

Phosphoric Acid – Operating Procedure

Updated on 11/28/2018 by IC

Warnings and Notes

- Phosphoric Acid is a corrosive (it can burn your flesh, eyes, lungs, and mucous membranes) liquid.
- You must read its SDS before you use it; the SDS is available in the yellow binders located in the cleanroom, on the UNDF-Tools shared drive, and in the “Current Users” section of the website (udnf.udel.edu).
- Phosphoric Acid can be used at room temperature or it can be heated to 80°C.
- **Never** use plastic beakers for Phosphoric Acid.
- Heated Phosphoric Acid may only be used in the middle wet bench (labeled Acids #2) in Bay 2 of the UNDF cleanroom.
- You must have a safety buddy to use Phosphoric Acid. The safety buddy does not have to stand by you or wear the PPE listed in the next section. However, the safety buddy must be in the cleanroom at all times while you use Phosphoric Acid and clean up and must check on you at least every 10 minutes.
- You must log into the “Chem – Phosphoric Acid” tool in FOM before you start work and log out once you are done using Phosphoric Acid. You must make reservations in advance in FOM.
- Identify the closest eye wash and safety shower before you start work.
- You must report all chemical spills and exposures to UNDF staff.
- Phosphoric Acid may be used only during staffed hours (typically 8:30-17:00, M-F while the University is open). Unstaffed hours will be announced via email and will be posted on the UNDF Calendar in FOM.
- You should expect to find the working area clean and dry and are expected to leave the working area clean and dry. Please ask for staff assistance as needed.
- You may not leave the solution unattended while it is in the hot water bath.

Emergency Procedures

- In case of **skin contact**: Flush the affected area(s) while removing all contaminated clothing with large amounts of water for at least 15 minutes. Seek immediate medical attention.
- In case of **eye contact**: Flush the affected eye(s) with large amounts of water for at least 15 minutes. Seek immediate medical attention.
- In case of **inhalation**: Remove the exposed person to fresh air – only if it is safe to do so. Seek medical attention for symptoms such as respiratory irritation, cough, or tightness of chest; please keep in mind that symptoms may be delayed.

Personal Protective Equipment and Tools

- In addition to the normal UDNF cleanroom suit, the following safety PPE must be worn when handling Phosphoric Acid:
 - Chemical apron
 - Face shield
 - Heavy duty chemical resistant gloves
- The PPE must be inspected before you start any work:
- If the gloves have any cracks, tears, holes, etc. please do not use them; ask staff for a new pair of gloves.
- If the apron is not completely dry, please do not use it; please notify staff.
- Only use plastic tweezers or the blue locking forceps when working with Phosphoric Acid.

Use Procedure

- Identify your safety buddy.
- Inspect PPE; if anything is not right with the PPE, please **STOP** and notify UDNF staff.
- Verify that the water bath is at the correct temperature; notify staff if it is not.
- Log into “Chem – Phosphoric Acid” tool in FOM. Enter the name of your safety buddy in the “Comment” section on the pop up window.
- Use one of the pre-formatted labels available in the file folder in Bay 2 to write the name of the chemical(s), date and time, your name, and contact info.
- Bring a number of cleanroom wipers into the hood and separate them; you will need them to dry the chemically resistant gloves if they get wet and to clean up when you are done using the chemicals.
- Attach your sample(s) to blue locking forceps and bring them into the hood.
- Put on the additional PPE in the following order:
 - Apron
 - Face shield
 - Chemical resistant gloves
- Fill a beaker with DI water for rinsing your sample(s).
- Pour Phosphoric Acid into a clean, dry **glass** beaker.
- Place the beaker containing Phosphoric Acid into one of the cutouts of the water bath.
- Once the temperature reaches the set point, place the sample into the beaker.
- Start the timer.
- Do not leave the Phosphoric Acid solution unattended while in the water bath.
- Remove the Phosphoric Acid beaker from the water bath and place in the tray.
- Remove the sample from the Phosphoric Acid beaker, place it into the DI

water beaker, and agitate for 1 min.

- Rinse sample thoroughly with DI water over the sink.
- Dry the sample with nitrogen.

Waste Disposal

- Allow Phosphoric Acid to cool to room temperature.
- **CAUTION:** Do NOT pour hot Phosphoric Acid into the waste bottle!
- When at room temperature, remove the cap from the waste bottle.
- Rinse the funnel with water over the sink.
- Pour Phosphoric Acid into the appropriate waste bottle using the funnel; do not overfill.
- **Note:** If you start a new waste bottle make sure it is dry on the inside and outside.
- Place the cap on the waste bottle.
- Rinse the funnel with water over the sink.

Cleanup and Final Steps

- Wash both beakers with DI water three times over the sink.
- Place the beakers in the designated location.
- Remove the note and dispose of it into the white “acid” trash can located in front of the bench.
- Wipe off any liquids from the bench, and dispose of the wipers into the white trash can located in front of the bench.
- Ensure the hotplate is at room temperature; wipe off any liquids/residue from the hotplate, and dispose of the wipers into the white trash can located in front of the bench.
- Wash chemical resistant gloves with DI water over the sink.
- Dry chemical resistant gloves with wipers, and dispose of the wipers into the white acid trash can located in front of the bench.
- Wipe off any liquids from the apron, and dispose of the wipers into the

white trash can located in front of the bench.

- Dry chemical resistant gloves with wipers, and dispose of the wipers into the white acid trash can located in front of the bench.
- Remove PPE in the following order:
- Remove gloves and place them in the fume hood.
- Remove face shield.
- Remove apron.
- Log out of “Chem – Phosphoric Acid” tool in FOM.