

## **Peroxide Former Inspection Procedures Stevenson University**

Peroxide forming chemicals are chemicals that may produce unstable and dangerous conditions when exposed to air, moisture, or impurities. Peroxides are formed through a spontaneous reaction with oxygen. Light and heat can act to accelerate the process. If not handled properly, even opening the container can cause a violent explosion. Peroxide formers should be inspected at least annually to ensure that peroxides have not formed and that the chemical is safe to use. **Please ensure that this document is read in its entirety prior to inspecting any potential peroxide formers.**

### **Pre-checklist:**

- Verify that the testing strips are not expired – If expired, order new testing strips prior to performing any inspections.
  - CTL Scientific Supply Corp – Quantofix Peroxide 100 – \$28.40
- Verify that no additional peroxide formers were purchased over the last year based on the chemical inventory for the current year.
  - Peroxide Former List on the L Drive under “Chemical Inventory.”
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- Print up-to-date Peroxide Former List.

### **Required Personal Protective Equipment (PPE):**

- Lab coat
- Gloves compatible with the chemicals being inspected
- Chemical splash goggles

### **Inspection:**

- Carefully remove each peroxide former from the safety cabinet.
- Initial Screening:
  - If there is any crystallization, visible discoloration, or liquid stratification, stop and refer to the emergency procedures outlined below.
  - Open container cautiously – Do NOT force open a rusted or stuck cap.
- Peroxide Testing:
  - Remove only as many test strips as required and close the test strip container immediately.
  - Do not touch the test field at the end of the test strip.
  - Dip the test strip into the test solution for 1 second.
  - Shake off excess liquid.
  - Wait 5 seconds.
  - Compare the test field with the color scale on the test strip container. If hydrogen peroxide is present, the test field will turn blue (color change after 1 minute does not represent a positive reaction).
  - Test strip container should be kept in a cool, dry area, not above 86°F.

**Peroxide Levels Assessment:**

< 25 ppm	Considered safe for general use
25 – 100 ppm	Not recommended for distilling or otherwise concentrating
> 100 ppm	Avoid handling and contact the Laboratory Safety Manager immediately to arrange disposal

**Emergency Procedures:****Suspicious Peroxide Former:**

## Staff and Faculty:

- If there are any concerns regarding peroxide formers, contact the Laboratory Safety Manager immediately.
- If crystals are observed in a chemical container, do NOT touch it.
- If a chemical container has been picked up and crystals are observed, gently place the chemical on the nearest fixed surface.
- If near a fume hood, and can **safely** place the chemical in the fume hood, do so.

## Laboratory Safety Manager:

- Ensure the chemical in question is in a safe location and isolate the area with signage.
- If the chemical is in a fume hood:
  - If possible, safely move any other materials out of the fume hood. Close the fume hood sash and place a sign on the fume hood sash stating “Do NOT open fume hood or move any materials inside – For further assistance, contact Laboratory Services”
- If the chemical is in a safety cabinet,
  - Close the safety cabinet and place a sign on the safety cabinet stating “Do NOT Open Safety Cabinet or Move Any Materials Inside – For further assistance, contact Laboratory Services.”
- Contact SU’s contracted hazardous waste vendor immediately for assistance with stabilization and disposal.

**Emergency Spill Response:**

- Leave the area immediately and close the door to the laboratory.
- Remove anyone in the area who may be in danger.
- Contact Laboratory Services and Security immediately.
- Remove all sources of ignition, if safe to do so.

**Laboratory Services Staff Spill Cleanup Procedures:**

- Read the SDS for the spilled chemical prior to cleanup.
- Contact SU’s contracted hazardous waste vendor or the Baltimore County Fire Department if spill cleanup is too advanced or is deemed an emergency situation.
- Ensure proper personal protective equipment (PPE) is worn to protect against chemical exposure.
- Use proper spill cleanup materials based on the SDS.
- Absorb chemical with inert material or spill pads and place in a suitable container (do not use combustible material, such as saw dust).
- Label the waste container with the contents and store in the Central Accumulation Area.

## Lists of Common Peroxide Forming Chemicals and Safe Storage Time Limits

(NOTE: The lists below cover many commonly known peroxide formers, but are not all-inclusive.)

### List A: Chemicals known to form explosive levels of peroxides without concentration

Suggested safe storage period: If unopened from manufacturer, up to 18 months or stamped expiration date, whichever comes first. After opening, materials should be discarded or evaluated for peroxides within 3 months. Store under nitrogen if possible.

Butadiene <sup>a</sup>
Chloroprene <sup>a</sup>
Divinyl acetylene
Divinyl ether
Isopropyl ether
Potassium amide
Potassium metal
Sodium amide (sodamide)
Tetrafluoroethylene <sup>a</sup>
Vinylidene chloride

<sup>a</sup>When stored as a liquid monomer

### List B: Chemicals known to present peroxide hazards upon concentration (distillation/ evaporation)

Suggested safe storage period: If unopened from manufacturer, up to 18 months or stamped expiration date, whichever comes first. After opening, materials should be discarded or evaluated for peroxides within 12 months.

Acetal (1,1-diethoxyethane)
Acetaldehyde
Benzyl alcohol
2-Butanol
Cumene
Cyclohexanol
2-Cyclohexen-1-ol
Cyclohexene
Cyclooctene
Cyclopentene
Decahydronaphthalene
Diacetylene
Dicyclopentadiene
Diethyl ether
Diethylene glycol dimethyl ether (diglyme)
Dioxanes
Ethylene glycol dimethyl ether (glyme)
Furan
4-Heptanol

2-Hexanol
Methyl acetylene
3-Methyl-1-butanol
Methylcyclopentane
Methyl isobutyl ketone
4-Methyl-2-pentanol
2-Pentanol
4-Penten-1-ol
1-Phenylethanol
2-Phenylethanol
2-Propanol
Tetrahydrofuran
Tetrahydronaphthalene
Vinyl ethers
Other secondary alcohols

**List C: Chemicals that may autopolymerize as a result of peroxide accumulation**

Suggested safe storage period: If unopened from manufacturer, up to 18 months or stamped expiration date, whichever comes first.

- **After opening, materials without inhibitors should not be stored for longer than 24 hours.**
- After opening, materials with inhibitors should be discarded or evaluated for peroxides within 12 months.

Acrylic acid <sup>a</sup>
Acrylonitrile <sup>a</sup>
Butadiene <sup>b</sup>
Chloroprene <sup>b</sup>
Chlorotrifluoroethylene
Methyl methacrylate <sup>a</sup>
Styrene
Tetrafluoroethylene <sup>b</sup>
Vinyl acetate
Vinyl acetylene
Vinyl chloride
Vinyl pyridine

<sup>a</sup> Although these chemicals form peroxides, no explosions involving these monomers have been reported.

<sup>b</sup> When stored in liquid form, these chemicals form explosive levels of peroxides without concentration. They may also be stored as a gas in gas cylinders. When stored as a gas, these chemicals may autopolymerize as a result of peroxide accumulation.

References:

Environmental Health and Safety, Stanford University. 5/29/15. *Information on Peroxide-Forming Compounds*. [https://web.stanford.edu/dept/EHS/prod/researchlab/lab/safety\\_sheets/07-207.pdf](https://web.stanford.edu/dept/EHS/prod/researchlab/lab/safety_sheets/07-207.pdf)

UCLA. *Standard Operating Procedures, Peroxide Forming Chemicals*. Standard Operating Procedure (SOP) Template Library. <http://www.sop.ehs.ucla.edu/>