

**Guideline****UBCV-RMS-OHS-GDL  
14-005**Risk Management Services  
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## Handling and Removing Peroxides

### 1. SCOPE

This guidance document is to be used when removing and handling peroxides.

### 2. PURPOSE

This guidance document is to be used to minimize the occurrence and impact of accidents that could occur when using or generating peroxides.

### 3. PROCEDURE

Either of the following procedures may be used to remove the peroxides:

a) **Activated Alumina Method:** Peroxides can be conveniently removed by passing the solvent through a short column of activated alumina. This method is effective for both water-insoluble and water-soluble solvents (except low molecular weight alcohols). Since this method does not destroy peroxides, the alumina should be flushed with a dilute acid solution of potassium iodide or ferrous sulfate following treatment to remove peroxides.

b) **Ferrous Salt Method:** Peroxide impurities in water-soluble solvents are easily removed by shaking with a concentrated solution of ferrous salt. A frequently used ferrous salt solution can be prepared either from 60 gm of ferrous sulfate + 6 mL concentrated sulfuric acid + 100 mL of water, or from 100 gm of ferrous sulfate + 42 mL concentrated hydrochloric acid + 85 mL of water.

### Guidelines for Working with Ethers

#### Peroxide Content and Uses

Peroxide formers must be tested for peroxide content before using, especially where there is a potential for exposure to heat or shock during the process. The following are general guidelines concerning the degree of hazard associated with peroxide contamination at the levels indicated:

< 3 ppm: Reasonably safe for most laboratory procedures involving moderate quantities.



3 - 30 ppm: Possible moderate hazard depending on type of use. Avoid concentration of the peroxides. Disposal recommended if the ether is not to be used.

> 30 ppm: Unacceptable; may pose a serious hazard. Dispose of ether or remove peroxides using a suitable procedure.

If the container show any evidence of crystal formation in solution or around the cap, or of oil formation, should be treated as extremely hazardous and should not be handled. Treat the container as a bomb!

### Relationship of Hazard to Type of Use

The degree of hazard associated with peroxide contamination is dependent on the way the material is used. Concentration of the peroxides will increase the hazard. The following are general guidelines for a variety of common uses:

**Distillation:** Only material containing **0 ppm of peroxides** should be used for distillations or refluxes, and care must be taken to ensure that the distillation container does not go dry. Leave at least 10% residue or "bottoms" when distilling peroxidizable compounds. Peroxide forming materials must be tested prior to use in a distillation, and must be *peroxide free*. Safety glasses are essential at all times and a shield should be used during the distillation or evaporation process. If it is necessary to remove peroxides, it can be accomplished by washing with a 5% solution of sodium metabisulphite or ferrous sulphate.

**Evaporation:** Evaporation (e.g. in a rotary evaporator) concentrates the peroxides and poses a hazard. When the volume is small and the evaporation is carried out near **room temperature, ethers with low levels of peroxides** may be reasonably safe. When **high volumes and/or high temperatures** are used, the ether must be **peroxide free**. Personal protective equipment is required, as noted in previous paragraph.

**Chromatography:** Peroxides formers with **moderate levels of peroxides are probably suitable** for a variety of forms of chromatography, provided that the ether is not going to be subsequently evaporated. Note, however, that peroxides bind to alumina and to some other adsorbents. This may concentrate peroxides at the top of a column, resulting in a hazard if the column is not washed with a suitable solvent and is then allowed to dry out.

**Users should be aware of potential problems associated with peroxides, and dispose of solvents containing >30 ppm peroxides immediately.**