

SOP Title:

## Materials Science and Engineering SOP 2D03 Hydroquinone

REVISION / EFFECTIVE DATE

Rev. 4.  
February 14, 2024.

### General Process Description

- To properly handle (carry, dispense, and dispose) of hydroquinone.
- Freezing point is determined by placing the liquid phase sample in a cold bath and monitoring the temperature change.
- Salt and hydroquinone solution will be tested to distinguish ionized/non-ionized cases.
- All work described in this SOP will be conducted in room JHE 128 in the fume hood.
- The following training through UHS are required:
  - WHMIS
  - Chemical Handling and Spill Training
- UHS Training Documentation must be kept up to date.
- Contact Person is Ed McCaffery Laboratory Manager (Room JHE 248 ext 24985).

### Link for McMaster University Health and Safety

- [Employee Health and Safety](#)

### Hazards of Hydroquinone

- Acute oral toxicity Category 4
- Serious Eye Damage/Eye Irritation Category 1
- Skin Sensitization Category 1
- Germ Cell Mutagenicity Category 2
- Carcinogenicity Category 2
- Specific target organ toxicity (single exposure) Category 3
- Target Organs - Respiratory system, Central nervous system (CNS).
- Combustible dust may form combustible dust concentrations in air.
- Harmful if swallowed
- May cause an allergic skin reaction
- Causes serious eye damage
- May cause respiratory irritation
- Suspected of causing genetic defects
- Suspected of causing cancer

## Personal Protective Equipment (PPE)

- Before using Hydroquinone, you must meet the following requirements
  - Goggles / Safety glasses (prescription glasses are not enough!)
  - Gloves – Nitrile
  - Closed-toe shoes with socks
  - Long pants (no shorts!).
  - Face shield if not wearing goggles.
  - Neoprene apron or Lab Coat (Optional).
  - No contact lenses.
  - Must work in fume hood
- Before proceeding, you must have read and are familiar with the SDS for Hydroquinone.
- All Safety Data Sheets (SDS) are located in room JHE 128 on top of the flammable cabinet in the yellow binder.

## Engineering / Ventilation Controls

- Engineering measures ensure adequate ventilation, especially in confined areas.
- Ensure that eyewash stations and safety showers are close to the workstation location.
- Personal Protective Equipment
- Eye/face Protection Tight sealing safety goggles.
- Skin and body protection wear appropriate protective gloves and clothing to prevent skin exposure.
- All work must be done in the fume hood, ensure the fume hood has been inspected and that the alarm is functioning.
- Hygiene measures are handled in accordance with good industrial hygiene and safety practice.

## Special Handling Procedures and Storage Requirements

- Handling
  - Wear personal protective equipment/face protection. Ensure adequate ventilation.
  - Avoid dust formation.
  - Do not get in eyes, on skin, or on clothing.
  - Avoid ingestion and inhalation.
- Storage
  - Keep containers tightly closed in a dry, cool, and well-ventilated place.
  - Incompatible Materials (Strong oxidizing agents, bases, and alkaline).
- Please review the last page for emergency contact and notifications.

## Spill and Accident Procedures

- If you spill hydroquinone and the spill is an immediate threat to your health, leave the room, dial (88) or (905) 522-4135. Remain nearby.
- In the event of exposure, follow “McMaster University First Aid Instructions” posted in the labs.
- Eye Contact
  - Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
  - Get medical attention.
- Skin Contact
  - Wash off immediately with plenty of water for at least 15 minutes.
  - Get medical attention.
- Inhalation
  - Remove to fresh air.
  - If breathing is difficult, give oxygen.
  - Get medical attention.
- Ingestion
  - Clean mouth with water and drink afterwards plenty of water.
- Causes eye burns.
- May cause allergic skin reaction.
- Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain.
- Do not flush into sanitary sewer system.
- Do not allow material to contaminate ground water system.
- Prevent product from entering drains.
- Local authorities should be advised if significant spillages cannot be contained.
- Ecological Information.
  - Avoid release to the environment.
  - Collect spillage.
  - Contact Campus Safety Ext (88) or 905-522-4135.
- If a fire breaks out leave the area immediately, activate the fire alarm, and call 88.
- Stay close to the building to inform emergency personal of what started the fire and what other chemicals are in the immediate area of the fire (<https://sop.mcmaster.ca/> web page is a chemical list of all chemicals in the Materials Engineering Department).

## Waste Disposal

- Any waste is to be dispensed into a properly labeled Chemical Waste Bucket located in the fume hood.
- Any glassware used needs to be rinsed three times with each rinseate disposed into the waste bucket.
- Secondary containment container must be rinsed three times (each rinse dispensed into the Waste Bucket).

## Training requirements

- Prior to entering and working in the laboratory you must have completed WHMIS training and any other training applicable to your work through UHS.
- The teaching assistant must have read and understood the SDS and SOP for using Hydroquinone.

## Approval Required

- Specific Workplace Training prior to starting work with hydroquinone.
- Users must have Chemical Handling Training, and Chemical Spills Training which is provided through UHS.
- Working with hydroquinone can only be used during normal lab hours (8:30 – 5:30)

## Decontamination

- All glassware, measuring cylinders, and secondary containment which have been used during the process of mixing the hydroquinone should be thoroughly rinsed with Distilled water (3 times) and then soap and water (1 time).
- Collect first three rinseate as hazardous waste in the Hydroquinone Chemical Waste Bucket.
- Wash down the fume hood with soapy water to ensure that no acid solution is on the surface.

## Designated Area

- Hydroquinone is only allowed to be handled in the fume hood.
- Upon leaving a designated work area, remove any personal protective equipment worn and wash hands, forearms, face, and neck.
- After each use (or day), wash down the immediate work area and equipment with water to prevent accumulation of chemical residue.
- Decontaminate the designated area before resuming normal laboratory work in the area.
- Do not leave the lab with used gloves on.

## Precise Process Description

- Working in the fume hood and wearing all PPE.
- In a large beaker add 1/3 ice with a small amount of salt to create a cold environment, keep layering with ice and salt.
- In the fume hood weigh out 0.5 – 0.6 grams of hydroquinone (Record the amount).
- Fill the inner tube approximately 1/3 full of 100% Ethanol to improve heat transfer.
- Tighten the cap to the outer vessel
- Transfer 50 ml of distilled water into the inner vessel by using a pipette and then place a magnetic stirring bar inside.
- Add the weighed substance in the inner vessel with caution.
- Insert the vessel vertically into the ice/salt mixture.
- Insert a temperature sensor into the ice/salt mixture with its protective glass tube.
- Add ice to cover whole solution. Use a glass rod to pack the ice densely between the large beaker and the outer vessel.
- Insert another temperature sensor into the solution. The tip of the sensor MUST NOT touch the inside walls of the vessel nor the stirring bar.
- When the temperature in the inner vessel has reached approximately 3°C, start to record the temperature of the solution at one-minute intervals.
- Wash any glassware which was used with the hydroquinone, rinse it 3 times with water, and collect the first three washes as hazardous waste.
- Wash the immediate area with water using paper towels.
- Dispose the paper towels into the garbage.
- Wash gloves thoroughly before removing them.

## Laboratory Spill Response Procedures

### Health Threatening Situation

In the event of an imminent or actual health-threatening emergency (threatening local or public health, safety, or welfare; or the environment outside the immediate area):

- 1) Call 88 for emergency response remain in the area to advise responders.
- 2) If necessary activate local alarm system.
- 3) Once personal safety is established, call Campus Safety Ext (88) or (905) 522-4135 and proceed with local notifications, below.

**Non-Health Threatening Situation** – In the event of a spill or release which may or has impacted the environment (storm drain, soil, air outside the building) or spill or release that cannot be cleaned up by local personnel:

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1) Notify McMaster Responders: Contact Campus Safety (88) or (905) 522-4135 (24 hours/day, 7 days/week), then

2) Provide local notifications:

Name	Phone Number	Title
Ed McCaffery	Ext 24985	Lab Manager
Campus Safety	Ext (88) or (905) 522-4135	Campus Security

**Local Response Situation:**

- In the event of a minor spill or release that can be cleaned up by local personnel using readily available equipment (absorbent, available from UHS in Spill Kit)
- Notify personnel in the area and restrict access.
- Eliminate all sources of ignition.
- Wear gloves and protective eyewear.
- Clean up using absorbent.
- Put the contaminated absorbent in a labeled hazardous waste container.

**Large Spill Situation:**

- If hydroquinone runs out of the fume hood, place spill-containment absorbent around the spill and call **88** (Emergency) leave the laboratory making sure you notify any personnel in that lab.
- Stay nearby to provide information to responders.
- Do not try to place the soaked absorbent into the neoprene bottle, as fume evaporating from the hydroquinone pose a serious health hazard.
- Contact Campus Safety Ext (88) or 905 522-4135.
- If the spill runs underneath the fume hood; or lab equipment; or if it goes down sink call Campus Safety Ext (88) or 905 522-4135.
- Submit online waste pickup request to UHS at: [waste@mcmaster.ca](mailto:waste@mcmaster.ca)
- An incident report must be completed by you and your supervisor.

**Disclaimer:** The SOP as written contains our best understanding at this time of how to work safely with hydroquinone. When new information is found that would improve the safe use of working with hydroquinone it will be added in a timely manner. As it stands we cannot be held liable for misuse or abuse of these instructions through negligence on the user's part or based on the content of these notes.