



<b>SAFE WORK PROCEDURE</b>	<b>Insert Reference Code: UBC-RMS-OHS-SWP-19-002</b>
<b>Department of Risk Management Services</b> www.rms.ubc.ca	Effective date: April 29, 2019 Review date: NA Supersedes: NA

## Working Safely with Picric Acid

### 1. SCOPE

Picric Acid is a trinitro-aromatic compound frequently found in forensic and histology laboratories as a staining and fixative agent. This compound is related to trinitrotoluene (TNT) and has been shown to be a high-power explosive and is mainly use in the ammunition and explosive industry. Therefore, careful precautions should always be taken when handling this chemical.

All UBC employees working with and/or handling picric acid should follow this safe work procedure. It describes methods to safely handle, use and store picric acid.

Work with picric acid is regulated by WorkSafe BC [Occupational Health and Safety Regulation 30.22](#).

### 2. RESPONSIBILITY

Supervisors and members of research groups who are using picric acid must:

- Keep an inventory of all picric acid
- Create and document a risk assessment prior to picric acid use
- Purchase, store and use the minimum quantity of picric acid possible; **disposal costs of picric acid far outreach the original cost**
- Periodically inspect the picric acid containers to make sure it contains at least 10% or more water
- Document and follow the appropriate safe work procedure.

### 3. EDUCATION/TRAINING REQUIRED

- [Chemical Safety Course](#) offered by Risk Management Services
- Read and understand the Picric Acid Safety Data Sheet (SDS). Contact Risk Management Services at [researchsafety@rms.ubc.ca](mailto:researchsafety@rms.ubc.ca) or 604-827-3409 if help is needed to locate and/or understand the SDS.

All employees working with picric acid must receive appropriate onsite training covering:

- Health effects resulting from exposure to picric acid
- Safe work procedures



- Personal protection
- How to clean a picric acid spill
- First aid and emergency procedure

#### 4. HAZARD

##### Physical Hazards

When hydrated, picric acid is a typically safe to handle, but it becomes a powerful explosive when dry (less than 10% water). Dry picric acid is highly sensitive to heat, shock, and friction. The moistened solid is classified as a flammable solid. Picric acid readily forms salts on contact with many metals (including copper, lead, mercury, zinc, nickel, and iron) that are more sensitive explosives than picric acid itself when subjected to heat, friction, or impact. Salts formed with ammonia and amines are also sensitive explosives. Contact with concrete floors or plaster may form the friction-sensitive calcium picrate.

##### Health Hazards

Picric acid is toxic by ingestion, inhalation and dermal absorption! According to ACGIH TLV documentation (2001) systemic poisoning after absorption of picric acid in man, ingestion of 1-2 grams would cause severe poisoning. Systemic poisoning causes headache, vertigo, nausea, vomiting, diarrhea, inflammation of kidney and acute hepatitis. Red colored urine may be produced. Inhalation of dust may cause lung damage.

Based on pH value (1.3 for saturated solution) picric acid is a strong acid and it is expected to be corrosive or strong irritant. The dust is irritating to the skin and eye. It is considered a skin sensitizer which can cause an allergic reaction that can spread from the hands / arms to the rest of the body. However, these symptoms would not be expected in the laboratory environment under safe usage practices. No human or animal carcinogenicity data for picric acid are available.

#### 5. ENGINEERING AND PERSONAL PROTECTIVE EQUIPMENT (PPE)

##### Engineering Controls

All picric acid solutions must be prepared and handled in a certified chemical fume hood. The use of a Biological Safety Cabinet is especially not appropriate for working with picric acid.

Any fume hood for which picric acid is used shall be posted with a warning sign that identifies the hazards and necessary controls.

##### Personal Protective Equipment

Hand protection: Nitrile, neoprene or butyl gloves are recommended (NOT latex). Double-gloving is recommended when working with pure picric acid or concentrated solutions. Change gloves frequently and when contaminated, punctured or torn.



**Eye protection:** ANSI-approved properly fitting safety glasses or chemical splash goggles are required.

**Skin and body protection:** Laboratory coats must be worn, appropriately sized for the individual, and buttoned to their full length. A chemical-resistant/rubber apron can be utilized in conjunction with the lab coat to minimize protection. 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:** Picric acid should never be used outside of a chemical fume hood; however, if picric acid must be used outside of a chemical fume hood, respiratory protection may be required. If this activity is necessary, contact [RMS Occupational Hygiene](#).

## 6. GUIDELINES FOR SAFE WORK PRACTICES

### 6.1. Handling

- All operations involving picric acid must be performed in a fully functioning chemical fume hood.
- The fume hood must be in the immediate vicinity of a safety shower and emergency eyewash station.
- The working surfaces of any fume hood for which picric acid is used should be protected with plastic backed absorbent pads to insure containment of any spills.
- Work at least 6" inside of fume hood and set sash at lowest possible position.
- Do not use metal spatulas to remove picric acid. Do not allow contact with metal: metal picrates are extremely shock sensitive.
- Carefully inspect the picric acid bottle before opening it. If there is any evidence of crystal formation, do not open the bottle and contact RMS for assistance (604 822 2029).
- Always clean the neck of the bottle, cap and thread with a wet cloth before recapping and seal cap with Parafilm. Thoroughly wet the cloth used, collect it in a plastic or glass container labeled as hazardous waste and contact ESF at 604-822-6306 for disposal.

### 6.2. Storage

- Label containers of picric acid or picric acid solutions with the date received and date opened. Dispose of the picric acid containers within 2 years from date received.
- Solid picric acid must be stored with at least 10% moisture content and regular inspections must be made to ensure that the minimum moisture content is maintained. **Never let picric acid dry out.**
- Store picric acid in a cool, dry, well-ventilated area, out of direct sunlight and away from sources of heat.



- Picric acid is incompatible and must not be stored with oxidizers, reducing agents, inorganic salts, alkaloids and metals.
- Use and store picric acid in containers made of polyethylene, polypropylene, Teflon or glass. Do not use containers with metal caps. Place storage containers in unbreakable secondary containment.
- Protect from freezing temperatures.

### 6.3. Spills

In the case of a small spill restricted inside a chemical fume hood, the spill can be cleaned by laboratory staff assuming that the correct equipment is present and that the staffs understands the hazards associated with picric acid.

- NEVER allow spilled material to dry - dampen spilled solids with water or a 2% v/v aqueous solution of acetone without stirring to keep picric acid wet.
- NEVER attempt to sweep up dry material; always keep picric acid wet to reduce any explosion hazards.
- Use a spill response pad or pillow damp with water to absorb spilled material.
- Place the pads / pillows in a compatible, impervious container with water added.
- Thoroughly wash the spill site after material pickup is complete.
- Collect all picric acid-containing waste in plastic or glass bottles and contact ESF at 604-822-6306 for disposal.
- Complete UBC Incident/Accident forms on [CAIRS \(Centralized Accident Incident Reporting System\)](#) within 48 hours of the spill.

In the event of a large spill located outside a chemical fume hood, request assistance for spill clean-up: RMS at 604 822 2029 or 911.

- Advise and warn co-workers.
- Evacuate the area immediately
- Restrict the access to the area.
- Contact RMS at 604 822 2029 or 911 for assistance.

### 6.4. Waste

- Waste Picric Acid should be placed in a chemically compatible container and disposed of as [hazardous waste](#)
- Never dispose of Picric Acid contaminated material in the trash.

## 7. REVIEW AND RETENTION

This SWP is reviewed annually or whenever deemed necessary by the responsible Risk Management Services representative.



**8. DOCUMENT INFORMATION**

Written / Reviewed by: RMS Advisor, Chemical Safety  
Contact: [researchsafety@rms.ubc.ca](mailto:researchsafety@rms.ubc.ca)  
604-827-3409