Standard Operating Procedure

Ammonium Nitrate

*This is an SOP template and is not complete until: 1) lab specific information is entered into the box below 2) lab specific protocol/procedure is added to the protocol/procedure section and
3) SOP has been signed and dated by the PI and relevant lab personnel.*

 Print a copy and insert into your
*Laboratory Safety Manual* and *Chemical Hygiene Plan*.
Refer to instructions for assistance.

|  |  |
| --- | --- |
| **Department:** | Click here to enter text. |
| **Date SOP was written:** | Click here to enter a date. |
| **Date SOP was approved by PI/lab supervisor:** | Click here to enter a date. |
| **Principal Investigator:** | Click here to enter text. |
| **Internal Lab Safety Coordinator/Lab Manager:** | Click here to enter text. |
| **Lab Phone:** | Click here to enter text. |
| **Office Phone:** | Click here to enter text. |
| **Emergency Contact:** | Click here to enter text. |
| *(Name and Phone Number)* |
| **Location(s) covered by this SOP:** | Click here to enter text. |
| *(Building/Room Number)* |

**Type of SOP:** [ ]  Process [x] Hazardous Chemical [ ]  Hazardous Class

**Purpose**

Ammonium nitrate is a potentially explosive chemical. It is commonly used as a nitrogen-rich fertilizer. It is also used as an oxidizing agent in explosives and as to hydrate the salt endothermically in instant cold packs.

**Physical & Chemical Properties/Definition of Chemical Group**

CAS#: 6484-52-2

Class: **Potentially explosive chemical, oxidizer**

Molecular Formula: NH4NO3

Form (physical state): Crystalline

Color: White

Boiling point: 210°C (410°F)

**Potential Hazards/Toxicity**

May cause irritation to the respiratory tract; symptoms may include coughing, sore throat, and shortness of breath. At high temperatures, exposure to toxic nitrogen oxides decomposition products can quickly cause acute respiratory problems. Inhalation of large amounts causes systemic acidosis and abnormal hemoglobin if inhaled. Causes skin and eye irritation.

**Personal Protective Equipment (PPE)**

**Respirator Protection**

A ½ or full face respirator equipped with appropriate cartridges should be used any time there is the potential for exposure to vapor and/or dust and a fume hood cannot be used.

Respirators should be used only under any of the following circumstances:

* As a last line of defense (i.e., after engineering and administrative controls have been exhausted).
* When Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded.
* Regulations require the use of a respirator.
* An employer requires the use of a respirator.
* There is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL)
* As PPE in the event of a chemical spill clean-up process

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested by ORS and should contact occhealt@uga.edu. This is a UGA requirement described in more detail in the [UGA Respiratory Protection Plan](https://esd.uga.edu/sites/default/files/respiratoryprotection.pdf) and supported by the [Office of Research Occupational Health and Safety Program](https://research.uga.edu/ohsp/).

**Hand Protection**

One of the following types of gloves are recommended: nitrile/neoprene/natural rubber/butyl rubber/PVC/Viton.

NOTE: Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with ammonium nitrate

Refer to glove selection chart from the links below:

<http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf>

OR

<http://www.allsafetyproducts.biz/page/74172>

OR

<http://www.showabestglove.com/site/default.aspx>

OR

<http://www.mapaglove.com/>

**Eye Protection**

ANSI approved safety glasses or goggles.

**Skin and Body Protection**

Fire/flame resistant lab coat (100% cotton based), cotton based clothing, full length pants, and closed-toe shoes are required.

**Hygiene Measures**

Wash thoroughly after handling. Wash hands before eating. Remove contaminated clothing and wash before reuse.

**Engineering Controls**

Safety shielding shall be used for any operation having the potential for explosion, including the following situations:

* When a reaction is attempted for the first time (small quantities of reactants should be used to minimize hazards);
* When a familiar reaction is carried out on a larger than usual scale (i.e., 5-10 times more material); or
* When operations are carried out under non-ambient conditions.

Shields must be placed so that all personnel in the area are protected from hazard. All operations involving potentially explosive chemicals and dilutions should be carried out in a certified fume hood to keep airborne level below recommended exposure limits. Chemical fume hoods must have a face velocity of 100 lfm, averaged over the face of the hood and must be certified annually. Laboratory rooms must be at negative pressure with respect to the corridors and external environment. The laboratory/room door must be kept closed at all times.

**First Aid Procedures**

**If inhaled**

Remove rapidly to clean air. Administer rescue breathing if necessary and call emergency services. Seek medical attention if needed.

**In case of skin contact**

Minor skin contact requires washing with water. Soaking or flushing contaminated areas of the skin with water for periods up to 15 minutes is required if a large area comes into contact with the chemical, or if prolonged contact occurs. Contaminated clothing may hold the chemicals in contact with the skin without being immediately noticed.

**In case of eye contact**

In the event of eye contact, the eye should be immediately flushed with water for at least 15 minutes. If the chemical is very irritating, it is likely that the affected individual will require assistance to hold the eye open during the flushing.

**If swallowed**

DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. Get medical attention immediately.

**Special Handling and Storage Requirements**

**Precautions for safe handling**

Ammonium nitrate must be handled inside the fume hood.

**Conditions for safe storage**

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Avoid storage on wood surfaces. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product. Do not store with organic solvents or acids. Do not store near combustibles. Do not store near high heat

Ammonium nitrate need to be secondarily contained and labeled as “EXPLOSION RISK & STRONG OXIDIZER”.

**Spill and Accident Procedure**

**Chemical Spill Dial 911**

**24-7 On-Call Response to Research, Environment, Health or Safety Concerns Dial 2-5561 from a campus phone or 706-542-5561 from a non-campus line.**

**Spill** – Follow the procedures set out in the [UGA Chemical and Laboratory Safety Manual.](http://research.uga.edu/docs/units/safety/manuals/Chemical-Laboratory-Safety-Manual.pdf)

[If there are any chemical-specific protocols for responding to a spill, insert them here or mark “none”:]

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# **Medical Emergency Dial 911**

**Life Threatening Emergency, After Hours, Weekends And Holidays** – Dial **911** or the emergency phone numbers listed at the beginning of the UGA Chemical and Laboratory Safety Manual

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Non-Life Threatening Emergency** – Follow the instructions in the UGA Chemical and Laboratory Safety Manual.

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Decontamination/Waste Disposal Procedure**

**For general hazardous waste disposal procedures, see Appendix H of the UGA Chemical and Laboratory Safety Manual.**

**Chemical Specific Procedures: [to be inserted or marked as “none”]**

No waste streams containing PECs shall be disposed of in sinks. Decontaminate work space with 70-75% ethanol. Wash hands and arms with soap and water after finished.

**Safety Data Sheet (SDS) Location**

UGA personnel can access Online SDS through a link in the upper left corner of the ESD home page (<https://esd.uga.edu>) and logging in by using their UGA email user name and password.

**Protocol/Procedure (Add lab specific Protocol/Procedure here)**

Click here to enter text.

**NOTE**

Any deviation from this SOP requires approval from PI.

**Documentation of Training** (signature of all users is required)

* Prior to conducting any work with Ammonium Nitrate, designated personnel must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
* The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and access to the SDS provided by the manufacturer.
* The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last 12 months.

I have read and understand the content of this SOP:

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| **Name** | **Signature** | **Date** |
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