National Human Exposure Assessment Survey (NHEXAS)

Arizona Study

Quality Systems and Implementation Plan for Human Exposure Assessment

The University of Arizona
Tucson, Arizona 85721

Cooperative Agreement CR 821560

Standard Operating Procedure **SOP-UA-L-5.1**

Title: Standard Protocol for Cleaning Laboratory and Field Sampling Apparatus

Source: The University of Arizona

U.S. Environmental Protection Agency
Office of Research and Development
Human Exposure & Atmospheric Sciences Division
Human Exposure Research Branch

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STANDARD PROTOCOL FOR CLEANING LABORATORY AND FIELD SAMPLING APPARATUS

1.0 Purpose and Applicability

This SOP describes the standard approach used for cleaning glassware and plasticware in the EPA NHEXAS and EPA Border Projects, as well as future "Health in the Environment" investigations.

2.0 Definitions

2.1 DDW = Distilled Deionized Water

2.2 Drain Disks = Nucleopore disk placed under the 37mm Teflo filters to add support during sample collection.

2.3 Filter Dish = plastic filter holders used to store filters before and after exposure.

2.4 General Glassware = Any field or laboratory container made of glass.

2.5 General Plasticware = Any field or laboratory container made of plastic.

2.6 PM Impactor = One of the two main components of the Harvard PM Sampling unit (the other being the pumping unit).

2.7 Technician = Laboratory or field personnel following this procedure.

2.8 URG Impactor = An apparatus used to hold filters for the personal air pumps.

3.0 References

Not applicable

4.0 Discussion

This is a baseline protocol describing minimal standard cleaning techniques for a number of items used in the laboratory and field. Additional rinses or treatments can be performed to items according to the discretion of the technician.

5.0 Responsibilities

5.1 The Project Director will be responsible for:

5.1.1 Final review and approval of this procedure.

5.2 The Project Lab Coordinator will be responsible for:

5.2.1 Insuring SOP procedures are followed by the Project Lab Staff.

5.2.2 Notifying the appropriate technicians with needed repairs. In cases when the item can not be fixed in house, Project Field Coordinator will generate the appropriate paperwork, notify the appropriate vendor or company, and ship the disfunctional item.

5.3 The Project Lab Staff will be responsible for:
- 5.3.1 Knowing and following the procedures described in this SOP.
- 5.3.2 Recording the information as directed in this SOP.
- 5.3.3 Notifying the Project Lab Supervisor of down equipment and when repair supplies are needed (where applicable).
- 5.3.4 Providing the Project Lab Supervisor with a down equipment label and isolating the down equipment into the down equipment area.
- 5.3.5 Insuring proper labeling techniques of down equipment.
- 5.3.6 Repairing the item (where applicable) in a timely manner.

6.0 Equipment and Materials

6.1 Equipment
- 6.1.1 Apron
- 6.1.2 Brushes (bottle, test tube)
- 6.1.3 Drying rack
- 6.1.4 Kimwipes absorbant wipes
- 6.1.5 Lab coat
- 6.1.6 Nalgene washing containers
- 6.1.7 Paper towels
- 6.1.8 Rubber gloves
- 6.1.9 Sponge
- 6.1.10 Tweezers
- 6.1.11 Ultrasonic cleaner

6.2 Materials
- 6.2.1 Alconox or equivalent
- 6.2.2 DDW
- 6.2.3 Hot and cold running water
- 6.3.4 RBS-35 Soap solution

6.3 Reagents
- 6.3.1 Diethyl ether
- 6.3.2 95% ETOH (ethyl alcohol)

7.0 Procedure

7.1 Preparation

7.1.1 Water Washing

A. The technician will don appropriate apparel including but not limited to lab coat, or apron, and rubber gloves.

B. Turn on the hot tap water and fill a nalgene wash basin with 1 to 2 gallons of hot water.
C. Add one tablespoon of Alconox per gallon of water. If an equivalent soap is used, follow the directions on the container.
D. Set up the appropriate drying apparatus for the items being washed.

7.1.2 Sonic Cleaner preparation
A. The technician will don appropriate apparel including but not limited to lab coat, and/or apron, and rubber gloves.
B. Remove the sonic cleaner from storage and place in the fume hood. Fill the reservoir with warm water and turn on. Close the fume hood to reduce noise in the rest of the lab.

7.2 Actions
7.2.1 Procedure for washing general glassware and plasticware
A. Wash wide mouth glass or plasticware with a sponge; clean all surfaces inside and out. Pay special attention to the area around any pouring lips or rims.
B. Use the appropriate bottle or test tube brushes on narrow necked containers.
C. Clean thoroughly.
D. Rinse with hot tap water.
E. After rinsing gloves with DDW, rinse cleaned glassware or plasticware with DDW and place in a clean drying rack.
F. Air dry washed items.
G. Store glassware/plasticware up side-down on shelves lined with clean absorbent paper.
H. Put all glassware/plasticware away within 24 hours.
I. Record any breakage or disposal of damaged glass/plasticware in the breakage log (Figure 1).
J. If you observe low stock of any glass/ plasticware or cleaning supplies, notify the lab supervisor.
7.2.2 Procedure for washing Plastic Filter Holders and Plastic Filter Dishes
A. Wash all filter dishes and filter holders in a 1% (V/V) RBS-35 solution.
B. Rinse all parts thoroughly with tap water followed by three rinses with deionized distilled water (DDW).
C. Lay the parts on several layers of paper toweling and air dry, covered, overnight.
D. Transfer to sealable plastic bags and place them in the weighing room for later use.
7.2.3 Procedure for washing 37mm Drain Disks
A. Fill the ultrasonic bath with 1% (V/V) RBS-35 solution and sonicate the disks for 15 minutes.

B. Rinse the drain disks with tap water.
C. Rinse the drain disks with DDW twice.
D. Fill the ultrasonic bath with DDW and sonicate the drain disks for 10 minutes.
E. Remove them from the bath and rinse them in DDW three times.
F. Dry the disks between several layers of Kimwipes, with a flat weight on top to prevent warping.

7.2.4 Procedure of washing tweezers

A. Fill the ultrasonic bath with 1% (V/V) RBS-35 solution and sonicate the tweezers for 15 minutes.
B. Rinse the tweezers with tap water.
C. Rinse the tweezers with DDW twice.
D. Place on paper towels and cover. Let air dry.

7.2.5 Procedure for cleaning PM and URG Impactors

A. Wet some large kimwipes with 95% ETOH alcohol.
B. Using a large pair of tweezers run the wetted kimwipes around the inside of the impactor wiping all surfaces.
C. Let the alcohol evaporate and reassemble the impactor
D. Put an aluminum foil sheet over the top of the PM impactors and store on the shelves in the Material Technician's area. The URG impactors are returned to clean plastic ziplock bags and stored on the shelves in the Material Technician's area.

7.2.6 Procedure for cleaning of the Impactor plates.

A. Place the impactor plates on a towel and place them in the fume hood. Turn the fume hood "on".
B. Into a beaker pour a small amount of Diethyl ether.
C. Scrub each impactor plate using a toothbrush dipped in the Diethyl ether.
D. Place the plates in a second beaker large enough to hold all of them.
E. Add enough Diethyl ether to just cover them.
F. Cover the beaker with a watch glass.
G. Sonicate the plates in the beaker for 10 minutes.
H. Remove plates and rinse with DDW.
I. Allow plates to dry on a layer of kimwipes, covered.
J. Once dry check for any sign of oil and place clean plates in the "Clean Impactor Plate" container ready for use. Plates with oil showing are to be returned to the "Dirty Impactor Plate" container to be cleaned again.

7.2.7 Procedure for cleaning Sieves.

A. Take the dirty seives and flush them under running water to remove fine dirt particles.
B. Once the screen is believed to be clean hold the seive up to the light and inspect for

particles stuck in the mesh. If particles are present re-wash and use a fine brush to remove the particles.

C. Rinse again washing all of the screen surface.
D. Rinse with DDW
E. To speed drying, dip the screen surface in a tub of 95% ETOH to bind with the water and then dry with a blow dryer.

7.3 Quality Control

7.3.1 Tolerance limits

Not applicable

7.3.2 Detection limits

A. After cleaning each item is visually inspected for cleanliness.

7.3.3 Corrective Actions

A. Any doubt by the technician of the cleanliness results in a repetition of the appropriate cleaning protocol.

8.0 Records

8.1 A notebook containing a record of glassware/plasticware breakage forms (figure 1) will be maintained in the Lab Supervisor's Office.

Figure 1: Glass/Plasticware Breakage Log.

GLASS/PLASTICWARE BREAKAGE LOG

Date	Tech	Item Description	Number Broken

L-5.0-1.0