

Principal Investigator: _____

Date Approved: _____

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

Ammonium Perchlorate and Ammonium Nitrate

Ammonium perchlorate (NH_4ClO_4) and ammonium nitrate (NH_4NO_3) are solid, oxidizing salts with a high potential for explosion when mixed with fuels such as aluminum powder, azides, or hydrocarbon oils. The strongly oxidizing anions perchlorate and nitrate can also use the ammonium cation as a fuel source when subjected to high temperatures or rapid heating. Sudden decomposition leads to detonation and generates rapidly expanding nitrogen and oxygen gas, among other byproducts.

Ammonium perchlorate is primarily used in the preparation of solid fuel propellants, while ammonium nitrate is used in instant cold packs, in agriculture as a fertilizer, and also as a component in explosive mixtures.



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 glasses or safety goggles. Consider using a face shield and/or blast shield for extra protection, especially if heating.

Labeling & Storage

Store tightly sealed in secondary containment at the manufacturer's recommended temperature in an explosion-proof cabinet, or an explosion-proof refrigerator/freezer, that does not contain flammables, combustibles, reducing agents, powdered metals, or strong acids. Keep away from heat, light, and any potential initiating mechanisms. Also, if not plainly visible (e.g., through a cabinet window), labeling must be applied to storage locations where these are stored to avoid an inadvertent encounter.

Engineering Controls, Equipment & Materials

Fume Hood

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 substances the use of a portable blast shield inside the fume hood is highly recommended.

Cautions and Considerations

Initiating Mechanism Before working with ammonium perchlorate or ammonium nitrate, remove from the work area all items that could inadvertently lead to an explosion via friction, impact, flammability/combustibility, light, or heat. 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 (mobile) 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 EHSS of the incident. Remain on site at a safe distance to provide detailed information to first responders.

Decontamination Decontaminate equipment and work surfaces which may have come into contact with ammonium perchlorate or ammonium nitrate using soap and water.

Waste Collect spent material in sealed containers protected from light and heat, and dispose of as hazardous waste.

First Aid & Emergencies

Skin or Eye Contact Remove contaminated clothing and accessories; flush affected area with water. If symptoms persist, get medical attention.

Inhalation Move person into fresh air. If symptoms persist, get medical attention.

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

Waste Disposal

Refer to the laboratory *Chemical Hygiene Plan* (Section 6.7) for information on proper chemical waste disposal procedures.

Name	Signature	Date