# Range explanation for VA and VG Series

## VA series (water)
### Vacuum break and air release

<table>
<thead>
<tr>
<th>Size</th>
<th>Press Bar</th>
<th>Valve ref number</th>
<th>Inlet</th>
</tr>
</thead>
<tbody>
<tr>
<td>025</td>
<td>25</td>
<td>025VA25</td>
<td>Screwed</td>
</tr>
<tr>
<td>050</td>
<td>25</td>
<td>050VA25</td>
<td>Screwed</td>
</tr>
<tr>
<td>080</td>
<td>25</td>
<td>080VA25</td>
<td>Flanged</td>
</tr>
<tr>
<td>100</td>
<td>25</td>
<td>100VA25</td>
<td>Flanged</td>
</tr>
<tr>
<td>150</td>
<td>25</td>
<td>150VA25</td>
<td>Flanged</td>
</tr>
<tr>
<td>200</td>
<td>25</td>
<td>200VA25</td>
<td>Flanged</td>
</tr>
</tbody>
</table>

### Specification
- **General**
  - This series of valves is designed for releasing air, breaking vacuum and some syphon applications on pipelines.
  - The VA series are for application on drinking water pipelines (potable water) and the VG series are for sewage or slurry pipelines.
  - The basic principle is to vent via an anti-siphon orifice and break vacuum via a full valve size intake orifice.

### Syphon Option
- The range allows for special a syphon application where only an air out function is required and the valve size can be reduced to suit the antisiphon size.
- **Note:** By special request only.

### Options
- **Digit 1 (valve material etc)**
  - 0 = Standard Valve 304 Stainless (* see Valve Data sheet *)
  - 1 = Standard Valve 316 Stainless
  - 2 = Full 304 Stainless valve, inc attachment flange
  - 3 = Full 316 Stainless valve, inc attachment flange
  - 4 = Standard Valve 304 Stainless valve - Flange as option
  - 5 = Standard Valve 316 Stainless valve - Flange as option

- **Digit 2 (porting and screen)**
  - 0 = None
  - 1 = Pressure port
  - 2 = Pressure port, screens
  - 3 = Flushing port
  - 4 = Flushing port, screens
  - 5 = Screens

- **Digit 3 (Spare)**

### End Connection
- **Screwed**
  - 1 inch BSPT = 1 inch BSP tared male
  - 2 inch BSPT = 2 inch BSP tared male

- **Flanged**
  - BS 4504 T10
  - BS 4504 T16
  - BS 4504 T25
  - BS 4504 T40
  - BS 10 TE
  - BS 16 TF
  - BS 4504 T10
  - BS 4504 T16
  - BS 4504 T25
  - BS 4504 T40
  - SABS 1123 T16
  - SABS 1123 T25
  - SABS 1123 T40

## VG series (sewage)
### Vacuum break and air release

<table>
<thead>
<tr>
<th>Size</th>
<th>Press Bar</th>
<th>Valve ref number</th>
<th>Inlet</th>
</tr>
</thead>
<tbody>
<tr>
<td>050</td>
<td>10</td>
<td>050VG10</td>
<td>Flg/Scr</td>
</tr>
<tr>
<td>080</td>
<td>10</td>
<td>080VG10</td>
<td>Flanged</td>
</tr>
<tr>
<td>100</td>
<td>10</td>
<td>100VG10</td>
<td>Flanged</td>
</tr>
<tr>
<td>150</td>
<td>10</td>
<td>150VG10</td>
<td>Flanged</td>
</tr>
<tr>
<td>200</td>
<td>10</td>
<td>200VG10</td>
<td>Flanged</td>
</tr>
</tbody>
</table>

### Specification
- **General**
  - This series of valves is designed for releasing air, breaking vacuum and some syphon applications on pipelines.
  - The VA series are for application on drinking water pipelines (potable water) and the VG series are for sewage or slurry pipelines.
  - The basic principle is to vent via an anti-siphon orifice and break vacuum via a full valve size intake orifice.

### Syphon Option
- The range allows for special a syphon application where only an air out function is required and the valve size can be reduced to suit the antisiphon size.
- **Note:** By special request only.

### Options
- **Digit 1 (valve material etc)**
  - 0 = Standard Valve 304 Stainless (* see Valve Data sheet *)
  - 1 = Standard Valve 316 Stainless
  - 2 = Full 304 Stainless valve, inc attachment flange
  - 3 = Full 316 Stainless valve, inc attachment flange
  - 4 = Standard Valve 304 Stainless valve - Flange as option
  - 5 = Standard Valve 316 Stainless valve - Flange as option

- **Digit 2 (porting and screen)**
  - 0 = None
  - 1 = Pressure port
  - 2 = Pressure port, screens
  - 3 = Flushing port
  - 4 = Flushing port, screens
  - 5 = Screens

- **Digit 3 (Spare)**

### End Connection
- **Screwed**
  - 1 inch BSPT = 1 inch BSP tared male
  - 2 inch BSPT = 2 inch BSP tared male

- **Flanged**
  - BS 4504 T10
  - BS 4504 T16
  - BS 4504 T25
  - BS 4504 T40
  - BS 10 TE
  - BS 16 TF
  - BS 4504 T10
  - BS 4504 T16
  - BS 4504 T25
  - BS 4504 T40
  - SABS 1123 T16
  - SABS 1123 T25
  - SABS 1123 T40

### Valve Ref number example

<table>
<thead>
<tr>
<th>Size</th>
<th>Series</th>
<th>Pressure</th>
<th>Options</th>
<th>End connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>080</td>
<td>VA</td>
<td>25</td>
<td>320</td>
<td>SABS 1123 T25</td>
</tr>
</tbody>
</table>

Subject to change without notice - check web site for updates

www.vacuventvalves.com

Range Explanation METRIC June 2015
Software design parameters - metric

We have manufactured and designed air release valves for 30 years. The Vacuvent design allowed us to look at various factors from manufacture, service, materials to performance. The process has been driven largely by the now prevalent use of hydraulic predictive programs. The subsequent software data together with actual testing has led us to a more optimised valve.

These are the parameters

Through Areas (large orifice)
A minimum 1:1 ratio of through area versus intake or riser bore, including cover plates and screens. The antishock orifices are spring loaded to the closed position but the spring force is only just enough to hold the upper float in the closed position. Effectively the spring force can be discounted (the mass of this float acts in a downward direction and assists opening). The valve is fully open during the vacuum cycle.

Exhaust is always via the antishock orifices.

Valve size (Water) Series VA
Through Area (valve inlet) mm²
491 1963 4418 7854 17671 31416
Dia antishock up to 25 Bar
4 6.4 8 10 12.7 16
Dia antishock up to 40 Bar
3.2 5 6.4 8 10 12.7
Dia Small Orifice
1.0

Valve size (Sewage) Series VG
Through Area (valve inlet) mm²
1963 4418 7854 17671 31416
Dia antishock up to 25 Bar
6.4 8 10 12.7 16
Dia Small Orifice
1.6 1.7 1.7 1.6 1.8

Intake curves Diff Press Bar Gauge
0 0 0 0 0 0 0

Water and Sewage series VA and VG
Output m³/hr
0.05 52.7 210.6 539.2 842.5 1895.7 3370.1
-0.1 71.6 286.2 732.8 1145.0 2576.2 4579.9
-0.2 104.0 415.9 1064.6 1663.4 3742.7 6653.8
-0.3 124.8 499.0 1277.5 1996.1 4491.3 7984.5
Suggested Max Diff press
-0.35 132.3 529.3 1354.9 2117.1 4763.5 8468.4
-0.4 137.7 550.9 1410.3 2203.5 4957.9 8814.1
-0.5 145.8 583.3 1493.2 2333.1 5249.6 9332.6
-0.6 149.9 599.5 1534.7 2397.9 5365.4 9691.8

Exhaust Diff Press Bar Gauge
0 0 0 0 0 0 0

Water Series VA
25 221 566 885 1383 2231 3541
40 224 574 897 1402 2246 3568

Exhaust Diff Press Bar Gauge
0 0 0 0 0 0 0

Sewage Series VG
10 0 236 369 576 929 1475
25 0 566 885 1383 2231 3541

Coefficient of discharge CD
For software program inputs
Anti shock Exhaust CD = 0.82
Vacuum intake Large Orifice CD = 0.4

The data shown is at a standard atmosphere 1,01325 Bar @ 20 deg C

If you require further info please contact Shaun Clegg at shaun@ivmsa.co.za or info@vacuventvalves.com

www.vacuventvalves.com
Software design parameters METRIC June 2015
025VA25  25 Bar
25 mm / 1.0 inch
Air release and vacuum break valves for Water Pipelines

Specifications
Operating Pressure  0.5 to 25 Bar
Media             Drinkable water
Inlet (Large Orifice)  1 inch (25 mm) Screwed BSPT
Outlet (Small Orifice)  Anti shock orifice 4.0 mm Dia

Overall Valve size  97 mm dia x 335 mm long
Mass              4.3 kg
Operating Temperature  4 - 85 Deg C
High pressure test  1.5 X Max Working Pressure
Low pressure test   0.5 Bar

Note: The valve and materials shown on this specification sheet are for the STANDARD option valve. For all other options including material and pressure port options see Range Explanation sheet. Subject to change without notice - check web site for updates.

www.vacuventvalves.com
Series 025VA25 METRIC June 2015
Specifications

<table>
<thead>
<tr>
<th>Operating Pressure</th>
<th>0.5 to 40 Bar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Media</td>
<td>Drinkable water</td>
</tr>
<tr>
<td>Inlet (Large Orifice)</td>
<td>1 inch (25 mm) Screwed BSPT</td>
</tr>
<tr>
<td>Outlet (Small Orifice)</td>
<td>Anti shock orifice 3.2 mm Dia</td>
</tr>
<tr>
<td>Overall Valve size</td>
<td>97 mm dia x 400 mm long</td>
</tr>
<tr>
<td>Mass</td>
<td>5.6 kg</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>4 - 85 Deg C</td>
</tr>
<tr>
<td>High pressure test</td>
<td>1.5 X Max Working Pressure</td>
</tr>
<tr>
<td>Low pressure test</td>
<td>0.5 Bar</td>
</tr>
</tbody>
</table>

Note: The valve and materials shown on this specification sheet are for the STANDARD option valve. For all other options including material and pressure port options see Range Explanation sheet. Subject to change without notice - check website for updates.

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Series 025VA40 METRIC June 2015
050VA25  25 bar
50 mm / 2.0 inch
Air release and vacuum break valves for Water Pipelines

Specifications

| T | V
|---|---
| Operating Pressure | 0.5 to 25 Bar |
| Media | Drinkable water |
| Inlet (Large Orifice) | 2 inch (50 mm) Screwed BSPT |
| Outlet (Small Orifice) | Anti shock orifice 6.4 mm Dia |
| Overall Valve size | 122 mm dia x 386 mm long |
| Mass | 6.0 kg |
| Operating Temperature | 4 - 85 Deg C |
| High pressure test | 1.5 X Max Working Pressure |
| Low pressure test | 0.5 Bar |

Note: The valve and materials shown on this specification sheet are for the STANDARD option valve. For all other options including material and pressure port options see Range Explanation sheet.

Subject to change without notice - check web site for updates.

www.vacuentvalves.com
Air release and vacuum break valves for Water Pipelines

Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure</td>
<td>0.5 to 40 Bar</td>
</tr>
<tr>
<td>Media</td>
<td>Drinkable water</td>
</tr>
<tr>
<td>Inlet (Large Orifice)</td>
<td>2 inch (50 mm) Screwed BSPT</td>
</tr>
<tr>
<td>Outlet (Small Orifice)</td>
<td>Anti shock orifice 5.0 mm Dia</td>
</tr>
<tr>
<td>Overall Valve size</td>
<td>122 mm dia x 475 mm long</td>
</tr>
<tr>
<td>Mass</td>
<td>7.5 kg</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>4 - 85 Deg C</td>
</tr>
<tr>
<td>High pressure test</td>
<td>1.5 X Max Working Pressure</td>
</tr>
<tr>
<td>Low pressure test</td>
<td>0.5 Bar</td>
</tr>
</tbody>
</table>

Note: The valve and materials shown on this specification sheet are for the STANDARD option valve. For all other options including material and pressure port options see Range Explanation sheet.

www.vacuentvalves.com

Series 050VA40 METRIC June 2015
Water Pipelines

Air release and vacuum break valves for Water Pipelines

**Specifications**

<table>
<thead>
<tr>
<th>Operating Pressure</th>
<th>Media</th>
<th>Inlet (Large Orifice)</th>
<th>Outlet (Small Orifice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5 to 25 Bar</td>
<td>Drinkable water</td>
<td>3 inch (80 mm Dia) Flanged</td>
<td>Anti shock orifice 8.0 mm Dia</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overall Valve size</th>
<th>Mass</th>
<th>Operating Temperature</th>
<th>High pressure test</th>
<th>Low pressure test</th>
</tr>
</thead>
<tbody>
<tr>
<td>149 mm dia x 360 mm long</td>
<td>13.0 kg</td>
<td>4 - 85 Deg C</td>
<td>1.5 X Max Working Pressure</td>
<td>0.5 Bar</td>
</tr>
</tbody>
</table>

**Note:** The valve and materials shown on this specification sheet are for the STANDARD option valve. For all other options including material and pressure port options see Range Explanation sheet.

Subject to change without notice - check web site for updates.
**Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure</td>
<td>0.5 to 40 Bar</td>
</tr>
<tr>
<td>Media</td>
<td>Drinkable water</td>
</tr>
<tr>
<td>Inlet (Large Orifice)</td>
<td>3 inch (80 mm Dia)</td>
</tr>
<tr>
<td>Outlet (Small Orifice)</td>
<td>Anti shock orifice 6.4 mm Dia</td>
</tr>
<tr>
<td>Mass</td>
<td>15.5 kg</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>4 - 85 Deg C</td>
</tr>
<tr>
<td>High pressure test</td>
<td>1.5 X Max Working Pressure</td>
</tr>
<tr>
<td>Low pressure test</td>
<td>0.5 Bar</td>
</tr>
<tr>
<td>Overall Valve size</td>
<td>149 mm dia x 430 mm long</td>
</tr>
</tbody>
</table>

**Note:** The valve and materials shown on this specification sheet are for the STANDARD option valve. For all other options including material and pressure port options see Range Explanation sheet.

Subject to change without notice - check web site for updates.

www.vacuentvalves.com

Series 080VA40 METRIC June 2015
100VA25  25 Bar
100 mm / 4.0 inch
Air release and vacuum break valves for Water Pipelines

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure</td>
<td>0.5 to 25 Bar</td>
</tr>
<tr>
<td>Media</td>
<td>Drinkable water</td>
</tr>
<tr>
<td>Inlet (Large Orifice)</td>
<td>4 inch (100 mm Dia) Flanged</td>
</tr>
<tr>
<td>Outlet (Small Orifice)</td>
<td>Anti shock orifice 10.0 mm Dia</td>
</tr>
<tr>
<td>Overall Valve size</td>
<td>176 mm dia x 348 mm long</td>
</tr>
<tr>
<td>Mass</td>
<td>15.5 kg</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>4 - 85 Deg C</td>
</tr>
<tr>
<td>High pressure test</td>
<td>1.5 X Max Working Pressure</td>
</tr>
<tr>
<td>Low pressure test</td>
<td>0.5 Bar</td>
</tr>
</tbody>
</table>

Note: The valve and materials shown on this specification sheet are for the STANDARD option valve. For all other options including material and pressure port options see Range Explanation sheet.

Subject to change without notice - check web site for updates

www.vacuentvalves.com
100VA40  40 Bar
100 mm / 4.0 inch
Air release and vacuum break valves for Water Pipelines

Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure</td>
<td>0.5 to 40 Bar</td>
</tr>
<tr>
<td>Media</td>
<td>Drinkable water</td>
</tr>
<tr>
<td>Inlet (Large Orifice)</td>
<td>4 inch (100 mm Dia) Flanged</td>
</tr>
<tr>
<td>Outlet (Small Orifice)</td>
<td>Anti shock orifice 8.0 mm Dia</td>
</tr>
<tr>
<td>Overall Valve size</td>
<td>176 mm dia x 398 mm long</td>
</tr>
<tr>
<td>Mass</td>
<td>18.8 kg</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>4 - 85 Deg C</td>
</tr>
<tr>
<td>High pressure test</td>
<td>1.5 X Max Working Pressure</td>
</tr>
<tr>
<td>Low pressure test</td>
<td>0.5 Bar</td>
</tr>
</tbody>
</table>

Note: The valve and materials shown on this specification sheet are for the STANDARD option valve. For all other options including material and pressure port options see Range Explanation sheet.

Subject to change without notice - check web site for updates.

www.vacuentvalves.com

Series 100VA40 METRIC June 2015
Air release and vacuum break valves for Water Pipelines

150VA25 25 bar
150 mm / 6.0 inch

Specifications
- **Operating Pressure**: 0.5 to 25 Bar
- **Media**: Drinkable water
- **Inlet (Large Orifice)**: 6 inch (150 mm Dia) Flanged
- **Outlet (Small Orifice)**: Anti shock orifice 12.7 mm Dia

- **Overall Valve size**: 278 mm dia x 600 mm long
- **Mass**: 46.0 kg
- **Operating Temperature**: 4 - 85 Deg C
- **High pressure test**: 1.5 X Max Working Pressure
- **Low pressure test**: 0.5 Bar

*Note*: The valve and materials shown on this specification sheet are for the STANDARD option valve. For all other options including material and pressure port options see Range Explanation sheet.

**Subject to change without notice - check web site for updates**

www.vacuventvalves.com
150VA40  40 bar
150 mm / 6.0 inch
Air release and vacuum break valves for Water Pipelines

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Pressure</td>
<td>0.5 to 40 Bar</td>
</tr>
<tr>
<td>Media</td>
<td>Drinkable water</td>
</tr>
<tr>
<td>Inlet (Large Orifice)</td>
<td>6 inch (150 mm Dia) Flanged</td>
</tr>
<tr>
<td>Outlet (Small Orifice)</td>
<td>Anti shock orifice 10.0 mm Dia</td>
</tr>
<tr>
<td>Mass</td>
<td>55.0 kg</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>4 - 85 Deg C</td>
</tr>
<tr>
<td>High pressure test</td>
<td>1.5 X Max Working Pressure</td>
</tr>
<tr>
<td>Low pressure test</td>
<td>0.5 Bar</td>
</tr>
<tr>
<td>Overall Valve size</td>
<td>278 mm dia x 638 mm long</td>
</tr>
</tbody>
</table>

Note: The valve and materials shown on this specification sheet are for the STANDARD option valve. For all other options including material and pressure port options see Range Explanation sheet. Subject to change without notice - check web site for updates.

www.vacuventvalves.com

Series 150VA40 METRIC June 2015
**Specifications**

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating Pressure</strong></td>
<td>0.5 to 25 Bar</td>
</tr>
<tr>
<td><strong>Media</strong></td>
<td>Drinkable water</td>
</tr>
<tr>
<td><strong>Inlet (Large Orifice)</strong></td>
<td>8 inch (200 mm Dia) Flanged</td>
</tr>
<tr>
<td><strong>Outlet (Small Orifice)</strong></td>
<td>Anti shock orifice 16.0 mm Dia</td>
</tr>
<tr>
<td><strong>Overall Valve size</strong></td>
<td>328 mm dia x 682 mm long</td>
</tr>
<tr>
<td><strong>Mass</strong></td>
<td>70.0 kg</td>
</tr>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>4 - 85 Deg C</td>
</tr>
<tr>
<td><strong>High pressure test</strong></td>
<td>1.5 X Max Working Pressure</td>
</tr>
<tr>
<td><strong>Low pressure test</strong></td>
<td>0.5 Bar</td>
</tr>
</tbody>
</table>

**Note**: The valve and materials shown on this specification sheet are for the **STANDARD** option valve. For all other options including material and pressure port options see **Range Explanation** sheet. Subject to change without notice - check website for updates.

**200VA25 25 Bar**

200 mm / 8.0 inch

Air release and vacuum break valves for Water Pipelines
200VA40  40 Bar
200 mm / 8.0 inch
Air release and vacuum break valves for Water Pipelines

Specifications
- Operating Pressure: 0.5 to 40 Bar
- Media: Drinkable water
- Inlet (Large Orifice): 8 inch (200 mm Dia) Flanged
- Outlet (Small Orifice): Anti shock orifice 12.7 mm Dia

Overall Valve size: 328 mm dia x 736 mm long
Mass: 84.0 kg
Operating Temperature: 4 - 85 Deg C
High pressure test: 1.5 X Max Working Pressure
Low pressure test: 0.5 Bar

Note: The valve and materials shown on this specification sheet are for the STANDARD option valve. For all other options including material and pressure port options see Range Explanation sheet.
Subject to change without notice - check web site for updates.

www.vacuventvalves.com
Series 200VA40 METRIC June 2015
General sizing and operation notes

Basic Operation
Vacuvent have full valve size intakes (large orifices) but control the exhaust exclusively via the Anti-Shock orifices. No exhaust is vented via the large orifice and this function is specifically designed for (further reading see technical information). The valve range covers most applications as standard but still allows the designer some scope to specify more accurately.

Basic Principles
When a section drains down the AV at the apex must be sized to protect the pipe and seals until next valve lower down opens. So intake can not be calculated by adding all the valves on that section. Exhaust however is another matter and its feasible in some instances to add all the anti shock capabilities for one section. Its also important to ensure that enough head (including dynamic) is available to seal the valve off otherwise a syphon valve may be required. This is a consideration on pumping systems where the final section after the apex has the possibility of draining down faster than the pumping rate. Another factor is the differentiation between designed flow rates and possible drainage rates. Drainage rates are generally estimated 2 times the designed flow rates i.e. 1-2 m/sec flow rate and say 2-4 m/sec drainage. If the pipe is protected for vacuum, generally the exhaust capability is more than adequate.

Sizing
Most sizing is based on the need to protect the pipeline from a negative pressure, vent the initial air, and to vent the pressurised air with the importance generally in that order. A good start is to select a scouring or drainage rate based on rupture or draining of 2-3 times the designed flow rate of that particular section. Size the AV to protect the pipeline and seals from low pressure within the pipeline during draining or other pipeline disturbances (eg pump trip). One accepted method is to limit the internal pressure to 3.5 m ΔP (0.35 Bar) below atmospheric @ sea level. The AV curves in each individual valve catalogue indicates that point and the resultant inflow of air.

Placement
The graphic shows most of the common places where AV (air release valves) are fitted. High points are a natural start, also where the pipeline crosses obstacles like rivers and roads. Check for syphon application above the hydraulic grade line. To control pump start and pump trip, AV should be placed before and after the check valve.

Pumped example

Disclaimer: Sizing, placement and application of Air Release Valves is beyond the scope of this document and the above is only a basic outline of the methods. For more technical information consult the “Technical section” and “Links” section of the website.

www.vacuventvalves.com
General sizing and operation notes

Basic Operation
Vacuvent have full valve size intakes (large orifices) but control the exhaust exclusively via the Anti-Shock orifices. No exhaust is vented via the large orifice and this function is specifically designed for (further reading see technical information). The valve range covers most applications as standard but still allows the designer some scope to specify more accurately.

Basic Principles
When a section drains down the AV at the apex must be sized to protect the pipe and seals until next valve lower down opens. So intake cannot be calculated by adding all the valves on that section. Exhaust however is another matter and its feasible in some instances to add all the anti shock capabilities for one section. It's also important to ensure that enough head (including dynamic) is available to seal the valve off otherwise a syphon valve may be required. This is a consideration on pumping systems where the final section after the apex has the possibility of draining down faster than the pumping rate. Another factor is the differentiation between designed flow rates and possible drainage rates. Drainage rates are generally estimated 2 times the designed flow rates ie 1-2 m/sec flow rate and say 2-4 m/sec drainage. If the pipe is protected for vacuum, generally the exhaust capability is more than adequate.

Sizing
Most sizing is based on the need to protect the pipeline from a negative pressure, vent the initial air, and to vent the pressurised air with the importance generally in that order. A good start is to select a scouring or drainage rate based on rupture or draining of 2-3 times the designed flow rate of that particular section. Size the AV to protect the pipeline and seals from low pressure within the pipeline during draining or other pipeline disturbances (eg pump trip). One accepted method is to limit the internal pressure to 3.5 m ΔP (0.35 Bar) below atmospheric @ sea level. The AV curves in each individual valve catalogue indicates that point and the resultant inflow of air.

Placement
The graphic shows most of the common places where AV (air release valves) are fitted. High points are a natural start, also where the pipeline crosses obstacles like rivers and roads. Check for syphon application above the hydraulic grade line. To control pump start and pump trip, AV should be placed before and after the check valve.

Disclaimer: Sizing, placement and application of Air Release Valves is beyond the scope of this document and the above is only a basic outline of the methods. For more technical information consult the "Technical section" and "Links" section of the website.

Subject to change without notice - check web site for updates www.vacuventvalves.com

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