

Principal Investigator: \_\_\_\_\_

Date Approved: \_\_\_\_\_

**This document covers basic chemical safety protocols (CSP) for organic peroxides & self-reactive chemicals and supplements the laboratory Chemical Hygiene Plan as appropriate. Additional lab-specific safety operating procedures for organic peroxides & self-reactive chemicals may also be required. The use of any organic peroxides & self-reactive chemicals is subject to pre-approval by the Principal Investigator (PI) and/or the designated Laboratory Responsible Safety Person. DO NOT USE ORGANIC PEROXIDES & SELF-REACTIVE CHEMICALS UNTIL YOU HAVE OBTAINED THE NECESSARY PRE-APPROVAL AND TRAINING.**

## Organic Peroxides & Self-Reactive Chemicals

Organic peroxides & self-reactive chemicals are liquid or solid materials that are thermally unstable and may undergo exothermic self-accelerating decomposition that can occur without the participation of oxygen (air). In addition, they may also be explosive, burn rapidly, be sensitive to impact or friction, or react dangerously with other substances. All chemicals in this band are considered highly hazardous. Examples include: acetylene, benzoyl peroxide, 3-azidosulfonylbenzoic acid, 2,2'-dimethyl-2,2'-azodipropionitrile (ADZN), and Hydrazine-trinitromethane. Chemicals covered by this SOP **do not** include peroxide-forming chemicals, picric acid, ammonium perchlorate or nitrate salts.



## Personal Protective Equipment & Personnel Monitoring

**Lab Coat**

Flame resistant lab coat.

**Gloves**

Nitrile or neoprene gloves.

**Eye Protection****Face Shield**

ANSI Z87.1-compliant safety goggles, or face shield if a splash hazard is present. Consider using a blast shield for extra protection.

## Labeling & Storage

- Avoid heat, flames, sparks, and other sources of ignition. Avoid shock or friction. Protect from physical damage.
- Use containers and tools/supplies/equipment made from non-metal materials and which are compatible with the peroxides used. Keep them very clean to avoid contamination.
- Glass containers with screw-cap lids or glass stoppers may not be acceptable for some organic peroxides, especially those sensitive to friction and grinding.
- Do not store organic peroxides that give off gas as they decompose in a tightly sealed, non-vented container. The buildup of gas pressure could rupture it. These peroxides are shipped in containers with specially vented caps. Use no other type of cap for containers of these organic peroxides. The vent caps relieve the normal buildup of gas pressure that could shatter an unvented container. Check vent caps regularly to ensure that they are working properly. Keep vented containers in an upright position.

- If a water-based formulation freezes, do not chip or grind it to break up lumps of material, or heat it to thaw it out. Follow the chemical supplier's advice.
- Dilute organic peroxides strictly in according to the chemical supplier's advice. Using the wrong solvent or a contaminated solvent could cause an explosion. For example, methyl ethyl ketone peroxide and cyclohexanone peroxide may explode if they are mixed with acetone, a common solvent. Using reclaimed solvents of uncertain composition can also be hazardous. They may contain dangerous concentrations of contaminants that are incompatible with the organic peroxide.
- Filtering friction-or shock-sensitive chemicals with materials and devices that produce heat, such as sintered glass filters, can also be hazardous. If the reactivity is not known but must be done, conduct these activities as if the organic peroxide is an explosive.
- Do not let combustible solids such as paper towels and lab coats become contaminated with organic peroxides. Should this happen, immediately soak and rinse with water to remove the organic peroxide.

### Engineering Controls, Equipment & Materials

#### Fume Hood

Consider the use of a glove box. Work in a chemical fume hood whenever possible. Keep the sash at the lowest practical height while working and close the sash when the fume hood is not in use.

#### Blast Shield

When working with these types of materials the use of a portable blast shield inside the fume hood is highly recommended.

### Cautions and Considerations

#### Limits on Scale

The PI and/or supervisor must communicate and enforce clear limits on the quantity of each organic peroxides & self-reactive chemical that can be used in any single experiment. Consult with your PI if you do not know the quantity limit(s) that has been set for your lab.

#### Initiating Mechanism

Before working with any organic peroxides & self-reactive chemical, determine the initiating mechanism that could lead to an explosion; friction, impact, catalysts, light, or heat. Refer to the chemical safety data sheets (SDS) for this information. Also consider working with equipment that cannot generate static electricity or sparks.

### Housekeeping

#### Spills

Notify others in the area of the spill, including your PI/Responsible Safety Person. If it is a small spill that you can easily handle, use the contents of your lab spill kit to clean it up. If it is a large spill, then evacuate the area where the spill occurred. Call Vanderbilt University Public Safety (VUPS) at 615-421-1911 or use the Vandysafe app on your smart phone. Report any exposure through Risk and Insurance Management's Origami portal and mark that it occurred in research when prompted. Both VUPS and the Origami system will notify EHS of the incident. Remain on-site at a safe distance to provide detailed information to first responders.

#### Decontamination

Decontamination methods will vary based on the materials handled and equipment being used. Please review the chemical SDS for guidance on cleaning materials.

#### Waste

Collect organic peroxides & self-reactive chemicals in sealed containers and dispose of as hazardous waste. If the material was shipped in a container with a vented cap because decomposition can create buildup of gas pressure and could cause it to rupture, consult OCRS for appropriate ways to containerize the material if the original

container and cap cannot be recycled. Refer to the laboratory *Chemical Hygiene Plan* (Section 6.7) for information on proper chemical waste disposal procedures.

## First Aid & Emergencies

### **Skin or Eye Contact**

Without putting yourself at risk, move person into fresh air. Remove contaminated clothing and accessories; flush affected area with water for at least 15 minutes. Get medical attention immediately.

### **Inhalation**

Without putting yourself at risk, move person into fresh air. Have victim rest in half-upright position. If symptoms persist, get medical attention.

### **Ingestion**

Rinse mouth with water and do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

