CADMIUM CHLORIDE MONOHYDRATE

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
CADMIUM CHLORIDE, DIHYDRATE

OTHER NAMES

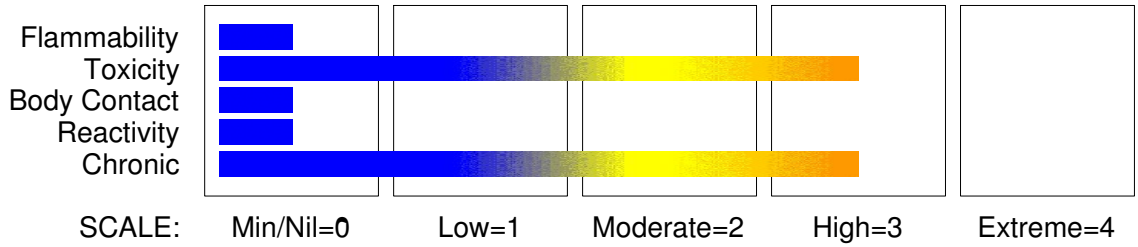
Cd-Cl2.2H2O, "cadmium chloride hydrate", monohydrate, "cadmium dichloride"

PROPER SHIPPING NAME
CADMIUM COMPOUND

PRODUCT USE
Photography; dyeing and calico printing; in the vacuum tube industry; manufacture of cadmium yellow; manufacture of special mirrors; as lubricant; in analysis; as an agricultural fungicide / fungicide ingredient.
Operators should be trained in procedures for safe use of this material.
Operators should be trained in correct use & maintenance of respirators.

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



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Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Dermal) Category 4
Acute Toxicity (Inhalation) Category 4
Acute Toxicity (Oral) Category 3
Carcinogen Category 1B
Chronic Aquatic Hazard Category 1

EMERGENCY OVERVIEW

HAZARD

DANGER
Determined by Chemwatch using GHS criteria:
H301 H332 H312 H350 H410
Toxic if swallowed
Harmful if inhaled
Harmful in contact with skin
May cause CANCER
Very toxic to aquatic life with long lasting effects
Harmful to life in the soil

PRECAUTIONARY STATEMENTS

Prevention

Avoid breathing dust/fume/gas/mist/vapours/spray.
Use only outdoors or in a well ventilated area.
Wear protective gloves/clothing
Use personal protective equipment as required.
Do not handle until all safety precautions have been read and understood.
Obtain special instructions before use.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

Response

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
If exposed or concerned: Get medical attention advice.
Wash contaminated clothing before reuse.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF ON SKIN: Gently wash with plenty of soap and water.
Specific treatment: refer to Label or MSDS.

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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, dihydrate	72589-96-9	> 98

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.

INHALED

· If dust is inhaled, remove from contaminated area.

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· 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.
· CaNa2EDTA 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	Hazardous concentrations
Blood <27 nml/l (<3ug/l), non- smokers <54 nmol/l (<6 ug/l), smokers	>180 nmol/l (>20 ug/l)
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	>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.
Use fire fighting procedures suitable for surrounding area.
Use water delivered as a fine spray to control the fire and cool adjacent area.

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Section 5 - FIRE FIGHTING MEASURES

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.

Section 6 - ACCIDENTAL RELEASE MEASURES

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.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)
The maximum airborne concentration below which it is believed that nearly all individuals could be exposed

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for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:
cadmium chloride, dihydrate 15 mg/m³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:
cadmium chloride, dihydrate 0.075 mg/m³

other than mild, transient adverse effects without perceiving a clearly defined odour is:
cadmium chloride, dihydrate 0.05 mg/m³

The threshold concentration below which most people will experience no appreciable risk of health effects:
cadmium chloride, dihydrate 0.0075 mg/m³

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

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SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

+	X	+	X	0	+

+: May be stored together
O: May be stored together with specific preventions
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.
· Always wash hands with soap and water after handling.
· Work clothes should be laundered separately. Launder contaminated clothing before re

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-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, dihydrate: CAS:72589- 96- 9 CAS:35658- 65- 2 CAS:7790- 78- 5 CAS:10108- 64- 2

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/m3 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
· physical examination with emphasis on the respiratory system

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· 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 Occupational Health and Safety Advisor.

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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

Fine, white, odourless cystals. Freely soluble in water. No odour.
Soluble in acetone; slightly soluble in methanol, ethanol.
Practically insoluble in ether.

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Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Also available as
Cadmium Chloride hydrate = CAS RN 7790-78-5
Cadmium Chloride monohydrate = CAS RN 35658-65-2

PHYSICAL PROPERTIES
Solid.
Mixes with water.

Molecular Weight: 219.32
Melting Range (°C): Not available
Solubility in water (g/L): Miscible
pH (1% solution): Not available
Volatile Component (%vol): Not applicable.
Relative Vapour Density (air=1): Not applicable
Lower Explosive Limit (%): Not applicable
Autoignition Temp (°C): Not applicable
State: Divided solid

Boiling Range (°C): Not applicable
Specific Gravity (water=1): 3.327
pH (as supplied): Not applicable
Vapour Pressure (kPa): Not applicable
Evaporation Rate: Not applicable
Flash Point (°C): Not applicable
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
Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 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

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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.
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.
If any of these symptoms are noticed, CEASE work immediately and seek medical attention or call a doctor.
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. At least one classification body considers that 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.
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- calcinuria) 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 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

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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

data for cadmium chloride 10108-64-2
Oral (woman) LDLo: 3000mg/kg Nil reported
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].

Section 12 - ECOLOGICAL INFORMATION

Marine Pollutant:Not Determined
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:
0.8 mg/kg (target)
12 mg/kg (intervention)
Air Quality Standards:
<1-5 ng/m3 (rural areas)
10-20 ng/m3 (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

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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	Subrisk:	None
UN Number:	2570	Packing Group:	III

Shipping Name:CADMIUM COMPOUND

Air Transport IATA:

ICAO/IATA Class:	6.1	ICAO/IATA Subrisk:	None
UN/ID Number:	2570	Packing Group:	III
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, dihydrate (CAS: 72589-96-9) is found on the following regulatory lists;
Great Lakes Binational Toxics Strategy Substances (U.S. and Canada) - Level II Substances

continued...

OSPAR List of Substances of Possible Concern
WHO Guidelines for Drinking-water Quality - Chemicals for which guideline values have not been established

cadmium chloride, dihydrate (CAS: 35658-65-2) 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, dihydrate (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, dihydrate	72589- 96- 9, 35658- 65- 2, 7790- 78- 5

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

Issue Date: 12-May-2018