



MATERIAL SAFETY DATA SHEET

Date : 03/01/2011

Reference No.: CES-32011

1. Identification of the substance/preparation and of the company/undertaking

Identification of the product

Product name : Ni-MH Battery
Chemical System: Nickel and Metal Hydride
Model: Cylindrical, Prismatic and coin Type Cells
Designated for RECHARGE? Yes ___ No

Manufacturer/supplier identification

Company : Contour Energy Systems
Contact for information : 1300 W. Optical Drive, Suite 300
Azusa, CA 91702
Emergency telephone No. : 626-610-0660

2. Composition/information on ingredients

Ingredient	Percent	CAS Index No./EC No.	Molar mass	Molecular formula	Symbol
Nickel Hydroxide	29.1%	12054-48-7		Ni(OH) ₂	
Cobalt Oxide	2.1%	1307-96-6		CoO	
Nickel Powder	0.2%	7440-02-0		Ni	
Alloy Powder	42.4%	N/A		MH	
Potassium Hydroxide	0.7%	1310-58-3		KOH	
Lithium Hydroxide	0.1%	1310-65-2		LiOH	
Foamed Nickel	11.6%	7440-02-0		Ni	
Polypropylene	7.1%	9003-07-0		N/A	
Steel	6.7%	7439-89-6		N/A	

3. Hazards identification

Routes of Entry:

Inhalation - Yes
Skin - Yes
Ingestion - Yes

Health Hazards (Acute and Chronic):

These chemicals are contained in a sealed can. Risk of exposure occurs only if the battery is mechanically or electrically abused. The most likely risk is an acute exposure when the gas release vent works. KOH solution has slight toxicity and can irritate skin and eyes.

Carcinogenicity:

NTP: None IARC Monograph: None OSHA Regulated: None

Medical Conditions Generally Aggravated by Exposure:
An acute exposure will not generally aggravate any medical condition.

4. First aid measures

After skin contact :	In case of skin contact with contents of battery, flush immediately with water. If irritation persists, get medical help.
After eye contact :	For eye contact, flush with copious amounts of water for 15 minutes. Do not inhale leaked material. If irritation persists, get medical help.
Inhalation:	If potential for exposure to fumes or dusts occurs, remove immediately to fresh air and seek medical attention.

5. Fire-fighting measures

Extinguishing Media:	Any class of extinguishing medium may be used on the batteries or their packing material.
Flammable Limits:	Not available
Special Fire Fighting Procedures:	Exposure to temperatures of above 212°F can cause venting of the liquid electrolyte. Internal shorting could also cause venting of the electrolyte. There is potential for exposure to iron, nickel, cobalt, rare earth metals (cerium, lanthanum neodymium, and praseodymium), manganese, and aluminum fumes during fire; use self-contained breathing apparatus.

6. Accidental release measures

The preferred response is to leave the area and allow the batteries to cool and the vapors to dissipate. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.

7. Handling and storage

Storage: Store in a cool, well ventilated area. Elevated temperatures can result in shortened battery life.

Mechanical Containment: Never seal or encapsulate nickel and metal hydride batteries.

Do not obstruct safety release vents on batteries. Encapsulation (potting) of batteries will not allow cell venting and can cause high pressure rupture.

Handling: Accidental short circuit for a few seconds will not seriously affect the battery. However, this battery is capable of delivering very high short circuit currents. Prolonged short circuits will cause high cell temperatures which can cause skin burns. Sources of short circuits include jumbled batteries in bulk containers, metal jewelry, and metal covered tables or metal belts used for assembly of batteries into devices.

If soldering or welding to the battery is required, use of tabbed batteries is recommended. If this cannot be done, consult your Contour Energy Systems representative for proper precautions to prevent seal damage or short circuit.

Do not open battery. The negative electrode material may be pyrophoric. Should an individual cell from a battery become disassembled, spontaneous combustion of the negative electrode is possible. This is much more likely to happen if the electrode is removed from its metal container. Here can be a delay

between exposure to air and spontaneous combustion.

Charging: This battery is made to be charged many times. Because it gradually loses its charge over a few months, it is good practice to charge battery before use. Use recommended charger. Improper charging can cause heat damage or even high pressure rupture. Observe proper charging polarity.

Labeling: If the Contour Energy label or package warnings are not visible, it is important to provide a package and/or device label stating:

WARNING: CHARGE ONLY WITH SPECIFIED CHARGERS ACCORDING TO DEVICE MANUFACTURER'S INSTRUCTIONS. DO NOT OPEN BATTERY, DISPOSE OF IN FIRE OR SHORT CIRCUIT - MAY IGNITE, EXPLODE, LEAK OR GET HOT CAUSING PERSONAL INJURY.

Where accidental ingestion of small batteries is possible, the label should state:

WARNING: (1) KEEP AWAY FROM SMALL CHILDREN. IF SWALLOWED, PROMPTLY SEE DOCTOR; (2) CHARGE ONLY WITH SPECIFIED CHARGERS ACCORDING TO DEVICE MANUFACTURER'S INSTRUCTIONS. DO NOT OPEN BATTERY, DISPOSE OF IN FIRE OR SHORT CIRCUIT - MAY IGNITE, EXPLODE, LEAK OR GET HOT CAUSING PERSONAL INJURY.

Disposal: Dispose in accordance with all applicable federal, state, and local regulations.

8. Exposure controls/personal protection

Specific control parameter :

Personal protective equipment :

Respiratory protection Not necessary under conditions of normal use.

(Specify Type) :

Ventilation: Not necessary under conditions of normal use.

Protective Gloves: Not necessary under conditions of normal use. Use neoprene or natural rubber gloves if handling an open or leaking battery.

Eye protection: Not necessary under conditions of normal use. Wear safety glasses with side shields if handling an open or leaking battery.

Other Protective Not necessary under conditions of normal use.

(Clothing or Equipment):

Open Battery Storage: Battery should not be opened. Should a cell become disassembled, the electrode should be stored in a fireproof cabinet, away from combustibles.

9. Physical and chemical properties

Appearance:

Ni(OH)₂ is an apple green, odorless powder.

CoO is a black, odorless powder.

MH is a black, odorless powder.

KOH is colorless, odorless liquid.

Specific Gravity: (H₂O=1): Ni(OH)₂: 5.15

Melting Point: (°C): Ni(OH)₂ decomposes at 230 deg. C

10. Stability and reactivity

Stability: Stable

Conditions to Avoid: Do not heat or disassemble.

Hazardous Decomposition or By-products: N/A
Hazardous polymerization will not occur.

11. Toxicological information

Under normal conditions of use, the battery is hermetically sealed.

- Ingestion:** Swallowing a battery can be harmful. Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.
- Inhalation:** Contents of an open battery can cause respiratory irritation. Hypersensitivity to nickel can cause allergic pulmonary asthma.
- Skin Contact:** Contents of an open battery can cause skin irritation and/or chemical burns. Nickel, nickel compounds, cobalt, and cobalt compounds can cause skin sensitization and an allergic contact dermatitis.
- Eye Contact:** Contents of an open battery can cause severe irritation and chemical burns.

Note: Nickel, nickel compounds, cobalt, and cobalt compounds are listed as possible carcinogens by International Agency for Research on Cancer (IARC) or National Toxicology Program (NTP).

12. Ecological information

Ecotoxic effects : N/A
Further ecological data : N/A

13. Disposal considerations

Contour Energy Systems encourages battery recycling. Our Ni-MH batteries are recyclable through the WEEE (Waste Electrical and Electronic Equipment). For information, see website www.valpak.co.uk.

DO NOT INCINERATE or subject battery cells to temperatures in excess of 212 F. Such treatment can vaporize the liquid electrolyte causing cell rupture. Incineration may result in cadmium emissions.

14. Transport information

Contour Energy Systems sealed Nickel Metal Hydride batteries are considered to "dry" batteries and not subject to hazardous materials (dangerous goods) regulations for the purpose of transportation by the U.S. Department of Transportation (DOT), the International Civil Aviation Organization (ICAO), the International Air Transport Association (IATA) or the International Maritime Organization (IMO).

The only DOT requirement for shipping Nickel Metal Hydride batteries are contained in Special Provision 130 which states, "*Batteries, dry, sealed, n.o.s*" are hermetically sealed and generally utilize metals (other than lead) and/or carbon as electrodes. These batteries are typically used for portable power applications. The rechargeable (and some non-rechargeable) types have gelled alkaline electrolytes (rather than acidic) making it difficult for them to generate hydrogen or oxygen when overcharged and

therefore, differentiating them from non-spillable batteries. A similar requirement is contained in 49 CFR 172.102 of the U.S. DOT hazardous materials regulations.

The IATA Dangerous Goods Regulations contain a similar requirement in Special Provision A123 which states, *“This entry applies to Batteries, electric storage, not otherwise listed in Subsection 4.2 – List of Dangerous Goods. Examples of such batteries are: alkali-manganese, zinc-carbon, nickel-metal hydride and nickel-cadmium batteries. Any electrical battery or battery powered device, equipment or vehicle having the potential of a dangerous evolution of heat must be prepared for transports so as to prevent short-circuit and accidental activation”*.

By ocean the IMO regulates them under Special Provision 295-304. The IMDG code is UN 3028. These Special Provisions have requirements which are similar to the requirements found in Special Provision 130 of the DOT.

Therefore, the overriding provisions that govern shipments of dry batteries are Special Provision 130, Special Provision A123 and 49 CFR 172.102 in the U.S. hazardous materials regulations. Any person that offers dry batteries or products containing dry batteries to a carrier that does not comply with Special Provisions 130, Special Provision A123, 49 CFR 172.102 or Special Provision 295-304 may be subject to civil penalties.

15. Regulatory information

The transportation of dry cell batteries manufactured or sold by Contour Energy Systems is not regulated by the China Department of Transportation or the major international regulatory bodies.
