***STANDARD OPERATING PROCEDURE – G001***

**Scientific glassware washing**

1. **Objectives**

The objective of this document is to establish standard operating procedures for washing of scientific glassware , ensuring the safety of laboratory personnel by mitigating potential risks associated with hazardous materials, and injuries. Additionally, this SOP aims to enhance the efficiency of experimental workflows.

1. **Personal Protective Equipment**

To ensure safety during scientific glassware washing, appropriate personal protective equipment (PPE) must be worn. This includes:

* Long pants and closed-toe shoes to protect against spills and splashes.
* A long-sleeved, buttoned lab coat to minimize skin exposure.
* Safety glasses or goggles to protect against splashes or flying debris.
* Strong rubber gloves to prevent direct contact with hazardous chemicals, detergent and broken glass.
* Face shield when handling hot water, steam, or highly corrosive chemicals.
* If the user has long hair, it should be tied back.

1. **Potential Hazards**

Scientific glassware washing poses various hazards that must be managed to maintain a safe working environment. These include:

* **Chemical Exposure:** Health risks from chemical residues and acid/base bath that may impact individuals through skin contact or inhalation.
* **Cuts and Lacerations:** Injuries caused by broken glassware during the cleaning process.
* **Skin Burns:** Burns from hot water, steam, acid/base bath and hot glassware.
* Slip Hazards: Wet floors can lead to slips and falls, creating safety concerns in the laboratory.
* **Biohazard Risks:** Contaminated glassware can pose biological hazards if not adequately cleaned.

1. **Training**

Ensure all personnel have received proper training on their hazards and safe handling techniques.

* MC03 Chemical Safety II / Hazardous Waste Management
* MC07 Chemical Safety I / Chemical Safety for Laboratory Users

1. **Procedures**
2. Preparation

* Wear the appropriate PPE before starting the washing process.
* Work areas should be free of clutter.
* A wet floor can become a slippery work hazard and requires sturdy shoes. The wash area should be equipped with a mop and bucket in case of water spillage.
* Boxes with large or multiple glassware items should be lifted with care using correct lifting procedures.
* Glassware should be rinsed with water right after use to prevent any residues from drying and hardening.
* Sort glassware by type and level of contamination.

1. Washing Process
2. Manual Washing

* Transport glassware to the washing area using large plastic boxes on a sturdy trolley. The wheels should be checked regularly to ensure they can move properly.
* Clean the glassware with a soft sponge or brush, giving special attention to the interior surfaces and any detailed areas.
* For tough residues, soak the glassware in soapy water for a few minutes before scrubbing.
* Rinse thoroughly with clean water to eliminate all detergent and residues.

1. Acid/Base Bath Cleaning

* Use acid/base baths only when necessary for removing stubborn residues (e.g., organic deposits, inorganic salts).
* Prepare acid/base baths in a fume hood to minimize inhalation risks.
* For acid baths, use diluted solutions of hydrochloric acid (HCl) or sulfuric acid (H₂SO₄) at concentrations ≤10%.
* For base baths, use sodium hydroxide (NaOH) or potassium hydroxide (KOH) solutions at concentrations ≤10%.
* Immerse glassware in the bath for a maximum of 1-2 hours to avoid excessive etching or damage.
* Rinse glassware thoroughly with deionized water after removing it from the bath to neutralize any remaining acid/base.
* Dispose of used acid/base solutions in designated hazardous waste containers.
* Label all acid/base containers clearly and store them in a secure, well-ventilated area. Avoid placing the container under the sink unit.

1. Machine Washing

* Remove dirty glassware from boxes near the sinks and soak it in hot water. Stickers should be removed after soaking.
* Load glassware into a laboratory-grade dishwasher, ensuring it is stacked and spaced out properly. Choose the appropriate wash cycle and detergent specifically designed for laboratory glassware.
* After the washing cycle is complete, inspect the glassware for any remaining residues or spots.
* Allow glassware to cool down especially if after washing using hot water.
* Allow the glassware to air dry on a clean, dry rack or manually dry it with a lint-free cloth.

1. Handling and Storage

* Store glassware in designated cabinets or shelves at or below eye level, organized by type and size, to protect it from breakage.
* Always use a tray or trolley to transport glassware from one location to another.
* Do not exceed the carrying capacity of the tray or trolley when moving glassware.
* Ensure that all glassware is completely dry before storing to prevent contamination.

1. **Incident Reporting**
   * Report any broken glassware or equipment issues to the supervisor.
   * Broken glassware on the floor should be swept up and disposed of in designated cardboard boxes for broken glass.
   * When handling broken glass, thick gloves should be worn to avoid cuts.
   * Clean and sanitize the washing area after use to ensure a safe and hygienic environment.

* Excessive water on the floor should be mopped immediately to avoid slips.
* Promptly notify the Principal Investigator (PI) and / or departmental safety officer (DSO) of any injuries.
* For serious incidents, contact the Security Unit immediately by calling the 24-hour hotline on **2358 8999**.

1. **References**

* Monaghan, B. & Smith, T. (2016). *SOP\_SMB018.3: Scientific glassware washing.* Risk Assessment. The University of Sydney.
* Coleman, N. & Dimauro, J (2014). *SOP SMB018.2 (JD NC 0714): Scientific glassware washing.* The University of Sydney*.*
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* Health, Safety and Environment Office, The Hong Kong University of Science and Technology (2014). *Chapter 7: General Laboratory Safety.* From: https://hseo.hkust.edu.hk/sm\_07