Cadmium Standard – Quick Tips

Background

Cadmium (Cd) is a soft, blue and white metal or grayish-white powder that is used as an anticorrosive for electroplated steel. Exposure occurs mainly in gas meter refurbishing, aircraft repair and shipyard industries. OSHA estimates that approximately 1,500,000 workers are at risk of exposure because they work in a specific industry or because they come in contact with compounds that contain cadmium. Sources of exposure include: smelting operations, electroplating baths and cadmium oxide in soaps that are used to stabilize plastics. It can also be found in certain paints, batteries and phosphate fertilizers.

Cadmium is considered a potential lung carcinogen. Breathing in high levels can cause severe damage to the lungs. Short-term effects of Cd exposure include: weakness, fever, headaches, chills, sweating and muscular pain. Long-term exposure can lead to kidney damage, emphysema, and bone deterioration. Cadmium exposure can also cause anemia, discoloration of teeth, and loss of the sense of smell.

Cadmium Standard

OSHA General Industry standard 29 CFR 1910 Subpart B 1910.19 addresses special provisions for air contaminants and sets forth 29 CFR 1910.1027 as the general industry cadmium standard. The final rule for this standard was issued on December 14, 1992.

In order to tailor requirements to the unique circumstances found in construction, shipyards, and agriculture, OSHA has established three separate standards for governing occupational exposures to Cadmium (Cd): construction (29 CFR 1926.1127), shipyards (29 CFR 1915.1027), and agriculture (29 CFR 1928.1027).

For the purposes of this document we will focus on the General Industry standard 29 CFR 1910.1027. The cadmium standard addresses:

- Permissible Exposure Limits (PEL)
- Air monitoring and detection
- Implementation of written programs
- Personal Protective Equipment (PPE)
- Hygiene areas and practices
- Medical Surveillance
- Recordkeeping
- Hazard Communication for employees

Click here to view OSHA 29 CFR 1910.1027.

Exposure

OSHA 29 CFR 1910.1027 sets the permissible exposure limit (PEL) to 5 micrograms per cubic meter calculated as an eight-hour time weighted average. The action level for the cadmium standard, where requirements such as medical surveillance may be required, is 2.5 g/mS3.

Again occupational exposures to Cd may result in kidney damage, emphysema, bone deterioration, and lung cancer.

Monitoring

Monitoring for Cd is accomplished with a sampling pump and cassette. Results are obtained through laboratory analysis; you cannot use a direct reading badge type monitor for Cd. Consult an American Industrial Hygiene Association (AIHA) accredited laboratory for assistance on filter selection and sampling methods. You can find accredited laboratories at www.AIHA.org.

Click here for more information on the OSHA sampling method for Cd.

Written Program

OSHA requires establishment and implementation of a written program for Cd if levels exceed the PEL. If engineering and work practice controls do not reduce exposure to levels below the PEL, the written program must include respirator selection information to comply with the PEL. According to 1910.1027(f)(2)(ii), the written program must also include:

- A description of the operation in which Cd is emitted
- A description of the means in which the employer will meet the PEL requirements
- A report of the technology and equipment that will be employed to meet the PEL requirements
- A detailed schedule for implementation of the program
- A written plan for emergency situations

The written program requires review and updates at least once a year or more often if changes to the program are necessary before the time of the annual revisions.

PPE

Respiratory protection is required when the Cd levels exceed the PEL of 5 g/m3 and/or when an employee is exposed to Cd at or above the action level and the employee requests a respirator. Please see 29 CFR 1910.1027(g)(3) and Quick Tips #330 Respirator Selection Requirements of Substance-Specific Standards for more information.

The employer is also required to provide protective work clothing and equipment to employees who are exposed to Cd in levels greater than the PEL. This includes coveralls or similar full-body work clothing, gloves, head coverings, boot or foot coverings, face shields, vented goggles, or other appropriate PPE that complies with 29 CFR 1910.133 Eye and Face Protection standard.

When Cd is in particulate form a standard Tyvek suit will protect the worker from exposure levels which exceed the PEL. Sources of Cd in the particulate phase include, but are not limited to: coatings, salts, and salt compounds. When Cd is in metallic form, a fire-rated material such as Nomex is required because Cd is highly flammable in metallic form. Nitrile, latex, PVC or neoprene gloves are most suitable for Cd.

Frequently Asked Questions

Q: Is there a medical test available to determine if I have been exposed to cadmium?

A: Yes. Cadmium can be measured in blood, hair, urine, or nails. A blood test would shows recent exposure, where the urine test will show both recent and past exposure. Therefore, urine analysis is the best way to test for Cd exposure.

Q: Other than at work, where else could I be exposed to cadmium?

A: Eating foods with high levels of cadmium (e.g. shellfish, liver, or kidney meats); smoking cigarettes or inhaling second-hand smoke; drinking contaminated water; living near facilities which release cadmium into the air.

Source

OSHA Standard on Cadmium:
https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10035

For Safety PPE (Personal Protective Equipment):
https://www.grainger.com/category/safety

Source: Grainger Know How – https://www.grainger.com/know-how