Standard Operating Procedure

Carbon Disulfide

*This is an SOP template and is not complete until: 1) lab specific information is entered into the box below 2) lab specific protocol/procedure is added to the protocol/procedure section and
3) SOP has been signed and dated by the PI and relevant lab personnel.*

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

|  |  |
| --- | --- |
| **Department:** | Click here to enter text. |
| **Date SOP was written:** | Click here to enter a date. |
| **Date SOP was approved by PI/lab supervisor:** | Click here to enter a date. |
| **Principal Investigator:** | Click here to enter text. |
| **Internal Lab Safety Coordinator/Lab Manager:** | Click here to enter text. |
| **Lab Phone:** | Click here to enter text. |
| **Office Phone:** | Click here to enter text. |
| **Emergency Contact:** | Click here to enter text. |
| *(Name and Phone Number)* |
| **Location(s) covered by this SOP:** | Click here to enter text. |
| *(Building/Room Number)* |

**Type of SOP:** ☐ Process ☒Hazardous Chemical ☐ Hazardous Class

**Purpose**

Carbon disulfide (CS2) is a select carcinogen and a highly flammable chemical. Hence, it is important to follow safety protocols to handle this chemical.

**Uses:** The compound is used frequently as a building block in organic chemistry as well as an industrial and chemical non-polar solvent. It has an "ether-like" odor, but commercial samples are typically contaminated with foul-smelling impurities, such as carbonyl sulfide. Carbon disulfide is a solvent for phosphorus, sulfur, selenium, bromine, iodine, fats, resins and rubber. It has been used in the purification of single-walled carbon nanotubes.

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

Class: Select carcinogen, flammable chemical.

CAS-No - 75-15-0

**Appearance**

Form: Liquid

Color: Colorless

Odor: Stench.

**Safety data**

Molecular Weight: 76.14 g/mol

pH: No data available

Melting point: 112 °C (234 °F) - lit.

Boiling point: 46 °C (115 °F) - lit.

Flash point: -30 °C (-22 °F) - closed cup

Ignition temperature: 100 °C (212 °F)

Lower explosion limit: 1.3 %(V)

Upper explosion limit: 50 %(V)

Vapor pressure: 394.956 hPa (296.241 mmHg) at 20 °C (68 °F)

 1,342.711 hPa (1,007.116 mmHg) at 55 °C (131 °F)

Density: 1.266 g/mL at 25 °C (77 °F)

Water solubility: No data available

Partition coefficient n-octanol/water: log Pow: 2.16

Relative vapor density: 2.63 - (Air = 1.0)

**Potential Hazards/Toxicity**

**Reproductive toxicity**

Suspected human reproductive toxin. May cause reproductive disorders.

**Potential health effects**

**Inhalation** May be harmful if inhaled. Causes respiratory tract irritation.

**Ingestion** May be harmful if swallowed.

**Skin** May be harmful if absorbed through skin. Causes skin irritation.

**Eyes** Causes eye irritation.

**Signs and Symptoms of Exposure**

May cause convulsions.

**Emergency Overview**

**OSHA Hazards**

Flammable liquid, Target Organ Effect, Irritant, Reproductive hazard

**Target Organs**

Eyes, Nerves, Liver, Kidney, Heart, Cardiovascular system, Male reproductive system & Female reproductive system.

**GHS Label elements, including precautionary statements**

**Pictogram**



**Signal word:** Danger

Hazard statement(s)

H225 Highly flammable liquid and vapor

H302 Harmful if swallowed.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

H361 Suspected of damaging fertility or the unborn child.

H372 Causes damage to organs through prolonged or repeated exposure if inhaled.

H402 Harmful to aquatic life.

Precautionary statement(s)

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P281 Use personal protective equipment as required

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P314 Get medical advice/attention if you feel unwell.

**HMIS Classification**

**Health hazard**: 2

**Chronic Health Hazard**: \*

**Flammability**: 3

**Physical hazards**: 0

**NFPA Rating**

**Health hazard**: 2

**Fire**: 3

**Reactivity Hazard**: 0

**Potential Health Effects**

**Inhalation** May be harmful if inhaled. Causes respiratory tract irritation.

**Skin** May be harmful if absorbed through skin. Causes skin irritation.

**Eyes** Causes eye irritation.

**Ingestion** May be harmful if swallowed.

**Personal Protective Equipment (PPE)**

**Respiratory protection**

General guidelines: Respirators should be used only under any 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 ORS and should contact occhealt@uga.edu. This is a UGA requirement described in more detail in the [UGA Respiratory Protection Plan](https://esd.uga.edu/sites/default/files/respiratoryprotection.pdf) and supported by the [Office of Research Occupational Health and Safety Program](https://research.uga.edu/ohsp/).

**Hand protection**

Handle with ***Nitrile*** or *Supported PolyVinyl Alcohol (PVA).*

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

Gloves must be inspected prior to use.

Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with Carbon disulfide.

Wash and dry hands.

**Eye protection**

Safety goggles.

**Skin and body protection**

* Fire/flame resistant lab coat (100% cotton based)
* Cotton based clothing/attire.
* Full length pants or equivalent
* Close toed shoes

**Hygiene measures**

Avoid contact with skin, eyes and clothing.

Wash hands before breaks and immediately after handling Carbon disulfide.

**Engineering Controls**

* All operations involving Carbon disulfide must be carried out in a certified chemical fume hood.
* Chemical fume hoods used as containment areas for Particularly Hazardous Substances (Select Carcinogens, Regulated Carcinogens, Reproductive Toxins and Acute Toxins) must have a face velocity of 100 ft/min averaged over the face of the fume hood.
* Laboratory rooms must be at negative pressure with respect to the corridors and external environment. To achieve this, the laboratory/room door must be kept closed at all times.

**First Aid Procedures**

**General advice**

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

**If inhaled**

If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

**In case of skin contact**

Wash off with soap and plenty of water. Consult a physician.

**In case of eye contact**

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**If swallowed**

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

**Special Handling and Storage Requirements**

* All Carbon disulfide containers must be stored using secondary container (tray/tub) with proper signage/caution label.
* Hazard communication: Warning/Caution label is required on each Carbon disulfide container, secondary containment, designated storage cabinets. Warning/Caution label must state the following:

“CARCINOGEN or CANCER HAZARD or SUSPECT CANCER AGENT or Reproductive Toxin”

**Precautions for safe handling**

* Avoid contact with skin and eyes.
* Avoid inhalation of vapor or mist.
* Keep away from sources of ignition.
* Take measures to prevent the build-up of electrostatic charge.

**Conditions for safe storage**

* Keep container tightly closed in a dry and well-ventilated place.
* Containers which are opened must be carefully resealed and kept upright to prevent leakage.
* Store in cool place.

Refrigerate before opening (follow MSDS from the same manufacturer). **NOTE:** Carbon disulfide must be stored in a refrigerator approved for storage of flammable chemicals. If the chemical manufacturer recommends storage of certain flammables inside refrigerator, and your lab does not have a refrigerator approved for flammable storage, store such flammables in a cooler under dry ice.

**Possibility of hazardous reactions**

Vapours may form explosive mixture with air.

**Conditions to avoid**

Heat, flames and sparks.

**Materials to avoid**

Alkali metals, Zinc, Amines, Azides, Oxidizing agents

**Hazardous decomposition products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides

**Spill and Accident Procedure**

**Chemical Spill Dial 911**

**24-7 On-Call Response to Research, Environment, Health or Safety Concerns Dial 2-5561 from a campus phone or 706-542-5561 from a non-campus line.**

**Spill** – Follow the procedures set out in the [UGA Chemical and Laboratory Safety Manual.](http://research.uga.edu/docs/units/safety/manuals/Chemical-Laboratory-Safety-Manual.pdf)

[If there are any chemical-specific protocols for responding to a spill, insert them here or mark “none”:]

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# **Medical Emergency Dial 911**

**Life Threatening Emergency, After Hours, Weekends And Holidays** – Dial **911** or the emergency phone numbers listed at the beginning of the UGA Chemical and Laboratory Safety Manual

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Non-Life Threatening Emergency** – Follow the instructions in the UGA Chemical and Laboratory Safety Manual.

*Note: All incidents that result in an injury or property damage must be reported to ORS / ESD using a University Incident/Accident Report.*

**Decontamination/Waste Disposal Procedure**

 **For general hazardous waste disposal procedures, see Appendix H of the UGA Chemical and Laboratory Safety Manual.**

**Chemical Specific Procedures: [to be inserted or marked as “none”]**

Carbon disulfide is listed as a Highly Hazardous substance. Even the containers (irrespective of the size) which once held Carbon disulfide must be disposed of as hazardous waste.

All dry hazardous waste must be double bagged (*use only transparent bags*).

**Safety Data Sheet (SDS) Location**

UGA personnel can access Online SDS through a link in the upper left corner of the ESD home page (<https://esd.uga.edu>) and logging in by using their UGA email user name and password.

**Protocol/Procedure**

***(Add specific description of procedure)***

**Any deviation from this SOP requires approval from PI.**

**Documentation of Training** *(signature of all users is required)*

* The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and a copy of the Carbon disulfide MSDS provided by the manufacturer.
* The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and access to the SDS provided by the manufacturer.
* The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last 12 months.

**Principal Investigator SOP Approval**

Print name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Approval Date:

I have read and understand the content of this SOP:

|  |  |  |
| --- | --- | --- |
| **Name** | **Signature** | **Date** |
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