

**Standard Operating Procedure for Using Nitric Acid**

Print a copy and keep with your Safety Data Sheets and training documents.

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| Department |  |
| Principal Investigator (PI) |  |
| PI Phone Number |  |
| Lab Manager |  |
| Lab Manager Phone Number |  |
| Emergency Contact |  |
| Emergency Contact Phone Number |  |

1. **Purpose**

The purpose of this document is to provide the information necessary to safely use nitric acid in the \_\_\_\_\_\_\_\_\_\_\_ laboratory and to comply with requirements of OSHA Standard 29 CFR 1910 Subpart Z ([CAS# 7697-37-2](https://www.cdc.gov/niosh/npg/npgd0447.html)).

1. **Hazard Identification:**
* *Strong oxidizing agent* -- Nitric acid is an extremely corrosive acid and strong oxidizing agent. It may be harmful if ingested, inhaled, or absorbed through the skin. It can cause severe skin and eye burns resulting in irreversible damage. It is extremely destructive to the tissue of the mucous membranes and the upper respiratory tract. As a strong oxidizing agent, it can cause violent explosions when combined with reducing agents.
* *Highly Reactive --* As a strong oxidizing agent, it can cause violent explosions when combined with reducing agents such as organic solvents and reagents. Therefore great care must be taken to store it separately from organic acids, flammable and combustible liquids (such as organic solvents), and organic reagents in general. Nitric acid waste must also be segregated from all other organic waste. Mixing of nitric acid waste with incompatible waste streams is a major cause of laboratory incidents.
1. **Engineering & Administrative Controls**

Nitric acid must only be handled/used within the chemical fume hood, which is designed to pull air and fumes up and away from the user (Engineering Control).

All lab personnel who use nitric acid must be trained on the hazards of nitric acid, including being familiar with this SOP (Administrative Control).

The door to the \_\_\_\_\_\_\_\_\_\_ lab is posted with signage indicating the presence and hazards associated with nitric acid (Administrative Control).

1. **Personal Protective Equipment (PPE)**
* *Hand Protection*: Neoprene gloves are acceptable for incidental exposure. Viton gloves are preferable if the loss of manual dexterity they cause is acceptable.
* *Eye Protection*: Safety glasses or splash goggles must be worn when handling nitric acid.
* *Skin and Body Protection*: A lab coat must be worn when handling nitric acid.
* *Respiratory Protection*: Nitric acid must only be used in the chemical fume hood. Do not open, pour, etc. nitric acid anywhere other than the chemical fume hood.
1. **Standard Operating Procedures for Nitric acid Handling and Storage:**

Nitric acid can be only used in areas properly equipped with a certified eye wash/safety shower that can be reached within ten seconds. It is essential that all strong oxidizers be stored separately from other laboratory chemicals with which they may react. For oxidizing acids such as nitric acid, this includes all organic materials. Ensure secondary containment and segregation of incompatible chemicals. Also, follow any substance-specific storage guidance provided in Safety Data Sheet (SDS) documentation.

The corrosive properties of nitric acid and its ability to produce fires or explosions by combination with combustible materials make the following considerations mandatory in the selection of a storage site:

* 1. A relatively cool, dry environment free from extremes of temperature--humidity should be maintained.
	2. Store in a material that is acid-resistant; this facilitates flushing and other cleanup procedures in the event of leaks or spills.
	3. Store on low shelves or in “Corrosives” storage cabinets.
	4. Segregate nitric acid from organic acids, and flammable and combustible liquids. **This is crucial to avoid fires/explosions.**
	5. Segregate all acids from active metals such as sodium, potassium, magnesium, etc.
	6. Use bottle carriers for transporting materials when possible.
	7. When mixing acids and water, always add acid to water. To avoid surface boiling/spattering, **NEVER add water to acid**.
	8. Store mineral acids together, separate from oxidizing agents and organic materials.
	9. Store acetic acid and other organic acids with the combustible organic liquids.
	10. As they deem necessary, the PI/supervisor should insert here any information about whether a special use-area is designated for this material/process.
	11. Add appropriate lab-specific information here describing how this material(s) is generally used. E.g., name of protocol, typical frequency done, quantities used, temperature and any additional safety measures, etc.
1. **Chemical Decontamination & Disposal**

Using proper personal protective equipment as outlined above, decontaminate equipment and bench tops using soap and water and properly dispose of all chemical and contaminated disposables as hazardous waste following the guidelines below.

All chemical waste must be disposed of in accordance with Federal and State regulations and UNM's Chemical Hygiene Plan. Nitric acid and nitric acid-containing wastes should be collected in suitable containers and properly labeled as soon as waste is added to the containers. Nitric acid waste should be labeled as such:

**HAZARDOUS WASTE**

**Nitric Acid waste**

**Corrosive & Reactive**

\* **It is crucial to avoid mixing nitric acid waste with organic waste of any kind. Nitric acid waste containers should be clearly marked as such to avoid accidental addition of any reducible materials. Failure to do this will cause a violent explosion.**

Call EHS at 277-2753 to schedule a pickup of waste nitric acid and/or other waste chemicals.

1. **Spill Procedures:**

For small/minor spills (<1L), use the materials in the spill kit to clean up the spill. Minimum PPE for cleaning up a nitric acid spill is safety glasses/goggles, gloves and lab coat. The spill clean-up materials must be double-bagged, tightly closed, labeled and picked up by EH&S for disposal.

Spills in excess of 1L of nitric acid should not be cleaned up by lab personnel. In the event of a large/major spill of nitric acid, evacuate the area and call:

* Campus Police -- 911 on a landline or 505-277-2241 on a mobile phone, and
* Environmental Health & Safety (EH&S) – 505-277-2753 during business hours, or
* EH&S Duty Officer Pager -- 505-951-0194 (enter your phone number after the message)
1. **First Aid Procedures**

In the event of a nitric acid exposure, seek immediate medical attention.

* Skin Contact and Eye Contact should be washed immediately in safety shower or eyewash respectively for 15 minutes.
* If the exposure is severe, seek medical attention at the emergency room. If heading to UNMH, a non-injured person should contact the UNMH charge nurse in advance at 505-604-9349 with information on the chemical and nature of exposure.
* UNM employees should contact Employee Occupational Health Services (EOHS) at 505-272-8034.
* UNM students should contact Student Health Services at 505-277-7810.
* If the exposure occurs after hours, employees and students should seek medical treatment at a hospital emergency room.
* The supervisor of the injured person and EH&S must be notified as soon as possible after the exposure.
* The notice of Accident, Incident, or Spill form should be filled out on the EH&S website.

1. **Other Emergencies**

**Fire or Medical Emergency -- Dial 911**

**Life-Threatening Emergency, After Hours, Weekends and Holidays** – **Dial 911**

**Non-Life-Threatening Emergency** – Call EH&S at 505-277-2753 to seek assistance and report the incident.

**Training Requirements**

All lab personnel who use nitric acid must review the lab-specific Nitric Acid SOP before beginning work.

**Principal Investigator SOP Approval**

By signing and dating here, the Principal Investigator certifies that this Standard Operating Procedure (SOP) for Using Nitric Acid is accurate and provides information sufficient to safely use nitric acid in the \_\_\_\_\_\_\_\_ laboratory.

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Signature Printed Name/Title Date

I have read and understand the content of this SOP:

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