

Picric Acid, Storage and Handling – Guideline

Picric acid (2,4,6 Trinitrophenol) is a military explosive that is used as a booster charge to set off another less sensitive explosive, such as TNT. It also can be a very useful laboratory reagent found in forensic and histology laboratories and in the manufacture of medicines.

Picric acid is distributed by the manufacturer wet with greater than 30% water and is classified as a flammable solid (DG class 4.1). It tends to form dangerously sensitive and unstable picrate salts, such as potassium picrate if the acid is kept for a long time or if improper storage allows the liquid to evaporate.

Many laboratories have phased out the use of picric acid but may not have disposed of the resulting surplus. A bottle of picric acid shown below was discovered in a university building – the material was very old, very dry and potentially unstable and the bottle had a metal lid (this can introduce the possibility of metal picrate formation, another explosive). The material was taken by the explosives inspectors from the Department of Mines and Energy to be detonated at the university under controlled conditions as it was too dangerous to be transported. The incident generated unwanted media attention for the university which could have been avoided by having up to date chemical inventory controls in the laboratory (this extends to offices which might be housing old and ‘precious’ chemicals).



What to do if dehydrated picric acid is found in your laboratory

If a container of dehydrated (dry) picric acid is found, DO NOT attempt to open the container as it could explode from friction on the crystals between the grooves of the cap and the threads. The following procedure should be followed:

- If the dry picric acid is in a plastic container, place the entire container in a bucket of water, add ice to cause shrinkage of the bottle to enhance penetration of the water and weigh down for several days. After several days, observe the presence of water inside the bottle, where at this point it is safe to remove the cap and rehydrate the acid inside the bottle;
- If the dry picric acid is in a container with a metal lid, contact UQ Security (33653333) immediately. An assessment will then be made between Security and OH&S and in most situations, the Department of Mines and Energy will be contacted to appropriately deal with the situation.

What if I need to use picric acid at the University

The use of picric acid should be avoided wherever possible. Prior to purchase, a risk assessment must be conducted.

Picric acid is now sold in a 1% solution in water which is much safer but care still needs to be taken as crystals can still form under the cap.

The following controls should be adopted if picric acid cannot be substituted for something safer:

- Make sure that the picric acid is kept wet and in a bottle with a plastic lid (metal lids should be disposed).
- When picric acid is opened, the date should be marked on the bottle and any contents older than 2 years shall be disposed of. Do not order a new bottle until needed.
- The least amount of picric acid required for the work should be purchased. DO NOT buy in large quantities to save money
- All containers must be labelled with information about:
 - Name of material
 - Dangerous Goods class
 - Concentration
 - Health and Safety Risk Statements
 - Date opened
 - Preparer's name and contact details
- Store away from strong oxidising agents, bases, most common metals, ammonia and strong reducing agents
- Flag picric acid on your laboratory inventory for bi-annual review
- Ensure risk assessment has been conducted and that appropriate ventilation and PPE is available before using the substance.