

# MATERIAL SAFETY DATA SHEET

# COBALT NITRATE

PRODUCT CODE NUMBER(S): 3210-1

## PRODUCT IDENTIFICATION

**Chemical Name and Synonyms:** Cobalt nitrate, cobalt (II) nitrate hexahydrate, Cobaltous nitrate

**Chemical Family:** Metal salt/cobalt compounds

**Chemical Formula:**  $Co(NO_3)_2 \cdot 6H_2O$

**Product Use:** Laboratory reagent

**Manufacturer's Name and Address:**

Caledon Laboratories Ltd.

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Georgetown, Ontario L7G 4R9

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## HAZARDOUS INGREDIENTS OF MATERIALS

Ingredients	%	TLV Units	CAS No.
Cobalt (II) nitrate hexahydrate	98	0.05 mg/m <sup>3</sup> (as Co)	10026-22-9

## PHYSICAL DATA

**Physical State:** Solid

**Odour and Appearance:** Red deliquescent crystals; odourless

**Odour Threshold (ppm):** Not applicable

**Vapour Pressure (mm Hg):** Negligible

**Vapour Density (Air = 1):** Not applicable

**Evaporation Rate:** Not applicable

**Boiling Point (degrees C):** 75°C (decomposes)

**Melting Point (degrees C):** 55°C

**pH:** Not available

**Specific Gravity:** 1.87

**Coefficient of Water/Oil distribution:** Not available

## SHIPPING DESCRIPTION

**UN:** 1477

**T.D.G. Class:** 5.1

**Pkg. Group:** II

## REACTIVITY DATA

**Chemical Stability:** Stable under normal conditions of use and storage; deliquescent in moist air.

**Incompatibility with other substances:** May react violently or explosively in contact with organic or combustible materials, reducing agents. Incompatible with tert-butyl hydroperoxide, ammonium hexacyanoferrate.

**Reactivity:** Avoid excessive heat, ignition sources, contamination of any kind, incompatible and combustible materials, generation of dust, shock, friction.

**Hazardous Decomposition Products:**  $CoO_x$ ,  $NO_x$

## FIRE AND EXPLOSION DATA

**Flammability:** Not combustible but strong oxidizer. Will enhance the burning rate or cause spontaneous combustion of organic or combustible material. Strong oxidants may ex-

plode when shocked or if exposed to heat, flame or friction. May be initiation source for dust or vapour explosions.

**Extinguishing Media:** Use flooding amounts of water to blanket fire, cool exposed containers, and to flush solid or vapours away from fire. Fight fire from upwind, from a safe distance.

Firefighters must wear protective equipment (full face-piece, positive-pressure self-contained breathing apparatus) and clothing sufficient to prevent inhalation of dusts or vapours, and contact with skin and eyes (full Bunker Gear).

**Flash Point (Method Used):** Not available

**Autoignition Temperature:** Not available

**Upper Flammable Limit (% by volume):** Not available

**Lower Flammable Limit (% by volume):** Not available

**Hazardous Combustion Products:**  $CoO_x$ ,  $NO_x$

**Sensitivity to Impact:** May be sensitive to shock

**Sensitivity to Static discharge:** Mixtures of dust with air may be sensitive under certain conditions, particularly when contaminated with organic materials, when ignited by an electrostatic or other high-voltage spark, or other ignition source.

## TOXICOLOGICAL PROPERTIES AND HEALTH DATA

### Toxicological Data:

**LD<sub>50</sub>:** (oral, rat) 434 mg/kg

**LC<sub>50</sub>:** Not available

### Effects of Acute Exposure to Product:

**Inhaled:** Harmful. Inhalation may cause irritation of the upper respiratory tract, coughing, nausea, and ringing in ears. At high temperatures, exposure to toxic nitrogen oxides decomposition products can quickly cause acute respiratory problems. Absorption leads to systemic poisoning with headache, fall in blood pressure, the formation of methemoglobin which decreases the ability of the blood to carry oxygen, causing cyanosis, possible convulsions, coma, and death. Onset may be delayed 2 to 4 hours or longer. Severe overexposure to nitrates can be fatal. Severe irritation and pulmonary edema have been observed in laboratory animals. May cause respiratory hypersensitivity, asthma. Inhalation of cobalt dust and fumes is associated with an increase in lung disease. Severe overexposure to nitrates or nitrites can cause methemoglobinemia, with cyanosis, nausea and vomiting. May progress to cause blood and central nervous system effects, anemia, reticulocytosis, hematuria, weakness, depression, headache, respiratory distress, irregular heart rate, eventual coma and death. Symptoms may be delayed for two to four (2-4) hours or longer.

**In contact with skin:** Irritating or corrosive to skin tissue. Can cause chemical burns; moisture such as perspiration accelerates tissue damage. Readily absorbed to cause systemic effects (see "Ingested").

**In contact with eyes:** Dust or solutions may cause redness, itching and pain. Extent of irritation depends on concentration and duration of exposure. Severe overexposure may cause burns with permanent damage and cloudiness of cornea.

**Ingested:** Harmful. May cause gastrointestinal hypermotility, nausea, vomiting, diarrhea, flushing of face and ears, ringing in the ears, dizziness, skin rash. Large doses depress erythrocyte production. In animal testing, large oral doses of cobalt salts caused reduced blood pressure, internal bleeding, diarrhea, muscle paralysis, damage to heart, kidneys and lungs. Toxic effects of cobalt compounds may be cumulative. Overexposure to nitrates or nitrites can cause methemoglobinemia (see "Inhaled").

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**Effects of Chronic Exposure to Product:**

Prolonged or repeated exposure may cause damage to spleen and blood cells, degeneration of heart muscle, thyroid gland, pancreas, and kidneys. Reaction to cobalt salts, with severe skin eruptions, swelling, reddening and itching may occur at low concentrations in sensitized individuals. Cross sensitivity to nickel and chromium has occurred. Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney or respiratory function may be more susceptible to the effects of this material. Persons with allergies or sensitivity to cobalt may also be more susceptible.

Chronic overexposure to nitrates can lead to methemoglobinemia (see "Inhaled"), and conversion of nitrate to nitrite in the stomach, causing nausea and vomiting, blood and central nervous system effects, weakness, depression, headache, irregular heart rate; severe overexposure can cause coma and death. Persons with a history of kidney or lung disease may be more susceptible to the effects of nitrates. Prolonged exposure causes blood disorders in infants.

**Carcinogenicity:** Cobaltous compounds are carcinogenic in laboratory animals under conditions that are not considered relevant to worker exposure (ACGIH, A3), IARC, Group 2B, possibly carcinogenic to humans.

**Teratogenicity:** No human or animal information available

**Reproductive Effects:** No information available

**Mutagenicity:** Insufficient information available. Early data suggests cobaltous compounds are not mutagenic.

**Synergistic Products:** None known

**PREVENTIVE MEASURES**

**Engineering Controls:** Local exhaust ventilation required

**Respiratory Protection:** Dust/mist mask. Up to 10x TLV, or the maximum use specified by the respirator supplier, whichever is lowest, NIOSH/MSHA approved half-face dust/mist filter respirator. Up to 50x TLV, or the maximum use specified by the respirator supplier, whichever is lowest, NIOSH/MSHA approved full face-piece dust/mist filter respirator. Higher or unknown concentrations, or for fire or spill conditions, self-contained breathing apparatus, or full face-piece, positive-pressure supplied-air respirator.

**Eye Protection:** Chemical safety goggles and/or face shield. Do not wear contact lenses when working with this substance.

**Skin Protection:** Butyl rubber or neoprene gloves. Other impervious protective clothing, apron, sleeves, coveralls, boots, sufficient to prevent contact.

**Other Personal Protective Equipment:** Safety shower and eye-wash fountain in work area.

**Leak and Spill Procedure:** Ventilate area. Eliminate all ignition sources and isolate from combustible materials. Cleanup personnel must be thoroughly trained in the handling of hazardous products and in the hazards of this particular product, and must wear protective equipment and clothing sufficient to prevent inhalation of dust or fumes, and contact with skin and eyes. Mix with wet sand and collect in a manner that does not raise dust, for re-use or disposal. Prevent from entering sewers, storm drains, or other waterways. As contact with any oxidant can render organic matter (paper, wood, textiles) dangerously combustible, wash area of spillage and contaminated clothing thoroughly with water.

**Waste Disposal:** Follow all federal, provincial and local regulations for disposal.

**Handling Procedures and Equipment:** OXIDIZER, TOXIC. Workers using this chemical must be thoroughly trained in its hazards and its safe use, and must wear appropriate protective equipment and clothing. Keep away from combustible or organic materials, and all sources of ignition. Use non-sparking tools. Protect against heat, shock, and physical damage. Avoid generation

of dust. Avoid inhalation and contact with skin and eyes. Use the smallest possible amount for the purpose, in designated areas with adequate ventilation. Keep work area clean and free of extraneous, particularly combustible, materials. Do not use on porous surfaces (wood); use surfaces that can be easily and thoroughly cleaned. Clean up spills immediately and thoroughly. Keep containers closed when not in use and when empty. Wash thoroughly after handling. Empty containers may contain hazardous residues; treat with caution.

**Storage Requirements:** Store in suitable, labelled containers, in a cool, dry, well-ventilated area, out of direct sunlight. Store away from incompatible, combustible or organic materials. Storage facilities (shelves, floors) should be constructed of non-combustible materials. Keep away from all ignition sources. Keep containers tightly closed when not in use and when empty. Protect from damage, and inspect frequently for signs of leaking; unattended spillage onto combustible materials (wood, paper, etc.) could result in fire.

**FIRST AID MEASURES****Specific Measures:**

**Eyes:** Flush eyes immediately with large amounts of gently running water or normal saline, holding eyelids open, until no evidence of chemical remains (at least 15-20 minutes). Take care not to flush contaminated water into unaffected eye. Wear protective gloves to avoid contact during first aid procedures. Get medical attention.

**Skin:** Remove contaminated clothing, including watches, rings, belts, and shoes. Wash skin with plenty of running water for five to ten (5-10) minutes, or until no trace of chemical remains. If irritation develops get medical attention. Decontaminate clothing before re-use, or discard; clothing may become dangerously flammable after contact with this chemical.

**Inhalation:** Remove to fresh air. Rescuer should take precaution to limit his own exposure. Eliminate all sources of ignition. Give oxygen and get medical attention for any breathing difficulty. Because exposure to nitrates can cause methemoglobinemia, the symptoms of which may be delayed, unless exposure is minor, the victim needs to be monitored for several hours for cyanosis, irregular heart rate, loss of consciousness.

**Ingestion:** If victim is alert and NOT convulsing, rinse mouth thoroughly with water, give 2 to 4 glasses of water to drink to dilute and induce vomiting under medical supervision. When vomiting occurs, have casualty lean forward with head down to avoid breathing in of vomitus. Get medical attention immediately.

**REFERENCES USED**

CCINFO disc: MSDS's, February 2007  
Budavari: The Merck Index, 12th ed., 1997  
Sax, Lewis: Hawley's Condensed Chemical Dictionary, 11th ed., 1987  
Sax: Dangerous Properties of Industrial Materials, 5th ed., 1979  
Suppliers' Material Safety Data Sheets

**ADDITIONAL INFORMATION**

**Date Issued:** February 20, 1990

**Revision:** February 2007

**MSDS:** 3210-1

**Proposed WHMIS Designation:** C; D2B

Prepared by: Caledon Laboratories Ltd. (905) 877-0101  
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