

5. Principal Investigator and Laboratory Personnel Responsibilities

The principal investigator (PI) or laboratory supervisor/coordinator/manager is responsible for ensuring that staff and students under their supervision have been trained in using, storing, and handling PFCs and all associated emergency procedures. PIs and laboratory personnel will provide guidance in assessing hazards, establishing engineering and administrative controls and good work practices, and selecting PPE. Records of this training must be retained by the department and a copy must be forwarded to the Environmental Health and Safety (EHS) Department. EHS will perform and document exposure monitoring to determine employee exposures to hazardous materials and to evaluate the adequacy of controls.

6. Health and Safety Hazards of Peroxide Forming Chemicals

PFCs have specific permissible exposure limits (PELs) which cannot be exceeded. Since this is a highly volatile chemical, inhalation exposure is a major concern. Exposure at high concentrations can cause sedation, unconsciousness, and respiratory paralysis. PFCs are sufficiently volatile and may produce a peroxide hazard if exposed to atmospheric oxygen for prolonged periods, creating an explosion/fire risk.

PFCs may be classified as one of three categories based on the potential to form peroxides and the associated hazards (i.e., Class A, Class B, and Class C). See Appendix B for a list of many commonly known peroxide formers and their associated categories. Some of these are commonly used in organic chemistry laboratories (e.g., diethyl ether, tetrahydrofuran, isopropanol, dicyclopentadiene, and cyclohexene) can form peroxides if not properly handled, used, or stored. However, this list in Appendix B is not all-inclusive; therefore, please consult with the manufacturer's SDS for additional guidance or contact EHS Department at 470-578-3321 or ehs@kennesaw.edu.

7. Requirement for Working with Peroxide Forming Chemicals

A. Hazard and Risk Assessments

The PI or laboratory supervisor/coordinator/manager must be aware of and approve the work performed under their jurisdiction and shall ensure that an appropriate hazard assessment for the use of peroxide forming chemicals has been conducted. EHS may be consulted to provide assistance in performing hazard assessments.

Each new operation using PFCs must be evaluated individually; assessment of the level of risk depends on how the substance will be used. The assessment should ensure appropriate protective measures have been put into place and that the proper level of work authorization has been obtained before commencing the operation.

B. Hazard Prevention and Control

The hazards of PFCs can be mitigated by a variety of means including chemical substitution, engineering controls, administrative controls, PPE, and work practices. The general control measures are discussed in this section. The PI or laboratory supervisor/coordinator/manager must develop control measures specific to the particular operation after conducting the appropriate hazards assessment and develop a separate SOP specific to the operation/project.

1. Chemical substitution

Before peroxide forming chemicals are selected for use in a particular operation/process, a safer alternative chemical should be considered for use in lieu of organic peroxides.

2. Engineering Controls

Because of its high volatility and the possibility of aerosol formation, PFCs must be handled in a chemical fume hood under negative pressure. The chemical fume hood must have been certified within the last 12 months and must function within the acceptable flow rate range. Work should be performed with the sash lowered as much as possible.

3. Work Practice Controls

Gloves, lab coat, and safety glasses must be worn when working with PFCs.

Wearing nitrile gloves should provide adequate hand protection for use of these chemicals. Change gloves regularly (at least every two hours) or when they obtain a breach.

C. Handling, Testing, and Storage

PFCs are incompatible with strong oxidizers, strong acids, and halogens. To avoid violent reactions, store them away from these chemicals in an appropriate flammables cabinet. Ensure that the containers are stored away from light and purge the headspace of the bottle with inert gas, such as nitrogen, which displaces air from within, to prolong shelf life of the chemical and to help prevent peroxide formation.

PFCs without inhibitors SHOULD be stored under inert gas, whereas some PFCs with inhibitors should

1. Accidental Exposure to Peroxide Forming Chemicals

Refer to the SDS of the chemical for exact procedures. In general, if peroxide forming chemical vapor has been inhaled, move the victim to fresh air immediately. If spilled on the skin or clothing, wash the affected area with large amounts of soap and water, using a safety shower or eyewash, as appropriate, for a minimum of 15 minutes. During washing, remove contaminated clothing and footwear. Remove goggles last. Those assisting the victim should wear appropriate PPE including protective gloves. A disposable laboratory coat, scrubs, or jumpsuit should be available for the exposed individual to wear after using a safety shower.

If exposure to the eyes has occurred, immediately flush affected eye(s) for at least 15 minutes without stopping. Hold upper and lower eyelids open and away from the eyes during irrigation. Do not allow victim to rub eyes or keep eyes closed. Remove contact lenses if possible. (Note: contact lenses should not be worn when working with this material.) If necessary, continue flushing with personal eyewash or apply ice water compresses during transport to a medical facility or eye specialist. Seek medical attention immediately.

If PFCs are ingested, do not induce vomiting, but flush mouth immediately. Never give anything by mouth to an unconscious person. Seek medical attention immediately.

PFCs exposure requires immediate first aid and medical treatment. Prompt first aid is essential, even if the victim does not exhibit any signs or symptoms, or feel any pain. After seeking medical attention, contact EHS Department to report the accident or incident.

2. Spill Clean-up

Spill clean-up must be performed by properly trained individuals. Do not attempt to clean up a spill of pure peroxide forming chemical or a solution of greater than 5% unless you have been properly trained.

Wipe up solutions with chemical absorbent pads.

Appendix A: SOP Review Record Form for Peroxide Forming Chemicals

To be completed by the employee/student

Peroxide forming chemicals (PFCs) are considered a

