Research
Research Laboratory & Safety Services

PO Box 245101
Tucson, AZ 85724-5101
Voice: (520) 626-6850
FAX: (520) 626-2583
rlss.arizona.edu

Oxidizers Hazard Class
Standard Operating Procedure

1. Purpose

This standard operating procedure (SOP) is intended to provide guidance on how to safely work with oxidizing chemicals in a University of Arizona (UA) laboratory. Laboratory personnel should review this SOP, as well as the appropriate Safety Data Sheet(s) (SDSs), before using oxidizers. If you have questions concerning the requirements within this SOP, contact the Approval Holder (AH)/Approval Safety Coordinator (ASC), or the Research Laboratory & Safety Services (RLSS).

2. Scope

This hazard class SOP only addresses safety issues specific to the oxidizing hazard of a chemical; several hazard class SOPs may be applicable for a specific chemical.

3. Hazard Description

Oxidizers are chemicals that may react violently when they come into contact with reducing agents (e.g. zinc, hydrazine, formic acid), or combustible materials. They initiate or promote combustion in other materials, generally by the rapid release of oxygen.

Examples of oxidizing chemicals include halogens, chlorates, nitrates, chromates, persulfates and peroxides. Strong oxidizers (e.g. calcium chlorate, fluorine, hydrogen peroxide, potassium bromate) are capable of forming explosive mixtures with combustible, organic or reducing materials.

4. General Control of Hazards

The following general control measures should be implemented whenever using or handling oxidizers:

- Minimize the quantities of oxidizers used and stored in the laboratory.
- Keep oxidizing materials away from heat, flammables and potential fuels such as clothing and other combustible materials.
- Use caution when mixing oxidizers with flammable, combustible, or reducing materials for an experiment. Use small amounts to allow better control of the reaction and heat generation.

5. Engineering Controls

Oxidizing chemicals should be stored and used in a well-ventilated area. Perchloric acid must be used in a special chemical fume hood that is equipped with wash down facilities. Contact the RLSS for more information on fume hood requirements for the use of this chemical.

Safety shielding is required any time there is a risk of an explosion, splash hazard or highly exothermic reaction. This shielding requirement may be met by performing the experiment in a chemical fume hood, with the sash at is lowest possible position. Portable blast shielding is acceptable, as long as it may be reasonably effective at protecting all laboratory workers in the area.

PO Box 245101
Tucson, AZ 85724-5101
Voice: (520) 626-6850
FAX: (520) 626-2583
rlss.arizona.edu

6. Personal Protective Equipment

At a minimum, all laboratory workers must wear safety glasses, long pants, closed-toed shoes, a laboratory coat and examination gloves when working with hazardous chemicals in a laboratory.

Laboratory personnel working with oxidizing chemicals when a splash hazard exists must wear splash goggles instead of safety glasses. Chemical-resistant gloves may be necessary if working with the oxidizing chemical for an extended period of time. Refer to the Personal Protective Equipment Selection Guide on the RLSS website for further information on appropriate chemical-resistant gloves.

7. Handling and Storage Requirements

Store oxidizing gases in a cool, dry, well-ventilated place away from flammable and combustible materials such as solvents, wood, paper, Styrofoam, and plastics. Oxidizing agents should also be segregated from reducing agents (e.g. zinc, alkaline metals, etc.), as they can react violently with oxidizers. Since combustible materials (i.e. wood, paper, etc.) are great fuels for oxidizers, oxidizing chemicals should not be stored in wooden cabinets or on wooden shelves.

Secondary containment must be used when storing strong oxidizing acids, such as perchloric acid and chromic acid. Cylinders of oxidizing gases must be fitted with flow reduction valves and fittings free from oil and grease (these are great combustible fuels for oxidizers).

8. Waste Disposal

Waste oxidizing chemicals should be collected in compatible waste containers (i.e. plastic 3.5 gallon buckets) and segregated from incompatible chemicals. Contact Risk Management Services for further information on the disposal of flammable chemicals.

9. Spill and Incident Procedures

Laboratory personnel may clean a spill of small amounts of oxidizers only if the spill does not involve a reactive mixture and they have appropriate materials and training. Before beginning spill cleanup, alert all laboratory workers in the area of the spill of oxidizing chemicals. Do not use paper towels or other inappropriate combustible materials to clean a spill of oxidizing chemicals; consider the use of other absorbents (e.g. vermiculite).

If the spill of oxidizing chemicals is large or contains a reactive mixture, do not attempt to clean the spill yourself. Evacuate the area and follow the procedures in the University Chemical Hygiene Plan section on major chemical spills. Inform the RLSS of all major chemical spills.

In the case of an explosion in the laboratory, evacuate the area immediately and call 911 from a campus phone, or call 911 from a non-campus phone and mention the incident is on the UA campus (if on the main Tucson campus). If there is a fire in the laboratory containing oxidizing chemicals, either contain the fire using an approved fire extinguisher, or pull the fire alarm if the fire is not quickly extinguished by building/laboratory fire control equipment.

If a laboratory worker is injured or exposed to oxidizing chemicals, immediately notify the AH/ASC. If a laboratory worker requires immediate medical attention, call 911. Remove contaminated clothing and

PO Box 245101
Tucson, AZ 85724-5101
Voice: (520) 626-6850
FAX: (520) 626-2583
rlss.arizona.edu

immediately flush the contaminated areas with water for at least 15 minutes. For eye exposures, immediately remove contact lenses, if present, and flush the eyes with water for at least 15 minutes. Consult the chemical's SDS for more specific information on appropriate first aid. Inform the RLSS and Risk Management Services of the incident as soon as practicable.

10. Designated Area

Designated areas are not required for this hazard class. However, chemicals may belong to multiple hazard classes, and an oxidizer may require a designated area if it belongs to a hazard class that includes particularly hazardous chemicals.