

**LONGWOOD**  
UNIVERSITY

**CADMIUM AWARENESS  
TRAINING FOR  
LABORATORIES**

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Office of Environmental Health and  
Occupational Safety

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201 High Street  
Farmville, VA 23909  
434.395.2940

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## CADMIUM AWARENESS TRAINING for LABORATORIES

**Substance:** Cadmium (Cd)

**CAS Registry Number:** 7440-43-9

**Synonym:** None

**Introduction:** The Occupational Safety and Health Administration (OSHA) considers Cadmium to be a toxic and hazardous substance. The OSHA Standard can be found in the Code of Federal Regulations, 29 CFR 1910.1027. The major elements of OSHA's Cadmium Standard are: A permissible exposure limit (PEL) of 0.5 micrograms of Cadmium per cubic meter of air, as averaged over an 8-hour period. Requirements that employers use engineering controls and work practices, where feasible, to reduce worker exposure. Requirements that employees observe good personal hygiene practices. Requirements that employees be provided with protective clothing, and where necessary, with respiratory protection.

This document is intended to raise your awareness level about the health and safety hazards associated with the use and handling of Cadmium, provide you with information on how to protect yourself from these hazards and provide you with a summary of key provisions of the OSHA standard.

Always read the Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS) before using this chemical.

**Appearance and Odor:** A soft, blue-white solid, gray-black metal or a gray or white powder. Odorless

### Physical and Chemical Properties:

Solubility: Insoluble in water

Odor Threshold:	None
Flash Point:	Non-combustible solid, flammable powder/dust
Vapor Pressure:	0 mm at Hg 20°C
Specific Gravity:	8.65
Melting Point:	321°C
Boiling Point:	765°C
Molecular Weight:	112.4

**Hazard Summary**

Hazard Rating	NFPA
Health	4
Flammability	3
Reactivity	1
Special Hazard	
CARCINOGEN TERATOGEN FLAMMABLE DUST OR POWDER POISONOUS GASSES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE	

*Hazard Rating Key: 0=minimal: 1=slight: 2=moderate: 3=serious: 4=severe*

**First Aid:**

Eye Contact: Immediately flush with large amounts of water for at least 15 minutes, lifting upper and lower lids. Remove contact lenses if worn, while rinsing.

Skin Contact: Remove contaminated clothing and wash contaminated skin with soap and water.

Inhalation: Remove the victim from exposure. Begin rescue breathing (using universal precautions) if breathing has stopped and CPR is heart action has stopped. Transfer promptly to a medical facility. If the victim is transferred to a medical facility send the MSDS or SDS with the rescue squad. Medical observation is recommended for 24 to 48 hours after the overexposure, as pulmonary edema may be delayed.

**EMERGENCY NUMBERS**

**Fire and Rescue: 911**

**Campus Police: (434)395-2091**

**Poison Control: (800)222-1222**

**Exposure Limits:** The Occupational Safety and Health Administration (OSHA) legal airborne permissible exposure limit (PEL) is 0.005 mg/m<sup>3</sup> averaged over an 8-hour work shift. The National Institute for Occupational Safety and Health (NIOSH) recommends exposure to occupational carcinogens be limited to the lowest feasible concentrations. The American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV) is 0.01 mg/m<sup>3</sup> (as total particulates) and 0.002 mg/m<sup>3</sup> (as the respirable fraction), averaged over an 8-hour work shift.

Cadmium is a carcinogen in humans and a probable teratogen in humans. There may be no safe level of exposure to a carcinogen, so all contact should be reduced to the lowest possible level.

**Routes of Exposure:** Cadmium may cause adverse health effects following exposure via inhalation, ingestion, dermal contact or eye contact.

**Signs and Symptoms of Exposure:** Short-term (acute) exposure to Cadmium may occur immediately or shortly after exposure and can cause irritation to the skin and eyes, nausea, vomiting, diarrhea and abdominal pain. Exposure to Cadmium may cause “*metal fume fever*.” This is flu-like illness with symptoms of metallic taste in the mouth, headache, fever and chills, aches, chest tightness and cough. The symptoms may be delayed for several hours after exposure and usually last for a day or two. Inhaling Cadmium can irritate the lungs causing coughing and or shortness of breath. Higher exposures may cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.

Chronic (long-term) health effects can occur at some time after exposure to Cadmium and can last for months or years.

**Cancer Hazard:** Cadmium is a carcinogen in humans. It has been shown to cause lung and prostate cancer.

**Reproductive Hazard:** Cadmium is a probable teratogen in humans. It may damage the male reproductive system and affect the female reproductive cycle.

**Other Effects:** Cadmium can irritate the lungs. Repeated exposure may cause bronchitis to develop with coughing, phlegm, and or shortness of breath. Repeated low exposures can cause liver and kidney damage. Cadmium can cause anemia, loss of smell and or discoloration of teeth.

**Medical Testing:** Before exposure and every twelve months OSHA requires your employer to provide, (for persons exposed to 0.0025 mg/m<sup>3</sup> or more of Cadmium) a work and medical history and exam which shall include:

Blood test for Cadmium blood levels should be less than 5 micrograms per liter of whole blood. A urine test for Cadmium where levels should be less than 3 micrograms per liter of urine. A urine test for Beta-2 microglobulin to detect kidney damage. Liver and kidney function test, lung function test, and a complete blood count.

OSHA requires your employer to provide you and your physician with a copy of the OSHA Cadmium Standards (29 CFR 1910.1027 and 1926.1127). Any evaluation should include a careful history of past and present symptoms with an exam. Medical test that look for damage already done are not a substitute for controlling exposure. Request copies of your medical testing by contacting Longwood University's Department of Environmental Health and Safety (434)395-2940. You have the legal right to this information under the OSHA Access to Employee Exposure and Medical Records Standard (29 CFR 1910.1020).

Mixed exposures of Cadmium can be caused by smoking. Cigarette smoke contains Cadmium. Because it is hard for the body to eliminate Cadmium, it tends to build up in the body. Any workplace exposure adds to these levels.

**Workplace Controls and Practices:** Very toxic chemicals, or those that are reproductive hazards or sensitizers, require expert advice on control measures if a less toxic chemical cannot be substituted. Control measures include enclosing chemical processes for severely irritating and corrosive chemicals, using local exhaust ventilation (fume hoods) for chemicals that may be harmful with a single exposure, and using general ventilation to control exposure to skin and eye irritants. For further information on workplace controls contact Longwood University's Department of Environmental Health and Safety at (434)395-2490.

**Personal Protective Equipment:** The OSHA Personal Protective Equipment Standard (29 CFR 1910.132) requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation. Prior to using Cadmium consult Longwood University's Department of Environmental Health and Safety at (434)395-29040 or the manufacture's MSDS or SDS.

*Gloves and Clothing:* Avoid skin contact with Cadmium. Wear personal protective equipment made of material which cannot be permeated or degraded by this substance. Safety equipment manufacturers recommend Nitrile or Neoprene gloves. All protective clothing should be clean, available each day and put on before working with Cadmium.

*Eye Protection:* Wear non-vented, Impact resistant goggles when working with fumes, gases, or vapors. For impact hazards (such as flying fragments, chips or particles), wear safety glasses with side shields or safety goggles. Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

*Respiratory Protection:* Always work with Cadmium in a fume hood.

**Spills and Emergencies:** If a Cadmium spill has occurred do not clean it up unless you have been properly trained by Longwood University's Department of Environmental Health and Safety. Call Campus Police at ext. 2091.

If you are trained to clean up a Cadmium spill take the following steps: Evacuate personnel and secure and control the entrance to the area. Eliminate all ignition sources. Collect spilled materials using a HEPA-filtered vacuum (DO NOT use a standard shop vac) or wet mop and deposit into a sealed container. Ventilate and wash area after clean-up is complete. Cadmium is a HAZARDOUS WASTE contact Longwood University's Department of Environmental Health and Safety for disposal.

**Handling and Storage:** Prior to working with Cadmium you should be trained on its proper handling and storage. A regulated, marked area should be established where Cadmium is handled, used and stored. Cadmium reacts with strong acids such as Hydrochloric acid, Sulfuric acid, and Nitric acid to form flammable and explosive Hydrogen gas. Cadmium dust or powder reacts with Oxidizing Agents such as Perchlorates, Peroxides, Permanganates, Chlorates, Nitrates, Chlorine, Bromine and Fluorine; Hydrogen azide; Ammonium nitrate; Ammonia; Potassium zinc; Sulfur; Selenium; and Tellurium to cause fires and

explosions. Sources of ignition, such as smoking and open flames are prohibited where Cadmium powder is used, handled or stored. Metal containers involving the transfer of Cadmium powder should be grounded and bonded. Use explosion proof electrical equipment and fittings wherever Cadmium powder is used, handled, manufactured or stored. Store Cadmium powder under Nitrogen. Store Cadmium metal in tightly closed containers in a cool, well-ventilated area.

**Work Area Preparation and Clean-up:** Always use a fume hood for your work area when using Cadmium. Ensure that the fume hood is working correctly. The digital read out on the fume hood should be between 60 to 100 linear feet per minute. Place a temporary covering, such as bench paper, in the fume hood. Place a sign on the hood:

**CAUTION CADMIUM WORK AREA**

**SEE (Add your name and phone number) FOR ENTRY**

When work with Cadmium is complete carefully roll up the temporary covering and place it in a hazardous waste container. Wet wipe the area and places the rags or paper towels in a hazardous waste container. Finally remove the sign. Work areas should be cleaned as soon as the work with Cadmium is complete.

**For more information, please contact:**

Ray Heinrich  
(434)395-2471  
[heinricht@longwood.edu](mailto:heinricht@longwood.edu)

or

Michael Lonon  
(434)395-490  
[lononrc@longwood.edu](mailto:lononrc@longwood.edu)