

SANYO NICKEL CADMIUM BATTERY, RECHARGEABLE

Chemwatch Material Safety Data Sheet

Issue Date: 21-Jul-2008

NC317ECP

CHEMWATCH 7134-83

Version No:2.0

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

SANYO NICKEL CADMIUM BATTERY, RECHARGEABLE

SYNONYMS

CADNICA, nickel, cadmium, battery, rechargeable

PRODUCT USE

Rechargeable battery. Sealed battery is Nonhazardous. The Risk codes are for exposure to hazardous battery contents.

SUPPLIER

Company: Sanyo Energy

Address:

2055 SANYO AVE.

SAN DIEGO,

CA, 92154

USA

Telephone: +1 619 661 4888

Section 2 - HAZARDS IDENTIFICATION

STATEMENT OF HAZARDOUS NATURE

HAZARDOUS SUBSTANCE. NON-DANGEROUS GOODS. According to the Criteria of NOHSC, and the ADG Code.

POISONS SCHEDULE

None

RISK

Harmful in contact with skin.

Very toxic by inhalation.

Causes burns.

Risk of serious damage to eyes.

May cause SENSITISATION by skin contact.

May cause CANCER.

Toxic: danger of serious damage to health by prolonged exposure through inhalation and if swallowed.

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

Possible risk of impaired fertility.

Possible risk of harm to the unborn child.

Possible risk of irreversible effects.

SAFETY

In case of insufficient ventilation wear suitable respiratory equipment.

Use only in well ventilated areas.

Keep container in a well ventilated place.

Avoid exposure - obtain special instructions before use.

To clean the floor and all objects contaminated by this material use water and detergent.

This material and its container must be disposed of in a safe way.

Keep away from food drink and animal feeding stuffs.

Take off immediately all contaminated clothing.

In case of accident or if you feel unwell IMMEDIATELY contact Doctor or Poisons Information Centre (show label if possible).

Use appropriate container to avoid environment contamination.

Avoid release to the environment. Refer to

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Section 2 - HAZARDS IDENTIFICATION

special instructions/ safety data sheets.
In case of accident by inhalation: remove casualty to fresh air and keep at rest.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
hermetically sealed case containing:		
cadmium	7440-43-9	11-26
cadmium hydroxide	21041-95-2	11-26
nickel	7440-02-0	8-17
nickel(II) hydroxide	12054-48-7	5-12
potassium hydroxide	1310-58-3	0-3
nylon	63428-83-1	0-2
steel		12-13
other		0-1

Section 4 - FIRST AID MEASURES

SWALLOWED

- For advice, contact a Poisons Information Centre or a doctor at once.
- Urgent hospital treatment is likely to be needed.
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Transport to hospital or doctor without delay.

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 fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prosthesis such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve

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Section 4 - FIRST AID MEASURES

resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

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

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.

- In cases of nickel poisoning, dimercaptol delivered by deep intramuscular injection may be a suitable antidote. (Patients should not exhibit renal or hepatic dysfunction.) The use of diethyldithiocarbamate is the subject of ongoing research.
- Irritant contact dermatoses or eczemas may respond to applications of weak antiseptic packs, antibiotic ointments (tetracycline or erythromycin) or inert pastes and ointments. Systemic antibiotics are advisable in the presence of lymphangitis or lymphadenitis.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.

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Section 5 - FIRE FIGHTING MEASURES

- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.
- Prevent, by any means available, spillage from entering drains or water courses.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

- Non combustible.
 - Not considered a significant fire risk, however containers may burn.
- May emit corrosive fumes.

FIRE INCOMPATIBILITY

None known.

HAZCHEM: None

Personal Protective Equipment

Gas tight chemical resistant suit.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

- Clean up all spills immediately.
- Secure load if safe to do so.
- Bundle/collect recoverable product.
- Collect remaining material in containers with covers for disposal.

MAJOR SPILLS

- Clean up all spills immediately.
- Secure load if safe to do so.
- Bundle/collect recoverable product.
- Collect remaining material in containers with covers for disposal.

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

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Limit all unnecessary personal contact.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- 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.
- 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

Carton.

STORAGE INCOMPATIBILITY

None known.

STORAGE REQUIREMENTS

- Keep dry.
- Store under cover.
- Protect containers against physical damage.
- Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA mg/m ³	Peak mg/m ³
Australia Exposure Standards	cadmium (Cadmium and compounds (as Cd))	0.01	
Australia Exposure Standards	cadmium hydroxide (Cadmium and compounds (as Cd))	0.01	
Australia Exposure Standards	nickel (Nickel, metal)	1	
Australia Exposure Standards	potassium hydroxide (Potassium hydroxide)		2
Australia Exposure Standards	nylon (Inspirable dust (not otherwise classified))	10	

The following materials had no OELs on our records

- nickel(II) hydroxide: CAS:12054- 48- 7 CAS:36897- 37- 7

EMERGENCY EXPOSURE LIMITS

Material	Revised IDLH Value (mg/m ³)	Revised IDLH Value (ppm)
cadmium	9	
nickel	10	
nickel(II) hydroxide	10	

MATERIAL DATA

Not available. Refer to individual constituents.

INGREDIENT DATA

NICKEL:

POTASSIUM HYDROXIDE:

It is the goal of the ACGIH (and other Agencies) to recommend TLVs (or their equivalent) for all substances for which there is evidence of health effects at airborne concentrations encountered in the workplace.

At this time no TLV has been established, even though this material may produce adverse health effects (as evidenced in animal experiments or clinical experience).

Airborne concentrations must be maintained as low as is practically possible and

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occupational exposure must be kept to a minimum.

NOTE: The ACGIH occupational exposure standard for Particles Not Otherwise Specified (P.N.O.S) does NOT apply.

CADMIUM HYDROXIDE:

CADMIUM:

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
- 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.

NICKEL(II) HYDROXIDE:

NOTE: Detector tubes for nickel, measuring in excess of 0.25 mg/m³ (as Ni) are commercially available.

Use control measures / protective gear to avoid personal contact. Animal inhalation studies with insoluble nickel dusts (other than nickel sulfide) at concentrations of 1 to 3 mg/m³ show no difference in respiratory cancer between exposed and control animals.

These studies do not provide evidence that there is no excess risk of lung and nasal cancer - in view of limited exposure data and the absence of guidance for a TLV based on epidemiological studies of nickel induced respiratory tract cancer, it has been necessary to incorporate the results of animal studies that have demonstrated the production of pulmonary pathology. These studies have shown consistent pulmonary damage following inhalation of 0.1 to 1 mg/m³ insoluble inorganic nickel compounds. Individuals who may be hypersusceptible or otherwise unusually responsive to industrial chemicals may not be adequately protected against adverse health effects from nickel or its compounds at concentrations below the recommended or proposed TLV.

POTASSIUM HYDROXIDE:

Sensory irritants are chemicals that produce temporary and undesirable side-effects on the eyes, nose or throat. Historically occupational exposure standards for these irritants have been based on observation of workers' responses to various airborne concentrations. Present day expectations require that nearly every individual should be protected against even minor sensory irritation and exposure standards are established using uncertainty factors or safety factors of 5 to 10 or more. On occasion animal no-observable-effect-levels (NOEL) are used to determine these limits where human results are unavailable. An additional approach, typically used by the TLV committee (USA) in determining respiratory standards for this group of chemicals, has been to assign ceiling values (TLV C) to rapidly acting irritants and to assign short-term exposure limits (TLV STELs) when the weight of evidence from irritation, bioaccumulation and other endpoints combine to warrant such a limit. In contrast the MAK Commission (Germany) uses a five-

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category system based on intensive odour, local irritation, and elimination half-life. However this system is being replaced to be consistent with the European Union (EU) Scientific Committee for Occupational Exposure Limits (SCOEL); this is more closely allied to that of the USA.

OSHA (USA) concluded that exposure to sensory irritants can:

- cause inflammation
- cause increased susceptibility to other irritants and infectious agents
- lead to permanent injury or dysfunction
- permit greater absorption of hazardous substances and
- acclimate the worker to the irritant warning properties of these substances thus

increasing the risk of overexposure.

The TLV-TWA is protective against respiratory tract irritation produced at higher concentrations.

PERSONAL PROTECTION

EYE

- Chemical goggles.
- Full face shield may be required for supplementary but never for primary protection of eyes
- 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

- Wear chemical protective gloves, eg. PVC.
- Wear safety footwear or safety gumboots, eg. Rubber.

NOTE:

- The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
- Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.

OTHER

- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

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.

ENGINEERING CONTROLS

General exhaust is adequate under normal operating conditions. If risk of overexposure exists, wear SAA approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas.

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Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Hermetically sealed case; does not mix with water.

PHYSICAL PROPERTIES

Molecular Weight: Not Applicable

Melting Range (°C): Not Available

Solubility in water (g/L): Not Available

pH (1% solution): Not Available

Volatile Component (%vol): Not Available

Relative Vapour Density (air=1): Not

Applicable

Lower Explosive Limit (%): Not Applicable

Autoignition Temp (°C): Not Applicable

State: Manufactured

Boiling Range (°C): Not Applicable

Specific Gravity (water= 1): Not Available

pH (as supplied): Not Applicable

Vapour Pressure (kPa): Not Available

Evaporation Rate: Not Applicable

Flash Point (°C): Not Applicable

Upper Explosive Limit (%): Not Applicable

Decomposition Temp (°C): Not Available

Viscosity: Not Applicable

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of heat source and ignition source.

Product is considered stable and hazardous polymerisation will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Not normally a hazard due to physical form of product.

The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

Nickel is not well absorbed orally. Excretion in the urine is complete after about 4-5 days. If injected, nickel is rapidly distributed to various organs.

Ingestion of cadmium salts rarely results in poisoning as vomiting rejects the dose.

Ingestion may cause excessive salivation, nausea, persistent vomiting, diarrhoea and abdominal pain.

EYE

Not normally a hazard due to physical form of product.

The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.

SKIN

Not normally a hazard due to physical form of product.

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

The material can produce chemical burns following direct contact with the skin.

Open cuts, abraded or irritated skin should not be exposed to this material.

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Section 11 - TOXICOLOGICAL INFORMATION

Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

Not normally a hazard due to non-volatile nature of product.

Cadmium is absorbed more from the respiratory tract than the intestinal tract. Staging of symptoms include an initial, acute swelling of the lungs, followed by inflammation of the lungs after several days and chronic permanent scarring. 40mg of cadmium with 4mg retention in the lungs in humans will probably cause death. Accumulation of cadmium in the kidney can also cause permanent damage, even after a single intravenous dose.

CHRONIC HEALTH EFFECTS

Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue. Gastrointestinal disturbances may also occur. Chronic exposures may result in dermatitis and/or conjunctivitis.

Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population.

Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility.

Based on experience with animal studies, exposure to the material may result in toxic effects to the development of the foetus, at levels which do not cause significant toxic effects to the mother.

Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation.

Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

There is some evidence that inhaling this product is more likely to cause a sensitisation reaction in some persons compared to the general population.

Chronic cadmium poisoning causes softening of the bones, reduced bone density, kidney stones and increased blood pressure. There may be cardiovascular disease and a yellow ring in the tooth structure. Repeated or prolonged exposure can lead to loss of smell, ulcers in the nose, emphysema and mild anaemia. The risk of prostate, respiratory, bowel and genito-urinary cancers may be increased in humans.

TOXICITY AND IRRITATION

Not available. Refer to individual constituents.

CADMIUM:

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Inhalation (human) LCLo: 39 mg/m³/20m

Inhalation (man) TCLo: 88 ug/m³/8.6y

Inhalation (rat) LC50: 25 mg/m³/30m

Oral (rat) LD50: 225 mg/kg

Oral (rabbit) LDLo: 70 mg/kg

IRRITATION

Nil Reported

CADMIUM HYDROXIDE:

No significant acute toxicological data identified in literature search.

NICKEL:

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (rat) LDLo: 5000 mg/kg

Oral (rat) TDLo: 500 mg/kg/5D- I

IRRITATION

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Section 11 - TOXICOLOGICAL INFORMATION

Inhalation (rat) TCl_o: 0.1 mg/m³/24H/17W- C

Intravenous (dog) LD50: 40 mg/kg

Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.

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

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

NICKEL(II) HYDROXIDE:

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (rat) LD50: 1500 mg/kg

Subcutaneous (mouse) LD50: 50 mg/kg

Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested.

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

Tumours of the respiratory and musculo-skeletal system and at sites of application recorded.

POTASSIUM HYDROXIDE:

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

Oral (rat) LD50: 273 mg/kg

IRRITATION

Skin (human): 50 mg/24h SEVERE

Skin (rabbit): 50 mg/24h SEVERE

Eye (rabbit): 1mg/24h rinse- Moderate

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder

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Section 11 - TOXICOLOGICAL INFORMATION

is characterised by dyspnea, cough and mucus production.

The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may cause severe skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. Repeated exposures may produce severe ulceration.

NYLON:

No significant acute toxicological data identified in literature search.

MATERIAL	CARCINOGEN	REPROTOXIN	SENSITISER	SKIN
cadmium	IARC:1 NTPA	ILOM ILOEI		
cadmium hydroxide	NTPA			
nickel	IARC:2B NTPB	ILOM ILOEI		
nickel(II) hydroxide	IARC:1			

CARCINOGEN

IARC: International Agency for Research on Cancer (IARC) Carcinogens: cadmium Category: WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS.

CARCINOGEN

NTPA: US National Toxicology Program (NTP) 11th Report Part A Known to be Human Carcinogens: cadmium Category:

REPROTOXIN

ILOM: ILO Agents toxic to the male reproductive system: cadmium

REPROTOXIN

ILOEI: ILO Chemicals in the electronics industry that have toxic effects on reproduction: cadmium

CARCINOGEN

NTPA: US National Toxicology Program (NTP) 11th Report Part A Known to be Human Carcinogens: cadmium hydroxide Category:

CARCINOGEN

IARC: International Agency for Research on Cancer (IARC) Carcinogens: nickel Category: WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.

CARCINOGEN

NTPB: US National Toxicology Program (NTP) 11th Report Part B. Reasonably Anticipated to be a Human Carcinogen: nickel Category:

REPROTOXIN

ILOM: ILO Agents toxic to the male reproductive system: nickel

REPROTOXIN

ILOEI: ILO Chemicals in the electronics industry that have toxic effects on reproduction: nickel

CARCINOGEN

IARC: International Agency for Research on Cancer (IARC) Carcinogens: nickel(II) hydroxide Category: WARNING: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS.

Section 12 - ECOLOGICAL INFORMATION

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

Metal-containing inorganic substances generally have negligible vapour pressure and are

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Section 12 - ECOLOGICAL INFORMATION

not expected to partition to air. Once released to surface waters and moist soils their fate depends on solubility and dissociation in water. Environmental processes (such as oxidation and the presence of acids or bases) may transform insoluble metals to more soluble ionic forms. Microbiological processes may also transform insoluble metals to more soluble forms. Such ionic species may bind to dissolved ligands or sorb to solid particles in aquatic or aqueous media. A significant proportion of dissolved/ sorbed metals will end up in sediments through the settling of suspended particles. The remaining metal ions can then be taken up by aquatic organisms.

When released to dry soil most metals will exhibit limited mobility and remain in the upper layer; some will leach locally into ground water and/ or surface water ecosystems when soaked by rain or melt ice. Environmental processes may also be important in changing solubilities.

Even though many metals show few toxic effects at physiological pHs, transformation may introduce new or magnified effects.

A metal ion is considered infinitely persistent because it cannot degrade further.

The current state of science does not allow for an unambiguous interpretation of various measures of bioaccumulation.

The counter-ion may also create health and environmental concerns once isolated from the metal. Under normal physiological conditions the counter-ion may be essentially insoluble and may not be bioavailable.

Environmental processes may enhance bioavailability.

Transport and distribution of nickel particulates between different environmental compartments, is strongly influenced by particle size. Fine particulate matter has a longer residence time in the environment and is carried a long distance from its source; larger particles are deposited near the emission source. Atmospheric residence time for nickel particulates is estimated to be 5.4-7.9 days. Water solubility and bioavailability is affected by soil pH; decrease in pH generally mobilises nickel, thus acid rain can mobilise nickel from the soil and increase nickel concentrations in ground water. Nickel bioaccumulates in the food chain but is not bioconcentrated.

Drinking Water Standards:

Nickel 50 ug/l (UK max.)

20 ug/l (WHO guideline)

Soil Guidelines:

Dutch Criteria: 35 mg/kg (target)

210 mg/kg (intervention).

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.

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

continued...

SANYO NICKEL CADMIUM BATTERY, RECHARGEABLE

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and bioconcentrate in the food chain. Biomagnification in terrestrial food chains is not expected.

Cadmium is more mobile in aquatic environments than most other heavy metals (e.g., lead). In most natural surface waters, the affinities of complexing ligands for cadmium generally follow the order of humic acids > CO₃²⁻ > OH⁻ > Cl⁻ > SO₄²⁻. In unpolluted natural waters, most cadmium transported in the water column will exist in the dissolved state as the hydrated ion Cd(H₂O)₆²⁺. Minor amounts of cadmium are transported with the coarse particulates, and only a small fraction is transported with the colloids. In unpolluted waters, cadmium can be removed from solution by exchange of cadmium for calcium in the lattice structure of carbonate minerals. In polluted organic-rich waters, adsorption of cadmium by humic substances and other organic complexing agents plays a dominant role in transport, partitioning, and remobilization of cadmium. Cadmium concentration in water is inversely related to the pH and the concentration of organic material in the water. Because cadmium exists only in the +2 oxidation state in water, aqueous cadmium is not strongly influenced by the oxidizing or reducing potential of the water. However, under reducing conditions, cadmium may form cadmium sulfide, which is poorly soluble and tends to precipitate. Free (ionic) cadmium seems to be the toxic form and becomes much more prevalent at low salinity. Cadmium has a relatively long residence time in aquatic systems. In Lake Michigan, a mean residence time of 4-10 years was calculated for cadmium compared to 22 years calculated for mercury.

Precipitation and sorption to mineral surfaces, hydrous metal oxides, and organic materials are the most important processes for removal of cadmium to bed sediments. Humic acid is the major component of sediment responsible for adsorption. Sorption increases as the pH increases.

Sediment bacteria may also assist in the partitioning of cadmium from water to sediments. Both cadmium-sensitive and cadmium-resistant bacteria reduced the cadmium concentration in the water column from 1 ppm to between 0.2 and 0.6 ppm, with a corresponding increase in cadmium concentration in the sediments in the simulated environment. Studies indicate that concentrations of cadmium in sediments are at least one order of magnitude higher than in the overlying water. The mode of sorption of cadmium to sediments is important in determining its disposition to remobilize. Cadmium associated with carbonate minerals, precipitated as stable solid compounds or co-precipitated with hydrous iron oxides, is less likely to be mobilized by resuspension of sediments or biological activity. Cadmium that is adsorbed to mineral surfaces such as clay, or to organic materials, is more easily bioaccumulated or released in the dissolved state when the sediment is disturbed. Cadmium may redissolve from sediments under varying ambient conditions of pH, salinity, and redox potential. Cadmium is not known to form volatile compounds in the aquatic environment, so partitioning from water to the atmosphere does not occur.

In soils, pH, oxidation-reduction reactions, and formation of complexes are important factors affecting the mobility of cadmium. Cadmium can participate in exchange reactions on the negatively charged surface of clay minerals. In acid soils, the reaction is reversible. However, adsorption increases with pH and may become irreversible. Cadmium also may precipitate as insoluble cadmium compounds, or form complexes or chelates by interaction with organic matter. Available data suggest that organic matter is more effective than inorganic constituents in keeping cadmium unavailable. Examples of cadmium compounds found in soil are Cd₃(PO₄)₂, CdCO₃, and Cd(OH)₂. These compounds are formed as the pH rises. It has been found that about 90% of cadmium in soils remains in the top 15 cm.

Aquatic and terrestrial organisms bioaccumulate cadmium. Cadmium concentrates in freshwater and marine animals to concentrations hundreds to thousands of times higher than in the water. Reported bioconcentration factors (BCFs) range from 113 to 18,000 for invertebrates, from 3 to 4,190 for fresh water aquatic organisms, and from 5 to 3,160 for saltwater aquatic organisms. Bioconcentration in fish depends on the pH and the humus content of the water. Cadmium (not an estrogen mimic) has also been shown to cause increased vitellogenesis in female Atlantic croaker (*Micropogonias undulatus*), but this is thought to be caused by direct toxic action on the pituitary, leading to altered secretion of gonadotropin hormone. Because of their high ability to accumulate metals, some aquatic plants have been suggested for use in pollution control. For example, it has been suggested that the rapidly-growing water hyacinth *Eichhornia crassipes* could be used

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SANYO NICKEL CADMIUM BATTERY, RECHARGEABLE

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to remove cadmium from domestic and industrial effluents. The data indicate that cadmium bioaccumulates in all levels of the food chain. Cadmium accumulation has been reported in grasses and food crops, and in earthworms, poultry, cattle, horses, and wildlife. The metal burden of a crop depends on uptake by the root system, direct foliar uptake and translocation within the plant, and surface deposition of particulate matter. In general, cadmium accumulates in the leaves of plants and, therefore, is more of a risk in leafy vegetables grown in contaminated soil than in seed or root crops.

Since cadmium accumulates largely in the liver and kidneys of vertebrates and not in the muscle tissue and intestinal absorption of cadmium is low, biomagnification through the food chain may not be significant. In a study of marine organisms from the Tyrrhenian Sea, no evidence of cadmium biomagnification was found along pelagic or benthic food webs. Although some data indicate increased cadmium concentrations in animals at the top of the food chain, comparisons among animals at different trophic levels are difficult, and the data available on biomagnification are not conclusive. Nevertheless, uptake of cadmium from soil by feed crops may result in high levels of cadmium in beef and poultry (especially in the liver and kidneys). This accumulation of cadmium in the food chain has important implications for human exposure to cadmium, whether or not significant biomagnification occurs.

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).

DO NOT discharge into sewer or waterways.

Refer to data for ingredients, which follows:

CADMIUM:

Hazardous Air Pollutant: Yes

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.

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

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SANYO NICKEL CADMIUM BATTERY, RECHARGEABLE

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cadmium with a resultant protective action against its toxic effects.

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.

Cadmium is more mobile in aquatic environments than most other heavy metals (e.g., lead).

In most natural surface waters, the affinities of complexing ligands for cadmium generally follow the order of humic acids > CO₃²⁻ > OH⁻ > Cl⁻ > SO₄²⁻. In unpolluted natural waters, most cadmium transported in the water column will exist in the dissolved state as the hydrated ion Cd(H₂O)₆²⁺. Minor amounts of cadmium are transported with the coarse particulates, and only a small fraction is transported with the colloids. In unpolluted waters, cadmium can be removed from solution by exchange of cadmium for calcium in the lattice structure of carbonate minerals. In polluted organic-rich waters, adsorption of cadmium by humic substances and other organic complexing agents plays a dominant role in transport, partitioning, and remobilization of cadmium. Cadmium concentration in water is inversely related to the pH and the concentration of organic material in the water. Because cadmium exists only in the +2 oxidation state in water, aqueous cadmium is not strongly influenced by the oxidizing or reducing potential of the water. However, under reducing conditions, cadmium may form cadmium sulfide, which is poorly soluble and tends to precipitate. Free (ionic) cadmium seems to be the toxic form and becomes much more prevalent at low salinity. Cadmium has a relatively long residence time in aquatic systems. In Lake Michigan, a mean residence time of 4-10 years was calculated for cadmium compared to 22 years calculated for mercury.

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Aquatic and terrestrial organisms bioaccumulate cadmium. Cadmium concentrates in freshwater and marine animals to concentrations hundreds to thousands of times higher than in the water. Reported bioconcentration factors (BCFs) range from 113 to 18,000 for invertebrates, from 3 to 4,190 for fresh water aquatic organisms, and from 5 to 3,160 for saltwater aquatic organisms. Bioconcentration in fish depends on the pH and the humus

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SANYO NICKEL CADMIUM BATTERY, RECHARGEABLE

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content of the water. Cadmium (not an estrogen mimic) has also been shown to cause increased vitellogenesis in female Atlantic croaker (*Micropogonias undulatus*), but this is thought to be caused by direct toxic action on the pituitary, leading to altered secretion of gonadotropin hormone. Because of their high ability to accumulate metals, some aquatic plants have been suggested for use in pollution control. For example, it has been suggested that the rapidly-growing water hyacinth *Eichhornia crassipes* could be used to remove cadmium from domestic and industrial effluents. The data indicate that cadmium bioaccumulates in all levels of the food chain. Cadmium accumulation has been reported in grasses and food crops, and in earthworms, poultry, cattle, horses, and wildlife. The metal burden of a crop depends on uptake by the root system, direct foliar uptake and translocation within the plant, and surface deposition of particulate matter. In general, cadmium accumulates in the leaves of plants and, therefore, is more of a risk in leafy vegetables grown in contaminated soil than in seed or root crops.

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3 ug/l (WHO guideline)

Soil Guidelines: Dutch Criteria:

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12 mg/kg (intervention)

Air Quality Standards:

<1-5 ng/m³ (rural areas)

10-20 ng/m³ (urban and industrial areas)

(WHO Guidelines).

BCF: 2.18-250000

Toxicity Fish: LC50(96)4.2-6.9mg/L

Toxicity invertebrate: LC50(96)11mg/L

Degradation Biological: sig

processes Abiotic: photodeg

CADMIUM HYDROXIDE:

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SANYO NICKEL CADMIUM BATTERY, RECHARGEABLE

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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).

NICKEL:

Hazardous Air Pollutant: Yes

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

DO NOT discharge into sewer or waterways.

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.

NICKEL(II) HYDROXIDE:

Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.

Wastes resulting from use of the product must be disposed of on site or at approved waste sites.

Transport and distribution of nickel particulates between different environmental

continued...

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compartments, is strongly influenced by particle size. Fine particulate matter has a longer residence time in the environment and is carried a long distance from its source; larger particles are deposited near the emission source. Atmospheric residence time for nickel particulates is estimated to be 5.4-7.9 days. Water solubility and bioavailability is affected by soil pH; decrease in pH generally mobilises nickel, thus acid rain can mobilise nickel from the soil and increase nickel concentrations in ground water. Nickel bioaccumulates in the food chain but is not bioconcentrated.

Drinking Water Standards:

Nickel 50 ug/l (UK max.)

20 ug/l (WHO guideline)

Soil Guidelines:

Dutch Criteria: 35 mg/kg (target)

210 mg/kg (intervention).

DO NOT discharge into sewer or waterways.

POTASSIUM HYDROXIDE:

Prevent, by any means available, spillage from entering drains or water courses.

DO NOT discharge into sewer or waterways.

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

HAZCHEM: None

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS:UN, IATA, IMDG

Section 15 - REGULATORY INFORMATION

POISONS SCHEDULE: None

REGULATIONS

Sanyo Nickel Cadmium Battery, Rechargeable (CAS: None):

No regulations applicable

cadmium (CAS: 7440-43-9) is found on the following regulatory lists;

- Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (AQUA/1 to 6 - inorganic chemicals)
- Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (Domestic water supply - inorganic chemicals)
- Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (IRRIG - inorganic chemicals)
- Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (STOCK - inorganic chemicals)
- Australia - Australian Capital Territory - Environment Protection Regulation: Pollutants entering waterways taken to cause environmental harm (Aquatic habitat)
- Australia - Australian Capital Territory - Environment Protection Regulation: Pollutants entering waterways taken to cause environmental harm (IRRIG)
- Australia - Australian Capital Territory Environment Protection Regulation Pollutants entering waterways - Agricultural uses (Stock)
- Australia - Australian Capital Territory Environment Protection Regulation Pollutants entering waterways - Domestic water quality
- Australia - New South Wales Hazardous Substances Requiring Health Surveillance
- Australia - Tasmania Hazardous Substances Requiring Health Surveillance
- Australia - Western Australia Hazardous Substances Prohibited for Specified Uses or Methods of Handling
- Australia - Western Australia Hazardous Substances Requiring Health Surveillance
- Australia Exposure Standards
- Australia Hazardous Substances
- Australia Hazardous Substances Requiring Health Surveillance
- Australia National Pollutant Inventory

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Section 15 - REGULATORY INFORMATION

Australia Occupational Health and Safety (Commonwealth Employment) (National Standards) Regulations 1994 - Hazardous Substances Requiring Health Surveillance
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix E (Part 2)
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix I
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 6
GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships
Great Lakes Binational Toxics Strategy Substances (U.S. and Canada) - Level II Substances
IMO IBC Code Chapter 17: Summary of minimum requirements
International Agency for Research on Cancer (IARC) Carcinogens
OECD Representative List of High Production Volume (HPV) Chemicals
OSPAR List of Chemicals for Priority Action
WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water

cadmium hydroxide (CAS: 21041-95-2) is found on the following regulatory lists;

Australia Exposure Standards
Australia National Pollutant Inventory
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix E (Part 2)
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix I
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 6
Great Lakes Binational Toxics Strategy Substances (U.S. and Canada) - Level II Substances

cadmium hydroxide (CAS: 29736-89-8) is found on the following regulatory lists;

Australia Exposure Standards
Australia National Pollutant Inventory
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix E (Part 2)
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix I
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 6
Great Lakes Binational Toxics Strategy Substances (U.S. and Canada) - Level II Substances

nickel (CAS: 7440-02-0) is found on the following regulatory lists;

Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (AQUA/1 to 6 - inorganic chemicals)
Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (Domestic water supply - inorganic chemicals)
Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (IRRIG - inorganic chemicals)
Australia - Australian Capital Territory - Environment Protection Regulation: Ambient environmental standards (STOCK - inorganic chemicals)
Australia - Australian Capital Territory - Environment Protection Regulation: Pollutants entering waterways taken to cause environmental harm (Aquatic habitat)

Australia - Australian Capital Territory - Environment Protection Regulation: Pollutants entering waterways taken to cause environmental harm (IRRIG)
Australia - Australian Capital Territory Environment Protection Regulation Pollutants entering waterways - Agricultural uses (Stock)
Australia - Australian Capital Territory Environment Protection Regulation Pollutants entering waterways - Domestic water quality
Australia - Western Australia Hazardous Substances Prohibited for Specified Uses or Methods of Handling
Australia Exposure Standards
Australia Hazardous Substances
Australia High Volume Industrial Chemical List (HVICL)
Australia National Pollutant Inventory
International Agency for Research on Cancer (IARC) Carcinogens
OECD Representative List of High Production Volume (HPV) Chemicals
WHO Guidelines for Drinking-water Quality - Guideline values for chemicals that are of health significance in drinking-water

nickel(II) hydroxide (CAS: 12054-48-7) is found on the following regulatory lists;

Australia - Victoria Occupational Health and Safety Regulations - Schedule 9: Materials at Major Hazard Facilities (And Their Threshold Quantity) Table 2
Australia Hazardous Substances
Australia National Pollutant Inventory
International Agency for Research on Cancer (IARC) Carcinogens
OECD Representative List of High Production Volume (HPV) Chemicals

nickel(II) hydroxide (CAS: 36897-37-7) is found on the following regulatory lists;

Australia - Victoria Occupational Health and Safety Regulations - Schedule 9: Materials at Major Hazard Facilities (And Their Threshold Quantity) Table 2
Australia National Pollutant Inventory
International Agency for Research on Cancer (IARC) Carcinogens

potassium hydroxide (CAS: 1310-58-3) is found on the following regulatory lists;

Australia Exposure Standards
Australia Hazardous Substances
Australia High Volume Industrial Chemical List (HVICL)
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix E (Part 2)
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Appendix F (Part 3)
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 5
Australia Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP) - Schedule 6
CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP
GESAMP/EHS Composite List of Hazard Profiles - Hazard evaluation of substances transported by ships
IMO IBC Code Chapter 17: Summary of minimum requirements
International Council of Chemical Associations (ICCA) - High Production Volume List
OECD Representative List of High Production Volume (HPV) Chemicals

nylon (CAS: 63428-83-1) is found on the following regulatory lists;

Australia Exposure Standards

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name

cadmium hydroxide

nickel(II) hydroxide

CAS

21041- 95- 2, 29736- 89- 8

12054- 48- 7, 36897- 37- 7

continued...

SANYO NICKEL CADMIUM BATTERY, RECHARGEABLE

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Section 16 - OTHER INFORMATION

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	Endpoint	CR	Adeq TLV
cadmium	0.002 mg/m ³	NA	NA	8	Yes
nickel	0.01 mg/m ³	100	R	8	—

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).

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references.

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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