

MATERIAL SAFETY DATA SHEET

1. SUBSTANCE AND SOURCE IDENTIFICATION

National Institute of Standards and Technology
Standard Reference Materials Program
100 Bureau Drive, Stop 2300
Gaithersburg, Maryland 20899-2300

SRM Number: 746
MSDS Number: 746
SRM Name: Cadmium – Vapor Pressure

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MSDS Coordinator: Mario Cellarosi
Telephone: 301-975-2200
FAX: 301-926-4751
E-mail: SRMMSDS@nist.gov

Emergency Telephone ChemTrec:
1-800-424-9300 (North America)
+1-703-527-3887 (International)

Description: A unit of Standard Reference Material (SRM) 746 consists of one 6.4 mm by 64 mm rod of cadmium metal.

Substance: Cadmium metal

Other Designations: Cadmium element

2. COMPOSITION AND INFORMATION ON HAZARDOUS INGREDIENTS

Component	CAS Number	EC Number (EINECS)	Nominal Concentration (mass fraction)
Cadmium, metal	7440-43-9	231-152-8	100 %

For EC Classification, Risk, and Safety Phrases: See Section 15 “Regulatory Information”

3. HAZARDS IDENTIFICATION

NFPA Ratings (Scale 0–4): Health = 4 Fire = 0 Reactivity = 0

Physical Hazards: There are no physical hazards listed for cadmium in solid metal form.

Major Health Hazards: Cadmium metal and its compounds are known or suspected human carcinogens. Exposure to cadmium and its compounds are known to cause renal damage and/or failure.

NOTE: It is unlikely that exposure to a significant amount of cadmium can occur with this SRM under normal conditions of use; however, cadmium is highly cumulative, and any exposure to cadmium metal or its compounds should be kept to a minimum.

Potential Health Effects

Inhalation: It is unlikely that a significant amount of cadmium fume or dust can be inhaled from this material under normal conditions of use. Long term (chronic) or repeated exposure may result in irreversible kidney damage, damage to the lungs or liver, blood or bone disorders, immunosuppression and an increased risk of cancer of the lungs or prostate. Short term (acute) exposure to high levels of fume or dust may be immediately dangerous to life or health. Symptoms of acute exposure may be irritation of the respiratory tract, cough, or metallic taste progressing to shortness of breath, chest pain, weakness, fever, headache, chills, sweating, muscular pain and pulmonary edema, which may result in death. Concentrations of fume between 40 – 50 mg/m³ for 1 hour or 9 gm/m³ for 5 hours resulting in fatalities have been noted.

Skin Contact: Skin contact may result in irritation. Seek medical attention, if needed.

Eye Contact: Exposure may cause irritation. Seek medical attention, if needed.

Ingestion: Ingestion of this material is unlikely; however, exposure to cadmium or its compounds through ingestion may result in nausea, vomiting, diarrhea, stomach pain, headache, dizziness, muscle cramps, blurred vision, kidney or liver damage.

Listed as a Carcinogen/Potential Carcinogen:

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens ^(a)	<u>X</u>	_____
In the International Agency for Research on Cancer (IARC) Monographs ^(b)	<u>X</u>	_____
By the Occupational Safety and Health Administration (OSHA) ^(c)	<u>X</u>	_____

^(a)NTP: Known human carcinogen.

^(b)IARC: Human sufficient evidence, animal sufficient evidence, Group 1 (cadmium and cadmium compounds) animal limited evidence (cadmium metal).

^(c)OSHA: Carcinogen.

ACGIH: A2 – Suspected human carcinogen (cadmium and cadmium compounds).

4. FIRST AID MEASURES

Inhalation: If adverse effects occur, remove to uncontaminated area. If not breathing, give artificial respiration. Seek immediate medical attention.

Skin Contact: Wash exposed skin with copious amounts of water for at least 15 minutes. Remove any contaminated clothing. Seek medical attention if needed.

Eye Contact: Immediately flush eyes with copious amounts of water for at least 15 minutes. Seek medical attention, if needed.

Ingestion: Ingestion of this material is not likely. If swallowed, seek immediate medical attention. Do not chelate.

5. FIRE FIGHTING MEASURES

Fire and Explosion Hazards: Not applicable.

Extinguishing Media: Use extinguishing agents appropriate for the surrounding fire.

Fire Fighting: Wear full protective clothing and NIOSH-approved self-contained breathing apparatus (SCBA).

Flash Point (°C): Not applicable.

Method Used: Not applicable.

Autoignition Temp. (°C): Not applicable

Flammability Limits in Air

UPPER (Volume %): Not applicable.

LOWER (Volume %): Not applicable.

6. ACCIDENTAL RELEASE MEASURES

Occupational Release: Not applicable to this material.

Disposal: Refer to Section 13, “Disposal Considerations”.

7. HANDLING AND STORAGE

Storage: Store and handle in accordance with OSHA 29 CFR, Subpart Z, Toxic and Hazardous Substances, 1910.1027, Cadmium.

Safe Handling Precautions: See Section 8, “Exposure Controls and Personal Protection”.

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: Cadmium

OSHA (PEL): 5 µg/m³ TWA (metal and compounds) (fume) (dust).

OSHA (action level): 2.5 µg/m³ (metal and compounds).

ACGIH: 0.01 mg/m³ TWA (metal and compounds).

ACGIH: 0.002 mg/m³ TWA (respirable fraction) (metal and compounds).

NIOSH: TWA (lowest feasible concentration) (metal fume and dust).

UK WEL: 0.025 mg/m³ (metal and compounds) (except CdO, CdS, and CdS pigments).

Ventilation: Use a local exhaust ventilation system. Ensure compliance with applicable exposure limits.

Respirator: A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed if workplace conditions warrant a respirator. Refer to the "NIOSH Guide to the Selection and Use of Particulate Respirators Certified under 42 CFR 84" for selection and use of respirators certified by NIOSH.

Eye Protection: Wear safety goggles. An eye wash station should be readily available near areas of use.

Personal Protection: Wear appropriate protective clothing and chemically resistant gloves to prevent skin exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Component: Cadmium, metal.

Physical State: Solid rod.

Appearance and Odor: Soft, blue-white, malleable, lustrous metal.

Molar Mass (g/mol): 112.41

Specific Gravity: 8.642

Water Solubility: Not soluble.

pH: Not applicable.

10. STABILITY AND REACTIVITY

Stability: Stable Unstable

Conditions to Avoid: Skin contact, eye contact, inhalation of metal fume or dust.

Incompatible Materials: Acids

Fire/Explosion Information: See Section 5, "Fire Fighting Measures".

Hazardous Decomposition: Thermal decomposition produces oxides of cadmium.

Hazardous Polymerization: Will Occur Will Not Occur

11. TOXICOLOGICAL INFORMATION

Route of Entry: Inhalation Skin Ingestion

Toxicity Data:

Rat, oral LD₅₀: 2330 mg/kg

Rat, inhalation LC₅₀: 25 mg/m³ for 30 minutes

Human, inhalation LCLo: 39 mg/m³ for 20 minutes

Human, inhalation (fume) LD: 40 – 50 mg/m³ for 1 hour

Human, inhalation (fume) LD: 9 mg/m³ for 5 hours

Target Organs: Kidneys, Lungs

Health Effects:

(Acute and Chronic): See section 3: "Hazards Identification" for potential health effects.

12. ECOLOGICAL INFORMATION

Ecotoxicity Data: Not available for Cadmium metal rods.

13. DISPOSAL CONSIDERATIONS

Waste Disposal: Dispose in accordance with all applicable federal, state, and local regulations.

14. TRANSPORTATION INFORMATION

U.S. DOT and ICAO/IATA: This material is not regulated by DOT or ICAO/IATA.

15. REGULATORY INFORMATION

U.S. Regulations:

CERCLA Sections 102a/103 (40 CFR 302.4): Not regulated.
SARA Title III Sections 302 (40 CFR 355.30): Not regulated.
SARA Title III Sections 304 (40 CFR 355.40): Not regulated.
SARA Title III Sections 313 (40 CFR 372.65): Not regulated.
SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE: No
CHRONIC: No
FIRE: No
REACTIVE: No
SUDDEN RELEASE: No

OSHA Process Safety (29 CFR 1910.119): Not regulated.

State Regulations:

California Proposition 65: Known to the state of California to cause the following:
Cadmium compounds – Cancer (Oct. 01,1987), Developmental toxicity (May 01, 1997), Male reproductive toxicity (May 01, 1997).

CANADIAN Regulations: WHMIS Classification: Not determined

EUROPEAN Regulations:

EC Classification (assigned): T+ – Very Toxic, T – Toxic, N – Dangerous for the Environment, Carcinogen Category 2, Mutagen Category 3, Reproductive Toxin Category 3.

EC Risk Phrases:

R26 – Very toxic by inhalation.
R45 – May cause cancer.
R48/23/25 Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
R50/53 – Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R62 – Possible risk of impaired fertility.
R63 – Possible risk of harm to the unborn child.
R68 – Possible risk of irreversible effects.

EC Safety Phrases:

S45 – In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
S53 – Avoid exposure – obtain special instructions before use.
S60 – This material and its container must be disposed of as hazardous waste.
S61 – Avoid release to the environment. Refer to special instructions/Safety data sheets.

National Inventory Status

U.S. Inventory (TSCA): Listed on inventory.

TSCA 12 (b) Export Notification: Not listed.

16. OTHER INFORMATION

Sources: ChemADVISOR, Inc., MSDS Cadmium, 11 December 2008

OSHA 29 CFR Subpart Z, 1910.1027 – Cadmium

OSHA 29 CFR Subpart Z, 1910.1027 Appendix A, Substance Safety Data Sheet – Cadmium.

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data in the MSDS. The certified values for this material are given in the NIST Certificate of Analysis.