

# Standard Operating Procedure

## Nitric Acid

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 *Lab-Specific Chemical Hygiene Plan*.

### Section 1 – Lab-Specific Information

Building/Room(s) covered by this SOP:	
Department:	
Principal Investigator Name:	
Principal Investigator Signature:	

### Section 2 – Hazards

**Health Hazards:** Concentrated nitric acid and its vapors are highly corrosive to the eyes, skin and mucous membranes. Dilute solutions cause mild skin irritation and hardening of the epidermis. Contact with concentrated nitric acid stains the skin yellow and produces deep painful burns. Eye contact can cause severe burns and permanent damage. Inhalation of high concentrations can lead to severe respiratory irritation and delayed effects, including pulmonary edema, which may be fatal. Ingestion of nitric acid may result in burning and corrosion of the mouth, throat, and stomach. An oral dose of 10 mL can be fatal in humans.

**Flammability and Explosibility:** While not a combustible substance, it is a strong oxidizer. Contact with easily oxidizable materials, including many organic substances, may result in fires or explosions.

**Reactivity and Incompatibility:** Nitric acid is a powerful oxidizing agent and ignites on contact or reacts explosively with a variety of organic substances including acetic anhydride, acetone, acetonitrile, many alcohols, thiols, amines, dichloromethane, DMSO and certain aromatic compounds including benzene. Nitric acid also reacts violently with a wide range of inorganic substances including many bases, reducing agents, alkali metals, copper, phosphorous and ammonia. Nitric acid corrodes steel.



### Section 3 – Engineering Controls and Personal Protective Equipment (PPE)

**Engineering Controls:** Use of corrosive materials should be conducted in a properly functioning chemical fume hood whenever possible. The chemical fume hood must be approved and certified by EHS and have a face velocity between 80 – 120 feet per minute.

**Hygiene Measures:** Avoid contact with skin, eyes, and clothing. Wash hands before breaks and immediately after handling the product.

**Hand Protection:** Two-sets of chemical-resistant gloves (e.g., nitrile) should be worn (“double-gloving”). A heavy-duty glove, such as butyl rubber, Viton, or equivalent, is recommended, especially when handling concentrated nitric acid or more than one liter. **NOTE:** Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with the specific chemical being used.



**Eye Protection:** ANSI approved properly fitting safety glasses or chemical splash goggles are required. A face shield is also recommended.

**Skin and Body Protection:** Laboratory coats must be worn and be appropriately sized for the individual and buttoned to their full length. Personnel must also wear full length pants, or equivalent, and close-toed shoes. Full length pants and close-toed shoes must be worn at all times by all individuals that are occupying the laboratory area. The area of skin between the shoe and ankle must not be exposed.

**Respiratory Protection:** If nitric oxide is being used outside of a chemical fume hood, respiratory protection may be required. If this activity is necessary, contact EHS (208) 885-5977 to enroll in the respiratory protection program.

### Section 4 – Special Handling and Storage Requirements

- Avoid contact with skin, eyes, and clothing.
- Keep container tightly closed in a dry and well-ventilated area. If possible, store in corrosive/acid/lab storage cabinet within a secondary containment (Nalgene/ polypropylene tray or tub). Store in original container away from direct sunlight.
- Avoid contact with alkali metals, reducing agents, cyanides, aldehydes, powdered metals, ammonia, acetic anhydride and all organic materials including organic solvents.
- Do not store in the top-most shelf of the storage cabinet. In general, do not store chemicals at or above eye level.
- Ensure the container is tightly closed at all times.

### Section 5 – Spill and Accident Procedures

Immediately evacuate area and ensure others are aware of the spill. If there is an imminent threat of a fire, pull the nearest fire alarm station to evacuate the building and **dial 911**. If personnel have become exposed and need medical assistance, **dial 911**. If the spill is minor and does not pose a threat to personnel, contact EHS at (208) 885-6524 during normal business hours (Monday – Friday, 8 AM – 5 PM) for spill cleanup assistance (dial 911 if spill occurs after hours and assistance is needed).

## Section 6 – Waste Disposal Procedures

Store hazardous waste in closed containers that are properly labeled and in a designated area. Nitric acid waste should be segregated from all incompatible chemicals such as caustics. Complete an online Chemical Waste Pickup Request to arrange for disposal by EHS.

## Section 7 – Protocol (Add lab specific Protocol/Procedure here)

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**NOTE:** Any deviation from this SOP requires approval from PI.

## Section 8 – Documentation of Training (signature of all users is required)

Prior to conducting any work with nitric acid, the Principal Investigator must ensure that all laboratory personnel receive training on the content of this SOP.

**I have read and understand the content of this SOP:**

Name	Signature	Date