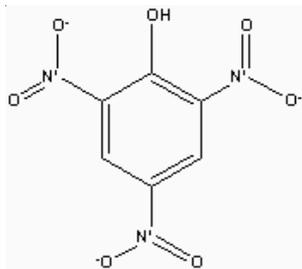
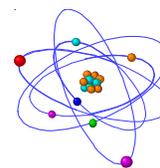


LABORATORY SAFETY FACT SHEET #23

Guidelines for Work with Picric Acid



What is Picric Acid?

Picric acid (also known as trinitrophenol) is a pale yellow, odorless crystal that is slightly soluble in water and highly sensitive to heat, shock, or friction. Because of picric acid's explosive nature, it is among the most hazardous substances found in the laboratory.

What are the Hazards?

Classified as a flammable solid when wetted with more than 30% water and a high explosive with less than 30% water, it has some very noteworthy properties. It is explosive but also shock, heat, and friction sensitive. Picric acid is toxic by all routes of entry (i.e., inhalation, ingestion, dermal), it's also a skin irritant and allergen and will produce toxic products on decomposition.

Picric acid is primarily used in laboratories for use as a chemical reagent. Water can be added to picric acid to act as a desensitizer. The wetted product is considerably less shock sensitive than the dry acid. Picric acid is highly reactive with a wide variety of materials (e.g., copper, zinc, lead, salts, plaster, concrete, ammonia, etc.) and extremely susceptible to the formation of picrate salts. Many of these salts are even more reactive and shock sensitive than the acid itself. Picrate salts are formed by the reaction of picric acid with any of the following: metals, metal salts, bases, ammonia, and concrete. Particular attention must be paid in order to prevent the formation of picrate salts during normal use of picric acid. Metal picrates are particularly sensitive and can be formed with metals such as copper, nickel, lead, iron, and zinc. Calcium picrate is formed by the reaction of picric acid with concrete.

Note: Picric acid must never be allowed to dry out, especially on metal or concrete surfaces.

Identify and Evaluate the Hazard

Refer to the SDS, other Internet resources, and publications such as *Prudent Practices in the Laboratory* etc. **It is very important that all of the available information regarding the use of picric acid be thoroughly reviewed by all parties before any work begins.** Determine the potential hazards before beginning an experiment.

Control the Hazard

Use the information from the hazard assessment process to identify work practices, engineering control, and protective equipment necessary to perform the experiment safely. This information should be included in written lab procedures or as separate safety "SOP".

- If possible, engineer out the use of picric acid if another product will perform the same task with less potential for risk.
- Keep an accurate and up-to-date chemical inventory of all laboratory spaces to reduce the potential for old and overlooked picric acid.

- All work with picric acid should be done in a chemical fume hood to minimize inhalation exposure.
- If picric acid must be used then be sure to wear the proper protective equipment (i.e., lab coat with sleeves fully extended to the wrist, eye protection such as splash goggles, neoprene gloves, full-length trousers, closed toe shoes). Under no circumstances should disposable gloves ever be reused!
- Use and store the least amount of picric acid that the work requires rather than purchasing larger quantities to save money. In the end, it may be more cost effective to have less rather than more.
- Remember, picric acid should never be allowed to dry out.
- Make sure picric acid is kept in clearly labeled (including date received), compatible containers.
- Perform a dry run to work out the potential pitfalls before actually using picric acid. Do not allow picric acid to come in contact with skin, eyes, or respiratory tract at any time.
- Be prepared for accidents - Before picric acid is used in the laboratory, have a specific action plan in place in the event that an accidental release or exposure occurs. Know the location of all safety equipment, including eyewash/douse showers and the first aid kit, emergency telephone numbers and who to notify in the event of an emergency, and keep your coworkers informed as to your activities regarding picric acid activities.
- Do not assume that all laboratory personnel know the hazards regarding, and risks surrounding, the use of picric acid.

Storage of picric acid

Storage of unused liquid inventories should be put in polyethylene secondary containers (large enough to contain the entire contents if the original container should rupture) and stored with all other inorganic acids. Be sure to label all containers that contain picric acid (including date received).

Potentially old picric acid is an item of special concern and garners considerable attention. If old or previously unaccounted for bottles of picric acid are discovered, the following steps should be taken.

- Most importantly **DO NOT TOUCH THE CONTAINER!** Depending on how long the bottle has been left and the state of the product inside, even a minor disturbance could be dangerous. Crystals may have formed between the lid and the container. Any attempt to open the container could result in an explosion large enough to do serious damage to personnel and equipment.
- Visually inspect the container for product identification and check for an expiration date. If the product is relatively new, there may not be a problem. Nevertheless, treat the situation carefully.
- Inspect the contents of the bottle to determine water content and check for signs of crystallization inside the bottle and around the lid. If there is no evidence of crystal formation and the water content is fairly high, there is probably little cause for concern. If there is even the slightest indication of crystallization or low levels of water in the bottle, the situation is more serious. Contact EH&S immediately for guidance! Immediately secure the area and restrict access. A measure of security can be obtained by lightly misting any attainable crystals (such as those that may have formed on the outside of the bottle) with large quantities of water. A water spray bottle is ideal for this purpose.
- Dry picric acid or picrate salts should not be touched or moved under any circumstances. This is a serious potential hazard.

If you feel that your laboratory may have old picric acid in your chemical inventory, contact EH&S (893-3293) for a special pick-up to have it removed, **but do not handle it yourself.**

Accidents

- For medical assistance call 9-911 and also inform EH&S
- If the exposure is through skin contact use the nearest eyewash/douse shower and immediately begin flushing with water for at least fifteen minutes.
- Remove all contaminated clothing (no room for modesty here) .
- Make sure all exposed areas are rinsed; victim will need assistance to hold eyes open in water if necessary.
- Be sure an MSDS is available for the medical personnel .

Disposal Procedures

All picric acid waste should be properly packaged and clearly labeled for EH&S to collect it.