

# National Human Exposure Assessment Survey (NHEXAS)

## *Maryland Study*

## Quality Systems and Implementation Plan for Human Exposure Assessment

Emory University  
Atlanta, GA 30322

Cooperative Agreement CR 822038

**Standard Operating Procedure**

**NHX/SOP-L02**

**Title:** Cleaning of Glass and Plastic Containers

**Source:** Harvard University/Johns Hopkins University

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

**Notice:** The U.S. Environmental Protection Agency (EPA), through its Office of Research and Development (ORD), partially funded and collaborated in the research described here. This protocol is part of the Quality Systems Implementation Plan (QSIP) that was reviewed by the EPA and approved for use in this demonstration/scoping study. Mention of trade names or commercial products does not constitute endorsement or recommendation by EPA for use.

1.    Title of Standard Operating Procedure

Harvard University/Johns Hopkins University Standard Operating Procedures:  
**L02 Cleaning of Glass and Plastic Containers, Rev. 1.0**

2.    Overview and Purpose

The purpose of this SOP is to standardize the washing procedures for glassware and plasticware for all analytical activities in NHEXAS at HSPH, Westat, SwRI, and other facilities. This will ensure uniformity of cleanliness for all related analytical procedures. This SOP applies to all washing except when procedures are specified otherwise in other SOPs.

3.    Discussion

Because many of the substances being investigated in NHEXAS occur at low concentration levels, it is important to eliminate or minimize any potential source(s) of contamination. Otherwise, the glassware, plasticware, and apparatus used can be contributors to significant errors in levels of analyte concentrations. This SOP applies to both new and reusable glassware and plasticware; new glassware and plasticware will be tested prior to use to ensure no contamination is present.

4.    Personnel Responsibilities

All lab personnel are responsible for adhering to procedures set forth in this SOP.

Field personnel are responsible for maintaining the cleanliness by not allowing contamination to enter because of inattentiveness to detail; particularly in the collection of water samples, the field technician must strictly adhere to the steps in the appropriate protocols.

5.    Required Equipment and Reagents

5.1   Equipment

- sink with stopper
- fume hood (for acid washing)
- brushes, sponges, plastic woven abrasive
- wipes: Kimwipes or equivalent
- paper towels
- drying oven (optional)
- appropriate clothing including gloves, lab coat, and safety glasses
- ultrasonic bath (sonicator)

## 5.2 Reagents

hot and cold running tap water  
ultra-high-purity water (Milli-Q, Nanopure, or equivalent)  
deionized water (optional)  
commercial laboratory detergent, Liquinox or equivalent  
strong cleaning agent, Comet or equivalent  
nitric acid, concentrated ( $\text{HNO}_3$ )  
alcoholic (EtOH) KOH (3 g KOH/100 mL EtOH)  
plastic basin, drying racks

Note: "Cleaning solution," a solution of potassium dichromate in virtually concentrated sulfuric acid, is not to be used because it leaves persistent traces of chromium ion.

## 6. Procedure

### 6.1 Cleaning Glassware

Preparing: Remove all foreign material from the glassware and prerinse with hot tap water prior to initiating any washing procedures. Do not pour down the drain any potential clogging matter or hazardous waste. Hazardous waste should be disposed according to the departmental policy instructions of April 15, 1994.

Washing: Initial wash treatment: soap, hot water, soak and brush.

For difficult stains, dirt, grime, and grease:

1. soak overnight in 10%  $\text{HNO}_3$
2. rinse with water
3. soak and/or sonicate for 15 minutes in warm alcoholic KOH

Rinsing: 

1. tap water (if deionized is not available) 2x
2. deionized water (if available) 3x
3. ultra-high-purity water (necessary) 10-15x

Drying: 

1. use an oven set at 60°C with no possible analyte metal contamination
2. set on wipes, facing down; base surface must be free of possible contaminants
3. when dry, store in designated labeled storage location for clean, usable, dry glassware or plasticware.

Note: it is recommended that all glassware be covered with wipes while drying, even if facing down.

## 6.2 Cleaning Plasticware

Nalgene, Teflon, and other plastics may be washed similarly to glass; check manufacturer's instructions if available. Be more careful about scratching and use of abrasives with plastics of any kind.

## 6.3 Acid Washing

The following procedure is to be used except when a different procedure is specified in an SOP. It is safe for glass and most plastic; check plastic manufacturer's instructions.

1. Wash as specified in section 6.1 or 6.2.
2. Wash with hot 1:1  $\text{HNO}_3$  solution in a fume hood. **Caution:** acid gases.
3. Rinse 10-15 times with ultra-high-purity water. Allow to dry as in section 6.1.

## 7. Quality Assurance

For new and used glassware and plasticware, wash and rinse as in section 6.1, then combine a final Milli-Q rinse in an appropriate vessel and analyze the rinse in the next available run to ensure that any contamination has been removed. Repeat the washing/rinsing cycle if necessary until all traces of contamination have been removed.

## 8. References

Harvard University/Johns Hopkins University Standard Operating Procedures:  
L03 Operation of a High Purity Water System  
F07 Collection, Storage, and Shipment of Drinking or Tap Water Samples for Metal and Pesticide Analysis

HSPH    Dept. Memo on Hazardous Waste Policy, April 15, 1994

USEPA, *Handbook for Analytical Quality Control in Water and Wastewater Laboratories*,  
EPA-600/4-79-019, March 1979, EMSL, ORD, Cincinnati, Ohio 45268