

Shipboard Collection Procedures for Seawater DI¹⁴C

For the GO-SHIP program, clean glass bottles are provided by NOSAMS in individually numbered plastic crates containing 48 100-ml bottles each. Each box and bottle have unique ID numbers that should be used as the sample identifier and correctly listed on the collection sheets or 'deck log' provided in the sampling kits. The bottles should be handled as little as possible and removed from their packing crates only when sampling. Use the foam trays that hold the bottles to conduct sampling. Clean, disposable gloves should be worn any time the bottles are handled. Lab counter surfaces should be covered using the provided plastic bags before placing bottles on surfaces. Please use the provided collection sheets to record the required information and note any problems or comments on the sheet. If possible, make a copy or scan the collection sheet before placing the originals in each crate of bottles. At the end of the cruise, email scanned sheets to rhansman@whoi.edu.

Steps for collection:

- In the lab prior to sampling, remove the glass stoppers and the lab wipes from the bottles for the upcoming cast (always make sure the strips of lab wipe have been removed before collecting any seawater). Gently place rubber stoppers in bottles to transport out to the deck for sampling.
- Attach the tubing (Tygon or silicone) to the Niskin bottle. Flush the tubing and remove trapped air with approximately 25 ml of water. Now place the tubing inside the sample bottle and fill the bottle with approximately 25 ml of water; gently swirl around the sides of the bottles and discard; repeat once more.
- With the sampling tube at the bottom of the bottle, fill with enough water to fill the bottle 1.5 times; this can be accomplished by observing the amount of time it takes to fill the bottle and allowing the bottle to overflow for half this time. Carefully spill out just enough water so the rubber stopper can be gently placed back into the bottle.
- Repeat this procedure for the remaining samples from the cast. Using this procedure, a DI¹⁴C water sample in a 100-ml bottle will require approximately 225 ml of water.
- When all the bottles have been filled, move them to a safe dry place and continue preparing the samples for storage.
- Using the grease syringe or gun, apply a thin layer of grease in a wavy pattern around the glass stoppers and set aside. This step can be done in advance of sampling when glass stoppers are removed.
- Remove the rubber stopper. Using the large pipette or just by pouring, remove enough water for a 5 ml headspace to exist in the bottle; this level can be marked on the bottle. Headspace should be minimized but the water level should not reach the stopper joint to allow for a proper seal.
- Carefully and completely wipe the inside of the ground glass joint dry using lab wipes. Care must be taken not to put your finger in the sample. The joint **MUST BE DRY** for the grease seal to work properly!
- Using the Eppendorf pipette or other provided dispenser, add 50 µl of the saturated HgCl₂ solution to the bottle. If you are unsure whether a sample has been properly poisoned, a second aliquot can be added.

- Place greased glass stopper into the bottle neck. Push down gently on the stopper, rotating slowly. This will help make the grease joint seal. The seal should look clear with no bubbles.
- Secure the glass stopper to the bottle with one rubber band placed over the entire bottle and cap.
- After bottles are filled, poisoned, capped, and secured with an elastic band, shake gently to mix in poison.
- After all samples from one cast have been taken and sealed, each label/data sheet should be checked to make sure it contains the necessary information, and the integrity of the greased seals should be checked (i.e., should look clear, not bubbly). Data from the collection sheets for samples collected should be entered into an Excel spreadsheet with the following columns: whpid, station, cast, niskin, depth, bottle number, box number, comments.
- Once a box is full, close the plastic shipping box securely using provided zip-ties. Store boxed samples in a temperature-controlled environment (i.e., the ship's science hold or main lab space). Seawater samples must not be exposed to extremes of temperature. Poisoned samples do not need to be refrigerated and should **NEVER BE FROZEN**.