

Avista™ | Black Box

Membrane Monitoring Device

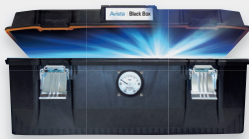
The Avista™ Black Box is a proprietary, stand-alone monitoring device that replicates membrane performance without interrupting the reverse osmosis (RO) system operation.



AN INNOVATION IN SYSTEM TROUBLESHOOTING

The Avista Black Box simulates spiral wound membrane performance for pilot or full-scale systems and eliminates the need to sacrifice full-sized elements for autopsy. The Black Box is self-contained and designed to be maintenance free. The inlet is connected to a sample port on the membrane system at the location where membrane performance will be monitored. The concentrate and permeate lines are connected to the system drain.

- Developed for system troubleshooting and optimization.
- Autopsy results derived from the Avista Black Box mirror those obtained from a full-sized element.



CONNECTS TO VARIOUS LOCATIONS

The Avista Black Box can be installed in minutes, and additional units can be added to achieve multiple goals simultaneously.

FEED

- Analyze the potential for colloid, organic, and biological fouling.
- Determine the effects of oxidizers on lead membranes.

INTER-STAGE

- Detect problems that are difficult to identify in the feed or concentrate.
- Find a unique inter stage foulant deposit.
- Confirm pretreatment is working properly.

CONCENTRATE

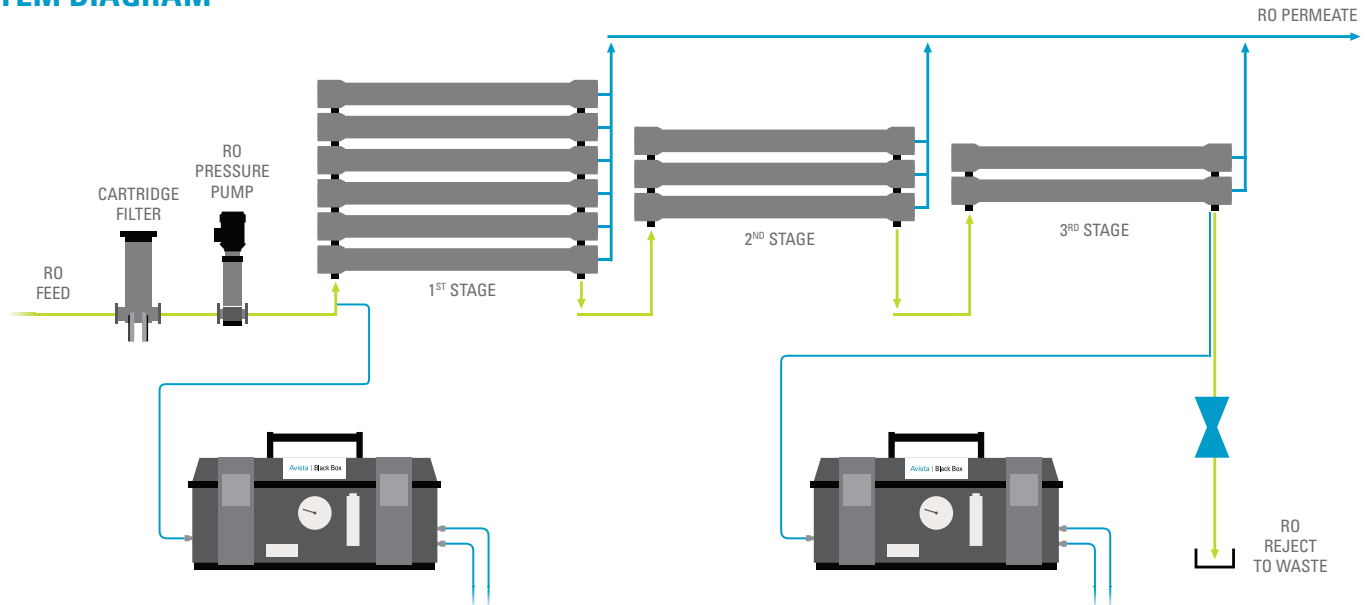
- Identify potential scale formers.
- Evaluate antiscalant performance.
- Test and optimize recovery rates.

AVISTA BLACK BOX: UNIQUE ADVANTAGES

- **Saves membranes:** Eliminates the need to sacrifice full-sized elements for analysis.
- **Pilot testing:** Ideal for pilot testing and full-scale system evaluation.
- **Autopsy results:** The Black Box foulant analysis results mirror those obtained from a full-sized element.
- **Easy to install:** The Avista Black Box can be installed in minutes, and additional units can be added to achieve multiple goals simultaneously.

BLACK BOX CASE STUDY

SYSTEM DIAGRAM



SITUATION

An industrial membrane system, running 24/7, experienced unexplained membrane fouling. The fouling had led to a decrease in system performance and an increase in downtime for membrane cleaning.

- Cleanings occurred every 30 days, with marginal results.
- An Avista™ Black Box monitoring device was installed at the first stage of the system to model foulant deposition.
- The Black Box was removed after a flux decline of 8%.

SOLUTION

While the system continued to run, an autopsy was performed on the Black Box. The autopsy results identified colloidal fouling and the presence of organics on the membrane surface.

- Through the autopsy, it was discovered that a multimedia filter at the pretreatment stage wasn't operating properly.
- A cleaning study was conducted on the Black Box membrane to identify cleaning chemicals capable of restoring proper membrane flow and pressure.
- Once the multimedia filter was repaired and the membranes were properly cleaned, the system was put back on-line.
- The customer now reports better permeate water quality and a higher production of water.
- The operating pressures have been reduced, the system is now cleaned every 6 months, and proper performance levels are restored after each cleaning.

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