

Physical and chemical assessment

Version: February 2018

Water quality sampling using automated sampling equipment

1 Purpose and scope

This document describes the method for the correct use of automatic samplers when collecting water samples intended for laboratory analysis of water quality parameters. Automated sampling devices include refrigerated or non-refrigerated automatic pump samplers and rising stage samplers. This document describes the method for using both automated sampler types. There are limitations associated with automatic sampling (e.g. intermediate sampling containers, sampling from a fixed point, sample storage and preservation), which should be considered and documented.

2 Associated documents

Sampling design and preparation:

- *Permits and approvals*
- *Record keeping including taking field photographs and videos*

Physical and chemical assessment: Background to water quality sampling using automated sampling equipment

3 Health and safety

Before following the methods contained in this document, a detailed risk management process (identification, assessment, control and review of the hazards and risks) must be undertaken. All work carried out must comply with the Queensland Work Health and Safety legislative obligations.

4 Permits and approvals

Permits and approvals may be required to conduct activities involving animals, plants and/or in protected areas (for example National Park/Regional Park, State Forest or State Marine Park). See *Permits and approvals* for more information on requirements.

5 Skills, training and experience

Staff using the methods in this document must have previous training and experience in the use and calibration of automated sampling equipment. Ideally this training should be recorded in a central location. The operator should also be familiar with manufacturer's instructions.

6 Equipment

See Appendix 1 for example equipment checklist.

7 Procedure

Note: Auto-sampler bottles can be fitted with either polypropylene (Figure 1) or glass (Figure 2) sampler bottles depending on parameters being monitored.

7.1 Collecting samples using automatic pump samplers (auto-samplers)

1. On arrival at the field based automatic pump sampler (auto-sampler), halt the program.
2. Retrieve and record data from the auto-sampler e.g. sample details, storage temperature, and internal clock settings.
3. Ensure that the auto-sampler bottles are labelled in the order in which they were automatically filled to avoid errors when sampler bottles are removed.
4. Wearing clean powder-free gloves, place lids on each of the auto-sampler bottles while still in the carousel. Remove individual auto-sampler bottles in sequence from the carousel, then follow steps 5-7 for each bottle.
5. Depending on the parameter being monitored, laboratory supplied sample bottles may need rinsing before the water sample is decanted. If so, shake the auto sampler bottle vigorously to resuspend settled material, decant a small volume of sample from the auto-sampler bottle into a laboratory supplied sample bottle, recap the laboratory supplied bottle and shake to rinse. Discard the rinse water

Note: Do not rinse bottles that contain preservative.

6. Repeat Step 5 twice more.
7. To collect the sample, recap the auto-sampler bottles, shake to resuspend settled material and decant into the rinsed laboratory supplied bottle. Replace the lid on the laboratory supplied sample bottle and keep refrigerated or on ice bricks until the sample can be stored/preserved appropriately before dispatch to the analytical laboratory.
8. If enough sample remains in an auto-sampler bottle, other samples can be collected for additional analyses. Record what samples are collected from each auto-sampler bottle.
9. If you intend to change the volume of sample to be collected by the auto-sampler you will need to refer to the manufacturer's operating procedures. Follow the manufacturer's operating procedures and calibrate the auto-sampler using a graduated measuring cylinder.
10. Fill the auto-sampler with clean bottles and store clean lids appropriately to mitigate contamination.
11. Restart the auto-sampler program ensuring the distributor arm (for sample delivery) will begin filling at bottle 1.
12. Dispatch water samples and necessary paperwork to the analytical laboratory for analysis within specified holding times. Ensure samples are packaged and transported within a timeframe appropriate to maintain storage conditions (e.g. filtered nutrients need to be kept chilled or preferably frozen to maintain parameter stability).
13. Clean used auto-sampler bottles. Use a soft bristle brush to dislodge residual particulate matter and allow bottles to soak in phosphate free detergent solution for three hours. Scrub internal and external surfaces of bottles and lids. Rinse bottles and lids with deionised water three times and allow drying in a clean location. If pump sampler bottles are glass, conduct a further final rinse using an appropriate solvent for the analyte of interest.
14. Store clean, dry automatic pump sampler bottles appropriately to minimise contamination.



Figure 1: Polypropylene pump sampler bottles



Figure 2: Glass pump sampler bottles

7.2 Collecting samples using rising stage samplers

Note: Rising stage samplers should be loaded with suitably cleaned bottles to minimise contamination. It is possible to have the rising stage sampler fittings modified to accept bottles supplied by a laboratory.

1. Bottles must be labelled with a unique identifier.
2. If the rising stage sample bottle is used as an intermediate container (to fill other sample bottles) follow steps 5-8 in Section 7.1. Record what samples are collected from each bottle.
3. If the rising stage sampler has been modified to accept laboratory bottles, simply remove the inflow assembly and put rinsed laboratory supplied lid on bottle. Make a record of each bottle collected from the site.
4. When removing the stage sampler bottle, replace the inflow assembly (Figure 3) of the stage sampler bottle with a clean lid.
5. When cleaning the stage sampler bottles, ensure all internal surfaces of the bottles, lids, hoses and pipes are scrubbed clean after soaking in a phosphate free detergent solution for three hours. Rinse the bottles and inflow assemblies with distilled water three times. Particular care must be taken to thoroughly rinse the inflow hoses and pipes.



Figure 3: Stage sampler bottle with inflow assembly

8 References and additional reading

AS/NZS 5667.1:1998, *Water quality – Sampling: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*, Standards Australia.

Appendix 1

Table 1: Equipment checklist

Equipment	✓
Clean, powder-free gloves	
Data sheets, notebook or field computer	
Waterproof marking pen	
Vehicle mounted fridge or Eskys containing frozen ice bricks	
Sample bottles of suitable composition and pre-treated for the analysis required	
Clean replacement automatic sampler bottles	
Soft bristled brush	
Phosphate free detergent and associated safety data sheet (e.g. Decon 90)	
Solvent and associated safety data sheet (e.g. methanol GR for analysis)	
Laboratory supplied deionised water	
Graduated measuring cylinder (minimum 2L volume)	
Manufacturer's instruction manual for automatic pump sampler	