**GLASSWARE CLEANING**

MLS 201

**Introduction**

Laboratory procedures require specific, sensitive and precise methods for a reliable result.

These methods should involve good glassware cleaning to ensure excellent laboratory results.

In all instances laboratory wares should be physically clean, chemical residue free, grease free and be sterile.

Laboratory glassware are a variety of materials made of glass used for scientific experiments and analysis in all fields of science especially the diagnostic and research field of medicine.

**Types of Laboratory Glassware**

Merck glassware

Duran glassware

Rankem glassware

Borosil R glassware

Borosilicate quality glassware

Hydrometer

Thermometer

Crucibles-silica

-Examples of glassware items include;

 \*Beakers

\*Test tubes



\*Glass petri dishes

\*Pipettes

\*Graduated cylinders

\*Microscopic slides

\*Jars etc.

 **Glassware cleaning**

Glassware cleaning is dependent on the type of glass and the agent to be cleaned off the glass.

In lieu of this, there are different method of glassware cleaning.

1. Initial Glass Cleaning

This is the first step in glassware cleaning.

If the glassware isn’t clean after these initial steps you can go on to more aggressive cleaning protocols.

Method

Scrape away any thick solid material from the glass if possible.

**Glassware cleaning(Methods)**

Wipe away any grease from the glass joints with a solvent like acetone which can be used to help remove the grease.

Put the glassware in a warm cleaning solution of detergent and water.

Use a brush or cleaning pad to clean any residue or contamination.

Rinse with tap water first, followed by deionized water and allow to dry.

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 , rinse in tap followed by DI water and allow to dry.

**Glassware cleaning(Methods)**

**2. Mild Cleaning Methods**

If the initial cleaning method fails try gentle solvents for long term soaking.

When dealing with the gentle aqueous solutions heat soaking or, in some instances, mechanical agitation such as stirring, shaking, or sonication can enhance its productivity.

The common gentle aqueous cleaning mixtures are described below.

**Common Gentle Aqueous Cleaning Mixtures and their Uses**

Deionized water for diluting out absorbed ions – passive soaking.

Dilute surfactants Solubilizing lipid material – agitation, brushing, rubbing or sonication.

Protein or saccharide hydrolyzing enzymes Breaking larger structures into soluble molecules – passive soaking.

Metal chelating compounds Insoluble salts become more so by removing the metal ion – passive soaking.

Dilute strong acids Insoluble salt’s anion is soluble as its acid form – soak or agitation.

Concentrated weak acids Insoluble salt’s anion is soluble as its acid form – soak or brush.

Dilute solutions of: Phosphates, Carbonates or Ammonia All create low levels of hydroxide ions for solubilizing weak insoluble acidic solids or hydrolyzing ester bonds – soak, agitate or brush.

**Glassware cleaning(Methods)**

**3. Using Organic Solvents**

* Organic solvents are often used to remove contaminants from glass.
* Basically, if it can be readily dissolved in an organic solvent it can be removed by these means.
* The use of organic solvents is complicated due to their flammability and toxicity.
* When working with solvents proper ventilation and appropriate PPE (suitable glove compatibility with the solvent) are necessary.
* Moistening a cloth with solvent is good for easily accessed surfaces.
* Agitating solvent inside of a glass container is another method.

**Glassware cleaning(Methods)**

**4. Aggressive Cleaning Methods**

If the mild, aqueous and organic solvent methods described above are not effective then aggressive cleaning method is adopted.

This method involves releasing the adhered material/ contaminant by removing the top layer of silicon oxide of the glass.

It can also be done by oxidizing the material itself from the glass surface.

This can be achieved by soaking the glass in 2% hydrofluoric acid or a base bath (sodium or potassium hydroxide in either ethanol or isopropanol) before rinsing and cleaning in detergent.

**Glass cleaners**

Detergents are the best e.g. Alconox.

They can be used for handwashing, soaking and automatic washer.

Always use soft brushes.

Always rinse glass well and do a final DI rinse.

Chromic Acid or Chromogen

It is 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 properly according to your local or company regulations.

Removal of Grease