JOHNVALVES
The Valve People
Australian made since 1896

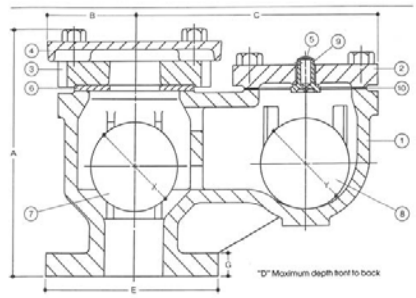
VALVE MANUFACTURE
GENERAL ENGINEERING
VALVE RECONDITIONING

A.C.N. 007 400 759 • A.B.N. 98 007 400 759

JOHN FIG. 784 Air Valve

This design of air valve for use in water systems incorporates both small and large orifices. The small orifice for automatic release of accumulated air during normal operation.Air can enter a pipeline in a number of ways, through pump glands, leaking joints and is even contained in solution in the water itself. This air accumulates at the high points of the system, and unless the flow of water is fast enough to purge the line, large pockets of air form to seriously impede the flow a condition known as “air binding”. By locating these air valves at specific points in the system, ventilation of these air pockets is achieved, increasing pumping efficiencies and flow capabilities of the pipeline. The large orifice allows automatic ventilation of the pipeline during filling and emptying. When filling, air is exhausted at a sufficiently high capacity to prevent restriction of the filing rate due to built up back pressure. When emptying, air is admitted to the pipeline at a rate sufficient to prevent high vacuum pressures developing.

Product No. 784: Flanged to AS2129 Table F

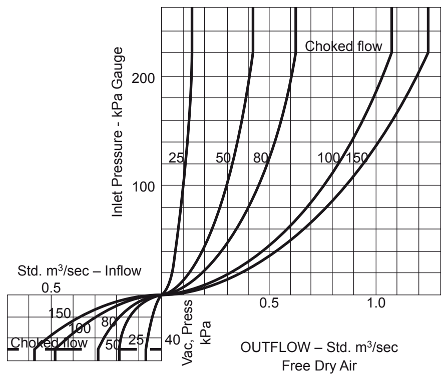


Operation

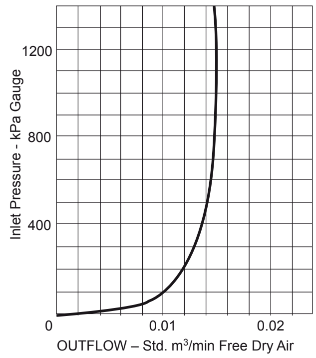
Small Orifice: With the pipeline full, under pressure and no air present in the valve body, sealing is effected by the combined upthrust of the submerged ball and differential pressure times the orifice area.
Accumulating air in the pipeline enters the body and depresses the water level to the point where the ball mass is sufficient to overcome to the differential pressure across the orifice allowing the ball to drop, opening the orifice and expel-ling air. When the water level rises as air is discharged, the flotation level of the ball seals the orifice, preventing water loss.

Large Orifice: Under normal operating conditions, the ball is held on the seat by pipeline pressure and will only open when this pressure drops to atmospheric. The ball is closely guided in the body and when the pipeline is filling, is held suspended in the exhaust air flow, away from the seat, by the aerodynamic design of the body. This aerodynamic feature has been the subject of extensive research at various field installations to ensure there is no possibility of premature valve closure even with sonic air discharge velocities.

Discharge Capacities
LARGE ORIFICE



SMALL ORIFICE



MATERIALS OF CONSTRUCTION

ITEM	DESCRIPTION	MATERIAL
1.	BODY	CAST IRON
2.	COVER SMALL ORIFICE	CAST IRON
3.	COVER LARGE ORIFICE	CAST IRON
4.	GUARD LARGE ORIFICE	CAST IRON
5.	PLUG DISC	BRASS
6.	SEAL	POLYURETHANE
7.	BALL LARGE ORIFICE	RUBBER-CEDAR CORE
8.	BALL SMALL ORIFICE	RUBBER-CEDAR CORE
9	ORIFICE PLUG	ARSENICALLY INHIBITED BRASS
10.	GASKET	RUBBER INSERTION

TABLE OF FLOW COEFICIENTS	
VALVE SIZE mm	FLOW COEFICIENTS
50	0.0296
80	0.0446
100	0.0750
150	0.0861

Sizing of large Orifice Air Valves

The air discharge rate through an aerodynamic large orifice valve can be determined from the following approximate expressions:
A. For pressure drops up to 210 kPa:
$Q=C\sqrt{P}$ m3/sec at S.T.P.
B. For pressure drops 210 kPa and above:
Note: The critical pressure ratio on choked flow condition occurs at a pressure differential of 210 kPa wherein the flow rate remains the same as the pressure drop increases.
$Q = C\sqrt{210}$ m3/sec at S.T.P.
Where: Q = Volumetric Flow Rate at S.T.P. (101.3 kPa - 15ºC)
P = Pressure Drop Across Valve in kPa.
C= Valve Flow Coefficient (from table)

DIMENSIONS

Valve Dia.	A	B	C	D	E	G	Ball Dia. X	Ball Dia. Y	Max WP kPa	App Wt Kg	Lrg Orifice Dia
50mm	208	77	210	153	165	19	76	76	1400	19	44
80mm	245	93	219	186	205	19	90	76	1400	25	54
100mm	290	110	250	220	230	22	114	76	1400	38	70
150mm	408	140	261	280	305	25	140	76	1400	50	82

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