Air Release Valves

2026 Water and Wastewater Workshop

Presenters: Noah Brace & Donnie Villarosa

EMCO WATERWORKS

SANDALE UTILITY PRODUCTS

Newfoundland & Labrador CANADA

Agenda

- Introduction
- The Problem: Air in Pipelines
- The Solution: ARVs
- ARV trouble shooting – Donnie
- Questions

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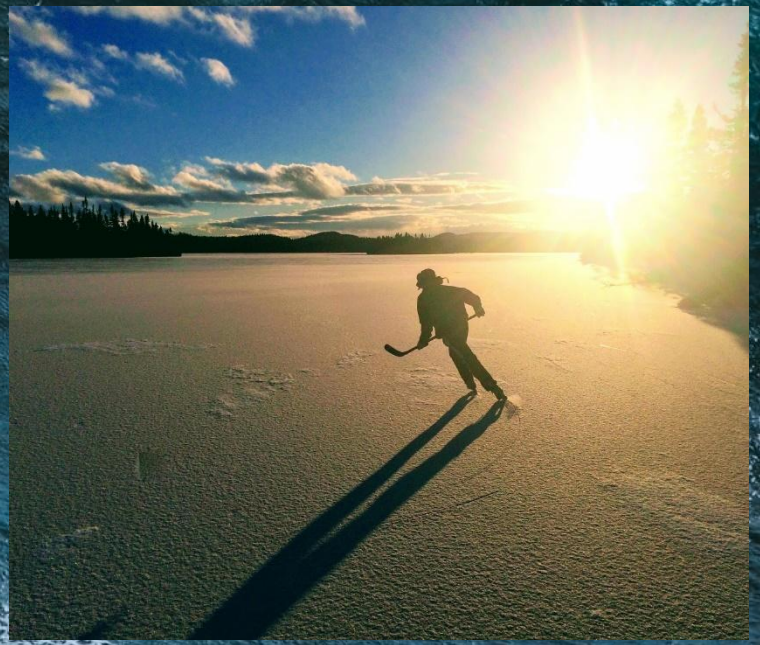
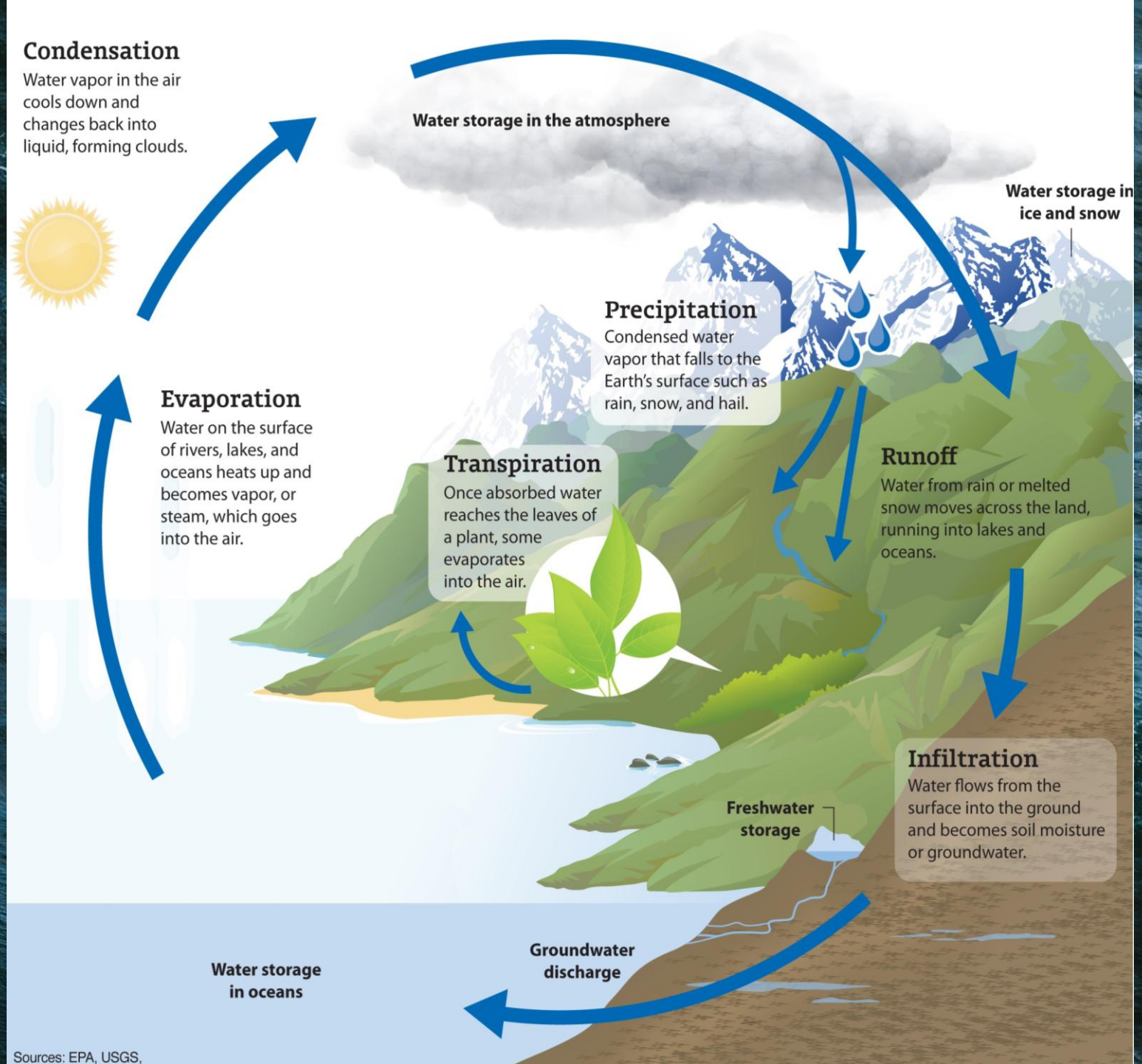
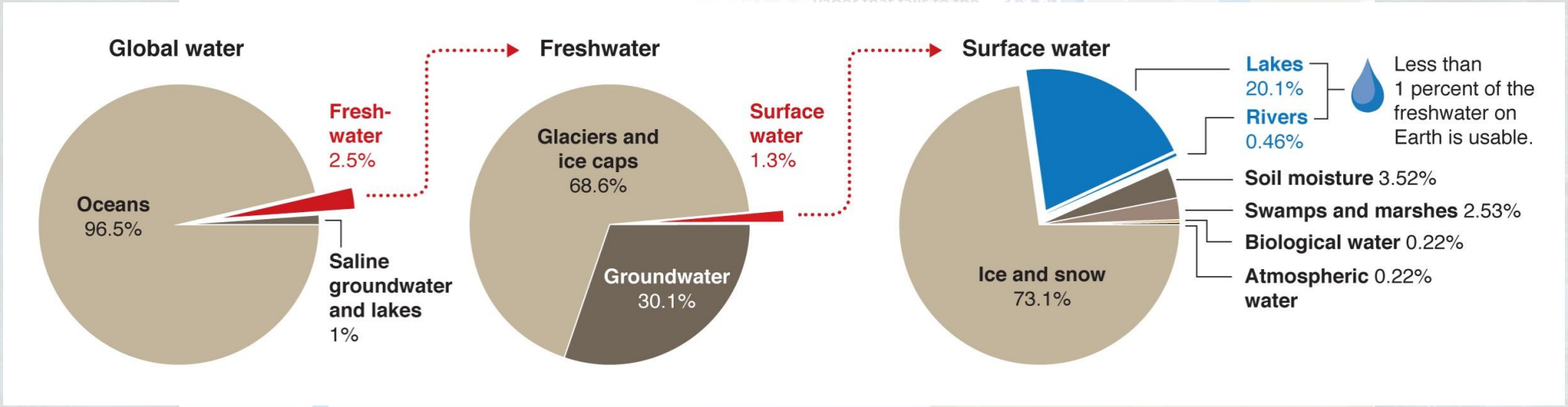
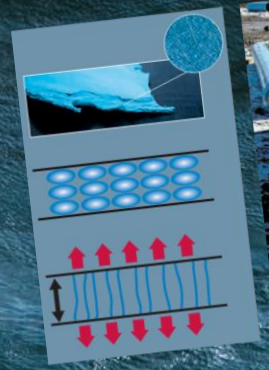
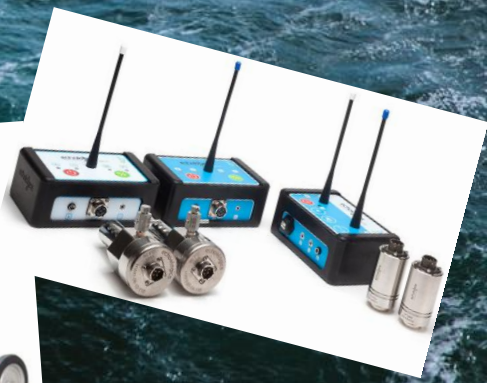



Condensation
Water vapor in the air cools down and changes back into liquid, forming clouds.
Water storage in the atmosphere
Water storage in ice and snow
Precipitation
Condensed water vapor that falls to the Earth's surface such as rain, snow, and hail.
Evaporation
Water on the surface of rivers, lakes, and oceans heats up and becomes vapor, or steam, which goes into the air.
Transpiration
Once absorbed water reaches the leaves of a plant, some evaporates into the air.
Runoff
Water from rain or melted snow moves across the land, running into lakes and oceans.
Infiltration
Water flows from the surface into the ground and becomes soil moisture or groundwater.
Freshwater storage
Groundwater discharge
Water storage in oceans
Sources: EPA, USGS,


Global water
Oceans
96.5%
Fresh-
water
2.5%
Saline
groundwater
and lakes
1%
Freshwater
Glaciers and
ice caps
68.6%
Groundwater
30.1%
Surface
water
1.3%
Surface water
Ice and snow
73.1%
Lakes
20.1%
Rivers
0.46%
Less than
1 percent of the
freshwater on
Earth is usable.
Soil moisture 3.52%
Swamps and marshes 2.53%
Biological water 0.22%
Atmospheric 0.22%
water

Solutions for Aging Infrastructure





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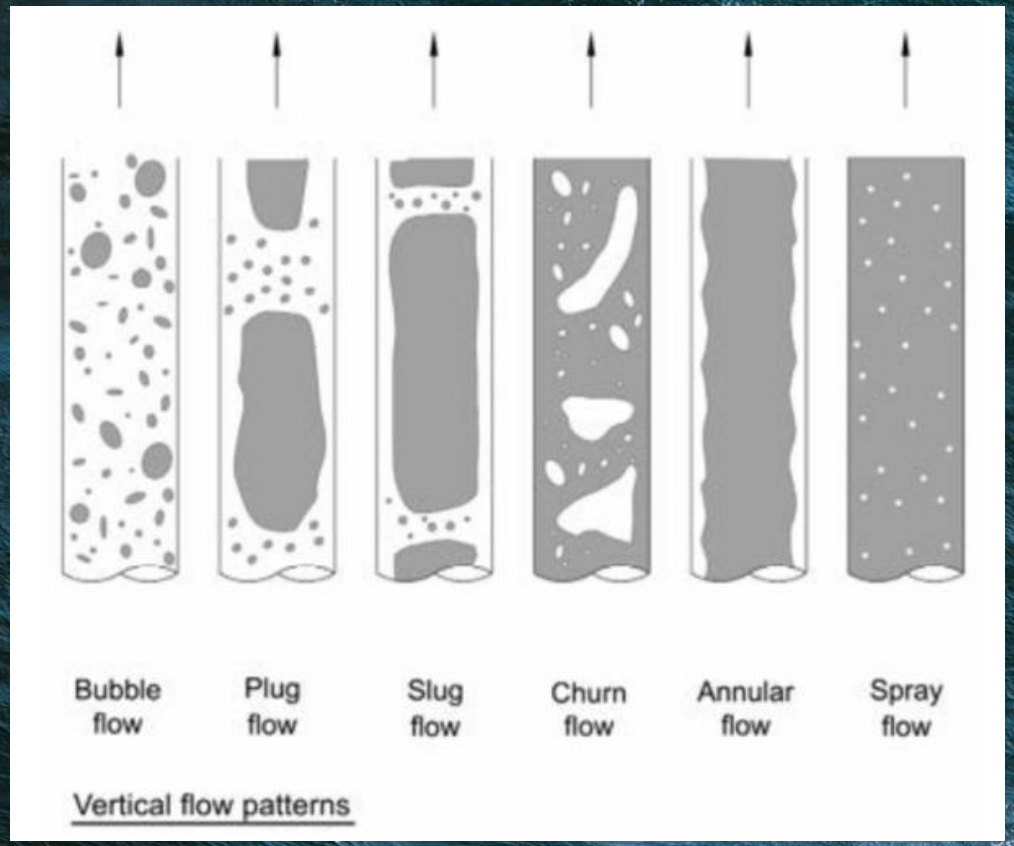
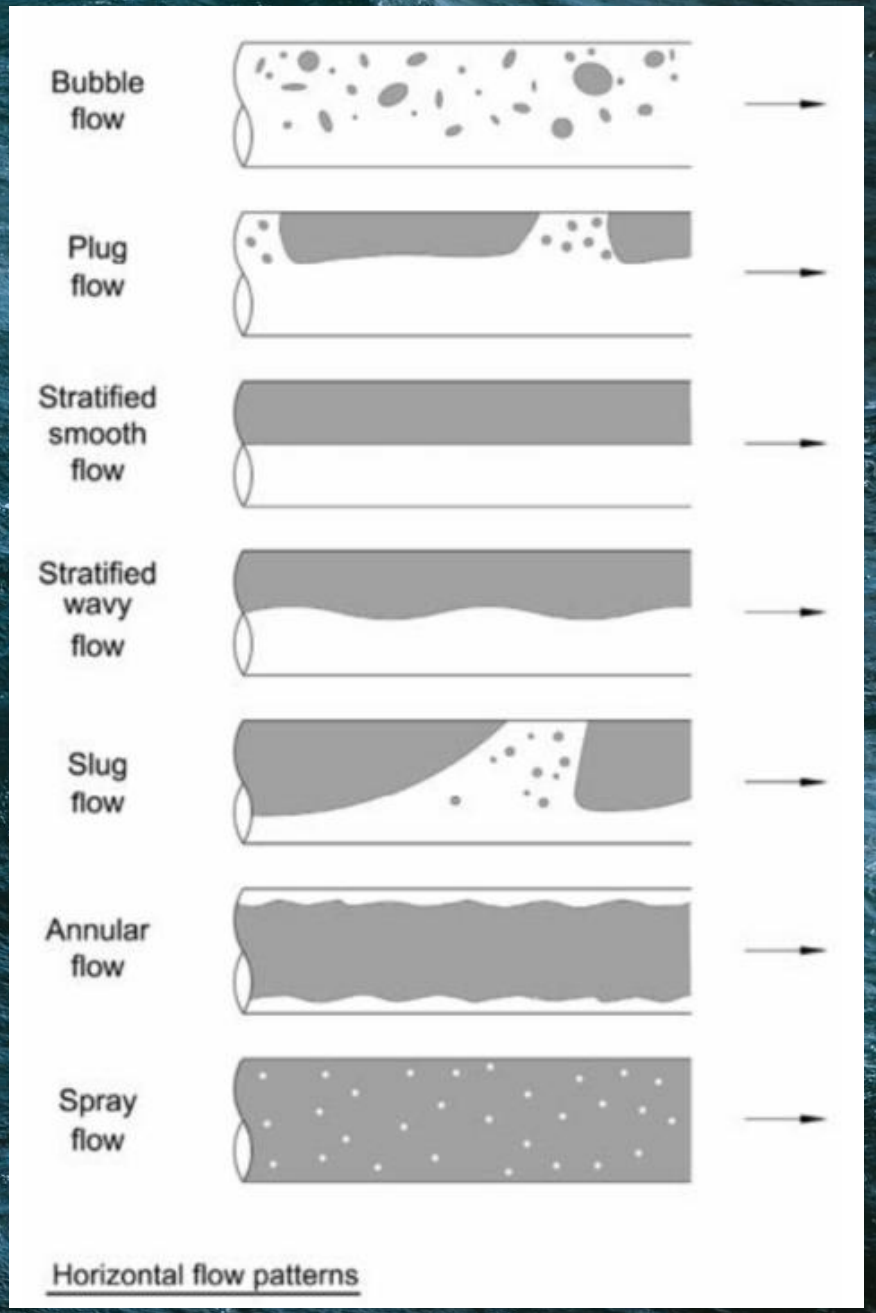
The Problem





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The Problem

- Air pockets reduce the effective pipe cross section, which results in a reduction in pipe capacity.
- The bulk properties of the fluid (a mixture of air and water) are changed. This introduces unknown forces.
- Air accumulation in a system may lead to disruption of the flow and such effects as blow-out or blow-back. This can lead to vibration and structural damage.
- Air can cause difficulties in filter operation. The surges produced by varying air pressure make it difficult to maintain good filter operations. Also, bubbles can become trapped in the sand filters reducing their efficiency.
- The presence of air can reduce pump and turbine efficiency. When air-mixed water is fed into a turbine there is a drop in output and efficiency is reduced. It can also cause waterhammer pressures. Admission of air to a pump can cause a loss of priming.
- In ferrous pipelines the presence of air enhances corrosion by making more oxygen available for the process.
- Sealing, a transition from part-full to pipe full flow, can cause vibrations of the structure and surging of the flow can accompany it.
- Air can produce false readings on measuring devices.
- Cooling water systems have additives in the water for anticorrosion and this increases foaming of the water.
- Transported air will be released at the discharge location. This raises environmental concerns including: foaming, particularly in conjunction with algal activity; visual, the appearance of the water can be very aerated (i.e. white water); and odour, from wastewater/sewerage.
- Air is associated with buoyancy effects for underwater pipelines, such as outfalls

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The Problem

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The Problem

1. AIR LOCKS, SURGE AND WATER HAMMER

2. GROWTH OF ORGANIC MATERIAL/CORROSION

3. VACUUM

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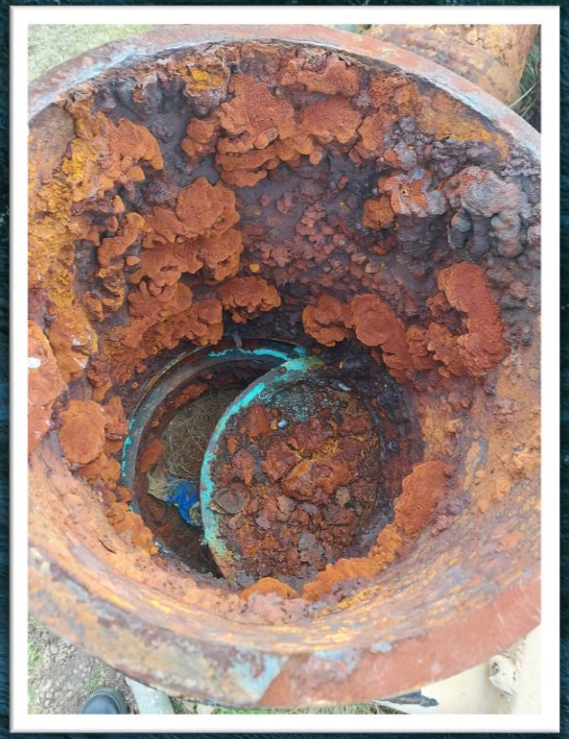
The Problem

The Problem



The Problem

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Cla-Val Air Valves

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Model 33A

1. Filling (large orifice release)

Exhausts large amounts of air during pipeline filling.

2. Pressurized Air Release (small orifice release)

Exhausts small amounts of air while the pipeline operates under pressure.

3. Draining (large orifice vacuum)

Admits large amounts of air to prevent a vacuum condition when pipeline is draining.

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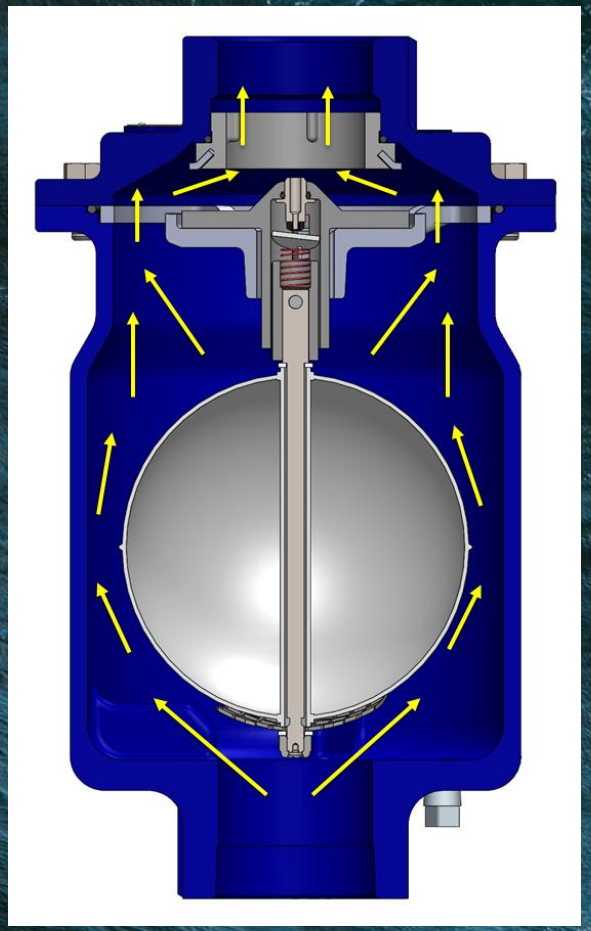
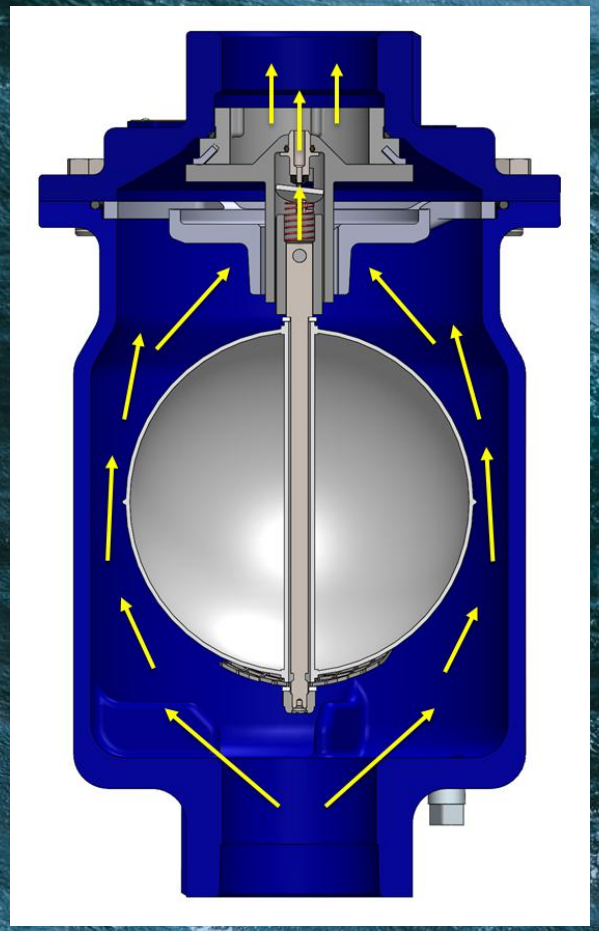
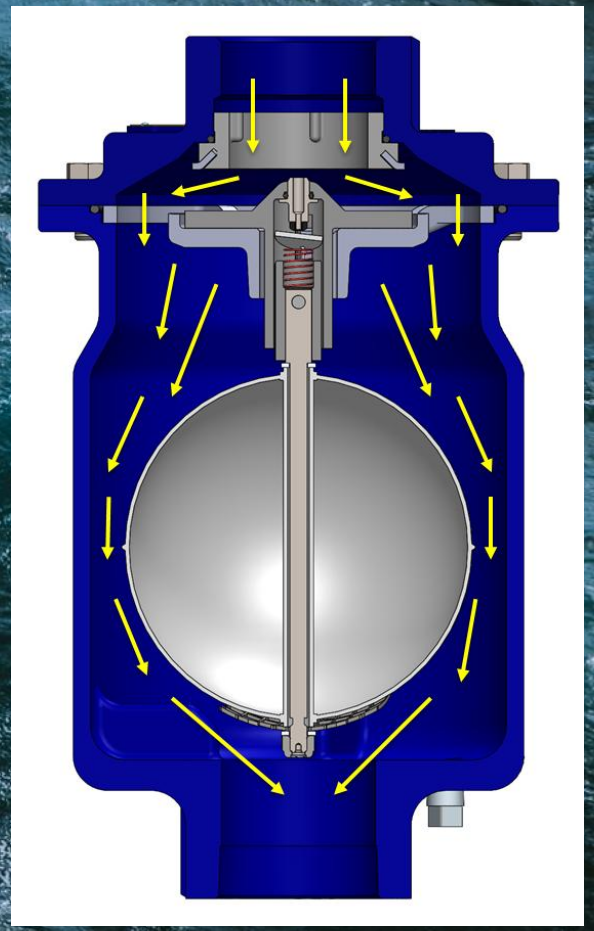
Model 33A



FILLING



PRESSURIZED



DRAINING

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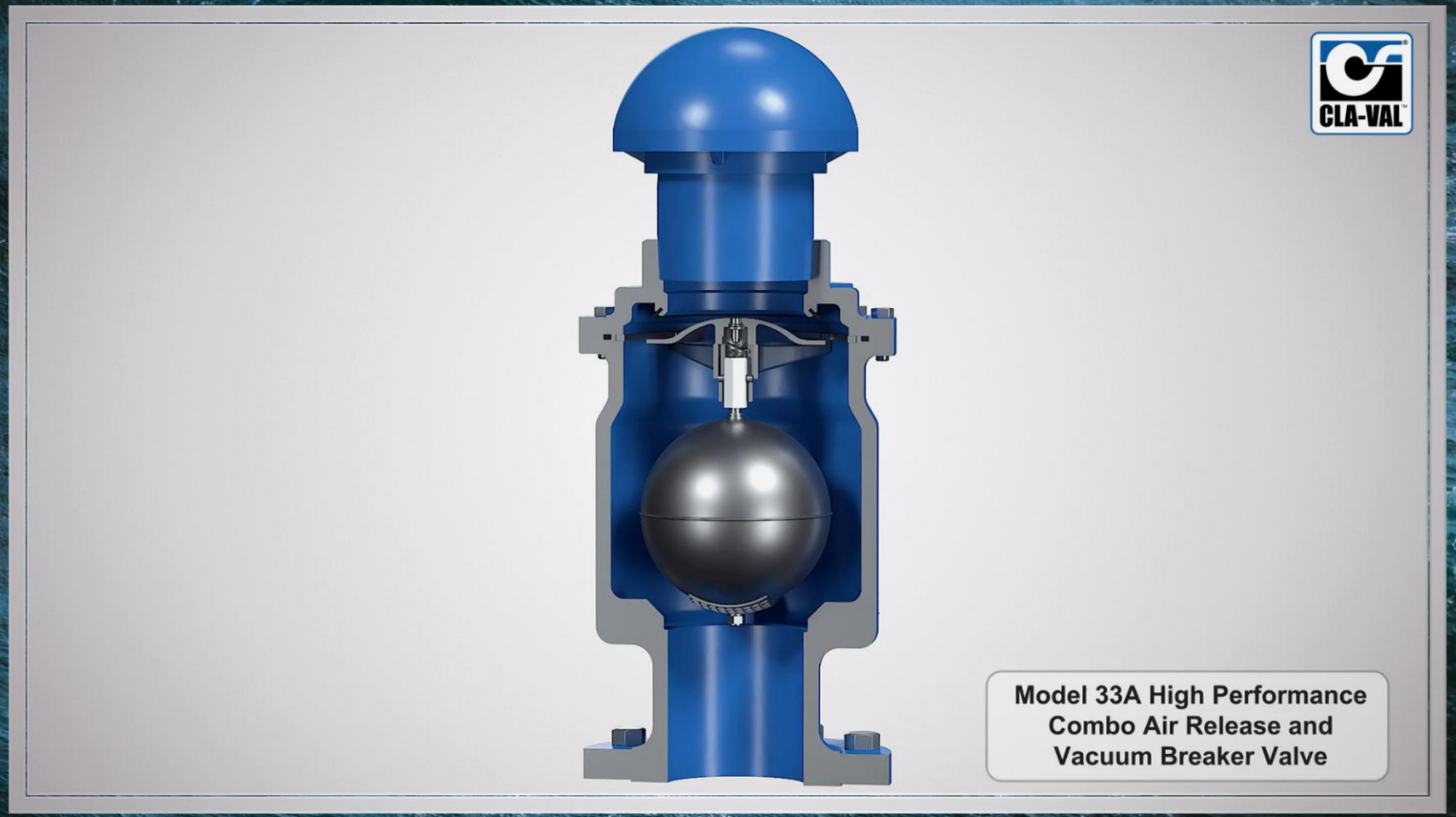
Model 33A



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Model 33A

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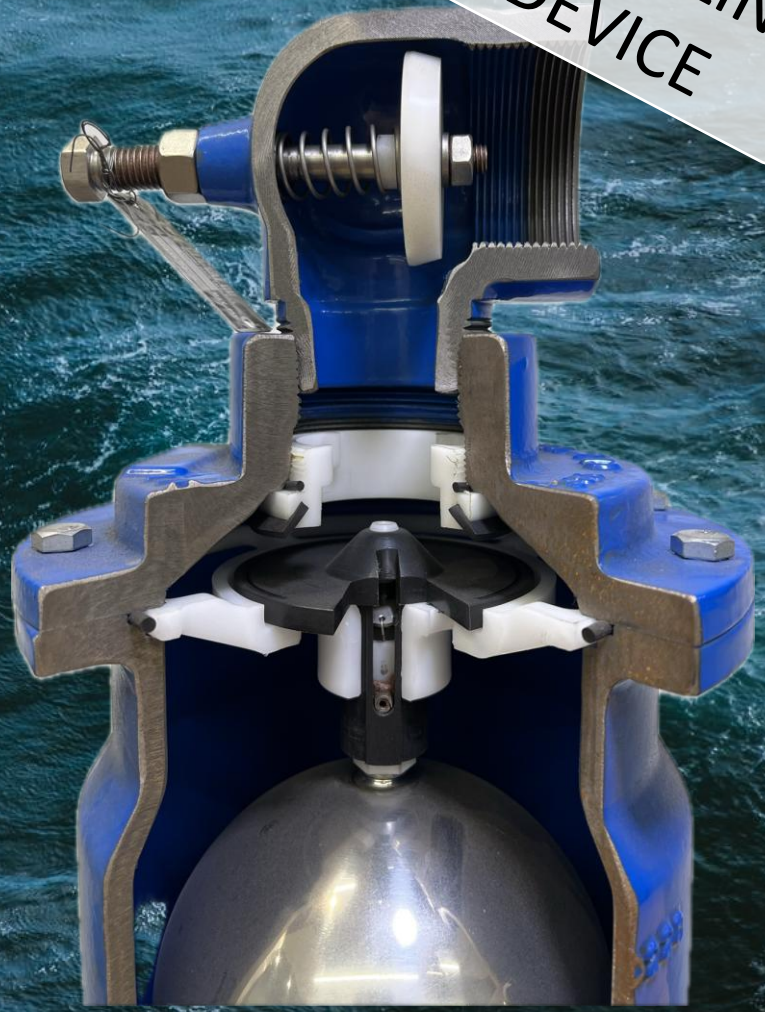
Model 33A

HOOD & SCREEN

THROTTLING DEVICE



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Model 39A

HIGH VOLUME AIR DISCHARGE

Air passes through the air valve at the same flow rate as the water in the pipeline.

The floats will remain in the open position.

H-TEC 992-00

- HaVent Automatic Air Valve Set (valve with shaft for underground installation)
- Large outlet cross section for maximum air release and intake capacity during pipeline filling or draining; opening size: 2”. Air release cross section for reliable air release during operation; opening size: 1”
- All maintenance and repair work for this air valve set can be done from the surface, avoiding all the dangers related to manhole access (eliminate confined space entry)

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33A: Problems / Solutions

Leakage at Inlet Connection:

- Tighten valve threaded connection. If leaks persist, remove valve and seal threads with pipe sealant or tape.

Leakage at Cover/Body joint:

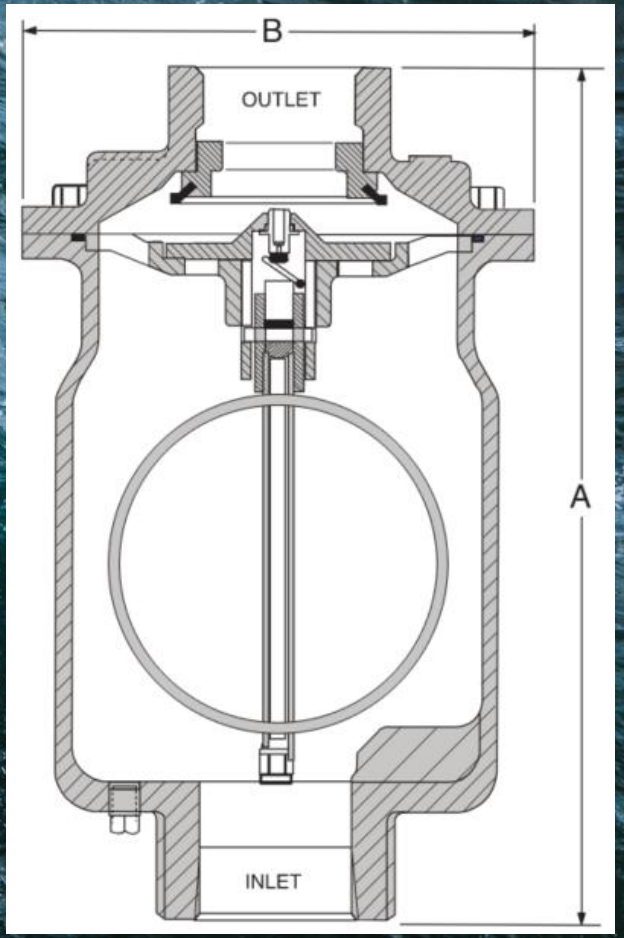
- Tighten bolts per spec, replace gasket.

Small or Large Orifice Leakage:

- Flush valve to remove debris. Disassemble and inspect both seat, orifices and float for wear or damage. Replace as needed with a float kit or seat kit

Small Orifice not Releasing Air Under Pressure:

- Check that operating pressure does not exceed Working Pressure on nameplate. Perform inspection step 3 and disassemble valve if problem persists.



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33A: Dis/Re-Assembly

1. Close inlet shut-off valve. Slowly open drain valve or remove drain plug. Remove the covers bolts slowly.
2. Pry cover loose and lift off valve body.
3. Remove entire seat & float assemblies inspect for damage or wear
4. Clean and inspect parts. Note: Shake float & if water inside float replace it and worn parts as necessary.

1. All parts must be cleaned and gaskets surfaces cleaned with a stiff wire brush in the direction of the serration or machine marks. Worn parts, gaskets and seal should be replaced during reassembly.
2. Apply Loctite or similar Compound to threaded Connections
3. Stand valve body vertically. Insert entire delrin frame, seat & float assembly into register. Move float up/down to insure concentricity and no binding.
4. Lay new cover gasket on clean surface and apply a gasket compound to both surfaces. Assemble gasket and cover over bolt holes in body.
5. Insert lubricated bolts and tighten to the spec torques
6. Place valve back in service. Refer to the installation Slowly open inlet isolation valve.

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Thanks for listening!
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QUESTIONS?
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