CLEANING BILAYER CUPS AND CHAMBERS

Several requests have been made regarding the proper cleaning of bilayer cups and chambers. In addition, several investigators have reported that the cleaning techniques they currently employ can degrade the quality of the aperture in the polystyrene cup over several months.

In general, Delrin is more chemically stable but not as structurally sound as polystyrene. By comparison, the advantages of the structural rigidity provided by polystyrene are compromised by the fact that it is more readily attacked by acids, bases and organic solvents.

We have developed a cleaning procedure which easily and quickly cleans polystyrene, polycarbonate and Delrin (as well as most other plastics). In field tests, materials cleaned using this technique have been maintained in good working order for several years.

Materials

- Sodium phosphate, tribasic ($Na_3PO_4 \bullet 12H_2O$)
  Make a 40-50 mM solution (~3 g per 200 ml – yes, you can estimate!)
- Dilute HCl solution (0.1% by volume)
- DD-H_2O and nanopure water
- 3 - 250 ml squirt bottles
  Label and fill squirt bottles with the solutions described above.
- Kimwipes or cotton swabs.

Procedure

Use the following procedure to clean both cups and chambers.

The general strategy is to first rinse with DD-H_2O, then clean using the trisodium phosphate (TSP) solution. After rinsing with DD-H_2O, residual phosphate is removed with dilute HCl. Any remaining HCl is removed with nanopure water.

Pre-rinse cups and chambers with DD-H_2O to remove your chemicals and biologicals. Take care to not lose your stirbar down the drain. Clean your cups first, then clean your chambers. This will simplify your effort. Clean each cup fully before moving onto the next.

1. Clean the inside and outside of the cup with TSP using the procedure described on the next page.
2. Rinse the TSP away using DD-H_2O from a carboy.
3. Remove any residual TSP by rinsing with dilute HCl. Rinse the aperture as described on the next page but omit the cotton swab/Kimwipe step..
4. A final rinse is performed using DD H_2O. Proceed as described for step 3.
5. Cups and chambers can be quickly dried using dry Kimwipes or an air jet.

NOTES:

1. **A special commentary is required for cleaning a cup**. The hole in the cup is fragile and, generally speaking, you need to clean the hole without damaging it. This is achieved by:
   - Rinse the cup with solution. When rinsing the inside of the cup, squirt your solution with some force so that the bubbles formed will agitate any particulates away.
   - Clean the hole by filling the cup with solution and applying pressure. Do this by sealing the top of the cup with your thumb and pressing. A small stream of fluid should squirt out of the hole.
   - Next **gently** wiping the outside of the hole with a TSP soaked cotton swab or Kimwipe.
   - Finally, repeat the pressure/squirt step described above.
2. **Do not store plastics in phosphate solution**. We recommend plastics be stored dry. They can, however, be stored for a short time in nanopure H_2O.

Please let us know if there are any problems or clarifications needed!