

# Nitric Acid

## Chemical and Physical Properties

Nitric acid is a colorless, yellow, or red, fuming liquid with an acrid, suffocating odor. Nitric acid is a strong oxidant that decomposes on warming to produce nitrogen oxides. It reacts violently with combustibles, reducing materials, and organic solvents to cause fires and explosion hazards. It is a strong acid, reacts violently with bases and is corrosive to metals. Fuming nitric acid is concentrated nitric acid that contains dissolved nitrogen dioxide.

## Health Hazards

### Acute Health Effects

The following **acute (short-term)** health effect may occur immediately or shortly after exposure to nitric acid:

- Contact can severely irritate and burn the skin and eyes with possible eye damage.
- Exposure to nitric acid can irritate the nose and throat.
- Inhalation can irritate the lungs causing coughing and/or shortness of breath. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
- Nausea, vomiting, diarrhea, and abdominal pain

### Chronic effects

The following **chronic (long-term)** health effects can occur at some time after exposure to nitric acid and can last for months or years:

- Prolonged or repeated contact can cause a skin rash, pain, redness, and ulceration.
- Repeated inhalation exposure may cause bronchitis to develop with coughing, phlegm, and/or shortness of breath.
- Exposure to the high concentrations may cause erosion of the teeth.

## Safe Work Practices

- Whenever possible, substitute nitric acid for a less hazardous alternative.
- When using high concentrations of nitric acid, or when heating nitric acid above room temperature, work should be done in a fume hood equipped with a water wash down system. **Contact UHS for additional information.**
- Gloves (butyl rubber or neoprene), chemical splash goggles, and a face shield should be worn when handling high concentrations or large quantities (greater than 4 L) of nitric acid.
- When diluting nitric acid, **add the acid to water slowly.**
- Do not store nitric acid near materials it might react with. Nitric acid must be store in a compatible containment tray and **away from organic chemicals and bases.**

## Nitric Acid (cont.)

### Accidental Exposure

**Any accidental exposure requires medical attention. Call 911 for medical assistance.**

- **Inhalation:** If nitric acid mist or vapors are inhaled, immediately move to fresh air.
- **Skin Contact:** Immediately remove contaminated clothing and rinse profusely with water.
- **Eye Contact:** Using eyewash, flush eyes while holding eyelids open. Ensure contact lenses (if worn) have been removed.
- **Accidental ingestion:** Do not induce vomiting. Never give anything by mouth to an unconscious person.

### Spill Response

Please review the [Chemical Spills Fact Sheet](#) for details regarding emergency and non-emergency spill cleanup. Review this fact sheet prior to work with chemicals in the lab and annually thereafter.

If there is a non-emergency spill within your capability to clean up, be sure not to use organic absorbing material, such as paper towels or sawdust, as a fire could result. After the initial cleanup, neutralize the area with a sodium carbonate solution and rinse with copious amounts of water.

### Waste Disposal

Dispose of nitric acid in unused waste containers or containers that have previously held nitric acid solution. **DO NOT re-use containers** that previously contained incompatible materials, such as organic solvents.

### Additional Information

For general information regarding the safe use of nitric acid, please contact University Health and Safety (UHS) at [uhs@umn.edu](mailto:uhs@umn.edu) or (612) 626-6002.

### Resources

[Prudent Practices Lab Safety Summary—Nitric Acid](#)

[Pub Chem Nitric Acid Laboratory Chemical Safety Summary \(LCSS\)](#)

[Video of the reaction between ethanol and nitric acid](#)