MSDS Report

NI-MH BATTERY

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Materials Safety Data Sheet (MSDS)

According to ISO11014: 2009
NI-MH BATTERY

Section 1 – Chemical Product and Company Identification

Product Reference:	NI-MH BATTERY
Recommended Uses:	Used in electric tools, flashlights, emergency lights etc.
Restrictions on use:	N/A

Company Identification:

Address: One-LUX limited
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Section 2 – Hazards Identification

Emergency Overview

Physical and chemical hazards: Battery can be overheated by an external source or by internal shorting and develop metal hydroxide mist.

Human health hazards: The battery pack and enclosed cells should not be opened, dissembled, crushed, burned or exposed to high temperatures. Under normal use and handling, the customer has no contact with the internal components of the battery. However, on some bad using conditions (high over charge, inverse charge, external shout circuit…) and in case of a bad functioning, some electrolyte can be removed from the cell by the security vent. Exposure to the ingredients contained within the battery pack could be harmful under some circumstances.

Environmental hazards: N/A

Specific hazards: N/A

UN Classifications: None.

European Labelling in Accordance with EC Directives 1999 / 45 / EC: None.

Important symptoms: See section 11 for more information.
An outline of an anticipated emergency: In case of an accident or if you feel unwell, seek medical advice immediately. See section 4 for more information.

Section 3 – Composition, Information or Ingredients

General Chemical Description: The chemical product is a mixture.

Composition, Information on Ingredients:

Chemical Name	Percentage (By Weight)	CAS No.	EC#	EC Annex I Index #
Nickel (Ni)	16-29%	7440-02-0	231-111-4	028-002-00-7
Alloy Powder	15-28%	N/A	N/A	N/A
Potassium Hydroxide	12-13%	1310-58-3	215-181-3	019-002-00-8
Nylon	1.8-2.2%	N/A	N/A	N/A
Water	5-6%	7732-18-5	231-791-2	Unlisted

Declaration of Ingredients according to 67 / 548 / ECC (If necessary):

CAS No.	EC Annex I Index#	Percentage (by Weight)	Classification
7440-02-0	028-002-00-7	10-25%	Carc.Cat.3: R 40; T: R 48 / 23-43.
1310-58-3	019-002-00-8	12-13%	Xn: R22; C: R35.

Please refer to section 16 for an overview of all R-phrases mentioned here.

Section 4 – First Aid Measures

Caution! No effect under routine handling and use. If exposure to internal materials within cell due to damaged outer metal casing, the following actions are recommended.

Eyes: Rinse immediately with plenty of water during at least 15-30 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses if easily possible. Get medical aid immediately.

Skin: In case of contact, immediately flush skin with copious amounts of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing and shoes before reuse. Get medical aid.

Inhalation: If inhaled, remove from exposure and move to fresh air immediately. Rinse mouth and nose with water. Get medical aid immediately. DO NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Ingestion: Do not induce vomiting. If the injured is fully conscious: wash mouth out with water, then give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Most important acute and delayed symptoms / effects: See section 11 for more information.

Protection of first-aiders: If it is suspected that dust / fume is still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Use proper personal protective equipment as indicated in section 8.

Note to physicians: Treat symptomatically and supportively.

Section 5 – Fire Fighting Measures

Extinguishing Media: Class D-Dry chemical powder, sand is suitable. DO NOT use water.

Special fire fighting procedures: If batteries are on charge, turn off power.

Specific Hazards: Battery can be overheated by an external source or by internal shorting and develop metal hydroxide mist. In fire situations fumes containing, nickel, cadmium, cadmium hydroxide and nickel hydroxide may evolved. Toxic vapour may release in case of fire.

Specific Extinguishing Methods: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Approach fire from upwind to avoid hazardous vapours and toxic decomposition products. Move containers from fire area if this can be done without risk. Prevent run off from fire control dilution from entering streams or drinking water supply.

Protective Equipment: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSDA/NIOSH (approved or equivalent), and full protective gear,

Section 6 – Accidental Release Measures

Person-related Safety Precautions: No action shall be taken involving any personal risk or without suitable training. Review section 5 and section 7 sections before proceeding with clean-up. Use proper personal protective equipment as indicated in section 8. Appropriate ventilation. If electrolyte leaks or spills, do not touch or walk through electrolyte.

Measures for Environmental Protection: Avoid dispersal of spilled material and runoff and contact with soil, water ways, drains and sewers.

Measures for Cleaning / Collection: Remove all sources of ignition or heat. Stop leak if safe to do so. Move containers from spill area. Carefully collect undamaged batteries in a clean, dry and appropriate container for reuse or disposal. If electrolyte leaks or spills, collect all released material in an appropriate container before proper disposal.

Section 7 – Handling and Storage

General Information: This product should be stored handled and used in accordance with good industrial hygiene practices and in conformity with any legal regulation. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period.

Storage: Store in a cool, dry area, but prevent condensation on cell or battery terminals. High temperature may damage the performance of the battery, cause leaking or rusting. Protect from physical damage and short circuits. To avoid risk of fire or explosion, keep sparks and other source of ignition away from the battery. Do not allow metal objects to simultaneously contact both positive and negative terminal of batteries. Do not store batteries on electrically conductive surfaces.

Description	Unit	Standard
Storage Temperature	◦C	-20-+25 (within 1 year) -20-+30 (within 3 month) -20-+40 (within 1 month) -20-+50 (within 1 week)

Handling: Do not dispose in fire, mix with other battery types, charge above specified rate, connect improperly, or short circuit, which may result in overheating, explosion or leakage of cell contents. Accidental short circuit will bring high temperature elevation to the battery as well as shorten the battery life. Be sure to avoid prolonged short circuit since the heat can burn attendant skin and even rupture of the battery cell case. Battery bulk container, coins, metal jewellery, metal workable, metal belt or other equipment for assembly battery may be the source for short circuit. Use effective anti-short circuit measures. Do not use organic solvents or other chemical cleaners on battery. Do not disassembly or decompose. Avoid contacting with water, avoid straight sunlight.

Section 8 – Exposure Controls, Personal Protection

Exposure Limit:

CAS No.	ACGIH (mg / M3)	NIOSH (mg / M3)	OSHIA (mg / M3)
7440-02-0	TLV-TWA 1.5	None listed	PEL-TWA 1
1310-58-3	TLV-TWA 2 (Ceiling)	None Listed	None Listed
7732-18-5	None listed	None listed	None listed

Monitoring Methods: No information found.

Engineering Controls: General room ventilation is sufficient during normal use and handling. Do not install these batteries in sealed, unventilated areas. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

Work Hygienic Practices: Remove jewellery, rings, watches and any other metallic objects while working on battery. All tools should insulate to avoid the possibility of shorting connections. DO NOT lay tools on top of the battery. The work area should be equipped with the corresponding species and quantity of fire equipment and leakage emergency equipment.

Personal Protective Equipment:

- Respirations: Under normal condition of use and handling no special protection is required for sealed battery. Use appropriate respirator if airborne dust or mist concentrations exceed.
- Hand Protection: Under normal condition of use and handling no special protection is required for sealed battery.
- Eyes: Under normal condition of use and handling no special protection is required for sealed battery.
- Skin and Body Protection: Under normal condition of use and handling no special protection is required for sealed battery.

Personal Protection Equipment (In the Event of Battery Case Breakage):

Always wear appropriate safety glasses with side shields or full face shield. Use appropriate gloves. Wear appropriate boots, apron or clothing. Use appropriate respirator.

Other Protection: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processes. Wash hand, forearms and face thoroughly after handling products, before eating, smoking and using the lavatory and at the end of the working period.

Section 9 – Physical and Chemical Properties

Physical State:	Cylindrical battery
Colour:	White
Odour:	Odourless
pH:	N/A
Melting Point:	N/A
Freezing Point:	N/A
Boiling Point:	N/A
Flash Point:	N/A
Explosion Limits:	N/A
Vapour Pressure:	N/A
Vapour Density (air=1):	N/A
Relative Density (water = 1):	N/A
Solubility:	Insoluble in water.

n-octanol/water partition coefficient as log Pow: N/A

Auto-ignition Temperature:	N/A
Decomposition Temperature:	N/A
Odour Threshold:	N/A
Evaporation rate:	N/A
Viscosity:	N/A

Section 10 – Stability and Reactivity

Chemical Stability: Stable under normal condition.

Possibility of Hazardous Reactions: When a battery cell is exposed to an external short-circuit, crushed, modification, high temperature, open flames, it will be the cause of heat generation and ignition.

Conditions to Avoid: Exposed to an external short-circuit, crushed, modification, high temperature, open flames, incompatible materials, direct sunlight and high humidity.

Incompatibilities with Other Materials: Conductive materials, water, seawater, strong oxidizers and acids.

Hazardous Decomposition Products: Oxides of nickel, oxides of cadmium, harmful gas and etc.

Hazardous Polymerization: Will not occur.

Section 11 – Toxicological Information

Toxicological Information:

CAS No.	RTECS#	LD50/LC50
Nickel (7440-02-0)	QR5950000	No data available
Potassium Hydroxide (1310-58-3)	TT2100000	LD50: 273 mg/kg (Oral, rat)
Water (7732-18-5)	ZC0110000	LD50: >90 ml/kg (Oral, rat)

Skin irritation / corrosion:

Composition: CAS# 1310-58-3

- Draize test, rabbit, skin: 50mg / 24H Severe

Eye irritation / Corrosion: No data available

Respiratory or Skin sensitisation: No data available

Reproductive Cell Mutagenicity: No data available

Carcinogenicity:

Composition: CAS# 7440-02-0

- ACGIH: A5-Not suspected as a human carcinogen.
- IARC: Group 2B-Possibly carcinogenic to humans (listed as Nickel, metallic and alloys).
- CA Prop 65: Carcinogen, initial date 10/01/89.
- NTP: Responsibly Anticipated to be human Carcinogens, listed as Nickel compounds and Metallic Nickel.

Composition: CAS# 1310-58-3

- Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65..

Composition: CAS# 7732-18-5

- Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Reproductive Toxicity: No date available.

Specific target organ toxicity-Single exposure: No date available.

Specific target organ toxicity-Repeated exposure: No date available.

Aspiration hazard: No date available.

Potential Health Effects:

- Eye: No effect under routine handling and use for sealed battery. Exposure to the electrolyte contained inside the battery may result in severe irritation and chemical burns.
- Skin: No effect under routine handling and use for sealed battery. Exposure to the electrolyte contained inside the battery or battery particulate may cause result in chemical burns or dermatitis.
- Ingestion: No effect under routine handling and use for sealed battery. Harmful if swallowed the electrolyte contained inside the battery. Exposure to the electrolyte contained inside the battery may cause severe chemical burn to mouth, espphagus and gastrointestinal system.
- Inhalation: No effect under routine handling and use for sealed battery. If battery is broken, inhale fume / dust may cause irritation, chemical burns or lung oedema.

Section 12 - Ecological Information

Ecological Toxicity:	Not available.
Persistence and degradability:	Not available
Bioaccumulative Potential:	Not available
Mobility in Soil:	Not available
Water Pollution Classification, WGK:	Not available
Other adverse effects:	Not available
Other Information:	If the battery is discarded into the environment, the harmful contents inside may be dangerous.

Section 13 – Disposal Considerations

The generation of waste should be avoided or minimized wherever possible. Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Disposal should be in accordance with applicable region, national and local laws and regulation.

Do not incinerate, since batteries may explode at excessive temperature. Refer to section 7 – Handling and Storage and Section 8 – Exposure Controls / Personal Protection for additional handling information and protection of employees.

Section 14 – Transport Information

Sealed Nickel-metal hydride battery packs are considered to be "Battery Dry" and are not subject to dangerous goods regulations for purposes of transportation by International Civil Aviation Organization (ICAO), International Air Transport Association (IATA), the International Maritime Dangerous Goods Regulations (IMDG CODE), and the Recommendations on TRANSPORT OF DANGEROUS GOODS model Regulations (UN TDG).

Air shipments must comply with ITATA DGR Special Provision A123, which includes the requirement that "Any electrical battery or battery powered device, equipment or vehicle having the potential of dangerous evolution of heat must be prepared for transport so as to prevent a short-circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals; or, in the case of equipment, by disconnection of the battery and protection of exposed terminals) and accidental activation". Under IATA regulations, effective January 1, 2009, any waybill accompanying a consignment of these batteries must contain the words "Non-restricted" and "Special Provision A123".

Ocean shipments and land shipments must comply with IMDG CODE and UN TDG Special Provision 304, which includes the requirement that "Batteries, dry, containing corrosive electrolyte which will not flow out of the battery if the battery case is cracked are not subject to these regulations provided the batteries are securely packed and protected against short-circuits. Examples of such batteries are: Alkali Manganese, Zinc-Carbon, Nickel-Metal Hydride and Nickel-Cadmium Batteries".

The requirements for shipping these batteries, in all modes of transportation, are that they be separated from each other to prevent short-circuits and to prevent movement that could lead to short-circuits. Products must also be packed in strong packaging that can withstand the rigors normal to transportation. These products are labelled in accordance to requirements for cargo shipments of Nickel-Cadmium batteries and cells.

Section 15 – Regulatory Information

Regulatory Information: Reference to the local, national, US, EU, CA and international regulations.

CAS No.	TSCA	DSL/NDSL	IECSC	KECI
7440-02-0	Listed	Listed in DSL	Listed	KE-25818
1310-58-3	Listed	Listed in DSL	Listed	KE-29139
7732-18-5	Listed	Listed in DSL	Listed	KE-35400

Section 16 – Additional Information

Issue Time: 2015-03-01
Issue Department: Quality Department

Notice to reader
To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes and liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist. List of all R phrases mentioned in the document:

Carc Cat 3: Category 3 carcinogens
Xn: Harmful
C: Corrisive
T: Toxic
N: Dangerous for the environment
R 22: Harmful if swallowed
R 48/23: Toxic: danger of serious damage to health by prolonged exposure through inhalation.
R 35: Causes severe burns
R 40: Limited evidence of a carcinogenic effect
R 43: May cause sensitization by skin contact

Other Information:
ACGIH: (American Conference of Governmental Industrial Hygienists), CAS: (Chemical Abstracts Services), DSL: (the Domestic Substances List of Canada), EC: (European Commission), IARC: (International Agency for Research on Cancer), IATA: (International Air Transport Association), IECSE: (Inventory of Existing Chemical Substances in China), IMDG: (International Maritime Dangerous Goods), KECI (KE-NO): (Korea Existing Chemicals Inventory), LC50: (Lethal concentration, 50 percent kill), LD50: (Lethal dose, 50 percent kill), NDSL: (the Non-domestic Substances List of Canada), NIOSH: (US National Institute for Occupational Safety and Health), NTP☹US National Toxicology Program), OSHA: (US Occupational Safety and Health), PC-STEL: (Permissible concentration-time weighed average), PC-TWA: (Permissible concentration-short time exposure limit), PEL: (Permissible Exposure Level), REL: (Recommended Exposure Limit, RTECS: (Registry of Toxic Effects of Chemical Substances), STEL: (Short Term Exposure Limit), TDG: (Recommendations on the TRANSPORT OF DANGEROUS GOODS model Regulations), TSCA: (Toxic Substances Control Act of USA), TWA: (Time Weighted Average), TLV: (Threshold Limit Value).