

This Material Safety Data Sheet complies with Controlled Products Regulations (SOR/88-66) and with ANSI Z400.1-2004

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name Cadmium
Chemical formula Cd
CAS # (Chemical Abstracts Service) 7440-43-9
EC # (European Chemical Substance) 231-152-8
Use of the substance Electronic and semiconductor industry
Supplier/manufacturer 5N Plus Inc.
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SECTION 2. HAZARDS IDENTIFICATION

Physical state Solid (ingots, shots)
Colour Silver
Risk status This product is classified as toxic by the WHMIS
Emergency overview Toxic by ingestion, may cause cancer
Routes of entry Inhalation, ingestion.
Potential acute health effects
Eyes No effects reported
Skin No effects reported
Inhalation Deep inhalation of the fumes or dust of cadmium or cadmium compounds may cause symptoms such as coughing, dyspnea and tightening of the chest resembling those caused by metal fume fever, but which in the worst, can progress into pneumonia, pulmonary edema and death as a result of respiratory arrest. Acute exposure can result in residual emphysema and fibrosis.
Ingestion Toxic if ingested may cause abdominal pain, diarrhea, headache, nausea and vomiting.
Potential chronic health effects Carcinogenicity: classified 1 by IARC, classified 1 by NTP, classified 2 by the European Union, classified A2 by ACGIH.

For toxicological information, see Section 11

SECTION 3. COMPOSITION OF/INFORMATION REGARDING CONSTITUENTS

Name	Symbol	CAS #	EC #	Percentage (%)
Cadmium	Cd	7440-43-9	231-152-8	100%

SECTION 4. FIRST AID

Eye contact Check for and remove any contact lenses. In the event of contact with eyes, rinse immediately with plenty of water. Get medical attention.
Skin contact In case of contact, immediately flush skin with plenty of water. Remove and wash any contaminated clothing. Dust may provoke skin irritation.
Inhalation If inhaled, remove to fresh air. Get immediate medical attention.
Ingestion Rare in industry. Ingestion may cause irritation of the nose and throat. If the person is unconscious, do not give anything to drink or induce vomiting. Get immediate medical attention.
Note to attending physician There is no specific antidote. Please contact poison centre.

SECTION 5. FIREFIGHTING MEASURES

Flammability of the product Not-applicable under this form; dust or powder can ignite if they come into contact with air.
Products of combustion Cadmium oxides
Extinguishing media
Suitable Use an extinguishing agent suitable for the surrounding fire. Use water spray to keep exposed containers cool.
Not suitable None-know
Special exposure hazards Toxic metal oxides can form in the event of fire.
Special protective equipment for firefighters Firefighters should wear self-contained breathing apparatus (SCBA).

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions Safety goggles, impervious gloves and boots. If the airborne concentration is above the IDLH (set at 9 mg/m³) or unknown, wear approved self-contained breathing apparatus and full protective gear.

Environmental precautions Contain spilled material, and prevent runoff and contact with soil, waterways, drains or sewers.

Clean-up methods Eliminate all sources of ignition. Vacuum or carefully scoop up spilled material and place in an appropriate container for disposal in a safe place.

SECTION 7. HANDLING AND STORAGE

Handling Never breathe or ingest dust. Wear suitable respiratory equipment in case of insufficient ventilation. In the event of accidental ingestion or inhalation, contact medical services immediately and forward them the material safety data sheet. Avoid skin and eye contact.

Storage Keep in a tightly sealed container in a cool, well-ventilated area, away from strong oxidizing agents and acids.

SECTION 8. EXPOSURE CONTROL/PERSONAL PROTECTION

Occupational exposure limits

Product name	QUEBEC (CA) TWA _{EV} (mg/m ³)	ACGIH (U.S.A.) TLV-TWA (mg/m ³)	OSHA (U.S.A.) PEL-TWA (mg/m ³)
Cadmium	0.025	0.01 (inhalable fraction) 0.002 (respirable fraction)	0.005

Technical measures Use only in well ventilated areas. If handling generates dust, fumes, gases, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Eyes Safety goggles

Skin Lab coat

Respiratory If there is a risk of exceeding exposure limits, use at least a type P100 particulate filter respirator.

Hands Natural rubber (latex).

Personal safety equipment pictograms



Personal protection in case of a large spill Safety glasses, impervious gloves and boots and. Full protective gear and NIOSH-approved self-contained breathing apparatus are recommended.

Hygiene measures Wash hands, forearms and face thoroughly after handling this product and before eating, smoking or using the lavatory. Do not take your work clothes home.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state Solid.

Colour Silver.

Molecular weight 112.4 g/mol.

Molecular formula Cd

Melting point 321°C

Specific gravity 8.642 (Water = 1)

Vapour density Negligible

SECTION 10. STABILITY AND REACTIVITY

Stability and reactivity This product is unstable under the following conditions: oxidizes in humid air.

Incompatibility with various substances Incompatible with acids and oxidizing materials.

Hazardous polymerization Will not occur.

Conditions of reactivity Excess heat, ignition source and finely dispersed particles.

SECTION 11. TOXICOLOGICAL INFORMATION

Toxicological data

Product/ingredient name	Test	Result	Route	Species
Cadmium	LD50	2330 mg/kg	Oral	Rat
Cadmium	LD50	890 mg/kg	Oral	Mouse
Cadmium	LC50	25 mg/m ³ /30 minutes	Inhalation	Rat

Acute effects

Eyes Exposure to particulates may cause redness or pain.
Skin No effects reported

Inhalation Deep inhalation of the fumes or dust of cadmium or cadmium compounds may cause symptoms such as coughing, dyspnea and tightening of the chest resembling those caused by metal fume fever, but which in the worst, can progress into pneumonia, pulmonary edema and death as a result of respiratory arrest. Acute exposure can result in residual emphysema and fibrosis.

Ingestion Toxic if ingested may cause abdominal pain, diarrhea, headache, nausea and vomiting.

Potential chronic health effects

Carcinogenic effects Classified in Group 1 (proven in humans) by the IARC, classified 1 (proven carcinogenic effect in humans) by NTP, and (proven) by OSHA, classified 2 (possible in humans) by the European Union and classified A2 (suspected for humans) by ACGIH.

Mutagenic effects Classified 3 (Possible risk of harm to the unborn child).

Teratogenic effects Classified 3 (Possible risk of impaired fertility).

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity data

Product/ingredient name	Species	Period	Result (LC50)
Cadmium	Acanthopagrus schlegeli	4 days (96 heures)	15500 ug/L

Environmental precautions Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Breakdown products Cadmium oxides

Toxicity of biodegradation products Not-available

SECTION 13. DISPOSAL CONSIDERATIONS

Waste disposal The generation of waste should be avoided or minimized wherever possible. Contain spilled material, and prevent runoff and contact with soil, waterways, drains or sewers. Disposal of this product, solutions and any by-products should comply at all times with the requirements of environmental protection and waste disposal legislation and any regional and local authority requirements.

SECTION 14. TRANSPORTATION INFORMATION

Regulatory information	Proper shipping name	Class	UN number	PG	Label
UN/IMDG/IATA Class	Not classified	Not classified	Not classified	Not classified	Not classified
DOT classification	Not classified	Not classified	Not classified	Not classified	Not classified
TDG classification	Not classified	Not classified	Not classified	Not classified	Not classified

SECTION 15. REGULATORY INFORMATION

CANADA

WHMIS D1A: Very toxic material causing immediate serious toxic effects
 D2A: Very toxic material causing other toxic effects

Domestic substances list This substance appears on the Domestic Substances List in accordance with the Canadian Environmental Protection Act.

United States

HCS Classification Toxic, carcinogenic.

EU Regulation

Indications of danger



Hazardous to the environment



Toxic

Risk phrases

- R45 May cause cancer.
- R26 Very toxic by inhalation.
- 48/23/25 Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.
- R62 Possible risk of impaired fertility.
- R63 Possible risk of harm to the unborn child.
- R68 Possible risk of irreversible effects.
- R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases

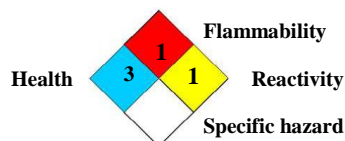
- S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
- S53 Avoid exposure – obtain special instructions before use.
- S60 This material and its container must be disposed of as hazardous waste.
- S61 Avoid release to the environment. Refer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

SECTION 16. OTHER INFORMATION**Information to appear on label****HMIS (United States)**

Health	*	3
Fire hazard		1
Physical hazard		1
Personal protection		C

HAZARD RATINGS

- 4- Extreme
3- Serious
2- Moderate
1- Slight
0- Minimal

NFPA (United States)**References**

1. CSST – Service du répertoire toxicologique du Québec, February 2007
2. FactSage 5.4 (Thermodynamic database)
3. INRS (national institute of scientific research) – Classification règlementaire des produits chimiques cancérigènes, mutagènes et toxiques pour la reproduction
4. NIOSH Pocket Guide to Chemical Hazards – Ed. of August 2006
5. CANUTEC'S ERGO 2004, Version 1.0 (Transport Canada)
6. Controlled Products Regulations (SOR/88-66)
7. Règlement sur la santé et la sécurité du travail (Quebec)
8. OSHA Hazard Communication Standard (29 CFR 1910.1200)
9. NIOSH RTECS® databases (Registry of Toxic Effects of Chemical Substances)
10. European Inventory of Existing Commercial chemical Substances (EINECS) – European Chemical Bureau
11. Encyclopédie de sécurité et de santé au travail, 3rd French-language edition
12. International Chemical Safety Cards – International Program on Chemical Safety
13. The N-CLASS Database on Environmental Hazard Classification version 6.0
14. European Chemical Bureau's Classlab database
15. ECOTOX Databases 4.0.

Glossary

IARC- *International Agency for Research on Cancer*

NTP- National Toxicology Program

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration (U.S.)

LD50- Indicates the dose that is lethal to 50% of an exposed group (Lethal Dose 50%).

LC50- Indicates the concentration of the chemical that is lethal to 50% of the exposed animals (Lethal Concentration 50%).

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