Installation & Maintenance of Forcemain

Air Relief Valves

Why do we need AIR VALVES?

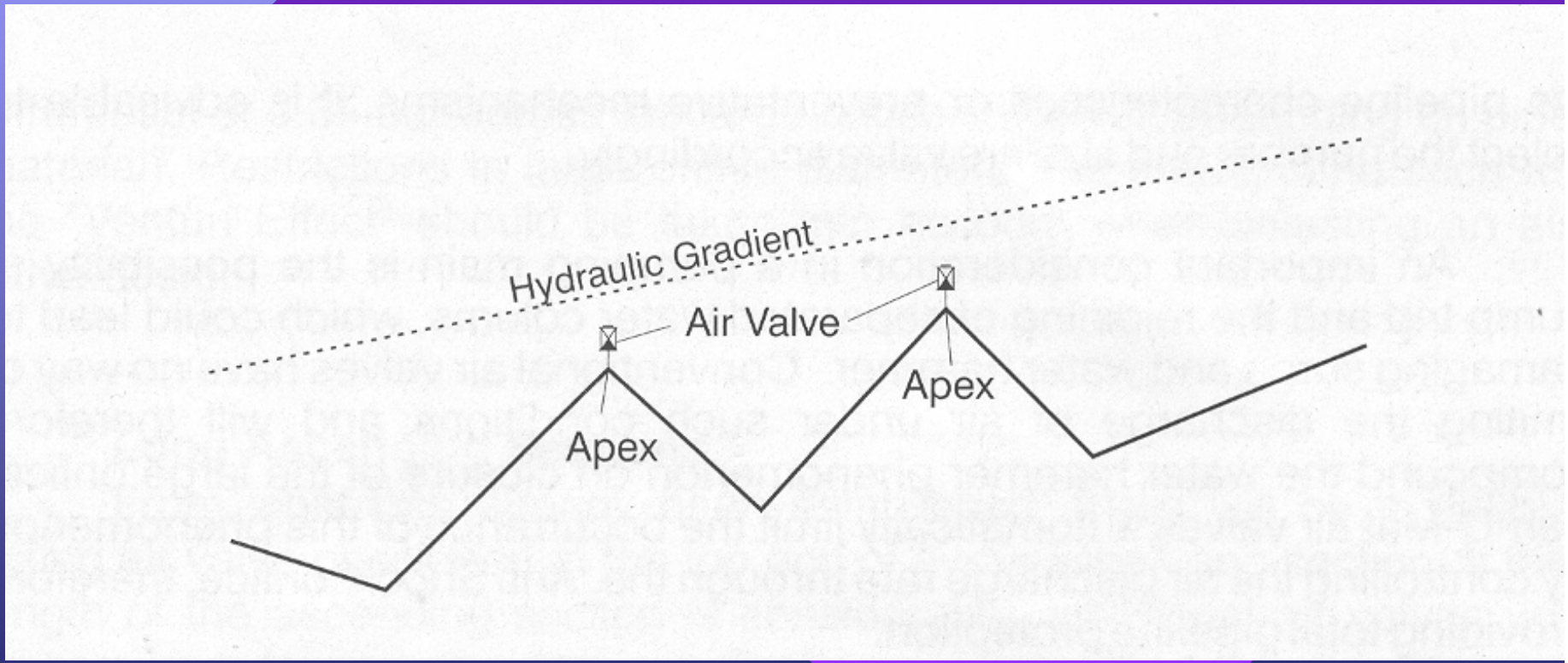
- Delay in pipeline filling
- Reduction in discharge capacities
- Risk of surge and water hammer
- Possible pipeline collapse
- Increased pump/running costs
- Pipeline corrosion

Where Do We Need Air Valves?

- Air Valves should by sized for
- vacuum conditions. which result from pipeline rupture or instantaneous pump stoppage
- and from column separation.

- ***Air Valves should be installed at the high points of the line***

High Points



Standard Practices

- Air Valves should by sized for vacuum conditions which may result from pipeline rupture or instantaneous pump stoppage causing column separation.
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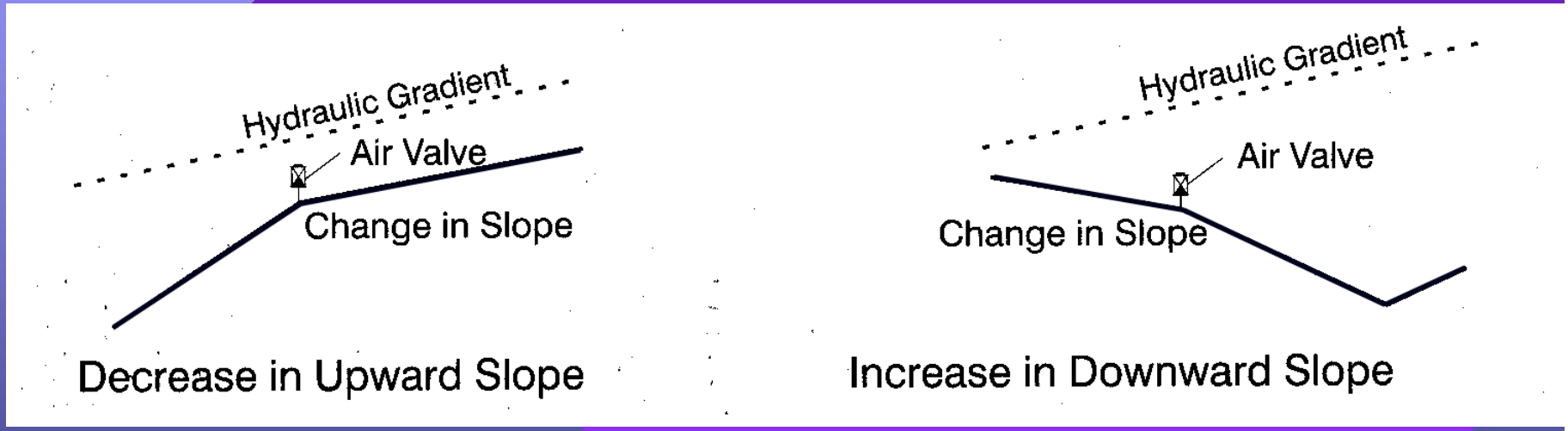
Air Valves should be installed where there are negative breaks. ***(Decrease in upward slope or increase in downward slope)***

Negative Breaks



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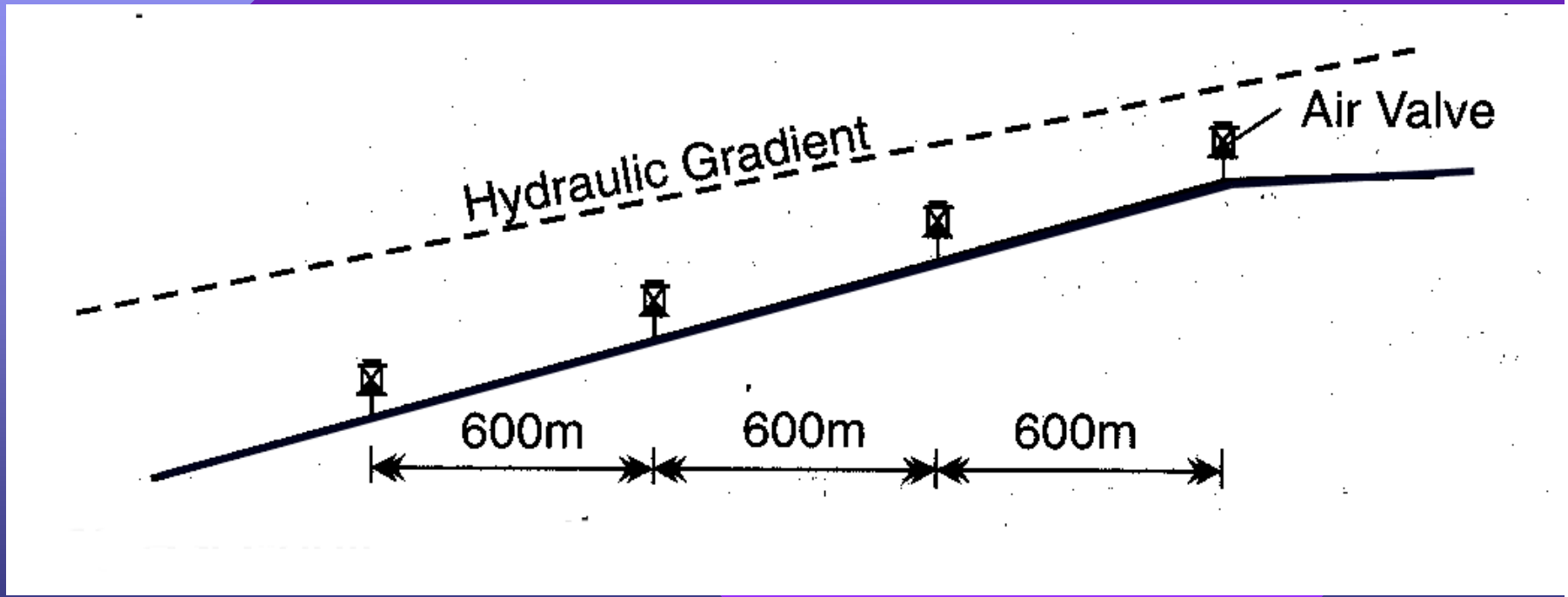
Air Valves should be installed on long ascending lines at about every 600m or 650 yards.

Ascending Lines



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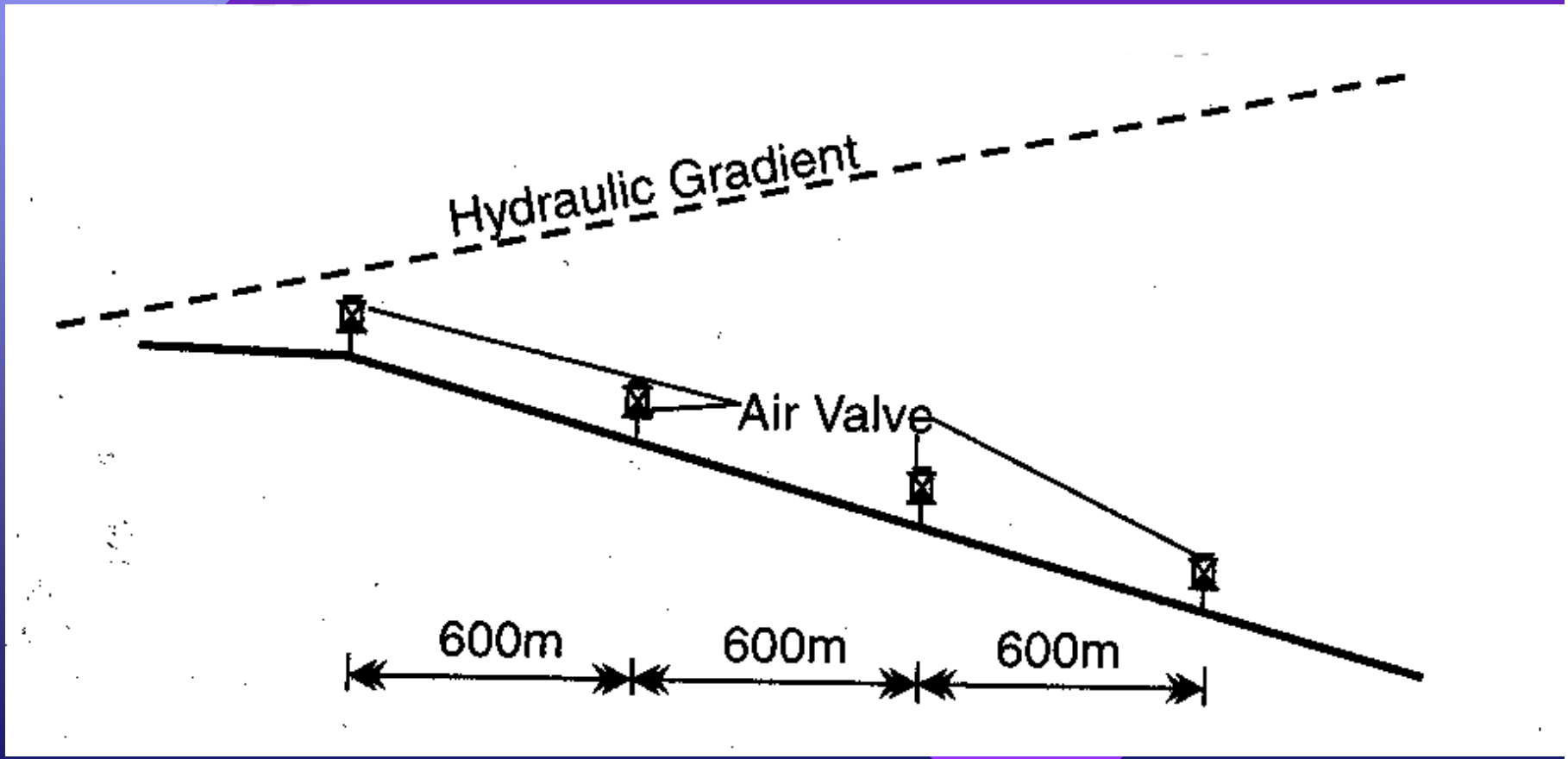
Descending Lines



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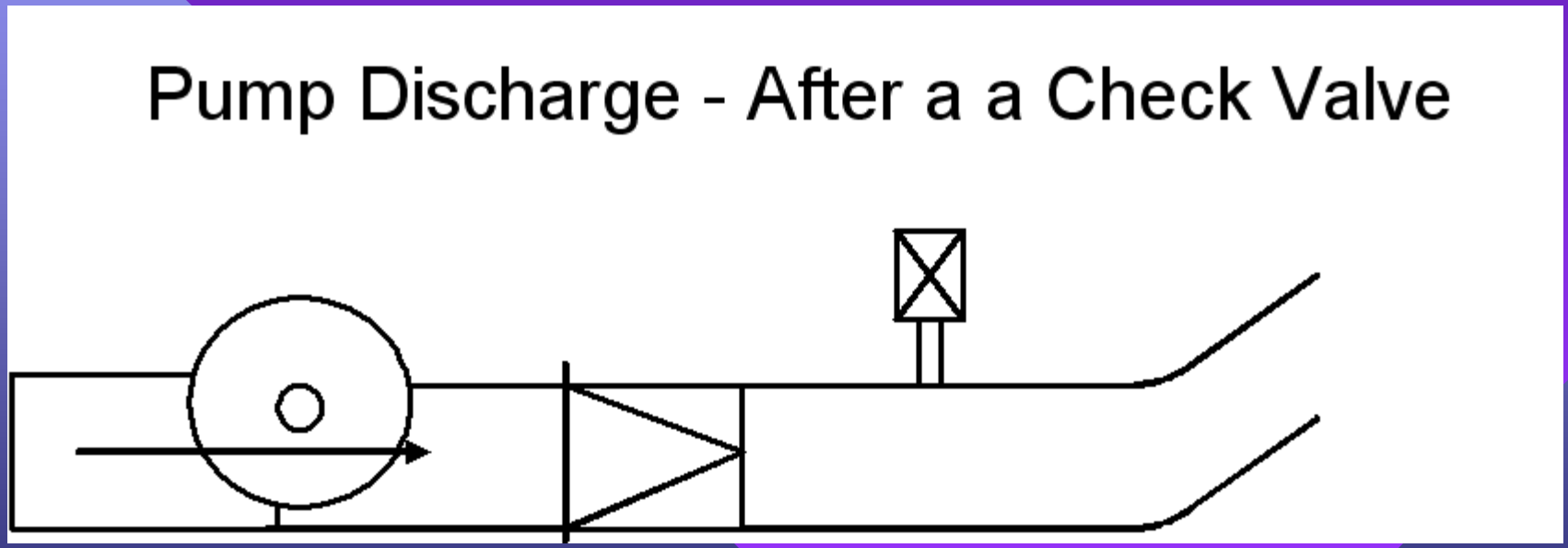
- ***At pump discharge - after a check valve.***

Pump Discharge



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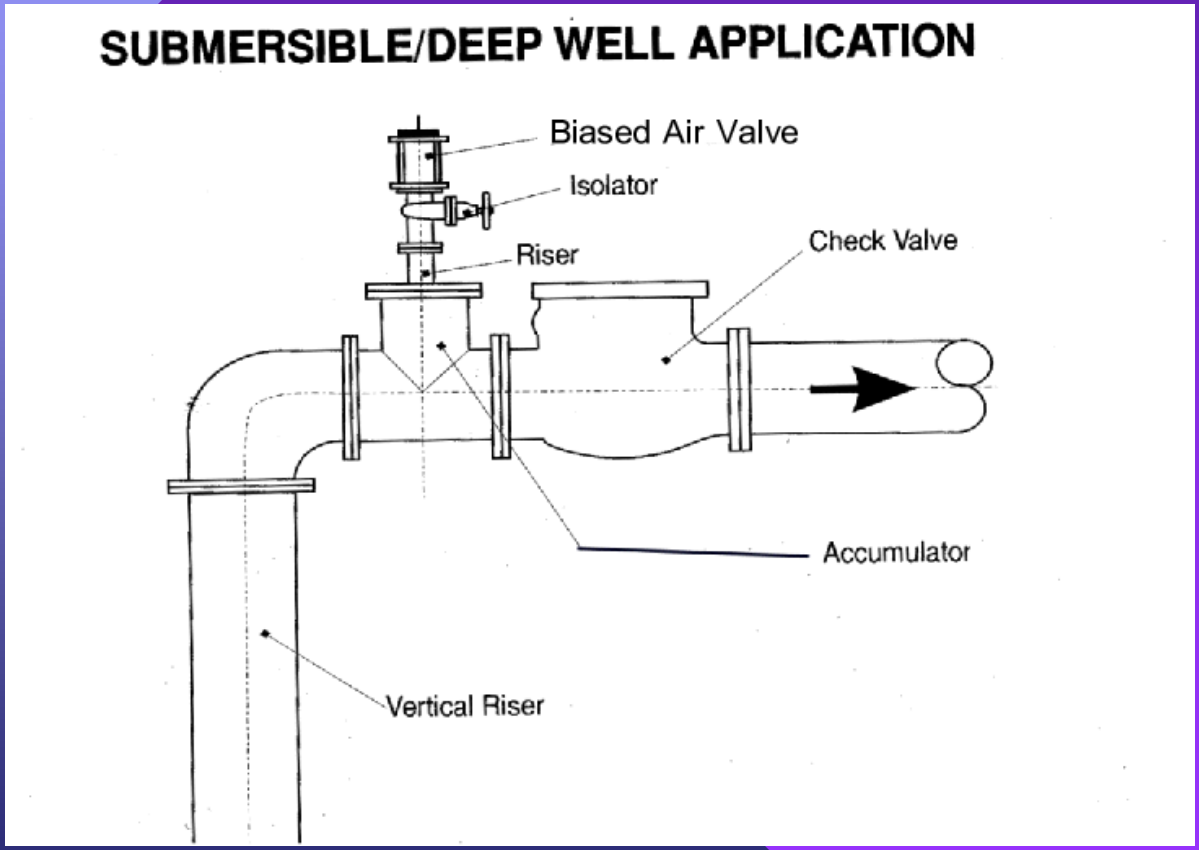
- ***Prior to a check valve on deep well pumps***

Deep Well Pumps



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- At pump discharge - after a check valve.
- Prior to a check valve on deep well pumps
- ***At blank or dead ends***

Where Does The Air Come From?

- In Line at Start-Up -
- Out of solution
- Enters through equipment, pumps, fittings

Types of Air Valves

- **Conventional Design**
- Air Release
- Air/Vacuum
- Combination
  - Apco/ARI/ValMatic/Golden A./Crispin
- **Unconventional Design**
- Four Function Vent-Tech
- Discussed Later

Air Release Valve

- Releases air under pressure
- Typically 3 inch or smaller
- Limited ability to admit/exhaust air

Air/Vacuum Valve

- Exhausts and admits large volumes of air during pump start up, pipeline filling and pipeline draining.
- Will act as vacuum valve but will not allow air to escape while pipeline is under pressure.
- Anti Slam device offered as add on

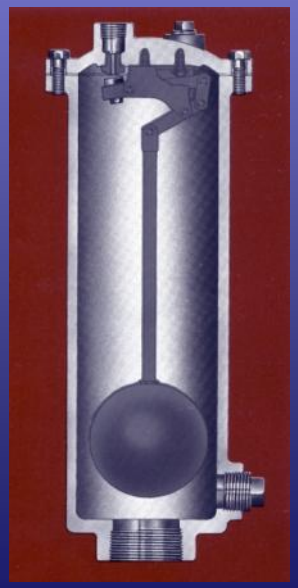
Combination Air/Vacuum Valve

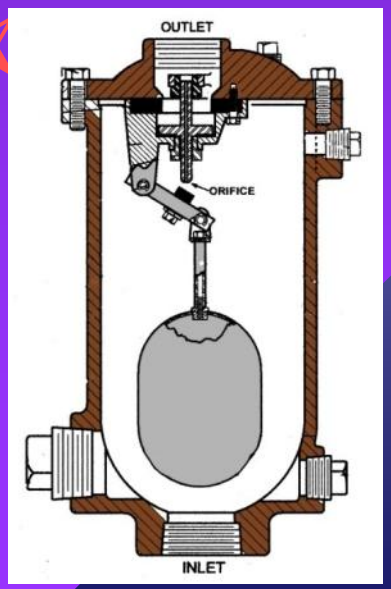
- Offers the functions of both the air release and the air/vacuum valve
- Either in a single or dual body design they allow large amounts or air to escape and enter and also allow air to escape while line is under pressure.

Basic Designs

Water

- Air Release
-
- Combination

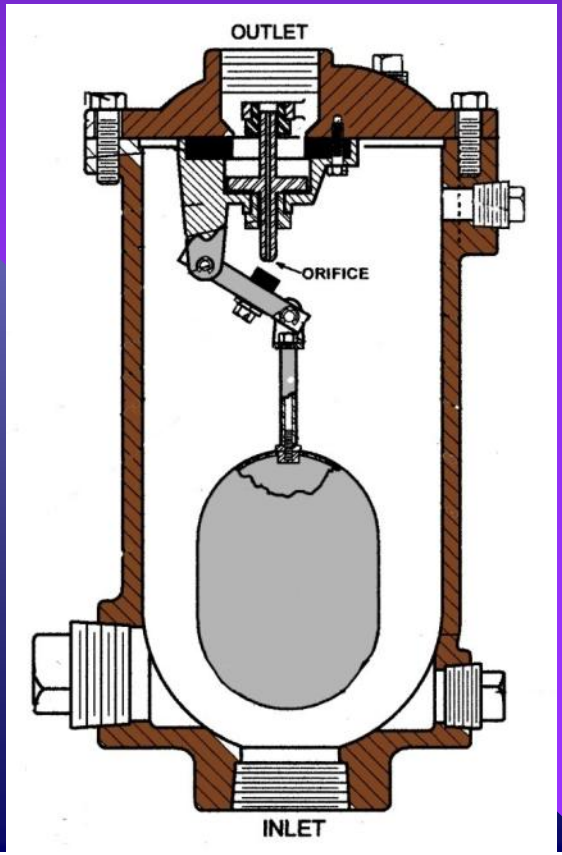


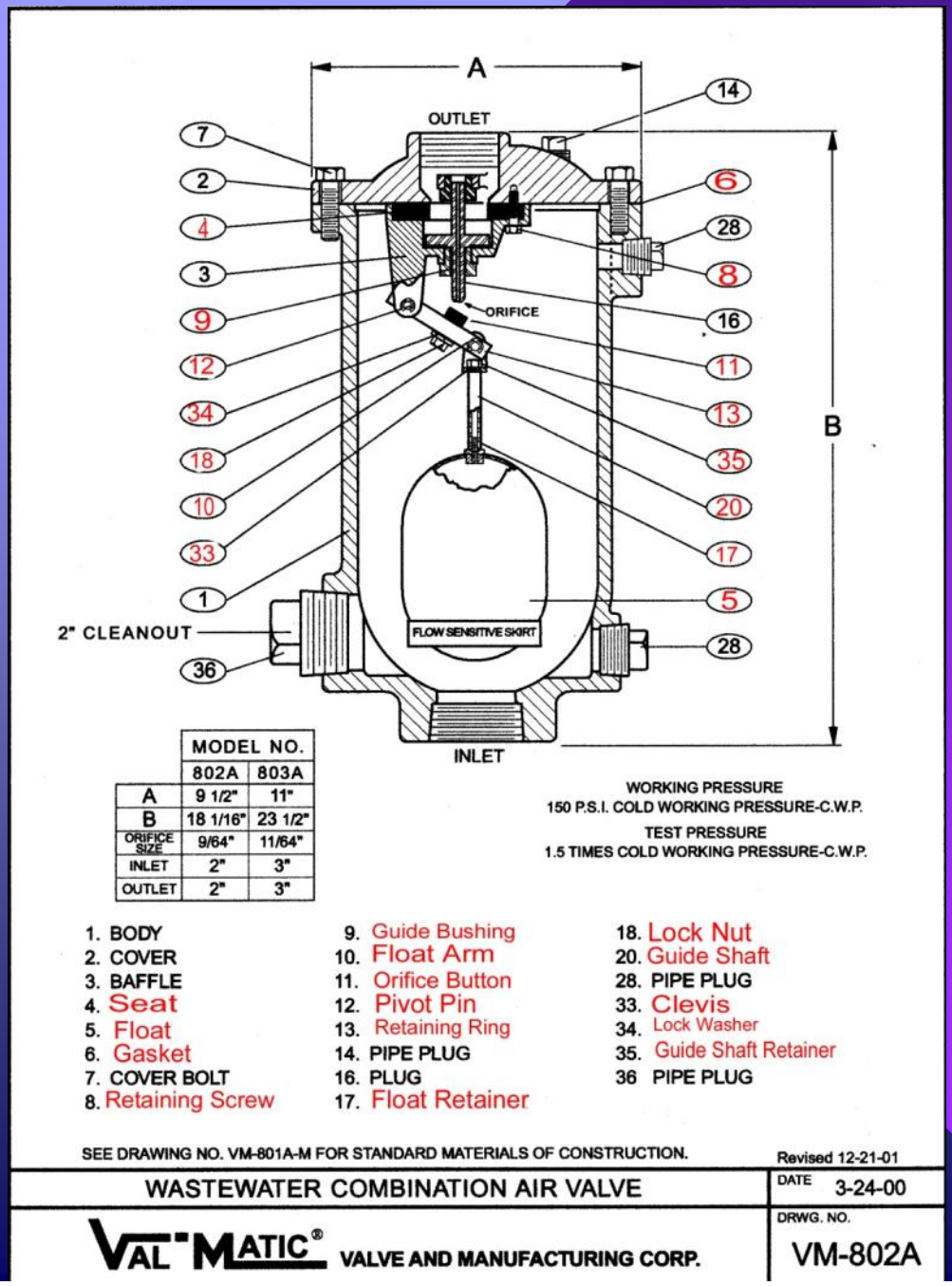


Sewage

How does the Combination ARV work?

- When air enters the valve, it is released through the large top outlet of the valve.
- When fluid enters the valve, the fluid lifts the float and it seals the orifice button against the stainless steel plug and presses the plug against a resilient seal. The plug contains a through-hole, which vents air when the force main is under pressure.
- When a vacuum condition occurs in the pipeline, the float and plug drop and air enters through the top of the valve.
- Additional ports are provided for backwash and cleaning the valve.





	MODEL NO.	
	802A	803A
A	9 1/2"	11"
B	18 1/16"	23 1/2"
ORIFICE SIZE	9/64"	11/64"
INLET	2"	3"
OUTLET	2"	3"

WORKING PRESSURE
150 P.S.I. COLD WORKING PRESSURE-C.W.P.
TEST PRESSURE
1.5 TIMES COLD WORKING PRESSURE-C.W.P.

1. BODY
2. COVER
3. BAFFLE
4. Seat
5. Float
6. Gasket
7. COVER BOLT
8. Retaining Screw
9. Guide Bushing
10. Float Arm
11. Orifice Button
12. Pivot Pin
13. Retaining Ring
14. PIPE PLUG
16. PLUG
17. Float Retainer
18. Lock Nut
20. Guide Shaft
28. PIPE PLUG
33. Clevis
34. Lock Washer
35. Guide Shaft Retainer
36 PIPE PLUG

SEE DRAWING NO. VM-801A-M FOR STANDARD MATERIALS OF CONSTRUCTION.

Revised 12-21-01

WASTEWATER COMBINATION AIR VALVE

DATE 3-24-00

VAL-MATIC® VALVE AND MANUFACTURING CORP.

DRWG. NO. VM-802A

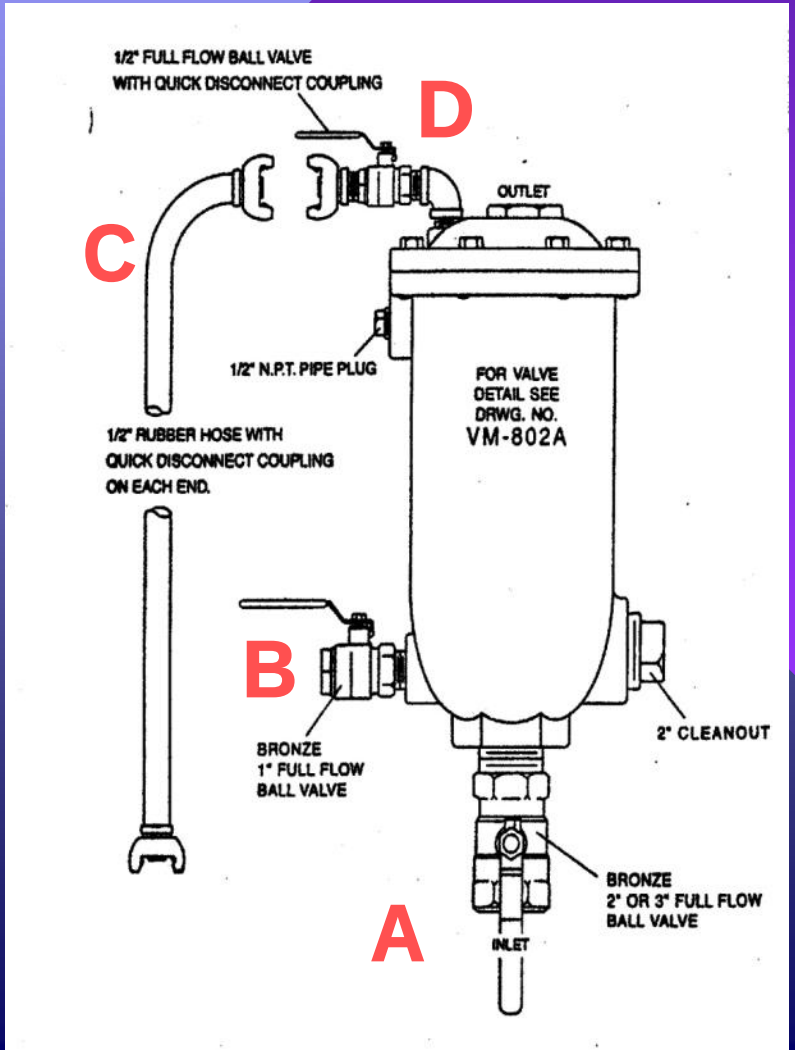
Repair Parts List

- 4 Seat
- 5 Float
- 6 Gasket
- 8 Retaining Screw
- 9 Guide Bushing
- 10 Float Arm
- 11 Orifice Button
- 12 Pivot Pin
- 13 Retaining Ring
- 17 Float Retainer
- 18 Lock Nut
- 20 Guide Shaft
- 33 Clevis
- 34 Lock Washer
- 35 Guide Shaft Retainer

Maintenance [Per Manufacturer]

- Wastewater valves should be scheduled for regular inspection and backwash on a ***monthly*** basis. Val-Matic suggests a more frequent backwash may be desirable to ***minimize*** leakage.
- Periodic inspection should be done to verify operation and check for leaks. If the valve is leaking it is not seating and should be backwashed.

Backwash Piping & Procedure



- To properly backwash the valve a 1” clean water supply of at least 30 psi is needed. This supply should be connected to the top of the valve with a rubber hose and quick disconnect couplings.
- Pipe valve **B** to drain prior to backwashing
- Close inlet valve **A**
- Open valve **B**
- Connect water supply to **C**, open valve **D** and supply water for 3 minutes. Close valve **D** and **B** and slowly open valve **A**.

Air valves have been in use since the early 1900's.

Their **basic design has not changed**. Some refinements have been made in the **materials of construction.** Conventional Air Valves have served the industry well, but compared to other industries, they have not kept up with technological advances.

The single most inherent shortcoming of the conventional air release valve is the **maintenance requirement**, materials of construction and the cost associated with the required maintenance.

In reality, air valves have become the joke of the industry. Their purpose is misunderstood. **Their maintenance requirements are unrealistic.** They are often **installed and forgotten**. Or... they are only maintained after an catastrophic break or pipeline **malfunction.**

- Air valve failure is not entirely the maintenance departments' fault.

- Manufacturers have not invested enough time, money and research into designing user friendly equipment.

- In the real world, the manufacturers' maintenance schedule is not followed.

- This is a shortcoming of the valve and the manufacturer….not the maintenance department. Too often the only time an air valve is visited or inspected is when there is visible trouble.

- **It is reasoned that the continuing expense of maintaining the valves is far greater than the occasional need to replace one.**


FORT
Extrudé Polystyrène Insulfoam
Polystyrène extrudé

Faulty or non working air valves result in:

Water Hammer
Increased Energy Costs
Faulty Seals and Pumps
Pump curve anomalies/discrepancies
Lower Volumes
Longer Pump Cycles
Possible Pipe Breaks
Wet and/or flooded valve chambers

So,..... what is the solution?

What else is there?

Two Types Categories of Air Valves

- **Conventional Design**
- Air Release
- Air/Vacuum
- Combination
  - Apco/ARI/ValMatic/Golden A./Crispin

Unconventional Design

Four Function Vent-Tech

A New Design In Air Valve Technology.

Industry Recommendations:

Check Air Valves annually

More often for problematic valves

Look for leakage

ALMOST ANY VALVE WILL WORK WITH

ENOUGH MAINTENANCE