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*Assignment on laboratory glassware cleaning.*

**Answer.**

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.

Laboratory experiments involve the use of glassware which must be physically clean, chemical residue free, grease free and be sterile for excellent laboratory results. Glassware cleaning is dependent on the type of glass and the agent to be cleaned off the glass; therefore there are different methods of glassware cleaning.

1. **THEMOMETER:**

**INITIAL GLASS CLEANING.**

This is the first step of glassware cleaning. If this method doesn’t clean the glassware properly, you can go to more aggressive protocols/methods.

*Method:*

1. Scrape away any thick solid material from the glass if possible.
2. Wipe away any grease from the glass joints with a solvent like acetone which can be used to help remove the grease.
3. Put the glassware in a warm cleaning solution of detergent and water.
4. Use a brush or cleaning pad to clean any residue or contamination.
5. Rinse with tap water first, followed by deionized water and allow to dry.
6. 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.
7. **PIPETS:**

**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 e.g.: deionized water, dilute surfactants, protein or saccharide hydrolyzing enzymes, metal chelating compounds, dilute strong acids, concentrated weak acids, etc.

1. **VOLUMETRIC FLASKS:**

**MILD CLEANING METHODS.**

Here you may need to soak the glassware overnight in soapy water. 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 glassware may require scrubbing with a brush.

The common gentle aqueous cleaning mixtures are described below e.g.: deionized water, dilute surfactants, protein or saccharide hydrolyzing enzymes, metal chelating compounds, dilute strong acids, concentrated weak acids, etc.

1. **DURAN GLASSWARE:**

**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.

1. **OXIDIZING CONTAMINANTS FROM GLASSWARE.**

Often the residue on glass is insoluble to organic solvents, surfactant solutions, or mildly acidic solutions. At this point one of the common ways to clean glass is to oxidize the contaminant in order to render it soluble.

Oxidizing agents include aqua regia (nitric acid and HCl); Chromic acid which is a sulfuric acid based agent; Piranha solution (hydrogen peroxide based agent), fuming sulfuric acid which contains pyrosulfuric acid.