AIR RELEASE AND VACUUM BREAK VALVES SERIES RBX "ANTI-SHOCK"

The <u>Unique</u> defence against pipe bursts and pipeline system damage!

Vent-O-Mat Series RBX 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 RBX 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 below:

Automatic Surge Protection
The Unique Series RBX 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 RBX design ensures effective de-aeration under all pipeline flow and operating conditions, via either one of three discharge orifices.

Vacuum Protection
The RBX 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 RBX 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 RBX design has been incorporated in the well-known SURGE 5 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
- Canada
- Carribean
- United Arab Emirates
- South America
- Thailand
- Germany
- Kenya
- Egypt
- UK
- South Africa
- Zimbabwe
- Tanzania
- Malawi
- Zambia
- Namibia
- Hong Kong
- Taiwan
- New Zealand
- Vietnam
- Kuwait
- Brazil
- France
- Singapore
- Australia

VENT-O-MAT®

Series RBX
"ANTI - SHOCK"
AIR RELEASE & VACUUM BREAK VALVES

CATALOGUE INDEX

VENT-O-MAT®

Series RBX
OPERATION

PRE NOTES:

1. VENTING OF A FILLING PIPELINE:

The operation of a kinetic air release valve is such that fast approaching water is almost instantaneously halted by the valve's closure without the shock cushioning benefit of any retained air in the pipeline. 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 (1) when water approach velocities are sub critical, the Vent-O- Mat series RBX air release valves feature an automatic Anti Shock Orifice (8) device that serves to decelerate water approaching at excessive speed, thereby limiting pressure rise to a maximum of 2 x rated working pressure of the valve.

2. SURGE ALLEVIATION - PIPELINE PRESSURIZED:

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

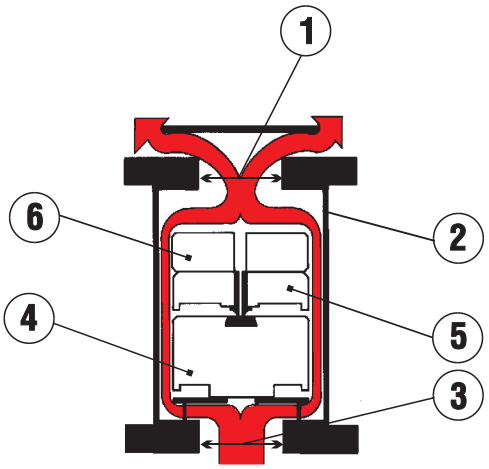
The Vent -O- Mat series RBX takes in air through the unobstructed large orifice when water column separation occurs, but controls the discharge of air through the 'Anti Shock' Orifice as the separated column commences to rejoin. The rejoining impact velocity is thereby sufficiently reduced to prevent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

3. PRESSURIZED AIR RELEASE FROM A FULL PIPELINE:

Effective discharge by the valve of pressurized air depends on the existence of a 'CRITICAL RELATIONSHIP' between the area of the Small Orifice (7) and the mass of Control Float (4), i.e., the mass of the float must be greater than the force created by the working pressure acting on the orifice area. If the float is relatively too light or the orifice area relatively too great, the float will be held against the orifice, even when not buoyed,and air discharge will not be effected.

To ensure that the correct 'CRITICAL RELATIONSHIP' exists the requisite 'DROP TEST' described under TEST SPECIFICATION on page 17 must be applied to any air release valve which is intended for discharge of pressurized air.

VENTING OF A FILLING PIPELINE (SUB CRITICAL WATER APPROACH VELOCITY)

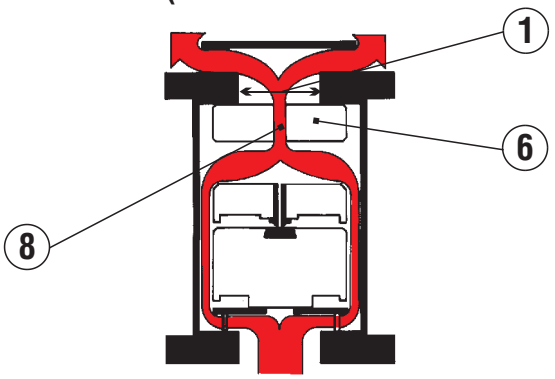


Air enters Orifice (3), travels through the annular space between the cylindrical floats (4), (5), and (6) and the valve Chamber Barrel (2) and discharges from the Large Orifice (1) into atmosphere.

Series RBX

OPERATION

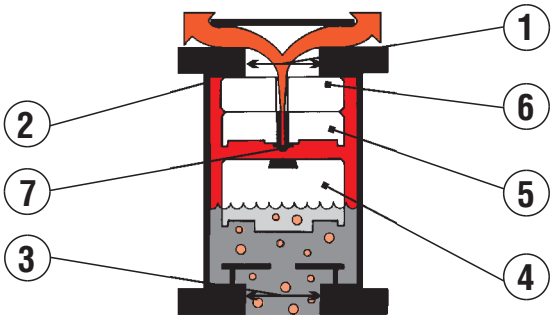
VENTING OF A FILLING PIPELINE (EXCESSIVE WATER APPROACH VELOCITY)



In reaction to increased air flow, Float (6) closes Large Orifice (1) and air is forced through the Anti Shock Orifice (8) resulting in deceleration of the approaching water due to the resistance of rising air pressure in the valve.

Attention is drawn to Pre Note 1 and 2 on page 1.

PRESSURIZED AIR RELEASE FROM A FULL PIPELINE

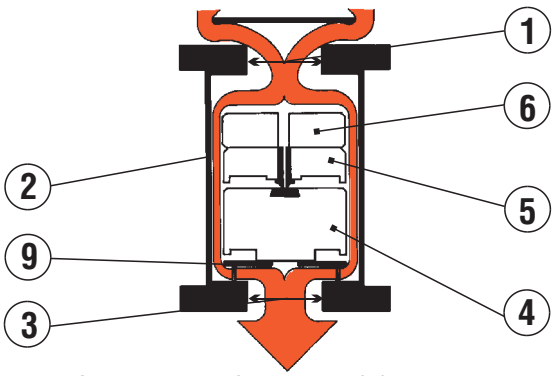


Subsequent to the filling of a pipeline, liquid enters the valve Barrel Chamber (2) and the Floats (4), (5) and (6) are buoyed so that the Large Orifice (1) is closed by Float (6), the valve will then become internally pressurized. A minimal working pressure of < 0. 5 bar (7. 3 psi) acting on the relatively large area of the Orifice (1) will lock Float (6) into the closed position across the Large Orifice (3).

Disentrained air rises through the liquid and accumulates in the valve chamber, when the volume of air is sufficient to displace the liquid, Float (4) will no longer be buoyant and will gravitate downwards thereby opening the Small Orifice (7) and allowing accumulated air to be discharged into atmosphere, as air is discharged the liquid raises Float (4) and re - seals the Small Orifice (7) and prevents escape of liquid

Specific attention is drawn to pre note 3 on page 1.

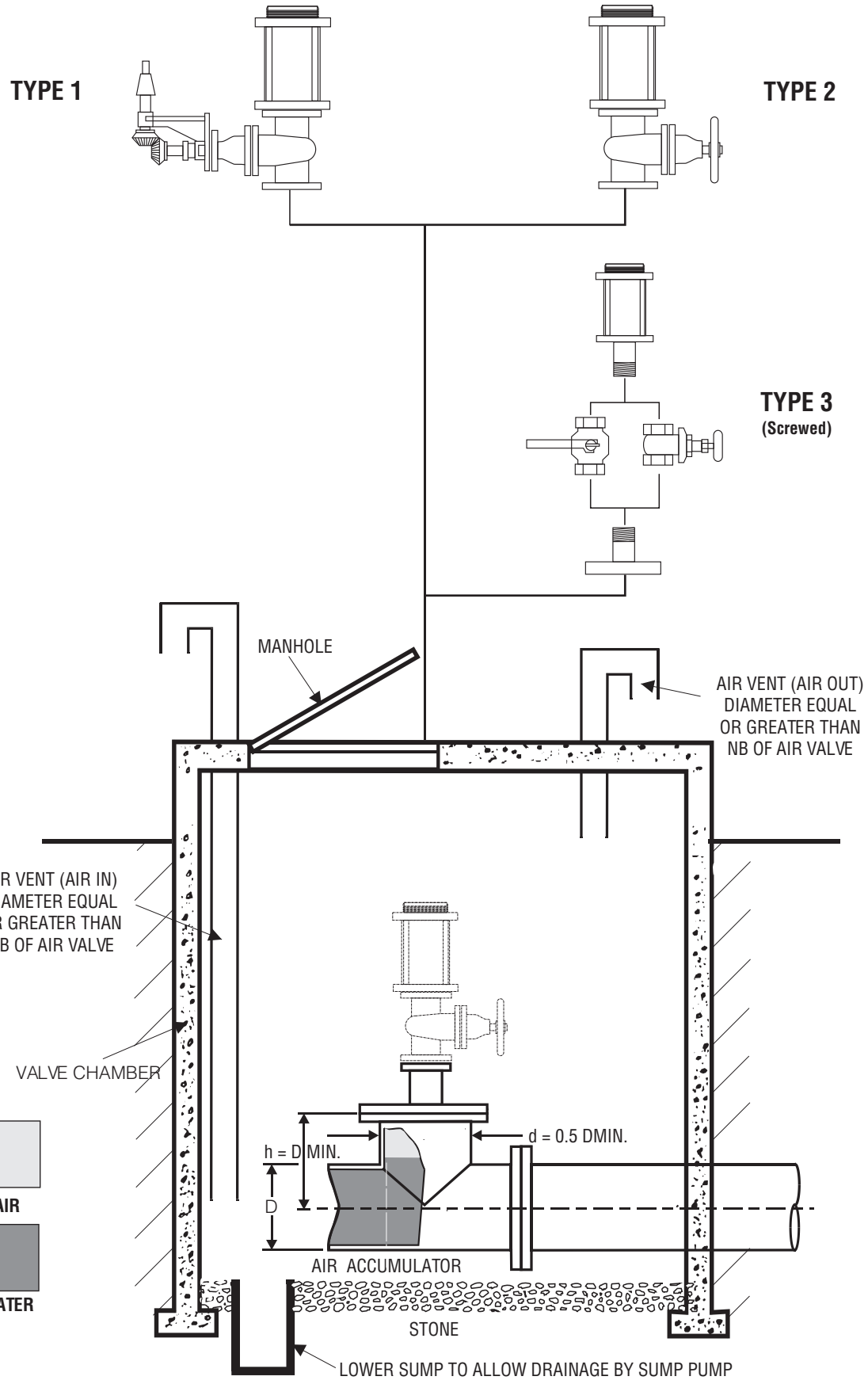
VACUUM RELIEF (AIR INTAKE) OF A DRAINING PIPELINE



Simultaneous drainage of liquid from Valve Chamber (2) causes Floats (4), (5) and (6) to gravitate downwards onto the Baffle Plate (9), thereby allowing atmospheric air through the valve to rapidly displace draining liquid in the pipeline and prevent potentially damaging internal negative pressure.

Series RBX

RECOMMENDED INSTALLATION ARRANGEMENTS



VENT-O-MAT®

Series RBX

COMPONENT DESCRIPTION & MATERIAL SPECIFICATION
SCREWED - DN25 (1") & DN50 (2")

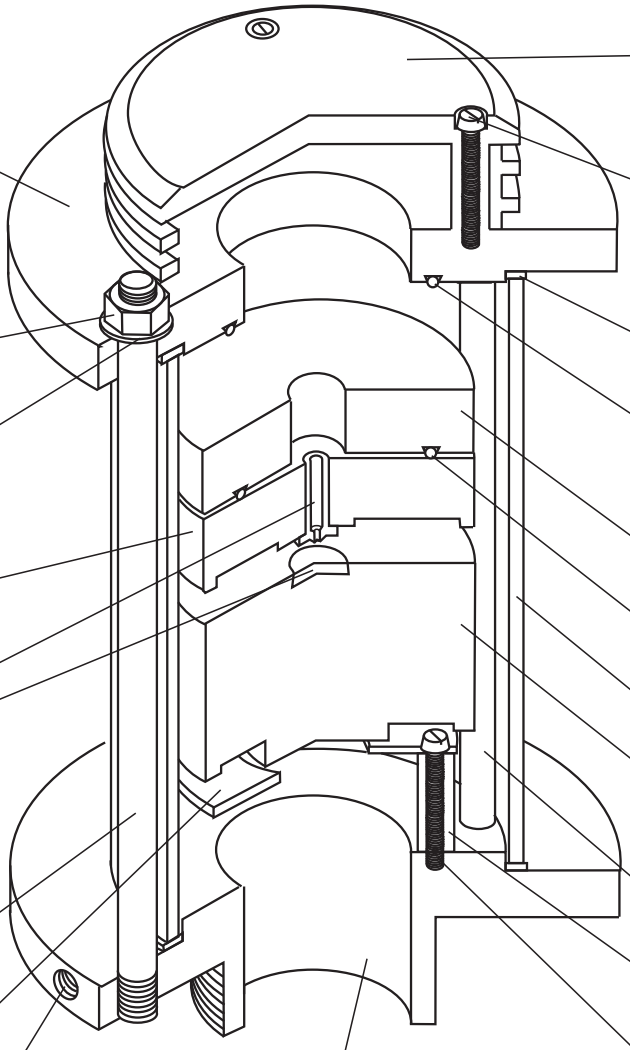
Type:
Series RBX - Double Orifice (Small & Large Orifice) with Anti Shock Orifice Mechanism

End Connection:
Screwed BSP (ISO R7)/ NPT Male

Nominal Sizes:
DN25 (1")
DN50 (2")

Model No's:
RBX 2511 & 2521
RBX 4011 & 4021

Pressure Ratings:
PN25 (363 psi) ANSI #250
PN40 (580 psi) ANSI #300



Top Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Screen Mesh
Stainless Steel AISI 304

Nuts
Stainless Steel AISI 304

Washer
Stainless Steel AISI 304

Top Float
High Density Polyethylene

Nozzle
Stainless Steel AISI 304

Nozzle Seat
Natural Rubber

Guide Screws (Not Shown)
Cheesehead
Stainless Steel AISI 304
(only applicable to DN25 (1") valves)

Tie Rods
Stainless Steel AISI 304

Baffle Plate
Stainless Steel AISI 304

Optional Test Cock Connection
1/4" BSP/ NPT female

Top Cover
ABS Plastic
Polylac PA 737

Assembly Screws
Cheesehead
Stainless Steel AISI 304

Barrel Seal
CAF 400 gasket material
BS 2815 Grade A

O - Ring Seal
Nitrile Rubber

Anti Shock Orifice
High Density Polyethylene

O - Ring Seat
Nitrile Rubber

Barrel
Stainless Steel AISI 304

Lower Float
High Density Polyethylene

Float Guide
Stainless Steel AISI 304
(only applicable to DN50 (2") valves)

Baffle Spacer
Grey P.V.C.

Support Screw
Cheesehead
Stainless Steel AISI 304

Lower Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304
Screwed BSP (ISO R7)/ NPT male

information subject to change without prior notice

VENT-O-MAT®

Series RBX

COMPONENT DESCRIPTION & MATERIAL SPECIFICATION

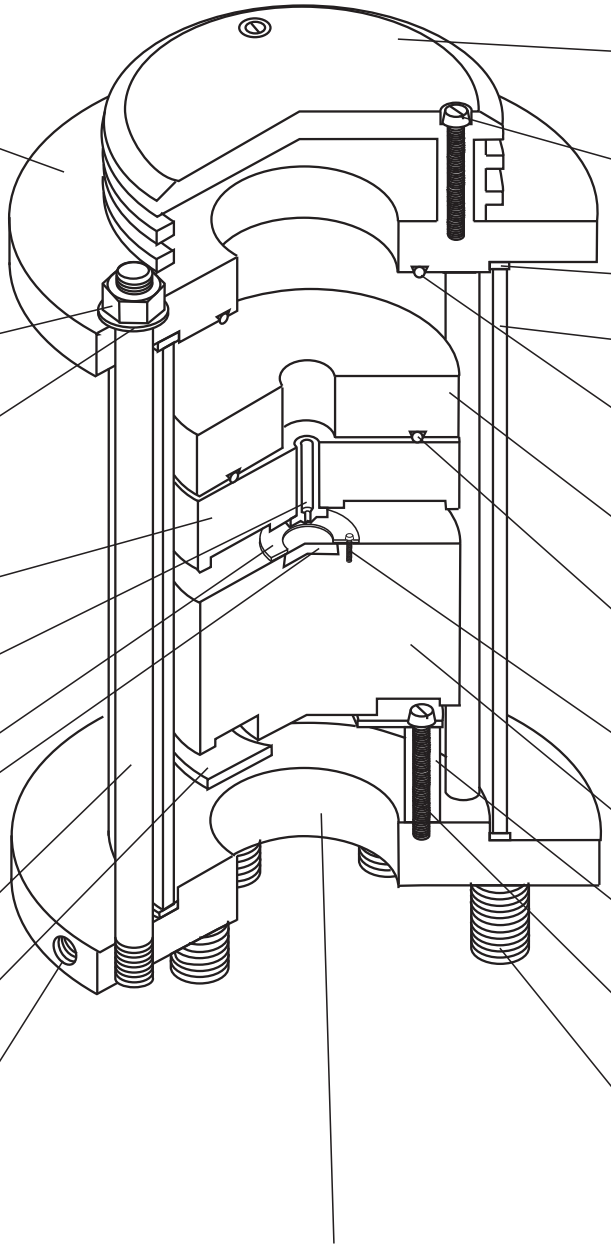
FLANGED - DN80 (3") TO DN100 (4")

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

End Connection:
Flange with screwed studs.

Nominal Sizes:
DN80 (3")
DN100 (4")

Model No's:	Pressure Ratings:
RBX 1601 & 1631	PN16 (232 psi) ANSI #125
RBX 2501 & 2531	PN25 (363 psi) ANSI #250
RBX 4001 & 4031	PN40 (580 psi) ANSI #300



Top Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated alternatively
Stainless Steel AISI 304

Nuts
Stainless Steel AISI 304

Washer
Stainless Steel AISI 304

Top Float
High Density Polyethylene

Nozzle
Stainless Steel AISI 304

Nozzle Seat Retaining Plate
Stainless Steel AISI 304

Nozzle Seat
Natural Rubber

Tie Rods
Stainless Steel AISI 304

Baffle Plate
Stainless Steel AISI 304

Optional Test Cock Connection
1/4" BSP/ NPT female

Top Cover
ABS Plastic
Polylac PA 737

Assembly Screws
Cheesehead
Stainless Steel AISI 304

Barrel Seal
CAF 400 gasket material
BS 2815 Grade A

Barrel
Stainless Steel 304L

O - Ring Seal
Nitrile Rubber

Anti Shock Orifice
High Density Polyethylene

O - Ring Seat
Nitrile Rubber

Connecting Screws
Cheesehead
Stainless Steel 304

Lower Float
High Density Polyethylene

Baffle Spacer
Grey P.V.C.

Support Screw
Cheesehead
Stainless Steel AISI 304

Studs
Stainless Steel AISI 304L

Lower Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated alternatively
Stainless Steel AISI 304

information subject to change without prior notice

VENT-O-MAT®

Series RBX

COMPONENT DESCRIPTION & MATERIAL SPECIFICATION

FLANGED - DN150 (6") TO DN200 (8")

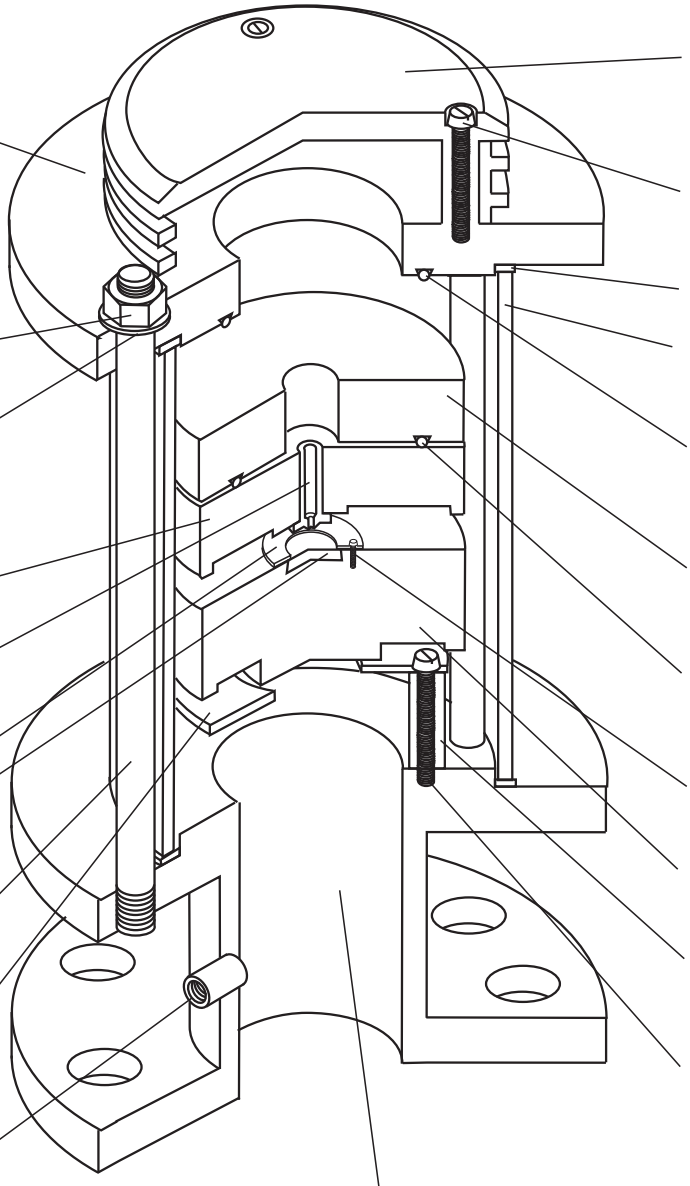
Type:
Series RBX - Double Orifice (Small & Large Orifice) with Anti Shock Orifice Mechanism.

End Connection:
Flange

Nominal Sizes:
DN150 (6")
DN200 (8")

Model No's:
RBX 1601 & 1631
RBX 2501 & 2531
RBX 4001 & 4031

Pressure Ratings:
PN16 (232 psi) ANSI #125
PN25 (363 psi) ANSI #250
PN40 (580 psi) ANSI#300



Top Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Nuts
Stainless Steel AISI 304

Washer
Stainless Steel AISI 304

Top Float
High Density Polyethylene

Nozzle
Stainless Steel AISI 304

Nozzle Seat Retaining Plate
Stainless Steel AISI 304

Nozzle Seat
Natural Rubber

Tie Rods
Stainless Steel AISI 304

Baffle Plate
Mild Steel BS 4360 Gr. 43A
Fusion Bonded Epoxy Powder Coated.

Optional Test Cock Connection
1/4" BSP/ NPT female

Top Cover
ABS Plastic
Polylac PA 737

Assembly Screws
Cheesehead
Stainless Steel AISI 304

Barrel Seal
CAF 400 gasket material
BS 2815 Grade A

Barrel
Stainless Steel 304L

O - Ring Seal
Nitrile Rubber

Anti Shock Orifice
High Density Polyethylene

O - Ring Seat
Nitrile Rubber

Connecting Screws
Cheesehead
Stainless Steel 304

Lower Float
High Density Polyethylene

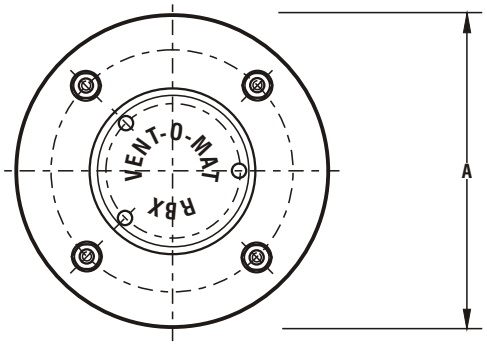
Baffle Spacer
Grey P.V.C.

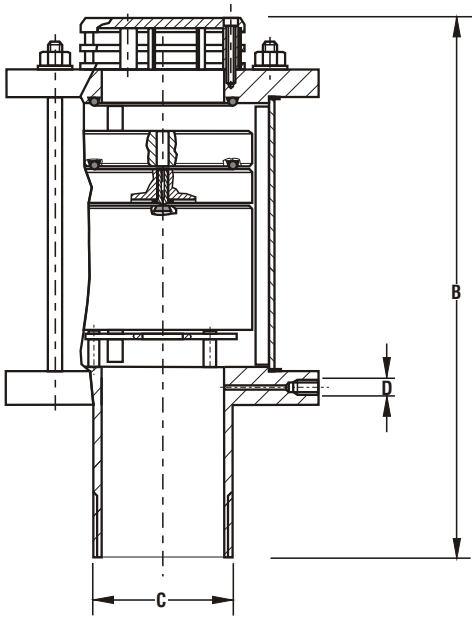
Support Screw
Cheesehead
Stainless Steel AISI 304

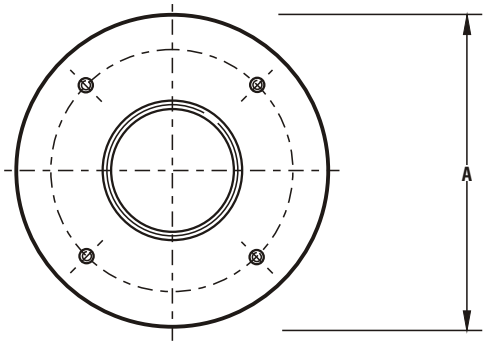
Lower Flange Assembley
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

VENT-O-MAT®

Series RBX
GENERAL SPECIFICATIONS
SCREWED - DN25 (1") & DN50 (2")







Type:
Double Orifice (Small & Large Orifice) with Anti Shock Orifice mechanism.

End Connection:
Screwed BSP/ NPT male

Nominal Sizes:
DN25 (1") & DN50 (2")

Model No's:	**Pressure Ratings bar (psi)**
RBX 2511& 2521	PN 25 (363 psi) ANSI #250
RBX 4011 & 4021	PN 40 (580 psi) ANSI #300

Operating Pressure Range - bar (psi):

	Min	Max.
PN25 (363 psi) ANSI #250	0.5 (7.2)	25 (363)
PN40 (580 psi) ANSI #300	0.5 (7.2)	40 (580)

Operating Temperature Range:
4˚C (40 F) to 80 C (180 F)

Acceptable Media:
Potable or strained raw water.

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

Materials of Construction: - see page 4
Installation:- see page 3

Standard Factory Tests:
i) Hydrostatic - 1.5 x max. rated working pressure
ii) Low head leak - 0.5 bar (7.2 psi)
iii) Small orifice function at max. rated working pressure (minimum 1 valve in 10).

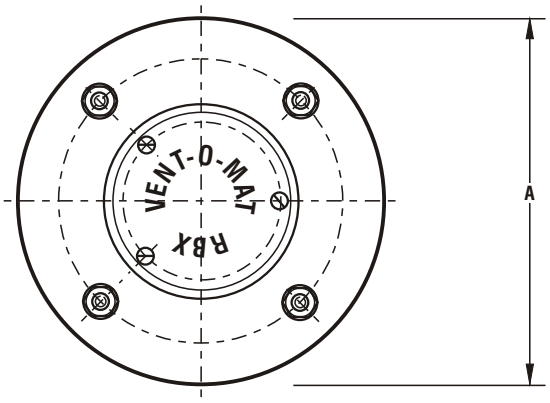
OVERALL DIMENSIONS & WEIGHTS

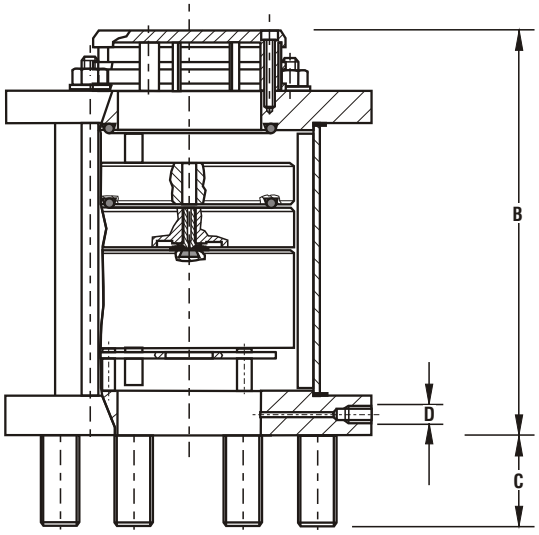
DN mm	DN in.	MODEL No.	PRESSURE RATING	A mm	A in.	B mm	B in.	C	D	WEIGHT kg.	WEIGHT lbs
25	1"	025RBX 2511 &2521	PN25 (363 psi) ANSI #250	120	4 3/4	265	10 7/16	1" BSP/NPT	OPTIONAL 1/4 BSP/NPT BLEED PORT FOR TEST COCK	4.6	10.1
25	1"	025RBX 4011 &4021	PN40 (580 psi) ANSI #300	120	4 3/4	317	12 1/2	1"BSP/ NPT		5.2	11.4
50	2"	050RBX 2511 &2521	PN25 (363 psi) ANSI #250	165	6 1/2	320	12 3/5	2"BSP/ NPT		9.4	20.6
50	2"	050 RBX 4011 & 4021	Pn40 (580 psi) ANSI #300	165	6 1/2	335	13 3/16	2" BSP/ NPT		9.7	21.3

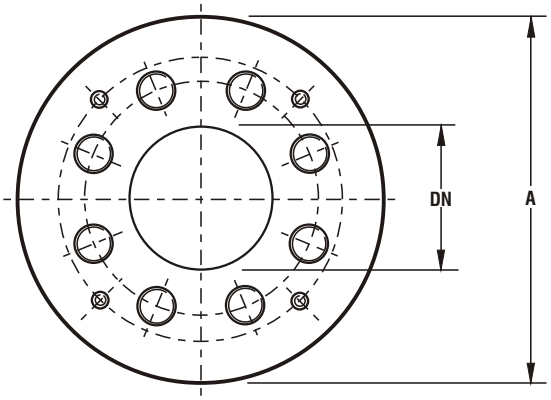
VENT-O-MAT®

Series RBX

GENERAL SPECIFICATIONS
FLANGED - DN80 (3") TO DN100 (4")







Type:
Double Orifice (Small & Large Orifice) with Anti Shock Orifice mechanism.

End Connection:
Flange with Screwed Studs for Alignment to;
BS 4504 PN 10, PN16, PN25 &PN40
SABS 1123 - Tables 1000/3, 1600/3, 2500/3 & 4000/3
ANSI B16. 1 Class 125, Class 250 & ANSI B16. 5 Class 300

Nominal Sizes:
DN80 (3") & DN100 (4")

Model No's:	**Pressure Ratings bar (psi):**
RBX 1601 & 1631	PN 16 (232 psi) ANSI #125
RBX 2501 & 2531	PN 25 (363 psi) ANSI #250
RBX 4001 & 4031	PN 40 (580 psi) ANSI #300

Operating Pressure Range - bar (psi):

	Min	Max.
PN25 (363 psi) ANSI #250	0.5 (7.2)	25 (363)
PN40 (580 psi) ANSI #300	0.5 (7.2)	40 (580)

Operating Temperature Range:
4 C (40 F) to 80 C (180 F)

Acceptable Media:
Potable or strained raw water.

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

Materials of Construction: - see page 5
Installation: - see page 3

Standard Factory Tests:
i) Hydrostatic - 1.5 x max. rated working pressure
ii) Low head leak - 0.5 bar (7.2 psi)
iii) Small orifice function at max. rated working pressure (minimum 1 valve in 10).

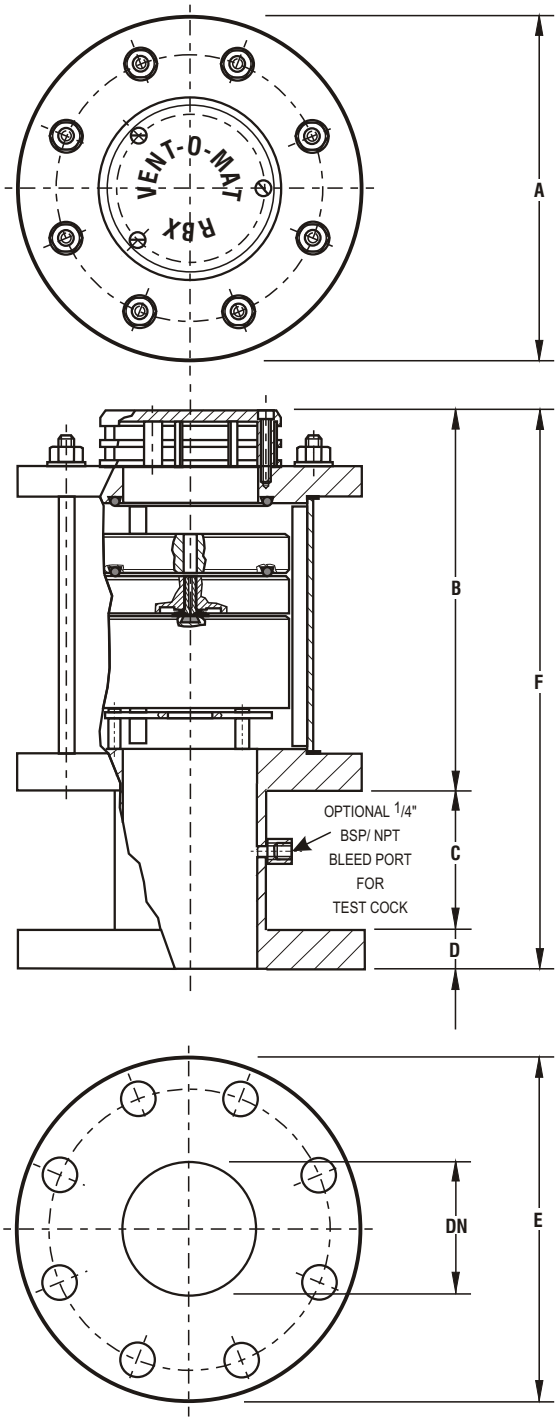
OVERALL DIMENSIONS & WEIGHTS

DN		MODEL No.	PRESSURE RATING	A		B		C		D	WEIGHT	
mm	in			mm	in	mm	in	mm	in		kg.	Lbs
80	3	080 RBX 1601 & 1631	PN16 (232 psi) ANSI #125	235	9 1/4	305	12	50	2	OPTIONAL 1/4" BSP/ NPT BLEED PORT FOR TEST COCK	23	50.6
80	3	080 RBX 2501 & 2531	PN25 (363 psi) ANSI #250	235	9 1/4	305	12	50	2		23	50.6
80	3	080 RBX 4001 & 4031	PN40 (580 psi) ANSI #300	235	9 1/4	320	12 3/5	50	2		25	55
100	4	100 RBX 1601 & 1631	PN16 (232 psi) ANSI #125	235	9 1/4	320	12 3/5	50	2		22	48.5
100	4	100 RBX 2501 & 2531	PN25 (363 psi) ANSI #250	235	9 1/4	320	12 3/5	50	2		22	48.5
100	4	100 RBX 4001 & 4031	PN40 (580 psi) ANSI #300	235	9 1/4	353	13 7/8	50	2		26	57.2

VENT-O-MAT®

Series RBX

GENERAL SPECIFICATIONS
FLANGED - DN150 (6") TO DN200 (8")



Type:
Double Orifice (Small & Large Orifice) with Anti Shock Orifice mechanism.

End Connection:
Flange for Alignment to;
BS 4504 PN 10, PN16, PN25 &PN40
SABS 1123 - Tables 1000/3, 1600/3, 2500/3 & 4000/3
ANSI B16. 1 Class 125, Class 250 & ANSI B16. 5 Class 300

Nominal Sizes:
DN150 (6") & DN200 (8")

Model No's:	**Pressure Ratings bar (psi):**
RBX 1601 & 1631	PN 16 (232 psi) ANSI #125
RBX 2501 & 2531	PN 25 (363 psi) ANSI #250
RBX 4001 & 4031	PN 40 (580 psi) ANSI #300

Operating Pressure Range - bar (psi):

	Min	Max.
PN25 (363 psi) ANSI #250	0.5 (7.2)	25 (363)
PN40 (580 psi) ANSI #300	0.5 (7.2)	40 (580)

Operating Temperature Range:
4 C (40 F) to 80 C (180 F)

Acceptable Media:
Potable or strained raw water.

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

Materials of Construction: - see page 6
Installation: - see page 3

Standard Factory Tests:
i) Hydrostatic - 1.5 x max. rated working pressure
ii) Low head leak - 0.5 bar (7.2 psi)
iii) Small orifice function at max. rated working pressure (minimum 1 valve in 10).

OVERALL DIMENSIONS & WEIGHTS

DN mm	DN in	MODEL No.	PRESSURE RATING	A mm	A in	B mm	B in	C mm	C in	D mm	D in	E mm	E in	F mm	F in	WEIGHT kg.	WEIGHT lbs
150	6	150 RBX 1601 & 1631	PN16 (232 psi) ANSI #125	340	13 2/5	440	17 5/16	120	4 3/4	22	7/8	285	11 1/5	582	22 7/8	70	154.3
150	6	150 RBX 2501 & 2531	PN25 (363 psi) ANSI #250	340	13 2/5	440	17 5/16	120	4 3/4	30	1 3/16	300	11 7/8	590	23 1/4	70	154.3
150	6	150 RBX 4001 & 4031	PN40 (580 psi) ANSI #300	340	13 2/5	440	17 5/16	120	4 3/4	30	1 3/16	300	11 7/8	590	23 1/4	78	171.9
200	8	200 RBX 1601 & 1631	PN16 (232 psi) ANSI #125	390	15 3/8	480	18 7/8	130	5 1/8	24	15/16	340	13 2/5	634	24 14/15	92	202.8
200	8	200 RBX 2501 & 2531	PN25 (363 psi) ANSI #250	390	15 3/8	480	18 7/8	130	5 1/8	28	1 1/8	360	14 1/10	638	25 1/8	92	202.8
200	8	200 RBX 4001 & 4031	PN40 (580 psi) ANSI #300	390	15 3/8	480	18 7/8	130	5 1/8	34	1 3/8	375	14 3/4	644	25 3/8	98	216

SELECTION & POSITIONING

PRE-NOTES

The functional limits of an air valve are governed by three physical laws namely: Joukowski's Equation Boyle's Law and Pascal's Law. Air valve operation however is also dependent on design and internal configuration, and can vary dramatically from manufacturer's product to manufacturer's product, within the parameters of what is physically possible. The basis of the Vent -O- Mat design is in the understanding of these laws, which have been used to design an air release and vacuum break valve that provides the optimum usable safe performance relative to all functions. The following summary is a general guideline of factors to consider when sizing air valves.

Sizing for Vacuum
Calculate necessary valve orifice sizes independently for each apex point.

Determine the smallest air release and vacuum break valve capable of admitting air into the pipeline equal to the potential water flow out of the pipeline whilst not exceeding a differential pressure that would put the pipeline and gasket joints at risk. We recommend 0.35 bar (5psi) Dp for steel pipe or lower if GRP, uPVC or HDPE pipe is being utilised. This exercise is simplified on pages 11 and 12 of this catalogue. Be cautious of air valve designs with spherical floats as a low pressure zone is created above the float which causes it to partially close off the large orifice during air intake.

Note that vacuum protection is dependent on valve size selection and orifice size relative to the nominal size of the valve. In sizing air valves be cautious of designs with restricted orifice diameters, i.e., orifice diameters that are smaller than the nominal size of the valve, as this could lead to insufficient vacuum protection and pipe collapse if not accommodated for. Vent -O- Mat large orifice diameters and flow path through the valve is equal to the nominal size of the valve e.g. a DN100 (4") valve has a 100mm (4") orifice. This ensures the least possible resistance to the intake of air and consequently the least possible negative pressure within a draining pipeline.

Sizing for Discharge
If a Vent -O- Mat air valve is sized correctly for air intake, discharge should not be a factor in sizing as all air will be discharged through the large orifice or "Anti-Shock" orifice (refer to RBX operation on pages 1 and 2 of this catalogue). If this information is used for the sizing of air valves other than Vent-O-Mat, we recommend that a valve be selected that is capable of discharging air equal to the filling rate, whilst not exceeding a differential of 0.05 bar (0.7) psi across the large orifice in order to prevent pressure surge and water hammer.

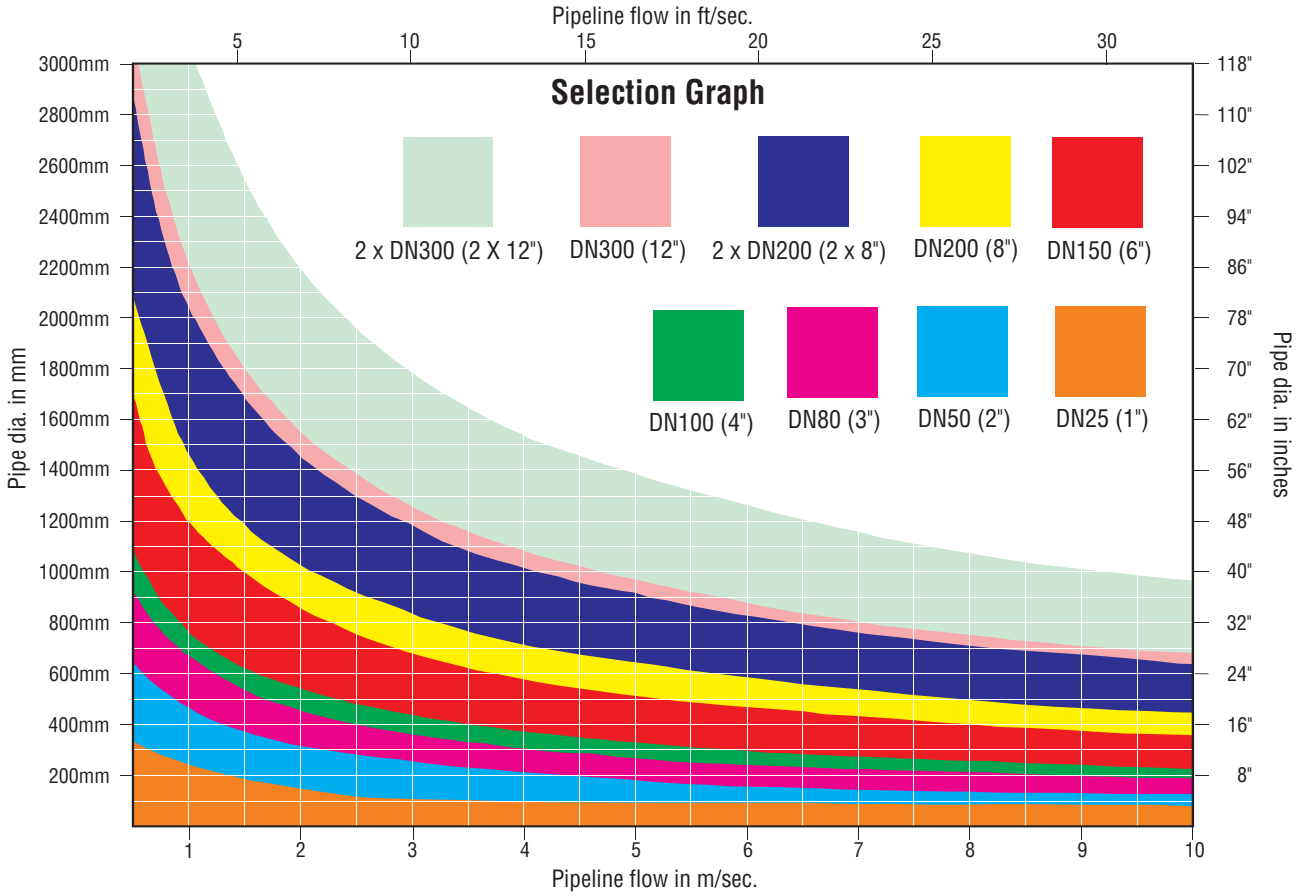
Pressurized Air Discharge
Effective discharge by an air release and vacuum break valve of pressurised air depends on the existence of a "Critical Relationship" between the area of the small orifice and the mass of the control float, i.e., the mass of the float must be greater than the force created by the working pressure acting on the orifice area. If the float is relatively too light or the orifice area relatively too great, the float will be held against the orifice even when not buoyed, and air discharge will not take place.

Surge Alleviation
It is imperative, due to the unpredictable nature of pipeline operation, that every air release and vacuum break valve should as standard, incorporate a surge and water hammer alleviation mechanism. This mechanism should only be activated in the instance of high velocity air discharge or pump trip (where the separated liquid columns rejoin at excessive velocities). The alleviation of surge and/or water hammer must be achieved by deceleration of the approaching liquid prior to valve closure (see operation of RBX on pages 1 and 2 of this catalogue). Relief mechanisms that act subsequent to valve closure cannot react in the low millisecond time span required and are therefore unacceptable (refer to pages 13 and 14 of this catalogue).

Kindly contact the manufacturer for a free Air Valve Sizing Disc and a copy of the Vent -O- Mat publication; "Air Valve Technology Reviewed", which gives a comprehensive guideline on air valve sizing as well as an in-depth look at air valve research and development over the past 35 years. . Vent-O-Mat in addition provides assistance on air valve sizing and positioning.

Series RBX

SELECTION & POSITIONING



PipeD ia		Pipeline Velocity in Metres per sec.																				
inches	mm	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
4	100	5	9	14	18	23	28	32	37	41	46	51	55	60	64	69	74	78	83	87	92
6	150	10	20	31	41	51	61	72	82	92	102	113	123	133	143	154	164	174	184	195	205
8	200	18	35	53	70	88	105	123	141	158	176	193	211	229	246	264	281	299	316	334	352
10	250	27	55	82	110	137	165	192	220	247	275	302	330	357	385	412	440	467	495	522	550
12	300	39	78	117	156	194	233	272	311	350	389	428	467	506	545	583	622	661	700	739	778
14	350	47	94	141	188	235	282	329	376	423	470	517	564	611	658	705	752	799	846	893	940
16	400	62	124	186	247	309	371	433	495	557	618	680	742	804	866	928	989	1051	1113	1175	1237
18	450	79	157	236	315	393	472	551	630	708	787	866	944	1023	1102	1180	1259	1338	1416	1495	1574
20	500	97	194	291	388	485	582	679	776	873	970	1067	1164	1261	1358	1455	1552	1648	1745	1842	1939
22	550	118	236	353	471	589	707	825	942	1060	1178	1296	1414	1532	1649	1767	1885	2003	2121	2238	2356
24	600	140	280	420	560	700	839	979	1119	1259	1399	1539	1679	1819	1959	2099	2239	2379	2518	2658	2798
26	650	163	326	489	653	816	979	1142	1305	1468	1631	1795	1958	2121	2284	2447	2610	2774	2937	3100	3263
28	700	190	380	570	760	949	1139	1329	1519	1709	1899	2089	2279	2468	2658	2848	3038	3228	3418	3608	3798
30	750	219	437	656	875	1093	1312	1530	1749	1968	2186	2405	2624	2842	3061	3280	3498	3717	3935	4154	4373
32	800	249	499	748	998	1247	1497	1746	1995	2245	2494	2744	2993	3242	3492	3741	3991	4240	4490	4739	4988
34	850	282	564	847	1129	1411	1693	1976	2258	2540	2822	3105	3387	3669	3951	4233	4516	4798	5080	5362	5645
36	900	317	634	951	1268	1585	1902	2219	2537	2854	3171	3488	3805	4122	4439	4756	5073	5390	5707	6024	6341
38	950	354	709	1063	1418	1772	2126	2481	2835	3190	3544	3899	4253	4607	4962	5316	5671	6025	6379	6734	7088
40	1000	393	785	1178	1571	1963	2356	2749	3142	3534	3927	4320	4712	5105	5498	5890	6283	6676	7069	7461	7854
44	1100	475	950	1425	1901	2376	2851	3326	3801	4276	4752	5227	5702	6177	6652	7127	7603	8078	8553	9028	9503
48	1200	565	1131	1696	2262	2827	3393	3958	4524	5089	5655	6220	6786	7351	7917	8482	9048	9613	10179	10744	11310
52	1300	664	1327	1991	2655	3318	3982	4646	5309	5973	6637	7300	7964	8628	9291	9955	10619	11282	11946	12610	13273
56	1400	770	1539	2309	3079	3848	4618	5388	6158	6927	7697	8467	9236	10006	10776	11545	12315	13085	13854	14624	15394
60	1500	884	1767	2651	3534	4418	5301	6185	7069	7952	8836	9719	10603	11486	12370	13254	14137	15021	15904	16788	17671
62	1600	1005	2011	3016	4021	5027	6032	7037	8042	9048	10053	11058	12064	13069	14074	15080	16085	17090	18096	19101	20106
66	1700	1135	2270	3405	4540	5675	6809	7944	9079	10214	11349	12484	13619	14754	15889	17024	18158	19293	20428	21563	22698
70	1800	1272	2545	3817	5089	6362	7634	8906	10179	11451	12723	13996	15268	16540	17813	19085	20358	21630	22902	24175	25447
74	1900	1418	2835	4253	5671	7088	8506	9924	11341	12759	14176	15594	17012	18429	19847	21265	22682	24100	25518	26935	28353
78	2000	1571	3142	4712	6283	7854	9425	10996	12566	14137	15708	17279	18850	20420	21991	23562	25133	26704	28274	29845	31416
82	2100	1732	3464	5195	6927	8659	10391	12123	13854	15586	17318	19050	20782	22513	24245	25977	27709	29441	31172	32904	34636
86	2200	1901	3801	5702	7603	9503	11404	13305	15205	17106	19007	20907	22808	24709	26609	28510	30411	32311	34212	36113	38013
90	2300	2077	4155	6232	8310	10387	12464	14542	16619	18696	20774	22851	24929	27006	29083	31161	33238	35315	37393	39470	41548
94	2400	2262	4524	6786	9048	11310	13572	15834	18096	20358	22619	24881	27143	29405	31667	33929	36191	38453	40715	42977	45239
98	2500	2454	4909	7363	9817	12272	14726	17181	19635	22089	24544	26998	29452	31907	34361	36816	39270	41724	44179	46633	49087
102	2600	2655	5309	7964	10619	13273	15928	18583	21237	23892	26546	29201	31856	34510	37165	39820	42474	45129	47784	50438	53093
106	2700	2863	5726	8588	11451	14314	17177	20039	22902	25765	28628	31491	34353	37216	40079	42942	45804	48667	51530	54393	57256
110	2800	3079	6158	9236	12315	15394	18473	21551	24630	27709	30788	33866	36945	40024	43103	46181	49260	52339	55418	58496	61575
114	2900	3303	6605	9908	13210	16513	19816	23118	26421	29723	33026	36329	39631	42934	46236	49539	52842	56144	59447	62749	66052
118	3000	3534	7069	10603	14137	17671	21206	24740	28274	31809	35343	38877	42412	45946	49480	53014	56549	60083	63617	67152	70686

Conversion Table l/sec. to m/sec. of Pipeline Velocity

information subject to change without prior notice

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 3.5. meters (5 psi) below atmospheric. It is not good practice to go below 7 meters (10 psi) absolute (3 meters (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 (ft/s) either for scouring, pipe rupture or column separation for a particular pipeline section. Conversion from l/sec to m/sec can be done fairly quickly; using the conversion table on page 11.
2. Move vertically on the selection graph (top of page 11) from the m/s (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 - 3. 5 meters (- 5 psi) and the lower portion - 1 meter (- 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)

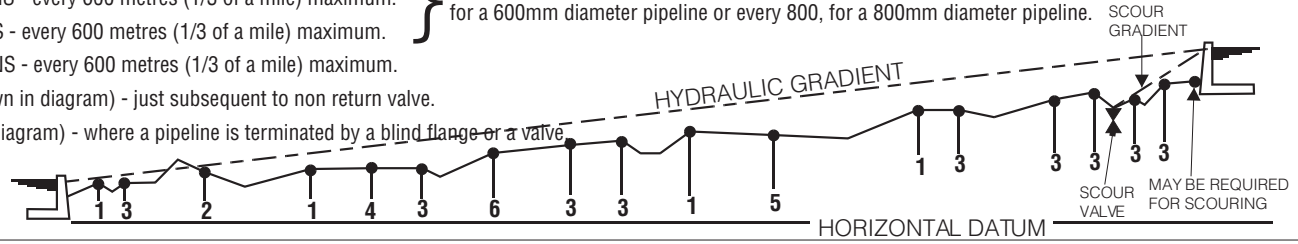
A Ø400mm (16") pipeline draining at 402 l/sec (851 scf/m) which equates to 3.25 m/sec. (10.66 ft/s), what valve size should be selected?

From the 3. 25 m/sec. (10. 66 ft/s) point, on the graph on page 11, move vertically until the Ø 400 mm (16") pipe size horizontal line is intersected. This places the intersection point in the operating band of a DN100 (4") Vent -O- Mat RBX valve. But, if for example, the drainage rate is 433 l/sec. (917 scf/m) which equates to 3.5 m/sec. (11.48 ft/s), the valve would be operating close to it's limit and it may be prudent to change to a DN150 (6") Vent -O- Mat RBX.

VALVE POSITIONING

1. ON APEX POINTS (relative to hydraulic gradient).
2. 5 METRES (16 FEET) BELOW APEX POINTS FORMED BY INTERSECTION OF PIPELINE AND HYDRAULIC GRADIENT - i.e. where pipeline siphoning over gradient an air release valve positioned on the apex would break the siphon. If positioning on apex is required a modified VENT -O- MAT Series RBX can be supplied.
3. NEGATIVE BREAKS (increase in downward slope or decrease in upward slope).
4. LONG HORIZONTAL SECTIONS - every 600 metres (1/3 of a mile) maximum.
5. LONG ASCENDING SECTIONS - every 600 metres (1/3 of a mile) maximum.
6. LONG DESCENDING SECTIONS - every 600 metres (1/3 of a mile) maximum.
7. PUMP DISCHARGE (not shown in diagram) - just subsequent to non return valve.
8. BLANK ENDS (not shown in diagram) - where a pipeline is terminated by a blind flange or a valve.

Alternatively: - 1 meter per every mm in pipe diameter e.g. space air valves every 600 meters for a 600mm diameter pipeline or every 800, for a 800mm diameter pipeline.



SURGE & WATERHAMMER PROTECTION

Introduction

The Vent-O-Mat Series RBX "Anti-Shock" 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 RBX incorporates the additional floating "Anti-Shock" Orifice which is aerodynamically engineered to throttle air discharge when water 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 water 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 RBX is an essential precaution for pipeline priming.

Surge Protection - Pump Trip Conditions

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

The Vent-O-Mat series RBX takes in air through the unobstructed large orifice when water column separation occurs, but controls the discharge of air through the "Anti-Shock" 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 air-valves forming an integral and valuable addition in a combined strategy for further reducing surge pressures. The benefit of the "Anti-Shock" 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 RBX 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 Protection - Primary Pipeline Surge Protection Failure

In instances where air vessels or other alleviation measures are utilised as primary surge protection and these devices fail, excessively high surge pressures will be generated. The same is true if pipeline demands are increased with time without the upgrading of initial surge protection equipment.

SURGE & WATERHAMMER PROTECTION

Protection by Vent-O-Mat Series RBX will provide the benefits already described. The valve in addition, has a pipeline over pressure safety feature which acts as a "rupture-disc". Operation of this feature will be without an explosive effect and without damage to valve. This feature consists of easily replaceable components such as gaskets and seals.

This feature will thus provide surge alleviation in instances where surge pressures are abnormally high. The net alleviation effect can be taken into account by the design engineer using surge modelling software.

Computer Modelling

The effectiveness of Vent-O-Mat series RBX 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 5.3** surge analysis software programme. Accurate results are also obtained by other commercially available surge analysis software programmes such as FLOWMASTER and TRANSAM.

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 RBX 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 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 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!

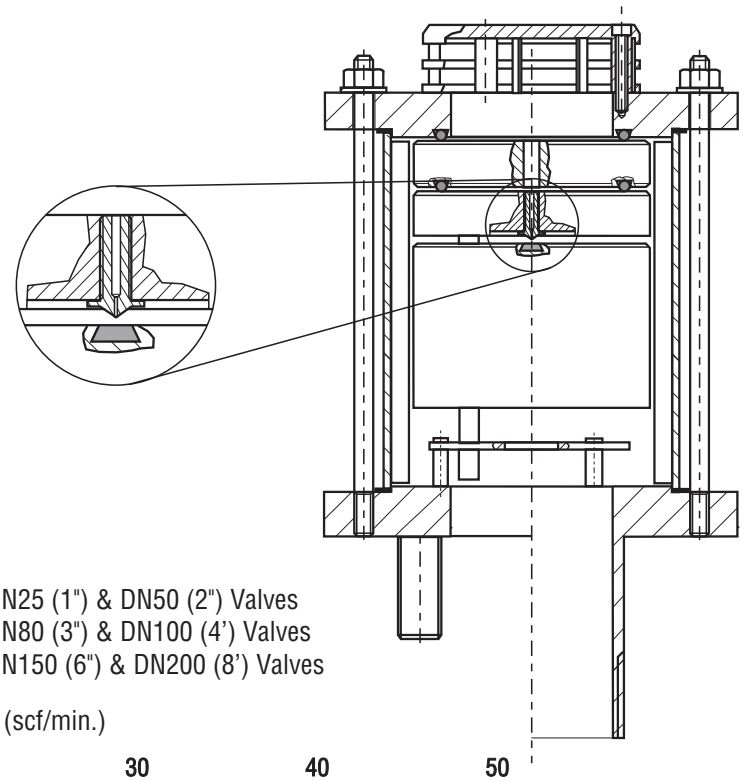
VENT-O-MAT®

Series RBX

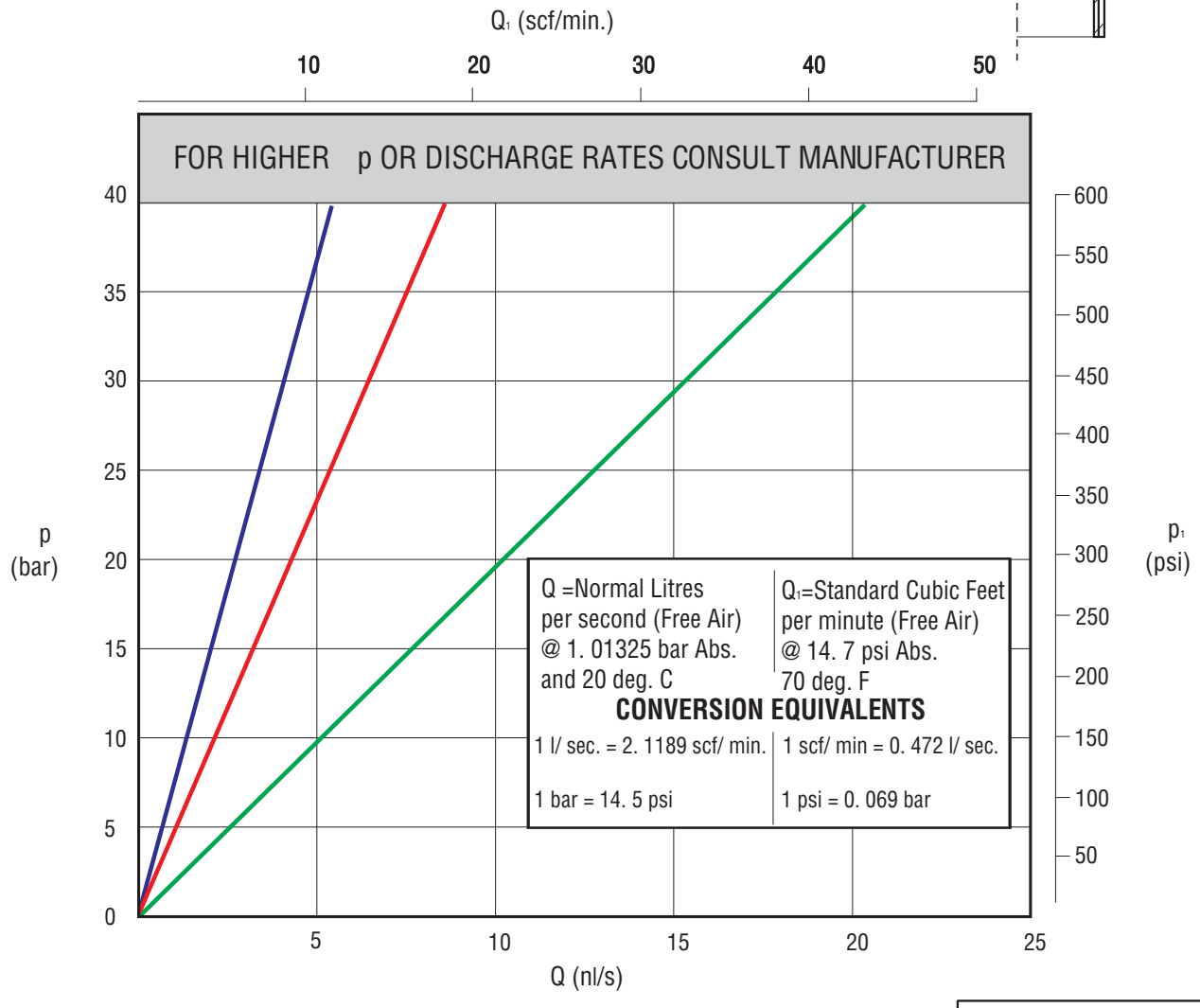
SMALL ORIFICE DISCHARGE PERFORMANCE

Type:
Series RBX - Double Orifice (Small & Large Orifice)
with 'Anti Shock Orifice' Mechanism

Model No's:
RBX 1601/ 1631
RBX 2511/ 2521/ 2501/ 2531
RBX 4011/ 4021/ 4001/ 4031



ø 1.2 mm (ø 0. 047") small orifice - DN25 (1") & DN50 (2") Valves
ø 1.5 mm (ø 0. 059") small orifice - DN80 (3") & DN100 (4') Valves
ø 2.4 mm (ø 0. 094") small orifice - DN150 (6") & DN200 (8') Valves



information subject to change without prior notice

VENT-O-MAT®

Series RBX
Why ?

- **"ANTI - SHOCK" - "ANTI - SURGE"** - The RBX 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 RBX 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 RBX 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 RBX 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 RBX series large orifice diameters equal the nominal size of the valve, i.e., a 200mm (8") valve has a 200mm (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 RBX 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!!!

PURCHASE SPECIFICATION

VENT-O-MAT MODEL NO.

Page 7 - Series RBX - DN25 (1") or DN50 (2") with BSP (ISO R7) or NPT, Screwed Male Connection.
Page 8 - Series RBX - DN80 (3") to DN100 (4") Flanged Connection.
Page 9 - Series RBX - DN150 (6") to DN200 (8") Flanged Connection.

CONSTRUCTION & DESIGN

The air release & vacuum break valve shall be of the compact single chamber design with solid cylindrical H.D.P.E. control floats housed in a tubular stainless steel body with epoxy powder coated cast iron or steel ends secured by means of stainless steel tie rods.
The valve shall have an integral 'Anti - Shock' Orifice mechanism which shall operate automatically to limit transient pressure rise or shock induced by closure to 2 x valve rated working 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 control float seating against a nitrile 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 the 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.
The valve design shall incorporate an over pressure safety feature that will fail without an explosive effect, such as is normally the case when highly compressed air is released suddenly. The feature shall consist of easily replaceable components such as gaskets, seals or the like.
Connection to the valve inlet shall be facilitated by a screwed BSP (ISO R7) or NPT male end (DN25 (1") & DN50 (2") only) or a flanged end conforming to PN10, 16, 25 or 40 ratings of BS 4504 or SABS 1123 Standards or, ANSI B16. 1 Class 125 and Class 250 and ANSI B16. 5 Class 300 Standards.
Flanged ends shall be supplied with the requisite number of stainless steel or mild steel screwed studs inserted for alignment to the specified standard. **Nuts, washers, or jointing gaskets shall be excluded.**

Optional: Provision of a 1/4" BSP/ NPT Test/ Bleed Cock.

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 water approach velocities are relative to a transient pressure rise, on valve closure, of < 2 x valve rated pressure.
   At higher water approach velocities, which have a potential to induce transient pressure rises > 2 x valve rated pressure on valve closure, the valve shall automatically discharge air through the Anti Shock Orifice and reduce water approach velocity, so that on closure a maximum transient pressure rise of < 2 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 0.5 bar (7.3 psi) to twice rated working pressure.
3. Valves shall respond to the presence of air by discharging it through the small orifice at any pressures within a specified design range, i.e. 0.5 bar (7.3 psi) to 16 bar (232 psi), 25 bar (363 psi) or 40 bar (580 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.

Series RBX

ORDERING GUIDE

0 5 0 | R B | X | 2 5 | 0 | 1

VALVE SIZE:
DN25 (1") - 0 2 5
DN50 (2") - 0 5 0
DN80 (3") - 0 8 0
DN100 (4") - 1 0 0
DN150 (6") - 1 5 0
DN200 (8") - 2 0 0

VALVE SERIES No.

ANTI SHOCK ORIFICE:

VALVE PRESSURE RATING:
PN16 (232 PSI), ANSI #125 1 6
PN25 (363 PSI), ANSI#250 2 5
PN40 (580 PSI), ANSI#300 4 0

VALVE END CONNECTION:
SCREWED - BSP 1
SCREWED - NPT 2
FLANGED - BS 4504 OR SABS 1123 0
FLANGED - ANSI B16. 1 OR B16. 5 3

VALVE TYPE:
DOUBLE ACTING 1

Note:
1. DN250 (10") and DN300 (12") valves are available on request.
2. Valves for pressure ratings of PN64 (928 psi) ANSI #400 and PN100 (1450 psi) ANSI #600 are available on request.
3. Valves are available with AISI 304 stainless steel flanged ends, please specify when ordering.

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 1.5 times the rated working pressure which shall be held for a period of 2 minutes. Any leaking, weeping or sweating shall be reason for rejection.

(B) A low head leak test whereby the valve is filled with water and pressurized to a maximum of 0.5 bar (7.3 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.

Series RBXb
OPERATION

PRE NOTES:

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

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

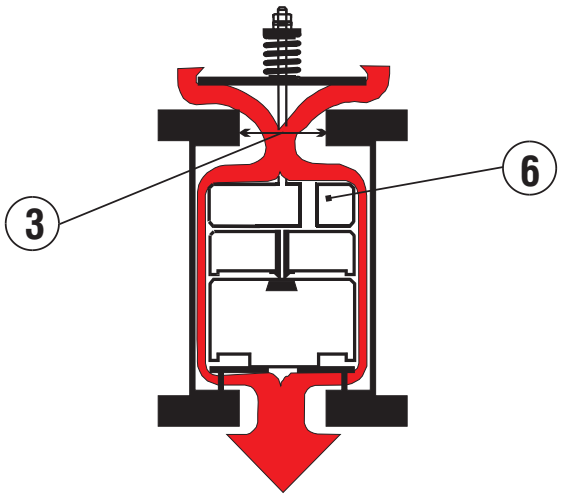
The Vent-O-Mat Series RBXb valve has specifically been developed for use on deep well submersible pump and vertical turbine pump applications where they are installed prior to the pump discharge check valve to fulfill the following functions:

Provide effective and controlled release of air in the vertical riser upon pump startup.

Dampen surge pressures upon pump startup.

Provide vacuum protection when the pump stops and the vertical column drains.

VACUUM RELIEF (AIR INTAKE)

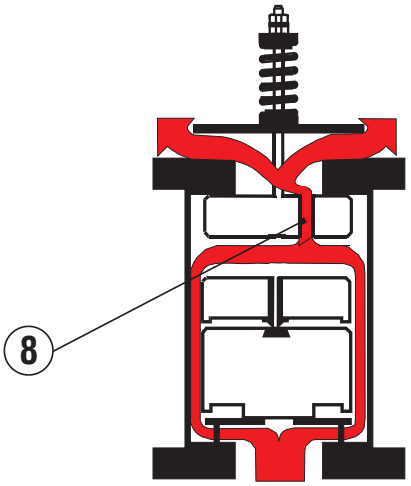


Upon pump stop, the pump discharge check valve closes. Liquid drains from the air valve and the pump's vertical column. The negative differential created by the draining liquid causes atmospheric air to push the "Anti-Shock" Float (6) down, opening the Large Orifice (3) and rapidly displaces the draining liquid to prevent potentially damaging internal negative pressure *.

***Note:** A differential pressure of less than 0.05 bar (0.7 psi) across the Large Orifice (3) is required to open the valve fully under vacuum conditions.

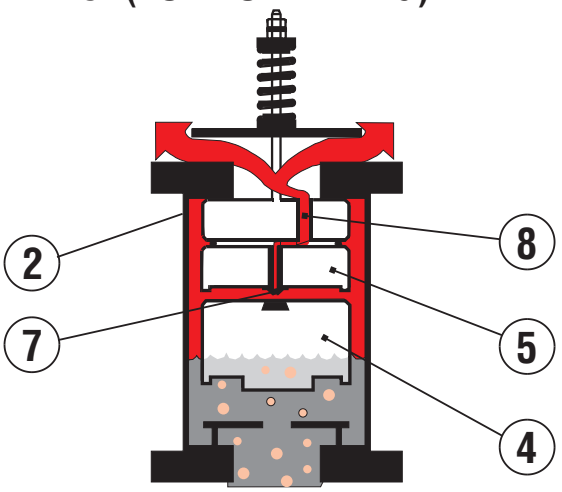
Series RBXb
OPERATION

VENTING (PUMP START UP)



Air is forced through the "Anti-Shock" Orifice (8) resulting in the deceleration of the approaching water column due to the resistance of rising air pressure in the valve. This dampens transients when the air valve closes and the water column opens the pump, discharge check valve.

PRESSURIZED AIR RELEASE (PUMP OPERATING)

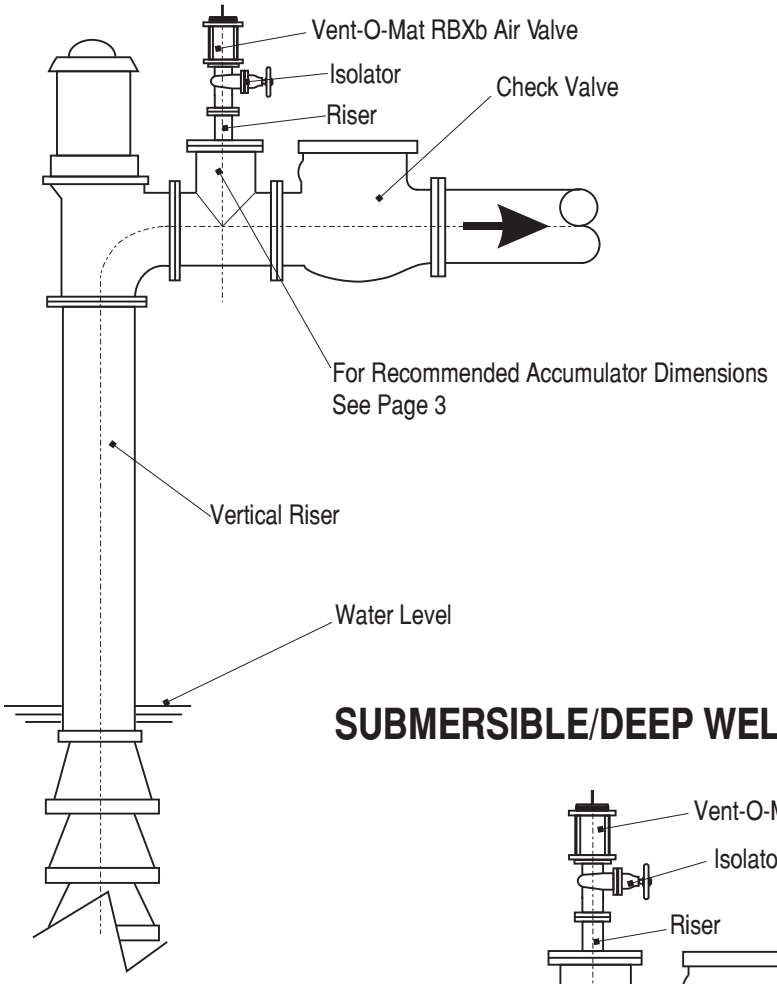


Liquid enters the valve Barrel Chamber (2) and the Floats (4), (5) are buoyed so that the "Anti-Shock" Orifice (8) is closed by the Floats (4), (5) the valve will then become internally pressurized.

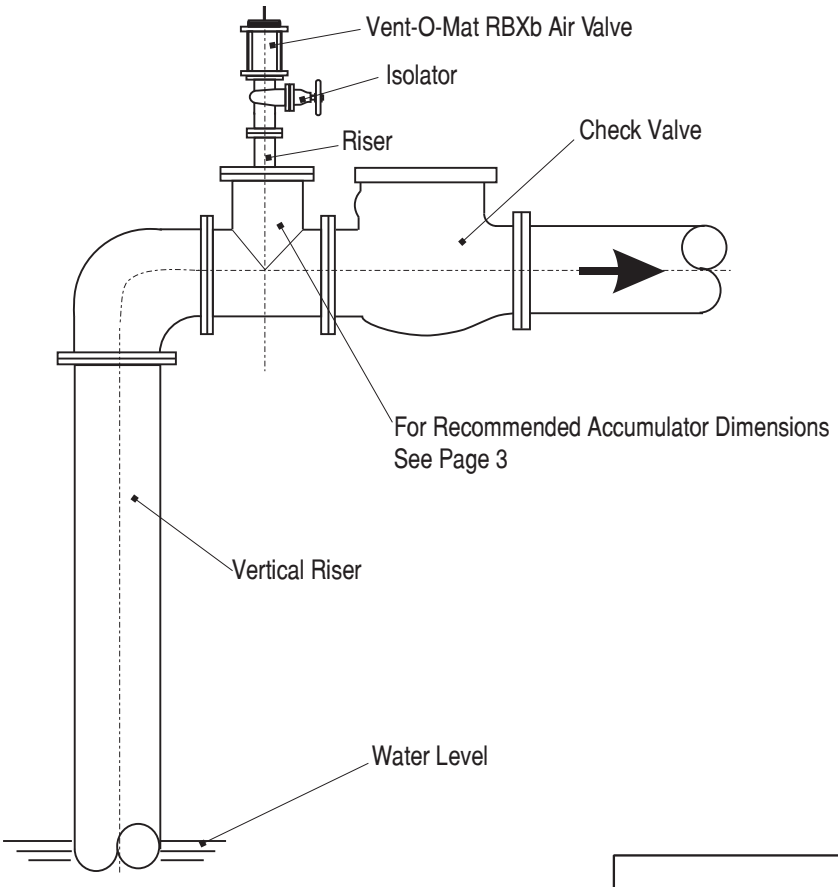
Disentrained air rises through the liquid and accumulates in the valve chamber when the volume of air is sufficient to displace the liquid, Float (4) will no longer be buoyant and will gravitate downwards thereby opening the Small Orifice (7) and allowing accumulated air to be discharged into atmosphere, as the air is discharged the liquid raises the Float (4) and reseals the Small Orifice (7) and prevents escape of liquid.

RECOMMENDED INSTALLATION ARRANGEMENTS

VERTICAL TURBINE PUMP APPLICATION



SUBMERSIBLE/DEEP WELL APPLICATION



VENT-O-MAT®

Series RBXb

COMPONENT DESCRIPTION & MATERIAL SPECIFICATION
SCREWED - DN25 (1") & DN50 (2")

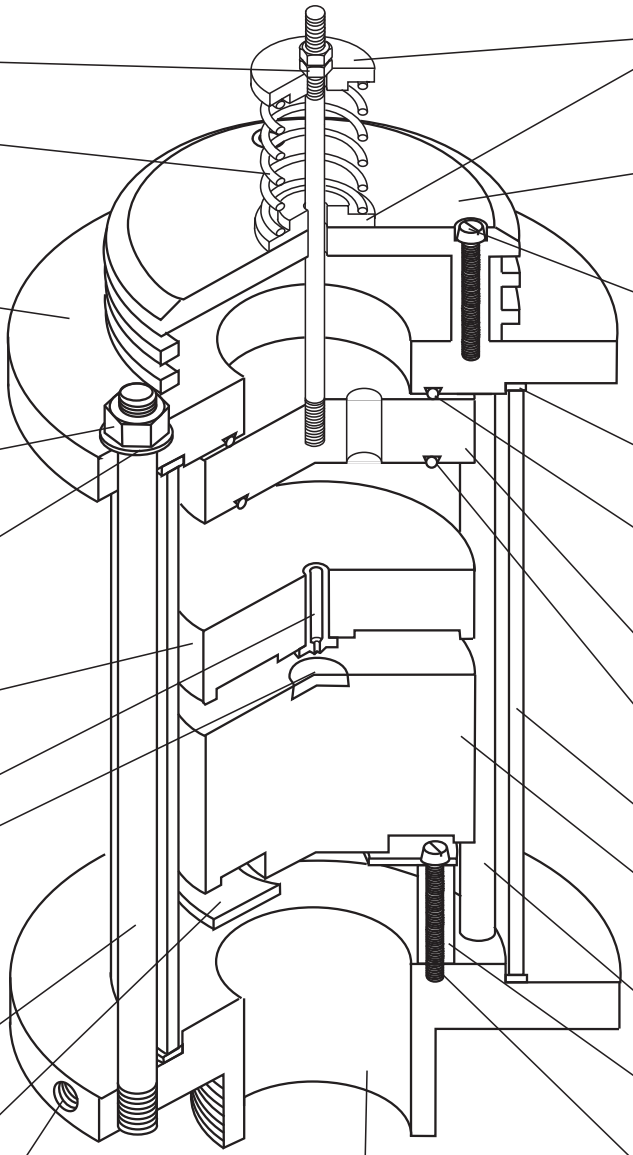
Type:
Series RBXb - Double Orifice (Small & Large Orifice) with *Bias* Mechanism

End Connection:
Screwed BSP (ISO R7)/ NPT Male

Nominal Sizes:
DN25 (1")
DN50 (2")

Model No's:
RBXb 2511 & 2521
RBXb 4011 & 4021

Pressure Ratings:
PN25 (363 psi) ANSI #250
PN40 (580 psi) ANSI #300



Locking Nuts
Stainless Steel AISI 304

Bias Spring
Stainless Steel AISI 304

Top Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Nuts
Stainless Steel AISI 304

Washer
Stainless Steel AISI 304

Top Float
High Density Polyethylene

Nozzle
Stainless Steel AISI 304

Nozzle Seat
Natural Rubber

Guide Screws (Not Shown)
Cheesehead
Stainless Steel AISI 304
(only applicable to DN25 (1") valves)

Tie Rods
Stainless Steel AISI 304

Baffle Plate
Stainless Steel AISI 304

Optional Test Cock Connection
1/4" BSP/ NPT female

Lower Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304
Screwed BSP (ISO R7)/ NPT male

Locating Lugs
Grey P.V.C.

Top Cover
ABS Plastic
Polylac PA 737

Assembly Screws
Cheesehead
Stainless Steel AISI 304

Barrel Seal
CAF 400 gasket material
BS 2815 Grade A

O - Ring Seal
Nitrile Rubber

Anti Shock Orifice
High Density Polyethylene

O - Ring Seat
Nitrile Rubber

Barrel
Stainless Steel AISI 304

Lower Float
High Density Polyethylene

Float Guide
Stainless Steel AISI 304
(only applicable to DN50 (2") valves)

Baffle Spacer
Grey P.V.C.

Support Screw
Cheesehead
Stainless Steel AISI 304

information subject to change without prior notice

VENT-O-MAT®

Series RBXb

COMPONENT DESCRIPTION & MATERIAL SPECIFICATION

FLANGED - DN80 (3") TO DN100 (4")

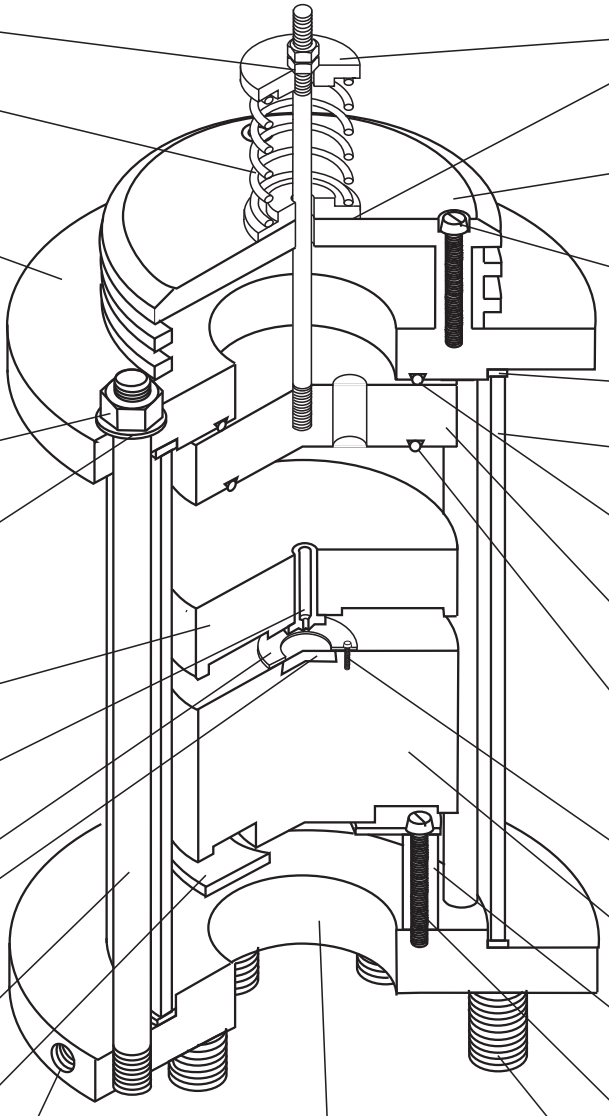
Type:
Series RBXb - Double Orifice (Small & Large Orifice) with *Bias* Mechanism.

End Connection:
Flange with screwed studs.

Nominal Sizes:
DN80 (3")
DN100 (4")

Model No's:
RBXb 1601 & 1631
RBXb 2501 & 2531
RBXb 4001 & 4031

Pressure Ratings:
PN16 (232 psi) ANSI #125
PN25 (363 psi) ANSI #250
PN40 (580 psi) ANSI#300



Locking Nuts
Stainless Steel AISI 304

Bias Spring
Stainless Steel AISI 304

Top Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Nuts
Stainless Steel AISI 304

Washer
Stainless Steel AISI 304

Top Float
High Density Polyethylene

Nozzle
Stainless Steel AISI 304

Nozzle Seat Retaining Plate
Stainless Steel AISI 304

Nozzle Seat
Natural Rubber

Tie Rods
Stainless Steel AISI 304

Baffle Plate
Stainless Steel AISI 304

Optional Test Cock Connection
1/4" BSP/ NPT female

Lower Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Locating Lugs
Stainless Steel AISI 304

Top Cover
ABS Plastic
Polylac PA 737

Assembly Screws
Cheesehead
Stainless Steel AISI 304

Barrel Seal
CAF 400 gasket material
BS 2815 Grade A

Barrel
Stainless Steel 304L

O - Ring Seal
Nitrile Rubber

Anti Shock Orifice
High Density Polyethylene

O - Ring Seat
Nitrile Rubber

Connecting Screws
Cheesehead
Stainless Steel 304

Lower Float
High Density Polyethylene

Baffle Spacer
Grey P.V.C.

Support Screw
Cheesehead
Stainless Steel AISI 304

Studs
Stainless Steel AISI 304L

VENT-O-MAT®

Series RBXb

COMPONENT DESCRIPTION & MATERIAL SPECIFICATION

FLANGED - DN150 (6") TO DN200 (8")

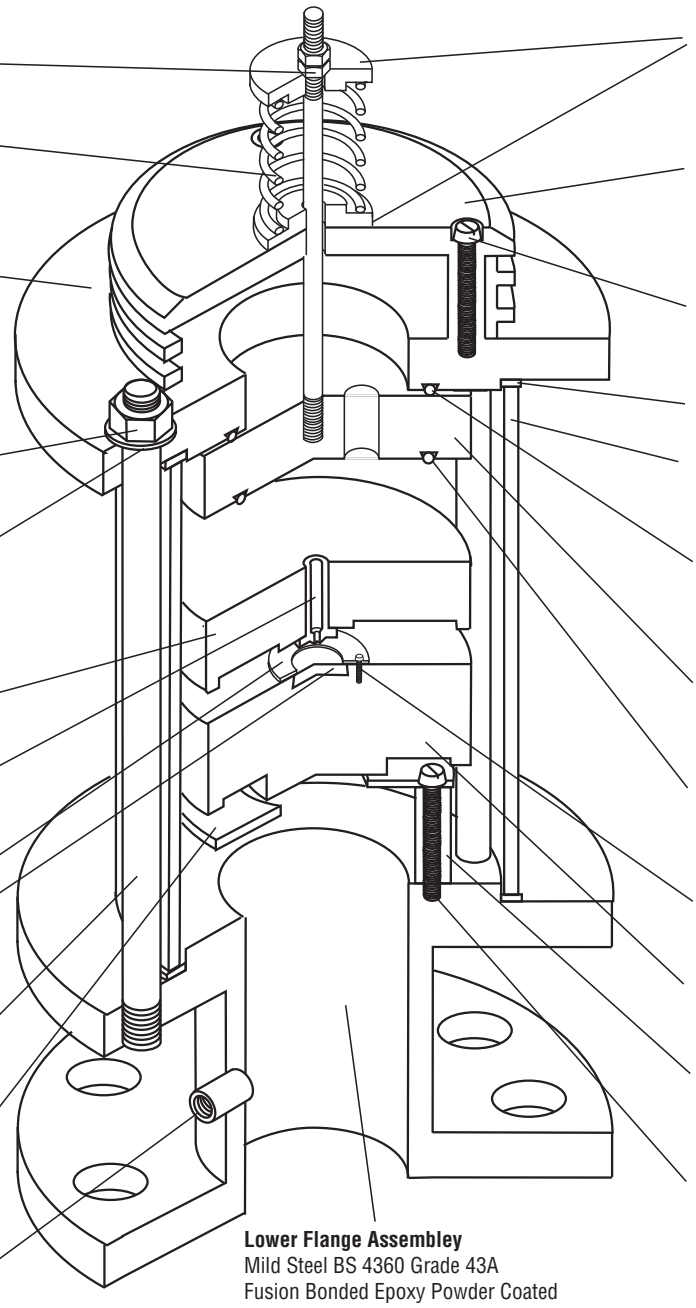
Type:
Series RBXb - Double Orifice (Small & Large Orifice) with *Bias* Mechanism.

End Connection:
Flange

Nominal Sizes:
DN150 (6")
DN200 (8")

Model No's:
RBXb 1601 & 1631
RBXb 2501 & 2531
RBXb 4001 & 4031

Pressure Ratings:
PN16 (232 psi) ANSI #125
PN25 (363 psi) ANSI #250
PN40 (580 psi) ANSI#300



Locking Nuts
Stainless Steel AISI 304

Bias Spring
Stainless Steel AISI 304

Top Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Nuts
Stainless Steel AISI 304

Washer
Stainless Steel AISI 304

Top Float
High Density Polyethylene

Nozzle
Stainless Steel AISI 304

Nozzle Seat Retaining Plate
Stainless Steel AISI 304

Nozzle Seat
Natural Rubber

Tie Rods
Stainless Steel AISI 304

Baffle Plate
Mild Steel BS 4360 Gr. 43A
Fusion Bonded Epoxy Powder Coated

Optional Test Cock Connection
1/4" BSP/ NPT female

Lower Flange Assembley
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Locating Lugs
Stainless Steel AISI 304

Top Cover
ABS Plastic
Polylac PA 737

Assembly Screws
Cheesehead
Stainless Steel AISI 304

Barrel Seal
CAF 400 gasket material
BS 2815 Grade A

Barrel
Stainless Steel 304L

O - Ring Seal
Nitrile Rubber

Anti Shock Orifice
High Density Polyethylene

O - Ring Seat
Nitrile Rubber

Connecting Screws
Cheesehead
Stainless Steel 304

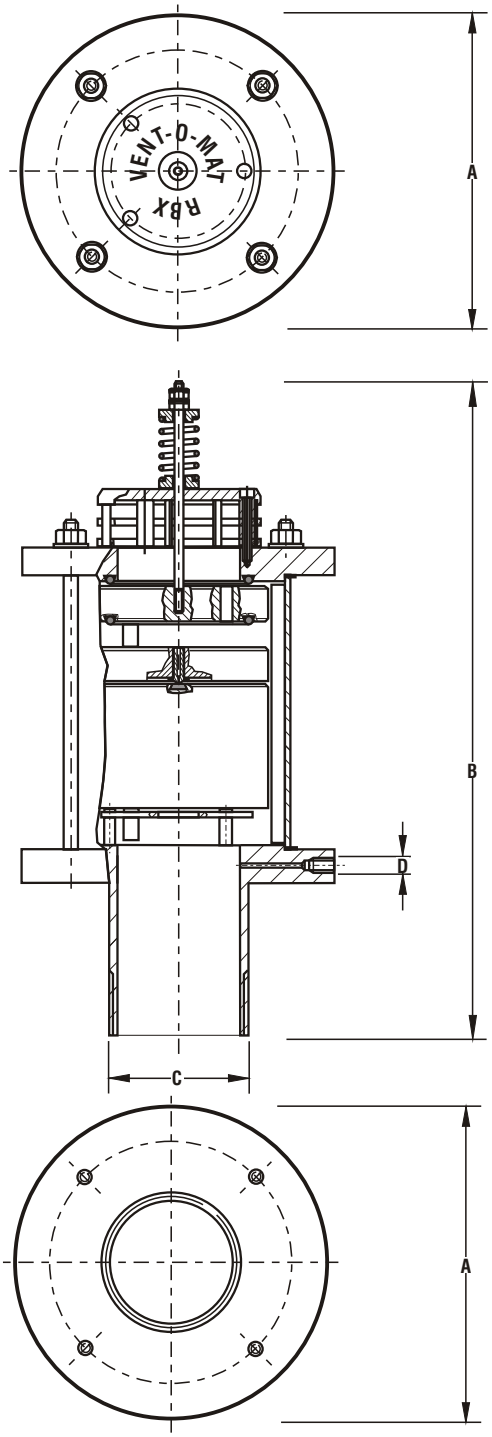
Lower Float
High Density Polyethylene

Baffle Spacer
Grey P.V.C.

Support Screw
Cheesehead
Stainless Steel AISI 304

VENT-O-MAT®

Series RBXb
GENERAL SPECIFICATIONS
SCREWED - DN 25 (1") & DN50 (2")



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

End Connection:
Screwed BSP/ NPT male

Nominal Sizes:
DN25 (1") & DN50 (2")

Model No's:	**Pressure Ratings bar (psi)**
RBXb 2511& 2521	PN 25 (363 psi) ANSI #250
RBXb 4011 & 4021	PN 40 (580 psi) ANSI #300

Operating Pressure Range - bar (psi):

	Min	Max.
PN25 (363 psi) ANSI #250	0.5 (7.2)	25 (363)
PN40 (580 psi) ANSI #300	0.5 (7.2)	40 (580)

Operating Temperature Range:
4 C (40 F) to 80 C (180 F)

Acceptable Media:
Potable or strained raw water.

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

Materials of Construction: - see page 22
Installation:- see page 21

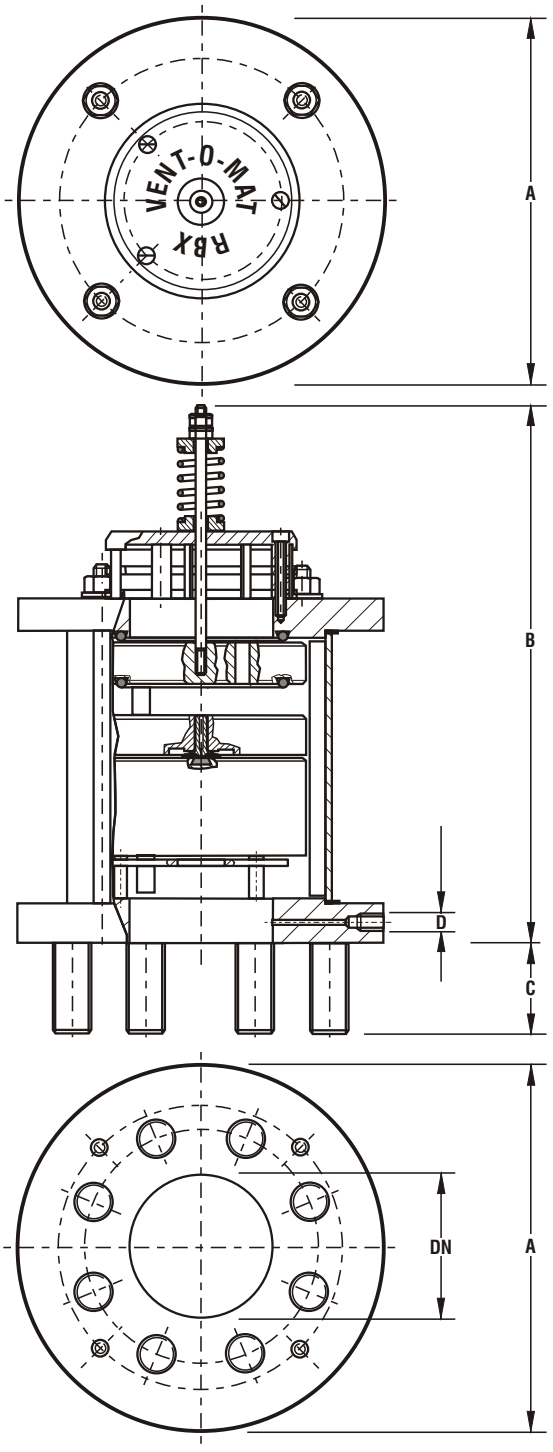
Standard Factory Tests:
i) Hydrostatic - 1.5 x max. rated working pressure
ii) Low head leak - 0.5 bar (7.2 psi)
iii) Small orifice function at max. rated working pressure (minimum 1 valve in 10).

OVERALL DIMENSIONS & WEIGHTS

DN mm	DN in.	MODEL No.	PRESSURE RATING	A mm	A in.	B mm	B in.	C	D	WEIGHT kg.	WEIGHT lbs
25	1"	025RBXb 2511 &2521	PN25 (363 psi) ANSI #250	120	4 3/4	385	15 1/7	1" BSP/NPT	OPTIONAL 1/4 BSP/NPT BLEED PORT FOR TEST COCK	5	11
25	1"	025RBXb 4011 &4021	PN40 (580 psi) ANSI #300	120	4 3/4	437	17 1/5	1"BSP/ NPT		5.6	12.4
50	2"	050RBXb 2511 &2521	PN25 (363 psi) ANSI #250	165	6 1/2	440	17 5/16	2"BSP/ NPT		9.8	21.6
50	2"	050 RBXb 4011 & 4021	PN40 (580 psi) ANSI #300	165	6 1/2	455	17 15/16	2" BSP/ NPT		10	22

VENT-O-MAT®

Series RBXb
GENERAL SPECIFICATIONS
FLANGED - DN80 (3") TO DN100 (4")



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

End Connection:
Flange with Screwed Studs for Alignment to;
BS 4504 PN 10, PN16, PN25 &PN40
SABS 1123 - Tables 1000/3, 1600/3, 2500/3 & 4000/3
ANSI B16. 1 Class 125, Class 250 & ANSI B16. 5 Class 300

Nominal Sizes:
DN80 (3") & DN100 (4")

Model No's:	**Pressure Ratings bar (psi):**
RBXb 1601 & 1631	PN 16 (232 psi) ANSI #125
RBXb 2501 & 2531	PN 25 (363 psi) ANSI #250
RBXb 4001 & 4031	PN 40 (580 psi) ANSI #300

Operating Pressure Range - bar (psi):

	Min	Max.
PN25 (363 psi) ANSI #250	0.5 (7.2)	25 (363)
PN40 (580 psi) ANSI #300	0.5 (7.2)	40 (580)

Operating Temperature Range:
4 C (40 F) to 80 C (180 F)

Acceptable Media:
Potable or strained raw water.

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

Materials of Construction: - see page 23
Installation: - see page 21

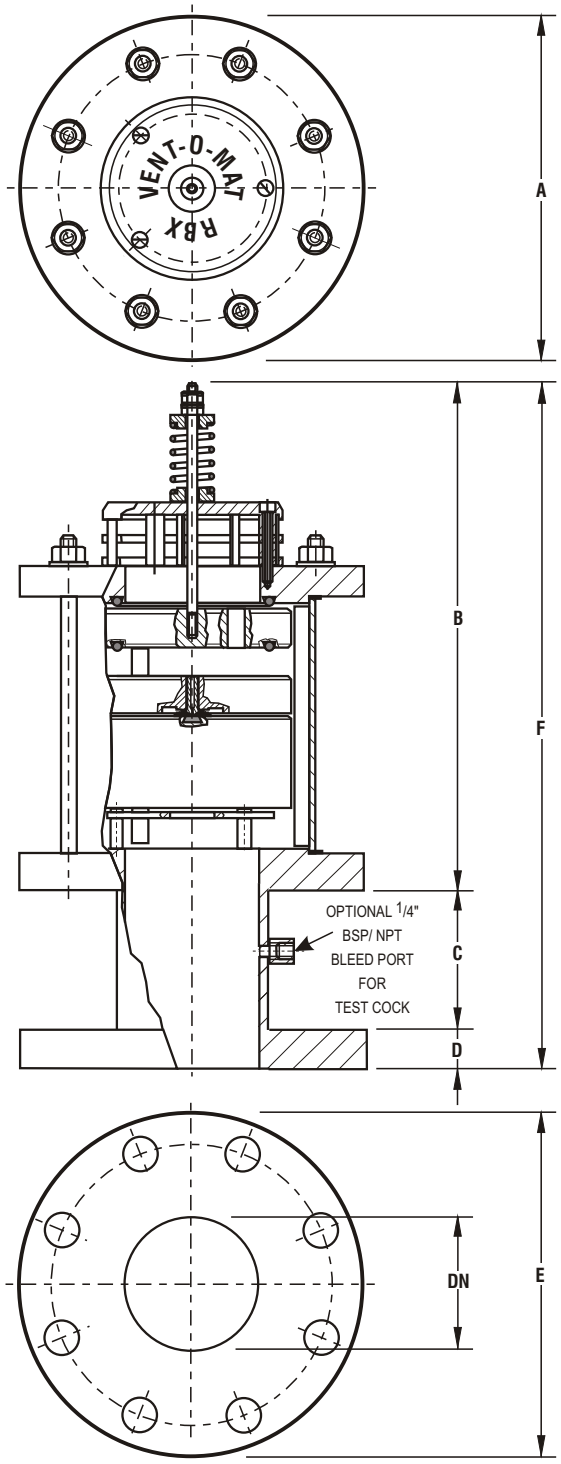
Standard Factory Tests:
i) Hydrostatic - 1.5 x max. rated working pressure
ii) Low head leak - 0.5 bar (7.2 psi)
iii) Small orifice function at max. rated working pressure (minimum 1 valve in 10).

OVERALL DIMENSIONS & WEIGHTS

DN		MODEL No.	PRESSURE RATING	A		B		C		D	WEIGHT	
Mm	in			mm	in	mm	in	mm	in		kg.	lbs
80	3	080 RBXb 1601 & 1631	PN16 (232 psi) ANSI #125	235	9 1/4	425	16 3/4	50	2		24	52.9
80	3	080 RBXb 2501 & 2531	PN25 (363 psi) ANSI #250	235	9 1/4	425	16 3/4	50	2	OPTIONAL 1/4"	24	52.9
80	3	080 RBXb 4001 & 4031	PN40 (580 psi) ANSI #300	235	9 1/4	440	17 5/16	50	2	BSP/ NPT	26	57.3
100	4	100 RBXb 1601 & 1631	PN16 (232 psi) ANSI #125	235	9 1/4	440	17 5/16	50	2	BLEED PORT	23	50.7
100	4	100 RBXb 2501 & 2531	PN25 (363 psi) ANSI #250	235	9 1/4	440	17 5/16	50	2	FOR	23	50.7
100	4	100 RBXb 4001 & 4031	PN40 (580 psi) ANSI #300	235	9 1/4	473	18 5/8	50	2	TEST COCK	27	59.5

VENT-O-MAT®

Series RBXb
GENERAL SPECIFICATIONS
FLANGED - DN150 (6") TO DN200 (8")



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

End Connection:
Flange for Alignment to;
BS 4504 PN 10, PN16, PN25 &PN40
SABS 1123 - Tables 1000/3, 1600/3, 2500/3 & 4000/3
ANSI B16. 1 Class 125, Class 250 & ANSI B16. 5 Class 300

Nominal Sizes:
DN150 (6") & DN200 (8")

Model No's:	**Pressure Ratings bar (psi):**
RBXb 1601 & 1631	PN 16 (232 psi) ANSI #125
RBXb 2501 & 2531	PN 25 (363 psi) ANSI #250
RBXb 4001 & 4031	PN 40 (580 psi) ANSI #300

Operating Pressure Range - bar (psi):

	Min	Max.
PN25 (363 psi) ANSI #250	0.5 (7.2)	25 (363)
PN40 (580 psi) ANSI #300	0.5 (7.2)	40 (580)

Operating Temperature Range:
4 C (40 F) to 80 C (180 F)

Acceptable Media:
Potable or strained raw water.

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

Materials of Construction: - see page 24
Installation: - see page 21

Standard Factory Tests:
i) Hydrostatic - 1.5 x max. rated working pressure
ii) Low head leak - 0.5 bar (7.2 psi)
iii) Small orifice function at max. rated working pressure (minimum 1 valve in 10).

OVERALL DIMENSIONS & WEIGHTS

DN		MODEL No.	PRESSURE RATING	A		B		C		D		E		F		WEIGHT	
Mm	in			mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lbs
150	6	150 RBXb 1601 & 1631	PN16 (232 psi) ANSI #125	340	13 2/5	560	22 1/21	120	4 3/4	22	7/8	285	11 1/4	702	27 5/8	72	158.7
150	6	150 RBXb 2501 & 2531	PN25 (363 psi) ANSI #250	340	13 2/5	560	22 1/21	120	4 3/4	30	1 3/16	300	11 3/4	710	27 15/16	72	158.7
150	6	150 RBXb 4001 & 4031	PN40 (580 psi) ANSI #300	340	13 2/5	560	22 1/21	120	4 3/4	30	1 3/16	300	11 3/4	710	27 15/16	80	176 .4
200	8	200 RBXb 1601 & 1631	PN16 (232 psi) ANSI #125	390	15 3/8	600	23 5/8	130	5 1/8	24	15/16	340	13 2/5	754	29 5/8	95	209.4
200	8	200 RBXb 2501 & 2531	PN25 (363 psi) ANSI #250	390	15 3/8	600	23 5/8	130	5 1/8	28	1 1/8	360	14 1/6	758	29 14/17	95	209.4
200	8	200 RBXb 4001 & 4031	PN40 (580 psi) ANSI #300	390	15 3/8	600	23 5/8	130	5 1/8	34	1 3/8	375	14 3/4	764	30 1/17	101	222.6

PURCHASE SPECIFICATION

VENT -O- MAT MODEL NO.

CONSTRUCTION & DESIGN

The air release & vacuum break valve shall be of the compact single chamber design with solid cylindrical H.D.P.E. control floats housed in a tubular stainless steel body with epoxy powder coated cast iron or stainless steel ends secured by means of stainless steel tie rods.

The valve shall have an integral 'Anti - Shock' Orifice mechanism which shall operate automatically to limit transient pressure rise or shock induced by closure to 1.5 x valve rated working 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 control float seating against a nitrile/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 the 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.

The valve design shall incorporate an over pressure safety feature that will fail without an explosive effect, such as is normally the case when highly compressed air is released suddenly. The feature shall consist of easily replaceable components such as gaskets, seals or the like.

Connection to the valve inlet shall be facilitated by a screwed BSP (ISO R7) or NPT male end (DN25 (1") & DN50 (2") only) or a flanged end conforming to PN10, 16, 25 or 40 ratings of BS 4504 or SABS 1123 Standards or, ANSI B16. 1 Class 125 and Class 250 and ANSI B16. 5 Class 300 Standards.

Flanged ends for DN80 and DN100 shall be supplied with the requisite number of stainless steel screwed studs inserted for alignment to the specified standard. **Nuts, washers, or jointing gaskets shall be excluded.**

Optional: Provision of a 1/4" BSP/ NPT Test/ Bleed Cock.

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-Shock" Orifice and reduce water 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 0.5 bar (7.3 psi) to twice rate d working pressure.

3. Valves shall respond to the presence of air by discharging it through the small orifice at any pressures within a specified design range, i.e. 0.5 bar (7.3 psi) to 16 bar (232 psi), 25 bar (363 psi) or 40 bar (580 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.

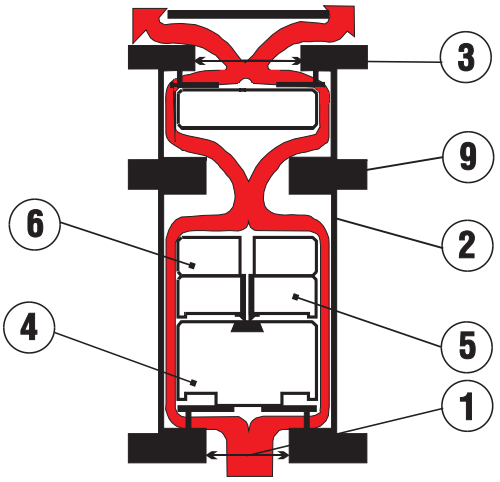
Series RBXv
OPERATION

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. Air intake may also be undesirable under pump trip conditions for pipelines running through a marsh (surge protection in these instances would be in the form of surge vessels and/or the pipeline will be designed for full vacuum).

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

VENTING OF A FILLING PIPELINE (SUB CRITICAL WATER APPROACH VELOCITY)

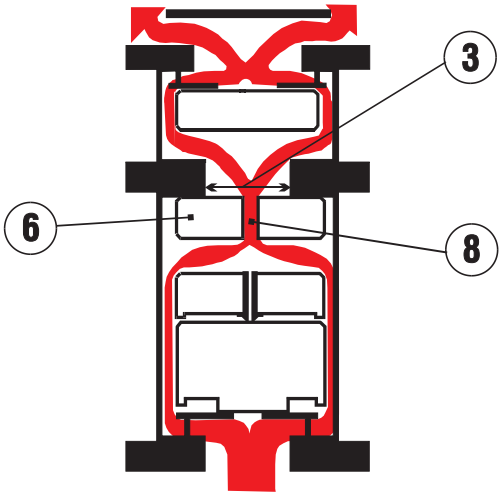


Air enters Orifice (1), travels through the annular space between the cylindrical floats (4) , (5), (6) and discharges through the Large Orifice (3) into atmosphere.*

***Note:** A relatively low flow discharge rate is required to lift float and ensure air release.Float will seat on the Middle Flange (9) under vacuum conditions, effectively preventing air entry.

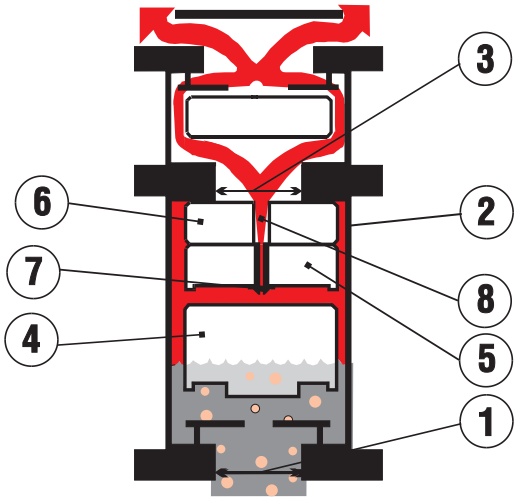
Series RBXv
OPERATION

VENTING OF A FILLING PIPELINE (EXCESSIVE WATER APPROACH VELOCITY)



In reaction to increased air flow, Float (6) closes Large Orifice and air is forced through the "Anti-Shock" Orifice resulting in deceleration of the approaching water due to the resistance of rising air pressure in the valve.

PRESSURIZED AIR RELEASE FROM A FULL PIPELINE



Subsequent to the filling of a pipeline, liquid enters the valve Barrel Chamber (2) and the Floats (4), (5) and (6) are buoyed so that the "Anti-Shock" Orifice (8) is closed by the Float (5) and the valve will then become pressurized. A minimal working pressure of <0.5 bar (7.3 psi) acting on a relatively large area of the Orifice (1) will lock Floats (5) and (6) into the closed position across the Large Orifice (3).

Disentrained air rises through the liquid and accumulates in the valve chamber, when the volume of air is sufficient to displace the liquid, Float (4) will no longer be buoyant and will gravitate downwards thereby opening the Small Orifice (7) and allowing accumulated air to be discharged into atmosphere, as air is discharged the liquid raises Float (4) and reseals the Small Orifice (7) and prevents escape of liquid.

VENT-O-MAT®

Series RBXv

COMPONENT DESCRIPTION & MATERIAL SPECIFICATION

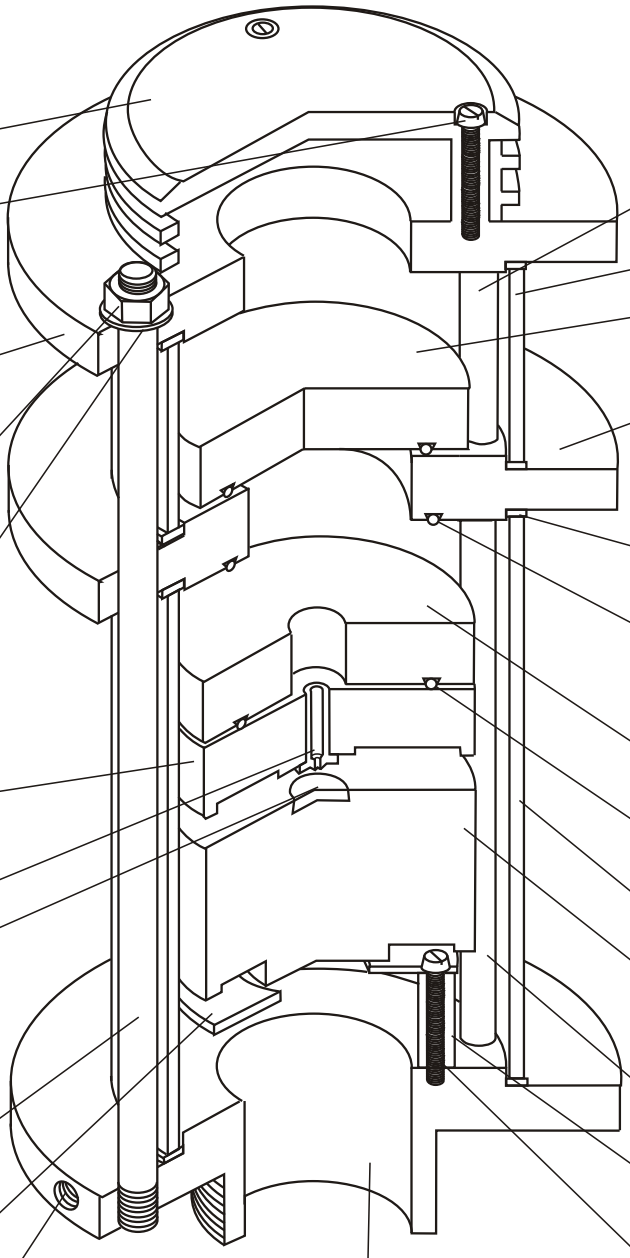
SCREWED - 1" & 2"

Type:
Series RBXv - Triple Orifice with *Bias* Mechanism

End Connection:
Screwed NPT Male

Nominal Sizes:
1"
2"

Model No's: **Pressure Ratings:**
RBXv 2521 _____ 363 psi
RBXv 4021 _____ 580 psi



Top Cover
ABS Plastic
Polylac PA 737

Assembly Screws
Stainless Steel AISI 304

Top Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Nuts
Stainless Steel AISI 304

Washer
Stainless Steel AISI 304

Top Float
High Density Polyethylene

Nozzle
Stainless Steel AISI 304

Nozzle Seat
Natural Rubber

Guide Screws (Not Shown)
Cheesehead
Stainless Steel AISI 304
(only applicable to 1"valves)

Tie Rods
Stainless Steel AISI 304

Baffle Plate
Stainless Steel AISI 304

Optional Test Cock Connection
1/4" NPT female

Lower Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304
Screwed NPT male

Float Guides
Stainless Steel AISI 304.

Barrel
Stainless Steel AISI 304

Float
High Density Polyethylene

Middle Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Barrel Seal
CAF 400 gasket material
BS 2815 Grade A

O - Ring Seal
Nitrile Rubber

Anti Shock Orifice
High Density Polyethylene

O - Ring Seat
Nitrile Rubber

Barrel
Stainless Steel AISI 304

Lower Float
High Density Polyethylene

Float Guide
Stainless Steel AISI 304
(only applicable to 2" valves)

Baffle Spacer
Grey P.V.C.

Support Screw
Cheesehead
Stainless Steel AISI 304

VENT-O-MAT®

Series RBXv

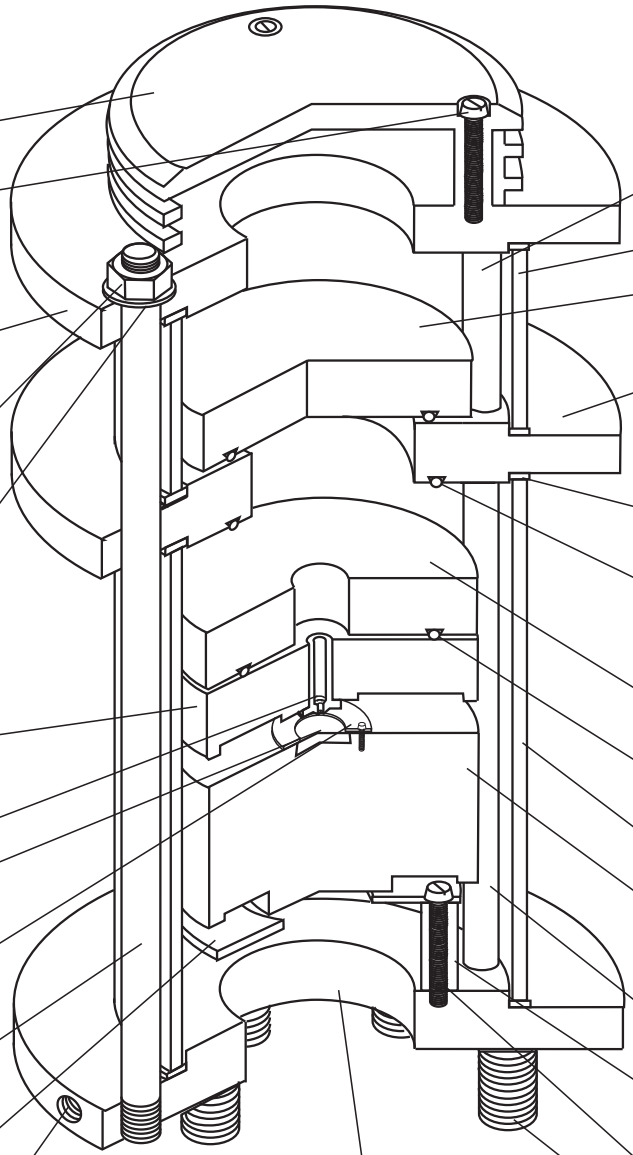
COMPONENT DESCRIPTION & MATERIAL SPECIFICATION
FLANGED - DN80 (3") & DN100 (4")

Type:
Series RBXv - Triple Orifice with *Bias* Mechanism

End Connection:
Flange

Nominal Sizes:
DN80 (3")
DN100 (4")

Model No's:	Pressure Ratings:
RBXv 1601 & 1631	PN16 (232 psi) ANSI #125
RBXv 2511 & 2531	PN25 (363 psi) ANSI #250
RBXv 4011 & 4031	PN40 (580 psi) ANSI #300



Top Cover
ABS Plastic
Polylac PA 737

Assembly Screws
Stainless Steel AISI 304

Top Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Nuts
Stainless Steel AISI 304

Washer
Stainless Steel AISI 304

Top Float
High Density Polyethylene

Nozzle
Stainless Steel AISI 304

Nozzle Seat
Natural Rubber

Nozzle Seat Retainer Plate
Stainless Steel AISI 304

Tie Rods
Stainless Steel AISI 304

Baffle Plate
Stainless Steel AISI 304

Optional Test Cock Connection
1/4" BSP/ NPT female

Lower Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304
Screwed BSP (ISO R7)/ NPT male

Float Guides
Stainless Steel AISI 304.

Barrel
Stainless Steel AISI 304

Float
High Density Polyethylene

Middle Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Barrel Seal
CAF 400 gasket material
BS 2815 Grade A

O - Ring Seal
Nitrile Rubber

Anti Shock Orifice
High Density Polyethylene

O - Ring Seat
Nitrile Rubber

Barrel
Stainless Steel AISI 304

Lower Float
High Density Polyethylene

Float Guide
Stainless Steel AISI 304
(only applicable to DN50 (2")
valves)

Baffle Spacer
Grey P.V.C.

Support Screw
Cheesehead
Stainless Steel AISI 304

Studs
Stainless Steel AISI 304

information subject to change without prior notice

VENT-O-MAT®

Series RBXv

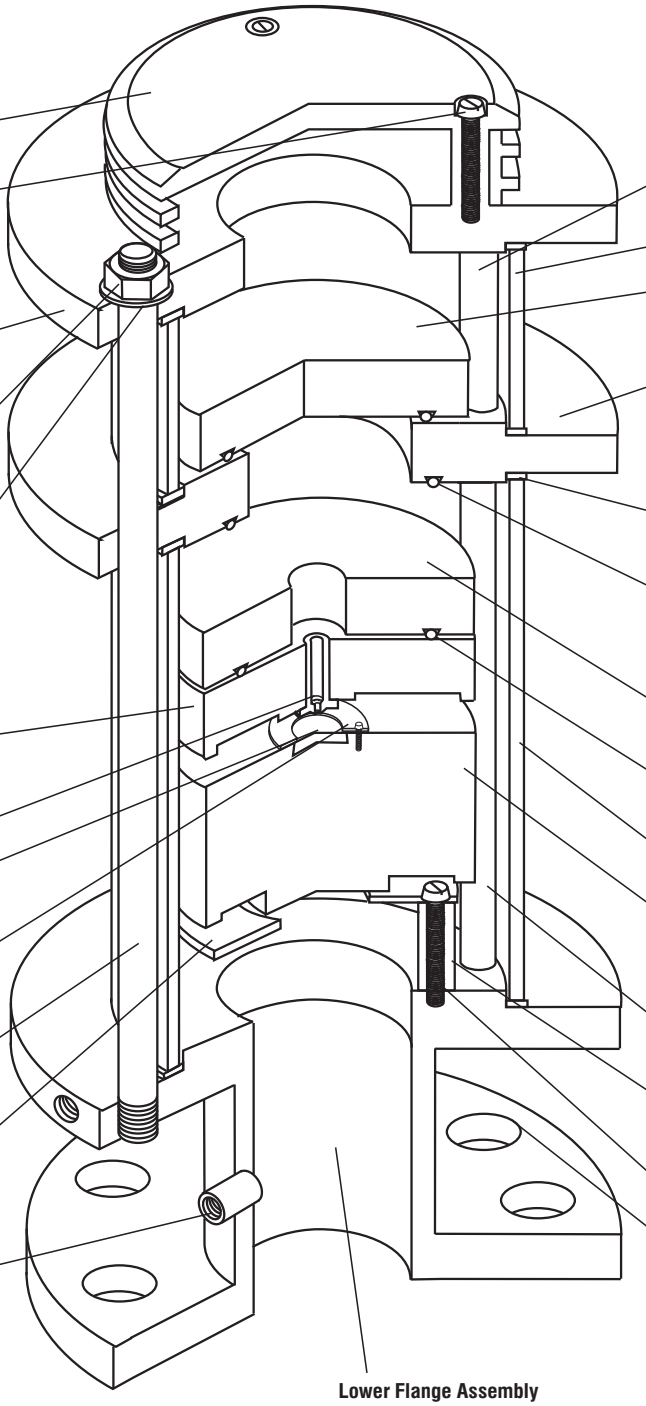
COMPONENT DESCRIPTION & MATERIAL SPECIFICATION
FLANGED - DN150 (6") & DN200 (8")

Type:
Series RBXv - Triple Orifice with *Bias* Mechanism

End Connection:
Flange

Nominal Sizes:
DN150 (3")
DN200 (4")

Model No's: **Pressure Ratings:**
RBXv 1601 & 1631 _____ PN16 (232 psi) ANSI #125
RBXv 2511 & 2531 _____ PN25 (363 psi) ANSI #250
RBXv 4011 & 4031 _____ PN40 (580 psi) ANSI #300



Top Cover
ABS Plastic
Polylac PA 737

Assembly Screws
Stainless Steel AISI 304

Top Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Nuts
Stainless Steel AISI 304

Washer
Stainless Steel AISI 304

Top Float
High Density Polyethylene

Nozzle
Stainless Steel AISI 304

Nozzle Seat
Natural Rubber

Nozzle Seat Retainer Plate
Stainless Steel AISI 304

Tie Rods
Stainless Steel AISI 304

Baffle Plate
Stainless Steel AISI 304

Optional Test Cock Connection
1/4" BSP/ NPT female

Float Guides
Stainless Steel AISI 304.

Barrel
Stainless Steel AISI 304

Float
High Density Polyethylene

Middle Flange
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

Barrel Seal
CAF 400 gasket material
BS 2815 Grade A

O - Ring Seal
Nitrile Rubber

Anti Shock Orifice
High Density Polyethylene

O - Ring Seat
Nitrile Rubber

Barrel
Stainless Steel AISI 304

Lower Float
High Density Polyethylene

Float Guide
Stainless Steel AISI 304
(only applicable to DN50 (2")
valves)

Baffle Spacer
Grey P.V.C.

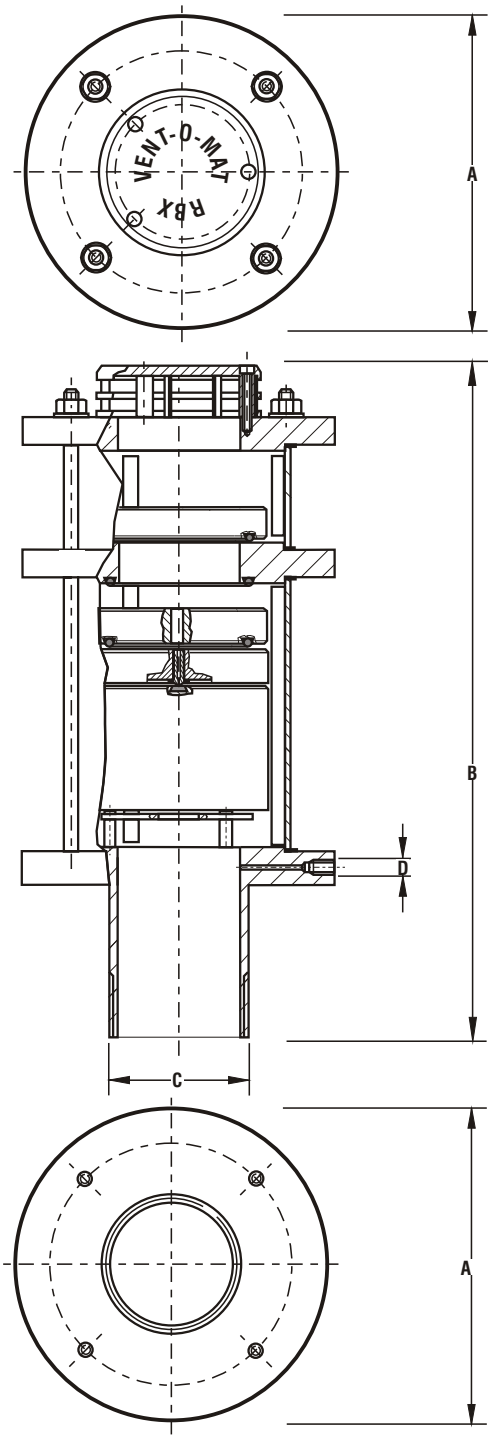
Support Screw
Cheesehead
Stainless Steel AISI 304

Studs
Stainless Steel AISI 304

Lower Flange Assembly
Mild Steel BS 4360 Grade 43A
Fusion Bonded Epoxy Powder Coated
alternatively
Stainless Steel AISI 304

VENT-O-MAT®

Series RBXv
GENERAL SPECIFICATIONS
SCREWED - DN 25 (1") & DN50 (2")



Type:
Triple Orifice Air Vent Valve with *Bias* mechanism for air discharge but not air re-entry.

End Connection:
Screwed BSP/ NPT male

Nominal Sizes:
DN25 (1") & DN50 (2")

Model No's:	**Pressure Ratings bar (psi)**
RBXv 2511& 2521	PN 25 (363 psi) ANSI #250
RBXv 4011 & 4021	PN 40 (580 psi) ANSI #300

Operating Pressure Range - bar (psi):

	Min	Max.
PN25 (363 psi) ANSI #250	0.5 (7.2)	25 (363)
PN40 (580 psi) ANSI #300	0.5 (7.2)	40 (580)

Operating Temperature Range:
4◦C (40 F) to 80 C (180 F)

Acceptable Media:
Potable or strained raw water.

Function:
i) High volume air discharge - pipeline filling
ii) Pressurized air discharge - pipeline filled.
iii) Surge dampening - high velocity air discharge.

Materials of Construction: - see page 31
Installation:- see page 3

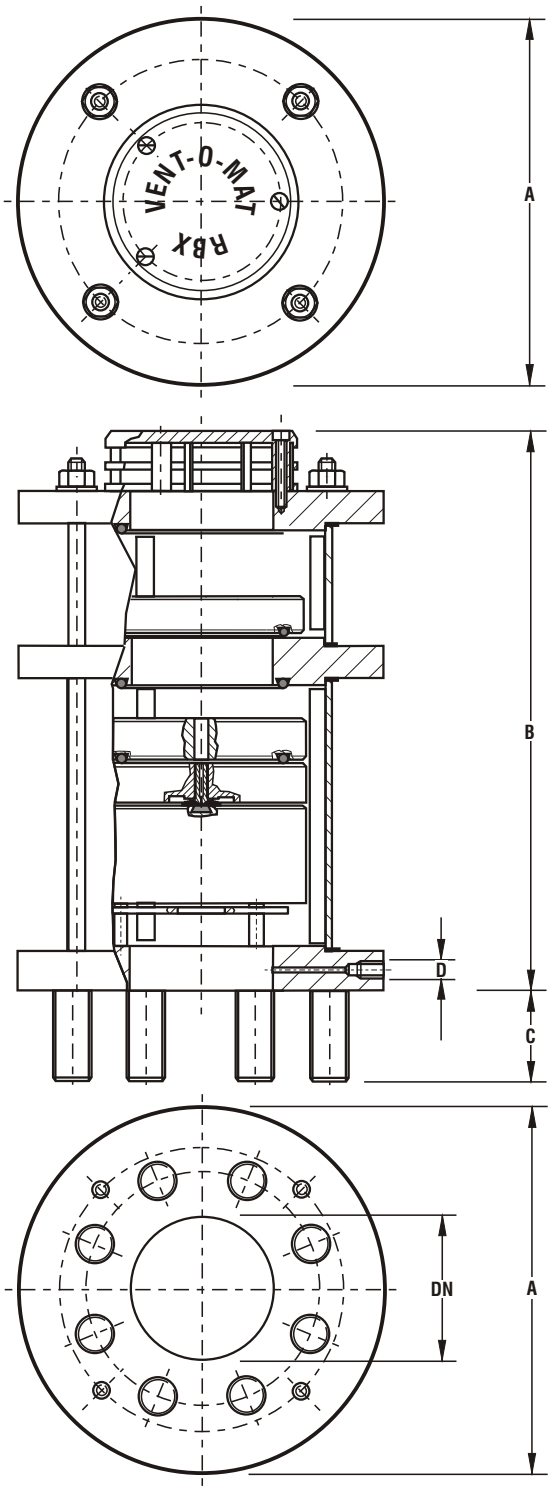
Standard Factory Tests:
i) Hydrostatic - 1.5 x max. rated working pressure
ii) Small orifice function at max. rated working pressure (minimum 1 valve in 10).

OVERALL DIMENSIONS & WEIGHTS

DN mm	DN in.	MODEL No.	PRESSURE RATING	A mm	A in.	B mm	B in.	C	D	WEIGHT kg.	WEIGHT lbs
25	1"	025RBXv 2511 &2521	PN25 (363 psi) ANSI #250	120	4 3/4	385	15 1/8	1" BSP/NPT	OPTIONAL 1/4 BSP/NPT BLEED PORT FOR TEST COCK	7	15.4
25	1"	025RBXv 4011 &4021	PN40 (580 psi) ANSI #300	120	4 3/4	437	17 1/5	1"BSP/ NPT		7.6	16.7
50	2"	050RBXv 2511 &2521	PN25 (363 psi) ANSI #250	165	6 1/2	440	17 5/16	2"BSP/ NPT		12.8	28.2
50	2"	050 RBXv 4011 & 4021	PN40 (580 psi) ANSI #300	165	6 1/2	455	17 15/16	2" BSP/ NPT		13	28.6

VENT-O-MAT®

Series RBXv
GENERAL SPECIFICATIONS
FLANGED - DN80 (3") TO DN100 (4")



Type:
Triple Orifice Air Vent Valve with *Bias* mechanism for air discharge but not air re-entry.

End Connection:
Flange with Screwed Studs for Alignment to;
BS 4504 PN 10, PN16, PN25 &PN40
SABS 1123 - Tables 1000/3, 1600/3, 2500/3 & 4000/3
ANSI B16. 1 Class 125, Class 250 & ANSI B16. 5 Class 300

Nominal Sizes:
DN80 (3") & DN100 (4")

Model No's:	**Pressure Ratings bar (psi):**
RBXv 1601 & 1631	PN 16 (232 psi) ANSI #125
RBXv 2501 & 2531	PN 25 (363 psi) ANSI #250
RBXv 4001 & 4031	PN 40 (580 psi) ANSI #300

Operating Pressure Range - bar (psi):

	Min	Max.
PN25 (363 psi) ANSI #250	0.5 (7.2)	25 (363)
PN40 (580 psi) ANSI #300	0.5 (7.2)	40 (580)

Operating Temperature Range:
4 C (40 F) to 80 C (180 F)

Acceptable Media:
Potable or strained raw water.

Function:
i) High volume air discharge - pipeline filling.
ii) Pressurized air discharge - pipeline filled.
iii) Surge dampening - high velocity air discharge.

Materials of Construction: - see page 28
Installation: - see page 3

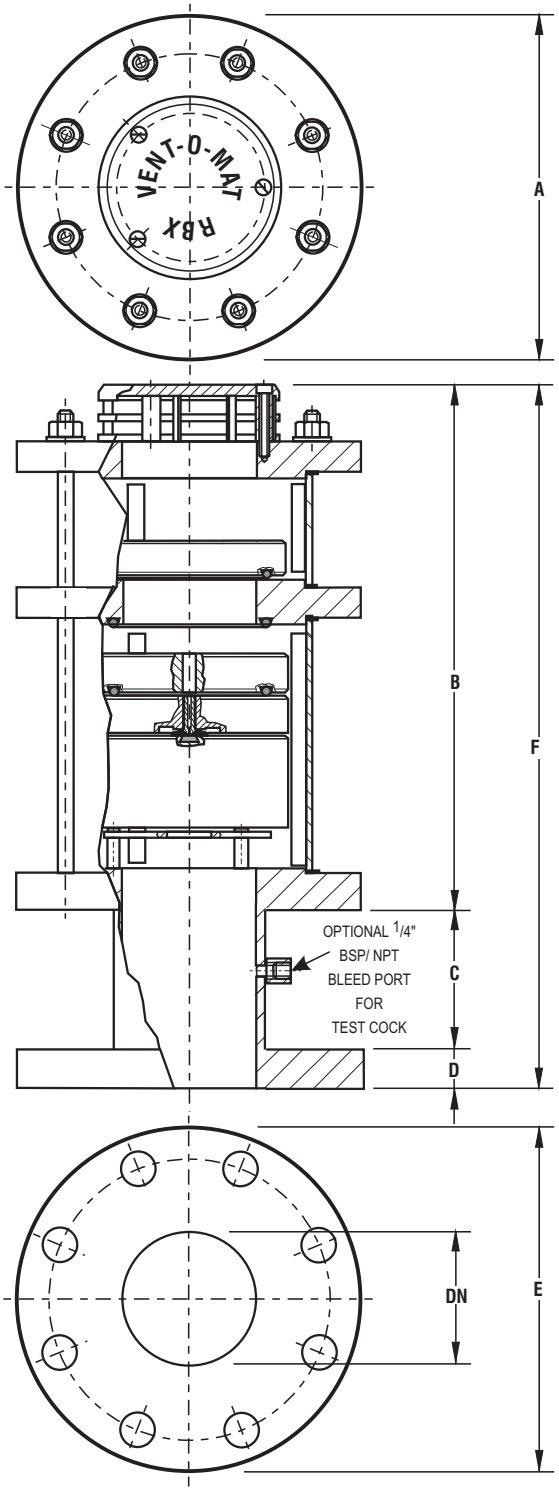
Standard Factory Tests:
i) Hydrostatic - 1.5 x max. rated working pressure
ii) Small orifice function at max. rated working pressure (minimum 1 valve in 10).

OVERALL DIMENSIONS & WEIGHTS

DN mm	DN in	MODEL No.	PRESSURE RATING	A mm	A in	B mm	B in	C mm	C in	D	WEIGHT kg.	WEIGHT lbs
80	3	080 RBXv 1601 & 1631	PN16 (232 psi) ANSI #125	235	9 1/4	475	18 3/4	50	2	OPTIONAL 1/4" BSP/ NPT BLEED PORT FOR TEST COCK	31	68.3
80	3	080 RBXv 2501 & 2531	PN25 (363 psi) ANSI #250	235	9 1/4	475	18 3/4	50	2		31	68.3
80	3	080 RBXv 4001 & 4031	PN40 (580 psi) ANSI #300	235	9 1/4	490	19 1/3	50	2		33.5	73.8
100	4	100 RBXv 1601 & 1631	PN16 (232 psi) ANSI #125	235	9 1/4	490	19 1/3	50	2		30	66.1
100	4	100 RBXv 2501 & 2531	PN25 (363 psi) ANSI #250	235	9 1/4	490	19 1/3	50	2		30	66.1
100	4	100 RBXv 4001 & 4031	PN40 (580 psi) ANSI #300	235	9 1/4	523	20 5/8	50	2		34	74.9

VENT-O-MAT®

Series RBXv
GENERAL SPECIFICATIONS
FLANGED - DN150 (6") TO DN200 (8")



Type:
Triple Orifice Air Vent Valve with *Bias* mechanism for air discharge but not air re-entry.

End Connection:
Flange for Alignment to;
BS 4504 PN 10, PN16, PN25 &PN40
SABS 1123 - Tables 1000/3, 1600/3, 2500/3 & 4000/3
ANSI B16. 1 Class 125, Class 250 & ANSI B16. 5 Class 300

Nominal Sizes:
DN150 (6") & DN200 (8")

Model No's:	**Pressure Ratings bar (psi):**
RBXv 1601 & 1631	PN 16 (232 psi) ANSI #125
RBXv 2501 & 2531	PN 25 (363 psi) ANSI #250
RBXv 4001 & 4031	PN 40 (580 psi) ANSI #300

Operating Pressure Range - bar (psi):

	Min	Max.
PN25 (363 psi) ANSI #250	0.5 (7.2)	25 (363)
PN40 (580 psi) ANSI #300	0.5 (7.2)	40 (580)

Operating Temperature Range:
4 C (40 F) to 80 C (180 F)

Acceptable Media:
Potable or strained raw water.

Function:
i) High volume air discharge - pipeline filling.
ii) Pressurized air discharge - pipeline filled.
iii) Surge dampening - high velocity air discharge.

Materials of Construction: - see page 33
Installation: - see page 3

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

OVERALL DIMENSIONS & WEIGHTS

DN		MODEL No.	PRESSURE RATING	A		B		C		D		E		F		WEIGHT	
mm	in			mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg.	lbs
150	6	150 RBXv 1601 & 1631	PN16 (232 psi) ANSI #125	340	13 3/8	550	21 5/8	120	4 3/4	22	7/8	285	11 1/5	792	31 3/16	88	194
150	6	150 RBXv 2501 & 2531	PN25 (363 psi) ANSI #250	340	13 3/8	550	21 5/8	120	4 3/4	30	1 3/16	300	11 14/16	800	31 1/2	88	194
150	6	150 RBXv 4001 & 4031	PN40 (580 psi) ANSI #300	340	13 3/8	550	21 5/8	120	4 3/4	30	1 3/16	300	11 14/16	800	31 1/2	96	207.2
200	8	200 RBXv 1601 & 1631	PN16 (232 psi) ANSI #125	390	15 4/10	690	27 1/5	130	5 1/8	24	15/16	340	13 2/5	844	33 1/3	116	255.7
200	8	200 RBXv 2501 & 2531	PN25 (363 psi) ANSI #250	390	15 4/10	690	27 1/5	130	5 1/8	28	1 1/8	360	14 1/10	848	33 2/5	116	255.7
200	8	200 RBXv 4001 & 4031	PN40 (580 psi) ANSI #300	390	15 4/10	690	27 1/5	130	5 1/8	34	1 3/8	375	14 3/4	854	33 2/3	122	268.9

PURCHASE SPECIFICATION

VENT-O-MAT MODEL NO.

Page 35 - Series RBXv - DN25 (1") or DN50 (2") with BSP (ISO R7) or NPT, Screwed Male Connection.
Page 36 - Series RBXv - DN80 (3") to DN100 (4") Flanged Connection.
Page 37 - Series RBXv - DN150 (6") to DN200 (8") Flanged Connection.

CONSTRUCTION & DESIGN

The air vent valve shall be of the compact single chamber design with solid cylindrical H.D.P.E. control floats housed in a tubular stainless steel body with epoxy powder coated mild steel ends or stainless steel ends secured by means of stainless steel tie rods.
The valve shall have an integral 'Anti - Shock' Orifice mechanism which shall operate automatically to limit transient pressure rise or shock induced by closure to 1.5 x valve rated working pressure.
The discharge 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 control float seating against a nitrile 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 the 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.
The valve design shall incorporate an over pressure safety feature that will fail without an explosive effect, such as is normally the case when highly compressed air is released suddenly. The feature shall consist of easily replaceable components such as gaskets, seals or the like.
Connection to the valve inlet shall be facilitated by a screwed BSP (ISO R7) or NPT male end (DN25 (1") & DN50 (2") only) or a flanged end conforming to PN10, 16, 25 or 40 ratings of BS 4504 or SABS 1123 Standards or, ANSI B16. 1 Class 125 and Class 250 and ANSI B16. 5 Class 300 Standards.
Flanged ends for DN80 and DN100 valves shall be supplied with the requisite number of stainless steel screwed studs inserted for alignment to the specified standard. **Nuts, washers, or jointing gaskets shall be excluded.**

Optional: Provision of a 1/4" BSP/ NPT Test/ Bleed Cock.

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 water approach velocities are relative to a transient pressure rise on valve closure of 1.5 x valve rated pressure
   At higher water appoach velocities, which have a potential to induce transient pressure rises >1.5 times valve rated pressure on closure, the valve shall automatically discharge through the "Anti-Shock" Orifice and reduce water 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 0.5 bar (7.3 psi) to 1.5 times rated working pressure.

3. Valves shall respond to the presence of air by discharging it through the small orifice at any pressures within a specified design range, i.e. 0.5 bar (7.3 psi) to 16 bar (232 psi), 25 bar (363 psi) or 40 bar (580 psi), and shall remain leak tight in the absence of air.

Series RBXb & RBXv

ORDERING GUIDE

0 5 0	R B	X	v	2 5	0	1

VALVE SIZE:
DN25 (1") - 0 2 5
DN50 (2") - 0 5 0
DN80 (3") - 0 8 0
DN100 (4") - 1 0 0
DN150 (6") - 1 5 0
DN200 (8") - 2 0 0

VALVE SERIES No.

ANTI SHOCK ORIFICE:

SPECIAL APPLICATION:
BIAS AIR IN b
BIAS AIR OUT v

VALVE PRESSURE RATING:
PN16 (232 PSI), ANSI #125 1 6
PN25 (363 PSI), ANSI#250 2 5
PN40 (580 PSI), ANSI#300 4 0

VALVE END CONNECTION:
SCREWED - BSP 1
SCREWED - NPT 2
FLANGED - BS 4504 OR SABS 1123 0
FLANGED - ANSI B16. 1 OR B16. 5 3

VALVE TYPE:
DOUBLE ACTING 1

Note:
1. DN250 (10") and DN300 (12") valves are available on request.
2. Valves for pressure ratings of PN64 (928 psi) ANSI #400 and PN100 (1450 psi) ANSI #600 are available on request.
3. Valves are available with AISI 304 stainless steel flanged ends, please specify when ordering.

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 1.5 times the rated working pressure which shall be held for a period of 2 minutes. Any leaking, weeping or sweating shall be reason for rejection.

(B) A low head leak test whereby the valve is filled with water and pressurized to a maximum of 0.5 bar(7.3 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.

VENT-O-MAT®

AIR RELEASE & VACUUM BREAK VALVES
Series RBX

CONDITIONS OF SALE

Sale of VENT -O- MAT equipment is subject to the purchaser's acceptance of the company's STANDARD CONDITIONS OF TENDER AND SALE a copy of which is available on request.

CONTRACTUAL LIMITATIONS:
The 'Company's' supply is limited to such equipment, accessories, work and documentation as is specified in it's quotations.

DRAWINGS AND DATA:
All drawings, illustrations, descriptive literature, technical data or particulars of mass and dimensions accompanying the 'Company's' quotations must be considered approximate except when specifically certified.

TESTS:
The goods will be tested in accordance with the specifications of the 'Company's' tender and/or relevant standard specifications as stated therein.

AVAILABILITY:

(a) Offers for equipment available ex- stock are subject to such stock remaining unsold at time of order placement.

(b) Delivery periods quoted are based on the manufacturing position at the time of quotation. Whilst every endeavour will be made to maintain such deliveries, no liability shall be accepted by the 'Company' for delay due to causes beyond it's control.

(c) The 'Company' shall only accept liability for late delivery where the 'Company's' liability for such late delivery is not excluded in terms of the foregoing and where the 'Company' has specifically agreed in writing to the payment of a penalty or liquidated damages or damages for such late delivery. In which case the 'Company's' liability shall be l limited to the amount so agreed.

PRICE BASIS:
Prices are referenced from the 'Company's' valid lists or from the 'Company's' written or verbal quotation exclude packaging and delivery.

PAYMENT TERMS:
Without exception, payment for all goods and services shall be received by the 'Company' not later than 30 (THIRTY) days subsequent to the date of statement. Interest at prime lending rate + 2% shall be charged on all overdue amounts.

TITLE:
Ownership of all goods supplied by the 'Company' will not pass to the purchaser or any other party until paid for in full and until such time. the 'company' shall be entitled to re - possess the goods whether affixed to immovable property or not. All such good
S shall be deemed to be removable property and severable from immovable property.

TENDER/ QUOTATION VALIDITY:
Written or verbal quotations will be held valid for a maximum of 30 (thirty) days unless contradicted in writing by the 'Company'.

RETURNS FOR CREDIT:
Acceptance of goods returned will be entirely at the discretion of the 'Company' and subject to a minimum restocking charge equal to 15% of the gross invoiced value of such returned goods.

LIMITED LIABILITY:
The 'Company' shall not be liable for any incidental or consequential loss or damages or expense arising directly or indirectly from the use of any goods supplied, nor shall liability be accepted for any labour or other expenses incurred. The 'Company's' liability is limited solely to the terms of it's guarantee.

WARRANTY

(a) The 'Company' guarantees that the goods supplied will conform to specifications and to any requirements specifically accepted by the ' Company' in writing in regard to each order but, except as aforesaid, the ' Company' gives no warranty, express or implied, of the material workmanship or fitness of goods for any particular purpose whether such purpose is known to us or not. In accordance with the specifications or requirements aforesaid, or should defects under proper use appear in the goods within a period of 12 (TWELVE) calendar months after the goods have been delivered, caused solely by faulty design, materials or workmanship, we shall, if requested to do so within a reasonable time, but not later than 18 (EIGHTEEN) calendar months, from date of delivery, repair such goods or the defective parts thereof, free of charge by supplying other goods or replacement parts at the initial place of delivery which do comply with specifications or requirements aforesaid and/or which are free of the defects complained of.

(b) It is a condition of this guarantee:

(i) that any defective parts are returned to the 'Company's' works at the purchaser's expenses and;

(ii) in respect of parts or components not of the 'Company's' manufacture, the 'Company's' guarantee shall be limited to the Guarantee, if any which we may have received from the supplier of such parts or components in respect thereof so that the 'Company's' liability in terms of such guarantee shall be no greater than the 'Company's' liability in terms of the' Company's' own guarantee as set out in this clause;

(iii) the 'Company' shall be given reasonable time and opportunity to comply with the terms of the guarantee before you call on the 'Company' to pay any sums in respect of the liquidated damages and;

(iv) save as provided in the clause, the 'Company' shall be under no liability, whether in contract, delict or otherwise in respect of defects in goods delivered, or for any injury, damage or loss resulting from defect or from any work done in connection therewith.