# University of Arizona

## Cadmium Compounds Standard Operating Procedure

*[This is a template. Fill in all necessary blanks and delete all highlighted areas when complete. Add any sections necessary for your laboratory. This will be appended to your Laboratory Chemical Hygiene Plan.]*

**Title:**  **Click here to enter the title of your SOP.**

**Approval Holder (AH):** Click here to enter text **Approval #:** Click here to enter text

**Approval Holder Phone Number(s):** Click here to enter text

**Approval Safety Coordinator (ASC):** Click here to enter text

**Approval Safety Coordinator Phone Number(s):** Click here to enter text

**Department:** Click here to enter text

1. **Purpose**

This standard operating procedure (SOP) is intended to provide guidance on how to safely store, handle, use, and dispose of cadmium and/or cadmium-containing compounds in Enter AH’s name’s laboratory. Laboratory personnel should review this SOP, as well as the appropriate Safety Data Sheet(s) (SDSs), before Describe the procedure or process this SOP will address. If you have questions concerning the requirements within this SOP, contact your Approval Holder (AH) or Approval Safety Coordinator (ASC).

1. **Scope**

*[Describe when this SOP applies and to whom this SOP applies.]*

1. **Hazard Description**

*[Describe the hazards presented by the procedure or process this SOP addresses. What makes it hazardous? Provide an example, if applicable.]*



Cadmium and cadmium compounds are highly toxic. Cadmium is a known carcinogen and imposes a possible risk of impaired fertility and harm to unborn child. Cadmium and cadmium compounds are also chronic toxins. Minor but repeated exposure to cadmium may result in cumulative poisoning effects such as bone softening, increased blood pressure, kidney damage, anemia, pulmonary fibrosis, emphysema, and respiratory tract damage. Cadmium is fatal if inhaled and toxic is swallowed and further causing genetic defects, infertility to an unborn child and may cause cancer. Symptoms include flu-like symptoms of weakness, fever, headache, chills, nausea, vomiting, dizziness, sweating, muscular pain, cough and difficulty breathing. Acute pulmonary edema may develop within 24 hours and reaches a maximum by three days. The first chronic effect of exposure to cadmium is generally kidney damage, manifested by excretion of excessive protein in the urine, followed by anemia, teeth discoloration and loss of smell. Cadmium compounds have an occupational exposure limit (OSHA) of 2 ug/m3.

1. **Process & Hazard Controls**

*[Describe the steps needed to set up and complete the procedure or process in safe manner following the* [*hierarchy of controls*](https://www.cdc.gov/niosh/topics/hierarchy/default.html)*. Use as much detail as is necessary to ensure all laboratory workers can complete the procedure or experiment safely.]*

* 1. **Elimination/Substitution**

*[Describe any eliminations of hazardous chemicals or processes; alternatively, any substitutions with less hazardous alternatives that could be used to accomplish the task.]*

* 1. **Engineering Controls**

*[Describe any engineering controls (e.g. fume hoods, gas cabinets, local exhausts, blast shields, etc.) that are used to safely accomplish the task.]*

* **Fume hoods or other RLSS approved local exhaust ventilation are strongly recommended for all uses of cadmium compounds; consult RLSS before performing operations or experiments with cadmium chloride.**
* Work with cadmium should be conducted in a fume hood with the sash lowered appropriately or under a local exhaust ventilation, such as a snorkel or glove box.
	1. **Work Practices**

*[Describe any work practices (e.g. staggering schedules, additional cleaning measures for particulates, etc.) that are used to safely accomplish the task.]*

**Housekeeping and cleaning**: As with other metals and powders, the use of wet cleaning methods and disposable mats are recommended to prevent contamination of the use and surrounding areas when working with cadmium compounds.

* Place a disposable mat under all cadmium use and storage areas.
* Dispose of mats after uses of cadmium.
* Always use a pre-wetted, disposable cloth to wipe down cadmium use areas once work has concluded for the day.
	+ Also wipe the floor in front of and/or around the use area to prevent general laboratory contamination.
* Use a specific lab coat for cadmium compound work; clean regularly via professional dry cleaning service. Cadmium and other metals compounds easily cling to clothing and can be taken home to expose workers and relatives in the home.
* Wash hands rigorously and regularly to prevent accidental ingestion after working with cadmium compounds.
	1. **Personal Protective Equipment**

*[Describe the personal protective equipment needed to adequately protect laboratory workers when performing the process or procedure addressed by this SOP. Ensure to specify any personal protective equipment beyond the minimum (i.e. safety glasses, lab coat, gloves, long pants and closed-toed shoes).]*

* **Hand and Arm Protection**: For heavy or extended use, recommend double gloving using nitrile gloves.
* **Eye and Face Protection**: Safety glasses or goggles.
* **Body Protection**: Use a specific lab coat for cadmium compound work; clean regularly via professional dry-cleaning service. Cadmium and other metals compounds easily cling to clothing and can be taken home to expose workers and relatives in the home.
* **Respiratory Protection**: respirators may be required if exposures are not able to be adequately controlled by the use of engineering controls or other means. All uses of respiratory protection require RLSS assessment and consultation (for assessment of work, selection of respirator and filtration, and OSHA-mandated medical clearance and fit testing).
	1. **Transportation and Storage**

*[Describe how to safely transport and/or store (e.g. ventilated cabinet, flammable cabinet, under inert blanket, etc.) the hazardous chemical(s) or processes.]*

* Store in a cool, dry and well-ventilated area away from incompatible substances.
* Materials to avoid include oxidizing agents and bromine trifluoride’ ensure segregation of incompatible chemicals.
* Follow any substance-specific storage guidance provided in Safety Data Sheet (SDS) documentation. This is particularly important for regulated carcinogens as human exposure must be avoided.
1. **Spills, Cleanup & Disposal**

*[Describe how to safely end the procedure or process, clean up the process or spills, and/or dispose of any waste generated.]*

**Spills:**

Spills should always follow the [University Chemical Hygiene Plan](https://rgw.arizona.edu/sites/default/files/cs-univeristy_chemical_hygiene_plan.pdf) Section 8.2.

**Exposure Response**

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| --- | --- | --- | --- |
| **Inhalation** | **Ingestion** | **Skin Contact** | **Eye Contact** |
| Move to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required. | Do not induce vomiting. Call a physician or Poison Control Center immediately | Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required. | Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. |

1. **Enter Additional Section Title**

*[Add as many sections as necessary to adequately describe how to safely perform the procedure or process addressed by this SOP.]*

References:

* [www.cchem.berkeley.edu](http://www.cchem.berkeley.edu)
* ehs.oregonstate.edu
* <https://ehs.oregonstate.edu/sds>
* <https://hazard.com/msds/f2/bjr/bjrpz.html>

https://ehs.yale.edu/sites/default/files/files/carcinogens-sop.pdf