

**SAN DIEGO STATE UNIVERSITY  
ENVIRONMENTAL HEALTH & SAFETY DEPARTMENT**

**STANDARD OPERATING PROCEDURES  
OXIDIZING CHEMICALS**

Standard operating procedures (SOP) are intended to provide you with general guidance on how to safely work with a specific class of chemical or hazard. This SOP is generic in nature. It addresses the use and handling of substances by hazard class only. In some instances multiple SOPs may be applicable for a specific chemical (i.e., both the SOPs for flammable liquids and carcinogens would apply to benzene). If you have questions concerning the applicability of any item listed in this procedure contact Environmental Health & Safety Department (619) 594-6778 or the Principal Investigator of your laboratory. Specific written procedures are the responsibility of the principal investigator.

If compliance with all the requirements of this standard operating procedure is not possible, the principal investigator must develop a written procedure that will be used in its place. This alternate procedure must provide the same level of protection as the SOP it replaces.

Oxidizing chemicals are materials that spontaneously evolve oxygen at room temperature or with slight heating or promote combustion. This class of chemicals includes peroxides, chlorates, perchlorates, nitrates, and permanganates. Strong oxidizers are capable of forming explosive mixtures when mixed with combustible, organic or easily oxidized materials. Examples of strong oxidizers are listed at the end of this SOP.

**Hazard assessment**

Hazard assessment should address proper use and handling techniques, fire safety, storage, and waste disposal issues.

**EH&S Notification**

You should notify Environmental Health & Safety Department (619) 594-6778 prior to the initial use of the following oxidizers: perchloric acid.

**Special storage**

Oxidizers should be stored in a cool and dry location. Keep oxidizers segregated from all other chemicals in the laboratory. Minimize the quantities of strong oxidizers stored in the laboratory.

Never return excess chemicals to the original container. Small amounts of impurities may be introduced into the container which may cause a fire or explosion.

**Designated area**

Not applicable

**Securing of gas cylinders**

Not applicable

**Eye protection**

Eye protection in the form of safety glasses must be worn at all times when handling oxidizing chemicals. Ordinary (street) prescription glasses do not provide adequate protection. (Contrary to popular opinion these glasses cannot pass the rigorous test for industrial safety glasses.) Adequate safety glasses must meet the requirements of the Practice for Occupational and Educational Eye and Face Protection (ANSI Z.87. 1 1989) and must be equipped with side shields. Safety glasses with

side shields do not provide adequate protection from splashes; therefore, when the potential for splash hazard exists other eye protection and/or face protection must be worn.

### **Eyewash**

Where the eyes or body of any person may be exposed to oxidizing chemicals, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use. Bottle type eyewash stations are not acceptable.

## **Respiratory Protection**

### **Fume hood**

The use of certain concentrations of perchloric acid must be performed in a fume hood equipped with wash down facilities. Contact Environmental Health & Safety Department (619) 594-6778 for fume hood requirements.

### **Glove (dry) box**

Not applicable

### **Special ventilation**

The use of certain concentrations of perchloric acid must be performed in a fume hood equipped with wash down facilities. Environmental Health & Safety Department (619) 594-6778 for fume hood requirements.

## **Protective apparel**

Lab coats, closed toed shoes and long sleeved clothing should be worn when handling oxidizing chemicals. Additional protective clothing should be worn if the possibility of skin contact is likely.

### **Safety shielding**

Safety shielding is required any time there is a risk of explosion, splash hazard or a highly exothermic reaction. All manipulations of oxidizing chemicals which pose this risk should occur in a fume hood with the sash in the lowest feasible position. Portable shields, which provide protection to all laboratory occupants, are acceptable.

### **Gloves**

Gloves should be worn when handling oxidizing chemicals. Disposable nitrile gloves provide adequate protection against accidental hand contact with small quantities of most laboratory chemicals. Lab workers should contact EH&S for advice on chemical resistant glove selection when direct or prolonged contact with hazardous chemicals is anticipated.

## **Safety shower**

A safety or drench shower should be available in a nearby location where the oxidizing chemicals are used.

## **Signs and labels**

**Containers:** All oxidizing chemicals must be clearly labeled with the correct chemical name. Handwritten labels are acceptable; chemical formulas and structural formulas are not acceptable.

## **Vacuum protection**

Evacuated glassware can implode and eject flying glass, and splattered chemicals. Vacuum work involving oxidizing chemicals must be conducted in a fume hood, glove box or isolated in an acceptable manner.

Mechanical vacuum pumps must be protected using cold traps and, where appropriate, filtered to prevent particulate release. The exhaust for the pumps must be vented into an exhaust hood.

### **Waste disposal**

All materials contaminated with oxidizing chemicals pose a fire hazard and should be disposed of as hazardous waste. Alert the Environmental Health & Safety Department (619) 594-6778 if you generate wastes contaminated by oxidizers. Do not let contaminated wastes remain in the laboratory overnight unless proper containers are provided.

### **Decontamination procedures**

**Personnel:** Wash hands and arms with soap and water immediately after handling oxidizing chemicals.

**Area:** Carefully clean work area after use. Paper towels or similar materials contaminated with strong oxidizing chemicals may pose a fire risk.

### **Spill response**

Anticipate spills by having the appropriate clean up equipment on hand. The appropriate clean up supplies can be determined by consulting the material safety data sheet. This should occur prior to the use of any oxidizing chemicals. Spill control materials for oxidizers are designed to be inert and will not react with the reagent. Never use paper towels or other inappropriate materials which are combustible. The waste materials generated during spill cleanup may pose a flammability risk and should not remain in the laboratory overnight unless it is stored in an appropriate container.

In the event of a spill. Alert personnel in the area that a spill has occurred. Do not attempt to handle a large spill of oxidizing chemicals. Vacate the laboratory immediately and call for assistance.

- Environmental Health & Safety Department (619) 594-6778
- San Diego State University Public Safety Department Emergency Number (619) 594-6778 or 911 from a campus phone.

Remain on the scene, but at a safe distance, to receive and direct safety personnel when they arrive.

### **Emergency procedure**

Emergency procedures which address response actions to fires, explosions, spills, injury to staff, or the development of sign and symptom of overexposure must be developed. The procedures should address as a minimum the following:

**Who to contact:** (University police, Environmental Health & Safety Department (619) 594-6778, Principal investigator of the laboratory including evening phone number)

The location of all safety equipment (showers, spill equipment, eye wash, fire extinguishers, etc.)

The method used to alert personnel in nearby areas of potential hazards

Special first aid treatment required by the type of oxidizing chemicals material(s) handled in the laboratory

### **Examples of Strong Oxidizers**

Ammonium perchlorate  
Barium peroxide  
Calcium chlorate  
Chlorine trifluoride  
Chromic acid  
Fluorine  
Magnesium peroxide  
Perchloric acid  
Potassium chlorate  
Propyl nitrate  
Sodium chlorite  
Sodium peroxide

Ammonium permanganate  
Bromine  
Calcium hypochlorite  
Chromium anhydride  
Dibenzoyl peroxide  
Hydrogen peroxide  
Nitrogen trioxide  
Potassium bromate  
Potassium peroxide  
Sodium chlorate  
Sodium perchlorate

Source: CRC Handbook of Laboratory Safety, 3rd edition.