Standard Operating Procedure

**Toluene**

Print a copy and insert into your   
*Laboratory Safety Manual* and *Chemical Hygiene Plan*.   
Refer to instructions for assistance.

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| --- | --- |
| **Department:** | Chemistry |
| **Date SOP was written:** | 7/21/2014 |
| **Date SOP was approved by PI/lab supervisor:** | 7/21/2014 |
| **Principal Investigator:** | Sarah Keller |
| **Location(s) covered by this SOP:** | *BAG 005* |
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**Type of SOP:**  Process Hazardous Chemical  Hazardous Class

**Purpose**

Toluene is a ‘Reproductive Toxin’. If not stored and handled properly, this can pose a serious threat to the health and safety of laboratory personnel, emergency responders and chemical waste handlers. Hence, it is important to follow safety protocols to handle this chemical.

Toluene is a common solvent, able to dissolve paints, paint thinners, silicone sealants, many chemical reactants, rubber, printing ink, adhesives (glues), lacquers, leather tanners, and disinfectants. It can also be used as a fullerene indicator, and is a raw material for toluene diisocyanate (used in the manufacture of polyurethane foam) and TNT. In addition, it is used as a solvent to create a solution of carbon nanotubes. It is also used as a cement for fine polystyrene kits (by dissolving and then fusing surfaces) as it can be applied very precisely by brush and contains none of the bulk of an adhesive.

**Physical & Chemical Properties/Definition of Chemical Group**

CAS#: 108-88-3

Class: Reproductive Toxin and Flammable

Molecular Formula: C6H5CH3

Form (physical state): liquid

Color: Colorless

Boiling point: 110.6 °C

**Potential Hazards/Toxicity**

- OSHA Permissible Exposure Limit (PEL):

200 ppm (TWA); 300 ppm (acceptable ceiling conc.); 500 ppm (maximum conc.).

**Toxicological Data:**

Oral rat LD50: 636 mg/kg; skin rabbit LD50: 14100 uL/kg; inhalation rat LC50: 49 gm/m3/4H; Irritation data: skin rabbit, 500 mg, Moderate; eye rabbit, 2 mg/24H, Severe. Investigated as a tumorigen, mutagen, reproductive effector.

**Reproductive Toxicity:** Has shown some evidence of reproductive effects in laboratory animals.

**Inhalation:** Inhalation may cause irritation of the upper respiratory tract. Symptoms of overexposure may include fatigue, confusion, headache, dizziness and drowsiness. Peculiar skin sensations (e. g. pins and needles) or numbness may be produced. Very high concentrations may cause unconsciousness and death.

**Ingestion:** Swallowing may cause abdominal spasms and other symptoms that parallel over-exposure from inhalation. Aspiration of material into the lungs can cause chemical pneumonitis, which may be fatal.

**Skin Contact:** Causes irritation. May be absorbed through skin.

**Eye Contact:** Causes severe eye irritation with redness and pain.

**Chronic Exposure:** Reports of chronic poisoning describe anemia, decreased blood cell count and bone marrow hypoplasia. Liver and kidney damage may occur. Repeated or prolonged contact has a defatting action, causing drying, redness, dermatitis. Exposure to toluene may affect the developing fetus.

**Personal Protective Equipment (PPE)**

**Respiratory Protection**

Toluene should be handled inside the fume hood. When a respirator is the sole means of protection, use a full-face supplied air respirator.

Respirators should be used only under any of the following circumstances:

* As a last line of defense (i.e., after engineering and administrative controls have been exhausted).
* When Permissible Exposure Limit (PEL) has exceeded or when there is a possibility that PEL will be exceeded.
* Regulations require the use of a respirator.
* An employer requires the use of a respirator.
* There is potential for harmful exposure due to an atmospheric contaminant (in the absence of PEL)
* As PPE in the event of a chemical spill clean-up process

Lab personnel intending to use/wear a respirator mask must be trained and fit-tested by EH&S. This is a regulatory requirement. (<http://map.ais.ucla.edu/go/1004655>)

**Hand Protection**

Wearing neoprene or nitrile gloves are recommended.

NOTE: Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with toluene.

Refer to glove selection chart from the links below:

<http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf>

OR

<http://www.allsafetyproducts.biz/page/74172>

OR

<http://www.showabestglove.com/site/default.aspx>

OR

<http://www.mapaglove.com/>

**Eye Protection**

Use chemical safety goggles or ANSI approved safety glasses.

**Skin and Body Protection**

Wear impervious protective clothing, including boots, neoprene or nitrile gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

**Hygiene Measures**

Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

**Engineering Controls**

Always handle toluene in a certified chemical fume hood, ducted biosafety cabinet, or a glove box.

**First Aid Procedures**

**If inhaled**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. CALL A PHYSICIAN IMMEDIATELY.

**In case of skin contact**

In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician immediately.

**In case of eye contact**

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

**If swallowed**

Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.

**Special Handling and Storage Requirements**

All work with toluene is to be done in a chemical fume hood or ducted biosafety cabinet in order to keep toluene contamination to a minimum. Any persons in this area are required to wear personal protective equipment. Safety shower and eye wash stations should be easily accessible where toluene is used. Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred with signage stating “Reproductive Toxin” both on the storage and on the chemical container. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

**Spill and Accident Procedure**

**Chemical Spill Dial 911 and x59797**

**Spill** – Assess the extent of danger. Help contaminated or injured persons. Evacuate the spill area. Avoid breathing vapors. If possible, confine the spill to a small area using a spill kit or absorbent material. Keep others from entering contaminated area (e.g., use caution tape, barriers, etc.).

**Small (<1 L)** – If you have training, you may assist in the clean-up effort. Use appropriate personal protective equipment and clean-up material for chemical spilled. Double bag spill waste in clear plastic bags, label and take to the next chemical waste pick-up.

**Large (>1 L)** – Dial **911** (or 310-825-1491 from cell phone) and EH&S at x59797 for assistance.

**Chemical Spill on Body or Clothes** – Remove clothing and rinse body thoroughly in emergency shower for at least 15 minutes. Seek medical attention. *Notify supervisor and EH&S at x59797 immediately.*

**Chemical Splash Into Eyes** – Immediately rinse eyeball and inner surface of eyelid with water from the emergency eyewash station for 15 minutes by forcibly holding the eye open. Seek medical attention. *Notify supervisor and EH&S at x59797 immediately.*

# **Medical Emergency Dial 911 or x52111**

**Life Threatening Emergency, After Hours, Weekends And Holidays** – Dial **911** *Note: All serious injuries must be reported to EH&S.*

**Needle stick/puncture** **exposure** (as applicable to chemical handling procedure) – Wash the affected area with antiseptic soap and warm water for 15 minutes. For mucous membrane exposure, flush the affected area for 15 minutes using an eyewash station. *All needle stick/puncture exposures must be reported to EH&S.*

**Decontamination/Waste Disposal Procedure**

Wearing proper PPE, please decontaminate equipment and bench tops using soap and water. Please dispose of the used toluene and disposables contaminated with toluene as hazardous waste.

*General hazardous waste disposal guidelines:*

**Label Waste**

* Affix an on-line hazardous waste tag on all waste containers using the Online Tag Program <http://otp.ucop.edu/> as soon as the first drop of waste is added to the container

**Store Waste**

* Store hazardous waste in closed containers, in secondary containment and in a designated location
* Double-bag dry waste using transparent bags <http://map.ais.ucla.edu/go/1002774>
* Waste must be under the control of the person generating & disposing of it

**Dispose of Waste**

* Dispose of regularly generated chemical waste within 90 days
* Call EH&S at x61887 for questions
* Empty Containers
* Dispose as hazardous waste if it once held extremely hazardous waste (irrespective of the container size) <http://ehs.ucla.edu/Pub/ExtremelyHazardousWaste.pdf>
* Consult waste pick-up schedule <http://ehs.ucla.edu/pub/HazWaste%20Pickup%20Schedule.pdf>

Prepare for transport to pick-up location

* Check on-line waste tag
* Write date of pick-up on the waste tag
* Use secondary containment

**Safety Data Sheet (SDS) Location**

Online SDS can be accessed at [http://msds.ehs.ucla.edu](http://msds.ehs.ucla.edu/).

**NOTE**

Any deviation from this SOP requires approval from PI.

**Principal Investigator SOP Approval**

Print name Sarah Keller

Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Approval Date: