



Tech Note 090127-1: Mixing Triton-X with bleach to prevent calcium precipitation in WQM BLIS

Background

In certain environments, the capillary tube used to inject bleach into the WQM's CT/DO chamber may clog with precipitated calcium. User reports suggest this is more common in high salinity waters, and in waters with high concentrations of dissolved calcium. The procedure described in this document has been shown to eliminate precipitation clogging in limited field testing. No adverse effects have been noted, and none are expected to arise. However, this should be considered an experimental procedure.

Indications

Consider using this procedure if

- WQM is operated in saltwater, or
- BLIS has failed in the past at your location.

Tools and Supplies

- Triton-X, supplied in a 50ml bottle in your WQM service kit.
- 1ml graduated pipette or other precision measuring device.
- 1L of fresh household bleach.
- WQM Hardware User's Guide.
- WQM Host Software User's Guide.

Procedure

1. Test the BLIS

- A. Remove the copper outer sleeve around the BLIS. Clean the intake and surrounding area with de-ionized water (DI). Fill the intake with DI. Wipe away any excess from the outer surface using your finger. Now there is a 2 ml puddle with a meniscus in the intake.
- B. Command the BLIS to pump 300 squirts*. The intake should be empty before the pump finishes. If it is not, you will need to either return the WQM to WET Labs for service, or attempt to service it yourself. Please refer to Tech Note 090127-2 for a field procedure to un-clog a bleach injection tube.

* Procedure for commanding 300 pump squirts:

1. Connect to your WQM with WQM Host.
2. Click the Stop WQM Sample button.
3. Select Help > Troubleshooting.
4. On the Sensor Troubleshooting tab, select BLIS Testing.
5. At the bottom, delete the text

Keyboard Entries

6. In the same box, enter **\$BLS 300** and press Enter. Do **not** click Send.
7. In the large window, you will see the BLIS pump start decrementing from 300.

2. Prepare the bleach + Triton-X solution

- A. Procure a 1L (or 1 quart) bottle of household bleach. Mark the label to indicate “1:1000 Triton-X solution in bleach.”
- B. Find the 50 ml bottle of Triton-X in the service kit that came with your WQM.
- C. Use a graduated pipette or similar device capable of accurately measuring 1 ml of Triton-X. A 3 ml graduated syringe will work. Do not guess or estimate. Transfer 1 ml of Triton-X concentrate to the liter of bleach.
- D. Cover the bleach bottle and shake gently, just enough to mix. It will foam readily.

3. Fill the BLIS reservoir

Follow the procedure in the Hardware User’s Guide to fill your BLIS reservoir and re-deploy the WQM. Store the remaining solution in a cool, dark place for up to six months.

4. Send feedback

Please let us know how this solution works for you. Next time you service your WQM, note:

- Did the BLIS consume the expected amount of bleach? Measure and record the remaining bleach as compared to the initial quantity. Note the duration of deployment and the injection schedule.
- Does your BLIS still empty its intake in 300 squirts or less?
- Does your data appear reasonable?

Discussion

Triton-X is a non-ionic surfactant. It is specified for cleaning WQM CT/DO passages when diluted to 1000 ppm in water. It has a critical micelle concentration (CMC) of 189 ppm. Above this concentration, it will foam readily.

By the default settings, the BLIS injects 4 squirts after the CT/DO circulation pumps stops. The immediate area of the injection port and DO sensor is about 2ml. Triton-X concentration in this region is estimated using the maximum squirt volume of 8 μ L:

$$(4 \text{ squirts} \times .008 \text{ ml} \times .001 \text{ diluted Triton-X}) / 2 \text{ ml} = 16 \text{ E-6 or } 16 \text{ ppm Triton-X}$$

At this low concentration, we expect all the Triton-X will flush from the CT/DO chamber before the next sampling begins. We do not expect and negative short- or long-term effects to any part of the WQM.