

# School Material Safety Data Sheet

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CADMIUM NITRATE  
TETRAHYDRATE  
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## SECTION 1. INTRODUCTORY INFORMATION

**MATERIAL NAME AND FORMULA:** CADMIUM NITRATE TETRAHYDRATE;  $\text{Cd}(\text{NO}_3)_2 \cdot 4(\text{H}_2\text{O})$

**SYNONYMS:** Nitric Acid, Cadmium Salt

**CAS NUMBER:** 10022-68-1

**INGREDIENTS:** Cadmium nitrate tetrahydrate, >99%. NOTE: Purity level varies with grade. Check with supplier's specifications for exact composition.

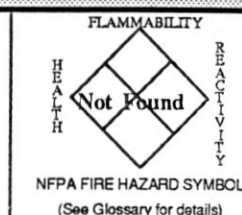
**DOT CLASSIFICATION:** Poisonous; Oxidizer

**EPA CLASSIFICATION:** Hazardous Waste (#D001 and D006); Priority Toxic Pollutant

**MANUFACTURERS:** Always request Material Safety Data Sheets from your chemical supplier. These should indicate the manufacturer of the substance and include an emergency phone number to call. The Manufacturers section of this book contains a listing of some of the larger manufacturers and available emergency numbers.

**DESCRIPTION:** Cadmium nitrate is available as white hygroscopic crystals (powder, needles, or flakes). It has no odor. The material is soluble in water, ammonia, and alcohol.

**PRELIMINARY INFORMATION:** This material is very toxic if inhaled or ingested. It is an oxidizer and may therefore be a fire or explosion hazard in contact with certain materials. Because of its hazardous nature and possible carcinogenic risk (see sect. 4), this material is **NOT RECOMMENDED** for use (or preparation) in schools unless educational objectives cannot be met in other ways. If the substance is deemed necessary, use with great caution and take all appropriate safety measures.



## SECTION 2. USE AND STORAGE INFORMATION

### -- PRELIMINARY PLANNING CONSIDERATIONS --

- Safety glasses or goggles and protective clothing (rubberized apron, etc.) should be worn for all experiments.
- Be sure eyewash station and safety shower are in good working order and readily available.
- Always provide for safe disposal of all chemical waste generated in the lab. Check applicable regulations prior to use.
- Not recommended for use or storage in schools without an absolute need being determined.
- Whenever possible, substitute less hazardous materials.
- Review sections 3, 5, and 6 to prepare for possible accidents or emergencies.
- Rubber gloves are recommended when working with this material.

### -- USAGE PRECAUTIONS AND PROCEDURES --

- READ THE LABEL and follow all precautions.
- Maintain good housekeeping practices to avoid unintentional mixing with incompatible materials and dust accumulation. Clean up spills promptly and completely.
- For safety, contact lenses should not be worn in the laboratory; soft lenses may absorb irritants and all lenses may concentrate them. Particles can also adhere to contact lenses and cause corneal damage.
- Avoid creating airborne dust conditions.
- After working with this material, always wash hands and face before eating, drinking, or smoking.
- Avoid inhalation of dust or mist. DO NOT INGEST! Prevent eye and skin contact.
- Remove contaminated clothing and launder before reuse. Keep material off your books and belongings.

### -- ADDITIONAL INFORMATION --

- Cadmium nitrate is an oxidizer. Avoid contact with flammable liquids or other combustibles (may cause fires).
- Cadmium nitrate does not polymerize. This material is stable at room temperature under normal conditions.
- Incompatible with reducing agents, flammable or combustible materials.

### -- PREFERRED STORAGE LOCATION AND METHODS --

- Storage area should be cool and well ventilated. Containers should be tightly closed.
- Do not store chemicals alphabetically by name; store by chemical family, instead, to keep compatibles together.
- All chemical containers should be protected from physical damage and kept out of direct sunlight.
- Smoking should not be permitted in areas where chemicals are stored.
- Purchase only amounts equivalent to one year's needs, if at all.
- Store with compatible materials on sturdy noncombustible shelving. Keep away from flammable or combustible materials.
- May be stored in approved, locked POISONS cabinet, if incompatibles are not present.

## SECTION 3. SPILLS AND DISPOSAL PROCEDURES

### IF MATERIAL IS SPILLED:

- Ventilate area of spill.
- Cleanup personnel should wear personal protective equipment as necessary to prevent skin or eye contact and inhalation of dust.
- For liquid (solution) spills, cover material with an inert solid absorbent (vermiculite, dry sand, etc.) and scoop into an appropriate container (with secure lid) for disposal in accordance with existing regulations. Dike with inert absorbent material, as needed, to contain and limit spill area. Prevent release to drains or waterways; hazardous waste.
- Sweep, vacuum, or scoop up spilled solid, avoiding generation of dust. Place in a suitable container (with secure lid) for later disposal.
- Cleanup methods such as vacuuming (with appropriate filter) or wet mopping will minimize dust dispersion.

### DISPOSAL OF SMALL QUANTITIES:

- Reclaim when possible. Unsalvageable waste requires disposal as a hazardous waste in an approved chemical waste landfill.
- Contact your supplier or a licensed disposal contractor for specific treatment/disposal procedures.

### DISPOSAL OF LARGER AMOUNTS: Contact a licensed disposal company.

**\*FOLLOW ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS FOR ALL WASTE DISPOSAL\***

## SECTION 4: HEALTH HAZARDS

Current ACGIH TLV: 8-hr. TWA: 0.05 mg/m<sup>3</sup> for cadmium dust and salts (as Cd).

Current OSHA PEL: 8-hr. TWA: 0.2 mg/m<sup>3</sup> (Ceiling of 0.6 mg/m<sup>3</sup>) for cadmium dust (as Cd).

The NIOSH-recommended TWA (10 hr.) and ceiling concentrations for cadmium (as Cd) are 0.04 mg/m<sup>3</sup> and 0.2 mg/m<sup>3</sup>, respectively.

- Cadmium salts are toxic when ingested or inhaled. Acute inhalation exposure to excessive concentrations of Cd may irritate the respiratory tract and cause cough, dyspnea, chest pain, fever and chills, and, in severe cases, pulmonary edema. The onset of these symptoms may not appear until several hours after exposure. These effects have been observed primarily in workers exposed to cadmium fume.
- The primary effects of chronic inhalation exposure to cadmium dust are pulmonary emphysema and changes in kidney function. The renal dysfunction is characterized initially by urinary excretion of proteins, particularly low molecular weight proteins.
- Ingestion can cause excessive salivation, nausea, persistent vomiting, diarrhea, abdominal pain, and loss of consciousness.
- Skin and eye contact with dust and solutions may cause irritation.
- In a 1984 *Current Intelligence Bulletin*, NIOSH recommended that Cd and its compounds be regarded as "potential occupational carcinogens." The NTP lists "cadmium compounds" as anticipated human carcinogens and the IARC lists them as probable human carcinogens (Groups 2A and 2B). Cadmium nitrate is not specifically cited in either instance.

## SECTION 5: FIRST AID PROCEDURES

## Eye contact:

- Flush eyes promptly with plenty of running water for at least 15 minutes, including under the eyelids.
- Get prompt medical attention.\*

## Skin contact:

- Wash exposed areas of skin with soap and water.
- Remove contaminated clothing.
- Contact medical personnel.\*

## Inhalation:

- Remove victim to fresh air; restore and/or support breathing as necessary.
- Get prompt medical attention.\*

## Ingestion:

- Get prompt medical attention.\*
- Give several glasses of milk or water to drink. Induce vomiting -- but ONLY if victim is conscious and alert. (Vomiting may occur spontaneously.)
- Never give anything by mouth to a person who is unconscious or convulsing.

\* Get medical help (in school, paramedic, or community) for further treatment, observation, and support after first aid.

## SECTION 6: FIRE PROCEDURES AND DATA

- Cadmium nitrate is an oxidizer which can initiate and intensify combustion of flammable materials. Flood fires with water (if suitable for other burning materials).
- Prevent runoff to sewers and waterways.
- Extinguishing media: Use media appropriate to surrounding fire conditions.
- For major fires, or if large quantities of this material are involved, fire fighters should wear appropriate protective clothing and use respiratory protection. Self-contained breathing apparatus is recommended. Toxic fumes may be evolved under fire conditions.
- A water spray may be used to cool fire-exposed containers and disperse vapors.

**THERMAL DECOMPOSITION PRODUCTS:** Cadmium oxide and toxic oxides of nitrogen (above 139°F [59°C]).

**FLASH POINT AND METHOD(S) ...** Not Applicable

**AUTOIGNITION TEMPERATURE ...** Not Applicable

**FLAMMABILITY LIMITS IN AIR (vol. %) :** Not Applicable

## SECTION 7: PHYSICAL DATA

**BOILING POINT (@ 1 atm) ...** 269.6°F (132°C)

**VAPOR PRESSURE (@ 20°C, mm Hg) ...** Negligible

**SOLUBILITY IN WATER (@ 0°C) ...** 132 g/100g

**SPECIFIC GRAVITY ...** 2.455 g/cc

**MELTING POINT ...** 139.1°F (59.5°C)

**FORMULA WEIGHT ...** 308.50

**DATA SOURCES:** Genium's Industrial MSDS #171 (1/86) and references 1, 2, 4, 5, 7, 12, 14, 19, 27, 30, 44, 49, 55, 56, 58, 61, 62, 82, 501, 506, 509, 518.  
(see glossary for titles)

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Medical Review