



DJ Gongol & Associates, Inc.

PO Box 180 | West Des Moines, IA 50061-0180

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515-223-4144 | 515-981-0581 fax

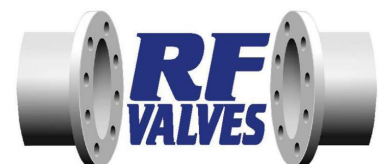
info@gongol.net

**VENT-O-MAT<sup>®</sup>**

# SERIES RGX

AIR RELEASE AND VACUUM BREAK VALVES

FOR SEWAGE USE



[www.rfvalves.com](http://www.rfvalves.com)

# Series RGX

## PRODUCT HIGHLIGHTS

**Four Functions in one:**

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



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**Full port design for maximum pipeline protection under vacuum condition**

**Stainless steel construction, HDPE floats**

**No maintenance required**

**10 year warranty**

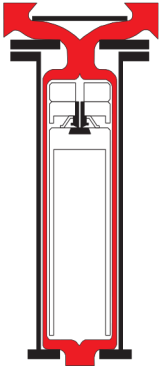


# TABLE OF CONTENTS

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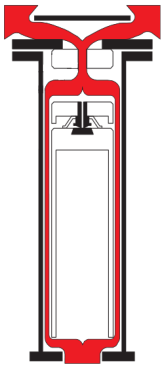
<b>SERIES RGX OPERATION</b>	<b>PAGE 4</b>
<b>RECOMMENDED INSTALLATION ARRANGEMENTS</b>	<b>PAGE 5</b>
<b>COMPONENT DESCRIPTION &amp; MATERIAL SPECIFICATIONS THREADED 2" &amp; STUDDED INLET - 3" TO 12"</b>	<b>PAGE 6</b>
<b>COMPONENT DESCRIPTION &amp; MATERIAL SPECIFICATIONS THREADED 2" &amp; STUDDED INLET - 3" TO 12" EXPANDED BODY</b>	<b>PAGE 7</b>
<b>COMPONENT DESCRIPTION &amp; MATERIAL SPECIFICATIONS FLANGED - 2" TO 12"</b>	<b>PAGE 8</b>
<b>ORDERING GUIDE</b>	<b>PAGE 9</b>
<b>DIMENSIONS &amp; WEIGHTS &amp; TEST SPECIFICATIONS</b>	<b>PAGES 10 &amp; 11</b>
<b>SELECTION &amp; POSITIONING</b>	<b>PAGES 12 &amp; 13</b>
<b>AVAILABLE DISCHARGE CONNECTIONS 2" TO 12"</b>	<b>PAGE 14</b>
<b>SPECIAL CONFIGURATIONS (RBXb, RBXv)</b>	<b>PAGE 15</b>

## OPERATION



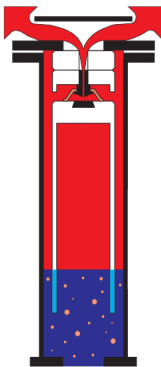
### **PIPELINE FILLING (SUB CRITICAL SEWAGE/ EFFLUENT APPROACH VELOCITY)**

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.

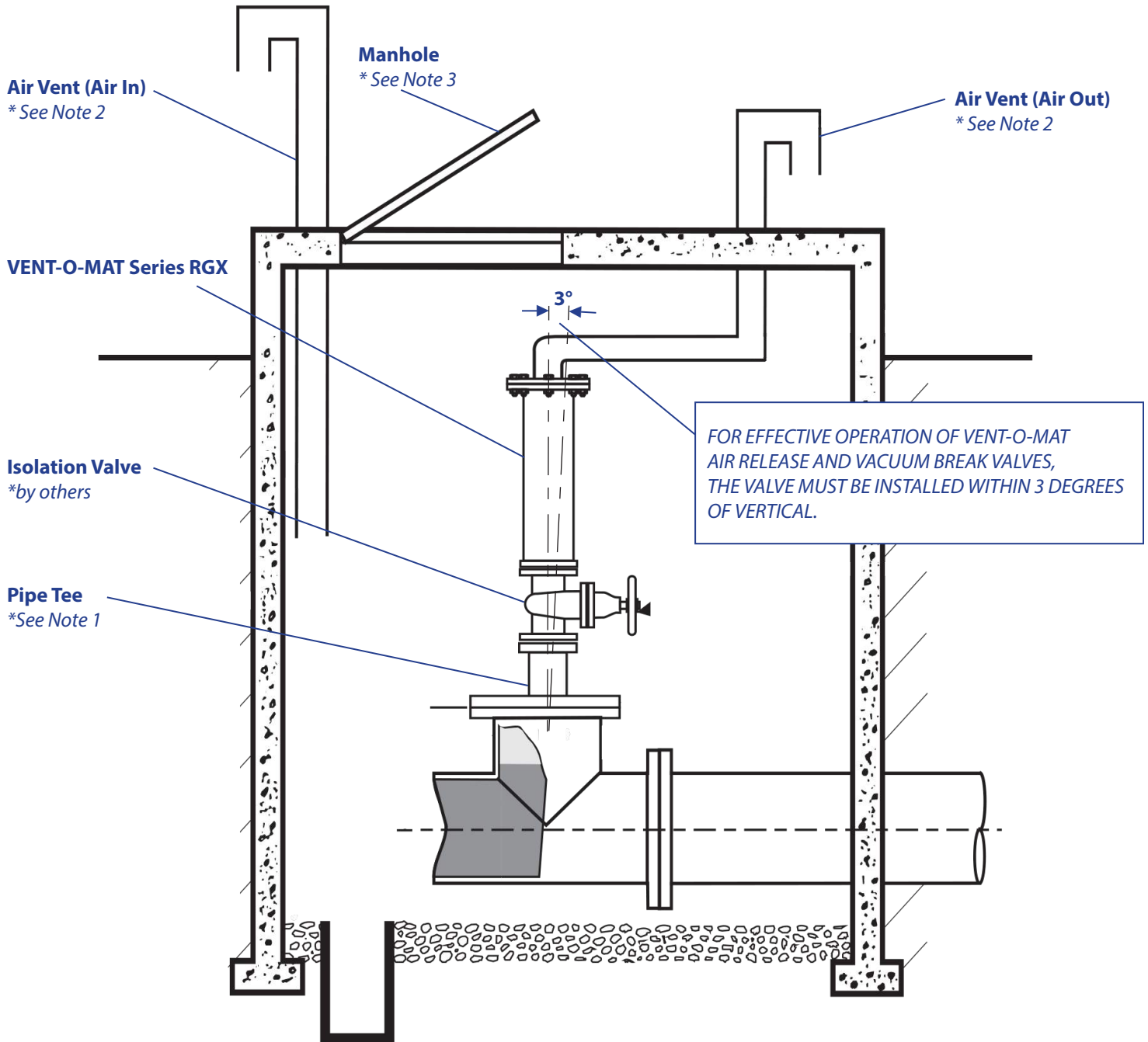
The control float will close the small orifice when sufficient air/gas has been released to restore the sewage effluent to the normal operating level. The considerable sewage/effluent free area obviates the possibility of leaks that could otherwise be caused by solids entering the sealing areas.



### **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.

## RECOMMENDED INSTALLATION ARRANGEMENTS



**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.

## COMPONENT DESCRIPTION & MATERIAL SPECIFICATIONS THREADED 2" & STUDED 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  
145 psi

**Operating Pressure Range - psi :**

145 psi Max

**Function:**

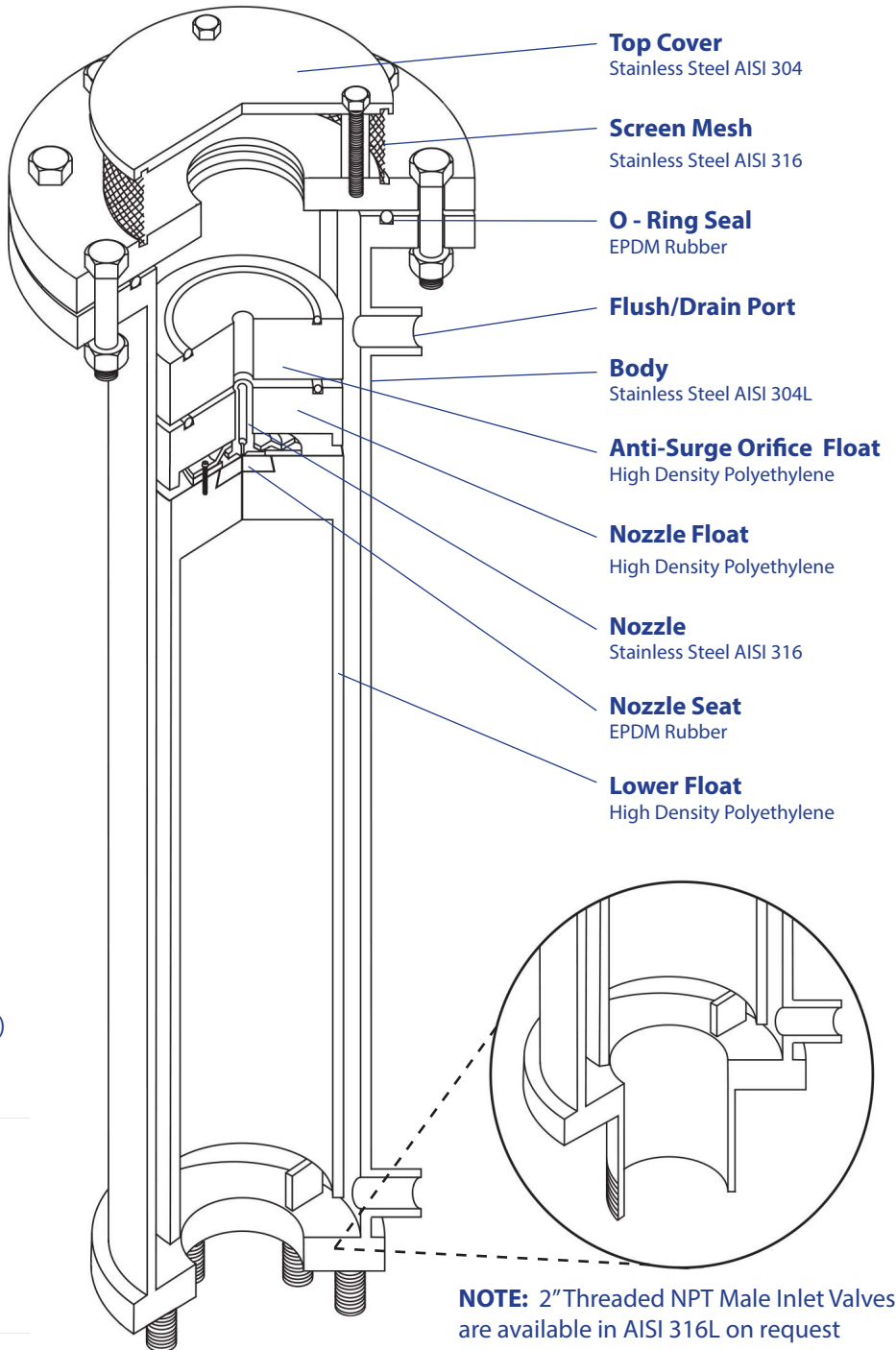
- i) High volume air/gas discharge - pipeline filling
- ii) High volume air intake - pipeline draining
- iii) Pressurized air/gas discharge - pipeline filled
- iv) Surge dampening - high velocity air/gas discharge, liquid column separation & liquid oscillation

**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)



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



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## COMPONENT DESCRIPTION & MATERIAL SPECIFICATIONS THREADED 2" & STUDED 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  
232 psi

**Operating Pressure Range - psi :**

232 psi Max

**Function:**

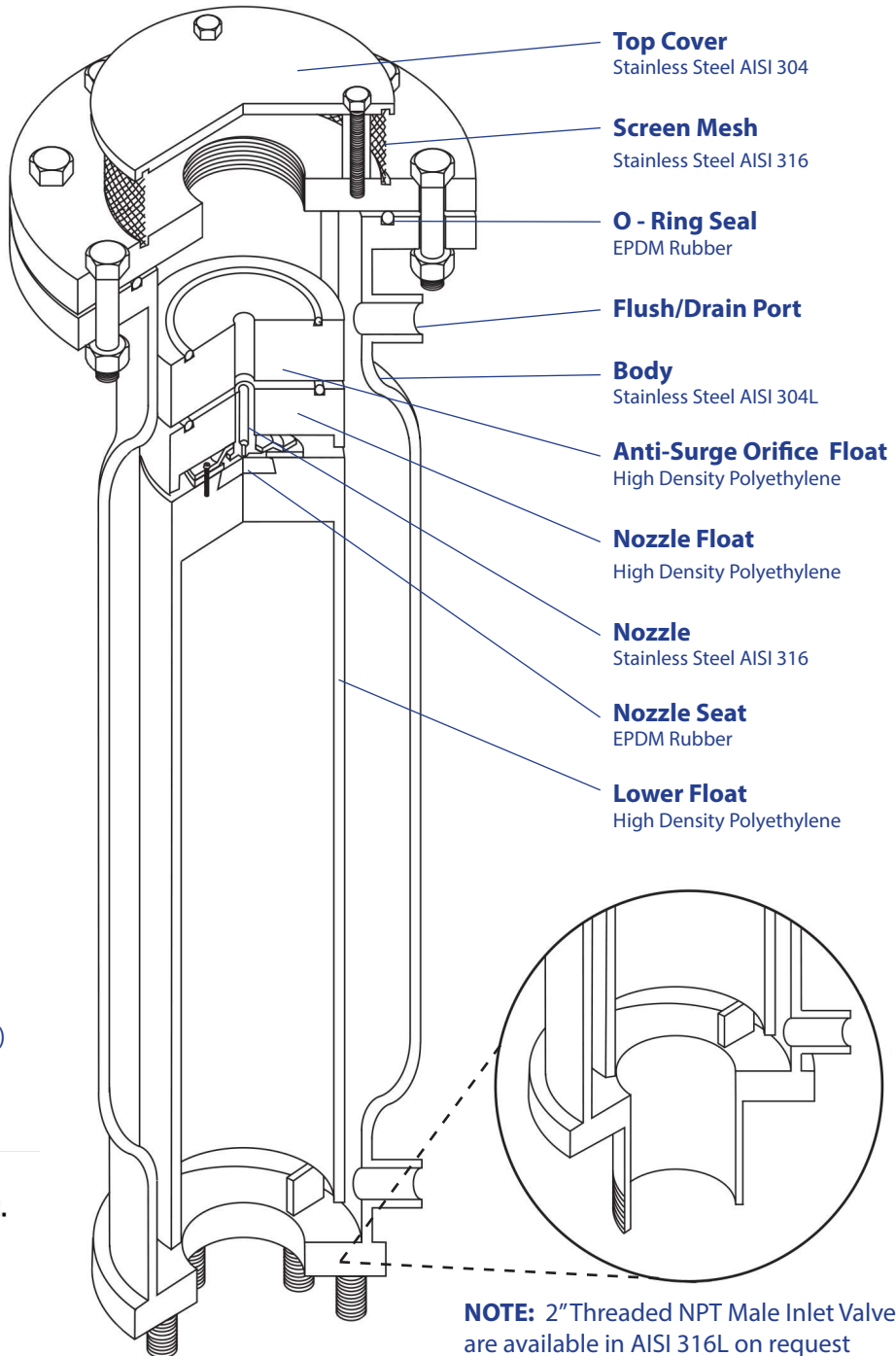
- i) High volume air/gas discharge - pipeline filling
- ii) High volume air intake - pipeline draining
- iii) Pressurized air/gas discharge - pipeline filled
- iv) Surge dampening - high velocity air/gas discharge, liquid column separation & liquid oscillation

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Stainless Steel AISI 304  
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- i) Hydrostatic - 1.5 x max. rated working pressure
- ii) Small orifice function at max. rated working pressure (minimum 1 valve in 10)



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# 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.*



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**ORDERING GUIDE**

**050** **RGX** **10** **2** **1** **S4**

**VALVE SIZE:**

- 2" **050**
- 3" **080**
- 4" **100**
- 6" **150**
- 8" **200**
- 10" **250**
- 12" **300**

**VALVE SERIES**

**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** - STUDED - ANSI 150#

**VALVE PRESSURE RATING:**

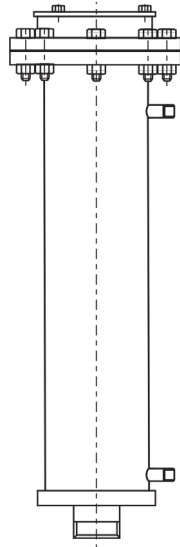
- 10** - 10 bar (145 psi)
- 16** - 16 bar (232 psi)

**OPTIONS:** (choose all that apply)

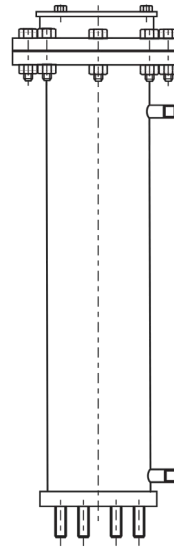
- \_ - STANDARD
- s - FLANGED OUTLET
- b - BIAS ANTI-SHOCK MODE VALVE PRESSURE RATING
- v - VENT ONLY OPERATION

\*see page 15

**INLET CONNECTIONS**



**2 - SCREWED NPT**



**3 - STUDED 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.



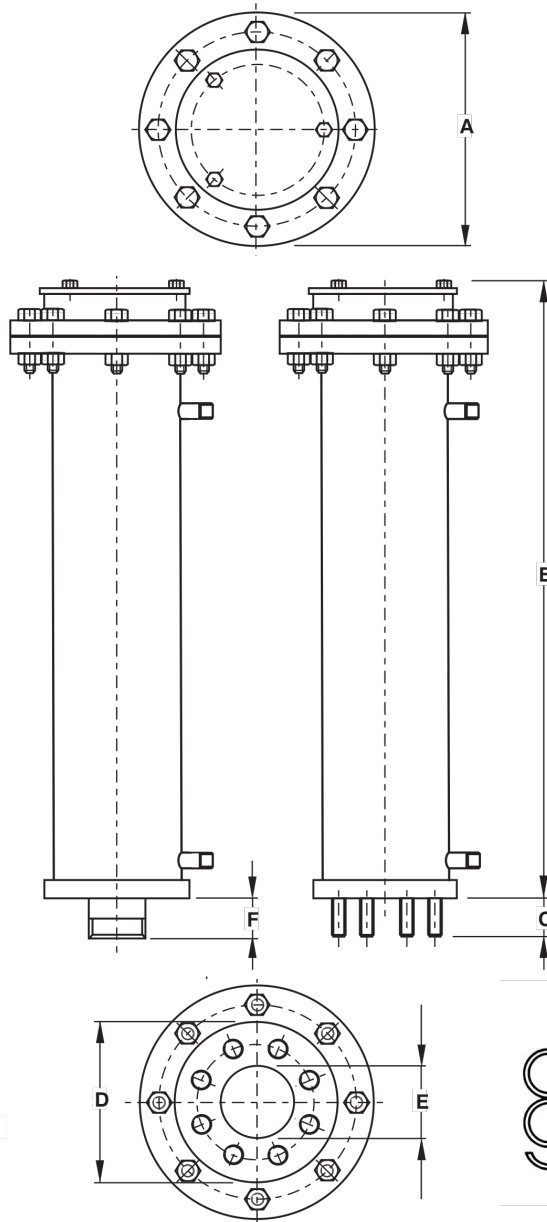
Valves can be made to meet American Iron & Steel (AIS), Buy America, and Buy American upon request.



# Series RGX

## DIMENSIONS & WEIGHTS

**THREADED 2" & STUDED INLET - 3" TO 8"**  
**OVERALL DIMENSIONS & WEIGHTS**



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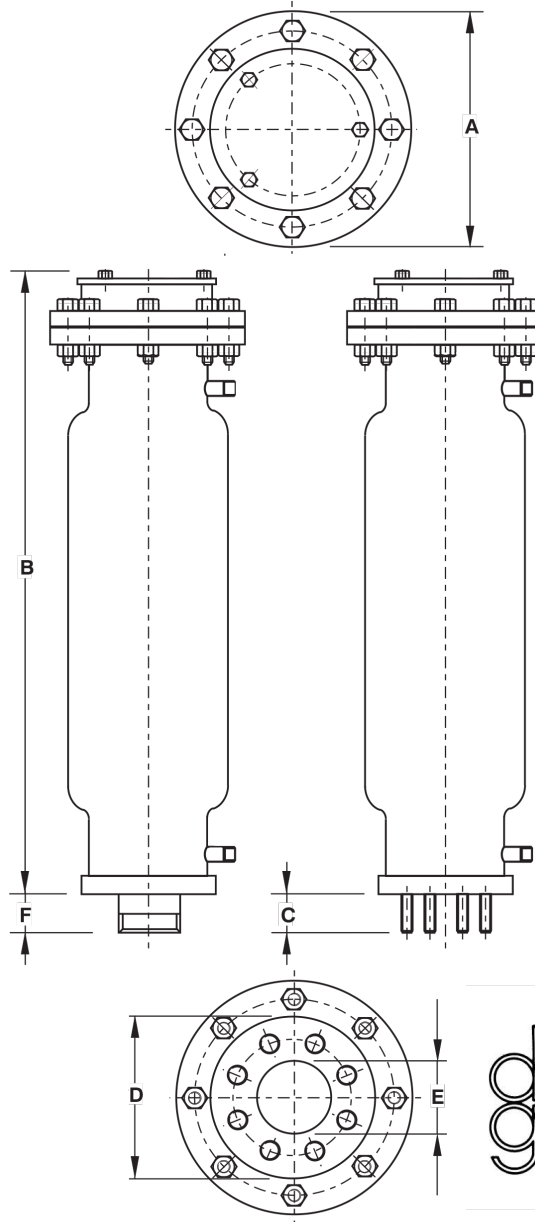
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VALVE SIZE in.	MODEL No.	PRESSURE RATING	A in.	B in.	C in.	D in.	E in.	F in.	WEIGHT lbs. / Kg
2	050 RGX 1021	145 psi	8 2/3	30 3/8	N/A	5	2	1 3/8	39.7 / 18.01
3	080 RGX 1031	145 psi	11 1/4	30 7/10	2 1/8	7 7/8	3	N/A	80.5 / 36.51
4	100 RGX 1031	145 psi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

# Series RGX

## DIMENSIONS & WEIGHTS

**THREADED 2" & STUDED INLET - 3" TO 8" EXPANDED BODY  
OVERALL DIMENSIONS & WEIGHTS**



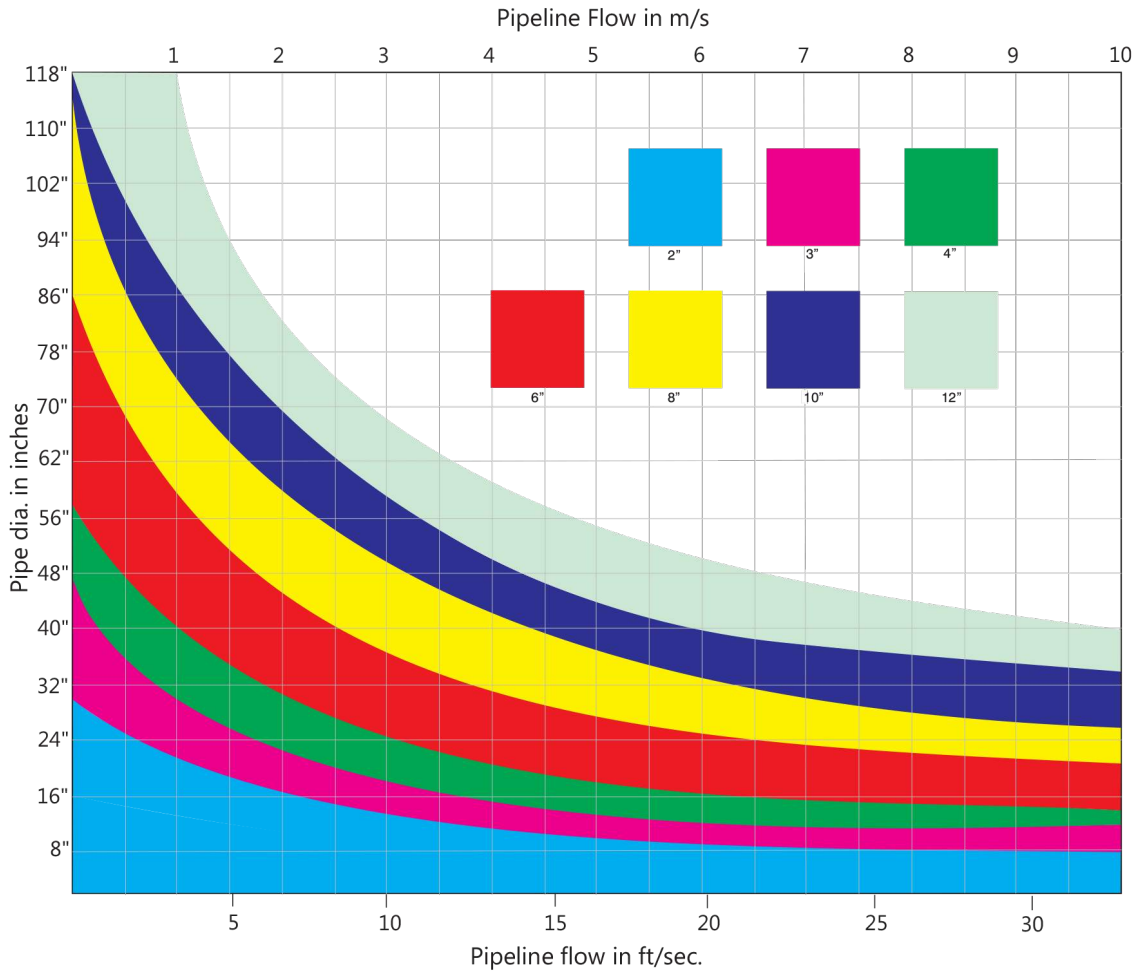
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VALVE SIZE in.	MODEL No.	PRESSURE RATING	A in.	B in.	C in.	D in.	E In.	F In.	WEIGHT lbs. / Kg
2	050 RGX 1621	232 psi	8 3/8	30 3/8	N/A	5	2	1 3/8	46.3 / 21.00
3	080 RGX 1631	232 psi	11 1/4	30 7/16	2 1/8	7 7/8	3	N/A	83.7 / 37.96
4	100 RGX 1631	232 psi	11 1/4	30 7/16	2 1/8	8 3/8	4	N/A	82.6 / 37.47
6	150 RGX 1631	232 psi	15 5/16	41 7/16	2 1/8	11	6	N/A	186.3 / 84.50
8	200 RGX 1631	232 psi	17 1/2	41 7/16	2 1/8	13 5/16	8	N/A	232.5 / 105.46

# Series RGX

## SELECTION & POSITIONING



Pipe Dia	Pipeline Velocity in Feet per Sec											
Inches	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	1145	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	3876	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	8720	10306	11891	12684	14269	15855
20	1957	2936	4893	6851	7830	9787	10766	12723	14680	15659	17616	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	19182	21101	24937	28773	30692	34528	38365
30	4404	6606	11010	15414	17616	22021	24223	28627	33031	35233	39637	44041
32	5011	7516	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	15855	22197	25368	31710	34880	41222	47564	50735	57077	63419
38	7066	10599	17665	24731	28265	35331	38864	45930	52996	56529	63595	70661
40	7830	11744	19574	27403	31318	39148	43062	50892	58721	62636	70466	78295
44	9474	14211	23684	33158	37895	47369	52105	61579	71053	75790	85263	94737
48	11275	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	76729	84402	99748	115094	122767	138113	153458
60	17616	26425	44041	61657	70466	88082	96890	114507	132123	140931	158584	176164
62	18810	28216	47026	65836	75242	94052	103457	122268	141078	150483	169294	188104
66	21316	31974	53290	74605	85263	106579	117237	138553	159869	170527	191843	213159
70	23978	35967	59945	83923	95912	119889	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	148859	163745	193516	223288	238174	267946	297717

**Conversion Table ft/sec of Pipeline Velocity to gal/min**

## SELECTION & POSITIONING

### 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.

### 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.

### 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.



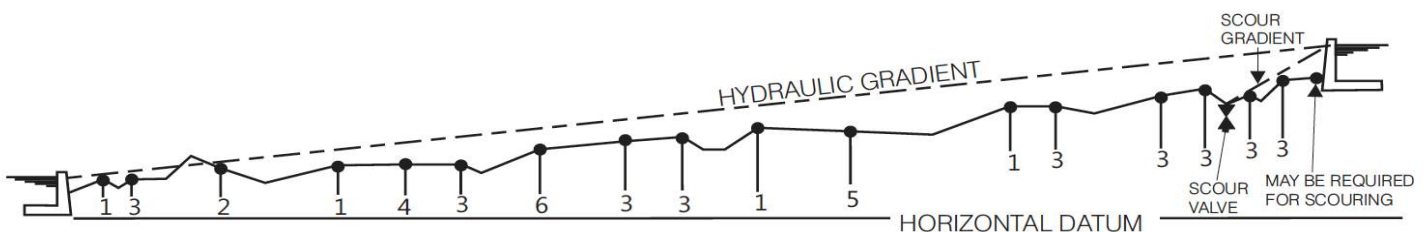
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### VALVE POSITIONING

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.

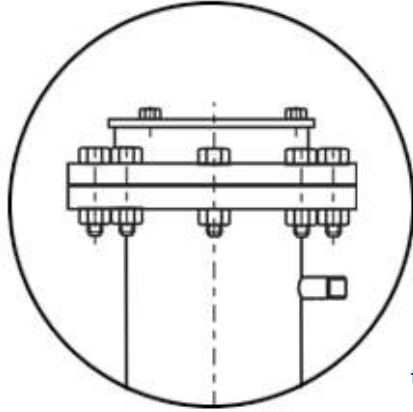
Alternatively: - 1.094 yard per every 0.04 inch in pipe diameter e.g. space air valves every 656.4 yards for a 24" inch diameter pipeline or every 875.2 yrd for a 32" inch diameter pipeline



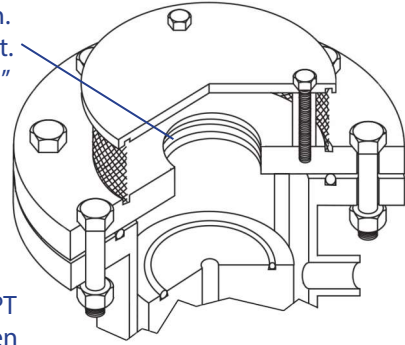
# Series RGX

## AVAILABLE DISCHARGE CONNECTIONS 2" TO 8"

10" & 12" VALVES AVAILABLE ON REQUEST

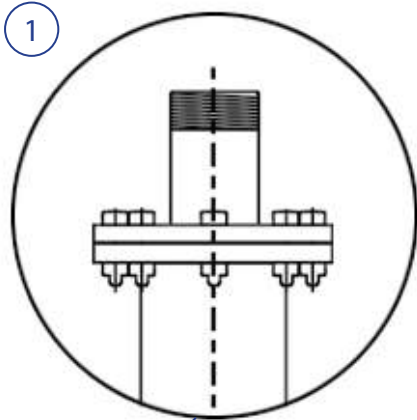


Top Cap With Standard Discharge Connection. Screen Mesh on Outlet. 2", 3", 4", 6", 8", 10" & 12"

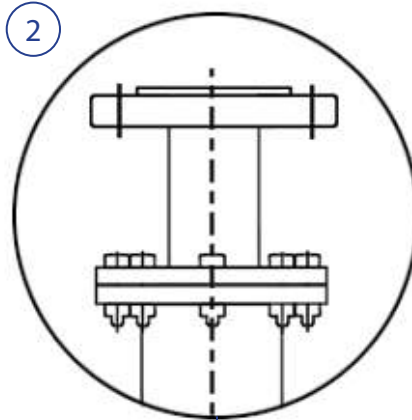


Note: 2" to 4" have FNPT thread under the screen

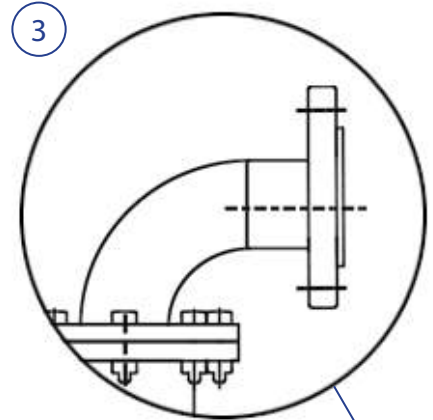
### Outlet Configurations



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

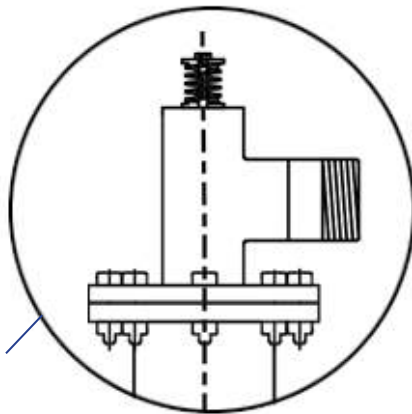


2  
Swivel Flanged Outlet Connection  
Sizes: 2" - 12"

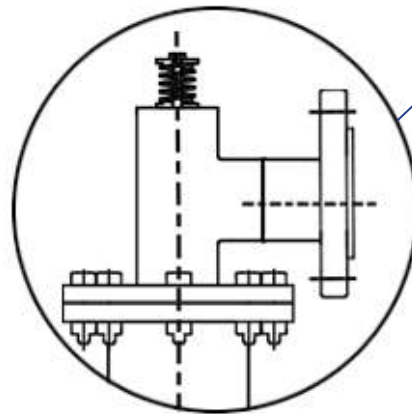


3  
Swivel Flange Outlet With Bend  
Sizes: 2" - 12"

### Biased Outlet Configurations



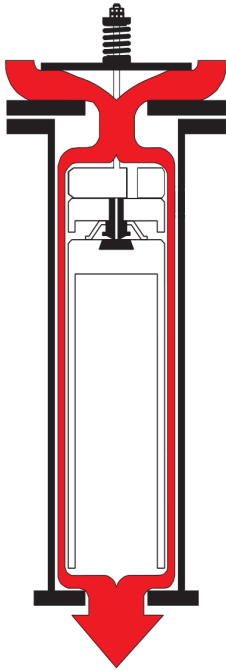
4  
T-outlet with Bias Screwed NPT Outlet  
2", 3" & 4" Valves Only



5  
T-outlet with Bias Flanged Outlet



## SPECIAL CONFIGURATIONS (RGXb, RGXv)



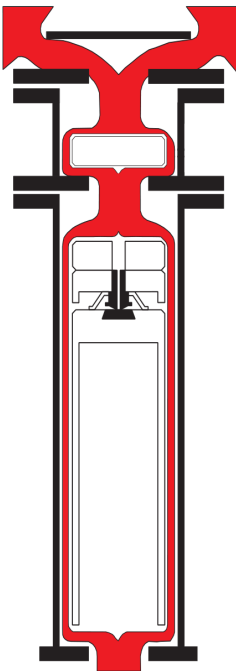
### RGXb – Biased Anti-Shock

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.





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