the cap, do not open or attempt to move the container. If already open, do not reseal. Immediately call EH&S for assistance.

Do not allow containers to evaporate to dryness. Rinse empty containers with water and dispose of in the trash.

Peroxide-forming materials should not be opened after the manufacturer's expiration date or one year after receipt, whichever occurs first. These materials should be disposed of as dangerous waste.

Distillation

Commercially available peroxide-forming chemicals normally contain inhibitors to hinder formation of peroxides. Distillation of these solvents removes the inhibitors. If you choose to distill peroxide-forming solvents, please familiarize yourself with the associated hazards prior to distillation.

Common Peroxidizable Materials

- Acetal
- Cyclohexane
- Decahydronaphthalene (Decalin)
- Diacetylene
- Dicyclopentadiene
- Diethyl ether
- Diethylene glycol dimethyl ether
- Dioxane
- Divinyl acetylene
- Ethylene glycol dimethyl ether
- Isopropyl ether
- Methyl acetylene
- Potassium metal
- Sodium amide
- Tetrahydrofuran
- Tetrahydronaphthalene (Tetralin)
- Vinyl ethers
- Vinylidene chloride

Getting Assistance

For additional information about peroxidizable chemicals or assistance with obtaining MSDSs or chemical disposal, the procedures are available via the internet at www.ehs.wsu.edu/hazwaste/disposal.asp or you may contact your EH&S office.

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Pullman, WA 99164-1172
(509) 335-3041

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Vancouver.....360-546-9706
Spokane.....509-358-7993

http://www.ehs.wsu.edu

Environmental Health & Safety

Peroxidizable Chemicals

Safe Use and Handling

Peroxide formation in solvents and reagents have been the cause of occasional accidents. Even the relatively innocuous solvent, isopropyl alcohol is capable of peroxide formation. Explosive peroxides form by the reaction of a peroxidizable material with molecular oxygen through a process called autoxidation or peroxidation. This can occur upon exposure to air, heat, light, or simply with passage of time. Elevated concentrations of peroxides may become sensitive to heat, friction, or shock and become explosive.

Peroxide Formation

Peroxidation is generally a problem of the liquid state. Solid peroxide formers present little problem except when finely divided because the reaction, if any, occurs only at the surface. Peroxidation does not seem to be a problem in gases or vapors. For liquids, peroxidation usually occurs when containers are not fully sealed and blanketed with inert gas.

Generally, the more volatile a compound, the greater its potential hazard, because evaporation can significantly increase peroxide concentration. Special provisions should be taken to help prevent formation of elevated concentrations of peroxides.

Purchasing

Peroxide-forming materials should be purchased in amounts that will be used within six months to one year. This practice will help ensure that existing materials are consumed first, before dangerous levels of peroxide form.

In some cases, manufacturers add *stabilizers or inhibitors* that slow peroxide formation within the solvent's shelf. Buy factory-inhibited materials if possible. Remember anesthetic ether and distilled peroxide-forming solvents contain no inhibitors.

Testing for Peroxide Formation

For safety reasons, WSU no longer recommends testing for peroxide concentrations in organic solvents. Testing may be more dangerous than helpful because the principal moment of danger occurs when the cap is twisted to open the container, whether for use or testing. Also, peroxide concentrations only become dangerous at levels that far exceed the 100 PPM detection limit of available test strips.

Furthermore, commonly used peroxide test strip kits, such as those supplied by EMQUANT, cost some $50 and are only viable for 90 days. Consequently, purchases of large quantities and test strips to extend utilization periods should be avoided, as they lead to a false sense of economy.

Therefore, use of peroxide test strips and labels should be discontinued and existing stocks of them discarded.

Container Storage

Store peroxide-forming materials in the original manufacturer's container when possible. If it is necessary to use a different container, use one that is opaque and does not have a glass stopper or metal lid. These materials should be stored in tightly closed containers to eliminate evaporation and decrease contact with air.

Store material in a safe environment away from heat, light, and ignition sources. Containers should be protected from physical damage.

Upon receiving materials, write the date of receipt on the container if a manufacturer's expiration date is not listed.

Handling

Procedures and precautions outlined in Standard Operating Procedures (SOPs) and Material Safety Data Sheets (MSDSs) should be followed.

If a viscous liquid or crystalline solid is observed in the material or around