

Readiness Review

All Ames Laboratory activities must be approved by the Safety Review Committee via the READINESS REVIEW procedure prior to the work being conducted. Ask your supervisor if you have any questions about the Readiness Review for your activity, and make sure you are approved to proceed.

The Iowa State University Laboratory Safety Manual serves as the Chemical Hygiene Plan for the Laboratory.

Hazards of Picric Acid

Picric acid, or 2,4,6-trinitrophenol, is a compound that is both toxic and explosive, with greater explosive force than TNT. It is useful in organic synthesis and analytic chemistry. This handout gives general recommendations for working with picric acid. For more detailed information, see the Safety Data Sheet provided by the manufacturer, and the SOPs for your activity.

● HEALTH HAZARD

Very hazardous in case of skin contact (irritant), of eye contact (irritant). Hazardous in case of ingestion or inhalation. The amount of tissue damage depends on length of contact. Eye contact can result in corneal damage or blindness. The substance may be toxic to blood, kidneys, liver.

● SYMPTOMS

- Corrosive to eyes and skin. Slightly hazardous in case of skin contact (permeator).
- May cause skin sensitization

- Acute LD50 (Lethal Dose for 50% of test subjects) 200 mg/kg (rat)

● FIRE HAZARDS

Highly flammable solid when wet; explosive when dry. Contact between picric acid and concrete floors, ammonia, metals, or bases leads to the formation of highly unstable salts.

Storage/Disposal

- Dry picric acid is a severe explosion hazard when exposed to shock or heat.
- Material must be wet at all times. Inspect and add water every six months as needed.
- Materials older than 2 years should be disposed of through ESH&A (294-2153).
- Get rid of old bottles with metal caps. Do not let dry picric acid crystals form in container or on the cap threads of container.
- Keep container tightly closed, and store in cool, dry area.
- Keep away from heat, sparks and open flame.

Personal Protection Equipment

- Eye Protection: Splash-proof safety goggles.
- Gloves: Nitrile, latex, neoprene
- Ventilation: Use in a hood with at least 100 fpm face velocity. Use blast shields as appropriate.
- Respirator: Contact ESH&A.
- Clothing: Lab coat and impervious apron if significant dermal exposure potential exists.

Handling Precautions

- Picric acid is distributed by the manufacturer wet. Commercial grade moisture specifications range from 10% to 30% water. Wetted picric acid is classified as a flammable solid.
- NEVER ALLOW PICRIC ACID TO DRY OUT. DRY PICRIC ACID IS HIGHLY EXPLOSIVE!
- Use the smallest amount of reagent possible to complete the experiment.
- Dry picric acid is especially explosive when combined with metals such as copper, lead, zinc or iron. Do not use metal spatulas or vessels.
- Picric acid will react with alkaline materials including plaster and concrete to form explosive materials.
- If a container of picric acid is found of unknown age, DO NOT ATTEMPT TO OPEN IT! The container could explode from friction on the crystals between the grooves of the cap and the threads. Call ESH&A for assistance (294-2153).

First Aid

- Wash any exposed areas of skin with large volumes of water. Remove contaminated clothing. Thoroughly clean shoes before reuse, or discard if not cleanable.
- If eye contact occurs, flush in eye wash for at least 15 minutes and seek prompt medical attention.
- Notify your supervisor, ESH&A and/or Occupational Medicine if an exposure has occurred.

Spill Remediation

Personal protective equipment (PPE) requirements for spill response may be greater than those for routine handling. Evacuate to a safe location and call for help if adequate PPE is not available.

- Spills should be diluted with water and not allowed to dry. Use an inert, inorganic absorbent to soak up water-diluted spills of picric acid. A mop and water bucket may also be used.
- Contact ESH&A, 4-2153, for advice and assistance in spill remediation.
- Notify your supervisor of any spill that has occurred.

Physical Properties

CAS:	88-89-1
Formula:	$C_6H_3N_3O_7$
Color:	Moist, yellow powder
Odor:	None
Melting Point:	121° C
Density:	7.9

Regulatory Information

Shipping Description (Note variations):

UN 3364; Trinitrophenol (picric acid), wetted, with not less than 10% water, by mass

UN 1344; Trinitrophenol, wetted, with not less than 30% water, by mass

TSCA 8(b) inventory: Picric acid

Exposure Limits

OSHA PEL:	0.1 mg/m ³ TWA [skin]
ACGIH TLV:	0.1 mg/m ³ TWA
NIOSH REL:	0.1 mg/m ³ TWA; 0.3 mg/m ³ STEL [skin]
IDLH (NIOSH):	75 mg/m ³

NOTE: This information is not intended to replace the Safety Data Sheet (SDS). Always have access to a current, vendor-specific SDS in your lab for each chemical.

References

<http://cameochemicals.noaa.gov>

<http://www.cdc.gov/niosh/idlh/88891.HTML>

Picric Acid Safety, from University of Wisconsin-Madison Web site, Department of Environmental Health, Safety & Risk Management.

Material Safety Data Sheet, Sigma Company, St. Louis, MO.

Handout 10200.029 Revision 3
Effective Date July 15, 2013

Environment, Safety, Health & Assurance
G40 TASF – 294-2153

Picric Acid

Safe Handling Precautions For Picric Acid

Ames Laboratory users of picric acid must complete Hazard Communication Training (AL-137) and activity-specific training prior to work. See your supervisor or ESH&A with any questions.

