



## Peroxide-Forming Material (PFM) Safety

### Peroxide-Forming Materials (PFMs)

Peroxide-forming chemicals are a class of chemicals that can undergo an autoxidation process to form unstable, shock-sensitive organic peroxides. These peroxides are highly explosive and can detonate if disturbed by heat, friction, or physical impact.

### Identifying and Classifying

PFMs are segregated into 3 classes: Class A, Class B, and Class C. Class A is the highest hazard, while Class C generally is dependent on concentration or physical changes (heating, distillation, etc.).

- ❖ Class A: High Hazard Without Concentration
  - These chemicals spontaneously decompose and become explosive with or without exposure to air.
- ❖ Class B: Concentration Hazard
  - Chemicals in this class can form explosive levels of peroxides when distilled, evaporated, or concentrated. They require external energy sources to decompose.
- ❖ Class C: Shock or Heat Sensitive
  - These are highly shock and heat-sensitive and can auto-polymerize if there is an accumulation of peroxides in the solution.

To ensure all hazards are identified, the chemical's Safety Data Sheet (SDS) must be evaluated in addition to the official CMU PFM list, located on the EHS website and in the PFM Guideline. Hazard statements regarding the formation of organic peroxides are typically located in Sections 2 (Hazard Identification), 7 (Handling and Storage), or 10 (Stability and Reactivity).

### Handling and Storage

Proper handling and storage of Peroxide-Forming Materials is the most effective way to prevent peroxide formation. Keeping PFMs for the shortest possible time and avoiding purchasing a surplus are both ways to prevent storage of expired PFMs and peroxide formation. If possible, purchase those containing an inhibitor like butylated hydroxytoluene (BHT).

When a PFM is received, the EHS PFM label must be placed on the bottle immediately, even if not opened. The label tracks the date received, the class and testing requirements, and the inspection record.

PFMs should be entered into ChemTracker immediately upon receipt. Store all PFMs in an air-tight bottle, and away from light and heat. In addition, they should be protected from physical damage or ignition sources by being stored in a flammable cabinet.

### Testing and Disposal

PFM testing and disposal requirements are determined by their hazard classification and the specific detection method used.

- ❖ Class A: Test before every use and discard within 3 months.
- ❖ Class B: Test every 6 months after opening and immediately before evaporation or distillation. Dispose of after 12 months unless testing indicates there are no peroxides present.
- ❖ Class C: Test every 6 months after opening. Inhibited chemicals must be disposed of within 12 months unless testing confirms they are peroxide-free.

Detection strips are the most accurate quantitative method, but the iodine detection method is also accepted for classes B and C. Do not use the iodine detection method for Class A PFMs. For solid PFMs, use visual cues (such as discoloration or crust formation) to determine if EHS intervention is needed. In addition to following the manufacturer's instructions, PFMs should only be tested in a fume hood while wearing proper PPE. This includes safety glasses, gloves, and a fire-retardant lab coat.

For detection strips, use the following chart to determine if the chemical needs to be disposed of or if EHS intervention is needed:

< 50 ppm	Safe for general use
50-100 pm	Not recommended for distillation or concentrating. Submit a ticket for Hazardous Waste Pickup.
>100 or obvious crystal formation	Call EHS at 412-268-8182

To dispose of any chemical waste that is either expired or has formed peroxides, please submit a ticket through the EHS Hazardous Waste Program. If a PFM has formed peroxides, please include that information in the pickup request.

## CAUTION

### PEROXIDE FORMING MATERIAL

CHEMICAL NAME: \_\_\_\_\_

DATE RECEIVED: \_\_\_\_\_

**CLASS AND TESTING FREQUENCY:**

- CLASS A (3 MONTHS)
- CLASS B (6 MONTHS)
- CLASS C (12 MONTHS)

DATE	VISUAL INSPECTION	RESULTS
	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	ppm
	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	ppm
	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	ppm
	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL	ppm

DISPOSE OF ANY CHEMICAL THAT FAILED THE VISUAL INSPECTION OR IF THE PPM EXCEEDS 100 PPM

QUESTIONS? EMAIL SAFETY@ANDREW.CMU.EDU

*EHS PFM Label*

*Questions? Email [safety@andrew.cmu.edu](mailto:safety@andrew.cmu.edu)*