 ½</td>
<td>8 ½</td>
<td>4</td>
<td>N/A</td>
<td>79.4 / 36.02</td>
</tr>
<tr>
<td>6</td>
<td>150 RGX 1031</td>
<td>145 psi</td>
<td>15 ¾</td>
<td>41 ¾</td>
<td>2 ½</td>
<td>11</td>
<td>6</td>
<td>N/A</td>
<td>180.8 / 82.01</td>
</tr>
<tr>
<td>8</td>
<td>200 RGX 1031</td>
<td>145 psi</td>
<td>17 ½</td>
<td>41 ¾</td>
<td>2 ½</td>
<td>13 ¾</td>
<td>8</td>
<td>N/A</td>
<td>227 / 102.96</td>
</tr>
<tr>
<td>10</td>
<td>250 RGX 1031</td>
<td>145 psi</td>
<td>22 ¼</td>
<td>43 ¾</td>
<td>2 ¼</td>
<td>16 ¾</td>
<td>10</td>
<td>N/A</td>
<td>498 / 225.88</td>
</tr>
<tr>
<td>12</td>
<td>300 RGX 1031</td>
<td>145 psi</td>
<td>25 ¾</td>
<td>46 ¾</td>
<td>2 ¼</td>
<td>20 ¾</td>
<td>12</td>
<td>N/A</td>
<td>584 / 264.89</td>
</tr>
</tbody>
</table>
## Series RGX

### DIMENSIONS & WEIGHTS

**THREADED 2” & STUDDED INLET - 3” TO 8” EXPANDED BODY
OVERALL DIMENSIONS & WEIGHTS**

<table>
<thead>
<tr>
<th>VALVE SIZE</th>
<th>MODEL No.</th>
<th>PRESSURE RATING</th>
<th>A in.</th>
<th>B in.</th>
<th>C in.</th>
<th>D in.</th>
<th>E in.</th>
<th>F in.</th>
<th>WEIGHT lbs. / Kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>050 RGX 1621</td>
<td>232 psi</td>
<td>8 ½</td>
<td>30 ⅜</td>
<td>N/A</td>
<td>5</td>
<td>2</td>
<td>1 ⅔</td>
<td>46.3 / 21.00</td>
</tr>
<tr>
<td>3</td>
<td>080 RGX 1631</td>
<td>232 psi</td>
<td>11 ¾</td>
<td>30 ⅜</td>
<td>2 ⅜</td>
<td>7 ⅜</td>
<td>3</td>
<td>N/A</td>
<td>83.7 / 37.96</td>
</tr>
<tr>
<td>4</td>
<td>100 RGX 1631</td>
<td>232 psi</td>
<td>11 ¾</td>
<td>30 ⅜</td>
<td>2 ⅜</td>
<td>8 ⅜</td>
<td>4</td>
<td>N/A</td>
<td>82.6 / 37.47</td>
</tr>
<tr>
<td>6</td>
<td>150 RGX 1631</td>
<td>232 psi</td>
<td>15 ⅜</td>
<td>41 ⅜</td>
<td>2 ⅜</td>
<td>11</td>
<td>6</td>
<td>N/A</td>
<td>186.3 / 84.50</td>
</tr>
<tr>
<td>8</td>
<td>200 RGX 1631</td>
<td>232 psi</td>
<td>17 ½</td>
<td>41 ⅜</td>
<td>2 ⅜</td>
<td>13 ⅞</td>
<td>8</td>
<td>N/A</td>
<td>232.5 / 105.46</td>
</tr>
</tbody>
</table>
Pipe Dia | Pipeline Velocity in Feet per Sec
---|---
| 2 | 3 | 5 | 7 | 8 | 10 | 11 | 13 | 15 | 16 | 18 | 20
---|---|---|---|---|---|---|---|---|---|---|---|---
4 | 78 | 117 | 196 | 274 | 313 | 391 | 431 | 509 | 587 | 626 | 705 | 783
6 | 176 | 264 | 440 | 617 | 705 | 881 | 969 | 1143 | 1321 | 1409 | 1585 | 1762
8 | 313 | 470 | 783 | 1096 | 1253 | 1566 | 1722 | 2036 | 2349 | 2505 | 2819 | 3132
10 | 489 | 734 | 1223 | 1713 | 1957 | 2447 | 2691 | 3181 | 3670 | 3915 | 4404 | 4893
12 | 705 | 1057 | 1762 | 2466 | 2819 | 3523 | 3878 | 4580 | 5285 | 5637 | 6342 | 7047
14 | 958 | 1439 | 2398 | 3357 | 3836 | 4796 | 5275 | 6234 | 7193 | 7673 | 8632 | 9591
16 | 1253 | 1879 | 3132 | 4385 | 5011 | 6264 | 6890 | 8143 | 9295 | 10022 | 11275 | 12527
18 | 1585 | 2378 | 3964 | 5549 | 6342 | 7927 | 8728 | 10306 | 11891 | 12684 | 14269 | 15855
20 | 1957 | 2936 | 4893 | 6851 | 7830 | 9787 | 10766 | 12723 | 14600 | 15659 | 17618 | 19574
22 | 2368 | 3553 | 5921 | 8289 | 9474 | 11842 | 13026 | 15395 | 17763 | 18947 | 21316 | 23684
24 | 2819 | 4228 | 7047 | 9865 | 11275 | 14093 | 15502 | 18321 | 21140 | 22549 | 25368 | 28186
26 | 3308 | 4962 | 8270 | 11578 | 13232 | 16540 | 18194 | 21502 | 24810 | 26464 | 29772 | 33080
28 | 3836 | 5755 | 9591 | 13428 | 15346 | 19162 | 21101 | 24937 | 28773 | 30692 | 34528 | 38365
30 | 4404 | 6006 | 11010 | 15414 | 17616 | 22021 | 24222 | 28627 | 33031 | 35233 | 39617 | 44041
32 | 5011 | 7156 | 12527 | 17538 | 20044 | 25054 | 27560 | 32571 | 37582 | 40087 | 45098 | 50109
34 | 5657 | 8485 | 14142 | 19799 | 22627 | 28284 | 31113 | 36769 | 42426 | 45255 | 50911 | 56568
36 | 6342 | 9513 | 15585 | 22197 | 25368 | 31710 | 34880 | 41222 | 47564 | 50735 | 57077 | 63419
38 | 7066 | 10599 | 17665 | 24731 | 28265 | 35351 | 38864 | 45930 | 52998 | 56529 | 63559 | 70661
40 | 7830 | 11744 | 19574 | 27403 | 31318 | 39146 | 43066 | 50892 | 58721 | 62636 | 70466 | 78295
44 | 9474 | 14211 | 23684 | 33158 | 37895 | 47369 | 52105 | 61579 | 70163 | 75790 | 85263 | 94737
48 | 11725 | 16912 | 28186 | 39461 | 45098 | 56373 | 62010 | 73284 | 84559 | 90196 | 101471 | 112745
52 | 13232 | 19848 | 33080 | 46312 | 52928 | 66159 | 72775 | 86007 | 99239 | 105855 | 119087 | 132319
56 | 15346 | 23019 | 38365 | 53710 | 61383 | 76279 | 84402 | 99748 | 115094 | 122767 | 138113 | 153458
60 | 17616 | 28425 | 44041 | 61567 | 70446 | 88082 | 96890 | 114507 | 132123 | 140931 | 158584 | 176164
62 | 18810 | 28216 | 47026 | 65836 | 75242 | 94052 | 103457 | 122686 | 141078 | 150483 | 169294 | 188104
66 | 21316 | 31974 | 53290 | 74605 | 85263 | 106579 | 117237 | 138553 | 159869 | 170527 | 191843 | 213159
70 | 23978 | 35967 | 59945 | 83923 | 95912 | 118989 | 131878 | 155856 | 179834 | 191823 | 215801 | 239779
74 | 26797 | 40195 | 66991 | 93788 | 107186 | 133983 | 147381 | 174177 | 200974 | 214372 | 241169 | 267965
78 | 29772 | 44658 | 74429 | 104201 | 119087 | 148535 | 163745 | 193516 | 223288 | 238174 | 267946 | 297717

Conversion Table ft/sec of Pipeline Velocity to gal/min
**VALVE SELECTION FROM GRAPH**

All the relevant information has been condensed into one graph to enable valve selection to be simple and easy and at the same time to allow flexibility to the designer to move within certain parameters which eventually allows the most suited and economically viable valve to be selected.

**IMPORTANT NOTE:** The graph is based on vacuum breaking and limiting vacuum to 0.34 bar (5 psi) below atmospheric. It is not good practice to go below 10 psi absolute (4.4 psi differential in pipeline at sea level). The graph allows for change in altitude and hence change in atmospheric pressure and is based on the assumption that more than one valve per section is used for vacuum protection and venting.

**EXAMPLE OF VALVE SIZING**

(assuming an individual section)

A Ø 16” pipeline draining at 99.6 gal/sec which equates to 9.85 ft/s, what valve size should be selected?

From the 9.85 ft/s point, on the graph on page 12, move vertically until the Ø16” pipe size horizontal line is intersected. This places the intersection point in the operating band of a 3” Vent-O-Mat RGX valve. But, if for example, the drainage rate is 132.8 gal/sec which equates to 13.1 ft/s, the valve would be operating close to its limit and it may be prudent to change to a 4” Vent-O-Mat RGX.

**ACTUAL SELECTION**

 GRAVITY OR PUMPED PIPELINES)

Selection is based on the premise that pipelines are generally filled at a slower rate than they are drained, scoured or at which separation occurs (a maximum fill / drain ratio of 1:1).

1. Determine the maximum drainage rate in ft/s either for scouring, pipe rupture or column separation for a particular pipeline section. Conversion from gal/min to ft/sec can be done fairly quickly; using the conversion table on page 12.

2. Move vertically on the selection graph (top of page 12) from the ft/s point and move horizontally from the pipe size finding the intersecting point.

3. This point should fall within the operating band of a particular valve size. Consideration must be given to the fact that the upper portion of the band approaches - 5 psi and the lower portion - 1.45 psi for each valve size, this allows the designer to see at a glance if the valve is too close to its operating limits and to select the next valve size.

**VALVE POSITIONING**

1. ON APEX POINTS (relative to hydraulic gradient).
2. 16 FEET BELOW APEX POINTS FORMED BY INTERSECTION OF PIPELINE AND HYDRAULIC GRADIENT - i.e. where pipeline siphoning over gradient an air release valve positioned on the apex would break the siphon. If positioning on apex is required a modified VENT-O-MAT Series RGX can be supplied.
3. NEGATIVE BREAKS (increase in downward slope or decrease in upward slope).
4. LONG HORIZONTAL SECTIONS - every 1/3 of a mile maximum.
5. LONG ASCENDING SECTIONS - every 1/3 of a mile maximum.
6. LONG DESCENDING SECTIONS - every 1/3 of a mile maximum.
7. PUMP DISCHARGE (not shown in diagram) - just subsequent to non return valve.
8. BLANK ENDS (not shown in diagram) - where a pipeline is terminated by a blind flange or a valve.

**NOTE:** Alternatively: - 1.094 yard per every 0.04 inch in pipe diameter e.g. space air valves every 656.4 yards for a 24” inch diameter pipeline or every 875.2 yrd for a 32” inch diameter pipeline.

Selection is based on the premise that pipelines are generally filled at a slower rate than they are drained, scoured or at which separation occurs (a maximum fill / drain ratio of 1:1).

1. Determine the maximum drainage rate in ft/s either for scouring, pipe rupture or column separation for a particular pipeline section. Conversion from gal/min to ft/sec can be done fairly quickly; using the conversion table on page 12.

2. Move vertically on the selection graph (top of page 12) from the ft/s point and move horizontally from the pipe size finding the intersecting point.

3. This point should fall within the operating band of a particular valve size. Consideration must be given to the fact that the upper portion of the band approaches - 5 psi and the lower portion - 1.45 psi for each valve size, this allows the designer to see at a glance if the valve is too close to its operating limits and to select the next valve size.
Series RGX

AVAILABLE DISCHARGE CONNECTIONS
2” TO 8”
10” & 12” VALVES AVAILABLE ON REQUEST

Outlet Configurations

1. Threaded NPT Discharge Connection
   2”, 3” & 4” Valves Only

2. Swivel Flanged Outlet Connection
   Sizes: 2”- 12”

3. Swivel Flange Outlet With Bend
   Sizes: 2”- 12”

Biased Outlet Configurations

1. T-outlet with Bias Flanged Outlet
   2”, 3” & 4” Valves Only

Note: 2” to 4” have FNPT thread under the screen
Series RGX

SPECIAL CONFIGURATIONS (RGXb, RGXv)

**RGXb – Biased Anti-Shock**

It is good engineering practice, for vertical turbine pumps and deepwell, submersible pump applications, to install air valves prior to the pump discharge check valve. The purpose of these valves is to prevent air entry into the pipeline and to break vacuum in the vertical riser upon pump shutoff.

Operation of conventional air valves in this application is such that the air in the vertical riser is released very rapidly upon pump startup, resulting in very high pressure transients when the water column slams the air valve shut and/or slams into the closed discharge check valve.

The Vent-O-Mat Series RGXb valve has specifically been developed for use on deep well submersible pump and vertical turbine pump applications where they are installed prior to the pump discharge check valve to fulfill the following functions:

- Provide effective and controlled release of air in the vertical riser upon pump startup.
- Dampen surge pressures upon pump startup.
- Provide vacuum protection when the pump stops and the vertical column drains.

**RGXv – Vent-Only**

There are instances where the hydraulic gradeline falls below a peak point during normal operation and where air inflow would adversely affect the normal operation and surge characteristic of the pipeline. Air intake may also be undesirable under pump trip conditions for pipelines running through a marsh (surge protection in these instances would be in the form of surge vessels and/or the pipeline will be designed for full vacuum).

Vent-O-Mat offers the Series RGXv valve which has specifically been developed to ensure effective air release under all pipeline conditions but will not allow air entry under any operating condition.

Valves can be made to meet American Iron & Steel (AIS), Buy America, and Buy American upon request.
RF Valves, Inc.
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1.410.850.4464

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