

B60.20.0-1

## SONIC<sup>®</sup>, DUOSONIC<sup>®</sup> AIR EXHAUST VALVE AND NEYRTEC<sup>®</sup> AIR INLET VALVES



Operational safety in a water distribution pipes systems requires the control of elimination of the air accumulated on the top points during filling or air inlet in case of either desired or accidental pipe emptying.

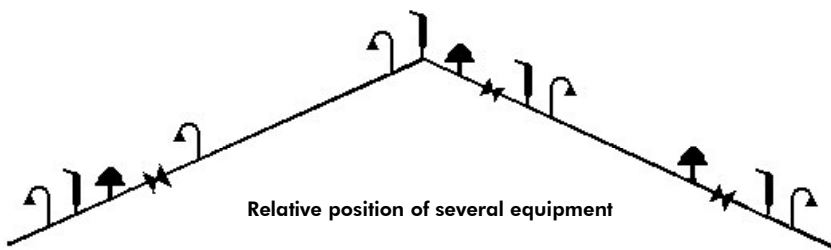
Eliminating the air pockets during pipe filling is of paramount importance to

prevent the flow pass section reduction and the harmful discharge and pressure oscillations due to the elasticity of the air pocket. This shall be performed without any pressure surge, in pressure.

During the filling process some pipe points become points of depression that impair the mechanical and hydraulic pipe

performance. The depression points have to be avoided, putting them in contact with the atmospheric pressure.

In order to ensure this double function and to effectively control the elimination of air pockets and depression points, it is preferable, unlike some well known devices, to employ two distinct kinds of equipment; each one sized individually as: Sonic<sup>®</sup> Air Valve (or the Duosonic<sup>®</sup> Air Valve) and Neyrtec<sup>®</sup> Air Inlet Valve supplied by **hydrostec**, generally installed at the pipe line's highest points, in downstream of control and security valves, as well as in small slope pipe line branches outlets, (at around 1 cm/m), from a pipeline branch with larger slope.

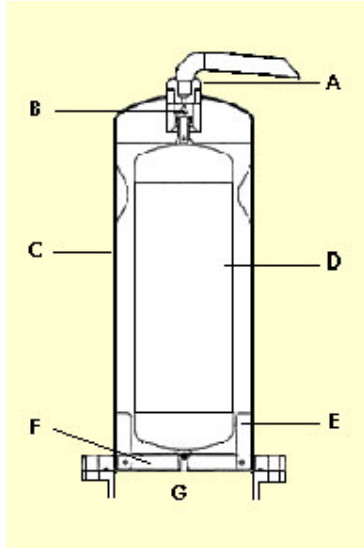


Relative position of several equipment

-  Sonic<sup>®</sup> Air Exhaust Valve
-  Neyrtec<sup>®</sup> Air Inlet Valve
-  Neyrtec<sup>®</sup> Pressure Relief Valve
-  Gate Valve

Sonic<sup>®</sup> and Duosonic<sup>®</sup> Air Exhaust Valves and Neyrtec<sup>®</sup> Air Inlet valves are trademark.

## SONIC® Air Exhaust Valves



- A Stainless Steel orifice
- B Needle obturator
- C Body
- D Float
- E Guides
- F Seating plate
- G Pipe intakes

The Neyrtec® Sonic Air Valve (as shown in the above figure) drains the air by limiting the surge at the end of purging because of a calibrated orifice that controls the maximum outlet speed.

The laws of this discharge are similar to those governing the pipes fed by a compressible fluid. The orifice outlet speed can not exceed 200m/s, corresponding to the sound speed in the fluid, regardless of the upstream pressure.

This limit is achieved provided the absolute pressure is higher than 2bar.

Assuming the above the discharge does not exceed the value of  $2000 \sigma$  ( $\sigma$  = orifice section in  $\text{dm}^2$ ).

The surge at the end of process is equal to  $2000 (\sigma/S)$  [m]

Where S = pipe section

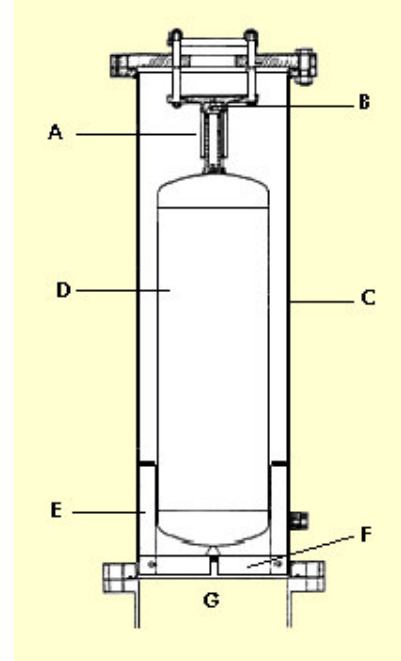
To define the size of Neyrtec® Sonic Air Valve we need to know the maximum working pressure and the pipe diameter at the installation point. Table 1 enables choice of the air exhaust valve type in terms of these two parameters. The arrows in some table columns indicate that the most appropriate type is the sample located at the left of the column. The number above the arrow indicates the number of air valves to be installed in a parallel layout.

The table 2 gives the main dimensions for Neyrtec® Sonic Air Valves.

## Neyrtec® Duosonic Air Exhaust Valves

The Neyrtec® Duosonic Air Valve allows quicker air draining because of a larger air outlet orifice.

At the end of the process, this orifice is closed and the air is exhausted only through one calibrated orifice, by the same principle operating of the Neyrtec® Sonic Air Valve and so limiting the pressure surge effect. The Neyrtec® Duosonic Air Valve is identified with a letter D in front of the index C or L in table 1. The table 1 is used also for sizing the Neyrtec® Duosonic Air Valve. The dimensions of the Neyrtec Duosonic® Air Valves are showed in table 3.



- A Mobile orifice
- B Obturator
- C Body
- F Float
- E Guides
- F Seating plate
- G Pipe intake



Table 1

Pipe diameter (mm)	≤ 200	250 to 275	300 to 375	400 to 475	500 to 575	600 to 775	800 to 975	1000 to 1200	1250 to 1550	≥ 1600	Flange according to ISO2531 or NBR7675
Orifice diameter (mm)	3	4	5	6	8	10	12	16	20	25	
Maximum working pressure (m)	3	4	5	6	8	10	12	16	20	25	
< 25	C 80	C 80	C 80	C 80	C 80	C 80	L 80	C 150	L 150	C 250	PN10
25 to 40	C 80	C 80	C 80	C 80	C 80	L 80	C 150	L 150	C 250	L 250	
40 to 60	C 80	C 80	C 80	C 80	L 80	C 150	L 150	C 250	L 250	←	
60 to 100	C 80	C 80	C 80	L 80	C 150	L 150	C 250	L 250	←	← 1 or 2	
100 to 160	C 80	C 80	L 80	C 150	L 150	C 250	L 250	←	← 1 or 2	← 1 to 4	PN16
160 to 250	C 80	L 80	C 150	L 150	C 250	L 250	←	← 1 or 2	← 1 to 4	← 1 to 6	PN25

Table 2

Dimensions in mm

Ø Nominal	Height		PN (bar)	Flange dimensions							
	Type C	Type L		Ø ext.	Ø drilling	Number of holes	Ø holes				
80	670	970	10	200	160	8	18				
			16								
			25								
150	810	1165	10	285	240	8	22				
			16								
			25					300	250	8	26
250	835	1160	10	395	350	12	22				
			16					405	355	12	26
			25					425	370	12	30

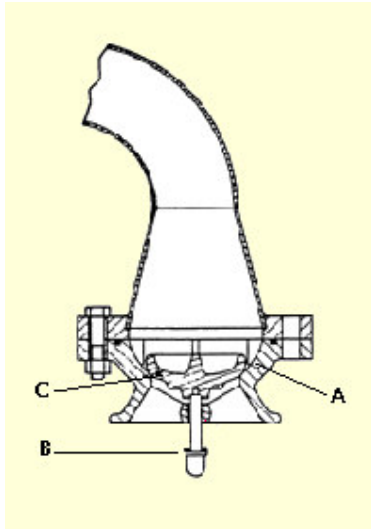
Table 3

Dimensions in mm

Air valve type	DC 80	DL 80	DC 150	DL 150	DC 250	DL 250
Height	680	960	960	1090	1070	1250
Flange nominal diameter*	80		150		250	
Clear opening for pipe dismantling	80		120		200	

(\*) Flange dimensions according to ISO 2531 Standard or NBR 7675.

## Neyrtec® Air Inlet Valve



- A Valve body
- B Damper rubber
- C Obturator

Neyrtec® Air Inlet Valve manufactured by our Group, with its specially constructed inlet profile, provides a practically negligible pressure loss.

Three standardized dimensions are provided: Ø80, Ø150, Ø250mm.

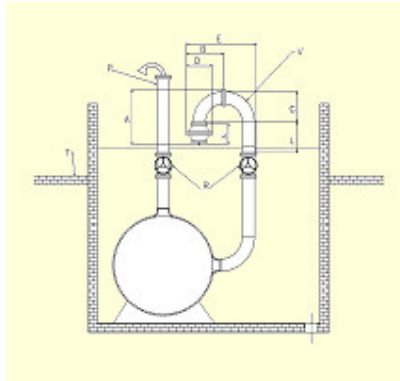
The criterion for defining the Neyrtec® Air Inlet valve is the maximum allowable pipe pressure depression.

For a 2m depression, the maximum allowable discharge for compressed air is approximately:

- Ø80 valve  $Q_{m\acute{a}x.} = 1\text{m}^3/\text{s}$
- Ø125 valve  $Q_{m\acute{a}x.} = 3,5\text{m}^3/\text{s}$
- Ø250 valve  $Q_{m\acute{a}x.} = 10\text{m}^3/\text{s}$

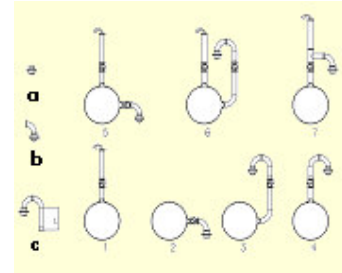
If depression exceeds 3, 4 or 5m, the above discharges are increased, by: 30, 60 and 100% respectively.

The table 4 shows the dimensions for Neyrtec® Air Inlet Valve according to the installation figure below:



- P Neyrtec® Sonic Air Exhaust Valve
- V Neyrtec® Air Inlet Valve
- R Gate valve
- T Land

The assembly sketch for Neyrtec® Air Inlet Valve and Neyrtec® Sonic and Duosonic Air Exhaust Valves are shown below:



Assembly mode:

- a- with flanges
- b- with elbow and flange
- c- with straight section, elbow and flange



Table 4

Dimensions in mm

Nominal Diameter	Maximum working pressure (bar)	A	B	C	D	E	H
80	25	500	250	180	200	480	300
150	25	800	430	320	360	800	450
250	25	1250	700	550	550	1300	650