


<b>Standard Operating Procedure (SOP)</b>			
<b>Working with Oxidizers</b>			
<i>Approved by:</i>		<i>Effective Date:</i>	01/27/07
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**PURPOSE**

Provides information pertinent to the safe storage, use, and handling of oxidizers.

**SCOPE**

Unless stated elsewhere in this document, the requirements of this document apply to all principal investigators, faculty, staff, students, tenants, and contractors at WFUHS.

**GENERAL**

The function of a space heater is to supply supplemental heat to a small space for a short period of time. WFUHS Engineering should be contacted to increase the heat to the area in question on a permanent basis.

**AUTHORIZED USE**

Oxidizers are compounds which are capable of reacting with and oxidizing (i.e., giving off oxygen) other materials. A well known example of oxidation is the process we know as corrosion, where the metal reacts with air to form the metal oxides referred to as "rust". Examples of common oxidizers used at WFUHS:

- chlorates
- chlorites
- dichromates
- hypochlorites
- nitrates
- nitrites
- perchlorates
- peroxides
- permanganates

The primary hazard associated with this class of compounds lies in their ability to act as an oxygen source, and thus to readily stimulate the combustion of organic materials.

<b>Classification System for Oxidizing Materials</b>	
<b>Class Rating</b>	<b>Hazard Description</b>
Class 1	An oxidizing material whose primary hazard is that it may increase the burning rate of combustible material with which it comes in contact.
Class 2	An oxidizing material that will moderately increase the burning rate or which may cause spontaneous ignition of combustible material with which it comes in contact.
Class 3	An oxidizing material that will cause a severe increase in the burning rate of combustible material with which it comes in contact or which will undergo vigorous self-sustained decomposition when catalyzed or

	exposed to heat.
Class 4	An oxidizing material that can undergo an <b>explosive reaction</b> when catalyzed or exposed to heat, shock or friction.

#### PERSONAL PROTECTIVE EQUIPMENT

- In many cases, the glove of choice will be neoprene, polyvinyl chloride (PVC), or nitrile.
- Be sure to consult a glove compatibility chart to ensure the glove material is appropriate for the particular chemical with which you are working.
- Goggles must be worn if the potential for splashing or splatters exists or if exposure to vapor or gas is likely.

#### ENGINEERING CONTROLS

- Use in a chemical fume hood as most oxidizers pose an inhalation hazard.
- Cylinders of compressed gases should be secured at all times.

#### USE AND STORAGE

- Store oxidizers away from flammables, organic compounds, and combustible materials.
- Keep away from reducing agents such as zinc, alkaline metals, and organic acids.
- Store in a cool, dry place.
- Strong oxidizing agents like chromic acid should be stored in glass or some other inert container, preferably unbreakable. Corks and rubber stoppers should not be used.
- Reaction vessels containing appreciable amounts of oxidizing material should never be heated in oil baths, but rather on a heating mantle or sand bath.

#### HEALTH HAZARDS

Oxidizers pose a physical hazard due to their potential to add to the severity of a fire or to initiate a fire. In general, oxidizers are corrosive and many are highly toxic.

- **Acute Health Effects:**
  - Some oxidizers, such as **nitric acid** and **sulfuric acid** vapors, **chlorine**, and **hydrogen peroxide**, act as irritant gases. All irritant gases can cause inflammation in the surface layer of tissues when in direct contact. They can also cause irritation of the upper airways, conjunctiva, and throat.
  - Some oxidizers, such as **fluorine**, can cause severe burns of the skin and mucus membranes. **Chlorine trifluoride** is extremely toxic and can cause severe burns to tissue.
  - **Nitrogen trioxide** is very damaging to tissue, especially the respiratory tract. Symptoms from an exposure may be delayed for hours, but fatal pulmonary edema may result.
  - **Osmium tetroxide** is also dangerous due to its high degree of acute toxicity. It is a severe irritant of both the eyes and the respiratory tract. Inhalation can cause headache, coughing, dizziness, lung damage, difficulty breathing, and may be fatal. Osmium tetroxide is regarded by many in the field as having "poor warning properties" because it is difficult to detect by smell or other means.
- **Chronic Health Effects:**
  - Nitrobenzene and chromium compounds can cause hematological and neurological changes.

- Compounds of chromium and manganese can cause liver and kidney disease.
- Chromium (VI) compounds have been associated with lung cancer.

**FIRST AID**

If a person has inhaled, ingested, or come into direct contact with these materials, use the following measures:

- Remove individual from the source of contamination as quickly as possible when it is safe to do so Call for medical help at 716-9111
- For an exposure directly to the skin or eyes, take the individual to an emergency shower or eyewash immediately–flush the affected area for a minimum of 15 minutes

**CONTACT INFORMATION**

- Environmental Health and Safety: 716-9375 or [ehs@wfubmc.edu](mailto:ehs@wfubmc.edu)
- WFUHS Engineering: 716-4351