



Suggestions for cleaning laboratory glassware

Introduction

Laboratory procedures require exact methods and should include good glassware cleaning to insure excellent lab results. In all instances labware should be physically clean, including both chemical residue free and grease free, and in many cases even be sterile. All class A glassware that is used in precise measuring of liquids should have fully wettable surfaces. A good test is to use distilled water and see if the water wets all the inner surfaces equally. Grease or residues will not only contaminate the reaction and test results but will also alter the measurement of the liquids.

Good cleaning practices should also be accompanied by good inspection of the glass surfaces for chips, cracks or abrasions which will cause mechanical failure.

Cleaning

Always wash glass labware immediately after use. If a thorough cleaning is not immediately possible, always allow the glassware to soak. If not cleaned immediately some residues may be impossible to remove.

Most new glass is slightly alkaline and should be washed upon receipt and generally can be soaked in a 1% HCL or HNO₃ solution before wash and DI rinse.

Never soak for long periods in strong alkaline solutions as it will damage the glass.

Always follow up a soap or acid wash with a good DI water rinse.

Always use soft brushes with a wooden or soft plastic handle to avoid abrasion. Do not use wire brushes or brushes with a wire core as it can abrade the glass.

Glass cleaners

Alconox is the best as it's not abrasive. In fact they have a full line of detergents for soaking, hand washing and automatic washers. A detergent such as a non-abrasive dishwasher soap will also work well. Always use soft brushes. Always rinse glass well and do a final DI rinse. If you need to do an acid wash, always rinse the soap off the glass completely or it may cause a reaction and leave a film on the glass. There are many lab detergents available commercially such as; Mallinckrodt's KleanAR and Chem-Solv. Texwipe and EM Science also make good cleaning detergents

Chromic Acid or Chromerge

A great cleaner and also removes organic residues. Use gloves and well ventilate the area when using chromic acid as it is a carcinogen and very corrosive. Make sure metal clamps or flanges are removed. It is best to fill the vessel or soak the item in the solution for a short time in a plastic tub so that you can contain the wash material, then rinse immediately several times before proceeding to a detergent wash. Make sure the residual chromic acid is diluted after use and disposed of properly and according to your local or company regulations.

Occasionally stronger acid washes are necessary for certain types of precipitates or residues. It is best to keep these very dilute and be used in an area where there is good ventilation and make sure you contain the residual acid and dissolved material for proper disposal. This method should only be used when absolutely necessary. Disposal of seriously stained glass maybe a less troublesome and less expensive course of action than using strong acid washes.

One other caution is that strong acid or Chromerge type washes may damage the graduation markings.

Removal of Grease

Grease is best removed by boiling the glass in a weak solution of sodium carbonate. Acetone or any other organic solvent can be used also, followed by several water and DI water rinses.

Other stains

For permanganate stains use a mixture of equal 3% sulfuric acid and 3% hydrogen peroxide.

For Iron stains use a solution containing one part hydrochloric acid and one part water.

For bacteriological contamination glassware should be soaked in a disinfectant solution and then steam autoclaved then followed by a suitable washing and rinsing.

Caution: Make sure you refer to MSDS sheets for the cleaning solutions and the materials that were in the glassware to insure that there won't be any adverse reactions from the combination of the materials.

Ultrasonic Cleaners

Ultrasonics is a good method of cleaning glassware. Ultrasonic cleaners that are heated will be the best and generally with a mild detergent they will clean most residues off of glassware. We typically clean all glass in our factory both during and after the fabrication process in heated ultrasonic cleaners.

Rinsing

Glassware should always have a water rinse after any cleaning procedure followed by a DI rinse. It is best to give smaller pieces such as test tubes a soaking rinse followed by a DI soaking rinse.

Glass pipettes are best soaked in a suitable pipette washer and washed and given both a water rinse and DI soaking rinse.

Drying

Oven drying at 100° C is best for all glassware. If not convenient, rack drying will work.

Steam Autoclaving or Sterilizing

Proper protocol for steam autoclaving of borosilicate glassware is 15-20 minutes at 100-120° C. **Always leave closures off or loose during autoclaving.**

Inspection after cleaning

Always inspect all glassware before steam autoclaving for cracks, chips or damage. The autoclave procedure will cause glassware to break if already damaged.

Remember – All labware is generally borosilicate glass, especially if it's made in the USA. The suggestions herein refer to borosilicate labware only. Bottles are generally NOT borosilicate glass and are made from soda lime or soft glass. Bottles do not have the temperature range or autoclave range of borosilicate glass. Please refer to cleaning procedures for these containers from the manufacturer. Do not mix bottles and labware in the same washes, heat drying and especially autoclaving procedures.