UCR Environmental Health & Safety

Spotlight On Safety

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Safe Use of Picric Acid

Picric acid (2,4,6-trinitrophenol, picronitric acid) is a pale yellow, odorless crystal that is slightly soluble in water. It is primarily used as a staining reagent and in synthesis reactions. It can be purchased in various forms: for example, as a solid moistened with water (≥ 35% water), as a saturated solutions in water (≈ 1.3%), as a more dilute solution in water, as a solution in ethanol, or as Bouin's solution (which contains picric acid, formaldehyde, and acetic acid in an aqueous solution).

Explosion 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 if swallowed, inhaled, or absorbed through the skin. Inhalation of dust may cause lung damage. Chronic exposure may cause liver or kidney damage. It is irritating to the skin and eyes and may cause an allergic skin reaction. See SDS for additional health effects and symptoms of exposure

Handling

- Do not use metal spatulas to remove picric acid. Do not place in metal containers or containers with metal lids.
- Whether handling the moistened solid or a solution, clean the bottleneck, cap, and threads with a wet cloth before resealing. Collect the used cloth in a plastic or glass container and label as hazardous waste for disposal by EH&S. Ensure that the material is thoroughly wetted.

Personal Protective Equipment and Engineering Controls

Use picric acid in a fume hood
In addition to long pants, close toe shoes, lab coat, and gloves, additional PPE may be needed depending on the Standard Operating Procedure (SOP).

Old Picric Acid

Potentially old picric acid (older than 2 years) requires special handling.

- DO NOT TOUCH THE CONTAINER! Even a minor disturbance can be dangerous (crystals may have formed between the lid and the container) - an attempt to open the container can result in a large explosion that can critically damage personnel and equipment

- Check the container for identification and an expiration date (should not be older than 2 years)
- Inspect bottle - if there is the slightest indication of crystallization or low levels of water (it should look like a wet paste), contact EH&S immediately! Dry picric acid or picric salts should not be touched or moved under any circumstances. Lightly mist any crystals on the outside of the bottle with water.

Exposure

- For medical assistance, call 9-1-1 and inform EH&S at 951-827-5528.
- If the exposure is through skin, use the nearest eyewash/shower station and immediately begin flushing with water for at least 15 minutes
- Remove all contaminated clothes

Symptoms from Exposure

- Strong irritant and allergen that causes allergic reactions
- Can cause skin damage, staining at the contact site, and poisoning when ingested or absorbed. Also a strong irritant and allergen that causes allergic reactions.

Reducing Chances of Lab Explosion

- After initially opening of container, inspect material monthly to ensure it contains enough water (material should look like a wet paste) - document in the inspection column
- Rehydrate contents of container every 6 months with deionized water to maintain a wet paste - document in the rehydration column.

Storage

- Label containers of picric acid or picric acid solutions with date received and date opened and store in the original container in a cool, dry, well ventilated area away from heat sources. Ensure the solid is under a layer of water.

- Store in original container in a cool, dry, well-ventilated area away from sources of heat.

Spill Procedures

- Contact EHS at 951-827-5528 if you spill any amount of picric acid.

Disposal Procedures

- Dispose of picric acid as hazardous waste through WASTe within two years of initial receipt.

For more information, visit www.ehs.ucr.edu or call 951-827-5528.