

Suggestions for Cleaning Glassware

Introduction

Good laboratory technique demands clean glassware, because the most carefully executed piece of work may give an erroneous result if dirty glassware is used. In all instances, glassware must be physically clean; it must be chemically clean; and in many cases, it must be sterile. All glassware must be absolutely grease-free. The safest criterion of cleanliness is uniform wetting of the surface by distilled water. This is especially important in glassware used for measuring the volume of liquids. Grease and other contaminating materials will prevent the glass from becoming uniformly wetted. This in turn will alter the volume of residue adhering to the walls of the glass container and thus affect the volume of liquid measured or delivered. Furthermore, in pipettes and burettes, the meniscus will be distorted and the correct adjustments cannot be made. The presence of small amounts of impurities may also alter the meniscus.

Wash glassware as quickly as possible after use. The longer it is left unwashed the harder it will be to clean. If a thorough cleaning is not possible immediately, disassemble the glassware and put it to soak in water. This is especially important for ground glass stopcocks and stoppers. If glassware is not cleaned immediately, it may become impossible to remove the residue. Do not overload sinks, dishwashers, or soaking bins. Rubber sink and counter mats can help reduce the chance of breakage and resultant injury. Most new glassware is slightly alkaline in reaction. For precision chemical tests, new glassware should be soaked several hours in acid water (a 1% solution of hydrochloric or nitric acid) before washing.

Safety Considerations

Eye protection and heavy duty slip-resistant and chemically resistant gloves should be used when washing glassware. If simple soap and water will not clean the glassware, chemical reagents can be used to remove most stains or solid materials. These reagents are generally too dangerous for novice or students to use. Any glassware that cannot be cleaned well enough with soap, detergent or cleaning powder should be cleaned by a person who has more experience with cleaning agents.

Glassware Cleaners

When washing, soap, detergent, or cleaning powder (with or without an abrasive) may be used. Cleaners for glassware include Alconox®, Liquinox®, Lux®, Tide® and Fab®. The water should be hot. For glassware that is exceptionally dirty, a cleaning powder with a very mild abrasive action, such as BonAmi®, will give more satisfactory results. The abrasive should not scratch the glass.

During the washing, all parts of the glassware should be thoroughly scrubbed with a brush. This means that a full set of brushes should be available: brushes to fit large and small test tubes, burettes, funnels, graduates and various sizes of flasks and bottles. Brushes with wooden or plastic handles are recommended as they will not scratch or abrade the glass surface. Motor driven revolving brushes are valuable when a large number of tubes or bottles are processed. Do not use cleaning brushes that are so worn that the brush spine hits the glass. Serious scratches may result. Scratched glass is more prone to break during experiments. Any mark in the uniform surface of glassware is a potential breaking point, especially when the piece is heated or used in vacuum applications. Do not allow acid to come into contact with a piece of glassware before the detergent (or soap) is thoroughly removed. If this happens, a film of grease may be formed.

Removing Grease

Grease is best removed by boiling in a weak solution of sodium carbonate. Acetone or any other fat solvent may be used. Strong alkalis should not be used.

Grease can also be removed from ground joints by wiping with a paper towel soaked in acetone or other appropriate solvent. Use a fume hood to minimize exposure to the fumes.

Drain and rinse degreased glassware with acetone or use fuming sulfuric acid for 30 minutes. Be sure to rinse off all of the cleaning agents.

Rinsing

It is imperative that all soap, detergents and other cleaning fluids be removed from glassware before use. This is especially important with the detergents, slight traces of which will interfere with serologic and cell culture applications.

After cleaning, rinse the glassware with running tap water. When test tubes, graduates, flasks and similar containers are rinsed with tap water, allow the water to run into and over them for a short time, then partly fill each piece with water, thoroughly shake and empty at least six times. Pipettes and burettes are best rinsed by attaching a piece of rubber tubing to the faucet and then attaching the delivery end of the pipettes or burettes to a hose, allowing the water to run through them. If the tap water is very hard, it is best to run it through a deionizer or reverse osmosis system before using.

Next rinse the glassware in a large bath of high purity or distilled water. Then do a final individual rinse of each item with high purity water. To conserve water, use a five gallon bottle as a reservoir. Store it on a shelf near your clean-up area. Attach a siphon to it and use it for replenishing the reservoir with used distilled water.