***STANDARD OPERATING PROCEDURE – C008***

**WORKING WITH OXIDIZER**

1. **Objectives**

The objective of this document is to establish standard operating procedures for working with oxidizer, ensuring the safety of laboratory personnel by minimizing the dangers posed by explosives or fire hazards. Additionally, this SOP seeks to optimize the effectiveness of experimental processes.

1. **Personal Protective Equipment**

To ensure safety during work with oxidizers, 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.
* Disposable nitrile/neoprene gloves to prevent direct contact with hazardous chemicals.
	+ **NOTE:** The chemical’s SDS should always be checked prior to start of work to ensure proper glove selection.
* If the user has long hair, it should be tied back.
1. **Potential Hazards**

When working with oxidizers, safety precautions must be taken to manage and maintain a safe working environment. There are several hazards a user can come into contact with and these include:

* **Fire Hazard:** Oxidizers may cause or contribute to the combustion of other materials. It can form EXPLOSIVE mixtures when mixed with combustible, organic materials, reducing agent or fuel. Solid oxidizers in solution may be too dilute to react with combustible materials to produce a fire. However, if a combustible material (e.g., a paper towel, lab coat, lab matting) is contaminated with a solution containing an oxidizer, as the solution dries, the oxidizer is concentrated. This can cause the combustible material to spontaneously ignite and burn intensely.
* **Health Hazard:** Oxidizers are often corrosive and can cause redness, irritation, and burns upon contact with skin. Eye exposure can lead to severe irritation, and potentially permanent damage. Inhaling oxidizer vapors or dust can irritate the respiratory tract, causing coughing, sore throat, and even chemical burns. Some oxidizers, like nitrogen trioxide, can cause delayed pulmonary edema (fluid buildup in the lungs).
* Users must familiarize themselves with the specific hazards of the compounds they are working with, which can be found on the chemical’s Safety Data Sheet (SDS).
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. Storage and handling
* Store oxidizers away from organic, flammable, dehydrating, or reducing agents.
* Do not store oxidizers in wooden cabinets or on wooden shelves.
* Do not store liquids above eye level.
* Provide secondary containment for strong oxidizing acids such as perchloric and chromic acid.
* Do not use corks or rubber stoppers.
* All containers and storage locations must be clearly labeled.
* Strong oxidizers must be stored in unbreakable secondary containment.
* All manipulations (open chemical use) must be conducted in a fume hood.
* Prepare your workstation prior to using strong oxidizers (e.g. remove any solvent/flammable squirt bottles and flammable materials such as Kimwipes and paper towels).
1. Disposal of oxidizer
* Refer to the SOP titled “Disposal of hazardous chemical waste” for more details. Pretreat the oxidizer before disposal whenever feasible.
* Check the waste log sheet and avoid incompatibilities.
1. **Spills, Incidents and Reporting**
* All spills must be cleaned up following Standard Operating Procedure.
* In the event of a fire, activate the fire alarm and evacuate the area. Do not activate the emergency ventilation system, as they can exacerbate combustion.
* For any skin or eye contact, remove contaminated clothing and accessories; flush affected area with water. If symptoms persist, get medical attention.
* For inhalation, move person into fresh air. If symptoms persist, get medical attention.
* For ingestion, rinse mouth with water. If symptoms persist, get medical attention.
* Report any accidents that result in injuries to the PI and/or the departmental safety officer (DSO) immediately.
* For serious incidents, notify the Security Unit immediately by calling the 24-hour hotline on **2358 8999**.

**7) References**

* University of Arizona. (2015). *Oxidizers hazard class: Standard operating procedure*. https://research.arizona.edu/sites/default/files/cs-chemical\_hazard\_class\_sop\_for\_oxidizers\_0.pdf
* Texas Woman's University. (n.d.) *Standard operating procedure: Oxidizers*. <https://twu.edu/media/documents/risk-management/Oxidizers-SOP.pdf>
* Health, Safety and Environment Office, The Hong Kong University of Science and Technology (n.d.). *List of Shock Sensitive and Explosive Chemicals.* Retrieved on June 30, 2025, from <https://hseo.hkust.edu.hk/chem-info/shock-sensitive-chemicals>
* Health, Safety and Environment Office - Hong Kong University of Science and Technology(n.d.). *Laboratory Emergency Preparedness and Response Video*, from <https://hseo.hkust.edu.hk/node/3653>