

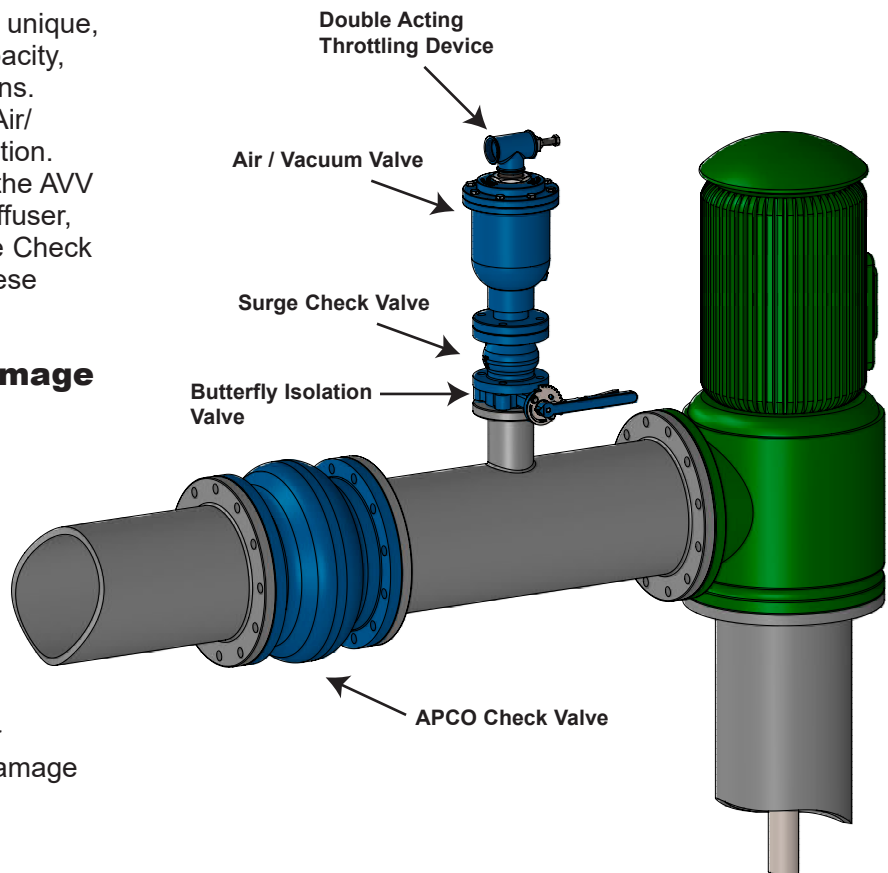
APCO VALVES FOR VERTICAL TURBINE PUMPS

Field Tested, Proven Solution

Each vertical turbine pump installation is unique, having its own characteristics, pump capacity, efficiency, well depths and head conditions. Because of these variables, a standard Air/Vacuum Valve alone is not the ideal solution. For Vertical Turbine Pump Installations, the AVV Air/Vacuum Valve with optional Water Diffuser, Double Acting Throttling Device or Surge Check Valve can be used to compensate for these variables.

Air Valves Prevent Costly Damage

For smooth operation, air must be vented from the pump discharge column to atmosphere and not forced into the water system. Without air venting, entrapped air in the water system will restrict water flow, resulting in consumer complaints about air in the water, and can also cause pressure surges and water hammer with each pump startup and shutdown. Surges and water hammer are the main cause for costly damage to piping and water system components.



For Vertical Turbine Pump applications, the APCO AVV Air/Vacuum Valve can be equipped with optional Water Diffuser, Double Acting Throttling Device and/or Surge Check Valve. An APCO Check Valve to prevent back flow and a DeZURIK butterfly valve for isolating the Air/Vacuum Valve can also be specified. Contact your local DeZURIK representative for specific valve style and size recommendations.

Double-Acting Throttling Device (DAT)

Air/Vacuum Valves efficiently discharge air from deep well pump columns when combined with an APCO Double-Acting Throttling Device (DAT). The DAT has an exclusive Throttling Air-Out/Full Flow Air-In design. Regardless of the amount of air throttling out, there is assured full line capacity air inflow on pump stop to prevent vacuum and water column separation. Available on valves sizes 0.5-8" (15-200mm), the DAT is fitted on the discharge orifice of the Air/Vacuum Valve. Because the pipeline media does not contact the Double Acting Throttling Device, it can be used on pipelines containing dirty fluids.

Throttling devices have been used on vertical turbine pumps for decades. Old style, one-way throttling devices are only able to regulate flow to restrict air out. Restricting air out helps minimize shock with each pump start, preventing damage to the pump, valves and piping. This establishes back pressure on the rising column of water, thereby reducing shock, pressure surge and water hammer when the water column hits the closed pump discharge check valve.

However, on pump stop, the pump discharge check valve closes and the vertical turbine air valve opens to allow air to re-enter the pump column to prevent vacuum and/or water column separation. Because an old-style, one-way throttling device restricted air re-entry at the same rate as air out, vacuum and water column separation can occur, damaging pump seals, packing, and gasketed joints. Additionally, the pump may be called to start while the column is still full, putting a severe strain on the pump shaft, motors and electrical controls.

Operation of Double Acting Throttling Device

The PTFE tapered plug of the throttling device is pushed ahead into the throttle position by a very lightweight, stainless steel spring. The plug stays in this position due to the force of air being discharged from the pump suction on pump start. On pump stop, the tapered plug moves from its throttle air-out position to the full-air-in position due to negative pressure inside and atmospheric forces of air rushing into the valve.

The desired tapered plug position for throttling air out is regulated by turning the stainless steel adjusting screw. When satisfactory throttling of air is achieved, the adjusting screw is locked in place with the stainless steel lock nut.

Water Diffusers (WD)

APCO Water Diffusers perform much like water faucet strainers, breaking down the solid water column force into a smooth, non-destructive flow. Water Diffusers (WD) are available in 0.5-3" (15-80mm) sizes.



AVV Air/Vacuum Valve with Double Acting Throttling Device (DAT)



AVV Air/Vacuum Valve with Double Acting Throttling Device (DAT) and Water Diffuser (WD)

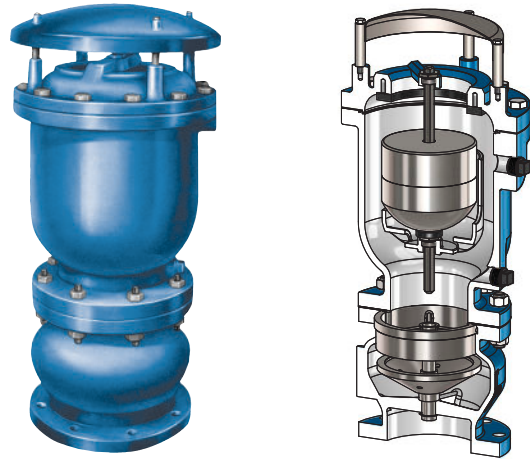
Slow-Closing Surge Check Valves (CSV)

Surge Check Valves absorb solid water column shock and break it down to smooth non-shock flow into the air valve. In this manner, the water diffuser and surge check facilitate positive water closure of the Air/Vacuum Valve without water hammer, shock or damage to the pump, valves or other system components. Surge Check Valves (CSV) are available in sizes 1-18" (25-450mm).

Slow Closing Air/Vacuum Valve Selection

The following steps for selection will satisfy normal installations. The selection table will satisfy typical deep well turbine pump installations which use a Silent Check Valve or conventional Swing Check Valve (as shown in diagram on page 4). For high service vertical turbine pump installations which utilize positive shut-off type discharge control valves, contact your local DeZURIK/APCO representative for a specific size recommendation.

If the air valve is to be installed inside the pump house, use threaded or flanged discharge connections and pipe back to the well or outside. This will greatly muffle the high noise level caused by air being discharged and provide for drainage of any small amount of water or water vapor that may exist.



AVV Air/Vacuum Valve with Surge Check Valve (CSV)

How To Select AVV Air/Vacuum Valves

1. Check pump curve for GPM (LPM) capacity at no head condition.
2. Refer to chart below to determine AVV Valve size.
3. If valve is to be installed inside pump house, specify discharge connection.
4. If the pump is scheduled to run for prolonged periods (6-8 hours) without stopping, Air Release Valve should be added.

2 psi with no Slow Close Device

Pump Capacity No Head GPM/LPM	Size	Optional Air Release Valve Body Style
up to 250 up to 946	.5" 15mm	50A
251-700 950-2650	1" 25mm	50A
701-1450 2654-5489	2" 50mm	50A
1451-3500 5493-13249	3" 80mm	50A
3501-7500 13253-28390	4" 100mm	200A
7501-18500 28394-70030	6" 150mm	200A
18501-40000 70034-151416	8" 200mm	200A
40001-56000 151420-211983	10" 250mm	200

Inch
Millimeter

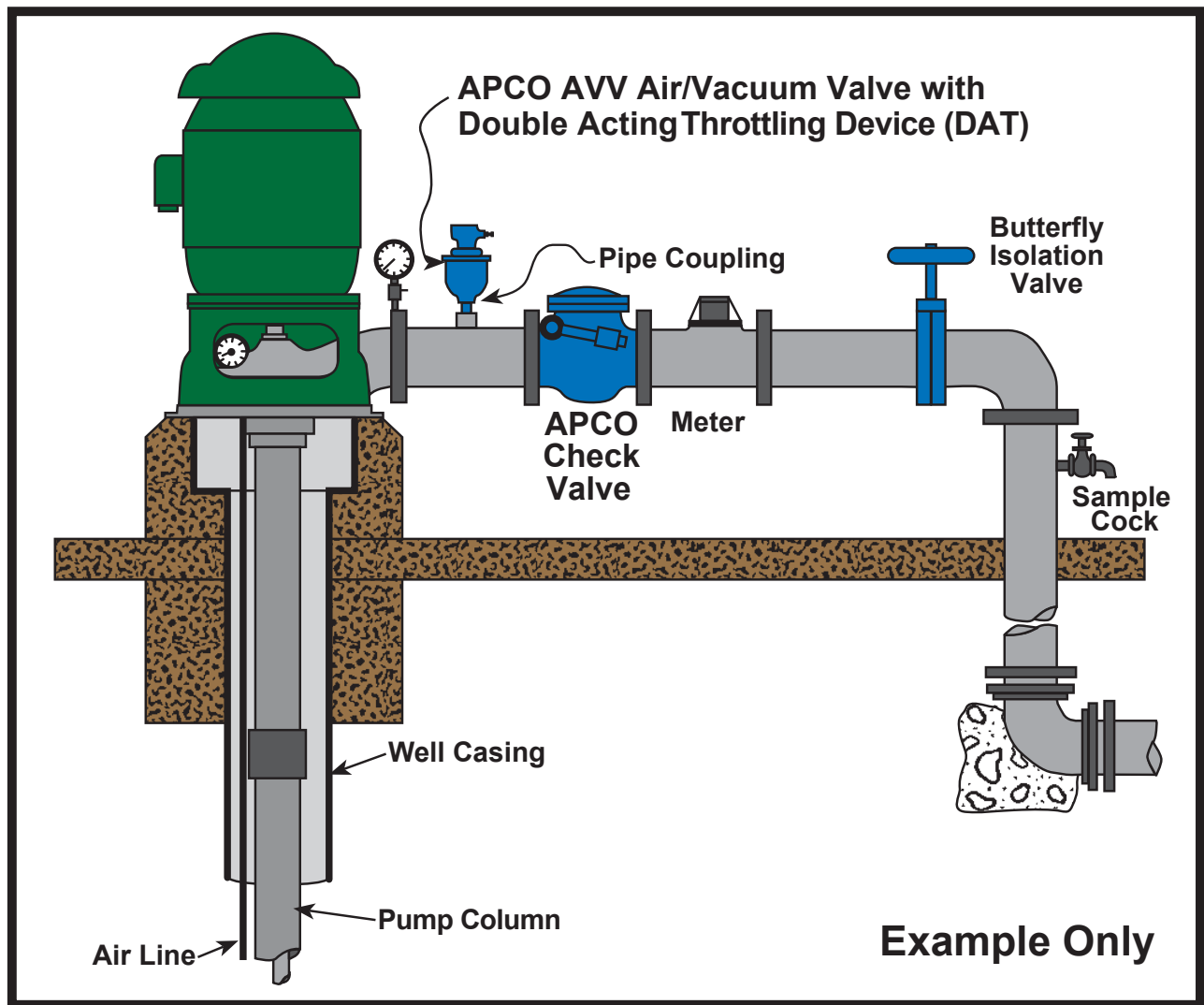
5 psi with Slow Close Device

Pump Capacity No Head GPM/LPM	Size	Optional Air Release Valve Body Style
Below 6300 Below 23848	See 2 psi chart	
6301 - 13500 23852 - 51103	4" 100mm	200A
13501 - 32000 51107 - 121133	6" 150mm	200A
32001 - 60000 121137 - 227125	8" 200mm	200A
60001 - 90000 227128 - 340687	10" 250mm	200
90001 - 140000 340691 - 529958	12" 300mm	200
140001 - 180000 529961 - 681374	14" 350mm	200
180001 - 250000 681378 - 946353	16" 400mm	200

Inch
Millimeter

Vertical Turbine Pump Installation

Vertical Turbine Air Vacuum Valves are installed on the pump discharge as close to the check valve as possible.



Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:

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