

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

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

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

## Perchloric Acid

Perchloric acid is a clear, odorless liquid with the chemical formula  $\text{HClO}_4$ . It is a very strong acid and powerful oxidizer, but aqueous solutions up to 70% behave as strong, non-oxidizing acids at room temperature. When heated or at higher concentrations perchloric acid is a potent oxidizing agent which can form explosive salts with nearby organic, inorganic, and metallic substances. These salts are shock sensitive and pose a risk of fire and/or violent explosion.



### Personal Protective Equipment & Personnel Monitoring



**Lab Coat**

Traditional lab coat.



**Gloves**

Nitrile or neoprene gloves when handling small quantities. Use thicker polyvinyl chloride (Vinyl) gloves for larger volumes.



**Eye Protection**

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



**Face Shield**

### Labeling & Storage

Store in secondary containment in a cool, dry, well-ventilated area away from metals and combustible materials. Do not store with hygroscopic chemicals (concentrated sulfuric acid, anhydrous phosphorous pentoxide, etc.). Avoid storage on wood floors or in wooden cabinets. Keep away from organic acids, all bases, and all organic material. Shelves and floor material should be non-combustible and acid-resistant. Protect from freezing. Also, if not plainly visible (e.g. through a cabinet window), labelling must be applied to storage locations where perchloric acid is kept to avoid an inadvertent encounter.

### Engineering Controls, Equipment & Materials

#### Fume Hood

Any procedure involving heating of perchloric acid must be conducted in a fume hood with a built-in wash-down system. Perchloric acid vapors have the potential to condense and crystallize in the fume hood exhaust system. Crystallized perchloric acid is unstable and vibration in the duct and exhaust fans may result in an explosion. Fume hoods with a wash-down system flush away crystals deposited in the ductwork.

Do not store organic materials in the fume hood where perchloric acid is used. If your protocol does not permit the handling of perchloric acid in a fume hood, contact the

Office of Environment, Health, Safety, and Sustainability (EHSS) to determine whether additional respiratory protection is warranted.

## 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

Clean contaminated surfaces with soap and water. Dispose of the paper towels as hazardous waste.

### Waste

Perchloric acid should not be mixed with any other type of waste. 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. Get medical attention immediately.

### Ingestion

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

