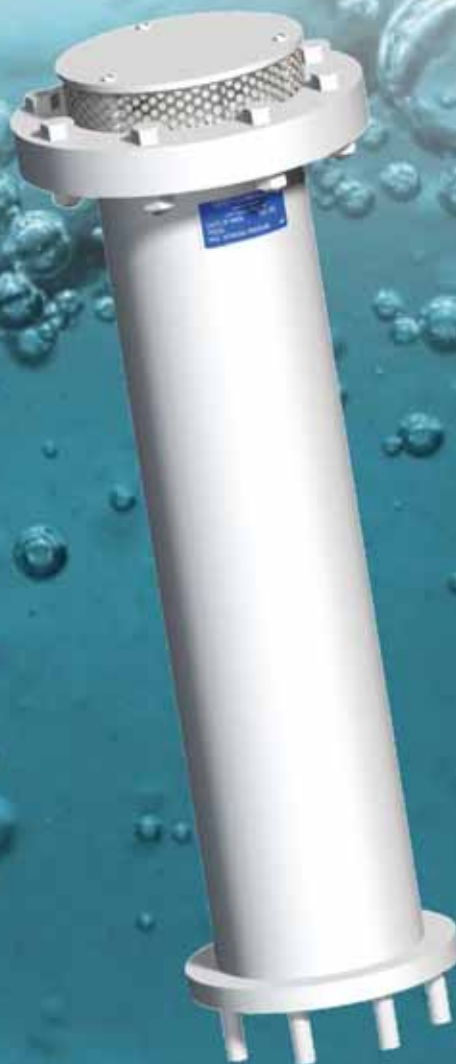


**VENT-O-MAT<sup>®</sup>**

## **SERIES RGX**

**“ANTI-SURGE”  
SEWAGE AIR RELEASE AND VACUUM BREAK VALVES  
FOR EFFECTIVE AIR RELEASE, VACUUM PROTECTION AND  
SURGE ALLEVIATION**



**AV** AVENG  
DFC



## SEWAGE AIR RELEASE & VACUUM BREAK VALVES SERIES RGX "ANTI - SURGE"

### The Unique defence against pipe bursts and pipeline system damage!

Vent-O-Mat Series RGX has evolved from a long lineage of research and development into a product that has proven unsurpassed for air release, vacuum protection, surge alleviation and pipeline flow enhancement.

The basis of the Vent-O-Mat design is in the understanding of the physical laws that govern air valve and pipeline operation. Reaction to pipeline dynamics is therefore instantaneous and protection provided is relevant to the pipeline's needs.

Vent-O-Mat Series RGX truly represents the pinnacle of valve design evolution. This valve design provides the most comprehensive, effective and efficient pipeline protection relative to initial cost of any other available pipeline component. This can easily be gauged from the below:

#### Automatic Surge Protection

The unique Series RGX valve incorporates as standard, three design features to automatically protect a pipeline, under all pipeline operating conditions, from the destructive surge and water hammer phenomena. These features are independent of any mechanical devices ensuring reaction in a very low milli second time span.

#### Effective Air Release

The RGX design ensures effective de-aeration under all pipeline flow and operating conditions, via either one of three discharge orifices.

#### Vacuum Protection

The RGX series large orifice diameters equal the nominal size of the valve. This ensures the least possible resistance to the intake of air and consequently the least possible negative pressure within a draining pipeline. The use of solid, cylindrical floats ensures instantaneous reaction, discourages the "Venturi" phenomenon and is a further guarantee of effective vacuum protection.

#### Guaranteed Performance

The RGX has been designed and developed to provide the optimum usable and safe performance relative to all functions. Selection data has been substantiated through third party testing and can therefore be confidently referenced.

The surge protection function of the RGX design has been incorporated in the well-known **SURGE 2000** surge analysis software programme and can be analysed with great accuracy in other commercially available surge analysis programmes such as FLOWMASTER and TRANSAM.

#### Unparalleled Service

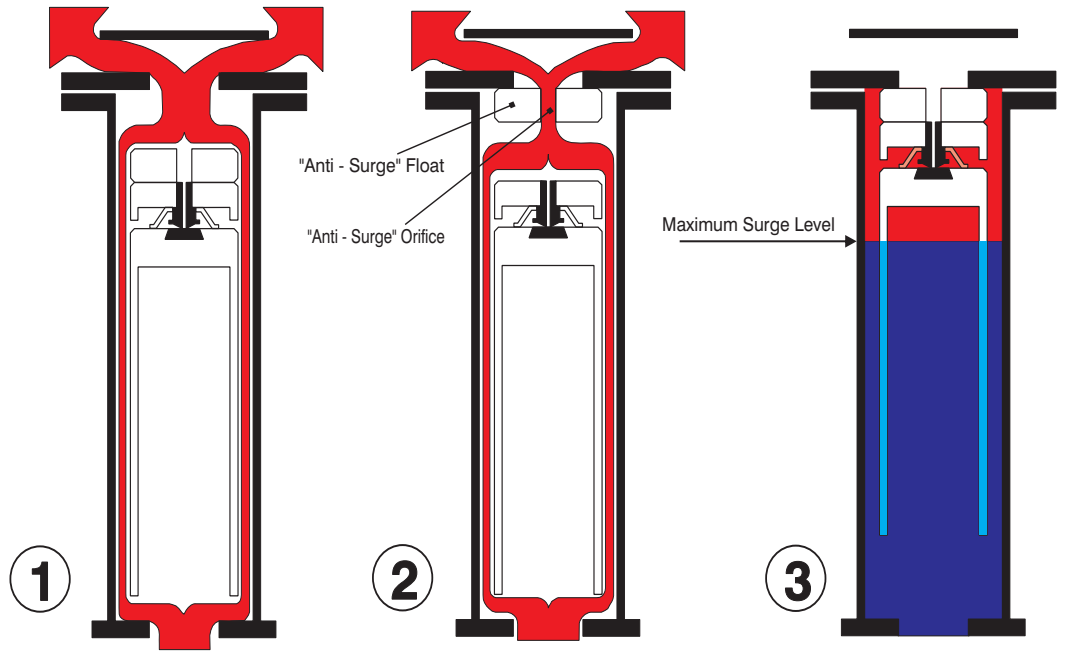
Vent-O-Mat is committed to customer service and to the selling of solutions. Our highly dedicated team is available at all times to assist with air valve sizing and positioning. Assistance is also provided in finding the most cost effective and/or efficient surge protection strategy relevant to the pipeline's needs.

#### International Representation

Vent-O-Mat is represented in the following countries and regions:

- |                        |            |                |               |             |
|------------------------|------------|----------------|---------------|-------------|
| * USA                  | * Thailand | * South Africa | * Tanzania    | * Kuwait    |
| * Canada               | * Germany  | * Mexico       | * Hong Kong   | * Brazil    |
| * Caribbean            | * Peru     | * Chile        | * Taiwan      | * France    |
| * United Arab Emirates | * Egypt    | * Malawi       | * New Zealand | * Singapore |

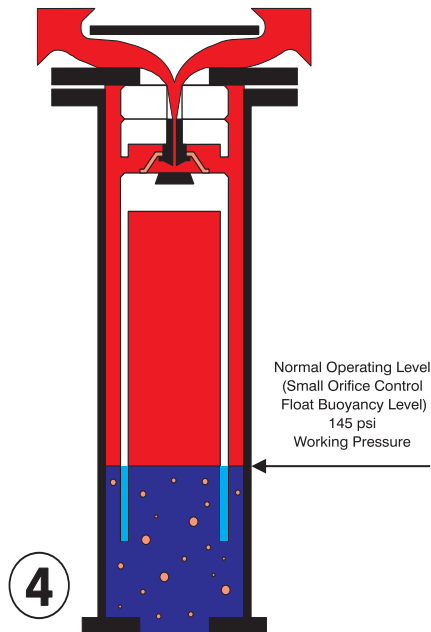
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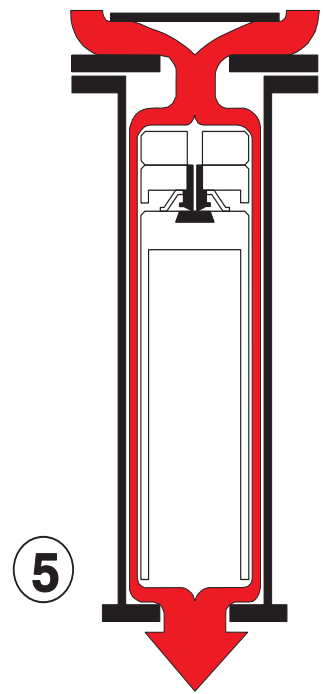
**PIPELINE FILLING  
(SUB CRITICAL SEWAGE / EFFLUENT  
APPROACH VELOCITY)**

**PIPELINE FILLING  
(EXCESSIVE SEWAGE / EFFLUENT  
APPROACH VELOCITY)**

**PIPELINE FULLY CHARGED**



**PRESSURIZED AIR / GAS RELEASE  
PIPELINE OPERATING**



**VACUUM RELIEF (AIR INTAKE)  
PIPELINE DRAINING**

# OPERATION

## PRE NOTES:

### A) VENTING OF A FILLING PIPELINE:

The operation of a conventional sewage air release valve is such that fast approaching sewage/effluent is almost instantaneously halted by the valve's closure. Consequently a transient pressure rise or shock of potentially damaging proportions can be generated in a pipeline system, even at normal filling rates.

In addition to venting through the Large Orifice when sewage/ effluent approach velocities are sub critical, the Vent -O- Mat series RGX sewage air release valves feature an automatic "Anti - Surge" Orifice device that serves to decelerate sewage/ effluent approaching at excessive speed, thereby limiting pressure rise in the pipeline.

### B) SURGE ALLEVIATION - PIPELINE PRESSURIZED:

In instances where a pipeline experiences liquid column separation due to pump stoppage, high shock pressures can be generated when the separated column rejoins.

The Vent -O- Mat series RGX takes in air through the unobstructed large orifice when column separation occurs, but controls the discharge of air/gas through the "Anti-Surge" Orifice as the separated column commences to rejoin. The rejoining impact velocity is thereby sufficiently reduced to prevent an unacceptably high surge pressure in the system. In the same way the series RGX valve prevents high surge pressures resulting from liquid oscillation in a pipeline.

---

### 1. 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.

### 2. 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.

**Attention is drawn to Pre Notes (A) and (B) above.**

### 3. PIPELINE FULLY CHARGED

Sewage/effluent has entered the valve chamber and buoyed the floats to close both the large and the small orifice. The design's compression/ volume relationship prevents the media from ever exceeding the maximum surge level indicated in diagram 3. The resultant sewage/ effluent free area protects against the fouling of the orifice seals by solids or high viscous substances.

### 4. 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.

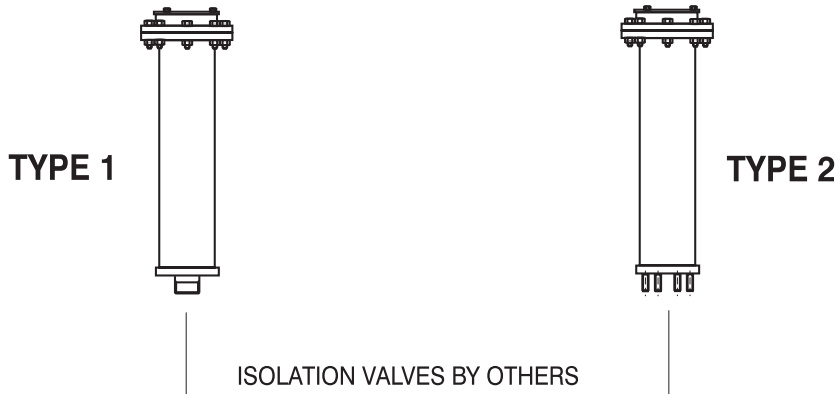
The considerable sewage/effluent free area obviates the possibility of leaks that could otherwise be caused by solids entering the sealing areas.

### 5. VACUUM RELIEF (AIR INTAKE) - PIPELINE DRAINING

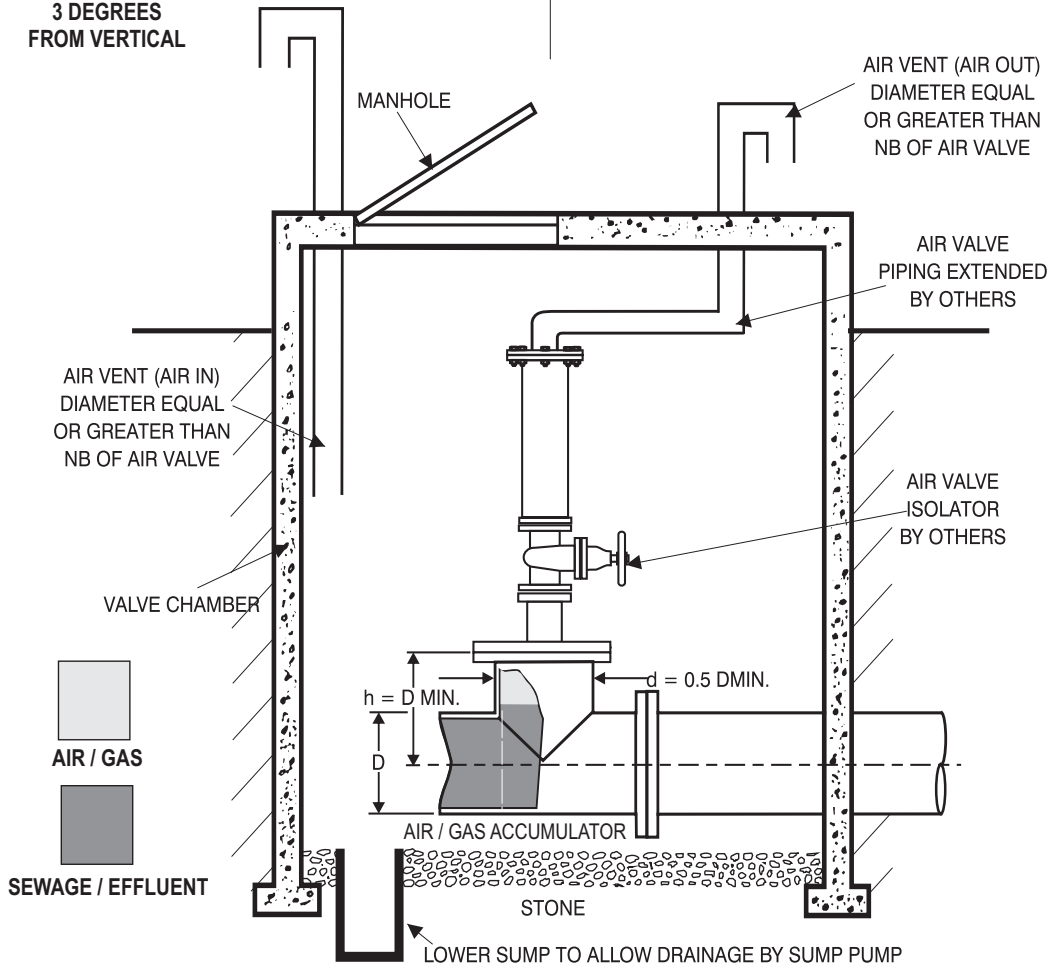
When the internal pipeline pressure reduces to atmosphere the "Anti - Surge " mechanism and control float assembly drops, opens the large orifice and allows the pipeline to take in air to displace the draining media so as to prevent undesirable low negative pressure\*.The hollow, smooth side float design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

**\*NOTE:** Negative pressure values are dependant on valve size selection.

**RECOMMENDED INSTALLATION ARRANGEMENTS**

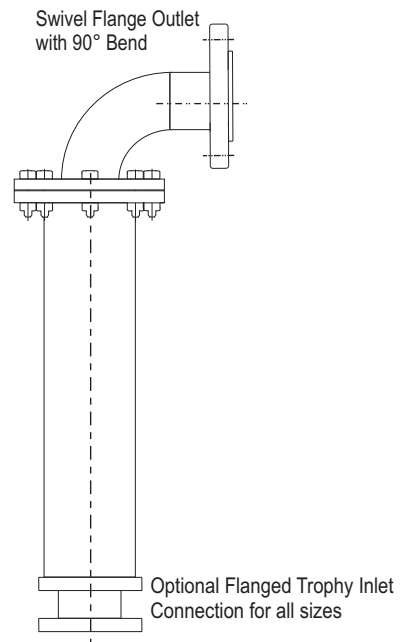
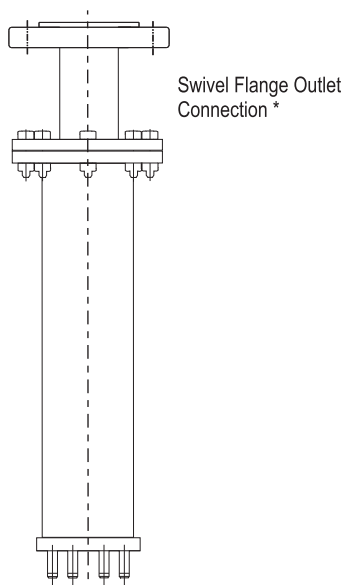
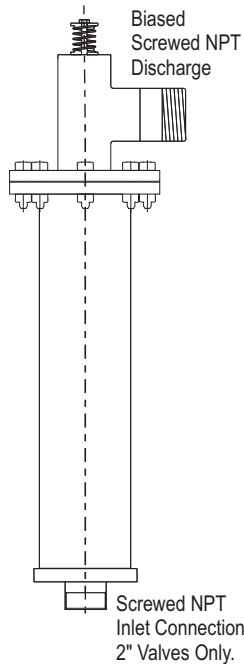
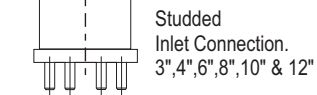
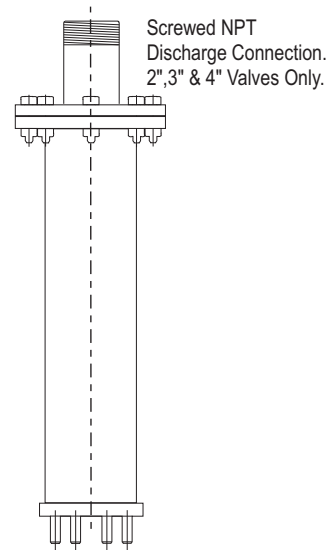
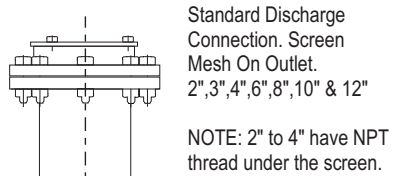


THE DEGREE OF TOLERANCE ALLOWED FOR THE EFFECTIVE OPERATION OF A VENT-O-MAT AIR RELEASE AND VACUUM BREAK VALVE IS **3 DEGREES FROM VERTICAL**



**TYPICAL VALVE CHAMBER**

**AVAILABLE DISCHARGE / INLET CONNECTIONS**  
**2" TO 8"**  
**10" & 12" VALVES AVAILABLE ON REQUEST**



\*NOTE  
Discharge Connections Are Equal To Valve Pressure Rating

Information subject to change

### COMPONENT DESCRIPTION & MATERIAL SPECIFICATION THREADED 2" & STUDED INLET - 3" TO 4"

**Type:**

Series RGX - Double Orifice (Small & Large Orifice) with "Anti-Surge" Mechanism.

**End Connection:**

Flange with Threaded NPT Male - 2" valves.  
Flange with Screwed Studs - 3" & 4" valves.

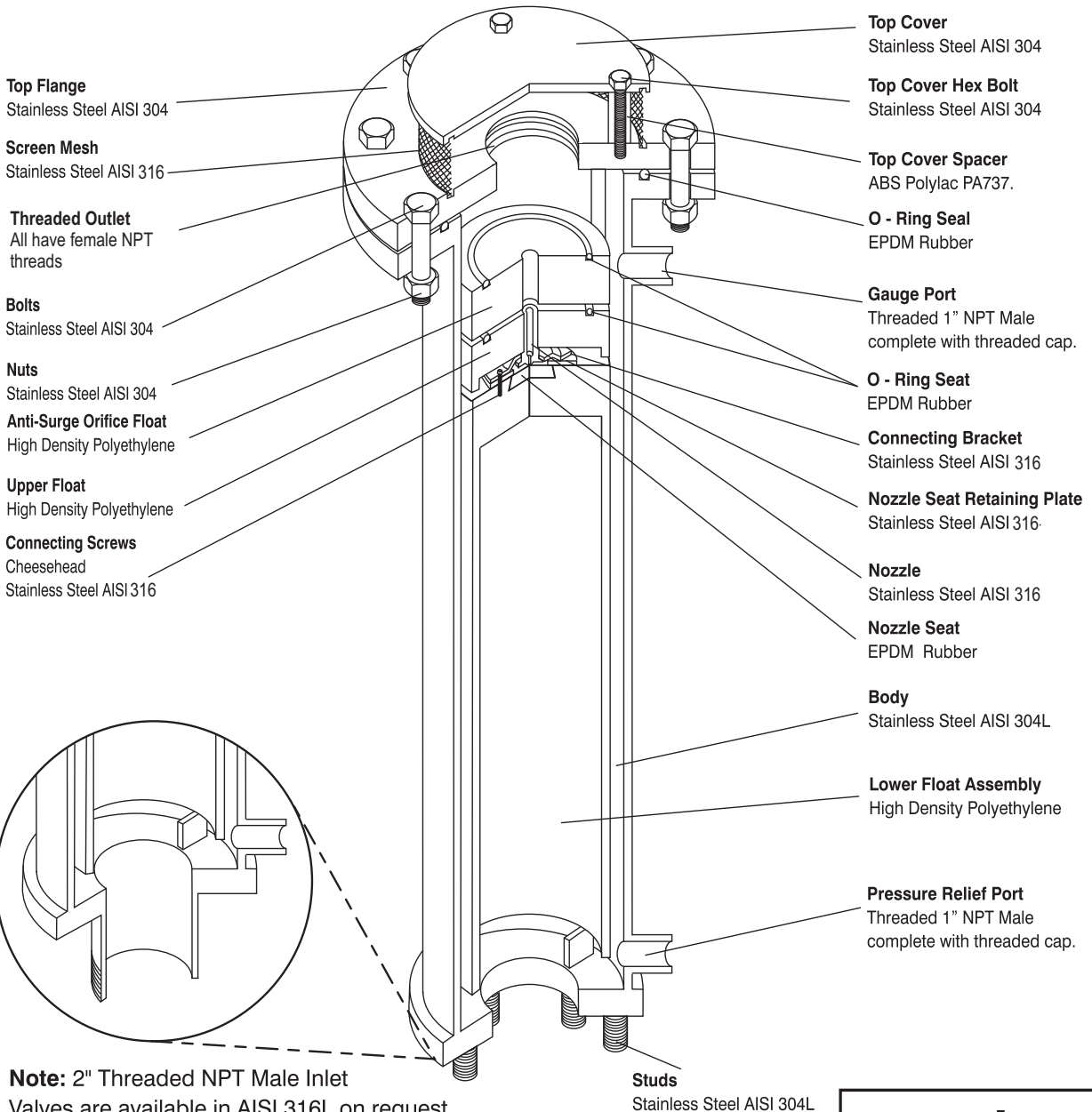
**Nominal Sizes:**

2"  
3"  
4"

**Model No:**

RGX 1021 \_\_\_\_\_ 145 psi  
RGX 1031 \_\_\_\_\_ 145 psi

**Pressure Ratings:**



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

Information subject to change without prior notice



**COMPONENT DESCRIPTION & MATERIAL SPECIFICATION  
THREADED 2" & STUDED INLET - 3" TO 4" EXPANDED BODY**

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

**End Connection:**  
Flange with Threaded NPT Male 2" valves.  
Flange with Screwed Studs 3" & 4" valves.

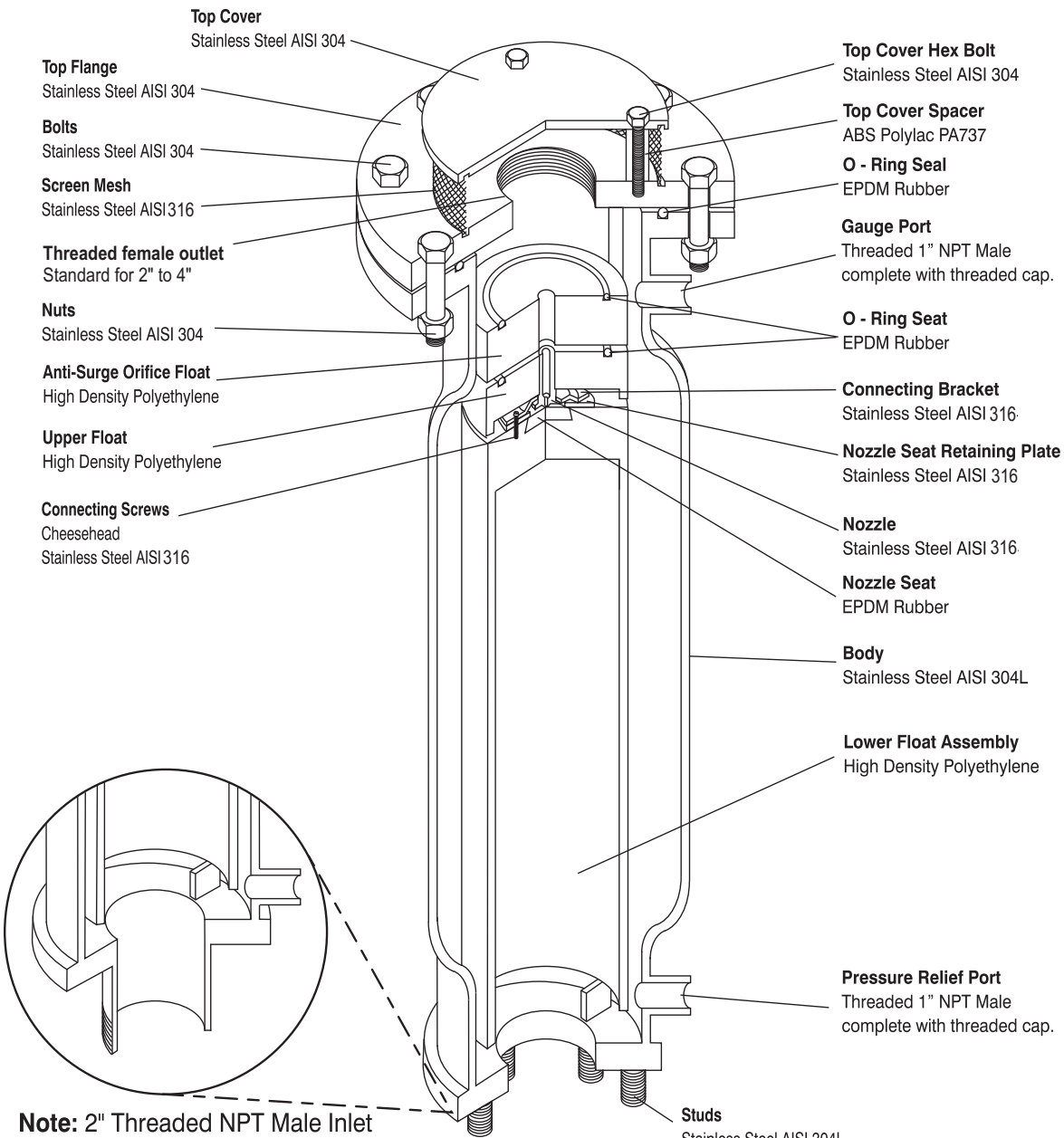
**Nominal Sizes:**

2"  
3"  
4"

**Model No's:**

RGX 1621 \_\_\_\_\_ 232 psi  
RGX 1631 \_\_\_\_\_ 232 psi

**Pressure Ratings:**



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

Information subject to change without prior notice

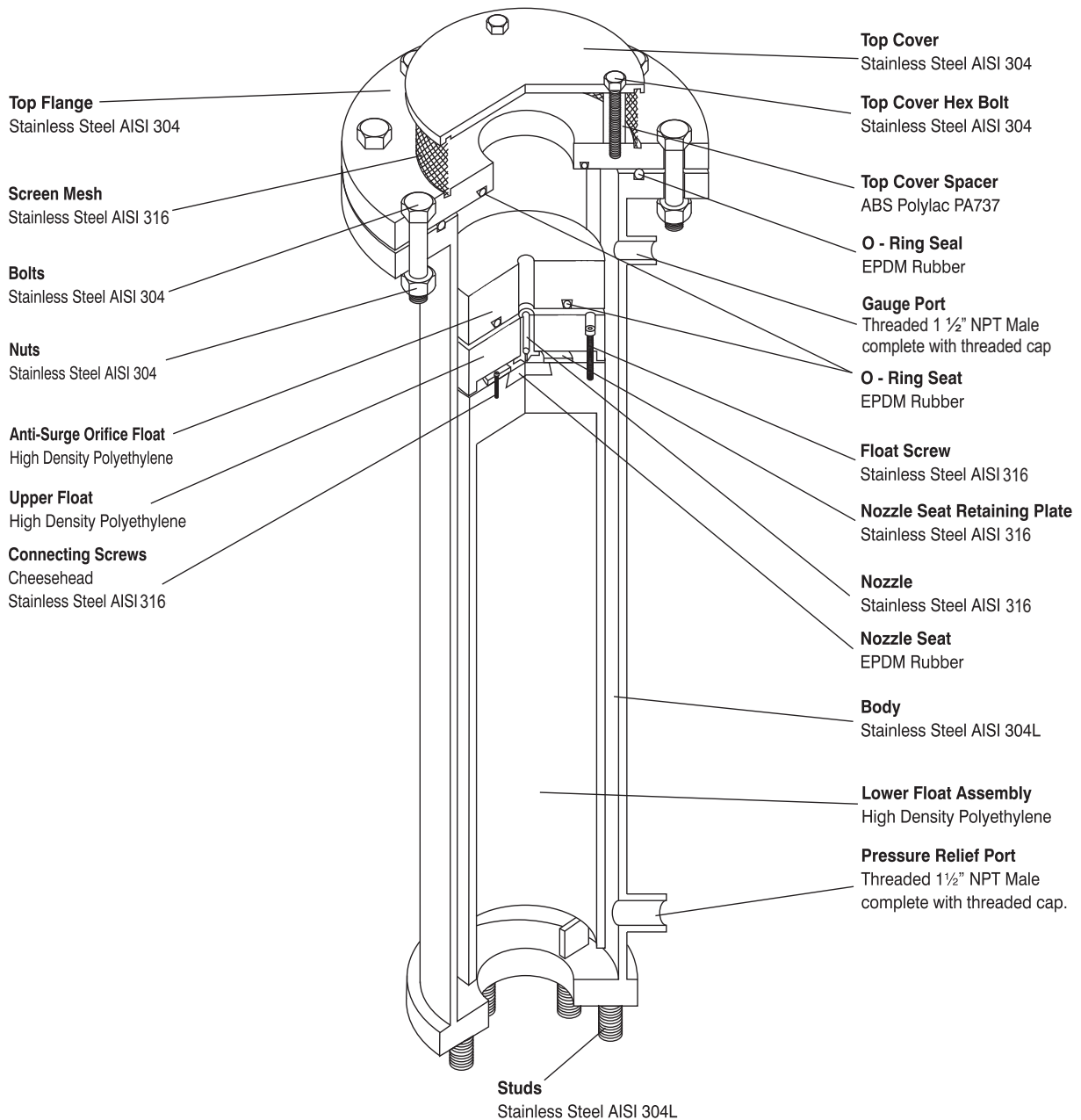
**COMPONENT DESCRIPTION & MATERIAL SPECIFICATION**  
**STUDED INLET - 6" & 8"**

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

**End Connection:**  
 Flange with Screwed Studs - 6" & 8" valves.

**Nominal Size:**  
 6"  
 8"

**Model No:** RGX 1031 \_\_\_\_\_ **Pressure Rating:** 145 psi



**Note:** Valves are available in AISI 316L on request.

Information subject to change without prior notice

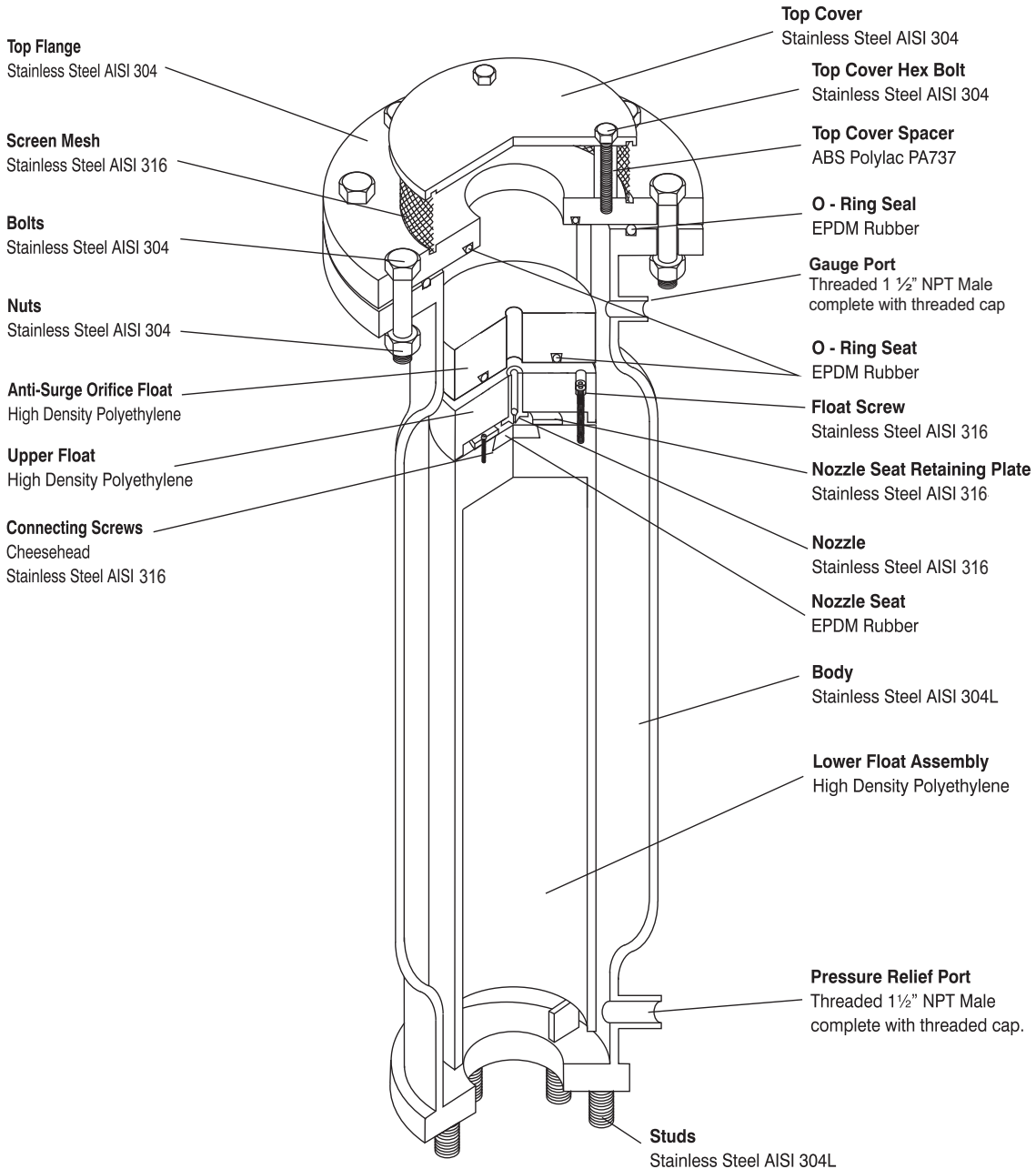
**COMPONENT DESCRIPTION & MATERIAL SPECIFICATION  
STUDED INLET - 6" TO 8" EXPANDED BODY**

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

**End Connection:**  
Flange with Screwed Studs - 6" & 8" valves.

**Nominal Sizes:**  
6"  
8"

**Model No's:** RGX 1631 \_\_\_\_\_  
**Pressure Ratings:** 232 psi

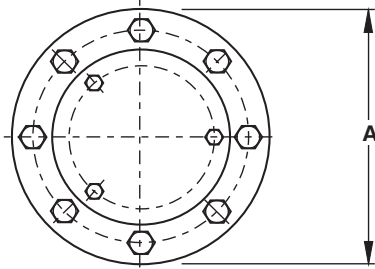


**Note:** Valves are available in AISI 316L on request.

Information subject to change without prior notice

## GENERAL SPECIFICATIONS

### THREADED 2" & STUDDED INLET - 3" TO 8"



**Type:**

Double Orifice (Small & Large Orifice) with Anti Surge Orifice mechanism.

**End Connection:**

Flange with 2" Male NPT Threaded and Screwed Studs for Alignment to ANSI B16.5 Class 150 for 3" to 8".

**Nominal Sizes:**

2", 3", 4", 6" & 8"

**Model No's:**

RGX 1021 \_\_\_\_\_ 145 psi  
 RGX 1031 \_\_\_\_\_ 145 psi

**Pressure Ratings psi :**

**Operating Pressure Range - psi :**

145 psi \_\_\_\_\_ Min \_\_\_\_\_ Max. \_\_\_\_\_  
 7.2 \_\_\_\_\_ 145

**Operating Temperature Range:**

40° to 176°F

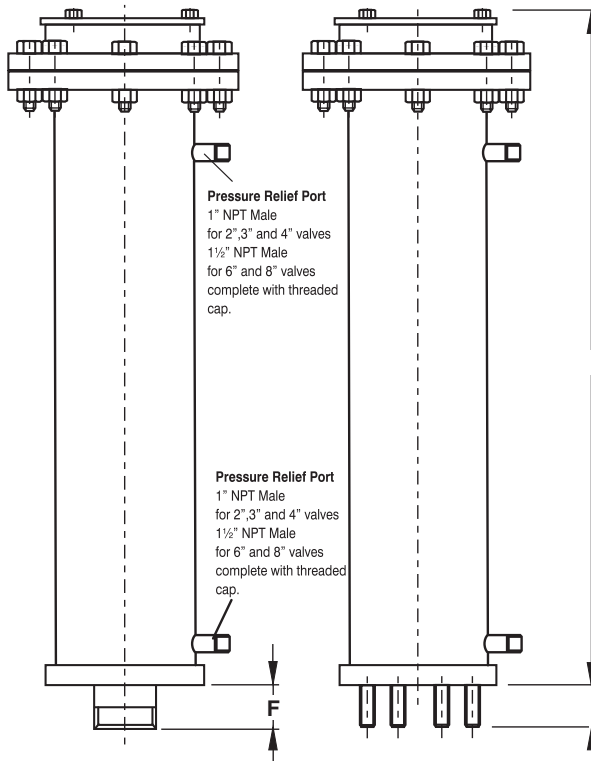
**Function:**

- 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.

**Valve Selection:-** see pages 11 & 12

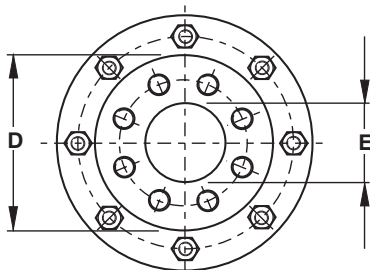
**Materials of Construction:-** see pages 5 & 7

**Installation:-** see page 3



**C Standard Factory Tests:**

- i) Hydrostatic test -1.5 x max. rated working pressure
- ii) Low head leak test - 7.2 psi
- iii) Small orifice function test at max. rated working pressure (minimum 1 valve in 10).



## OVERALL DIMENSIONS & WEIGHTS

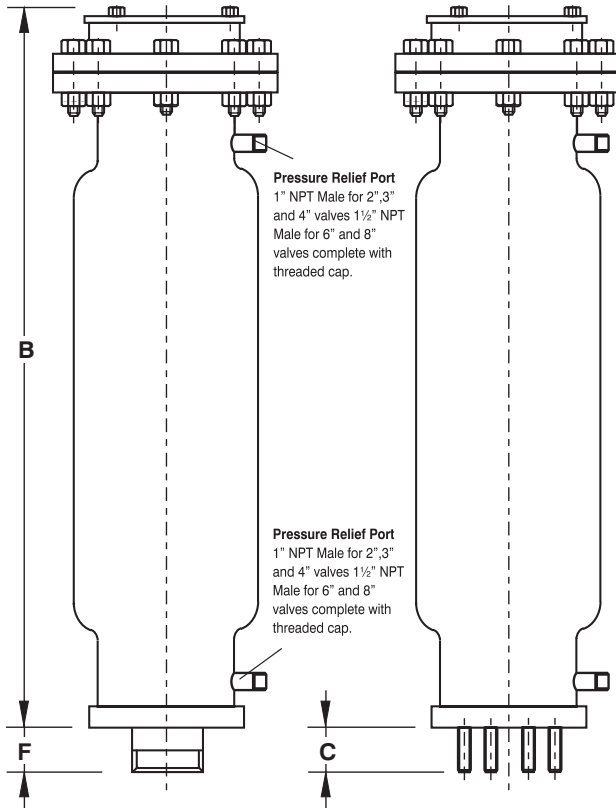
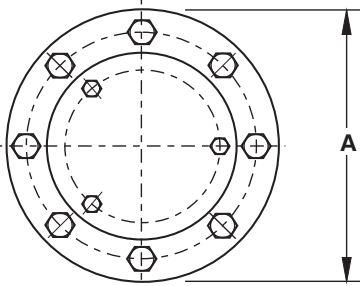
DN	Model No.	A	B	C	D	E	F	Weight Lbs
2	050 RGX 1021	8 2/3	30 3/8	N/A	5	2	1 2/3	39.7
3	080 RGX 1031	11 1/4	30 7/10	2 1/8	7 7/8	3	N/A	80.5
4	100 RGX 1031	11 1/4	30 7/10	2 1/8	8 2/3	4	N/A	79.4
6	150 RGX 1031	15 9/16	41 7/10	2 1/8	11	6	N/A	180.8
8	200 RGX 1031	17 1/2	41 7/10	2 1/8	13 6/16	8	N/A	227

Note: 2" valves have 2" NPT male inlet connections as standard.

Information subject to change without prior notice

## GENERAL SPECIFICATIONS

### THREADED 2" & STUDDED INLET - 3" TO 8" EXPANDED BODY



**Type:**

Double Orifice (Small & Large Orifice) with Anti Surge Orifice mechanism.

**End Connection:**

Flange with 2" Male NPT Threaded and Screwed Studs for Alignment to ANSI B16.5 Class 150 for 3" to 8".

**Nominal Sizes:**

2", 3", 4", 6" & 8"

**Model No's:**

RGX 1621 \_\_\_\_\_ 232 psi  
 RGX 1631 \_\_\_\_\_ 232 psi

**Pressure Ratings psi:**

**Operating Pressure Range - psi :**

232 psi \_\_\_\_\_ **Min** 7.2 \_\_\_\_\_ **Max.** 232

**Operating Temperature Range:**

40° to 176°F

**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.

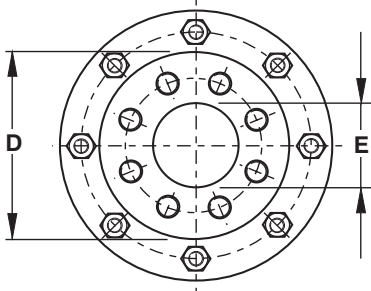
**Valve Selection:-** see pages 11 & 12

**Materials of Construction:-** see pages 6 & 8

**Installation:-** see page 3

**Standard Factory Tests:**

- i) Hydrostatic test -1.5 x max. rated working pressure
- ii) Low head leak test - 7.2 psi
- iii) Small orifice function test at max. rated working pressure (minimum 1 valve in 10).



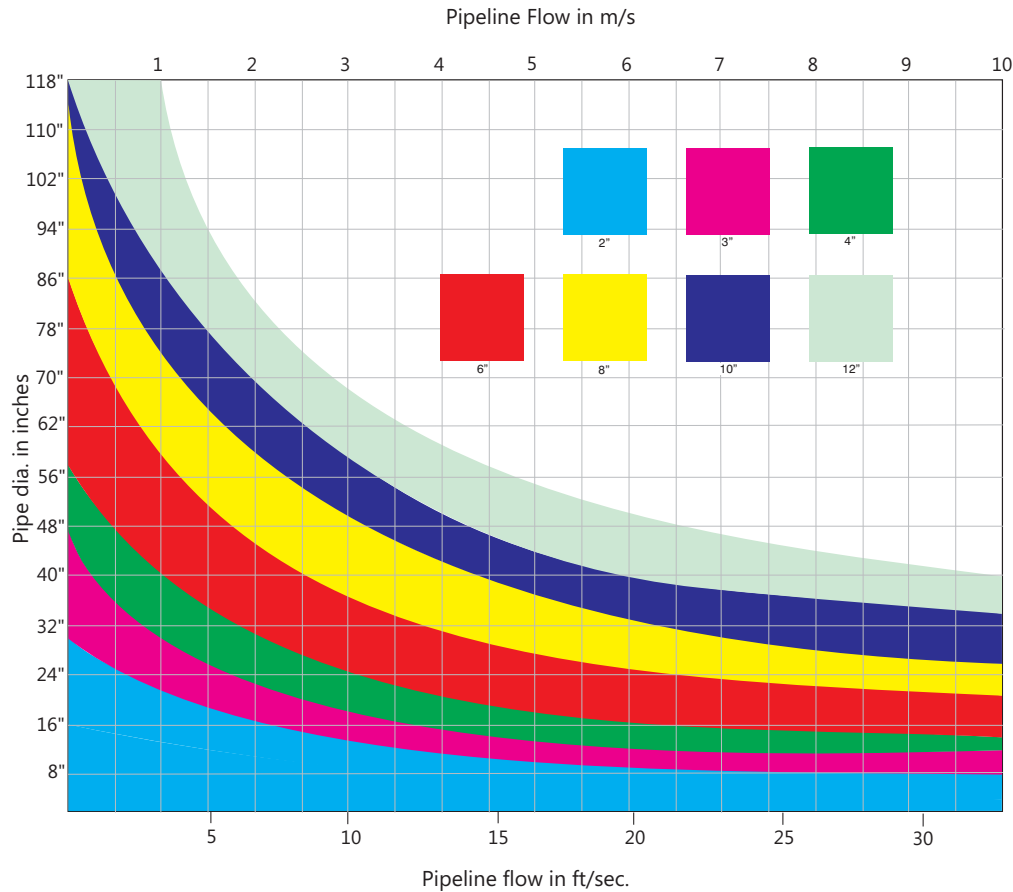
## OVERALL DIMENSIONS & WEIGHTS

DN	Model No.	A	B	C	D	E	F	Weight lbs
2	050 RGX 1621	8 2/3	30 3/8	N/A	5	2	1 2/3	46.3
3	080 RGX 1631	11 1/4	30 7/10	2 1/8	7 7/8	3	N/A	83.7
4	100 RGX 1631	11 1/4	30 7/10	2 1/8	8 2/3	4	N/A	82.6
6	150 RGX 1631	15 9/16	41 7/10	2 1/8	11	6	N/A	186.3
8	200 RGX 1631	17 1/2	41 7/10	2 1/8	13 6/16	8	N/A	232.5

Note: 2" valves have 2" NPT male inlet connections as standard.

Information subject to change without prior notice

**SELECTION & POSITIONING**



Pipe Dia Inches	Pipeline Velocity in Feet per sec																														
	2	3	5	7	8	10	11	13	15	16	18	20	21	23	25	26	28	30	31	33											
4	78	117	196	274	313	391	431	509	587	626	705	783	822	900	979	1018	1096	1174	1214	1292											
6	176	264	440	617	705	881	969	1145	1321	1409	1585	1762	1850	2026	2202	2290	2466	2642	2731	2907											
8	313	470	783	1096	1253	1566	1722	2036	2349	2505	2919	3132	3288	3602	3915	4071	4385	4698	4854	5167											
10	488	734	1223	1713	1957	2447	2891	3181	3670	3915	4404	4893	5138	5627	6117	6361	6851	7340	7585	8074											
12	705	1057	1762	2486	2819	3523	3876	4580	5285	5637	6342	7047	7399	8104	8808	9161	9865	10570	10922	11627											
14	959	1439	2398	3357	3836	4796	5275	6234	7193	7673	8632	9591	10071	11030	11989	12469	13428	14387	14866	15825											
16	1253	1879	3132	4385	5011	6264	6890	8143	9395	10022	11275	12527	13154	14406	15659	16285	17538	18791	19417	20670											
18	1585	2378	3964	5549	6342	7927	8720	10306	11891	12684	14269	15855	16648	18233	19818	20611	22197	23782	24575	26160											
20	1957	2936	4893	6851	7830	9787	10766	12723	14680	15659	17616	19574	20552	22510	24467	25446	27403	29361	30339	32297											
22	2368	3553	5921	8289	9474	11842	13026	15395	17763	18947	21316	23684	24868	27237	29605	30790	33158	35526	36711	39079											
24	2819	4228	7047	9865	11275	14093	15502	18321	21140	22549	25368	28186	29596	32414	35233	36642	39461	42279	43689	46507											
26	3308	4962	8270	11578	13232	16540	18194	21502	24810	26464	29772	33080	34734	38042	41350	43004	46312	48620	51274	54582											
28	3836	5755	9591	13428	15346	19182	21101	24937	28773	30692	34528	38365	40283	44119	47956	49874	53710	57547	59465	63302											
30	4404	6606	11010	15414	17616	22021	24223	28627	33031	35233	39637	44041	46243	50647	55051	57253	61657	66062	68264	72668											
32	5011	7516	12527	17538	20044	25054	27560	32571	37582	40087	45098	50109	52614	57625	62636	65142	70152	75163	77669	82680											
34	5657	8485	14142	19799	22627	28284	31113	36769	42426	45255	50911	56568	59397	65053	70710	73539	79196	84852	87681	93338											
36	6342	9513	15855	22197	25368	31710	34880	41222	47564	50735	57077	63419	66590	72932	79274	82445	88787	95129	98300	104641											
38	7066	10599	17665	24731	28265	35331	38864	45930	52996	56529	63595	70661	74194	81261	88327	91860	98926	105992	109525	116591											
40	7830	11744	19574	27403	31318	39148	43062	50932	58721	62636	70466	78295	82210	90039	97869	101784	109613	117443	121357	129187											
44	9474	14211	23894	33158	37895	47369	52105	61579	71053	75790	85263	94737	99474	108948	118421	123158	132632	142106	146843	156316											
48	11275	16912	28186	39461	45098	56373	62010	73284	84559	90196	101471	112745	118382	128657	140091	146569	157843	169118	174755	186029											
52	13232	19848	33080	46312	52928	66159	72775	86007	99239	105855	119087	132319	138935	152167	165398	172014	185246	198478	205094	218326											
56	15346	23019	38365	53710	61383	76729	84402	99748	115094	122767	138113	153458	161131	176477	191823	199496	214842	230188	237861	253206											
60	17616	26425	44041	61657	70466	88082	96890	114507	132123	140931	158548	176164	184972	202589	220205	228013	246630	264246	273054	290671											
62	18810	28216	47026	65836	75242	94052	103457	122266	141078	150483	169294	188104	197509	216320	235130	244535	263346	282156	291561	310372											
66	21316	31974	53290	74605	85263	106579	117237	138553	159869	170527	191843	213159	223816	245132	266448	277106	298422	319738	330396	351712											
70	23978	35987	59845	83923	95912	119889	131878	155866	179854	191843	215831	239819	251808	275796	297784	309772	333760	355748	367736	391724											
74	26797	40195	66991	93788	107186	133983	147381	174177	200974	214372	241169	267966	281363	308160	334956	348353	375150	401947	415344	442142											
78	29772	44658	74429	104201	119087	148859	163745	193516	223286	238174	267948	297722	312603	342376	372149	387032	416804	446576	461462	491234											
82	32904	49355	82259	115162	131614	164518	180969	213873	246777	262228	296132	329035	345487	378391	411294	427746	460649	493552	510005	542908											
86	36192	54288	90480	126672	144768	180960	199056	235248	271439	286935	325727	361919	380015	416207	452399	470495	506687	542879	560975	597167											
90	39637	59455	99092	138729	158548	198185	218003	257640	297277	317095	356732	396369	416188	455825	495461	515280	554917	594554	614372	654009											
94	43238	64858	108096	151335	172954	216192	237812	281050	324289	345908	389146	432385	454004	497243	540481	562100	605339	648577	670197	713435											
98	46987	70495	117492	164488	187987	234983	258482	305478	352474	375973	422970	469967	493465	540462	587458	610957	657953	704950	728448	775445											
102	50911	76367	122719	171860	203646	254537	280013	330924	381836	407291	458203	509114	534570	585481	636392	661848	712760	763671	789127	840038											
106	54983	82474	137457	192440	219931	274914	302405	357388	412371	439862	494845	549828	577319	632302	687285	714778	769761	824744	852233	907216											
110	59211	88816	148027	207237	236843	296054	325659	384870	444080	473686	528699	583712	621712	680923	740134	769739	828950	888161	917766	976977											
114	63595	95393	159898	222583	254381	317976	349774	413369	476964	506562	572357	638152	677750	731345	794940	826738	890333	953928	985726	1049321											
118	68136	102205	170341	238477	272545	340682	374750	442886	511023	545091	613227	681363	715432	783568	851704	885773	953909	1022045	1056113	1124250											

**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 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.
2. Move vertically on the graph 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 it's operating limits and to select the next valve size.

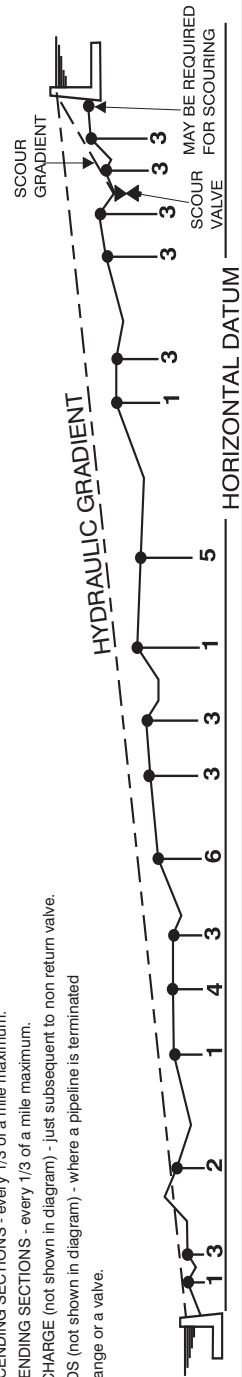
#### EXAMPLE OF VALVE SIZING (ASSUMING AN INDIVIDUAL SECTION)

A Ø 16" pipeline draining at 9.84 ft/s what valve size should be selected?

From the 9.84 ft/s point move vertically until the Ø 16" pipe size horizontal line is intersected. This places the intersection point squarely in the centre of the operating band of a 3" Vent -O- Mat RGX valve. But, if for example, the drainage rate is likely to go closer to 13.12 ft/s, the valve would be operating on it's limit and it may be prudent to change to a 4" Vent -O- Mat RGX.

#### 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 a sewage 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 DESCENDING SECTIONS - every 1/3 of a mile maximum.
6. LONG ASCENDING 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.



## Series RGX

# SURGE & WATERHAMMER PROTECTION

### Introduction

The Vent-O-Mat Series RGX "Anti-Surge" sewage air release and vacuum break valve, is the product of extensive research into the development of an efficient, but cost effective solution to surge problems (both mass liquid oscillation and elastic transient phenomena) associated with any operating pipeline. Automatic dampening, relevant to the pipeline's needs is provided by either one of three design features. These special features are unique in a pipeline component of such compact and economic design.

### Surge Protection - Initial Filling

The RGX incorporates the additional floating "Anti-Surge" Orifice which is aerodynamically engineered to throttle air discharge when liquid approach velocity would otherwise become too great and induce an unacceptable pressure rise. The air throttling action increases resistance to the flow of the approaching liquid which consequently decelerates to a velocity which reduces the pressure rise when the valve closes (see operation of valve on pages 1 & 2). Vent-O-Mat series RGX is an essential precaution for pipeline priming.

### Surge Protection - Pump Trip Conditions

In instances where a pipeline experiences liquid column separation due to pump stoppage, high shock pressures can be generated when the separated liquid column rejoins.

The Vent-O-Mat series RGX takes in air through the unobstructed large orifice when liquid column separation occurs, but controls the discharge of air/gas through the "Anti-Surge" Orifice as the separated column commences to rejoin. The rejoining impact velocity is thereby considerably reduced to alleviate high surge pressures in the system (see operation of valve on pages 1 & 2).

Other surge control measures may, dependant on pipeline profile, diameter and operating conditions, be needed to provide the primary surge alleviation function with the Vent-O-Mat sewage air-valves forming an integral and valuable addition in a combined strategy for further reducing surge pressures. The benefit of the "Anti-Surge" Orifice can be readily demonstrated by suitable surge modelling software.

### Surge Protection - Pipeline Operating

The operation of valves and similar flow control devices can cause high-pressure transients in an operating pipeline.

The unique, single chamber design of the Vent-O-Mat series RGX valve enables a pocket of air to be trapped in the valve chamber. Automatic operation of the small orifice control float regulates the volume of air entrapped.

The volume maintained in the valve will provide a cushioning benefit to the pipeline for short duration transient pressure "spikes". This effect can be modelled by the design engineer using suitable surge software.



## **SURGE & WATERHAMMER PROTECTION**

### **Computer Modelling**

The effectiveness of Vent-O-Mat series RGX has been substantiated by independent third party testing and by thousands of applications globally. Effective computer modelling, based on practical tests, has been ensured in the well-known and respected commercially available surge analysis software programmes such as SURGE 2000, PFT impulse, FLOWMASTER, TRANSAM and WATHAM.

### **Holistic Surge & Water Hammer Protection**

Vent-O-Mat forms an integral part of a well planned, holistic surge protection strategy that should, according to application needs and financial constraints, include surge vessels, check valves, control valves and/or any other equipment needed to alleviate unacceptable surge behaviour.

### **Technical and Financial Benefits**

The Vent-O-Mat series RGX valve offers definite financial and technical advantages when incorporated as part of a holistic surge protection strategy. This includes:

1. Improved alleviation of surge behaviour including reduction of:
  - Surge pressure magnitudes by slowing surge velocities
  - Duration of oscillation following a pump trip, as the sewage air-valve continuously absorbs and dissipates the energies of the surge.
2. Potential for reduction in size and/or quantity of conventional surge protection devices such as surge vessels etc.
3. Automatic protection during initial filling when most surge protection devices are not operational.
4. Holistic protection as each sewage air valve installed has design features to automatically damp surges.
5. The valve is virtually maintenance free.

### **Service**

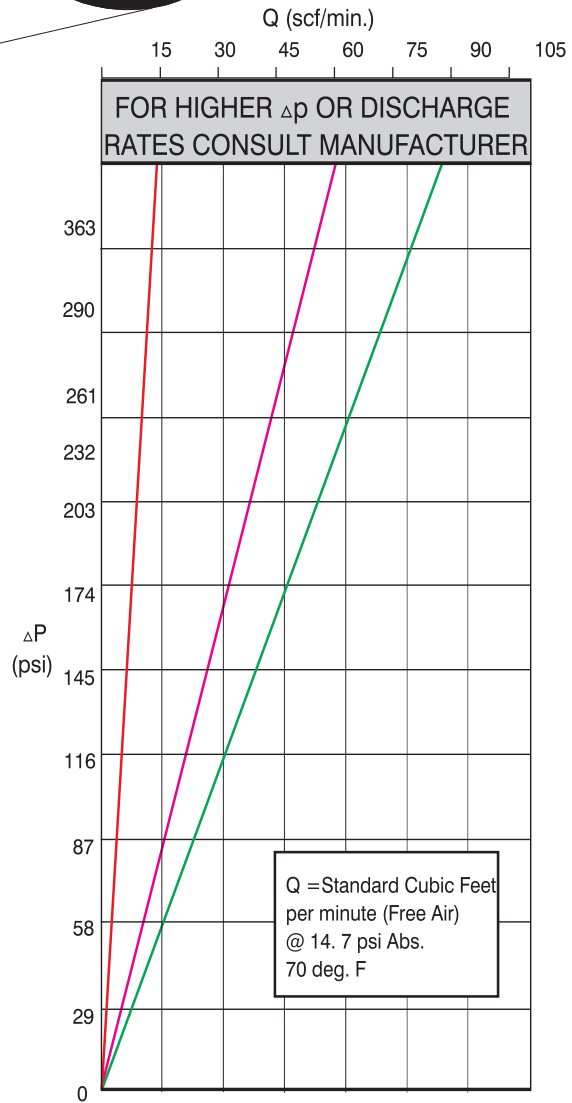
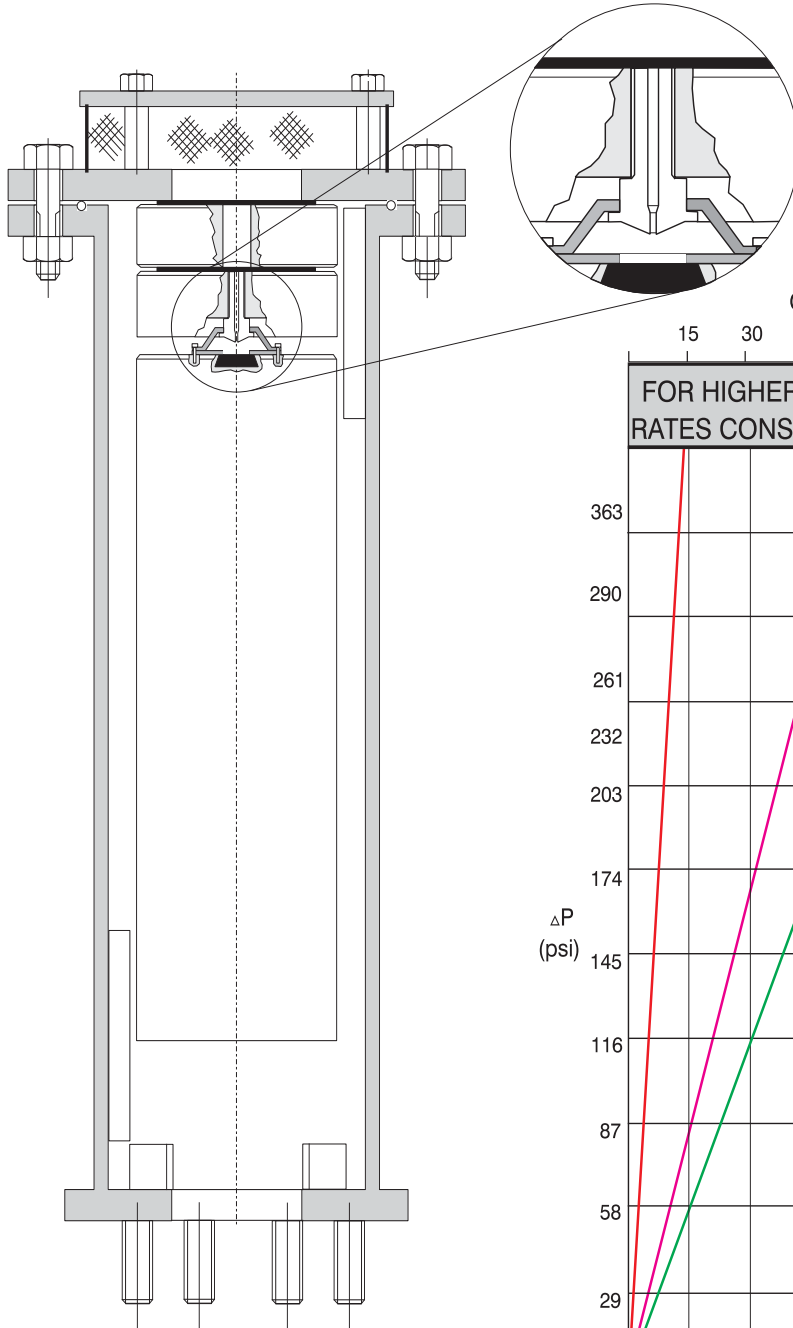
Vent-O-Mat is committed to finding the most cost effective and efficient solution to pipeline complexities. Services include air valve sizing and positioning and assistance to consulting engineers on defining appropriate surge and water hammer protection strategies. Vent-O-Mat has built a sound relationship with many international consulting firms and has gained global recognition for selling solutions!

### SMALL ORIFICE DISCHARGE PERFORMANCE

**Type:**  
Series RGX - Double Orifice (Small & Large Orifice)  
with "Anti-Surge" Orifice Mechanism

**Model No's:**  
RGX 1021/1031  
RGX 1621/1631

- █ " 0.07" small orifice - 2", 3", 4" Valves
- █ " 0.20" small orifice - 6" Valves
- █ " 0.24" small orifice - 8" Valves



## Why?

- **“ANTI - SHOCK” - “ANTI - SURGE”** - The RGX is the only air release valve available that is supplied as standard with a mechanism which operates automatically to prevent pipeline damage from the high induced pressure transients associated with high velocity air discharge. Surge resulting from liquid column separation and liquid oscillation is dramatically reduced as an automatic function of this mechanism.
- **PERFORMANCE** - The RGX has been designed and developed to provide the optimum usable and safe performance relative to all functions. Selection data has been substantiated through CSIR\* and other testing and can therefore, be confidently referenced.
- **QUALITY** - The RGX economically offers the highest quality construction and materials available in an air release and vacuum break valve. Stringent manufacturing and test procedures are maintained to ensure the best possible service and reliability is given by every valve produced.
- **SERVICEABILITY** - The RGX design facilitates extreme ease of service and maintenance. Components are in corrosion free materials to allow problem free disassembly and reassembly even after many years of operation. All maintenance spares are replaceable without special tools or skills.
- **VACUUM BREAK** - The RGX series large orifice diameters equal the nominal size of the valve, i.e., a 8" valve has a 8" orifice. This ensures the least possible resistance to the intake of air and consequently the least possible negative pressure within a draining pipeline.
- **COMPACTNESS** - Although extremely robust the RGX valve's lightweight and compact construction offers handling transport and installation advantages.
- **BACK UP** - Vent -O- Mat provides highly committed customer orientated sales, service, spares and technical back up - TRY US!!!

\* Council for Scientific and Industrial Research

## PURCHASE SPECIFICATION

### VENT -O- MAT MODEL NO.

Page 9 - Series RGX - 2" to 8".

Page 10 - Series RGX - 2" to 8". (Expanded Body)

### CONSTRUCTION & DESIGN

The Sewage Air Release & Vacuum Break Valve shall consist of a compact tubular all stainless steel fabricated body, hollow direct acting float and solid large orifice float in H.D.P.E. - stainless steel nozzle and woven dirt inhibitor screen, EPDM rubber seals and seat.

The valve shall have an integral "Anti-Surge" Orifice mechanism which shall operate automatically to limit transient pressure rise or shock induced by closure to less than 1.5 x valve rated working pressure.

The intake orifice area shall be equal to the nominal size of the valve i.e., a 6" valve shall have a 6" intake orifice. Large orifice sealing shall be effected by the flat face of the surge control float seating against a EPDM rubber 'O' ring housed in a dovetail groove circumferentially surrounding the orifice.

Discharge of pressurized air shall be controlled by the seating & unseating of a small orifice nozzle on a natural rubber seal affixed into the control float. The nozzle shall have a flat seating land surrounding the orifice so that damage to the rubber seal is prevented.

The valve construction shall be proportioned with regard to material strength characteristics, so that deformation, leaking or damage of any kind does not occur by submission to twice the designed working pressure.

Connection to the valve inlet shall be facilitated by flanged ends conforming to ANSI B16.5 Class 150 or NPT where applicable.

Flanged ends shall be supplied with the requisite number of stainless steel screwed studs inserted for alignment to the specified standard. **Nuts and washers shall be included.**

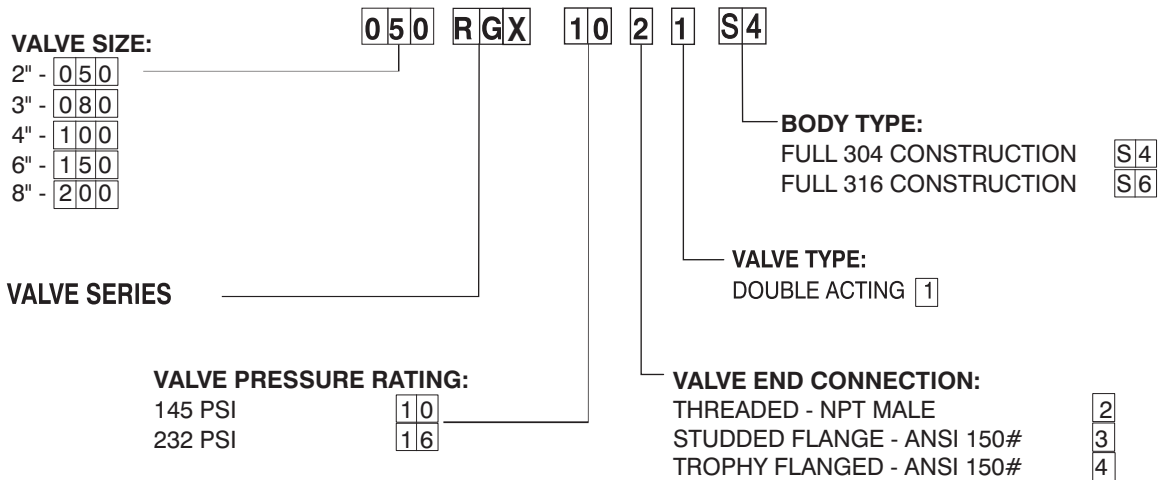
### OPERATION

1. Prior to the ingress of liquid into the valve chamber, as when the pipeline is being filled, valves shall vent through the large orifice when sewage/effluent approach velocities are relative to a transient pressure rise, on valve closure, of  $< 1.5 \times$  valve rated pressure.

At higher sewage/effluent approach velocities, which have a potential to induce transient pressure rises  $> 1.5 \times$  valve rated pressure on valve closure, the valve shall automatically discharge air/gas through the "Anti-Surge" Orifice and reduce sewage/effluent approach velocity, so that on closure a maximum Transient pressure rise of  $< 1.5 \times$  valve rated pressure is realised.

2. Valves shall not exhibit leaks or weeping of liquid past the large orifice seal at operating pressures of 7.2 psi to  $1.5 \times$  valve rated working pressure.
3. Valves shall respond to the presence of air/gas by discharging it through the small orifice at any pressures within a specified design range, i.e. 7.2 psi to 145 psi and shall remain leak tight in the absence of air.
4. Valves shall react immediately to pipeline drainage or liquid column separation by the full opening of the large orifice so as to allow unobstructed air intake at the lowest possible negative internal pipeline pressure.

## ORDERING GUIDE



**Note:**

- 10" and 12" valves are available on request.

### TEST SPECIFICATION

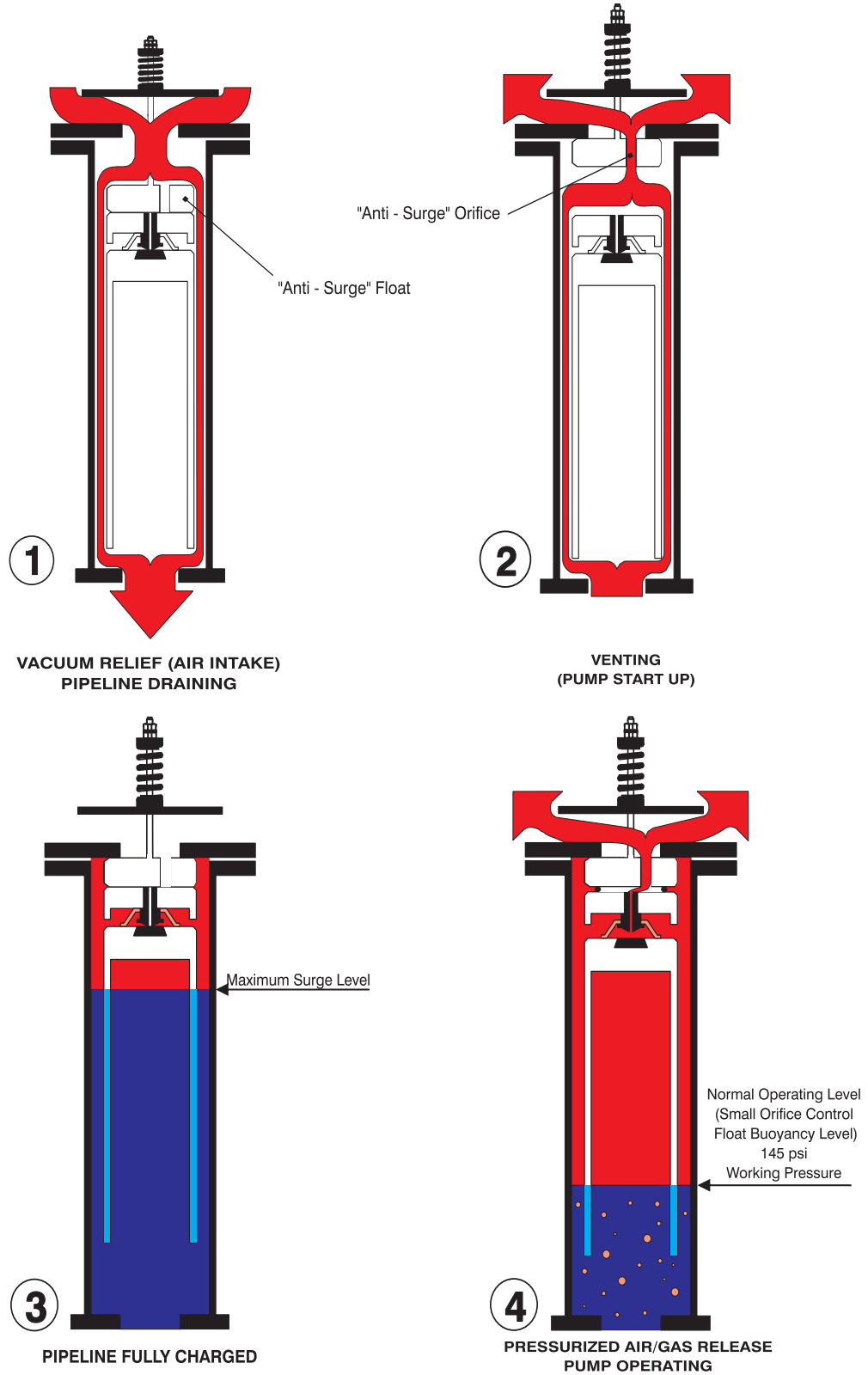
All air release valves supplied shall be subjected to the following testing procedures in the order laid down:

- A high pressure strength and leak test whereby the valve is filled with water and pressurized to twice the rated working pressure which shall be held for a period of 2 minutes. Any leaking, weeping or sweating shall be reason for rejection.
- A low head leak test whereby the valve is filled with water and pressurized to a maximum of 7.2 psi using a visible water column connected to the test rig. The valve shall be rejected if leak tightness is not maintained for 2 minutes.
- 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 30 - 45 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.

# Series RGXb OPERATION



**PRE NOTES:**

It is good engineering practice to install a sewage air valve prior to the pump discharge check valve, on vertical turbine pumps and deepwell submersible pump applications. The purpose of these valves are to control air/gas entry into the main pipeline on initial pump start up and to fully break vacuum in the vertical riser upon pump shutoff.

Operation of conventional sewage 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 liquid column slams the sewage 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 release of air/gas in the vertical riser upon pump startup.
- ` Dampen surge pressures upon startup.
- ` Provide vacuum protection when the pump stops and the vertical column drains.

**1. VACUUM RELIEF (AIR INTAKE)**

Upon pump stop, the discharge check valve closes. Sewage/effluent drains from the sewage air valve and the pump's vertical column. The negative differential created by the draining liquid causes atmospheric air to push the "Anti-Surge" Float down, opening the Large Orifice and allows air to displace the draining liquid to prevent potentially damaging internal negative pressure\*.

The hollow smooth side float design, discourages the adherence of solids and viscous substances which, therefore tend to withdraw from the valve into the pipeline when draining occurs.

**2. VENTING (PUMP START UP)**

Air/gas is forced through the "Anti-Surge" Orifice resulting in the deceleration of the approaching liquid column due to the resistance of rising air pressure in the valve.

This dampens transients when the sewage air valve closes and the liquid column opens the discharge check valve.

**3. PRESSURIZED AIR RELEASE FROM A FULL PIPELINE**

Sewage/effluent has entered the valve chamber and buoyed the floats to close both the "Anti-Surge" orifice and the small orifice. The design's compression/volume relationship prevents the media from ever exceeding the maximum surge level indicated in diagram 3. The resultant sewage/effluent free area protects against the fouling of the orifice seals by solids or high viscous substances.

**4. PRESSURIZED AIR RELEASE (PUMP OPERATING)**

The volume of disentrained air/gas increases in the valve and displaces the sewage/effluent level 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.

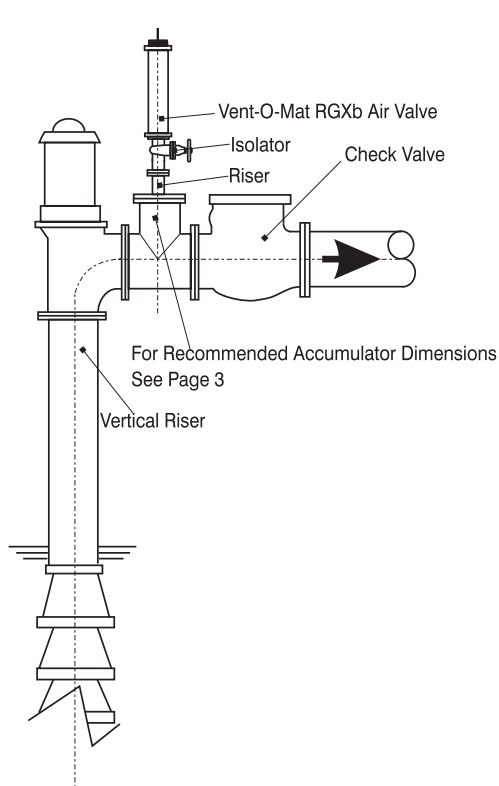
The control float will close the small orifice when sufficient air/gas has been released to restore the sewage/effluent level to the normal operating level.

The considerable sewage/effluent free area obviates the possibility of leaks that could otherwise be caused by solids entering the sealing areas.

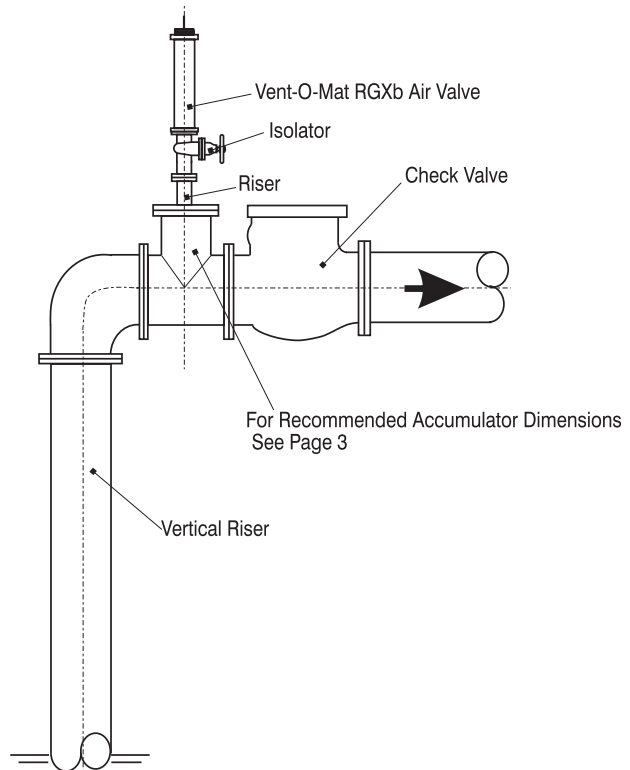
**\*Note:**

A differential pressure of less than 0.7 psi across the large orifice is required to open the valve fully under vacuum conditions.

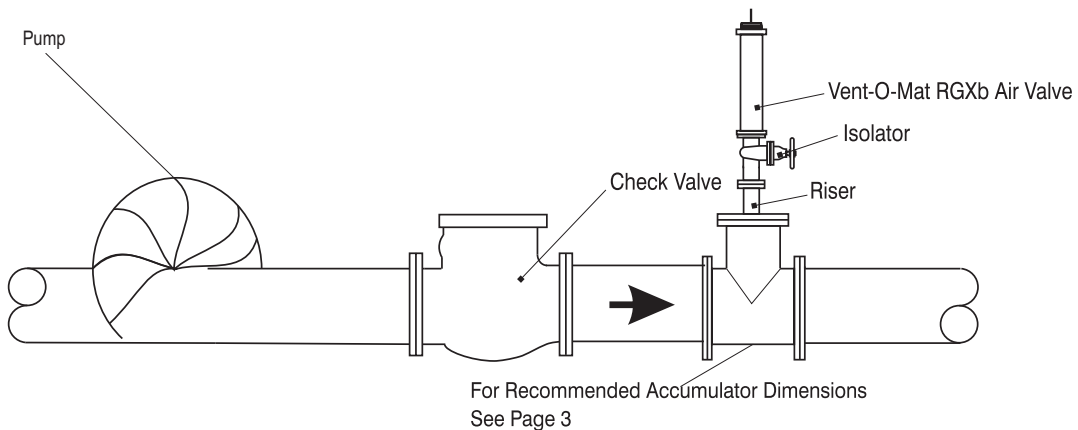
# RECOMMENDED INSTALLATION ARRANGEMENTS



**VERTICAL TURBINE  
PUMP APPLICATION**



**SUBMERSIBLE/DEEP WELL  
APPLICATION**



**CENTRIFUGAL PUMP APPLICATION**



## COMPONENT DESCRIPTION & MATERIAL SPECIFICATION THREADED 2" & STUDED INLET - 3" TO 4"

**Type:**  
Series RGXb -Double Orifice (Small & Large Orifice)  
with Bias Mechanism

**End Connection:**  
Flange with Threaded NPT Male - 2" valves.  
Flange with Screwed Studs - 3" & 4" valves.

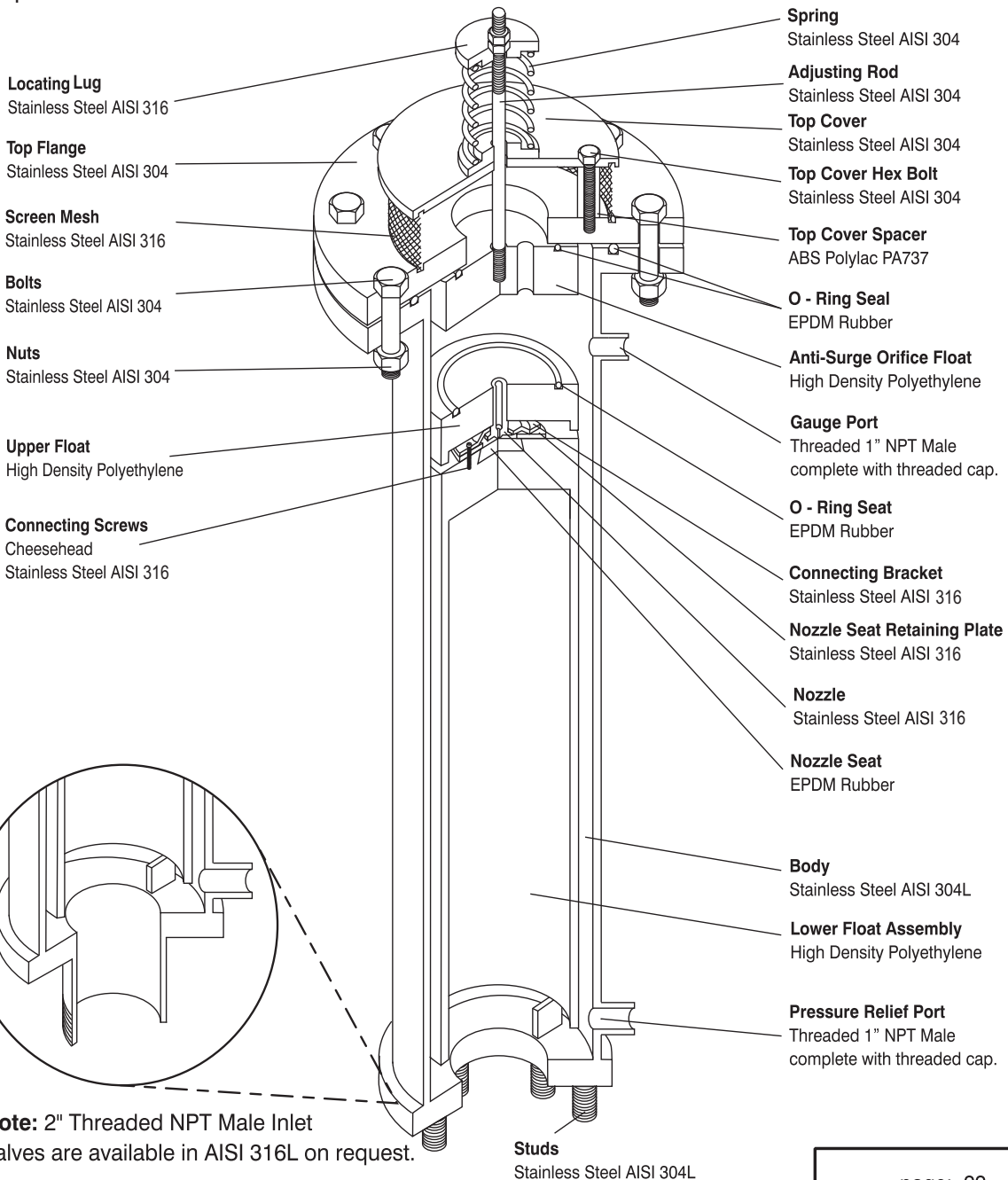
**Nominal Sizes:**

2"  
3"  
4"

**Model No's:**

RGXb 1021 \_\_\_\_\_ 145 psi  
RGXb 1031 \_\_\_\_\_ 145 psi

**Pressure Ratings:**



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

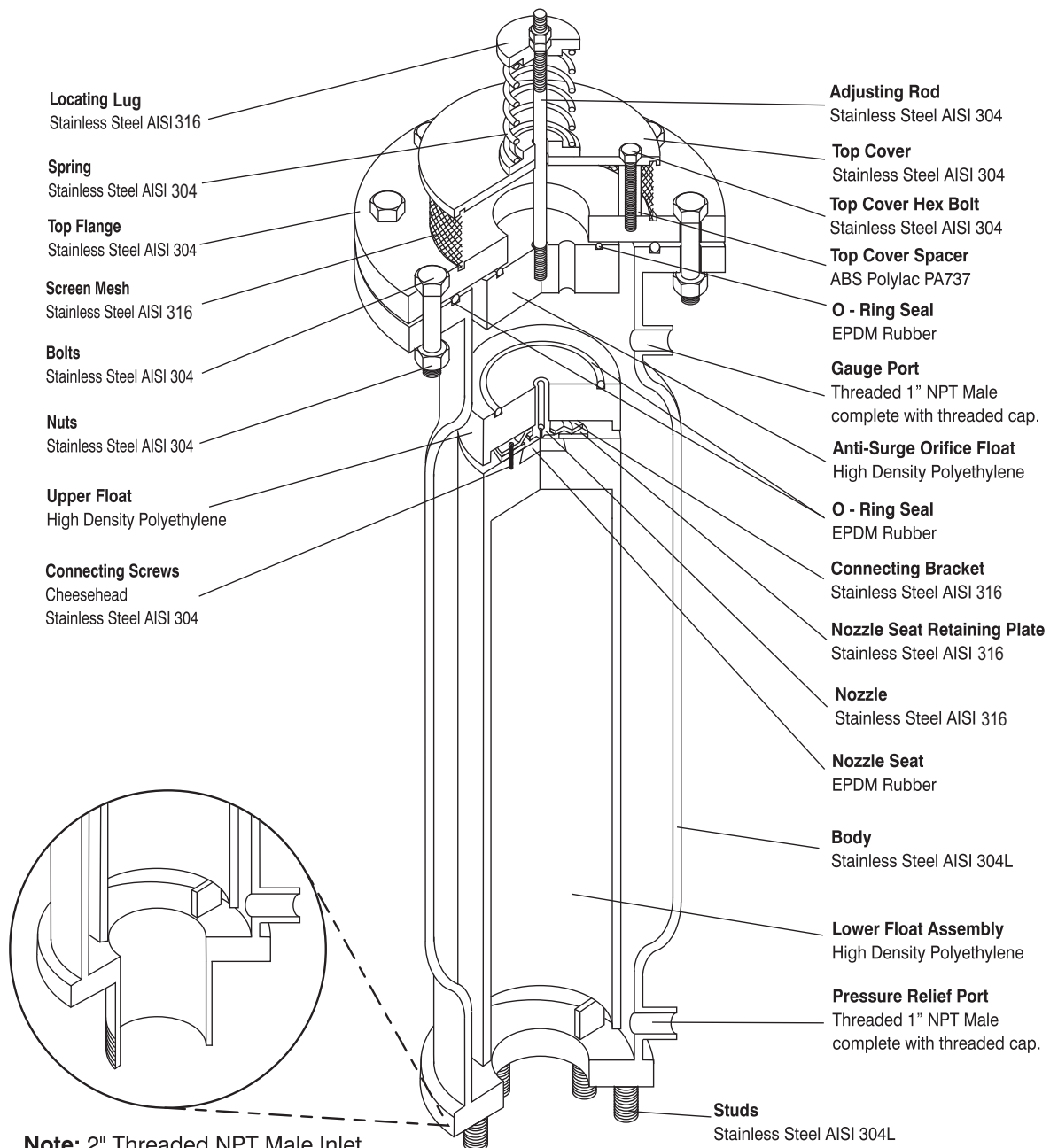
### COMPONENT DESCRIPTION & MATERIAL SPECIFICATION THREADED 2" & STUDED INLET - 3" TO 4" EXPANDED BODY

**Type:**  
Series RGXb - Double Orifice (Small & Large Orifice)  
with Bias Mechanism

**End Connection:**  
Flange with Threaded NPT Male - 2" valves.  
Flange with Screwed Studs - 3" & 4" valves.

**Nominal Sizes:**  
2"  
3"  
4"

**Model No's:**                      **Pressure Ratings:**  
RGXb 1621 \_\_\_\_\_ 232 psi  
RGXb 1631 \_\_\_\_\_ 232 psi



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

Information subject to change without prior notice

**COMPONENT DESCRIPTION & MATERIAL SPECIFICATION**  
**STUDED INLET - 6" TO 8"**

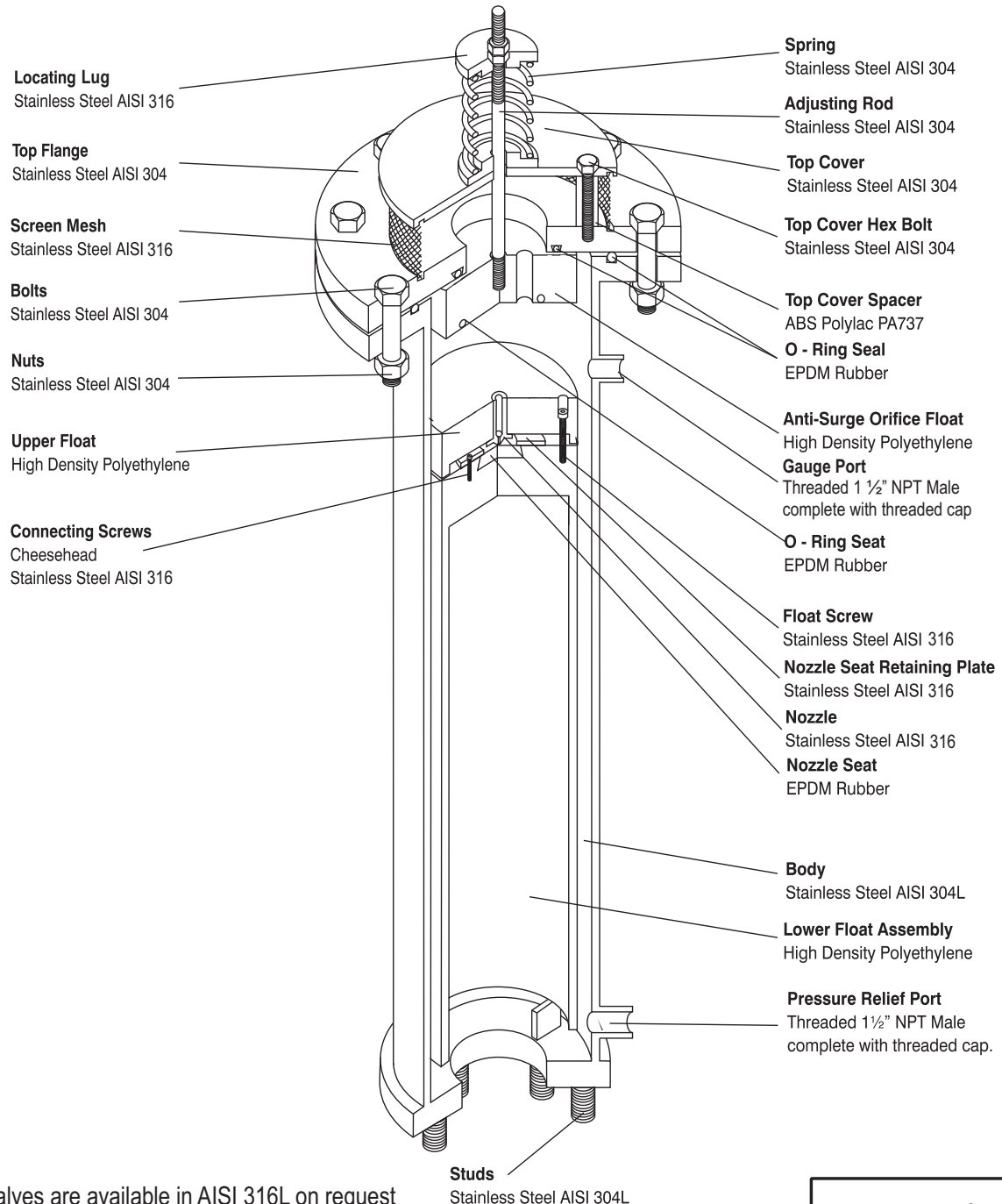
**Type:**  
 Series RGXb -Double Orifice (Small & Large Orifice)  
 with Bias Mechanism

**End Connection:**  
 Flange with Screwed Studs - 6" & 8" valves.

**Nominal Sizes:**  
 6"  
 8"

**Model No's:**  
 RGXb 1031 \_\_\_\_\_

**Pressure Ratings:**  
 145 psi



Valves are available in AISI 316L on request

Information subject to change without prior notice

**COMPONENT DESCRIPTION & MATERIAL SPECIFICATION**  
**STUDED INLET - 6" TO 8" EXPANDED BODY**

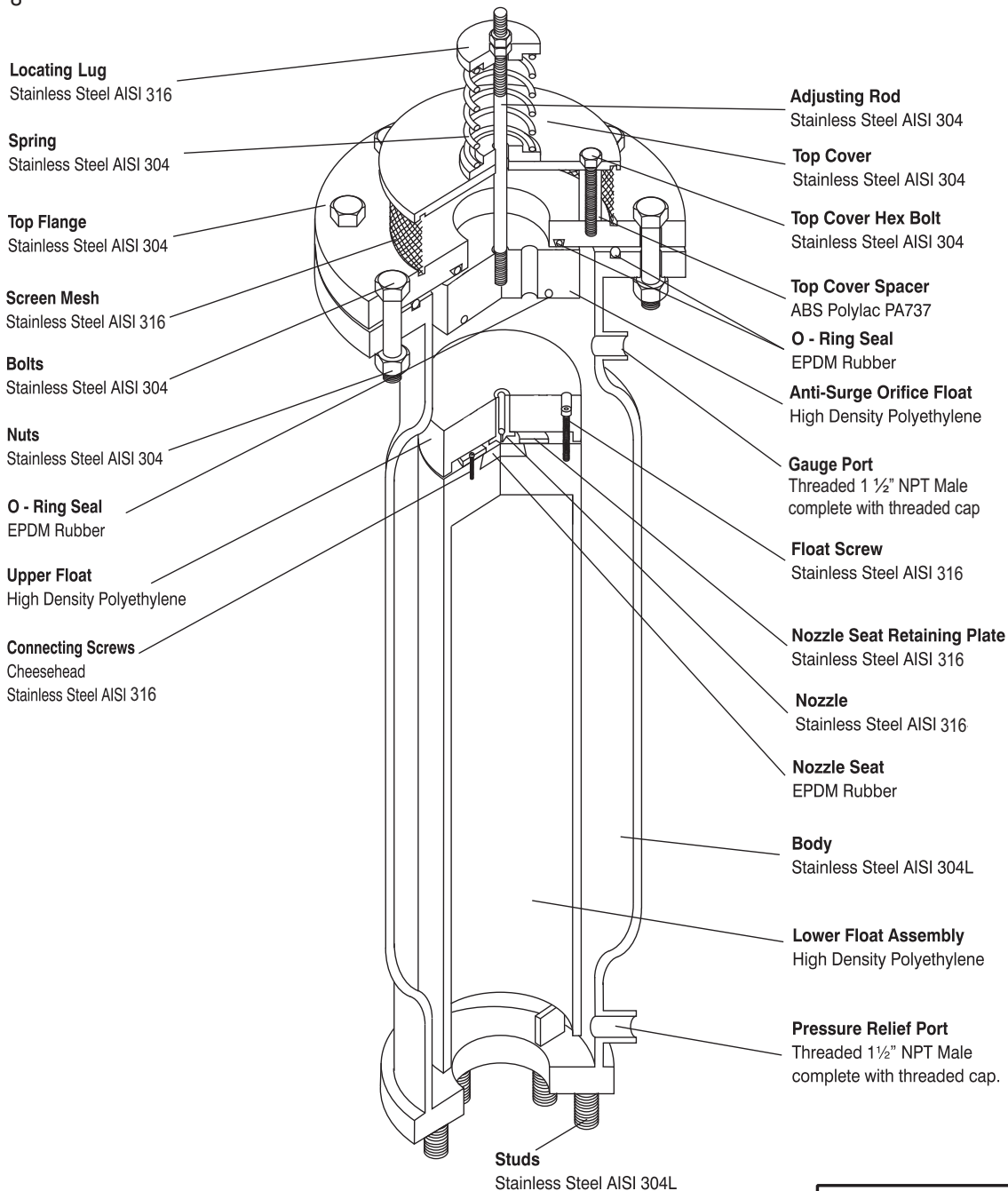
**Type:**  
 Series RGXb - Double Orifice (Small & Large) with Bias Mechanism

**End Connection:**  
 Flange with Screwed Studs - 6" & 8" valves.

**Nominal Sizes:**  
 6"  
 8"

**Model No's:**  
 RGXb 1631 \_\_\_\_\_

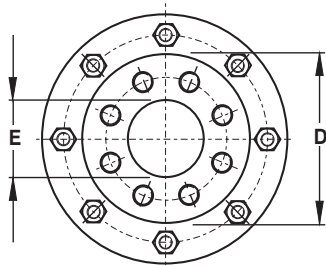
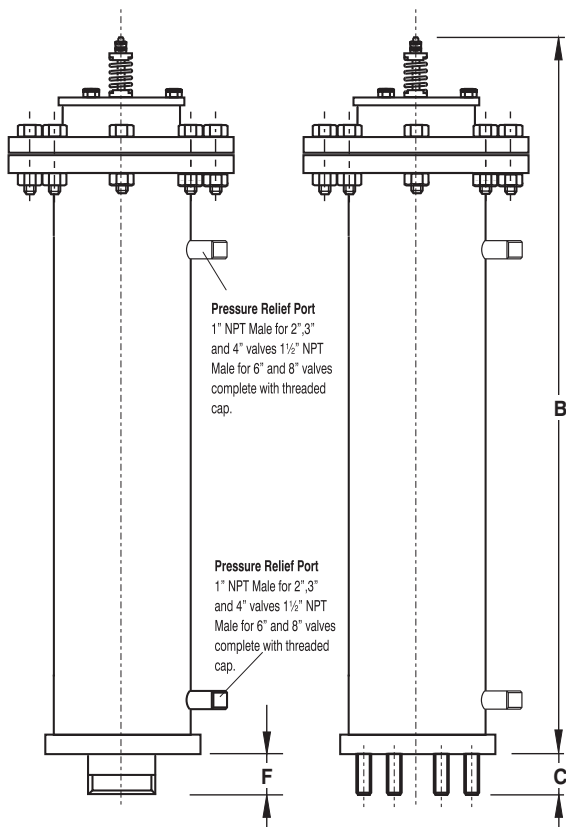
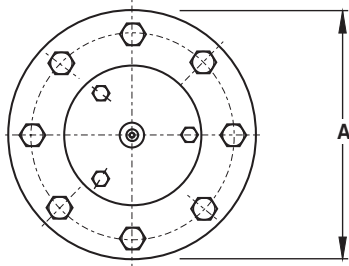
**Pressure Ratings:**  
 232 psi



Valves are available in AISI 316L on request

Information subject to change without prior notice

### GENERAL SPECIFICATIONS THREADED 2" & STUDED INLET - 3" TO 8"



**Type:**

Double Orifice (Small & Large Orifice) with Bias mechanism for large volume air intake and controlled air discharge.

**End Connection:**

Flange with 2" Male NPT Threaded and Screwed Studs for Alignment to ANSI B16.5 Class 150 for 3" to 8".

**Nominal Sizes:**

2", 3", 4", 6" & 8"

**Model No's:**

RGXb 1021 \_\_\_\_\_ 145 psi  
RGXb 1031 \_\_\_\_\_ 145 psi

**Pressure Ratings - psi:**

**Operating Pressure Range - psi:**

145 psi \_\_\_\_\_ Min \_\_\_\_\_ Max. \_\_\_\_\_  
7.2 \_\_\_\_\_ 145

**Operating Temperature Range:**

40° to 176°F

**Function:**

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

**Valve Selection:-** see pages 11 & 12

**Materials of Construction:-** see pages 22 & 24

**Installation:-** see page 21

**Standard Factory Tests:**

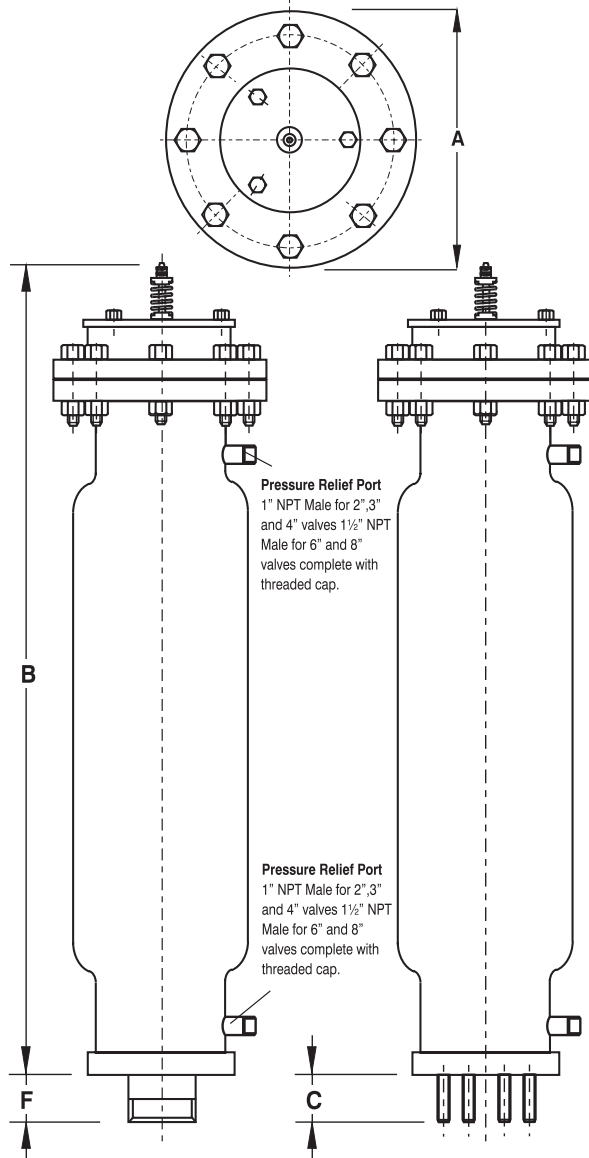
- i) Hydrostatic test -1.5 x max. rated working pressure
- ii) Low head leak test - 7.2 psi
- iii) Small orifice function test at max. rated working pressure (minimum 1 valve in 10).

### OVERALL DIMENSIONS & WEIGHTS

DN	Model No.	A	B	C	D	E	F	Weight lbs
2	050 RGXb 1021	8 2/3	33 7/16	N/A	5	2	1 2/3	39.9
3	080 RGXb 1031	11 1/4	34 7/8	2 1/8	7 7/8	3	N/A	80.9
4	100 RGXb 1031	11 1/4	34 7/8	2 1/8	8 2/3	4	N/A	79.8
6	150 RGXb 1031	15 9/16	48 4/10	2 1/8	11	6	N/A	181.7
8	200 RGXb 1031	17 1/2	48 4/10	2 1/8	13 6/16	8	N/A	227.9

### GENERAL SPECIFICATIONS

#### THREADED 2" & STUDED INLET - 3" TO 8" EXPANDED BODY



**Type:**

Double Orifice (Small & Large Orifice) with Bias mechanism for large volume air intake and controlled air discharge.

**End Connection:**

Flange with 2" Male NPT Threaded and Screwed Studs for Alignment to ANSI B16.5 Class 150 for 3" to 8".

**Nominal Sizes:**

2", 3", 4", 6" & 8"

**Model No's:**

RGXb 1621 \_\_\_\_\_

**Pressure Ratings - psi:**

232 psi

RGXb 1631 \_\_\_\_\_

232 psi

**Operating Pressure Range - psi:**

232 psi \_\_\_\_\_ Min. 7.2 \_\_\_\_\_ Max. 232

**Operating Temperature Range:**

40° to 176°F

**Function:**

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

**Valve Selection:-** see pages 11 & 12

**Materials of Construction:-** see pages 23 & 25

**Standard Factory Tests:**

- i) Hydrostatic test - 1.5 x max. rated working pressure
- ii) Low head leak test - 7.2 psi
- iii) Small orifice function test at max. rated working pressure (Minimum 1 valve in 10).

### OVERALL DIMENSIONS & WEIGHTS

DN	Model No.	A	B	C	D	E	F	Weight lbs
2	050 RGXb 1621	8 2/3	33 7/16	N/A	5	2	1 2/3	46.5
3	080 RGXb 1631	11 1/4	34 7/8	2 1/8	7 7/8	3	N/A	84.1
4	100 RGXb 1631	11 1/4	34 7/8	2 1/8	8 2/3	4	N/A	83
6	150 RGXb 1631	15 9/16	48 4/10	2 1/8	11	6	N/A	187.2
8	200 RGXb 1631	17 1/2	48 4/10	2 1/8	13 6/16	8	N/A	233.4

## PURCHASE SPECIFICATION

**VENT-O-MAT MODEL NO.**

Page 26 - Series RGXb - 2" to 8".

Page 27 - Series RGXb - 2" to 8" (Expanded Body).

**CONSTRUCTION & DESIGN**

The Sewage Air Release & Vacuum Break Valve shall consist of a compact tubular all stainless steel fabricated body, hollow direct acting float and solid large orifice float in H.D.P.E. - stainless steel nozzle and woven dirt inhibitor screen, EPDM rubber seals and seat.

The valve shall have an integral 'Anti-Surge' Orifice mechanism which shall operate automatically to limit surge pressures or shock induced by liquid oscillation and/or rapid air/gas discharge to less than 1.5 x valve rated working pressure.

The intake orifice area shall be equal to the nominal size of the valve i.e., a 6" valve shall have a 6" intake orifice. Large orifice sealing shall be effected by the flat face of the surge control float seating against a EPDM rubber 'O' ring housed in a dovetail groove circumferentially surrounding the orifice.

Discharge of pressurized air shall be controlled by the seating & unseating of a small orifice nozzle on a EPDM rubber seal affixed into the control float. The nozzle shall have a flat seating land surrounding the orifice so that damage to the rubber seal is prevented.

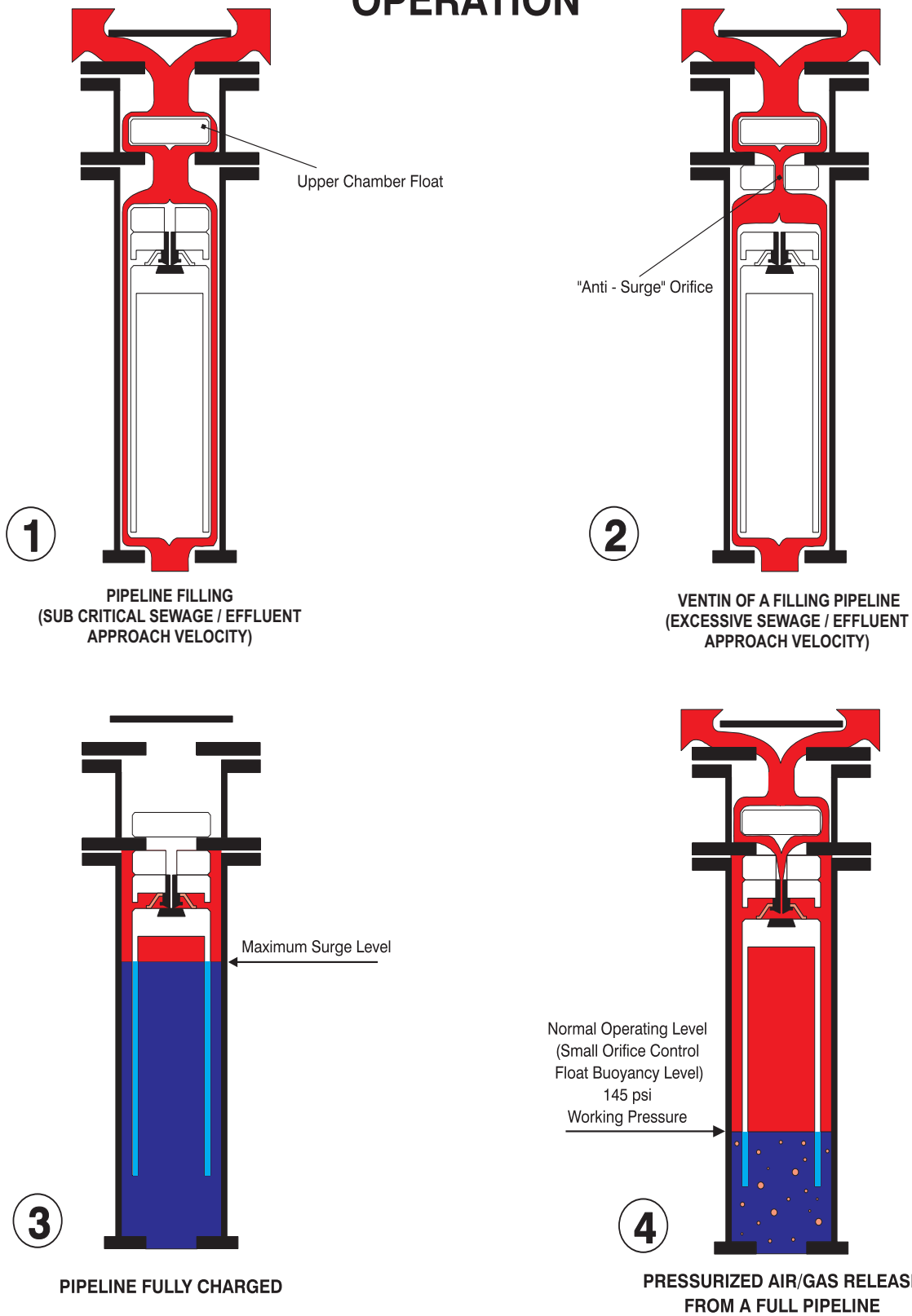
The valve construction shall be proportioned with regard to material strength characteristics, so that deformation, leaking or damage of any kind does not occur by submission to twice the designed working pressure

Connection to the valve inlet shall be facilitated by flanged ends conforming to ANSI B16.5 Class 150 and NPT where applicable.

Flanged ends shall be supplied with the requisite number of stainless steel screwed studs inserted for alignment to the specified standard. **Nuts and washers shall be included.**

**OPERATION**

1. Prior to the ingress of liquid into the valve chamber, as when the pipeline is being filled, valves shall vent through the "Anti-Surge" orifice when sewage/effluent approach velocities are relative to a transient pressure rise, on valve closure, of < 1.5 x valve rated pressure.
2. Valves shall not exhibit leaks or weeping of liquid past the large orifice seal at operating pressures of 7.2 psi to 1.5 x rated working pressure.
3. Valves shall respond to the presence of air/gas by discharging it through the small orifice at any pressures within a specified design range, i.e. 7.2 psi to 145 psi and shall remain leak tight in the absence of air.
4. Valves shall react immediately to pipeline drainage or water column separation by the full opening of the large orifice so as to allow unobstructed air intake at the lowest possible negative internal pipeline pressure.





**PRE NOTES:**

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.

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

**1. VENTING OF A FILLING PIPELINE (SUB CRITICAL LIQUID APPROACH VELOCITY)**

Air/gas flows through the annular space between the cylindrical floats and discharges through the Large Orifice into atmosphere.\*

**2. VENTING OF A FILLING PIPELINE (EXCESSIVE LIQUID APPROACH VELOCITY)**

In reaction to increased air/gas flow, "Anti Surge" Float closes the large orifice and air is forced through the "Anti-Surge" orifice resulting in deceleration of the approaching liquid due to the resistance of rising air/gas pressure in the valve.

**3. PIPELINE FULLY CHARGED**

Sewage/effluent has entered the valve chamber and buoyed the floats to close both the "Anti-Surge" orifice and the small orifice. The design's compression/volume relationship prevents the media from ever exceeding the maximum surge level indicated in diagram 3.

The resultant sewage/effluent free area protects against the fouling of the orifice seals by solids or high viscous substances.

**4. PRESSURIZED AIR/GAS RELEASE (PUMP OPERATING)**

The volume of disentrained air/gas increases in the valve and displaces the sewage/effluent level 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 level 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.

**\*Note:**

A relatively low flow discharge rate is required to lift the upper chamber float and ensure air release . The Upper Chamber Float will seat on the Middle Flange under vacuum conditions, effectively preventing air entry.

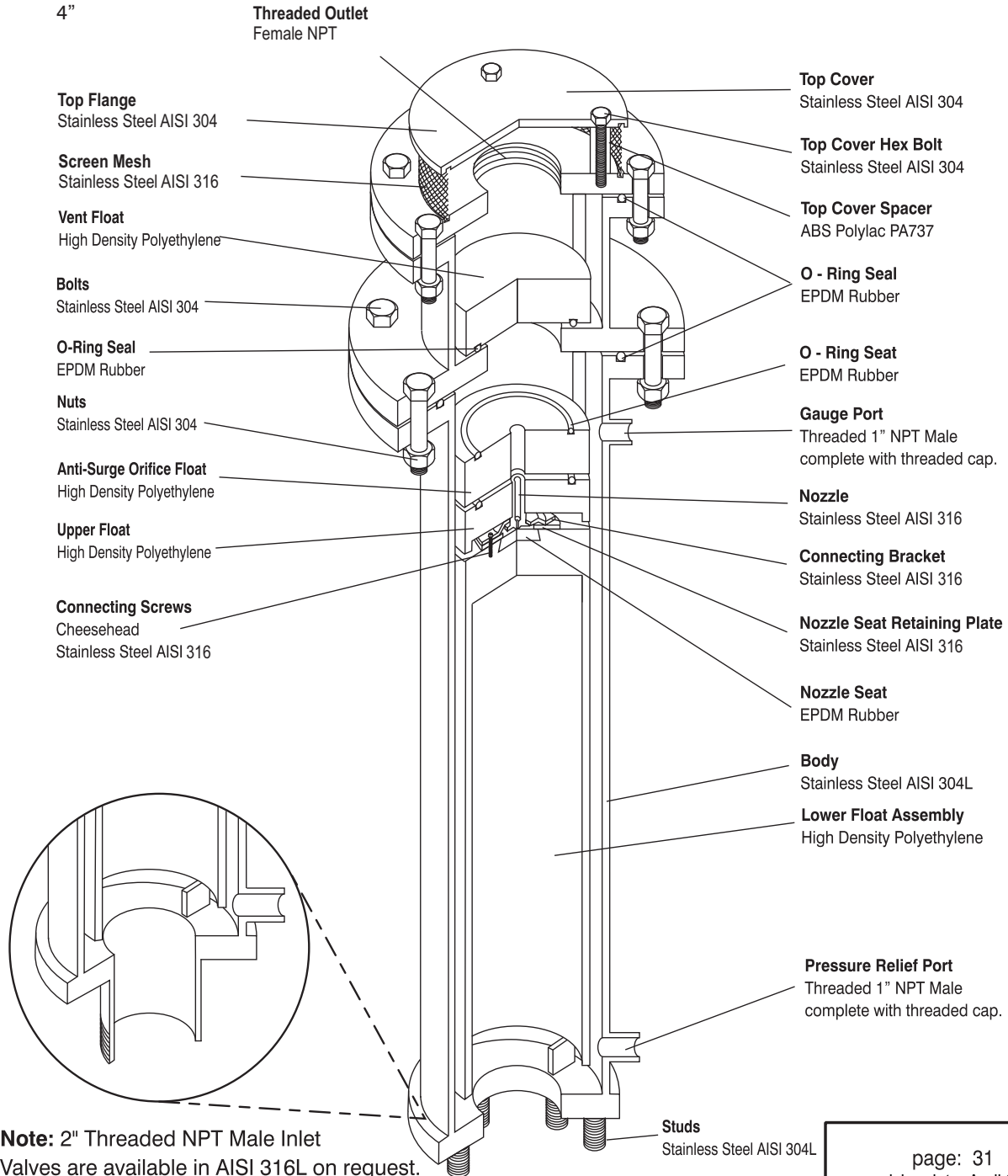
### COMPONENT DESCRIPTION & MATERIAL SPECIFICATION THREADED 2" & STUDED INLET - 3" TO 4"

**Type:**  
Series RGXv - Triple Orifice with "Anti-Surge"  
Mechanism

**End Connection:**  
Flange with Threaded NPT Male - 2" valves.  
Flange with Screwed Studs - 3" & 4" valves.

**Nominal Sizes:**  
2"  
3"  
4"

**Model No's:** \_\_\_\_\_ **Pressure Ratings:**  
RGXv 1021 \_\_\_\_\_ 145 psi  
RGXv 1031 \_\_\_\_\_ 145 psi



**Note:** 2" Threaded NPT Male Inlet  
Valves are available in AISI 316L on request.  
Information subject to change without prior notice

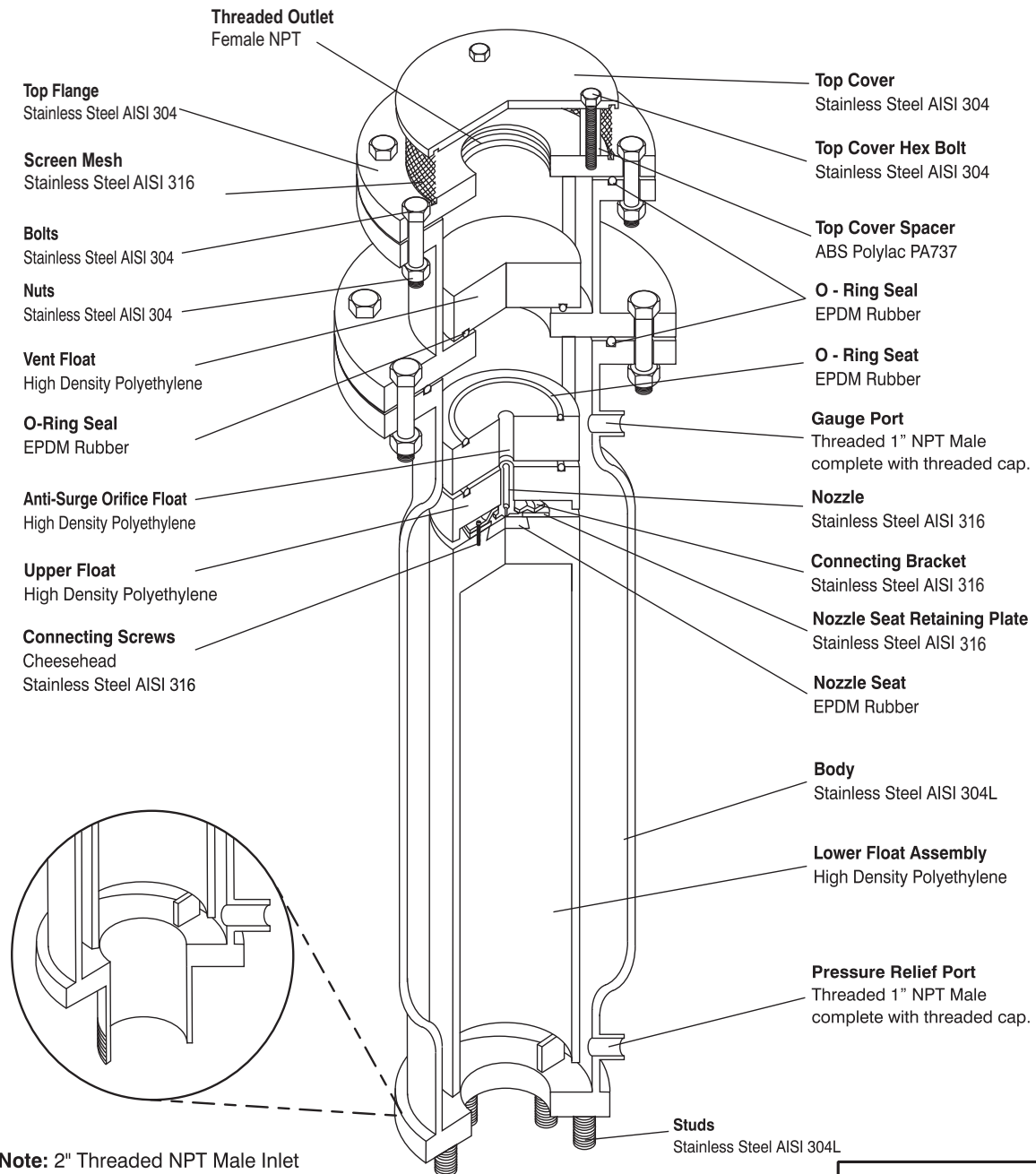
### COMPONENT DESCRIPTION & MATERIAL SPECIFICATION THREADED 2" & STUDED INLET - 3" TO 4" EXPANDED BODY

**Type:**  
Series RGXv - Triple Orifice with "Anti-Surge"  
Mechanism

**End Connection:**  
Flange with Threaded NPT Male - 2" valves.  
Flange with Screwed Studs - 3" & 4" valves.

**Nominal Sizes:**  
2"  
3"  
4"

**Model No's:** \_\_\_\_\_ **Pressure Ratings:**  
RGXv 1621 \_\_\_\_\_ 232 psi  
RGXv 1631 \_\_\_\_\_ 232 psi



**Note:** 2" Threaded NPT Male Inlet  
Valves are available in AISI 316L on request.  
Information subject to change without prior notice

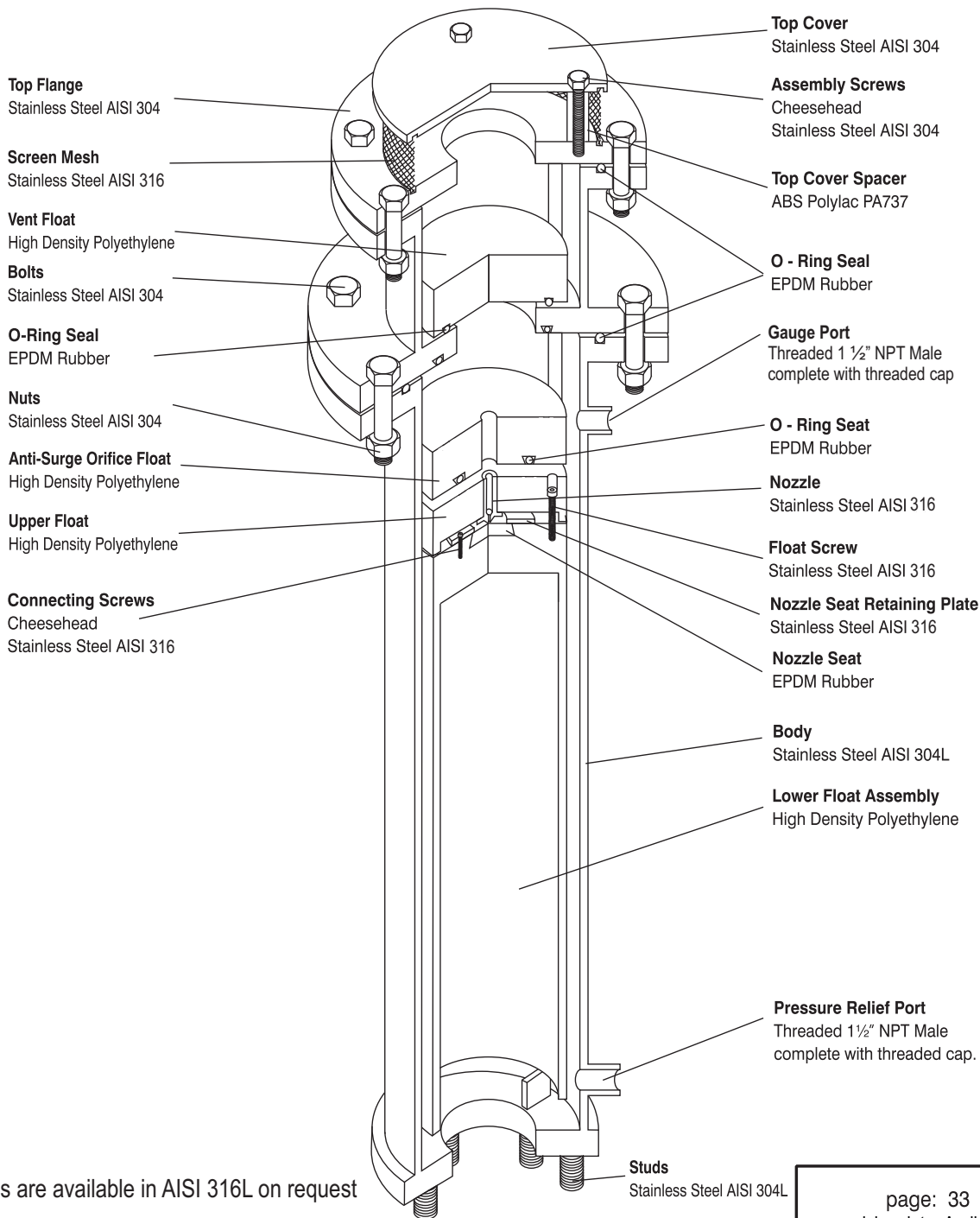
**COMPONENT DESCRIPTION & MATERIAL SPECIFICATION**  
**STUDED INLET - 6" & 8"**

**Type:**  
 Series RGXv - Triple Orifice with "Anti-Surge"  
 Mechanism

**End Connection:**  
 Flange with Screwed Studs - 6" & 8" valves.

**Nominal Sizes:**  
 6"  
 8"

**Model No's:** \_\_\_\_\_  
 RGXv 1031 \_\_\_\_\_ **Pressure Ratings:**  
 145 psi



Valves are available in AISI 316L on request

Information subject to change without prior notice

**COMPONENT DESCRIPTION & MATERIAL SPECIFICATION  
STUDED INLET - 6" & 8" EXPANDED BODY**

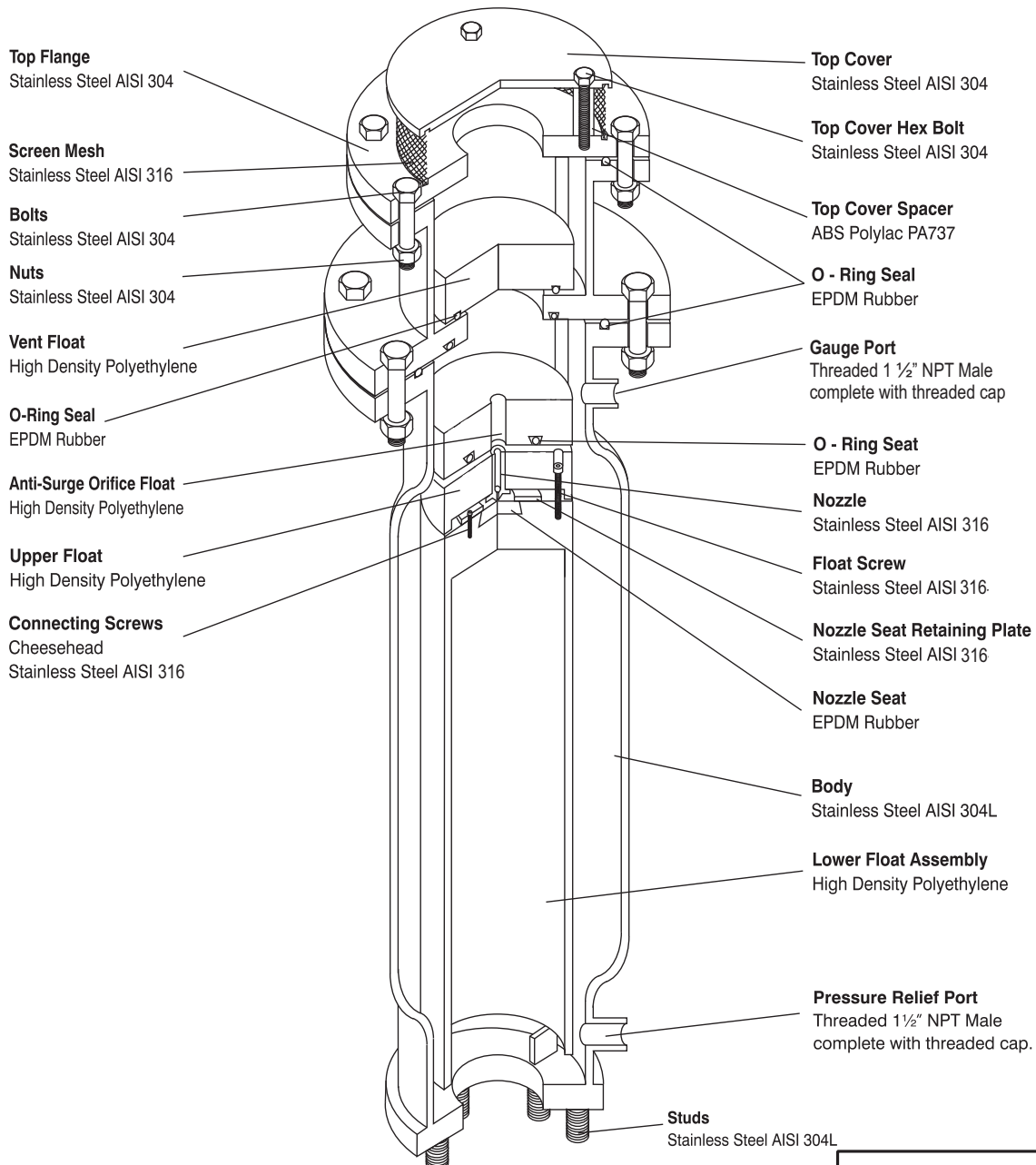
**Type:**  
Series RGXv - Triple Orifice with "Anti-Surge"  
Mechanism.

**End Connection:**  
Flange with Screwed Studs - 6" & 8" valves.

**Nominal Sizes:**  
6"  
8"

**Model No's:**  
RGXv 1631 \_\_\_\_\_

**Pressure Ratings:**  
232 psi

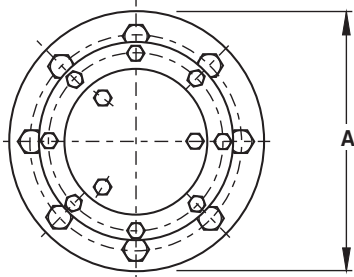


Valves are available in AISI 316L on request

Information subject to change without prior notice

### GENERAL SPECIFICATIONS

#### THREADED 2" & STUDED INLET - 3" TO 8"



**Type:**

Triple Orifice for air/gas discharge but not air re-entry.

**End Connection:**

Flange with 2" Male NPT Threaded and Screwed Studs for Alignment to ANSI B16.5 Class 150 for 3" to 8".

**Nominal Sizes:**

2", 3", 4", 6" & 8"

**Model No's:**

RGXv 1021 \_\_\_\_\_ 145 psi  
 RGXv 1031 \_\_\_\_\_ 145 psi

**Pressure Ratings - psi:**

**Operating Pressure Range - psi:**

	Min	Max.
145psi _____	7.2	145

**Operating Temperature Range:**

40° to 176°F

**Function:**

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

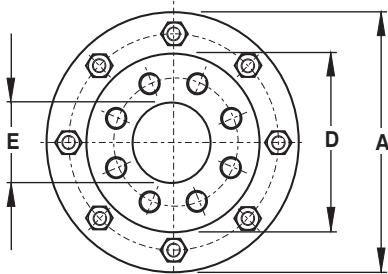
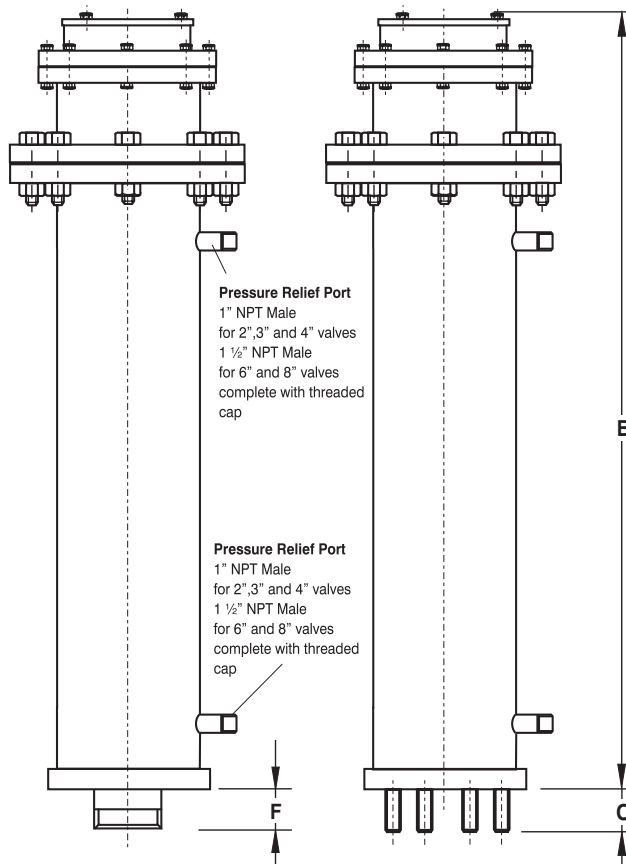
**Valve Selection:-** see pages 11 & 12

**Materials of Construction:-** see pages 31 & 33

**Installation:-** see page 3

**Standard Factory Tests:**

- i) Hydrostatic test -1.5 x max. rated working pressure
- ii) Low head leak test - 7,2 psi
- iii) Small orifice function test at max. rated working pressure (minimum 1 valve in 10).



### OVERALL DIMENSIONS & WEIGHTS

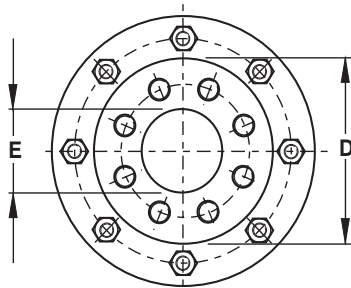
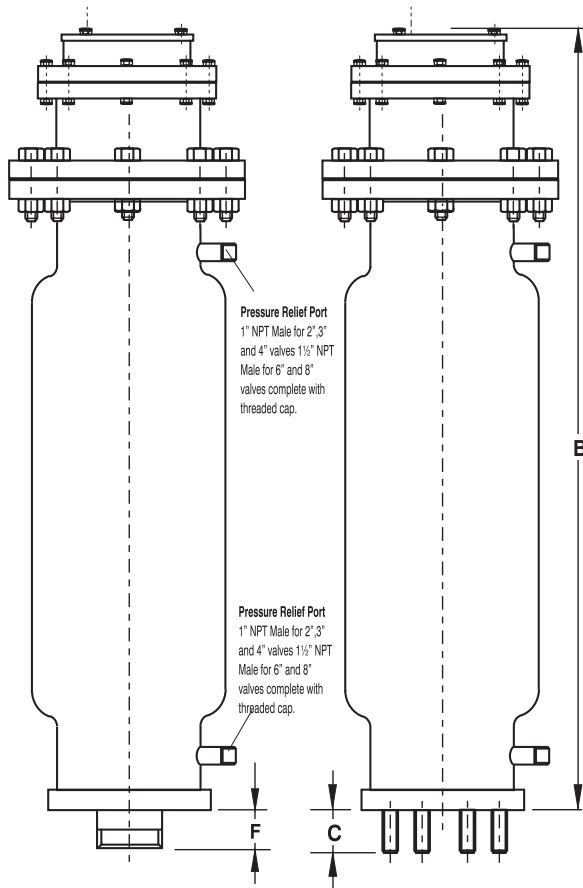
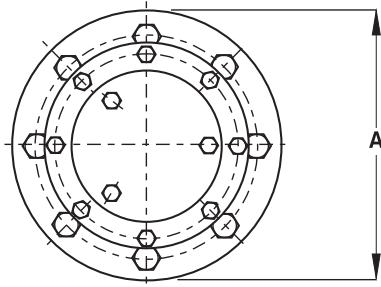
DN	Model No.	A	B	C	D	E	F	Weight lbs
2	050 RGXv 1021	8 2/3	34	N/A	5	2	1 2/3	49.6
3	080 RGXv 1031	11 1/4	34 1/3	2 1/8	7 7/8	3	N/A	94.8
4	100 RGXv 1031	11 1/4	34 1/3	2 1/8	8 2/3	4	N/A	93.7
6	150 RGXv 1031	15 9/16	48 2/10	2 1/8	11	6	N/A	212.7
8	200 RGXv 1031	17 1/2	48 2/10	2 1/8	13 9/16	8	N/A	259

Note: 2" valves have 2"NPT male inlet connections as standard.

Information subject to change without prior notice

### GENERAL SPECIFICATIONS

#### THREADED 2" & STUDED INLET - 3" TO 8" EXPANDED BODY



**Type:**

Triple Orifice with *Vent* mechanism for air/gas discharge but not air re-entry.

**End Connection:**

Flange with 2" Male NPT Threaded and Screwed Studs for Alignment to ANSI B16.5 Class 150 for 3" to 8".

**Nominal Sizes:**

2", 3", 4", 6" & 8"

**Model No's:**

RGXv 1621 \_\_\_\_\_  
RGXv 1631 \_\_\_\_\_

**Pressure Ratings - psi:**

232 psi  
232 psi

**Operating Pressure Range - psi:**

232 psi \_\_\_\_\_ Min \_\_\_\_\_ Max. \_\_\_\_\_  
7.2 \_\_\_\_\_ 232

**Operating Temperature Range:**

40° to 176°F

**Function:**

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

**Valve Selection:-** see pages 11 & 12

**Materials of Construction:-** see pages 32 & 34

**Installation:-** see page 3

**Standard Factory Tests:**

- i) Hydrostatic test -1.5 x max. rated working pressure
- ii) Low head leak test - 7.2 psi
- iii) Small orifice function test at max. rated working pressure (minimum 1 valve in 10).

### OVERALL DIMENSIONS & WEIGHTS

DN	Model No.	A	B	C	D	E	F	Weight Lbs
2	050 RGXv 1621	8 2/3	34	N/A	5	2	1 2/3	56.2
3	080 RGXv 1631	11 1/4	34 1/3	2 1/8	7 7/8	3	N/A	98
4	100 RGXv 1631	11 1/4	34 1/3	2 1/8	8 2/3	4	N/A	96.9
6	150 RGXv 1631	15 9/16	48 2/10	2 1/8	11	6	N/A	218.7
8	200 RGXv 1631	17 1/2	48 2/10	2 1/8	13 6/16	8	N/A	264.5

Note: 2" valves have 2"NPT male inlet connections as standard.

Information subject to change without prior notice

## PURCHASE SPECIFICATION

**VENT -O- MAT MODEL NO.**

Page 35 - Series RGXv - 2" to 8".

Page 36 - Series RGXv - 2" to 8" (Expanded Body)

**CONSTRUCTION & DESIGN**

The Sewage Air Release & Vacuum Break Valve shall consist of a compact tubular all stainless steel fabricated body, hollow direct acting float and solid large orifice float in H.D.P.E. - stainless steel nozzle and woven dirt inhibitor screen, EPDM rubber seals and seat.

The valve shall have an integral "Anti - Surge" Orifice mechanism which shall operate automatically to limit transient pressure rise or shock induced by closure to less than 1.5 x valve rated working pressure.

The intake orifice area shall be equal to the nominal size of the valve i.e., a 6" valve shall have a 6" intake orifice. Large orifice sealing shall be effected by the flat face of the surge control float seating against a EPDM rubber 'O' ring housed in a dovetail groove circumferentially surrounding the orifice.

Discharge of pressurized air shall be controlled by the seating & unseating of a small orifice nozzle on a natural rubber seal affixed into the control float. The nozzle shall have a flat seating land surrounding the orifice so that damage to the rubber seal is prevented.

The valve construction shall be proportioned with regard to material strength characteristics, so that deformation, leaking or damage of any kind does not occur by submission to twice the designed working pressure.

Connection to the valve inlet shall be facilitated by flanged ends conforming to ANSI B16.5 Class 150 and NPT where necessary .

Flanged ends shall be supplied with the requisite number of stainless steel screwed studs inserted for alignment to the specified standard. **Nuts and washers shall be included.**

**OPERATION**

1. Prior to the ingress of liquid into the valve chamber, as when the pipeline is being filled, valves shall vent through the large orifice when sewage/effluent approach velocities are relative to a transient pressure rise, on valve closure, of < 1.5 x valve rated pressure.

At higher sewage/effluent approach velocities, which have a potential to induce transient pressure rises > 1.5 x valve rated pressure on valve closure, the valve shall automatically discharge air/gas through the "Anti - Surge" Orifice and reduce sewage/effluent approach velocity, so that on closure a maximum transient pressure rise of < 1.5 x valve rated pressure is realised.

2. Valves shall not exhibit leaks or weeping of liquid past the large orifice seal at operating pressures of 7.2 psi to twice rated working pressure.

3. Valves shall prevent air from entering the pipeline by the seating of the upper chamber float in the upper chamber on the seat in the middle flange.



**Series RGXb & RGXv**

**ORDERING GUIDE**

050 RGX v 10 2 1 S4

**VALVE SIZE:**

2" -	050
3" -	080
4" -	100
6" -	150
8" -	200

**VALVE SERIES**

**SPECIAL APPLICATION:**

BIAS AIR IN  b  
 BIAS AIR OUT  v

**VALVE PRESSURE RATING:**

145 PSI  10  
 232 PSI  16

**BODY TYPE:**

FULL 304 S/S CONSTRUCTION  S4  
 FULL 316 S/S CONSTRUCTION  S6

**VALVE TYPE:**

DOUBLE ACTING  1

**VALVE END CONNECTION:**

THREADED - NPT MALE  2  
 STUDDER FLANGE - ANSI 150#  3  
 TROPHY FLANGED - ANSI 150#  4

**Note:**

- 1. 10" and 12" valves are available on request.

**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 x 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 maximum of 7.2 psi using 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.

**Copy and Complete the Form Below For Any Additional Information and E-mail, Fax or Mail to:**

RF Valves Inc.  
1342 Charwood Rd., Suite A  
Hanover, MD 21076 • USA  
Phone: +1-410-850-4404 • Fax: +1-410-850-4464

E-mail: [rfq@rfvalve.com](mailto:rfq@rfvalve.com)

Or contact us via our Website  
[www.rfvalve.com](http://www.rfvalve.com)

Company Name: \_\_\_\_\_

Postal Address: \_\_\_\_\_

Postal Code: \_\_\_\_\_ Country: \_\_\_\_\_

Tel: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail \_\_\_\_\_

Contact Name: \_\_\_\_\_ Title: \_\_\_\_\_

**Comments:**

\_\_\_\_\_  
\_\_\_\_\_

**Products you are interested in:****VENT-O-MAT® Series RBXc Air Release & Vacuum Break Valves**

Compact Single chamber design With Integral "Anti-Shock" surge dampening mechanism in an economical cast Ductile iron construction

**VENT-O-MAT® Series RBX Air Release & Vacuum Break Valves**

Compact Stainless Steel single chamber design with integral "Anti-Shock" surge dampening Mechanism

**VENT-O-MAT® Series RC Air Release and Vacuum Break Valves**

Cast air valve for irrigation and small reticulation systems

**VENT-O-MAT® Series RPS Air Release & Vacuum Break Valves**

Glass reinforced polypropylene CATT air valve for industrial, irrigation and small reticulation Systems

# VENT-O-MAT<sup>®</sup>

## RF Valves, Inc.

(Hereinafter referred to as Seller)

### STANDARD TERMS AND CONDITIONS

**1. CONTROLLING PROVISIONS:** These terms and conditions shall control with respect to any purchase order or sale of Seller's products. No waiver, alteration or modification of these terms and conditions whether on Buyer's purchase order or otherwise shall be valid unless waiver, alteration or modification is specifically accepted in writing and signed by an authorized representative of Seller.

**2. DELIVERY:** Seller will make every effort to complete delivery of products as indicated on Seller's acceptance of an order, but Seller assumes no responsibility or liability, and will accept no back charge for loss or damage due to delay or inability to deliver caused by acts of God, war, labor difficulties, accident, delays of carriers, by contractors or suppliers, inability to obtain materials, shortages of fuel and energy or any other causes of any kind whatever beyond the control of Seller. Seller may terminate any contract of sale of its products without liability of any nature, by written notice to Buyer, in the event that the delay in delivery or performance resulting from any of the aforesaid causes shall continue for a period of sixty (60) days. Under no circumstances shall Seller be liable for any special or consequential damages or for loss, damage or expense (whether or not based on negligence) directly or indirectly arising from delays or failure to give notice of delay.

**3. WARRANTY:** Seller warrants RF Pinch and RF-SKG for one year and Vent-O-Mat for limited 10 years from the date of shipment Seller's manufactured products to the extent that Seller will replace those having defects in material or workmanship when used for the purpose and in the manner which Seller recommends. Vent-O-Mat 10 year limited warranty applies to internal parts only. If Seller's examination shall disclose to its satisfaction that the products are defective, and an adjustment is required, the amount of such adjustment shall not exceed the net sales price of the defective products only and no allowance will be made for labor or expense of repairing or replacing defective products or workmanship or damage resulting from same. Seller does not guarantee resistance to corrosion, erosion, abrasion, or other sources of failure, nor does Seller guarantee a minimum length of service, or that the product shall be fit for any particular service. Seller warrants the products which it sells of other manufacturers to the extent of the warranties of their respective makers. Where engineering design or fabrication work is supplied, Buyer's acceptance of Seller's design or of delivery of work shall relieve Seller of all further obligation, other than as expressed in Seller's product warranty. THIS IS SELLER'S SOLE WARRANTY. SELLER MAKES NO OTHER WARRANTY OF ANY KIND, EXPRESSED OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE WHICH EXCEED SELLER'S AFORESTATED OBLIGATION ARE HEREBY DISCLAIMED BY SELLER AND EXCLUDED FROM THIS WARRANTY. Seller neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of its engineering designs or products. This warranty shall not apply to any products or parts of products which (a) have been repaired or altered outside of Seller's factory, in any manner; or (b) have been subjected to misuse, negligence or accidents; or (c) have been used in a manner contrary to Seller's instructions or recommendations. Seller shall not be responsible for design errors due to inaccurate or incomplete information supplied on Valve Data Sheet(s) by Buyer or its representatives. The laws of the State of Maryland shall govern, apply and construe all questions and interpretations hereunder.

**4. SELLER'S LIABILITY:** Seller will not be liable for any loss, damage, cost of repairs, incidental or consequential damages of any kind, whether based upon warranty (except for the obligation accepted by Seller under "Warranty", above), contract or negligence arising in connection with the design, manufacture, sale, use or repair of the products or of engineering designs supplied to Buyer.

**5. STORAGE:** Valves shall be stored indoors free from job site dirt, mud, and temperature changes. If indoor storage is not possible, the valve must be stored above possible water or snow level and remain covered in the original shipping container. Failure to store valves in this fashion or to follow storage requirements for electrical components or other auxiliary equipment will void their warranty.

**RETURNS:** Seller cannot accept return of any products unless it has been issued a Returned Goods Authorization (RGA) number and form from RF Valves' Customer Service Dept. at (410) 850-4404 or email to Support@rfvalve.com.

All credits for returned goods are subject to the following: (a) All material returned must be clearly marked with the RGA#, and on its arrival at Seller's plant, be found to be in first-class condition; if not, cost of putting in salable condition will be deducted from credit memoranda; (b) a minimum \$50 or 5% handling charge will be made from all credit memoranda issued for material returned; (c) Transportation charges, if not prepaid, will be deducted from credit memoranda.

Credits, subject to above, apply only within 90 days after shipment:

i) 75% - standard manual/air release valve(s), in original packaging

ii) 50% - standard automated valve(s), in original packaging

iii) 75% - standard accessories unused

iv) Special purpose valve(s) or accessories designed to customer specifications returned for non-warranty reasons - credit determined on a case-by-case basis subject to inspection.

**6. ORDER CANCELLATIONS or CHANGE ORDERS:** Cancellations subject to the following charges as a percentage of total order amount; **10%** order entered; **30%** released for manufacture; **50%** assembly in process or awaiting shipment, unless product is a non-standard, special purpose valve, in which case **100%** or as agreed upon in writing case-by-case. **Change Orders** - Changing standard accessories, manufacturer's re-stocking fee, plus cost of new item(s). Change of valve structure or design from standard valve design or following release to manufacture, **25%** of order, **50%** of order when assembly in process or awaiting shipment, unless product a non-standard, special purpose valve, in which cost agreed upon in writing on case-by-case basis.

**7. SHIPMENTS:** All products sent out will be carefully examined, counted and packed. The cost of any special packing or special handling caused by Buyer's requirements or requests shall be added to the amount of the order. No claim for shortages will be allowed unless made in writing within ten (10) days of receipt of shipment. Claims for products damaged or lost in transit should be made on the carrier, as Seller's responsibility ceases, and title passes, on delivery to the carrier.

**8. SPECIAL PRODUCTS:** Orders covering special or non-standard products are not subject to cancellation except on such terms as Seller may specify on application.

**9. PRICES AND DESIGNS:** Prices and designs are subject to change without notice. All prices are F.O.B. Point of Shipment, unless otherwise stated. In the absence of a special agreement, Buyer agrees to pay 1.5% monthly interest on all past due invoices. If Seller shall have any doubt at any time as to Buyer's financial responsibility, Seller may decline to make deliveries except of cash or satisfactory security.

**10. TAXES:** The amount of any sales, excise, or other taxes, if any, applicable to the products covered by this order, shall be added to the purchase price and shall be paid by Buyer unless Buyer provides Seller with an exemption certificate acceptable to the taxing authorities.

**11. MINIMUM ORDER:** \$500.00 plus transportation on complete valve assemblies. \$50 plus transportation on replacement spare parts.

**12. TERMS:** Cash, net 30 days unless otherwise specified

**WARNING** - RF Valves, Inc. VALVES ARE DESIGNED AND MANUFACTURED USING GOOD WORKMANSHIP AND MATERIALS, AND MEET INDUSTRY STANDARDS. THESE VALVES ARE AVAILABLE WITH COMPONENTS OF VARIOUS MATERIALS, AND THEY SHOULD BE USED ONLY IN SERVICES RECOMMENDED BY A COMPANY VALVE ENGINEER. MISAPPLICATION OF THE PRODUCT MAY RESULT IN INJURIES (INCLUDING DEATH) OR PROPERTY DAMAGE. A SELECTION OF VALVE COMPONENTS OF THE PROPER MATERIAL CONSISTENT WITH THE PARTICULAR PERFORMANCE REQUIREMENT IS IMPORTANT FOR PROPER APPLICATION. IF THE VALVE EXHIBITS ANY INDICATION OF LEAKAGE, DO NOT OPERATE. ISOLATE VALVE AND EITHER REPAIR OR REPLACE

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