# VENT-O-MAT®

# SERIES RGXII

## "ANTI-SURGE"
## SEWAGE AIR RELEASE AND VACUUM BREAK VALVES

### FOR EFFECTIVE AIR RELEASE, VACUUM PROTECTION AND SURGE ALLEVIATION

AVENG MANUFACTURING DFC

# VENT-O-MAT®

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

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

The Vent-O-Mat Series RGXII "Anti-Surge" sewage air release and vacuum break valve, is an evolution of market feedback and the incorporation of the already proven Vent-O-Mat technology which itself resulted from years of extensive research. The valve unlike many others is not just an adaption of an air valve to handle sewage valve but the result of over 30 years of dealing with sewage and seeing what works and adapting it to the needs of the end user

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 RGXII 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 RGXII 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 millisecond time span.

### Effective Air Release

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

### Vacuum Protection

The RGXII 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 RGXII 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 RGXII design has been incorporated in the well-known **SURGE 2000** surge analysis software program and can be analyzed with great accuracy in other commercially available surge analysis programs 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 | * Namibia | * Kuwait |
| * Canada | * Germany | * Zimbabwe | * Hong Kong | * Brazil |
| * Caribbean | * Kenya | * Tanzania | * Taiwan | * France |
| * United Arab Emirates | * Egypt | * Malawi | * New Zealand | * Singapore |

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# Series RGXII

- **DESIGN** - the RGXII has been designed owing to customer demand. When taking into account customer requests that influenced the design, key benefits that Vent-O-Mat was originally famous for was not compromised but further ones were incorporated into the new design.

- **"ANTI - SHOCK" - "ANTI - SURGE"** - The RGXII is a air release valve that is supplied as standard with a mechanism 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. This same mechanism allows for controlled filling of the pipeline, maintaining controlled discharge at all times.

- **COMPACTNESS** - The RGXII is more compact and shorter without compromising the pressure rating of the valve.

- **FULL PORT OPENING ON NEGATIVE PRESSURE** -During pipeline draining and instance of surge, the valve will allow the intake of air to the full nominal bore of the of the valve. The RGXII 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.

- **SEALING** - The RGXII has been designed for low head sealing as well where line pressures are generally lower than normal.

- **MATERIALS** - The RGXII is now available with a fusion bonded Ductile Iron Body as well as a 304 or 316 Stainless Steel Body.

- **PERFORMANCE** - The RGXII has been designed and developed to provide the optimum usable and safe performance relative to all functions.

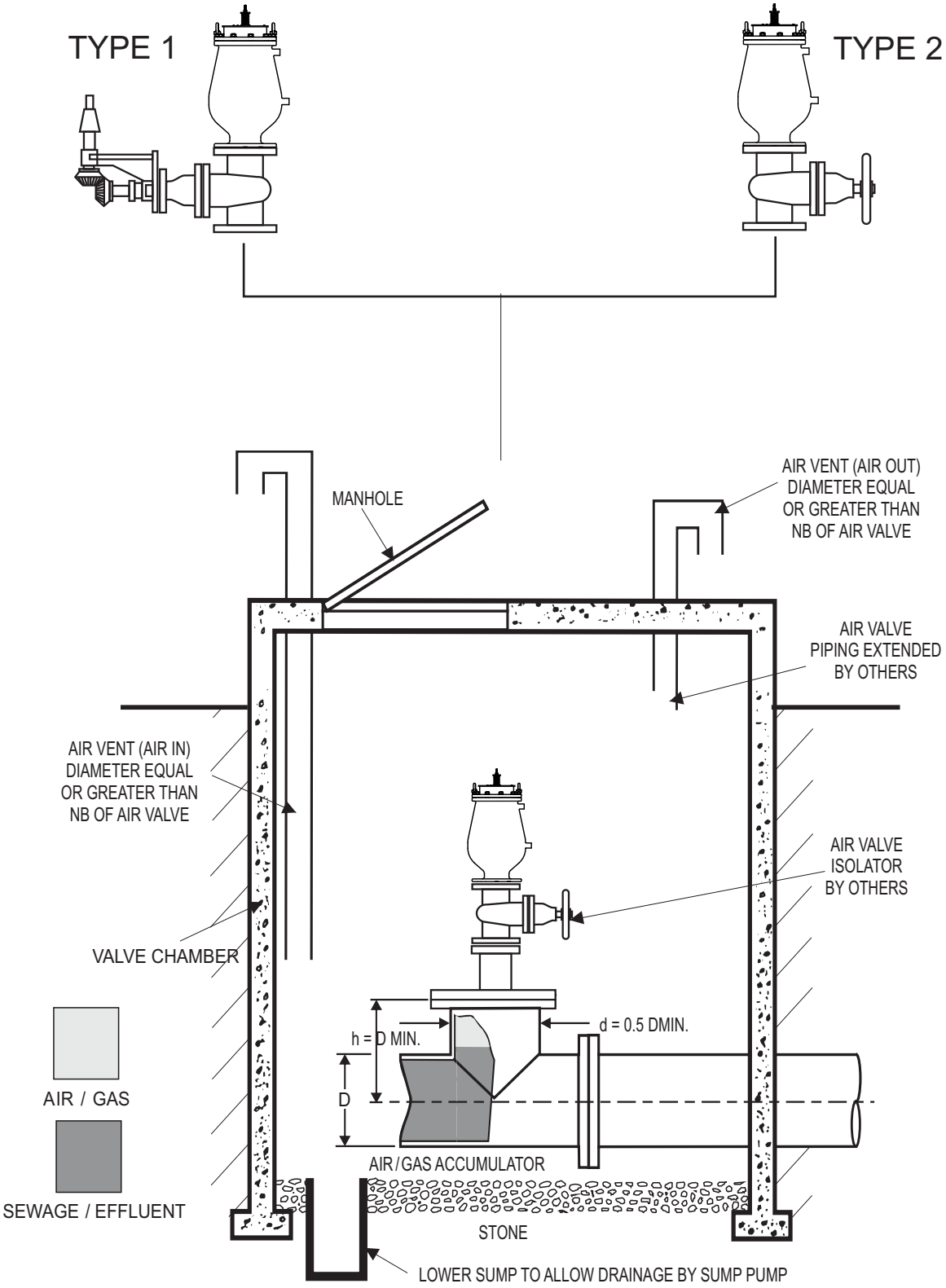
- **QUALITY** - The RGXII economically offers the highest quality construction and materials available in an air release and vacuum break valve. Stringent manufacturing and test procedures are maintained to ensure the best possible service and reliability is given by every valve produced.

- **SERVICEABILITY** - The RGXII 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.

- **BACK UP** - Vent -O- Mat provides highly committed customer orientated sales, service, spares and technical back up.

# Series RGXII

## RECOMMENDED INSTALLATION ARRANGEMENTS




TYPICAL VALVE CHAMBER

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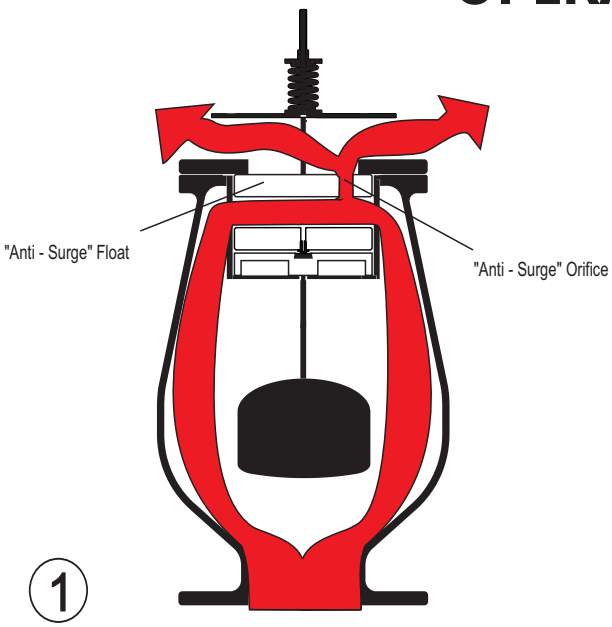
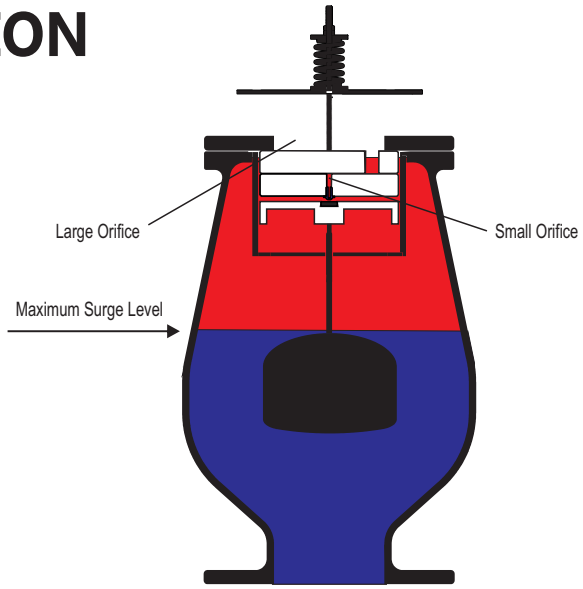
# Series RGXII
# OPERATION




1

PIPELINE FILLING
(SUB CRITICAL AND EXCESSIVE
SEWAGE/ EFFLUENT APPROACH VELOCITY)

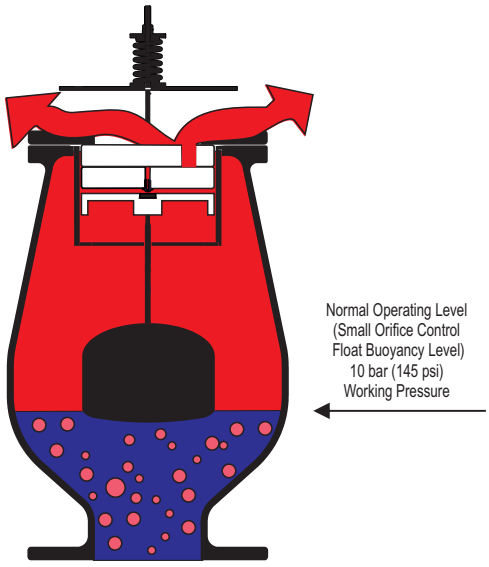
Air/gas flows through the annular area around the control float assembly and to atmosphere through the anti-surge float and out the large orifice.




2

PIPELINE FULLY CHARGED

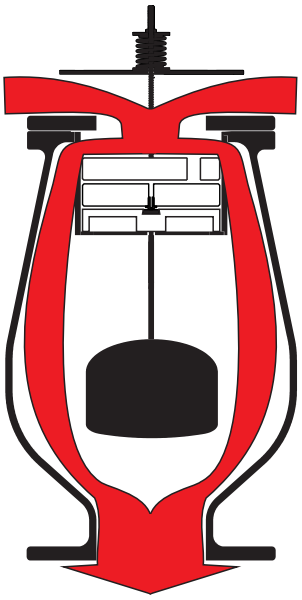
Sewage/effluent has entered the valve chamber and buoyed the floats to close both the large and the small orifice.
The design's compression/ volume relationship prevents the media from ever exceeding the maximum surge level indicated above . The resultant sewage/ effluent free area protects against the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




3

PRESSURIZED AIR/GAS RELEASE
PIPELINE OPERATING

The volume of disentrained air/gas increases in the valve, displacing the sewage/effluent to below the normal operating level. This results in the control float dropping away from the small orifice. The pressurized air/gas is then discharged to atmosphere. Once all additional air is discharged the control float will close the small orifice. Restore the sewage effluent to the normal operating level.



4

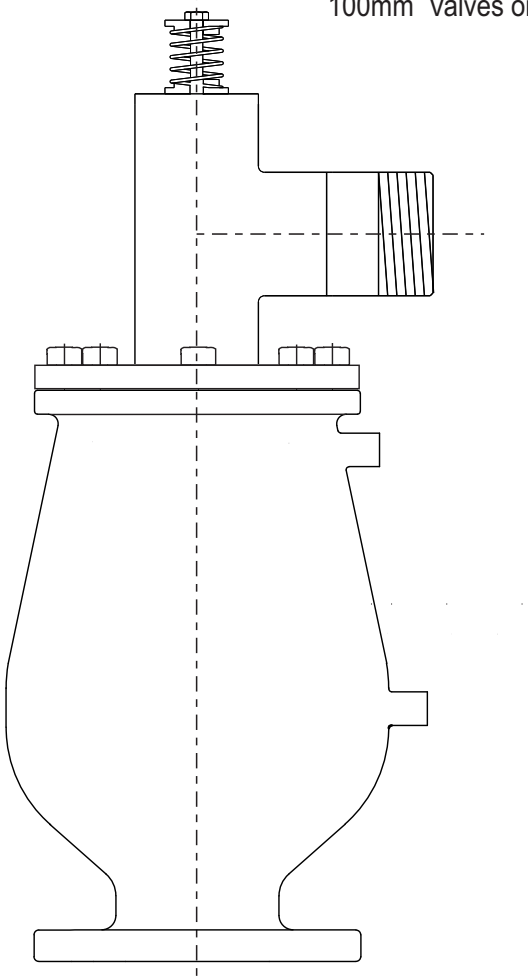
VACUUM RELIEF (AIR INTAKE)
PIPELINE DRAINING

Upon pump stop, Sewage/effluent drains from the sewage air valve and 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.

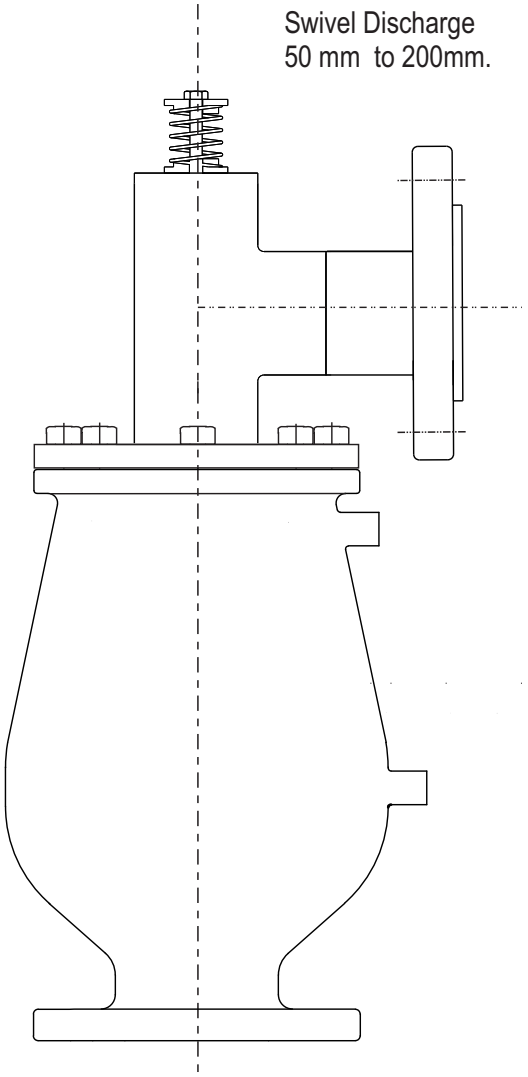
Information subject to change without prior notice

# AVAILABLE DISCHARGE CONNECTIONS
# DN50 (2") to DN300 (12")

Biased
Screwed BSP/NPT Discharge
50mm, 80mm &
100mm Valves only.



Biased
Swivel Discharge
50 mm to 200mm.



## Alternative Arrangements can be provided on request

*NOTE
Discharge Connections Are Equal To Valve Pressure Rating

# COMPONENT DESCRIPTION & MATERIAL SPECIFICATION
# FLANGED - DN50(2") to DN200(8")

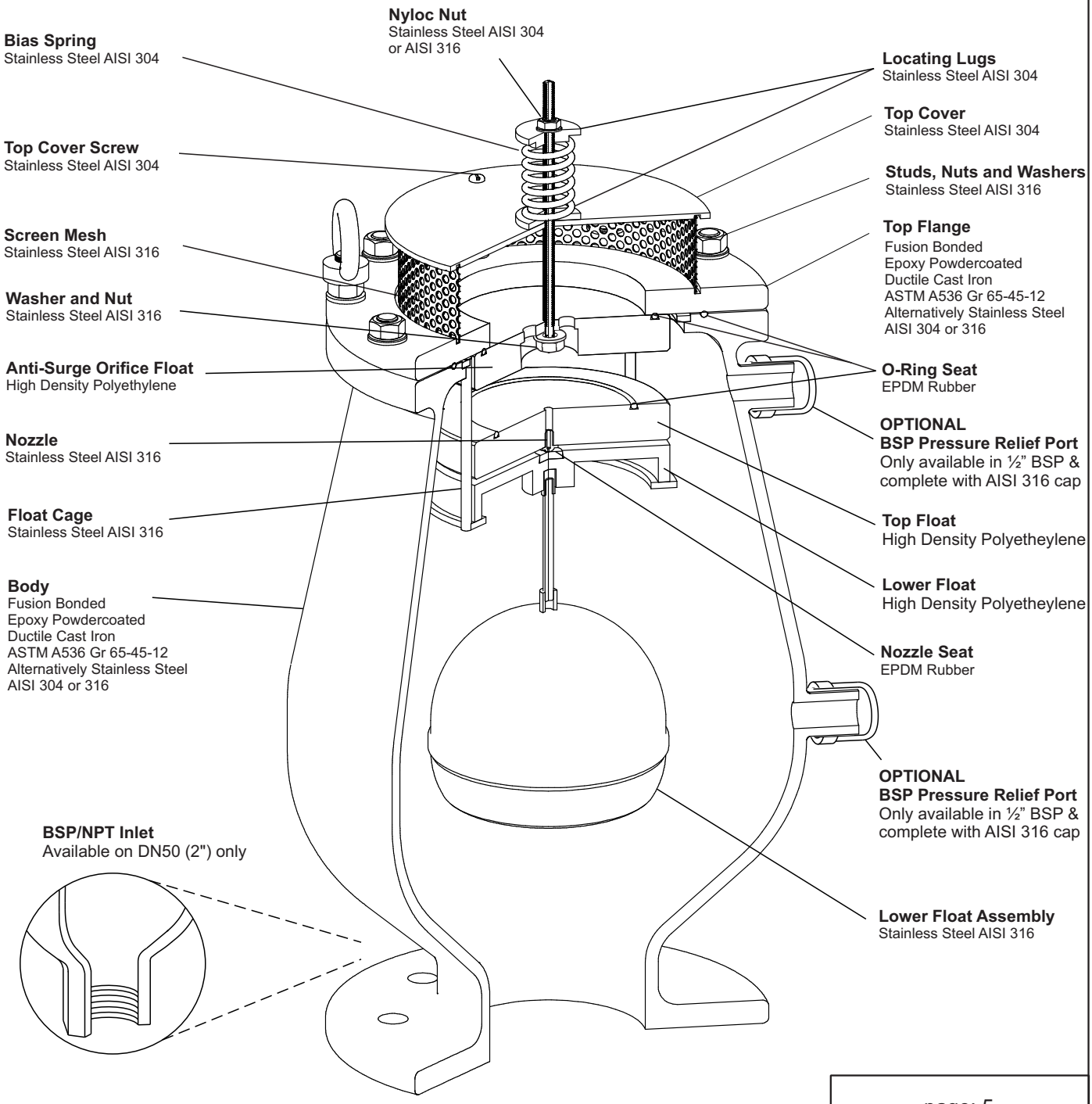
**Type:**
Series RGX II - Double Orifice (Small & Large Orifice)
with Anti Shock Orifice Mechanism.

**End Connection:**
Flanged - AS 4087
- ANSI B16.5

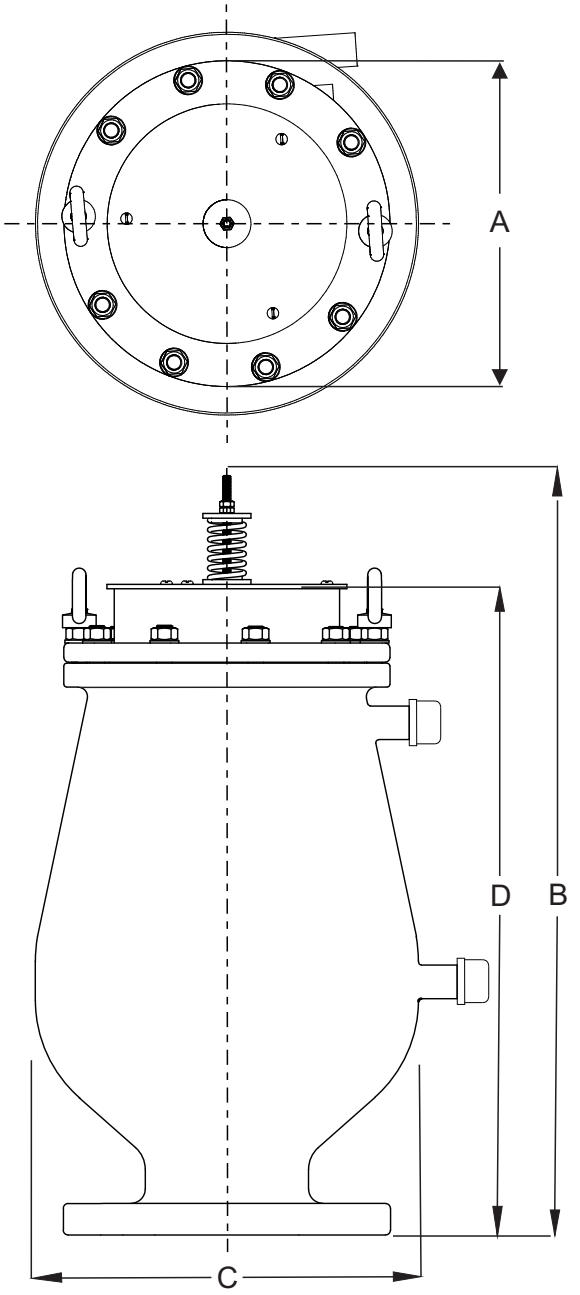
**Nominal Sizes:**
DN50(2") - DN200(8")

**Model No's:**
RGXII 1041 _____
RGXII 1641 _____

**Pressure Ratings:**
PN10 (145 psi)
PN16 (232 psi)



# GENERAL SPECIFICATIONS
## FLANGED - DN50 (2") to DN200 (8")




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

**End Connection: Flanged**

AS 4087 Fig B5 (Ductile Cast Iron)

**Nominal Sizes:**
DN50 (2"), DN80 (3"), DN100 (4"), DN150 (6") & DN200 (8")

**Model No's:** **Pressure Ratings** - bar (psi):
RGX II 1041 _____ PN10 (145psi)
RGX II 1641 _____ PN16 (232psi)

**Operating Pressure Range** - psi:

| | Min | Max. |
|---|---|---|
| PN10 (145 psi) | 0.2 (2.9) | 10 (145) |
| PN16 (232 psi) | 0.2 (2.9) | 16 (232) |

(Lower operating pressures can be accommodated, please state when ordering)

**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**:- Page 9

**Materials of Construction**:- Page 5

**Installation**:- Page 2

**Standard Factory Tests**:
i) Hydrostatic test -1.5 x max. rated working pressure
ii) Low head leak test - 0.2 bar (2.9 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 | | Weight Cast | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | in | | mm | in | mm | in | mm | in | mm | in | kg | lbs |
| 50 | 2 | 050 RGXII 1041 | 174 | 6.85 | 413 | 16.26 | 155 | 6.10 | 363 | 14.29 | 16 | 35.27 |
| 80 | 3 | 080 RGXII 1041 | 230 | 9.06 | 640 | 25.20 | 273 | 10.75 | 546 | 21.50 | 40 | 88.18 |
| 100 | 4 | 100 RGXII 1041 | 230 | 9.06 | 645 | 25.39 | 273 | 10.75 | 546 | 21.50 | 40 | 88.18 |
| 150 | 6 | 150 RGXII 1041 | 340 | 13.39 | 772 | 30.39 | 400 | 15.75 | 680 | 26.77 | 70 | 154.32 |
| 200 | 8 | 200 RGXII 1041 | 355 | 13.98 | 940 | 37.01 | 526 | 20.71 | 846 | 33.31 | 115 | 253.53 |

# COMPONENT DESCRIPTION & MATERIAL SPECIFICATION
# FLANGED - DN50(2") to DN200(8")

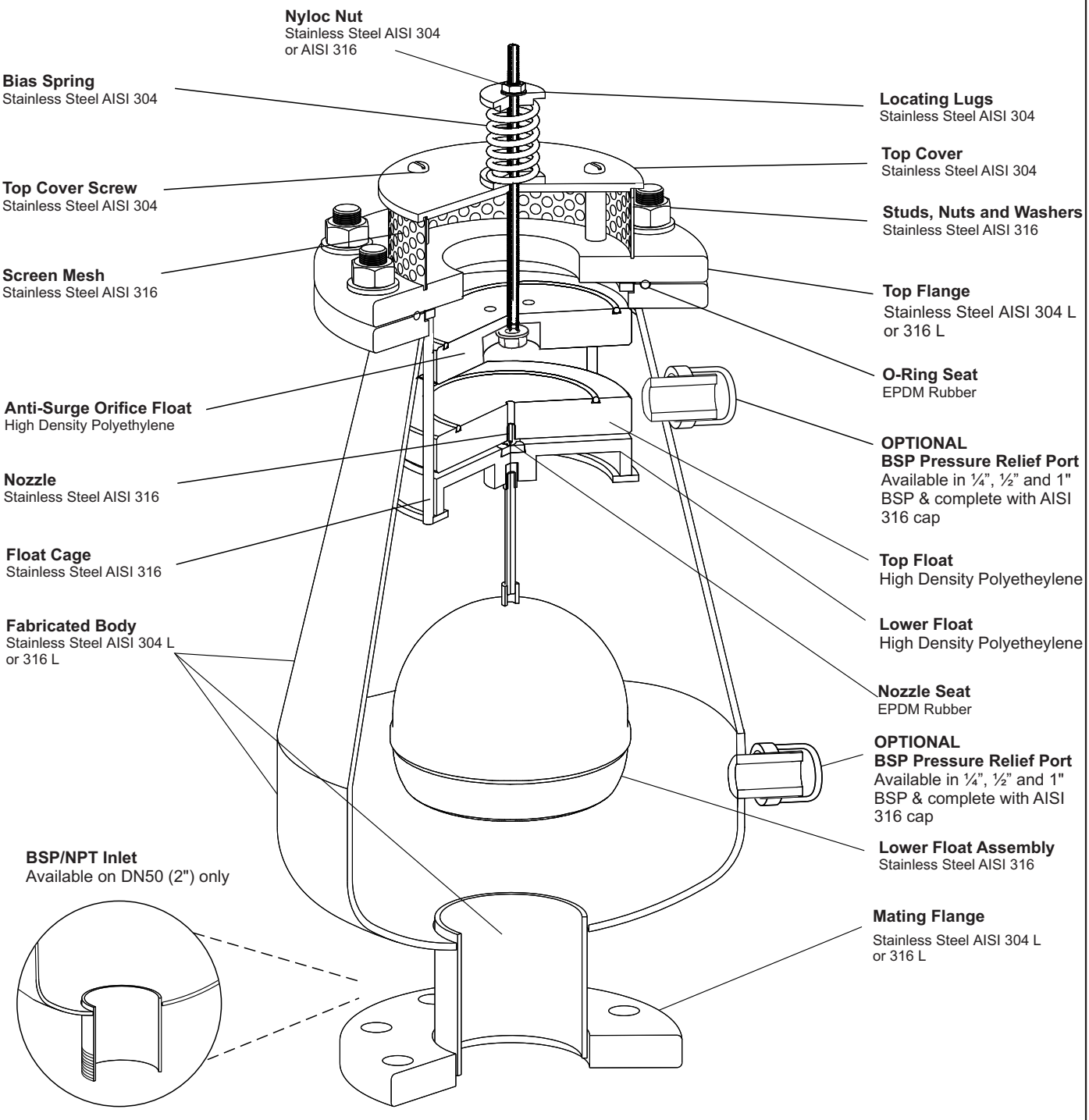
**Type:**
Series RGX II - Double Orifice (Small & Large Orifice)
with Anti Shock Orifice Mechanism.

**End Connection:**
Flanged - AS 4087
- ANSI B16.5

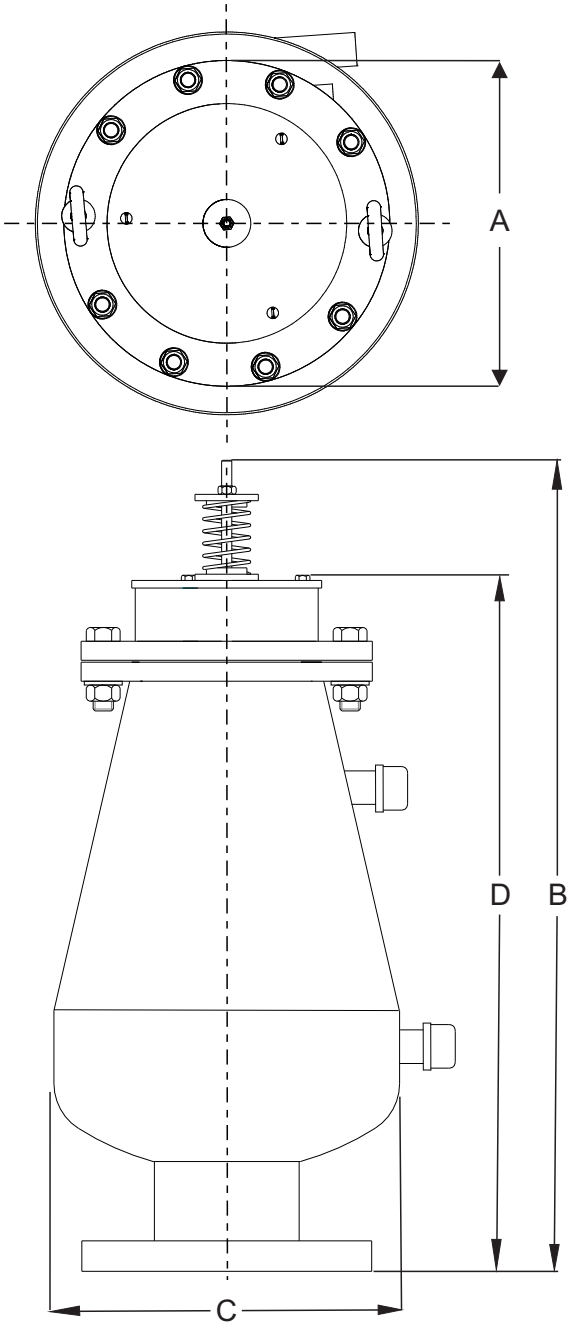
**Nominal Sizes:**
DN50(2") - DN200(8")

**Model No's:**
RGXII 1041 _____
RGXII 1641 _____

**Pressure Ratings:**
PN10 (145 psi)
PN16 (232 psi)



# GENERAL SPECIFICATIONS
## FLANGED - DN50 (2") to DN200 (8")




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

**End Connection: Flanged**
AS4087 Fig B7 (Stainless Steel)

**Nominal Sizes:**
DN50 (2"), DN80 (3"), DN100 (4"), DN150 (6") & DN200 (8")

**Model No's:** **Pressure Ratings** - bar (psi):
RGX II f 1041 _____ PN10 (145psi)
RGX II f 1641 _____ PN16 (232psi)

**Operating Pressure Range** - psi:

| | Min | Max. |
|---|---|---|
| PN10 (145 psi) | 0.2 (2.9) | 10 (145) |
| PN16 (232 psi) | 0.2 (2.9) | 16 (232) |

(Lower operating pressures can be accommodated, please state when ordering)

**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**:- Page 9

**Materials of Construction**:- Page 5

**Installation**:- Page 2

**Standard Factory Tests**:
i) Hydrostatic test -1.5 x max. rated working pressure
ii) Low head leak test - 0.2 bar (2.9 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 | | Weight S/Steel | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | in | | mm | in | mm | in | mm | in | mm | in | kg | lbs |
| 50 | 2 | 050 RGXIIf 1041 | 174 | 6.85 | 410 | 16.16 | 141 | 5.55 | 360 | 14.21 | 13 | 28.66 |
| 80 | 3 | 080 RGXIIf 1041 | 230 | 9.06 | 650 | 25.60 | 273 | 10.75 | 550 | 21.65 | 30 | 66.14 |
| 100 | 4 | 100 RGXIIf 1041 | 230 | 9.06 | 650 | 25.60 | 273 | 10.75 | 550 | 21.65 | 30 | 66.14 |
| 150 | 6 | 150 RGXIIf 1041 | 340 | 13.39 | 798 | 31.45 | 406 | 16.00 | 704 | 27.70 | 60 | 132.28 |
| 200 | 8 | 200 RGXIIf 1041 | 355 | 13.98 | 950 | 37.41 | 508 | 20.00 | 856 | 33.70 | 80 | 176.37 |

# SMALL ORIFICE DISCHARGE PERFORMANCE

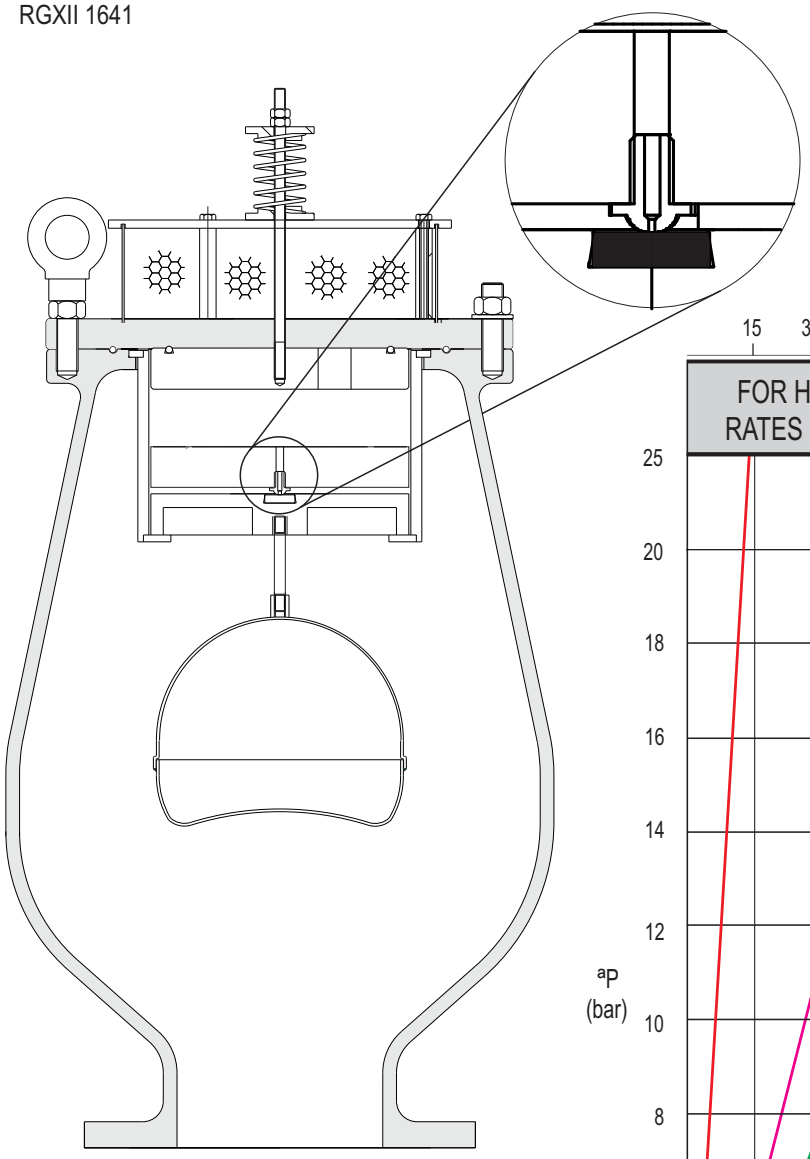
**Type:**
Series RGXII - Double Orifice (Small & Large Orifice) with "Anti-Surge" Orifice Mechanism

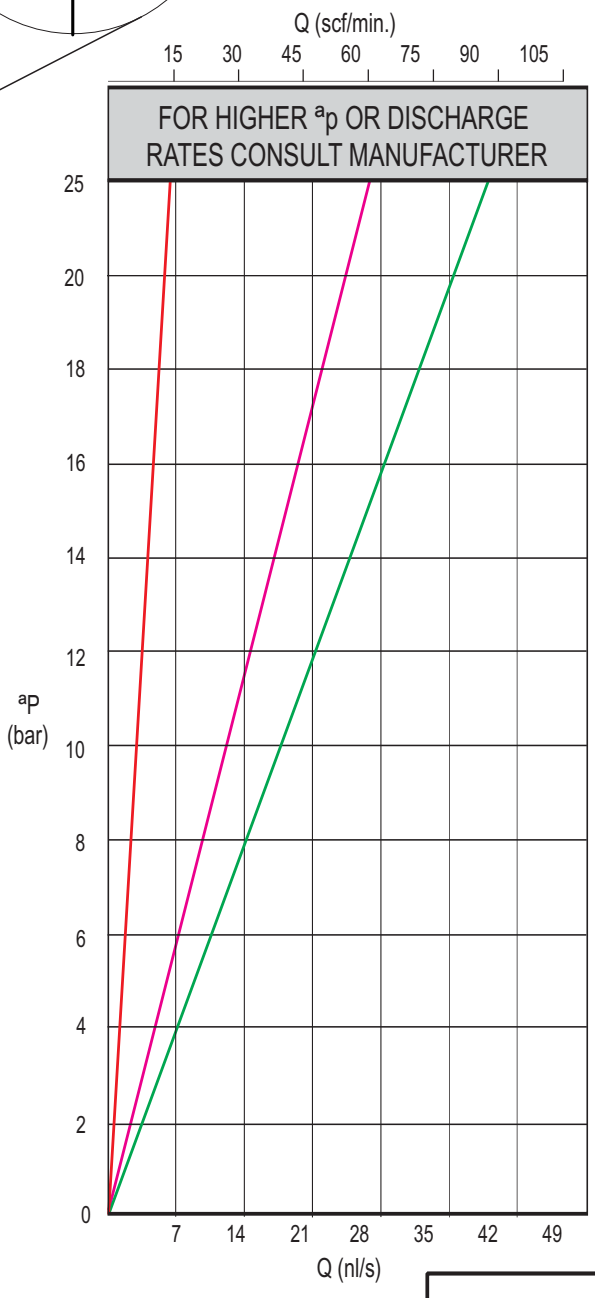
**Model No's:**
RGXII 1041
RGXII 1641

¨ 2mm (0.07") small orifice - DN50 (2"), DN80 (3"), DN100 (4") Valves

¨ 5mm (0.20") small orifice - DN150 (6") Valves

¨ 6mm (0.24") small orifice - DN200 (8") Valves






| | |
|---|---|
| Q = Normal Litres per second (Free Air) @ 1.01325 bar Abs. and 20 deg. C | $Q_1$= Standard Cubic Feet per minute (Free Air) @ 14.7 psi Abs. 68 deg. F |

**CONVERSION EQUIVALENTS**

| | |
|---|---|
| 1 l/ sec. = 2.1189 scf/ min. | 1 scf/ min = 0.472 l/ sec. |
| 1 bar = 14.5 psi | 1 psi = 0.069 bar |

# 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 0.69 bar (10 psi) absolute (0.303bar (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 m/s either for scouring, pipe rupture or column separation for a particular pipeline section.
2. Move vertically on the graph from the m/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 - 0.34 bar (5 psi) and the lower portion - 0.1 bar (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.

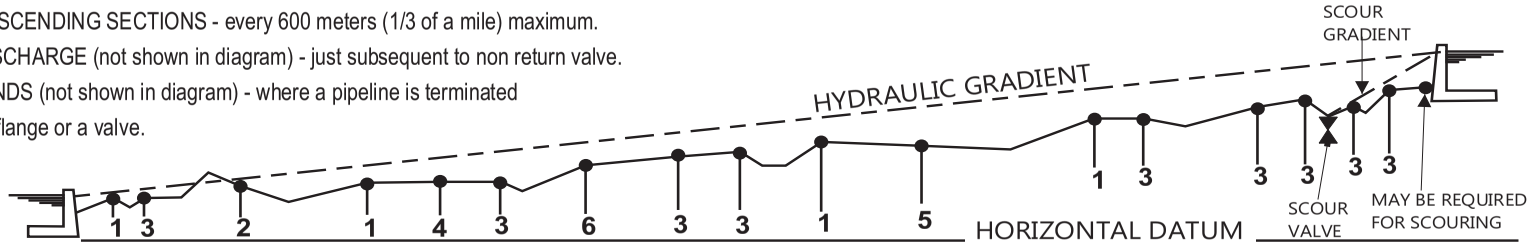
## EXAMPLE OF VALVE SIZING (ASSUMMING AN INDIVIDUAL SECTION)

A ø 400mm (16") pipeline draining at 377l/sec which equates to 3m/sec (10ft/s) what valve size should be selected?

From the 3m/sec (10ft/s) point, move vertically until the ø 400mm (16") pipe size horizontal line is intersected. This places the intersection point squarely in the centre of the operating band of a DN80 (3") Vent -O- Mat RGXII valve. But, if for example, the drainage rate is 503l/sec which equates to 4m/sec (13.2ft/s), the valve would be operating on it's limit and it may be prudent to change to a DN100 (4") Vent -O- Mat RGXII.

## VALVE POSITIONING

1. ON APEX POINTS (relative to hydraulic gradient).
2. 5 METERS (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 600 meters (1/3 of a mile) maximum.
5. LONG ASCENDING SECTIONS - every 600 meters (1/3 of a mile) maximum.
6. LONG DESCENDING SECTIONS - every 600 meters (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.






Information subject to change without prior notice



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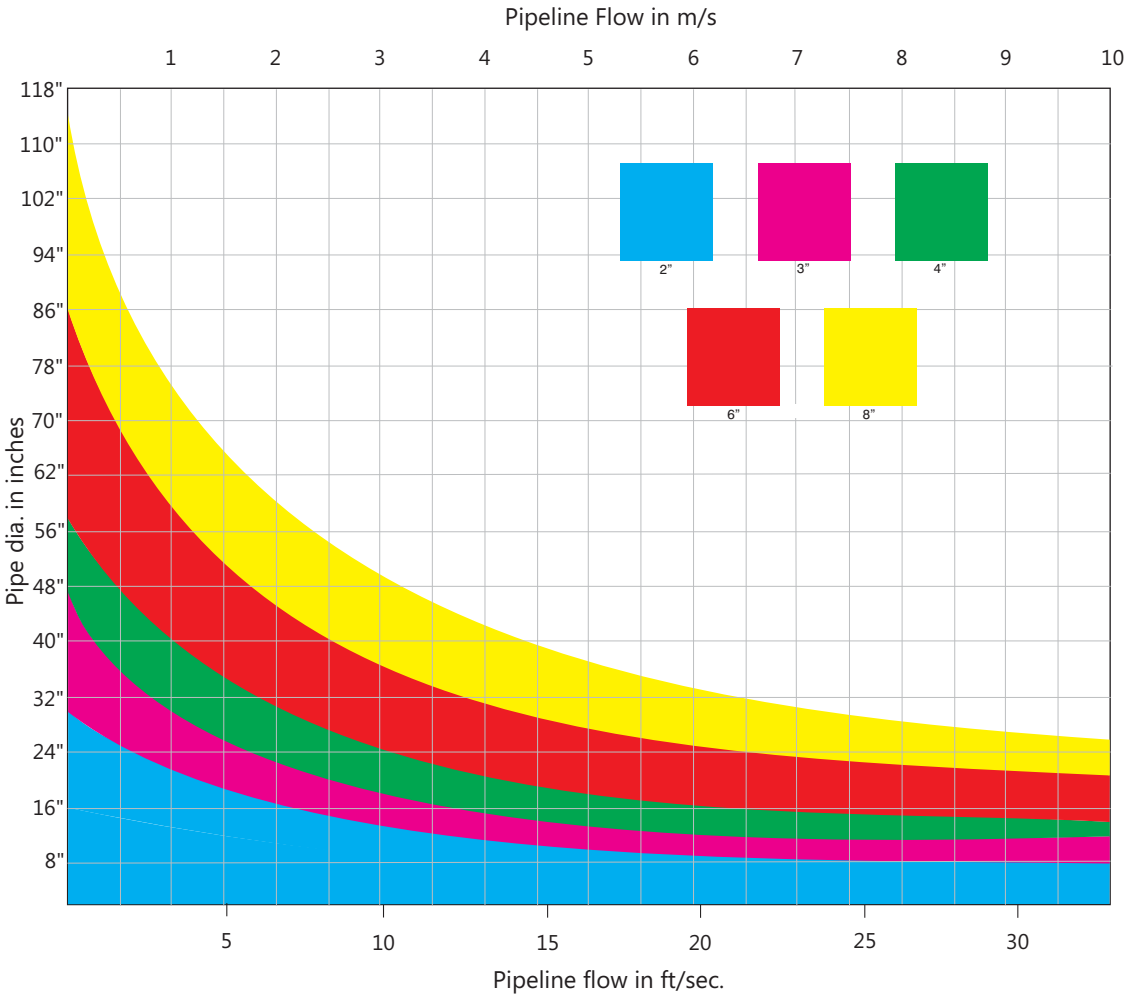
# SELECTION & POSITIONING




| Pipe Dia | Pipeline Velocity in Feet per sec | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inches | 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 | 2819 | 3132 | 3288 | 3602 | 3915 | 4071 | 4385 | 4698 | 4854 | 5167 |
| 10 | 489 | 734 | 1223 | 1713 | 1957 | 2447 | 2691 | 3181 | 3670 | 3915 | 4404 | 4893 | 5138 | 5627 | 6117 | 6361 | 6851 | 7340 | 7585 | 8074 |
| 12 | 705 | 1057 | 1762 | 2466 | 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 | 49620 | 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 | 50892 | 58721 | 62636 | 70466 | 78295 | 82210 | 90039 | 97869 | 101784 | 109613 | 117443 | 121357 | 129187 |
| 44 | 9474 | 14211 | 23684 | 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 | 129657 | 140931 | 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 | 229013 | 246630 | 264246 | 273054 | 290671 |
| 62 | 18810 | 28216 | 47026 | 65836 | 75242 | 94052 | 103457 | 122268 | 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 | 35967 | 59945 | 83923 | 95912 | 119889 | 131878 | 155856 | 179834 | 191823 | 215801 | 239779 | 251768 | 275746 | 299724 | 311713 | 335690 | 359668 | 371657 | 395635 |
| 74 | 26797 | 40195 | 66991 | 93788 | 107186 | 133983 | 147381 | 174177 | 200974 | 214372 | 241169 | 267965 | 281363 | 308160 | 334956 | 348355 | 375151 | 401948 | 415346 | 442142 |
| 78 | 29772 | 44658 | 74429 | 104201 | 119087 | 148859 | 163745 | 193516 | 223288 | 238174 | 267946 | 297717 | 312603 | 342375 | 372147 | 387032 | 416804 | 446576 | 461462 | 491234 |
| 82 | 32904 | 49355 | 82259 | 115162 | 131614 | 164518 | 180969 | 213873 | 246777 | 263228 | 296132 | 329035 | 345487 | 378391 | 411294 | 427746 | 460649 | 493553 | 510005 | 542908 |
| 86 | 36192 | 54288 | 90480 | 126672 | 144768 | 180960 | 199056 | 235248 | 271439 | 289535 | 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 | 46997 | 70495 | 117492 | 164488 | 187987 | 234983 | 258482 | 305478 | 352475 | 375973 | 422970 | 469967 | 493465 | 540462 | 587458 | 610957 | 657953 | 704950 | 728448 | 775445 |
| 102 | 50911 | 76367 | 127279 | 178190 | 203646 | 254557 | 280013 | 330924 | 381836 | 407291 | 458203 | 509114 | 534570 | 585481 | 636393 | 661848 | 712760 | 763671 | 789127 | 840038 |
| 106 | 54983 | 82474 | 137457 | 192440 | 219931 | 274914 | 302405 | 357388 | 412371 | 439862 | 494845 | 549828 | 577319 | 632302 | 687285 | 714776 | 769759 | 824741 | 852233 | 907216 |
| 110 | 59211 | 88816 | 148027 | 207237 | 236843 | 296054 | 325659 | 384870 | 444080 | 473686 | 532896 | 592107 | 621712 | 680923 | 740134 | 769739 | 828950 | 888161 | 917766 | 976977 |
| 114 | 63595 | 95393 | 158988 | 222583 | 254381 | 317976 | 349774 | 413369 | 476964 | 508762 | 572357 | 635952 | 667750 | 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**

# SURGE & WATERHAMMER PROTECTION

**Introduction**

The Vent-O-Mat Series RGXII "Anti-Surge" sewage air release and vacuum break valve, is an evolution of market feedback and the incorporation of the already proven Vent-O-Mat technology which itself resulted from years of extensive research. The valve unlike many others is not just an adaption of an air valve to handle sewage, but the result of over 30 years of dealing with sewage and seeing what works and adapting it to the needs of the end user.

**Surge Protection - Initial Filling**

The RGXII is always biased in the "Anti-Surge" mode meaning all air release is controlled through the "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 3). Vent-O-Mat series RGXII 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 RGXII 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 page 3).

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 RGXII 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.

**Computer Modelling**

The effectiveness of Vent-O-Mat "Anti-Surge" technology 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 AFT impulse, FLOWMASTER, Watham and SURGE 2000.

Technical and Financial Benefits

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.

# PURCHASE SPECIFICATION

VENT -O- MAT MODEL NO.
Page 5 - Series RGX II

**CONSTRUCTION & DESIGN**

The Sewage Air Release & Vacuum Break Valve shall consist of a ductile iron or stainless steel body, stainless steel direct acting float, solid small orifice top float and “Anti-Surge” float in H.D.P.E. - A stainless steel nozzle, stainless steel top cap and E.P.D.M. rubber seals and seat.

The valve shall have an integral "Anti-Surge" Orifice mechanism which shall limit transient pressure rise or shock induced by closure to less than 1.5 x valve rated working pressure, however, must open to the full diameter of the valve size during a negative pressure.

The intake orifice area shall be equal to the nominal size of the valve i.e., a 150mm (6") valve shall have a 150mm (6") intake orifice. Large orifice sealing shall be effected by the flat face of the anti-shock control float seating against a E.P.D.M. 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 E.P.D.M. rubber seal affixed into the 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 1.5 times the designed working pressure. Connection to the valve inlet shall be facilitated by flanged ends conforming to PN10, PN16, ratings of BS EN 1092 or SABS 1123 Standards or ANSI B16.5 Class 150. AS 4087 Fig. B5/B7, AS 2129. Flanged ends shall be supplied drilled to the Specified Standard.

**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 at all times.

2. Valves shall be tested and not exhibit leaks or weeping of liquid past the large orifice seal at operating pressures of 0,2 bar (2.9 psi) to 1.5 x valve rated working pressure.

3. When the pipeline is fully charged valves shall respond to the presence of air/gas by discharging it through the small orifice at the pressures within the specified design range, 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.

# Series RGXII

# ORDERING GUIDE

**050 RGXII 10 3 1**

VALVE SIZE:
DN50 (2") - 050
DN80 (3") - 080
DN100 (4") - 100
DN150 (6") - 150
DN200 (8") - 200

**VALVE SERIES No.**

VALVE PRESSURE RATING:
PN10 (145 psi) ANSI #150 10
PN16 (232 psi) ANSI #150 16 *

VALVE TYPE:
DOUBLE ACTING 1

**VALVE END CONNECTION:**
SCREWED - BSP 1
SCREWED - NPT 2
FLANGED - BS 4504 OR SABS 1123 0
FLANGED - ANSI B16. 5 3
FLANGED - AS 4087 Fig. B5/ B7 4
FLANGED - AS 2129 TABLE E 6

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## TEST SPECIFICATION

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 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.

(B) A low head leak test whereby the valve is filled with water and pressurized to a maximum of 0,2 bar (2.9 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 2 - 3 bar (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.

* Only available for DN50 to DN100.

Information subject to change without prior notice

VENT-O-MAT®

# Series RGXII

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

VENT-O-MAT AUSTRALIA (PTY) LTD
P. O. Box 156
SEVEN HILLS
NSW1730
SYDNEY
AUSTRALIA

E-mail: jkerrigan@ventomat.com.au

Tel: (+61 2) 8814 9699
Fax: (+61 2) 8814 9666

Or contact us via our Website
**www.ventomat.com.au**

**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 RGX Series Air Release & Vacuum Break Valves

Compact Stainless Steel or Ductile Iron single chamber design with integral "Anti-Shock" surge dampening mechanism for sewage applications

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

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

# VENT-O-MAT®

# STANDARD TERMS AND CONDITIONS

Vent-O-Mat Australia takes pride in the quality of its products and its services to customers. Customers are requested to inform Vent-O-Mat Australia if an order is incorrectly delivered or if there is dissatisfaction with the goods.

As a part of our quality procedures, it is important that Vent-O-Mat Australia and the customer agree on the terms on which business is to be transacted. These terms and conditions are current for trading with Vent-O-Mat Australia at the time of issue, however the terms and conditions may vary from time to time.

1. Interpretation
In these conditions unless the contrary intention appears:

"Additional Charges" includes all delivery, handling and storage charges, goods and services
tax, stamp duty, interest, legal and other costs of recovery of unpaid money and all other
government imposts and all money, other than the Purchase Price, payable by the Customer to
Vent-O-Mat Australia arising out of the sale of the Goods.

"Customer" means the person to or for whom the Goods are to be supplied by Vent-O-Mat
Australia.

"Goods" means the goods sold to the Customer by Vent-O-Mat Australia.

"Vent-O-Mat Australia" means Vent-O-Mat Australia Pty Limited, ABN 20 114 575 101.

"Purchase Price" means the list price for the goods as charged by Vent-O-Mat Australia at the
date of delivery or such other price as may be agreed by Vent-O-Mat Australia and the Customer
prior to delivery of the Goods.

2. Order for Goods
2.1 An order given to Vent-O-Mat Australia is binding on Vent-O-Mat Australia and the Customer, if:
2.1.1 a written acceptance is signed for or on behalf of Vent-O Mat Australia; or
2.1.2 the Goods are supplied by Vent-O-Mat Australia in accordance with the order.
2.2 An acceptance of the order by Vent-O-Mat Australia is then to be an acceptance of these conditions of sale by Vent-O-Mat Australia and the Customer and these conditions of sale will override any conditions contained in the Customer's order. Vent-O-Mat Australia reserves the right to accept a part only of any order by notifying the Customer in writing or by delivering the Goods to the Customer. No order is binding on Vent-O-Mat Australia until accepted by it.

2.3 An order which has been accepted in whole or in part by Vent-O-Mat Australia cannot be cancelled by the Customer without obtaining the prior written approval of Vent-O-Mat Australia, which it may refuse in its absolute discretion.

3. Warranties
3.1 Certain laws imply terms, conditions and warranties ("Prescribed Terms") into contracts for the supply of goods and prohibit the exclusion, restriction or modification of such terms, conditions and warranties. The liability of Vent-O-mat Australia in respect of a breach of a Prescribed Term or any warranty made under these terms and conditions is limited, to the extent permissible by law and at the option of Vent-O-Mat Australia, to the:
3.1.1 replacement of the Goods;
3.1.2 payment of the cost of replacing the Goods; or
3.1.3 refund of the Purchase Price paid by the Customer.
3.2 Any claims to be made against Vent-O-Mat Australia for short delivery of Goods must be lodged with Vent-O-Mat Australia in writing within 7 days of the delivery date.
3.3 Vent-O-Mat Australia warrants that it will repair or make good any defects in the materials or workmanship of the Goods arising under normal and reasonable condition of use within ninety (90) days of the date of delivery of the Goods provided written notice of the claim is received by Vent-O-Mat Australia as soon as reasonably possible after the defect is discovered.
3.4 Unless the terms and warranties are included in these standard terms and conditions, all prior discussions, quotations, warranties and Prescribed Terms, to the extent permitted by law, are excluded.

4. Product Testing
4.1 In the event that the Customer, in its order, has requested that Vent-O-Mat Australia conduct special tests on the Goods prior to delivery, or that tests on the Goods be conducted in the presence of the Customer prior to delivery, Vent-O-Mat Australia may, in its discretion, increase the Additional Charges for the cost of such tests.
4.2 The Customer must attend Vent-O-Mat Australia's premises for any testing of the Goods upon the written notice of Vent-O-Mat Australia. Should the Customer not attend Vent-O-Mat Australia's
premises within 7 days of such notice, Vent-O-Mat Australia may deliver to and invoice the Customer for the Goods.

5. Delivery
5.1 The times quoted for delivery are estimates only and Vent-O-Mat Australia accepts no liability for failure or delay in delivery of Goods. The Customer is not relieved of any obligation to accept or pay for Goods by reason of any delay in delivery. Goods may be delivered by instalments at the discretion of Vent-O-Mat Australia.
5.2 Risk in accepting the Goods passes on delivery to the Customer.
5.3. All Additional Charges are payable by the Customer in addition to the Purchase Price of the Goods.
5.4. Return of Goods will not be accepted by Vent-O-Mat Australia except by prior agreement in writing with Vent-O-Mat Australia. Any Goods returned will be subject to a restocking charge of 15% of the Purchase Price of those Goods.

6. Price and Payment
6.1 The Customer must pay the Purchase Price and the Additional Charges to Vent-O-Mat Australia.
6.2 If the Customer is in default, Vent-O-Mat Australia may at its option withhold further deliveries or cancel a contract without prejudice to any of its existing rights.
6.3 All payments are due within 30 days from invoice date. Interest maybe charged at the rate of 1.5% per month or part of a month from the expiry of that period until the date payment is received by Vent-O-Mat Australia.

7. Retention of Title
7.1 Ownership, title and property of the Goods remains with Vent-O-Mat Australia until payment in full for the Goods and all sums due and owing by the Customer to Vent-O-Mat Australia on any account has been made. Until the date of payment:
7.1.1 the Customer has the right to sell the Goods in the ordinary course of business;
7.1.2 until the Goods have been sold by the Customer in the ordinary course of the Customer's business, the Customer holds the Goods as bailee for Vent-O-Mat Australia;
7.1.3 the Goods are always at the risk of the Customer.
7.2 The Customer is deemed to be in default immediately upon the happening of any of the following events:
7.2.1 if any payment to Vent-O-Mat Australia is not made promptly before the due date for payment;
7.2.2 if the Customer ceases to carry on business or stops or suspends payment or states its intention of so doing or is unable to pay its debts as they fall due or if any cheque or bill of exchange drawn by the Customer payable to Vent-O-Mat Australia is dishonoured;
7.3 In the event of a default by the Customer, then without prejudice to any other rights which Vent-O-Mat Australia may have at law or under this contract:
7.3.1 Vent-O-Mat Australia or its agents may without notice to the Customer enter the Customer's premises or any premises under the control of the Customer for the purposes of recovering the Goods.
7.3.2 Vent-O-Mat Australia may recover and resell the Goods;
7.3.3 if the Goods cannot be distinguished from similar Goods which the Customer has or claims to have paid for in full, Vent-O-Mat Australia may in its absolute discretion seize all goods matching the description of the Goods and hold same for a reasonable period so that the respective claims of Vent-O-Mat Australia and the Customer may be ascertained. Vent-O-Mat Australia must promptly return to the Customer any goods the property of the Customer and Vent-O-Mat Australia is in no way liable or responsible for any loss or damage to the Goods or for any loss, damage or destruction to the Customer's business howsoever arising from the seizure of the Goods.
7.3.4 In the event that the Customer uses the Goods in some manufacturing or construction process of its own or some third party, then the Customer must hold such part of the proceeds of sale of such manufacturing or construction process as relates to the Goods in trust for Vent-O-Mat Australia. Such part will be an amount equal in dollar terms to the amount owing by the Customer to the Vent-O-Mat Australia at the time of the receipt of such proceeds. The Customer will pay Vent-O-Mat Australia such funds held in trust upon the demand of Vent-O-Mat Australia.

8. Goods and Services Tax
Goods and Services Tax (GST) will be shown separately in the tax invoice for the sale of the Goods. The amount of GST payable in respect of the supply of the Goods is payable by the Customer. The Customer must indemnify Vent-O-Mat Australia in respect of GST paid and payable by Vent-O-Mat Australia for the supply of the Goods.

9. General
9.1 These terms and conditions are to be construed in accordance with the laws from time to time in the State of New South Wales and the Commonwealth of Australia.
9.2 These standard trading conditions contain all of the terms and conditions of the contract between the parties and may only be varied by agreement in writing between the parties.
9.3 Any conditions found to be void, unenforceable or illegal may, to that extent be severed from the Agreement.
9.4 No waiver of any of these terms and conditions or failure to exercise a right or remedy by Vent-O-Mat
Australia will be considered to imply or constitute a further waiver by Vent-O-Mat Australia of the same or any other term, condition, right or remedy.

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