

COMBINATION AIR VALVE WITH OPTIONAL COMPONENTS

Scope

- 1.1 This specification is intended to cover the design, manufacture, and testing of 1 in. (25.4 mm) through 20 in. (500 mm) Combination Air Valves suitable for pressures up to 740 psig (5100 kPa) clean water or raw water service.
- 1.2 Combination Air Valves shall be automatic float operated valves designed to exhaust large quantities of air during the filling of a piping system and close upon liquid entry. The valve shall open during draining or if a negative pressure occurs. The valve shall also release accumulated air from a piping system while the system is in operation and under pressure. The valve shall perform the functions of both Air Release and Air/Vacuum Valves and furnished as a Single Body or Dual Body Type as indicated on the plans.

Connections

- 2.1 Dual Body Valve sizes 3 in. (75 mm) and smaller and Single Body Valve sizes 4 in. (100 mm) and smaller shall have full size NPT inlets and outlets equal to the nominal valve size. The body inlet connection shall be hexagonal for a wrench connection.
- 2.2 Larger sizes shall have bolted flanged inlets and plain outlets and protective hoods to prevent debris from entering the valve. Flanges shall be in accordance with ANSI B16.1 for Class 125 or Class 250 iron flanges and ANSI B16.5 for Class 300 steel flanges.
- 2.3 The valve shall have two additional NPT connections for the connection to gauges, testing, and draining.

Design

- 3.1 Both Single and Dual Body Valves shall provide a through flow area equal to the nominal size. Floats shall be unconditionally guaranteed against failure including pressure surges. The cover shall be bolted to the body and sealed with a flat gasket. A resilient bumper shall be provided on 4 in. (100 mm) and larger sizes to cushion the float during sudden opening conditions. The resilient seat shall be replaceable and provide drop tight shut off to the full valve pressure rating.
- 3.2 Dual Body Combination Valves shall consist of an Air Release Valve piped to an Air/Vacuum Valve with a quarter-turn, full-ported bronze ball valve.
- 3.2.1 The Air Release Valve shall have a leverage mechanism with 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. Compound Lever Designs shall consist of two levers and an adjustable threaded resilient orifice button.
- 3.2.2 The Air/Vacuum Valve sizes 4 in. (100 mm) and larger shall have a cover fitted to the valve body by means of a machined register to maintain concentricity between the top and bottom guide bushings at all times. The float shall be double guided with a guide shaft extending through the float to prevent any contact with the body. The float shall be protected against direct water impact by an internal baffle bolted to the cover or integrally cast in the body. The seat shall be a minimum of .5 in. (12 mm) thick on 2 in. (50 mm) and larger valves and secured in such a manner as to prevent distortion. Valves with working pressures above 400 psig (2760 kPa) shall have metal seat with synthetic seals.
- 3.3 Single Body Combination Valves shall have an expanded outlet to provide full flow area around the guide mechanism. The valve shall have a double guided plug on 2 in. (50 mm) and larger sizes, and an adjustable threaded orifice button. The plug shall be protected against direct water impact by an internal baffle. On valve sizes 4 in. (100mm) and smaller, the plug shall have a precision orifice drilled through the center stem. On valve sizes 6 in. (150 mm) and larger, air release and air/vacuum mechanisms shall be provided as separate units contained within the same body and meet the same design specifications for the Dual Body Combination Valve in section 3.2 above.

Materials

- 4.1 The valve body and cover shall be constructed of ASTM A126 Class B cast iron for Class 125 and Class 250 valves. Class 300 ductile iron valves shall be constructed of ASTM A536 Grade 65-45-12 ductile iron. Dual Body Class 300 steel valves shall be constructed of ASTM A216 Grade WCB cast steel.
- 4.2 The float, guide shafts, and bushings shall be constructed of Type 316 stainless steel. Non-metallic floats, linkage, or bushings are not acceptable. Resilient seats shall be Buna-N. Class 300 steel Dual Body Valves shall have a 316 stainless steel seat with Buna-N seal to provide an initial contact to Buna-N with a final metal-to-metal contact to prevent over compression of the resilient seal.

Options

- 5.1 An optional Anti-Slam Device shall be provided when specified to prevent valve pressure surges due to column separation or rapid changes in velocity and pressure.
- 5.1.1 The Anti-Slam Device shall be mounted on the inlet of the Combination Air Valve, allow free air flow in and out of the valve, close upon water entry, and control the inlet water velocity to reduce valve pressure surges. The disc shall have threaded holes to provide adjustment of the water flow rate through the valve. The spring shall exert sufficient force to hold the disc open during high air flow conditions and allow the disc to close upon water entry.
- 5.1.3 The material of the body shall be consistent with the Combination Air Valve. The spring shall be ASTM A313 Type 316 Stainless Steel. The seat and disc shall be ASTM A351 Grade CF8M stainless steel.
- 5.2 An optional Regulated Exhaust Device shall be provided when specified to reduce pressure surges due to column separation or rapid changes in velocity and pressure in the pipeline.

Revised 10-17-05

COMBINATION AIR VALVE WITH OPTIONAL COMPONENTS

DATE 1-17-80

VAL-MATIC[®] VALVE AND MANUFACTURING CORP.

DRWG. NO.

SS-177
Sheet 1 of 2

- 5.1.2 The device shall be a flanged, globe pattern, spring operated unit with a center guided disc and seat assembly. The
- 5.2.1 The Regulated Exhaust Device shall be mounted on the inlet of the Combination Air Valve, allow free air flow in and out of the valve, close upon rapid air exhaust, and control the air exhaust rate to reduce pressure surges.
- 5.2.2 The device shall have a flanged globe-style body with a center guided disc and seat assembly. The disc shall have threaded holes to provide adjustment of the air exhaust rate through the valve. The holes shall provide for a flow area of 5% of the nominal valve size.
- 5.2.3 The material of the body shall be consistent with the Combination Air Valve. The seat and disc shall be ASTM A351 Grade CF8M stainless steel.
- 5.3 A flanged or screwed outlet connection shall be provided when specified for vault piping.
- 5.4 A stainless steel screened outlet shall be provided when specified for outdoor installations.
- 5.5 Optional body materials include ASTM A536 Grade 65-45-12 ductile iron, ASTM A351 Grade CF8M stainless steel, and ASTM B584 Alloy C83600 cast bronze.
- 5.6 Optional threaded hoods with screens shall be provided on the outlet when specified.
- 5.7 An optional isolation valve shall be furnished under the combination air valve when specified. For sizes with threaded inlets, the isolation valve shall be a fully-ported brass ball valve. For sizes with flanged inlets, the isolation valve shall be an AWWA Class 150B or 250B Butterfly Valve with quarter-turn gear actuator and handwheel.

Manufacture

- 6.1 The manufacturer shall demonstrate a minimum of five (5) years experience in the manufacture of air valves. When requested, the manufacturer shall provide test certificates, dimensional drawings, parts list drawings, and operation and maintenance manuals.
- 6.2 The exterior of the valve shall be coated with a universal alkyd primer.

Cross Contamination and Security Protection

- 7.1 All Air (Release, Vacuum, etc) Valves installed in vaults or flood prone locations shall include an inflow preventer to prevent the introduction of contaminated water through the air valve outlet. The inflow preventer shall allow the admittance and exhausting of air while preventing contaminated water from entering during normal operating conditions. The inflow preventer shall be flow tested by an independent third party to certify performance. The third party shall be an approved testing lab of the American Society of Sanitary Engineers.

Certification

- 8.1 Valves shall be manufactured and tested in accordance with American Water Works Association (AWWA) Standard C512.
- 8.2 Valves for use in fire protection systems (series 15A and 22) shall be listed by Underwriters Laboratories and approved by Factory Mutual.
- 8.3 Air Release Valves shall be Series 15A to 50 as manufactured by Val-Matic and Manufacturing Corporation, Elmhurst, IL, USA or approved equal.

Revised 10-17-05

COMBINATION AIR VALVE WITH OPTIONAL COMPONENTS

DATE 1-17-80

VAL-MATIC[®] VALVE AND MANUFACTURING CORP.

DRWG. NO.
SS-177
Sheet 2 of 2