Title: Procedure for Glassware Washing

Purpose: To assist the laboratorian in performing glassware and plastic-ware washing, testing glassware for detergent residue and documenting results.

Procedure: Please check the appropriate box as the following steps are completed.
1. When handling glassware, observe universal precautions by wearing a lab coat, face mask (to prevent splashing) and gloves.

2. Collect glassware from the following rooms at NIB and CLASS Lab:
   - 1104 SW Right side of the room in the sink
   - 1110 SW Left side of the room in the sink
   - A120A Under the sink.

3. At NIB, use a large cart and pick up buckets of used glassware and plastic-ware and take them to Room 1104. Replace all buckets that were picked up with clean ones containing 1% solution of Contrex AP Powdered Labware detergent for soaking glassware and plastic-ware. Clean buckets are in Room 1104 beside the sink.

4. For CLASS glassware and plastic-ware, place items in a tray and wrap the tray with a plastic trash bag and twist tie for transport to NIB. A cart is available in A120A or A122.

5. Make an inventory of the glassware that was picked up from each room for washing.

6. Place glassware and plastic-ware in the glassware washing machine in Room 1168.
   a. Put pre-cleaned glassware and plastic-ware upside down over the pegs. Glassware on the tray should be all about the same height. Make sure the large tube on the right side of the tray is appropriately lined up with the tube on the right side of the glassware washer. Turn the diverter handle (outside of the glassware washer, below the panel to the right) until the tubes are firmly engaged,
   b. Insert the flat metal/mesh cage cover over the tray so that it is just above the level of the glassware.
   c. Close the door of the glassware washing machine.
d. Open the panel door and make sure POWER and HEAT are on. Push the START button. The process takes approximately 15 minutes. When the load is done, the glassware washing machine will light up the COMPLETE button.

e. Open the door and remove the glassware.

7. If glassware washing machine is not available for an extended time, it may be necessary to manually clean glassware and plastic-ware. In this case, use a test tube brush, sponge and Contrex AP Powder detergent dissolved in water, for cleaning all glassware and plastic-ware. Scrub items vigorously, rinse them thoroughly with tap water and then rinse them twice with DDI water.

8. Place all washed and DDI water-rinsed glassware and plastic-ware in the dryer just to the left of the doorway in Room 1168. After items are dry, place ONLY the glassware in the oven NOT THE PLASTIC-WARE. Set the timer to clean for 2 hours. Close the oven door, push the latch release button in and switch the latch to ‘Clean.’ This locks the oven door. The oven door will not open when the red light is on.

9. When the glassware is cool, remove it from the oven. Remove plastic-ware from the dryer. Remember to use gloves.

10. Cover all glassware/plastic-ware with aluminum foil, unless items have lids.

11. In order to detect detergent residues resulting from improper rinsing:

   a. Rinse a small clean beaker by filling and emptying 3 times with source water.
   b. Fill a fourth time and measure pH using a pH meter. Record the pH as source water pH.
   c. Take a piece of newly-cleaned glassware in order to test, fill about 10% full with source water. Use more water if necessary to get enough water to be able to sufficiently immerse the pH meter electrode.
   d. Agitate water in glassware to extract residues from all possible surfaces.
   e. Take pH reading with pH meter and record as glassware pH
   f. Any significant increase in pH indicates alkaline detergent residue. A significant change is 0.2 or more pH units on a pH meter measuring to 0.1 pH units of sensitivity. A result of less than 0.2 pH unit change indicates properly rinsed glassware.
g. If results indicate glassware has not been properly rinsed, repeat the process and retest.

g. Keep a log of the test date, types of glassware tested and test results in Room 1104 S.W.

If deionized water is used as the sample water, 100 uL of 1 mg/mL of reagent grade, non-buffering salt, specifically NaCl, in ddI water solution should be added to the sample water to allow pH meter to function properly. To avoid contaminating clean glassware, dump the glassware testing solution into a triple rinsed beaker and then add the non-buffering salt before measuring the pH with a meter.

Detergents and surface-active agents can interfere with some pH paper by causing a decrease of several pH units in reading. Test any pH paper with these detergents to determine if there is any interference before adapting this procedure to use with pH paper. **Test approximately 1% of large frequently washed quantities and 5% of smaller quantities of less frequently washed glassware, and rotate the types of glassware tested. Particularly try to test narrow-necked volumetric flasks more frequently.**

Note: for anionic detergent residues, kits are available from:

a. Chemetrics Inc. (phone# 800-356-3072) water testing kit for anionic detergents, sensitive to 1/4 ppm.
b. Lamotte (phone# 800-344-3100) chemical water testing kit for anionic detergents, sensitive to 1 ppm.
c. Hach Co. (phone # 800-227-4224) water testing method for anionic detergents, sensitive to 1 ppm.

12. Return all glassware and plastic-ware to their respective rooms on a cart covered with blue pads. Return CLASS glassware and plastic-ware in the transport tray. Each room should have a glassware inventory to use as a reference.

13. Refer any questions or problems to Dan McConnell (734-615-9566), Director of the Assay and Reagents Facility.