

# CADMIUM CHLORIDE HEMIPENTAHYDRATE

GHS Safety Data Sheet

Version No: 2.0

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## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### PRODUCT NAME

CADMIUM CHLORIDE HEMIPENTAHYDRATE

### OTHER NAMES

CdCl<sub>2</sub>, Caddy, "cadmium dichloride VI-CAD"

### PROPER SHIPPING NAME

CADMIUM COMPOUND

### PRODUCT USE

In photography; dyeing and calico printing; as an agricultural fungicide; in the vacuum tube industry; manufacture of cadmium yellow; galvanoplasty; manufacture of special mirrors; as a lubricant; in testing for pyridine bases.

### SUPPLIER

Company: S D FINE- CHEM LIMITED

Address:

315- 317, T.V. INDUSTRIAL ESTATE,

248, WORLI,

MUMBAI- 400030.INDIA.

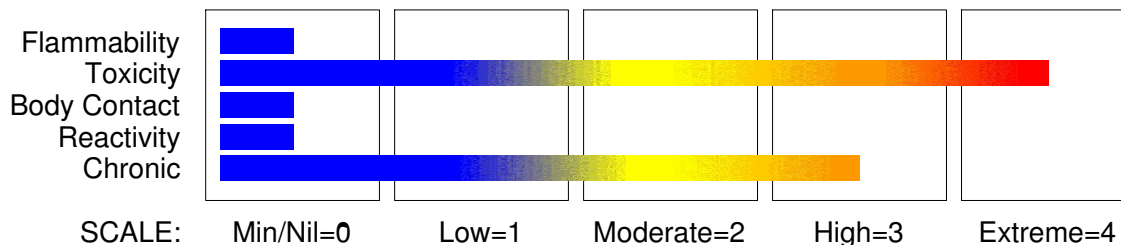
technical@sdfine.com

Telephone: 91- 22- 24959898

Telephone: 91- 22- 24959899

Fax: 91- 22- 24937232

### HAZARD RATINGS



## Section 2 - HAZARDS IDENTIFICATION

### GHS Classification

Acute Toxicity (Dermal) Category 4

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## Section 2 - HAZARDS IDENTIFICATION

Acute Toxicity (Inhalation) Category 2  
Acute Toxicity (Oral) Category 3  
Carcinogen Category 1B  
Chronic Aquatic Hazard Category 1  
Organ Damage Category 1  
Reproductive Toxicity Category 1B



## EMERGENCY OVERVIEW

### HAZARD

DANGER

Determined by Chemwatch using GHS criteria:

H330 H301 H312 H350 H360 H360 H372 H410

Fatal if inhaled

Toxic if swallowed

Harmful in contact with skin

May cause CANCER

May damage fertility

May damage the unborn child

Causes damage to organs through prolonged or repeated exposure.

Very toxic to aquatic life with long lasting effects

Harmful to life in the soil

### PRECAUTIONARY STATEMENTS

#### Prevention

Wear respiratory protection.

Wear protective gloves/clothing

Obtain special instructions before use.

Do not breathe dust/fume/gas/mist/vapours/spray.

Use only outdoors or in a well ventilated area.

Wash hands thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use personal protective equipment as required.

Do not handle until all safety precautions have been read and understood.

#### Response

If exposed or concerned: Get medical attention advice.

Wash contaminated clothing before reuse.

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.

Keep container tightly closed.

Specific treatment: refer to Label or MSDS.

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

Get medical advice/attention if you feel unwell.

IF ON SKIN: Gently wash with plenty of soap and water.

Immediately call a POISON CENTER or doctor/physician.

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## Section 2 - HAZARDS IDENTIFICATION

Call a POISON CENTER or doctor/physician if you feel unwell.

### Storage

Store locked up.

### Disposal

Dispose of contents and container in accordance with relevant legislation.

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

| NAME             | CAS RN     | %   |
|------------------|------------|-----|
| cadmium chloride | 10108-64-2 | >95 |

## Section 4 - FIRST AID MEASURES

### SWALLOWED

Rinse mouth out with plenty of water.

For advice, contact a Poisons Information Centre or a doctor.

· IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.

· For advice, contact a Poisons Information Centre or a doctor.

Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:

· Induce vomiting with fingers down the back of the of the throat, ONLY IF CONSCIOUS.

· Lean patient forward or place on left side (head-down position if possible) to maintain open airway and prevent aspiration.

NOTE: Wear a protective glove when inducing vomiting by mechanical means.

· In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.

· If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.

· If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

### EYE

If this product comes in contact with the eyes:

· Immediately hold eyelids apart and flush the eye continuously with running water.

· Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

· Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.

· Transport to hospital or doctor without delay.

· Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

### SKIN

If skin contact occurs:

· Immediately remove all contaminated clothing, including footwear.

· Flush skin and hair with running water (and soap if available).

· Seek medical attention in event of irritation.

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## Section 4 - FIRST AID MEASURES

### INHALED

- If dust is inhaled, remove from contaminated area.
- Encourage patient to blow nose to ensure clear passage of breathing.
- If irritation or discomfort persists seek medical attention.

### NOTES TO PHYSICIAN

- High acute exposure, to cadmium, produces delayed pulmonary oedema progressing to interstitial fibrosis.
  - For acute inhalations, initial presentation simulates metal fume fever (fever, headache, dyspnoea, pleuritic chest pain, conjunctivitis, rhinitis, sore throat, cough) developing 4-12 hours post-exposure. Respiratory failure may ensue in 3-10 days.
  - For acute oral exposures, gastroenteritis results with sudden onset of vomiting, diarrhoea and abdominal pain.
  - If vomiting is not prominent, use Ipecac/lavage/catharsis in usual manner.
  - CaNa<sub>2</sub>EDTA is the chelator of choice for acute cadmium exposure. British Anti-Lewisite increases nephrotoxicity and therefore is not indicated [Ellenhorn and Barceloux: Medical Toxicology]
- COMMENTS on HUMAN TOXICITY:

- Between 10 and 50% of inhaled cadmium is adsorbed, the adsorption being greater for smaller particles and fumes; absorption through skin is negligible.
- The half-life of cadmium in the human body is thought to be about around 30 years and it has no known biological function.

Blood and urine cadmium concentrations may be determined.

#### Normal concentrations

Blood <27 nmol/l (<3ug/l), non- smokers <54 nmol/l (<6 ug/l), smokers  
Urine <18 nmol/l (<2 ug/l), non- smokers 0.4-1.3 nmol/mmol creatinine <45 nmol/l (<5 ug/l), smokers 10- 35 nmol/mmol creatinine

#### Hazardous concentrations

>180 nmol/l (>20 ug/l)  
>180 nmol/l (>20 ug/l) >4- 13 nmol/mmol creatinine

### BIOLOGICAL EXPOSURE INDEX (BEI)

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

| Determinant      | Sampling time | Index             | Comments |
|------------------|---------------|-------------------|----------|
| Cadmium in urine | Not critical  | 5 ug/g creatinine | B        |
| Cadmium in blood | Not critical  | 5 ug/L            | B        |

B: Background levels occur in specimens collected from subjects NOT exposed.

## Section 5 - FIRE FIGHTING MEASURES

### EXTINGUISHING MEDIA

There is no restriction on the type of extinguisher which may be used.

### FIRE FIGHTING

Alert Fire Brigade and tell them location and nature of hazard.

- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water courses.

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## Section 5 - FIRE FIGHTING MEASURES

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Use fire fighting procedures suitable for surrounding area.  
Use water delivered as a fine spray to control the fire and cool adjacent area.  
DO NOT approach containers suspected to be hot.  
If safe to do so, remove containers from path of fire.

### FIRE/EXPLOSION HAZARD

- Non combustible.
  - Not considered to be a significant fire risk.
  - Heating may cause expansion or decomposition leading to violent rupture of containers.
  - May emit acrid smoke. May emit corrosive and poisonous fumes.
- Decomposes on heating and produces acrid and toxic fumes of: metal oxides, chlorides and hydrogen chloride.

### FIRE INCOMPATIBILITY

Avoid reaction with oxidising agents.

### Personal Protective Equipment

- Breathing apparatus.
- Gas tight chemical resistant suit.
- Limit exposure duration to 1 BA set 30 mins.

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## Section 6 - ACCIDENTAL RELEASE MEASURES

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### EMERGENCY PROCEDURES

#### MINOR SPILLS

- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Sweep up or
- Vacuum up (consider explosion-proof machines designed to be grounded during storage and use).
- Place in clean drum then flush area with water.

#### MAJOR SPILLS

DO NOT touch the spill material Clear area of personnel and move upwind.  
Alert Fire Brigade and tell them location and nature of hazard.  
Pollutant - contain spillage.

- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water courses.

Shut off all possible sources of ignition and increase ventilation.  
Stop leak if safe to do so.  
Contain spill with sand, earth or vermiculite.  
Use dry clean up procedures and avoid generating dust.  
Collect recoverable product into labelled containers for recycling.  
Collect residues and seal in labelled drums for disposal.  
Wash area down with large quantity of water and prevent runoff into drains.  
After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.  
If contamination of drains or waterways occurs, advise emergency services.

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## Section 6 - ACCIDENTAL RELEASE MEASURES

### EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:

cadmium chloride 15 mg/m<sup>3</sup>

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

cadmium chloride 0.075 mg/m<sup>3</sup>

other than mild, transient adverse effects without perceiving a clearly defined odour is:

cadmium chloride 0.05 mg/m<sup>3</sup>

The threshold concentration below which most people will experience no appreciable risk of health effects:

cadmium chloride 0.0075 mg/m<sup>3</sup>

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

|                 |          |               |         |
|-----------------|----------|---------------|---------|
| Very Toxic (T+) | >= 0.1%  | Toxic (T)     | >= 3.0% |
| R50             | >= 0.25% | Corrosive (C) | >= 5.0% |
| R51             | >= 2.5%  |               |         |
| else            | >= 10%   |               |         |

where percentage is percentage of ingredient found in the mixture

### SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+: May be stored together

O: May be stored together with specific precautions

X: Must not be stored together

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

## Section 7 - HANDLING AND STORAGE

### PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.

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## Section 7 - HANDLING AND STORAGE

- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

### SUITABLE CONTAINER

- Metal can or drum
  - Packaging as recommended by manufacturer.
  - Check all containers are clearly labelled and free from leaks.
- Glass container.

### STORAGE INCOMPATIBILITY

Avoid storage with oxidisers and Keep dry.  
May react violently with bromine trifluoride, potassium metal.

### STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE CONTROLS

The following materials had no OELs on our records

- cadmium chloride: CAS:10108- 64- 2 CAS:7790- 78- 5

### MATERIAL DATA

The adopted TLVs were recommended to prevent proteinuria, pulmonary oedema and emphysema. Evidence for added risk of carcinoma of the lung and prostate has been reported amongst smelter workers but exposure to other toxic fumes, gases and dusts is a confounding factor. Most of the data on cadmium levels responsible for these observed effects indicated exposures above the former TLV ceiling of 0.1 mg/m<sup>3</sup> for cadmium fume. It is anticipated that the total dust recommendation will prevent the development of preclinical kidney dysfunction and that the respirable fraction recommendation will protect the lower respiratory tract from the accumulation of cadmium burden that might directly act on the lung as a carcinogen. It is also expected that the recommendations will protect workers from metal fume fever. The concentration of respirable dust for application of this limit is to be determined from the fraction that penetrates a separator whose size collection efficiency is described by a cumulative log normal function with a median aerodynamic volume of 4.0 µm (+-) 0.3 µm and with a geometric standard deviation of 1.5 µm (+-) 0.1 µm, i.e. less than 5 µm. Some jurisdictions require that health surveillance be conducted on occupationally exposed workers.

Such surveillance should emphasise

- demography, occupational and medical history
- health advice, including counselling on additional cadmium burden from smoking

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## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

- physical examination with emphasis on the respiratory system
- completion of a standardised respiratory questionnaire
- standardised respiratory function tests such as FEV1, FVC and FEV1/FVC
- urinary cadmium and beta2-microglobulin
- records of personal exposure.

### PERSONAL PROTECTION



#### EYE

- Safety glasses with side shields; or as required,
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

#### HANDS/FEET

DO NOT handle directly. Wear gloves and use scoop / tongs / tools.  
PVC gloves or Rubber gloves or Safety footwear.  
Rubber boots.

#### OTHER

- Overalls.
- Eyewash unit.
- Barrier cream.
- Skin cleansing cream.

#### RESPIRATOR

| Protection Factor | Half- Face Respirator | Full- Face Respirator | Powered Air Respirator |
|-------------------|-----------------------|-----------------------|------------------------|
| 10 x ES           | P1 Air- line*         | -                     | PAPR- P1 -             |
| 50 x ES           | Air- line**           | P2                    | PAPR- P2               |
| 100 x ES          | -                     | P3                    | -                      |
|                   |                       | Air- line*            | -                      |
| 100+ x ES         | -                     | Air- line**           | PAPR- P3               |

\* - Negative pressure demand \*\* - Continuous flow.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.  
For further information consult site specific  
CHEMWATCH data (if available), or your

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## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Health and Safety Advisor.

### ENGINEERING CONTROLS

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

|                                                                                                                                                                                                                     |                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| Type of Contaminant:                                                                                                                                                                                                | Air Speed:                     |
| solvent, vapours, degreasing etc., evaporating from tank (in still air).                                                                                                                                            | 0.25- 0.5 m/s (50- 100 f/min)  |
| aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation) | 0.5- 1 m/s (100- 200 f/min.)   |
| direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)                                                      | 1- 2.5 m/s (200- 500 f/min.)   |
| grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).                                                                | 2.5- 10 m/s (500- 2000 f/min.) |

Within each range the appropriate value depends on:

|                                                            |                                   |
|------------------------------------------------------------|-----------------------------------|
| Lower end of the range                                     | Upper end of the range            |
| 1: Room air currents minimal or favourable to capture      | 1: Disturbing room air currents   |
| 2: Contaminants of low toxicity or of nuisance value only. | 2: Contaminants of high toxicity  |
| 3: Intermittent, low production.                           | 3: High production, heavy use     |
| 4: Large hood or large air mass in motion                  | 4: Small hood- local control only |

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### APPEARANCE

Colourless, hexagonal, odourless crystals. Soluble in water.  
Slightly soluble in alcohol; Insoluble in acetone, ether.

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## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### PHYSICAL PROPERTIES

Solid.

Mixes with water.

Molecular Weight: 183.3

Melting Range (°C): 568

Solubility in water (g/L): Miscible

pH (1% solution): 5.5- 6.5(5% soln)

Volatile Component (%vol): Not applicable.

Relative Vapour Density (air=1): Not available

Lower Explosive Limit (%): Not applicable

Autoignition Temp (°C): Not applicable.

State: Divided solid

Boiling Range (°C): 960

Specific Gravity (water=1): 4.05 @ 25 C

pH (as supplied): Not applicable

Vapour Pressure (kPa): 1.33 @ 656 C

Evaporation Rate: Not available

Flash Point (°C): Non combustible

Upper Explosive Limit (%): Not applicable

Decomposition Temp (°C): Not available

## Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

### CONDITIONS CONTRIBUTING TO INSTABILITY

Product is considered stable and hazardous polymerisation will not occur.

## Section 11 - TOXICOLOGICAL INFORMATION

### POTENTIAL HEALTH EFFECTS

#### ACUTE HEALTH EFFECTS

##### SWALLOWED

Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.

Considered an unlikely route of entry in commercial/industrial environments.

Ingestion of cadmium salts produces prompt vomiting and are not retained. For this reason exposure by this route tends to be less harmful than exposure by inhalation. Although as little as 10-20 mg of soluble cadmium has produced severe toxic syndrome following ingestion, lethal doses probably comprise several hundred milligram by the oral route. Ingestion may cause excessive salivation, nausea, persistent vomiting, diarrhoea and abdominal pain.

##### EYE

Although the material is not thought to be an irritant (as classified by EC Directives), direct contact with the eye may produce transient discomfort characterised by tearing or conjunctival redness (as with windburn).

##### SKIN

Skin contact with the material may be harmful; systemic effects may result following absorption.

The material is not thought to be a skin irritant (i.e. is unlikely to produce irritant dermatitis as described in EC Directives using animal models). Temporary discomfort, however, may result from prolonged dermal exposures. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

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## Section 11 - TOXICOLOGICAL INFORMATION

Toxic effects may result from skin absorption.  
Open cuts, abraded or irritated skin should not be exposed to this material.  
Bare unprotected skin should not be exposed to this material.

### INHALED

The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation, of the material, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress. Reactions may not occur on exposure but response may be delayed with symptoms only appearing many hours later.  
BE AWARE: Repeated minor exposures with only mild symptoms may have a serious cumulative poisoning effect.

Cadmium is absorbed more efficiently from the respiratory tract than from the gastrointestinal tract. Three clinical stages are recognised in dog. An acute pulmonary oedema (within 24 hours), proliferative interstitial pneumonitis (3rd-10th day) and permanent lung damage (consisting of perivascular and peribronchial fibrosis) have been identified - a similar sequence (though not permanent damage) is inferred from human autopsy material. The inhalation of 40 mg of cadmium with pulmonary retention of 4 mg is estimated to be fatal in man. Following absorption, organs accumulate low molecular weight proteins (metallothioneins - MTNs) which avidly bind metals such as cadmium, zinc and mercury. Single intravenous doses of cadmium-MTN complex produce necrosis and sloughing of renal tubular cells in rabbits. Renal (kidney) injury is also common amongst workers in cadmium industries exposed both acutely and chronically. Acute massive exposures may result in acute renal necrosis whereas prolonged low level exposures commonly produce renal tubular dysfunction characterised by low grade proteinuria (protein in the urine).

### CHRONIC HEALTH EFFECTS

On the basis, primarily, of animal experiments, the material may be regarded as carcinogenic to humans. There is sufficient evidence to provide a strong presumption that human exposure to the material may result in cancer on the basis of:

- appropriate long-term animal studies
- other relevant information.

There is sufficient evidence to provide a strong presumption that human exposure to the material may result in impaired fertility on the basis of: - clear evidence in animal studies of impaired fertility in the absence of toxic effects, or evidence of impaired fertility occurring at around the same dose levels as other toxic effects but which is not a secondary non-specific consequence of other toxic effects.

There is sufficient evidence to provide a strong presumption that human exposure to the material may result in developmental toxicity, generally on the basis of:

- clear results in appropriate animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the other toxic effects. Principal routes of exposure are usually by inhalation of generated dust and skin contact/absorption.

In chronic cadmium poisoning, bone softening (osteomalacia), radiological decreases in bone density, high levels of calcium in the urine (hyper-calciuria) and renal stones reflect disturbance in calcium metabolism. Although this disturbance may reflect cadmium induced renal tubular damage there is evidence in rats that direct action on the bone may produce metabolic breakdown of collagen (the main structural protein in bone). Animals sometimes exhibit significant hypertension after chronic exposure to cadmium in drinking water. Epidemiological studies suggest a relationship between airborne cadmium and human cardiovascular disease though this is still equivocal. From a diagnostic point of view the formation of a yellow ring as part of the tooth structure in chronically exposed humans may be significant. Heavy smoking has been reported to considerably increase

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## Section 11 - TOXICOLOGICAL INFORMATION

tissue calcium levels and would appear to increase the risk of cumulative toxic effects. Repeated or prolonged exposure may result in a loss of smell, ulceration of the nose, pulmonary emphysema and mild anaemia. Occupational exposure to cadmium (in the form of the oxide) may increase the risk of prostate, respiratory and genito-urinary cancers in humans. In one follow-up study of an investigation of cadmium-nickel workers and cadmium-copper alloy factory workers, additional cases of nasopharyngeal, colorectal, prostatic and lung-cancer were reported. In a further study of cadmium smelter workers a significant trend was noted for cumulative cadmium exposures and lung cancer mortality. This relationship has not been seen in other follow-up studies. Male rats continuously exposed to cadmium chloride aerosols developed dose-related increases in adenocarcinomas, epidermoid (squamous cell) carcinomas and mucoepidermoid carcinomas of the lung. When introduced through intratracheal instillation, cadmium chloride induced invasive prostatic carcinomas in the rat.

### TOXICITY AND IRRITATION

#### TOXICITY

Oral (woman) LDLo: 3000mg/kg

Oral (rat) LD50: 88 mg/kg

WARNING: This substance has been classified by the IARC as Group 2A: Probably Carcinogenic to Humans.

Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen  
[National Toxicology Program: U.S. Dep. of Health & Human Services 2002].

#### IRRITATION

Nil Reported

## Section 12 - ECOLOGICAL INFORMATION

Marine Pollutant: Not Determined

Hazardous Air Pollutant:

Yes

Fish LC50 (96hr.) (mg/l):

0.08

Daphnia magna EC50 (48hr.) (mg/l):

0.104- 0.12

BCF<100:

1750

The material is classified as an ecotoxin\* because the Fish LC50 (96 hours) is less than or equal to 0.1 mg/l

\* Classification of Substances as Ecotoxic (Dangerous to the Environment)

Appendix 8, Table 1

Compiler's Guide for the Preparation of International Chemical Safety Cards: 1993

Commission of the European Communities.

BCF: 50

Toxicity Fish: LC50(96)5.5-30.5mg/L

Toxicity invertebrate: LC50(96)0.76-3.5mg/L

Bioaccumulation: not sig

Nitrif. inhib.: inhib at 1mg/L

Significant compartments for soluble cadmium salts are likely to be soil and water.

Cadmium(II) adsorbs to sediments. Once in an aquatic environment cadmium is highly mobile ; its dissolved species are highly labile and are first to be released, for example, when salinity is increased in estuaries. In fresh water, cadmium toxicity is influenced by water hardness (the harder the water, the lower the toxicity). Cadmium can bioaccumulate and bioconcentrate in the food chain. Biomagnification in terrestrial food chains is not expected.

Drinking Water Standards:

5 ug/l (UK max.)

3 ug/l (WHO guideline)

Soil Guidelines: Dutch Criteria:

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## Section 12 - ECOLOGICAL INFORMATION

0.8 mg/kg (target)

12 mg/kg (intervention)

Air Quality Standards:

<1-5 ng/m<sup>3</sup> (rural areas)

10-20 ng/m<sup>3</sup> (urban and industrial areas) (WHO Guidelines)

The importance of cadmium in environmental disease is illustrated in the outbreak of itai-itai disease caused by the contamination of rice paddies in Japan by smelter waste. Cadmium toxicity affected the skeletal system of inhabitants of the region resulting in severe bony deformities and chronic renal disease. Although cadmium exposure has been implicated in the pathogenesis of the syndrome, vitamin D deficiencies and other nutritional deficiencies are also thought to be implicated. ("Itai-itai" translates to "ouch-ouch" reflecting the accompanying bone pain). Sewage sludge and phosphate fertilisers are often contaminated with cadmium which then concentrates in plants grown on contaminated soils. Compared with other heavy metals cadmium is mobile in the aqueous environment and may exist as the hydrated ion, as complexes with carbonate, chloride or sulfate or with humic acids. Cadmium thus tends to move in the environment and is widely distributed. It is taken up by organisms and is bioaccumulated. Bioconcentration in the aquatic environment is greatest in invertebrates such as mollusks and crustaceans, followed by fish and plants. However, under reducing conditions, cadmium forms the insoluble sulfide and precipitates in the sediment. The biological production of sulfide also promotes the formation of cadmium sulfide. Cadmium is one of the most readily absorbed metals in plants grown on contaminated soils and the potential for bioaccumulation is substantial. Zinc and calcium are also thought to bioaccumulate with cadmium with a resultant protective action against its toxic effects.

## Section 13 - DISPOSAL CONSIDERATIONS

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Bury residue in an authorised landfill.
- Recycle containers if possible, or dispose of in an authorised landfill.

## Section 14 - TRANSPORTATION INFORMATION



Labels Required: TOXIC  
HAZCHEM: 2X

### UNDG:

Dangerous Goods Class: 6.1

UN Number: 2570

Shipping Name: CADMIUM COMPOUND

Subrisk:

Packing Group:

None

III

### Air Transport IATA:

ICAO/IATA Class: 6.1

UN/ID Number: 2570

ICAO/IATA Subrisk:

Packing Group:

None

III

continued...

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## Section 14 - TRANSPORTATION INFORMATION

ERG Code: 6L  
Shipping name: CADMIUM COMPOUND

### Maritime Transport IMDG:

|             |            |                   |                |
|-------------|------------|-------------------|----------------|
| IMDG Class: | 6.1        | IMDG Subrisk:     | None           |
| UN Number:  | 2570       | Packing Group:    | III            |
| EMS Number: | F- A, S- A | Marine Pollutant: | Not Determined |

Shipping name: CADMIUM COMPOUND

## Section 15 - REGULATORY INFORMATION

### REGULATIONS

cadmium chloride (CAS: 10108-64-2) is found on the following regulatory lists;  
Great Lakes Binational Toxics Strategy Substances (U.S. and Canada) - Level II Substances  
OSPAR List of Substances of Possible Concern  
WHO Guidelines for Drinking-water Quality - Chemicals for which guideline values have not been established

cadmium chloride (CAS: 7790-78-5) is found on the following regulatory lists;  
Great Lakes Binational Toxics Strategy Substances (U.S. and Canada) - Level II Substances  
OSPAR List of Substances of Possible Concern  
WHO Guidelines for Drinking-water Quality - Chemicals for which guideline values have not been established

## Section 16 - OTHER INFORMATION

### INGREDIENTS WITH MULTIPLE CAS NUMBERS

| Ingredient Name  | CAS                       |
|------------------|---------------------------|
| cadmium chloride | 10108- 64- 2, 7790- 78- 5 |

### REPRODUCTIVE HEALTH GUIDELINES

Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for the reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

| Ingredient | ORG | UF | Endpoi<br>nt | CR | Adeq<br>TLV |
|------------|-----|----|--------------|----|-------------|
|------------|-----|----|--------------|----|-------------|

continued...

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## Section 16 - OTHER INFORMATION

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|                  |             |    |    |    |   |
|------------------|-------------|----|----|----|---|
| cadmium chloride | 0.002 mg/m3 | NA | NA | NA | - |
|------------------|-------------|----|----|----|---|

These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise.

CR = Cancer Risk/10000; UF = Uncertainty factor:

TLV believed to be adequate to protect reproductive health:

LOD: Limit of detection

Toxic endpoints have also been identified as:

D = Developmental; R = Reproductive; TC = Transplacental carcinogen

Jankovic J., Drake F.: A Screening Method for Occupational Reproductive

American Industrial Hygiene Association Journal 57: 641-649 (1996).

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