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**Assignment**

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 methods of glassware cleaning.

These are the cleaning methods of 4 laboratory glassware:

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.
* 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.

1. **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 pyro sulfuric acid.

1. **.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 oxiding 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.
* The aggressive method is achievable due to the borosilicate nature of laboratory glassware as the acid will attach to the silica layer of the glass.