



VAL-MATIC[®]

**Air Valves for
Fire Protection Service**

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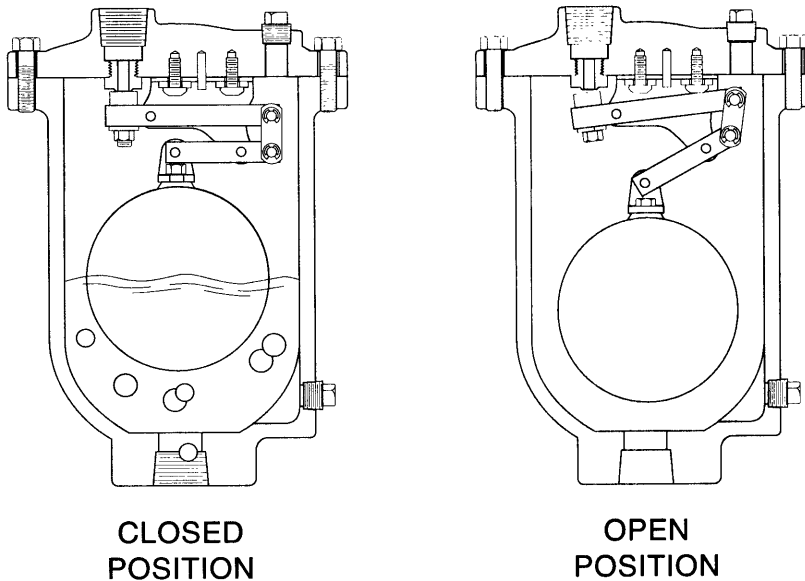
Air Valve Terminology

Air Valve terminology can be very confusing. Two terms are often used generically to cover all air valves: Air Valves and Air Release Valves. However, Air Release Valve also refers to a specific type of air valve. The following should help the specifier understand the different types of air valves and their correct application.

Why Air Valves?

Air Release Air Valves and Split Case Pumps

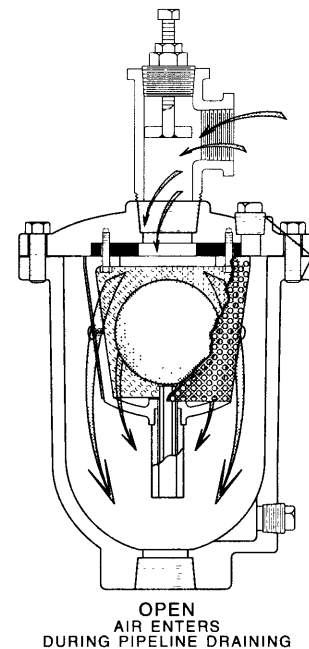
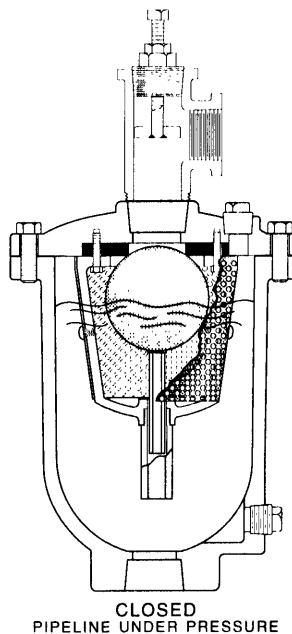
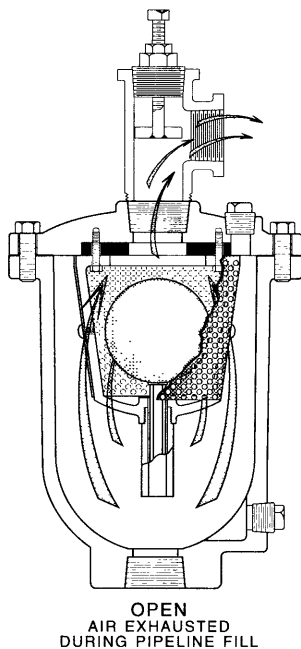
Fire protection systems utilize two types of Air Valves. The first is the Air Release Air Valve. The purpose of an Air Release Air Valve is to continuously remove air during system operation at system high points. As air enters the valve it displaces the water, allowing the float to drop. The air is then released to the atmosphere through a small orifice, typically 3/16" in diameter. As the air is vented it is replaced by water, raising the float and closing the valve orifice. As air accumulates in the valve it will continue to cycle in this manner to remove collected air. In fire protection systems, Air Release Air Valves are placed on top of split case pumps to release air from the top of the casing thereby improving efficiency and preventing pump cavitation.



Operation of an Air Release Air Valve

Well Service Air Valves and Vertical Turbine Pumps

Fire systems utilizing turbine pumps present a different concern. Prior to start-up, the pump column of a turbine pump is full of air. If this air is introduced to the system, it will accumulate at system high points promoting corrosion and creating a blockage and lowering the system flow rate. The results could be devastating. For this reason, Well Service Air Valves¹ are used on turbine pump installations. Unlike the Air Release Air Valve, the Well Service Air Valve has a large orifice (i.e. 1") and is designed to vent the pump column upon system start up. As water enters the valve, the float will rise closing the discharge port. The valve includes an adjustable throttling device on the discharge port to control the discharge of air during filling of the line. The valve will remain closed until system pressure drops to near zero psi when it opens admitting air to facilitate the draining of the line and relieving a potential vacuum condition. Unlike the Air Release Air Valve used on split case pumps, it will not open and release accumulated air during system operation.



Operation of a Well Service Air Valve

NFPA 20 Air Valve Regulatory Requirements

NFPA 20 Standard for the installation of Centrifugal Fire Pumps (1996 edition) covers the use and requirements for the above types of Air Valves. Split Case Pumps are covered in Chapter 3, paragraph 3.3 which states the following:

Pumps that are automatically controlled shall be provided with a listed float-operated air release not less than 1/2" (valve inlet) in size, to automatically release air from the pump.

Vertical shaft turbine pumps are covered in chapter 4, paragraph 3.5.2 which states the following:

A 1-1/2" (valve inlet) pipe size or larger automatic air release valve² shall be provided to vent air from the column and the discharge head upon the starting of the pump. This valve shall also admit air to the column to dissipate the vacuum upon stopping of the pump. It shall be located at the highest point in the discharge line between the fire pump and the discharge check valve.

NFPA 20 does not provide for any exceptions to the above requirements for split case and vertical turbine pump installations.

Why Val-Matic® Air Valves

There are few valve applications as critical as fire protection. Quality and dependability must be at the forefront when choosing components for a fire protection system. Peoples lives could depend on it. All Val-Matic® Air Valves are supplied standard with Stainless Steel Trim. The only exception is the resilient seat material used to assure drop tight shut-off. All Val-Matic® floats are Stainless Steel and are unconditionally guaranteed. All Val-Matic® Well Service Air Valve floats are center guided to assure drop tight shut-off. All Val-Matic® Air Release and Well Service Air Valves are Underwriters Laboratories (U.L.) Listed. In fact, Val-Matic® is the only approved valve for turbine pump applications. In addition to U.L. approval, Val-Matic® Air Release Air Valves are also Factory Mutual (F.M.) approved. Contact U.L. or F.M. for current listing information.

In addition to U.L. and F.M., Val-Matic® Air Valves fully comply with AWWA Standard C512 for Air Release and Air/Vacuum Air Valves.

¹Sometimes referred to as an Air Release (as in NFPA 20) or Air/Vacuum Air Valve.

²Air Release is a generic description for Air Valves. These are typically referred to as Air/Vacuum or Well Service Air Valves.

Air Valve Sizing Information

Air Valves may be sized using the following charts. Additional assistance may be obtained by calling Val-Matic® at 630-941-7600 between 8:00 AM and 5:00 PM, cst.

Air Release Air Valves for Split Case Fire Pumps

Air Release Air Valves for use with split case fire pumps					
Rated Capacity GPM	Rated Pressure PSIG	Inlet Size NPT, In.	Orifice Size In.	Outlet Size NPT, In.	Val-Matic® Model No.
2500	175	½	1/16	½	15A
2500	175	¾	1/16	½	15A.2
2500	175	1	1/16	½	15A.3
5000	175	½, ¾	3/32	½	22.4
5000	175	1	3/32	½	22.3
5000	300	½	1/16	½	22.7
5000	300	½, ¾, 1	1/16	½	22.9

Well Service Air Valves for use with vertical shaft turbine fire pumps.					
Rated Capacity GPM	Rated Pressure PSIG	Inlet Size NPT, In.	Orifice Size In.	Outlet Size NPT, In.	Val-Matic® Model No.
1350	300	1	1	1	101WST
4000	300	2	2	2	102WST
7000	300	3	3	3	103WST

**Also available from Val-Matic® for Fire Protection Systems:
Dual Disc and Silent Check Valves**

Well Service Air Valve Specification for Turbine Pump Applications

(See Air Release Air Valve Specification for Split Case Pump Applications)

FIRE PROTECTION WELL SERVICE AIR VALVE

Val-Matic® Valve Specification

1 Scope

1.1 This specification is intended to cover the design, manufacture, and testing of 1 in. through 3 in. Well Service Air Valves suitable for clean or raw water service in fire protection applications with pressures up to 300 psig.

1.2 Well Service Air Valves shall be fully automatic float operated valves designed to exhaust air which is present in the vertical pump column on pump startup and allow air to re-enter the column on pump shutdown or should a negative pressure occur. A top mounted Throttling Device shall provide adjustable control of the exhaust rate.

2 Connections

2.1 Valve sizes 3 in. (76 mm) and smaller shall have full size NPT inlets and outlets equal to the nominal valve size.

2.2 The body inlet connection shall be hexagonal for a wrench connection.

3 Design

3.1 The valve body shall provide a through flow area equal to the nominal valve size. A bolted cover with alloy screws and flat gasket shall be provided to allow for maintenance and repair.

3.2 Floats shall be unconditionally guaranteed against failure including pressure surges. The float shall have a hexagonal guide shaft supported in the body by circular bushings to prevent binding from debris. The float shall be protected against direct water impact by an internal baffle and stainless steel diffuser screen to break up the solid water column before coming in contact with the float.

3.3 The resilient seat shall provide drop tight shut off to the full valve pressure rating. The seat shall be a minimum of 1/2 in. (12 mm) thick on 2 in. (50 mm) and larger valves and secured in such a manner as to prevent distortion. The seat shall be precision molded with an o-ring type sealing surface and a slot in the seat opening to provide a positive seal at low pressures.

3.4 Valves shall be equipped with a throttling device to control the discharge of air from the valve. The device shall have an externally adjustable screw and locknut for adjusting the discharge control disc.

4 Materials

4.1 The Well Service Air Valve body, cover, and baffle shall be constructed of ASTM A126 Class B cast iron.

4.2 The float, guide shafts, and bushings shall be constructed of Type 304 Stainless Steel. Non-metallic guides and bushings are not acceptable.

4.3 The seat shall be Buna-N capable of providing drop tight shut off at the valve full pressure rating.

5 Manufacture

5.1 The manufacturer shall demonstrate a minimum of five (5) years experience in the manufacture of air valves. The valves shall be Factory Mutual Approved. The valves shall be manufactured and tested in accordance with American Water Works Association Standard (AWWA) C512.

5.2 The exterior of the valve shall be coated with a universal alkyd primer.

5.3 Well Service Air Valves shall be Series #101WST as manufactured by Val-Matic® Valve & Mfg. Corporation, Elmhurst, IL. USA. or approved equal.

Air Release Air Valve Specification for Split Case Pump Applications (See Well Service Air Valve Specification for Turbine Pump Applications)

FIRE PROTECTION AIR RELEASE AIR VALVE **Val-Matic® Valve Specification**

1 Scope

1.1 This specification is intended to cover the design, manufacture, and testing of 1/2 in. (13 mm) through 1 in. Air Release Air Valves suitable for clean or raw water service in fire protection applications with pressures up to 300 psig.

1.2 Air Release Valves shall be automatic float operated valves designed to release accumulated air from a split case centrifugal fire pump or piping system while the system is in operation and under pressure. The capacity and pressure rating of the valve is dependent on the diameter of the precision orifice in the cover. A large inlet connection is required for proper air and water exchange. *[NOTE: See Well Service Air Valves for exhausting and admitting large volumes of air.]*

2 Connections

2.1 The valve body shall be threaded with NPT inlets and outlets. The body inlet connection shall be hexagonal for a wrench connection.

2.2 The valve shall have two additional NPT connections for the addition of gauges, testing, and draining.

3 Design

3.1 The cover shall be bolted to the valve body and sealed with a flat gasket. Resilient seats shall be replaceable and provide drop tight shut off to the full valve pressure rating.

3.2 Floats shall be unconditionally guaranteed against failure including pressure surges. Mechanical linkage shall provide sufficient mechanical advantage so that the valve will open under full operating pressure. Simple Lever Designs shall consist of a single pivot arm and a resilient orifice button.

4 Materials

4.1 The valve body and cover shall be constructed of ASTM A126 Class B cast iron for working pressures up to 300 psig.

4.2 The orifice, float and linkage mechanism shall be constructed of Type 304 stainless steel. Non-metallic floats or linkage mechanisms are not acceptable.

4.3 The orifice button shall be Viton capable of providing drop tight shutoff at the full pressure rating of the valve.

5 Manufacture

5.1 The manufacturer shall demonstrate a minimum of five (5) years experience in the manufacture of air valves. The valves shall be Factory Mutual Approved and Underwriters Laboratories Listed. The valves shall be manufactured and tested in accordance with American Water Works Association Standard (AWWA) C512.

5.2 The exterior of the valve shall be coated with a universal alkyd primer.

5.3 Air Release Valves shall be Series 15A and 22 as manufactured by Val-Matic® Valve & Mfg. Corporation, Elmhurst, IL. USA. or approved equal.