**University of Arizona**

**Picric acid Standard Operating Procedure**

*[This is a template. Fill in all necessary blanks and delete all highlighted areas when complete. Add any sections necessary for your laboratory. This will be appended to your Laboratory Chemical Hygiene Plan.]*

**Title:**  **Click here to enter the title of your SOP.**

**Approval Holder (AH):** Click here to enter text **Approval #:** Click here to enter text

**Approval Holder Phone Number(s):** Click here to enter text

**Approval Safety Coordinator (ASC):** Click here to enter text

**Approval Safety Coordinator Phone Number(s):** Click here to enter text

**Department:** Click here to enter text

1. **Purpose**

This standard operating procedure (SOP) is intended to provide guidance on how to safely use, store, and dispose of picric acid in Enter AH’s name’s laboratory. Laboratory personnel should review this SOP, as well as the appropriate Safety Data Sheet(s) (SDSs), before Describe the procedure or process this SOP will address. If you have questions concerning the requirements within this SOP, contact your Approval Holder (AH) or Approval Safety Coordinator (ASC).

1. **Scope**

*[Describe when this SOP applies and to whom this SOP applies.]*

1. **Hazard Description**

*[Describe the hazards presented by the procedure or process this SOP addresses. What makes it hazardous? Provide an example, if applicable.]*



Picric acid, or 2,4,6-trinitrophenol (TNP), is a yellow, odorless crystalline solid that is mildly corrosive, highly flammable, and explosive when dry. Normally sold and stored wet, it is only slightly soluble in water. Picric acid is often used as a fixative and staining reagent in immunohistochemistry. This substance is prone to sublimation, whereupon it can react with nearby metals, bases, or other materials to form dangerous picrate salts.

1. **Process & Hazard Controls**

*[Describe the steps needed to set up and complete the procedure or process in safe manner following the* [*hierarchy of controls*](https://www.cdc.gov/niosh/topics/hierarchy/default.html)*. Use as much detail as is necessary to ensure all laboratory workers can complete the procedure or experiment safely.]*

* 1. **Elimination/Substitution**

*[Describe any eliminations of hazardous chemicals or processes; alternatively, any substitutions with less hazardous alternatives that could be used to accomplish the task. Delete this section if you are unable to eliminate or substitute.]*

* 1. **Engineering Controls**

*[Describe any engineering controls (e.g. fume hoods, gas cabinets, local exhausts, blast shields, etc.) that are used to safely accomplish the task.]*

* **Fume hood**: Use fume hood to keep exposure to picric acid as low as possible. If your protocol does not permit the handing of such materials in a fume hood, contact EH&S to determine whether additional respiratory protection is warranted.
  1. **Work Practices**

*[Describe any work practices (e.g. staggering schedules, additional cleaning measures for particulates, etc.) that are used to safely accomplish the task.]*

* When possible, purchase picric acid in solution. If you must purchase it as a solid make sure that it is sold moistened (not as a dry solid).
* Do not use a new bottle until the old picric acid is used completely.
* Make sure any stored picric acid is kept wet.
* Clean bottleneck, cap and threads with a wet cloth before re-sealing.
* Don’t allow picric acid come in long-term contact with metal surfaces. Remember, many metal picrates are much more sensitive to potential explosion than picric acid, itself.
* Never put picric acid in a metal container or use metal (unlined) lids.
* Do not use metal spatulas when manipulating picric acid. Wooden and plastic spatulas are safe to use.
* If there is any formation of solid deposits of picric acid around the plastic cap, immerse the container and lid in cold water and allow water to seep into the seal. Cold water can create negative pressure inside the reagent bottle.
* Check the hydration of picric acid as part of regular laboratory inspection and add distilled water if needed to maintain a wet paste (minimum 10% water by volume).
* Label the containers to show the date when they are opened first.
* Maintain a log for regular inspection of containers, usage, and the dates of receipt and opening.
  1. **Personal Protective Equipment**

*[Describe the personal protective equipment needed to adequately protect laboratory workers when performing the process or procedure addressed by this SOP. Ensure to specify any personal protective equipment beyond the minimum (i.e. safety glasses, lab coat, gloves, long pants and closed-toed shoes).]*

* **Hand and Arm Protection**: Nitrile gloves should always be used when creating, working with, or cleaning up.
* **Face and Eye Protection**: Safety goggles are a minimum protection; the use of a face shield with eye protection is strongly recommended to protect both the eyes and face from splashes.
* **Body Protection**: A 100% cotton lab coat should be used and can be combined with an acid resistant apron to prevent exposure to the body.
* **Respiratory Protection**: Respirators may be required if exposures are not able to be adequately controlled by the use of engineering controls or other means. All uses of respiratory protection require RLSS assessment and consultation (for assessment of work, selection of respirator and filtration, and OSHA-mandated medical clearance and fit testing). Contact [rlss-ppe@arizona.edu](mailto:rlss-ppe@arizona.edu) with any questions or concerns.
  1. **Transportation and Storage**

*[Describe how to safely transport and/or store (e.g. ventilated cabinet, flammable cabinet, under inert blanket, etc.) the hazardous chemical(s) or processes.]*

**Storage**

* Dry picric acid is sensitive to shock and friction and must therefore be stored wet, under a layer of water.
* Do not allow the solution to evaporate to dryness.
* Glass or plastic bottles are required, as picric acid can easily form highly sensitive metal picrate salts.
* Do not use metal spatulas when manipulating picric acid.
* Keep away from sources of ignition.
* Do not use glass stoppers as some material may be ground between the flask neck and the stopper, and it may explode.
* Clean bottleneck, cap, and threads with a wet cloth before re-sealing.
* Keep away from metals, amines, bases, and hygroscopic chemicals.

1. **Spills, Cleanup & Disposal**

*[Describe how to safely end the procedure or process, clean up the process or spills, and/or dispose of any waste generated.]*

**Spills**

Spill response should always follow the [University Chemical Hygiene Plan](https://rgw.arizona.edu/sites/default/files/cs-univeristy_chemical_hygiene_plan.pdf) Section 8.2.

**Exposure Response**

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| --- | --- | --- | --- |
| **Inhalation** | **Ingestion** | **Skin Contact** | **Eye Contact** |
| After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately  apply artificial respiration, if necessary also oxygen. | After swallowing: immediately make victim drink water (two glasses at most). Consult a  physician. | In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with  water/ shower. Call a physician immediately. | After eye contact: rinse out with plenty of water. Remove contact lenses. |

**Disposal**

* Picric acid should be collected in a sealed container as an aqueous solution.
* If an old or previously unaccounted for bottle of picric acid is discovered, **do not touch the container**. Depending on how long the bottle has been abandoned and the state of the product inside, even a minor disturbance could be dangerous. Visually inspect the contents of the bottle without moving it to evaluate its water content, looking for signs of crystallization inside the bottle and around the lid. If there is even the slightest indication of crystallization, evaporation, or the formation of dry solids, **do not handle the container** and contact EH&S immediately. Secure the area and restrict access to the container until it can be evaluated by EH&S personnel.

1. **Enter Additional Section Title**

*[Add as many sections as necessary to adequately describe how to safely perform the procedure or process addressed by this SOP.]*

1. **References**

* UCLA Picric Acid SOP: <https://ucla.box.com/s/jhk4doea9uh5ka2n4c201bsu1e3qa583>
* UW SOP: <https://ehs.wisc.edu/wp-content/uploads/sites/1408/2020/08/CHM-GUI-006-NEW.pdf>