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Title: Cleaning Glassware/Plasticware

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TITLE: STANDARD OPERATING PROCEDURE FOR CLEANING GLASSWARE/PLASTICWARE

SOURCE: Research Triangle Institute
Post Office Box 12194
Analytical and Chemical Sciences
Research Triangle Park, NC 27709-2194

AUTHOR(s):

R C Handy Date: 6/14/95

Date:

Date:

APPROVED BY:

Principal Investigator: E Pellizzari Date: 6/14/95

QA Officer: W J Smith Date: 6/15/95

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CLEANING GLASSWARE/PLASTICWARE

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1.0 INTRODUCTION

Room 170 in Camille Dreyfus Laboratory has been equipped with two triple basin sinks, each supplied with a deionized water line, and two industrial ovens capable of maintaining temperatures of 1000°F. ACS laboratory personnel use this facility to clean their dirty glassware and plasticware. The cleaning operation is carried out by an RTI employee assigned to this task.

2.0 SUMMARY OF PROCEDURE

Although several different cleaning procedures have been used in special situations, a standard method has evolved which is used most of the time. The following glassware cleaning procedure consists of two basic parts: soaking the glassware/plasticware in a detergent solution and heating (decontaminating) the glassware in a 900°F oven.

3.0 STANDARD GLASSWARE CLEANING PROCEDURE

3.1 Prepare solution for soaking glassware by mixing 1 cup of Amway detergent with hot water in one of the sink basins.

3.2 Carefully place the glassware from only one laboratory cart in a basin and soak for a minimum of 1 hour. Soak dirty glassware on other carts in separate basins.

NOTE: Expensive or custom-made glassware may be protected by placing item(s) in a basket, beaker or other container during the soaking period.

NOTE: Glassware received during late afternoon may be soaked overnight (or over the weekend).

3.3 Remove any exterior markings and labels and residues with a brush, an abrasive, or other appropriate means.

3.4 Thoroughly rinse the glassware with cold tap water.

NOTE: The criterion for sufficient rinsing is the absence of any soapy water on the glassware. However, there are certain techniques which have proved successful and are described below.

3.4.1 Vessels which hold liquids such as Erlenmeyer or volumetric flasks or narrow-mouth bottles: Fill twice to capacity and empty and then fill to approximately two-thirds capacity and empty while shaking vessel.

3.4.2 Vessels which hold liquids such as beakers, graduates, or wide-mouth bottles: Fill three times to capacity and empty.

3.4.3 Other equipment such as funnels, spatulas, or watchglasses: Rinse while rubbing surface with hands wearing rubber gloves.

3.5 Rinse the glassware with deionized water.

NOTE: This rinsing operation is not as intensive as the cold tap water rinse. Volume of deionized water used during rinse is approximately 1/3 that used of cold tap water.

NOTE: Before it is used in the laboratory, new glassware is often processed by rinsing with deionized water followed by oven heating (Section 3.8).

3.6 Place clean paper toweling (Crown, singlefold, 9 3/4" x 10 1/4") in the laboratory cart and place rinsed glassware on this toweling to dry.

NOTE: This is the toweling on which the glassware will be placed when removed from the oven (see Section 3.11).

NOTE: Certain pieces of glassware require a longer drying period than others (e.g., beaker vs. volumetric flask). This may be partially overcome by periodically draining any residual water from the vessel on the toweling. This drying operation usually takes 2-3 hours.

3.7 Discharge the soapy water used for soaking down the drain. A fresh soapy water is prepared for soaking glassware from other carts.

3.8 Place glassware in a high temperature oven, close both doors, and turn on heat (maximum temperature, 900° $\pm$ 25°F).

NOTE: Both ovens are programmed to heat to 900° $\pm$ 25°F, to maintain this temperature, and to shut off two hours after heating cycle began. Thus, the oven temperature is not at maximum during the entire 2 hour period since some of that time is required to heat oven to 900°F.

CAUTION

Do not put any plasticware in the oven. The high temperature will damage the item and contaminate the oven.

3.8.1 Do not oven-dry glassware or plasticware designated for use in trace metal

analysis. Instead, rinse three additional times with deionized water. For further treatment of glassware/plasticware for use in metal analysis, see Section 4.0.

3.9 After the 2 hour heating period, open the outer oven doors and allow the oven to cool in this manner for 30 minutes.

3.10 Carefully open the inner oven door and continue to cool glassware for an additional 30 minutes.

NOTE: Both cooling periods may be omitted if the heating cycle is started in the late afternoon. Operating in this manner will cause the oven to shut off two hours later and slowly cool overnight (or over the weekend) with the oven doors shut.

CAUTION

Rapid cooling of the oven will increase the likelihood of glassware cracking from extreme temperature changes. Wear nonasbestos, heat resistant gloves for all oven operations.

3.11 Remove the glassware from the oven and place on paper toweling in the laboratory cart.

NOTE: The toweling was used for the drying operation (see Section 3.6). It has not been customary to cover the clean glassware with anything.

CAUTION

To prevent damage to the glassware, do not remove glassware until the oven has completely cooled.

3.12 Return the glassware to the correct laboratory.

4.0 TREATMENT OF GLASSWARE USED IN METALS ANALYSIS

4.1 Soak clean glassware/plasticware to be used for metal analysis in a 20% HNO_3 (v/v) at least overnight.

4.2 Place all glassware/plasticware to be used for digestion of sample materials and all volumetric glassware 25 mL or less in a 20% HNO_3 bath and heat for two hours. Cool the bath and rinse the glassware/plasticware with deionized water.

4.3 Store the 1 liter glassware/plasticware filled with a 1% HNO_3 solution, stopper, and store in a laboratory cabinet.

4.4 Rinse all acid-treated glassware/plasticware copiously with deionized water before use.

CAUTION

Laboratory personnel should take precautions when working with acids and acid-treated glassware: wear lab coat, safety glasses or face shield and rubber gloves, and neutralize and rinse all laboratory surfaces exposed to acid solutions of any strength.

4.5 Treatment of glassware/plasticware used in the ACS Inorganic Clean Lab Facility is described in RTI/ACS-SOP-174-002.

5.0 VARIANCE TO STANDARD CLEANING PROCEDURE

Requests for the use of special cleaning protocols, not covered in the standard method, must be accompanied by a written SOP in which the requested protocol is clearly described. Before implementing the proposed procedure, the SOP must pass through the usual approval chain which consists of the ACS QA Officer and Vice President.

6.0 RULES FOR LABORATORY PERSONNEL

Before sending glassware/plasticware for cleaning, laboratory personnel will perform the following operations:

1. Clearly label all laboratory carts used for transporting glassware to and from Room 170. Include lab room number and name of staff member to whom glassware should be returned.
2. Place small pieces of dirty glassware on toweling or in a container to prevent breakage on floor.
3. Remove all residues from glassware.
4. Remove all labels and black markings from glassware.
5. Rinse all glassware and containers to remove solvents.

6. Writing on frosted sections of glassware should be done in pencil and erased before submitting to washing.
7. When clean glassware is returned to the laboratory, empty the cart by placing the glassware in designated storage areas. Dirty glassware should not be put in a cart containing clean glassware.
8. Do not place cracked or broken glassware on the cart for washing. Such items will be removed and not processed.