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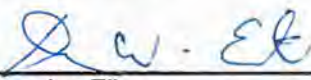
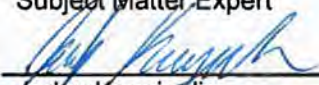

New Mexico Environment Department  
Surface Water Quality Bureau

Standard Operating Procedure (SOP)

for

**Chemical Sampling – Equipment Cleaning Procedures**

Approval Signatures

|   |         |
|---|---------|
|  | 3/21/11 |
| Douglas Eib<br>Subject Matter Expert  | Date    |
|  | 3/21/11 |
| Jodey Kougioulis<br>Quality Assurance Officer                                     | Date    |
|  | 3.21.11 |
| James Hogan<br>Program Manager  | Date    |

**1.0 Purpose and Scope**

The purpose of this procedure is to describe the equipment, supplies, and procedures needed to clean typical water chemical sampling equipment..

**2.0 Responsibilities**

Personnel who conduct environmental sampling or who supervise those who do are responsible for implementing this procedure. Technical staff should have experience with cleaning chemical sampling equipment before performing this procedure. All new employees will receive training and perform each of the described activities in this SOP under the supervision of a senior technical staff member at least once before being permitted to clean sampling equipment.

**3.0 Background and Precautions**

The goal of equipment cleaning is to minimize the chance that equipment is a source of foreign substances that could affect the ambient concentrations or chemistry of target analytes in samples. Equipment for chemical water samples should be as clean as practicable before contacting the sample.

Wear safety gloves, glasses, and apron when working with corrosive and oxidizing solutions. Work in a well-ventilated area.

**4.0 Definitions**

None

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## 5.0 Equipment and Tools

**Table 1. Cleaning equipment supplies**

| <b>Item</b>                           | <b>Description and Comments</b>  |
|---------------------------------------|--|
| Acid solution(a)                      | Hydrochloric: ACS trace-element grade (10 % by volume in DIW)  |
| Bags, plastic or fluorocarbon polymer | Sealable bags with uncolored closure strips, various sizes. Recyclable trash bags are recommended for large equipment storage.       |
| Brushes and sponges                   | Uncolored; plastic components needed for inorganic work  |
| Distilled water/DIW                   | Maximum specific electrical conductance, 1 mS/cm   |
| Laboratory-produced organic-grade DIW | Usable only as a cleaning solution and only as specified in the text. Must not be used to substitute for PBW or VBW.                 |
| Detergent                             | Nonphosphate laboratory soap (for example, Liquinox®).   |
| Gloves, disposable                    | Powderless, noncolored vinyl, latex, or nitrile (latex or nitrile for use with methanol), assorted sizes.                            |
| Safety equipment and guidelines       | For example, MSDS, safety glasses, chemical spill kit, apron, emergency phone numbers.   |
| Tap water                             | If quality is questionable, substitute DIW. Tap water is more effective for initial and rapid removal of detergent residue and dirt. |
| Wash bottles                          | Labeled to indicate contents (for example, ACID, DIW, TAP).  |
| Disinfectant                          | Bleach   |

Notes:

- (a) Hydrochloric acid is required if analyzing for nitrogen species; otherwise, nitric acid is acceptable.

## 6.0 Step-by-step Process Description

Clean sample collection and sample processing equipment before use to remove manufacturing residues from new equipment, dust and other foreign substances from equipment that has been in storage, and substances adhering to equipment from previous sampling events. Sampling equipment requiring cleaning consists primarily of sample tubing, equal-width-increment sampling equipment, processing equipment, such as churn splitters and automated sampling devices (e.g., ISCO® Automatic sampler). Disposable sample collection containers, if pre-cleaned and certified, do not require cleaning or rinsing prior to use.

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## Cleaning Procedures

The majority of equipment cleaning is performed in the laboratory prior to any sampling events. Space is dedicated in the laboratory for equipment cleaning and for storage of cleaning supplies

### A. Preparation at the laboratory

1. Prepare an area for cleaning and drying cleaning supplies, sample-collection, and sample-processing equipment.
  - a. Gather cleaning supplies, equipment to be cleaned, and plastic bags or other material with which to wrap cleaned equipment. See **Table 1** for cleaning supplies needed.
  - b. Place clean paper over the work surface.
  - c. Put on disposable, powderless gloves.
  - d. For most situations prepare a 0.1-0.2% solution of Liquinox. Use a higher concentration for dirtier equipment.
  - e. Prepare a 10% v/v dilution of American Chemical Society (ACS) trace-element-grade hydrochloric acid (HCl) in de-ionized water (DIW). **SAFETY NOTE: Always add acid to water, never add water to acid.**
2. Clean the items used to clean the equipment.
  - a. Fill wash basins and add approximately one cap full of Liquinox solution. Put wash bottles, scrub brushes, and other small items used for cleaning into a wash basin. **Soak for 30 minutes.**
  - b. Scrub interior and exterior sides of basins/tubs and standpipes with soft scrub brushes. Fill wash bottles with a soapy solution and shake vigorously.
  - c. Rinse all items thoroughly with tap water to remove detergent residue. No detergent bubbles should appear when fresh tap water is agitated in the basin, standpipe, or wash bottle.
3. Disassemble dirty sampling equipment as necessary to aid in cleaning.

### B. Detergent wash and tap water rinse

- a. Place small equipment parts into wash basin labeled for detergent and fill with Liquinox solution. **Soak equipment for 30 minutes.**
- b. Scrub exterior and interior of equipment surfaces to the extent possible using a firm sponge or soft brush to remove any adhering material such as oil and grease, sediment, algae, or chemical deposits. Pay particular attention to grooves and crevices, O-rings, nozzles, and other spaces where inorganic or organic materials might be trapped.
- c. Rinse equipment thoroughly with warm tap water.

### C. Check equipment

1. Nonmetal equipment or equipment with removable metal parts: remove any metal parts and go to Step D.
2. Metal equipment components: go to Step E, DIW rinse.

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D. Acid soak/rinse

For equipment constructed primarily of glass, fluorocarbon polymer, or other plastic, soak in a 10% HCl solution, or, using a wash bottle, rinse surfaces that contact sample water with 10% HCl.

1. Place nonmetal equipment and tubing into the wash basin labeled “acid solution.”
2. Fill basin with dilute 10% HCl solution. **Soak equipment and tubing for 30 minutes.** Swirl the acid solution several times during the 30-minute soak.
3. Carefully pour the used acid solution into sink.

E. DIW rinse

1. Place equipment into the cleaned wash basin.
2. Rinse exterior and interior of each piece of equipment thoroughly. For pieces of equipment too large to submerge in the wash basin, rinse surfaces that contact sample water by spraying with DIW from a wash bottle.
3. Place on a clean surface to dry.

F. Storage of clean equipment

Place dry, clean equipment inside plastic bags. For small equipment or parts, use sealable plastic bags.

G. Field

Equipment cleaning also occurs in the field as it is necessary to thoroughly rinse equipment with DIW as soon as possible after use. At each new sampling station, thoroughly rinse equipment with ambient water before collecting a sample. In the field, it is adequate to thoroughly rinse equipment with DIW as soon as possible after use. At each new sampling station, thoroughly rinse equipment with sample water before collecting a sample.

Additional Notes for Sample Tubing Preparation, Cleaning and Storage of Filtration Tubing

Remove new tubing from the factory packaging, cut to an appropriate length and place in 10% “Trace Metal” grade (or equivalent) HCl/DIW water solution for not less than 1 hr and not more than 2 hrs\*. At the end of the acid bath period, remove the tubing from the acid bath, rinse with DIW inside and out, coil and place the tubing in an unused zip-lock type, 1 gal. capacity plastic bag.

On returning from the field, soak the used tubing first in a hot water/Liquinox solution for a minimum of 15 minutes then rinse with hot, flowing tap water and then DI before placing the tubing in the acid bath and processed as above.

*\*The tubing is not acid resistant; exposure to HCl for extended periods will cause it to depolymerize and fail.*

Additional Notes for Miscellaneous sampling equipment

In the laboratory, after the sampling run is completed, sampling equipment (e.g., coolers, buckets, cups, nets, flow equipment, etc.) that came in contact with surface waters must be hosed off outdoors. Immerse all porous material (e.g., nets, felt soled boots) in a 10% bleach solution for 10 minutes. Rinse thoroughly with tap water. Dry and put coolers away.

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## 7.0 Related Forms

- MSDS

## 8.0 Revision History

Original