

Principal Investigator: _____

Date Approved: _____

This document covers basic chemical safety information for peroxide-formers. DO NOT USE PEROXIDE-FORMERS UNTIL YOU HAVE OBTAINED THE NECESSARY APPROVAL.

Peroxide-Forming Chemicals (PFCs)

Peroxide-forming chemicals (PFCs) are flammable organic liquids which are capable of forming potentially explosive R-O-O-R' peroxide bonds (where R = organic group) upon exposure to air or oxidizing impurities. Peroxides formed in a chemical container are particularly likely to accumulate within the threads of the screw cap, and may explode when subjected to heat, light, friction or mechanical shock (e.g. unscrewing the cap). It is particularly dangerous to allow these materials to evaporate to dryness, such as during distillation, leaving the crystals of peroxide on the surfaces of the container.



Exposure, Signs and Symptoms and Chemical Properties

Review the appropriate sections of the chemical specific Safety Data Sheet (SDS) for information on ways to detect exposure, appropriate exposure limits, signs and symptoms of exposures and chemical properties. If data is lacking in any area, refer to the following sites for additional information:

<https://pubchem.ncbi.nlm.nih.gov/>

<https://druginfo.nlm.nih.gov/drugportal/>

<https://toxnet.nlm.nih.gov/index.html>

<http://web.doh.state.nj.us/rtkhsfs/indexfs.aspx>

Always use the smallest amount of chemical that is consistent with the requirements of the work performed. Understand the chemical properties and what are the likely routes of exposure based on those properties and the procedures to be performed. Use containment devices (e.g., fume hood, glove box) when substance can volatilize, when the substance is manipulated, whenever aerosols or particulates may be produced, or when an action may result in an uncontrolled release.

Contact Environmental Health and Safety (EHS) if there are any questions (479-575-5448).

Personal Protective Equipment (PPE) & Personnel Monitoring



Lab Coat

Chemical/Flame resistant



Gloves

Nitrile or neoprene gloves typically provide adequate protection against minor splashes. Consult with your PI or supervisor to determine whether any materials involved in your process require alternative hand protection.



Eye Protection

ANSI Z87.1-compliant safety glasses or safety goggles if a splash hazard is present

Labeling & Storage

PFCs should be stored in a flammable storage cabinet with self-closing hinges or in a refrigerator rated for flammable storage. Containers greater than 1 gallon (4L) in size are not recommended, but must be stored in a flammable storage cabinet if present. All PFCs must be stored away from combustible materials and oxidizers.

PFCs must be marked with receiving date and opening date. They must be disposed of within the sooner of 12 months from the date of opening, 18 months of the date of receipt if unopened, or the expiration date as specified by the manufacturer if unopened.

<p>Class 1 PFCs form explosive peroxides after prolonged storage. These must be tested monthly for peroxides starting 3 months from opening.</p>	<ul style="list-style-type: none"> • Divinyl acetylene • Divinyl ether • Isopropyl Ether 	<ul style="list-style-type: none"> • Sodium amide • Potassium amide • Potassium metal
<p>Class 2 PFCs readily form explosive peroxides when they become concentrated (e.g., via evaporation or distillation). Stabilizers like hydroquinone and BHT inhibit peroxide formation. However, the concentration process defeats the action of most stabilizers.</p>	<ul style="list-style-type: none"> • Acetaldehyde • Cumene • Cyclohexene • Cyclopentene • Diacetylene 	<ul style="list-style-type: none"> • Diethyl Ether • Furan • Propyne • Methylcyclopentane • Vinyl ethers
<p>Class 3 PFCs can auto polymerize as a result of peroxide formation.</p>	<ul style="list-style-type: none"> • Acrylic acid • Butadiene • Chlorotrifluoroethylene • Methyl methacrylate 	<ul style="list-style-type: none"> • Tetrafluoroethylene • Vinylacetylene • 2-Vinylpyridine

Engineering Controls, Equipment & Materials

Fume Hood

Use a fume hood (or equivalent) to keep exposure to materials as low as possible. If your protocol does not permit the handling of such materials in a fume hood, contact EH&S (479-575-5448) to perform an exposure assessment to determine whether alternative engineering controls or additional respiratory protection is required.

Cautions and Considerations

Static Electricity

Large containers of PFCs are discouraged given the strict limits on prolonged storage. If required due to high demand, all large containers should always be grounded, and should be bonded to the receiving container during transfer. Always transfer flammable chemicals from glass containers to glassware or from glass container/glassware to plastic. Transferring these types of chemicals between plastic containers or unbonded metal containers may lead to a fire hazard due to static electricity.

Housekeeping

Spills

Notify others in the area of the spill, including your supervisor. Evacuate the location where the spill occurred. Call 911 and report any exposure to EHS (479-575-5448). Remain on-site (at a safe distance) to provide detailed information to first responders.

Decontamination

After each use (or day), wipe down the immediate work area and equipment to prevent accumulation of chemical residue. Decontaminate workspace with appropriate materials (refer to the SDS). When finished wash hands and arms with soap and water and properly dispose of all wastes. Contaminated items (e.g., solid and liquid materials and PPE) should be discarded as hazardous waste.

Waste

Refer to the UA Chemical Hygiene Plan for details and contact EHS (479-575-5448) for specific disposal instructions.

First Aid & Emergencies

Skin or Eye Contact

Remove contaminated clothing and accessories; flush affected area for at least 15 minutes with water. If symptoms persist, get medical attention/call 911.

Inhalation

Move person into fresh air. If symptoms persist, get medical attention/call 911.

Ingestion

Rinse mouth with water. If symptoms persist, get medical attention/call 911.

Attachments: Chemical Specific Safety Data Sheet (SDS)

Note: If there is more than one chemical that classifies as a peroxide-former; include all appropriate SDSs with this SOP.

Authorized and Trained Personal		
Name	Signature	Date