

## Oxidizers

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Oxidizing chemicals are fire and explosion hazards on contact with flammable and combustible materials. Depending on the class, an oxidizing material may increase the burning rate of combustibles. Such contact can cause the spontaneous ignition of combustibles, or produce an explosive reaction when exposed to heat, shock or friction. Oxidizers are generally corrosive.

### *Examples of Oxidizers*

Peroxides	Chlorates
Nitrates	Chlorites
Nitrites	Hypochlorites
Perchlorates	Dichromates

### *Use and Storage*

- Oxidizers should be stored away from flammables, organic compounds, and combustible materials.
- Strong oxidizing agents like chromic acid should be stored in glass or some other inert container. Corks and rubber stoppers should not be used.
- Reaction vessels containing oxidizing material should be heated in a mantle or sand bath. Oil baths should not be used.

### *Use and Storage of Perchloric Acid*

- Perchloric acid is an oxidizing agent of particular concern. The oxidizing power of perchloric acid increases as the concentration and temperature increase. Cold, 70% perchloric acid is a strong non-oxidizing corrosive. A 72% perchloric acid solution at elevated temperatures is a strong oxidizing agent. An 85% perchloric acid solution is a strong oxidizer at room temperature.
- If you do not have access to a properly functioning perchloric acid fume hood, **do not** attempt to heat perchloric acid. Perchloric acid can only be heated in a hood specially equipped with a wash-down system to remove perchloric acid residue. The hood should be washed down after each use, and (preferably) restricted to perchloric acid use only.
- Whenever possible, substitute a less hazardous chemical for perchloric acid or use a dilute solution.
- Perchloric acid can be stored in a perchloric acid fume hood. Keep only the minimum amount necessary for your work. Another acceptable storage site for perchloric acid is in an acid cabinet that has secondary containment.
- Do not allow perchloric acid to contact any strong dehydrating agents, such as sulfuric acid. The dehydration of perchloric acid is a severe fire and explosion hazard.
- Do not order or use anhydrous perchloric acid. It is unstable at room temperature and can decompose spontaneously with a severe explosion. Anhydrous perchloric

- acid will explode upon contact with wood.
- Consult with EHS before working with perchloric acid.

#### *Health Hazards Associated with Oxidizers*

- **Acute Health Effects**  
Some oxidizers 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.
  - Fluorine can severely burn 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. The symptoms from an exposure to nitrogen trioxide may be delayed for hours, but, fatal pulmonary edema can result.
  - Osmium tetroxide is dangerous due to its high degree of acute toxicity. It is a severe eye and respiratory tract irritant. Inhalation can cause headache, coughing, dizziness, lung damage, difficulty breathing and death. Osmium tetroxide has "poor warning properties" because it is difficult to detect by smell or other means. It is recommended that laboratories using osmium tetroxide have necessary safeguards in place before the container is opened.
- **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, the person should be removed from the immediate area as quickly as possible. Seek medical attention immediately. If there is direct skin exposure, rinse with a safety shower for at least 15 minutes. If there is direct eye exposure, flush with eyewash for at least 15 minutes.

#### *Personal Protective Equipment*

Oxidizers should be used in a chemical fume hood because of the inhalation hazard risk. Neoprene, polyvinyl chloride (PVC), or nitrile gloves are acceptable. Consult a glove compatibility chart or the SDS to ensure that the glove material is appropriate for the particular chemical you are using. Safety glasses must be worn.