VENT-O-MAT®

SERIES RBX

"ANTI-SHOCK" AIR RELEASE AND VACUUM BREAK VALVES

FOR EFFECTIVE AIR RELEASE VACUUM PROTECTION AND SURGE ALLEVIATION

ON TOP DOWN UNDER

Deeco

VENT-O-MAT®

Series RBX

COMPONENT DESCRIPTION & MATERIAL SPECIFICATION

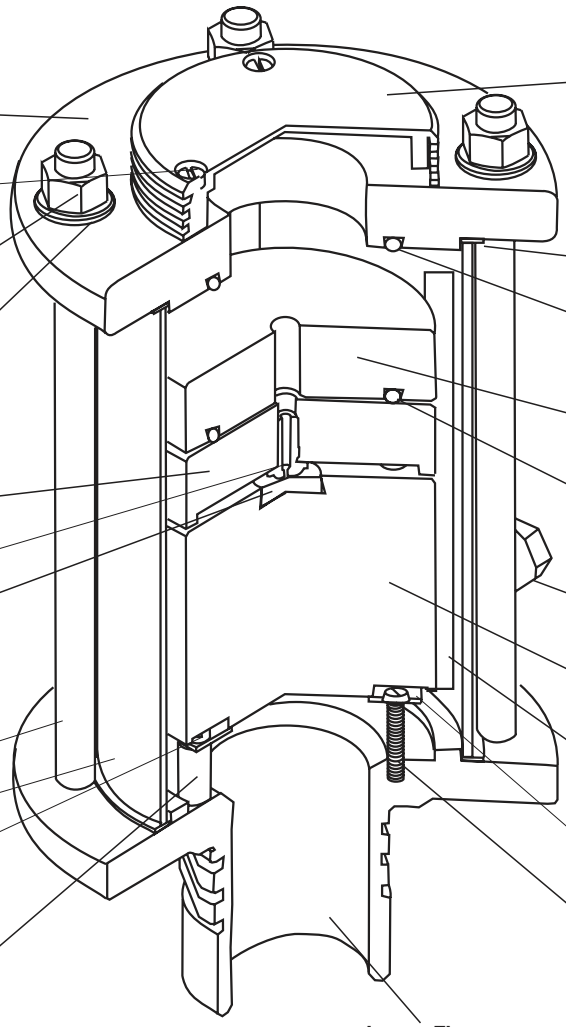
SCREWED - DN25(1") & DN50(2")

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: — **Pressure Ratings:**
RBX 2511 & 2521 — PN25 (363 psi)
RBX 4011 & 4021 — PN40 (580 psi)



Top Flange
Fusion Bonded
Epoxy Powder Coated
Ductile Cast Iron
BS2789 Grade 420/12
Alternatively Mild Steel
Bs4360 Grade 43A

Assembly Screws
Cheesehead
Stainless Steel AISI 304

Nuts
Stainless Steel AISI 304

Washer
Stainless Steel AISI 304

Top Float
High Density Polyethylene

Nozzle
Stainless Steel AISI 316

Nozzle Seat
EPDM Rubber

Tie Rods
Stainless Steel AISI 304

Barrel
Stainless Steel AISI 304L

Support Screw
Cheesehead
Stainless Steel AISI 304

Baffle Plate Spacer
ABS Polylac PA737

Top Cover
ABS Polylac PA737

Barrel Seal
Klingersil C4430 /Treadit Naloor Gasket

O - Ring Seal
EPDM Rubber
(NSF61)

Anti Shock Orifice
High Density Polyethylene

O - Ring Seat
EPDM Rubber (NSF61)

Optional Test Cock
¼" Female BSP

Lower Float
High Density Polyethylene

Float Guide
Stainless Steel AISI 304

Baffle Plate
Stainless Steel AISI 304

Support Screw
Cheesehead
Stainless Steel AISI 304

Lower Flange
Fusion Bonded
Epoxy Powder Coated
Ductile Cast Iron
BS2789 Grade 420/12
Alternatively Mild Steel
Bs4360 Grade 43A

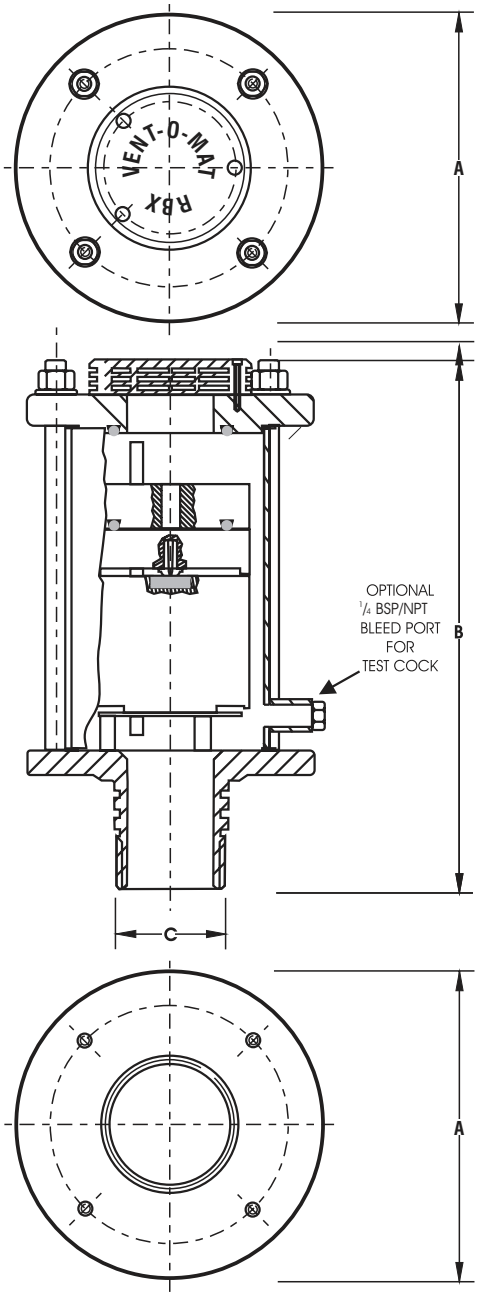
Valves are available in AISI 316L on request.

information subject to change without prior notice

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	PN 25 (363 psi)
RBX 4011	PN 40 (580 psi)

Operating Pressure Range - bar (psi):

	Min.	**Max.**
PN25 (363 psi)	0.5 (7.25)	25 (363)
PN40 (580 psi)	0.5 (7.25)	40 (580)

Operating Temperature Range:
4°C (40°F) to 80°C (176°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 (7.25 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	WEIGHT	
mm	in.			mm	in.	mm	in.		kg.	lbs
25	1"	025 RBX 2511 & 2521	PN25 (363 psi)	120	4 3/4	265	10 7/16	1" BSP/ NPT	5	11
25	1"	025 RBX 4011 & 4021	PN40 (580 psi)	120	4 3/4	317	12 1/2	1" BSP/ NPT	5.5	12.2
50	2"	050 RBX 2511 & 2521	PN25 (363 psi)	165	6 1/2	325	12 8/10	2" BSP/ NPT	9.5	21
50	2"	050 RBX 4011 & 4021	PN40 (580 psi)	165	6 1/2	340	13 6/16	2" BSP/ NPT	10	22

VENT-O-MAT®

Series RBX
OPERATION

PRE NOTES:

1. VENTING OF A FILLING PIPELINE:

The operation of a conventional 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 1.5 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.

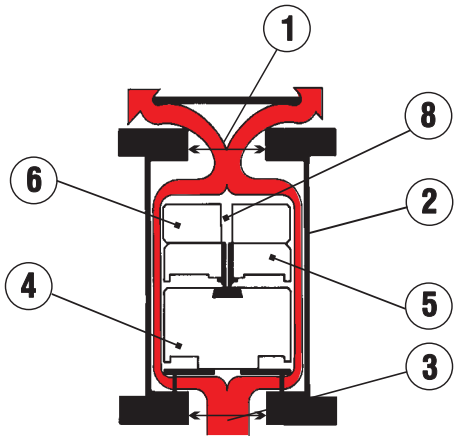
The Vent-O-Mat series RBX takes in air through the unobstructed large orifice when water column separation occurs, but controls the discharge of air through the "Anti-Shock" Orifice as the separated column commences to rejoin. The rejoining impact velocity is thereby sufficiently reduced to prevent an 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)



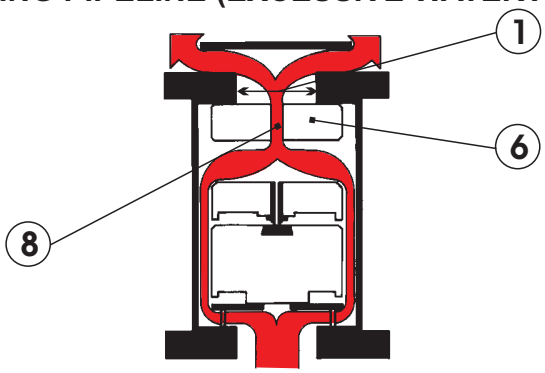
Air enters Orifice (3), travels through the annular space between the cylindrical floats (4), (5), and (6) and the valve Chamber Barrel (2) and discharges from the Large Orifice (1) into atmosphere.

VENT-O-MAT®

Series RBX

OPERATION

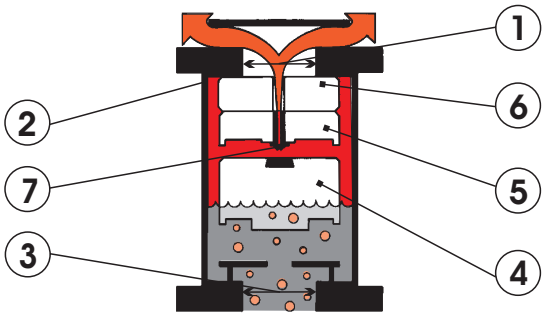
VENTING OF A FILLING PIPELINE (EXCESSIVE WATER APPROACH VELOCITY)



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

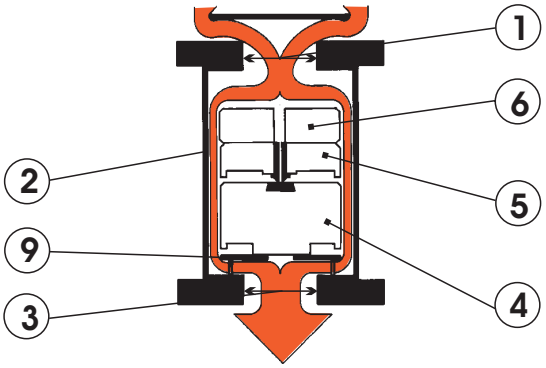


Subsequent to the filling of a pipeline, liquid enters the valve Barrel Chamber (2) and the Floats (4), (5) and (6) are buoyed so that the Large Orifice (1) is closed by Float (6), the valve will then become internally pressurized. A minimal working pressure of < 0. 5 bar (7. 3 psi) acting on the relatively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

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.

VENT-O-MAT®

Series RBX

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.

VENT-O-MAT®

Series RBX

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 2000 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

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 DN200 (8") valve has a DN200 (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!!!

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 due to negative internal pressure. We recommend 0.35 bar (5 psi) Dp or lower. 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 (0.725 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.

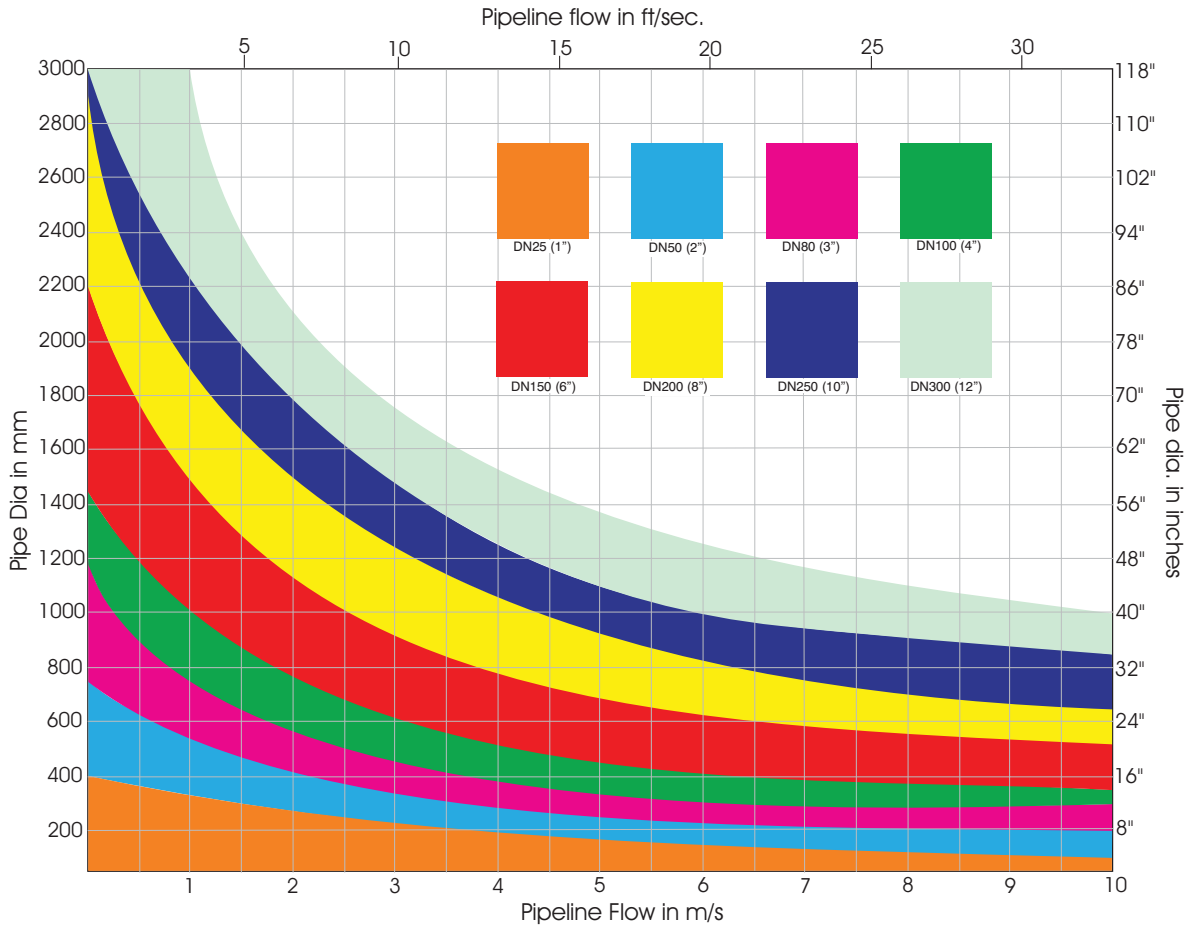
Kindly contact the manufacturer for free copies of the Vent-O-Mat publications; "Points to Consider when Sizing and Position Air Release and Vacuum Break Valves" and "Air Valve Technology Reviewed", should you require more information on the phenomena of surge and water hammer as a result of air release, as well as the functional limits of all available air valve designs and configurations.

Vent-O-Mat has an interactive sizing programme available on the Internet. The website address is: http://www.ventomat.com. You can, should you experience any problems, or need additional assistance, contact us at our E Mail address: ventomat@dfc.co.za

VENT-O-MAT®

Series RBX

SELECTION & POSITIONING



Pipe Dia	Pipeline Velocity in Metres per sec																			
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
100	4	8	12	16	20	24	27	31	35	39	43	47	51	55	59	63	67	71	75	79
150	9	18	27	35	44	53	62	71	80	88	97	106	115	124	133	141	150	159	168	177
200	16	31	47	63	79	94	110	126	141	157	173	188	204	220	236	251	267	283	298	314
250	25	49	74	98	123	147	172	196	221	245	270	295	319	344	368	393	417	442	466	491
300	35	71	106	141	177	212	247	283	318	353	389	424	459	495	530	565	601	636	672	707
350	48	96	144	192	241	289	337	385	433	481	529	577	625	673	722	770	818	866	914	962
400	63	126	188	251	314	377	440	503	565	628	691	754	817	880	942	1005	1068	1131	1194	1257
450	80	159	239	318	398	477	557	636	716	795	875	954	1034	1113	1193	1272	1352	1431	1511	1590
500	98	196	295	393	491	589	687	785	884	982	1080	1178	1276	1374	1473	1571	1669	1767	1865	1963
550	119	238	356	475	594	713	832	950	1069	1188	1307	1425	1544	1663	1782	1901	2019	2138	2257	2376
600	141	283	424	565	707	848	990	1131	1272	1414	1555	1696	1838	1979	2121	2262	2403	2545	2686	2827
650	166	332	498	664	830	995	1161	1327	1493	1659	1825	1991	2157	2323	2489	2655	2821	2986	3152	3318
700	192	385	577	770	962	1155	1347	1539	1732	1924	2117	2309	2501	2694	2886	3079	3271	3464	3656	3848
750	221	442	663	884	1104	1325	1546	1767	1988	2209	2430	2651	2872	3093	3313	3534	3755	3976	4197	4418
800	251	503	754	1005	1257	1508	1759	2011	2262	2513	2765	3016	3267	3519	3770	4021	4273	4524	4775	5027
850	284	567	851	1135	1419	1702	1986	2270	2554	2837	3121	3405	3688	3972	4256	4540	4823	5107	5391	5675
900	318	636	954	1272	1590	1909	2227	2545	2863	3181	3499	3817	4135	4453	4771	5089	5407	5726	6044	6362
950	354	709	1063	1418	1772	2126	2481	2835	3190	3544	3899	4253	4607	4962	5316	5671	6025	6379	6734	7088
1000	393	785	1178	1571	1963	2356	2749	3142	3534	3927	4320	4712	5105	5498	5890	6283	6676	7069	7461	7854
1100	475	950	1425	1901	2376	2851	3326	3801	4276	4752	5227	5702	6177	6652	7127	7603	8078	8553	9028	9503
1200	565	1131	1696	2262	2827	3393	3958	4524	5089	5655	6220	6786	7351	7917	8482	9048	9613	10179	10744	11310
1300	664	1327	1991	2655	3318	3982	4646	5309	5973	6637	7300	7964	8628	9291	9955	10619	11282	11946	12610	13273
1400	770	1539	2309	3079	3848	4618	5388	6158	6927	7697	8467	9236	10006	10776	11545	12315	13085	13854	14624	15394
1500	884	1767	2651	3534	4418	5301	6185	7069	7952	8836	9719	10603	11486	12370	13254	14137	15021	15904	16788	17671
1600	1005	2011	3016	4021	5027	6032	7037	8042	9048	10053	11058	12064	13069	14074	15080	16085	17090	18096	19101	20106
1700	1135	2270	3405	4540	5675	6809	7944	9079	10214	11349	12484	13619	14754	15889	17024	18158	19293	20428	21563	22698
1800	1272	2545	3817	5089	6362	7634	8906	10179	11451	12723	13996	15268	16540	17813	19085	20358	21630	22902	24175	25447
1900	1418	2835	4253	5671	7088	8506	9924	11341	12759	14176	15594	17012	18429	19847	21265	22682	24100	25518	26935	28353
2000	1571	3142	4712	6283	7854	9425	10996	12566	14137	15708	17279	18850	20420	21991	23562	25133	26704	28274	29845	31416
2100	1732	3464	5195	6927	8659	10391	12123	13854	15586	17318	19050	20782	22513	24245	25977	27709	29441	31172	32904	34636
2200	1901	3801	5702	7603	9503	11404	13305	15205	17106	19007	20907	22808	24709	26609	28510	30411	32311	34212	36113	38013
2300	2077	4155	6232	8310	10387	12464	14542	16619	18696	20774	22851	24929	27006	29083	31161	33238	35315	37393	39470	41548
2400	2262	4524	6786	9048	11310	13572	15834	18096	20358	22619	24881	27143	29405	31667	33929	36191	38453	40715	42977	45239
2500	2454	4909	7363	9817	12272	14726	17181	19635	22089	24544	26998	29452	31907	34361	36816	39270	41724	44179	46633	49087
2600	2655	5309	7964	10619	13273	15928	18583	21237	23892	26546	29201	31856	34510	37165	39820	42474	45129	47784	50438	53093
2700	2863	5726	8588	11451	14314	17177	20039	22902	25765	28628	31491	34353	37216	40079	42942	45804	48667	51530	54393	57256
2800	3079	6158	9236	12315	15394	18473	21551	24630	27709	30788	33866	36945	40024	43103	46181	49260	52339	55418	58496	61575
2900	3303	6605	9908	13210	16513	19816	23118	26421	29723	33026	36329	39631	42934	46236	49539	52842	56144	59447	62749	66052
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

www.deeco.co.nz

VALVE SELECTION FROM GRAPH

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

IMPORTANT NOTE: The graph is based on vacuum breaking and limiting vacuum to 0.34 bar (5 psi) below atmospheric. It is not good practice to go below 0.69 bar (10 psi) absolute (0.303 bar (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 - 0.34 bar (5 psi) and the lower portion - 0.1 bar (1.45 psi) for each valve size, this allows the designer to see at a glance if the valve is too close to it's operating limits and to select the next valve size.

EXAMPLE OF VALVE SIZING (ASSUMING AN INDIVIDUAL SECTION)

AØ 400mm (16") pipeline draining at 377l/sec (99.6 gal/sec) which equates to 3m/sec. (9.85 ft/s), what valve size should be selected?

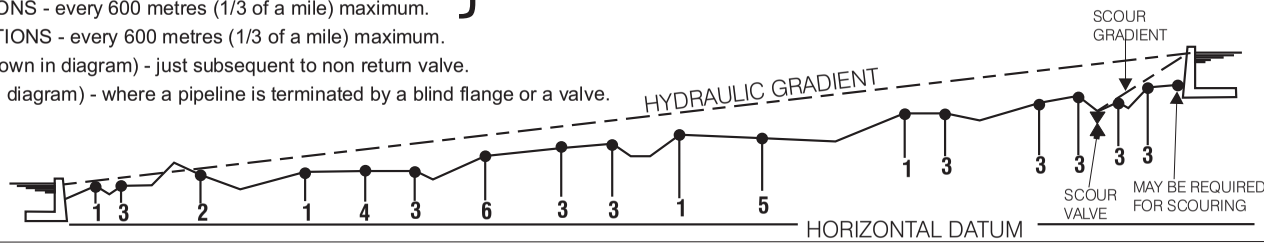
From the 3m/sec. (9.85 ft/s) point, on the graph on page 11, move vertically until the Ø400 mm (16") pipe size horizontal line is intersected. This places the intersection point in the operating band of a DN80 (3") Vent-O-Mat RBX valve. But, if for example, the drainage rate is 503 l/sec. (132.8 gal/sec) which equates to 4m/sec. (13.1 ft/s), the valve would be operating close to it's limit and it may be prudent to change to a DN100 (4") 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.

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

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.



VENT-O-MAT®

Series RBX

RECOMMENDED INSTALLATION ARRANGEMENTS