

# MATERIAL SAFETY DATA SHEET

Date : Jan 1<sup>st</sup>, 2017  
Reference No.: TDR-W5-872

## 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 : Tdrforce Technology Co., Ltd..  
Contact for information : Room1508,city commercial centre,No.129 wuyi north road,Fuzhou,China  
Emergency telephone No. : 0086-591-87607465

## 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) <sub>2</sub>	
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.

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#### 4. First aid measures

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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.

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#### 5. Fire-fighting measures

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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.

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#### 6. Accidental release measures

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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.

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#### 7. Handling and storage

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**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 TDRFORCE Technology Co.,Ltd 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

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charging can cause heat damage or even high pressure rupture. Observe proper charging polarity.

**Labeling:** If the TDRFORCE 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.

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## 8. Exposure controls/personal protection

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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.

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## 9. Physical and chemical properties

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### Appearance:

Ni(OH)<sub>2</sub> 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:** (H<sub>2</sub>O=1): Ni(OH)<sub>2</sub>: 5.15

**Melting Point:** (°C): Ni(OH)<sub>2</sub> decomposes at 230 deg. C

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## 10. Stability and reactivity

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Stability: Stable

Conditions to Avoid: Do not heat or disassemble.

Hazardous Decomposition or By-products: N/A

Hazardous polymerization will not occur.

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## 11. Toxicological information

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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).

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## 12. Ecological information

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

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## 13. Disposal considerations

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TDRFORCE encourages battery recycling. Our Ni-MH batteries are recyclable through the Rechargeable Battery Recycling Corporation's (RBRC) **Charge Up to Recycle! Program**. For information call 1-800-8-BATTERY or see their website at [www.rbrc.org](http://www.rbrc.org). Ni-MH batteries must be handled in accordance with all applicable state and federal laws and regulations.



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.

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## 14. Transport information

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In general, all batteries in all forms of transportation (ground, air, or ocean) must be packaged in a safe and responsible manner. Regulatory concerns from all agencies for safe packaging require that batteries be packaged in a manner that prevents short circuits and be contained in 'strong outer packaging' that prevents spillage of contents. All original packaging for TDRFORCE Nickel Metal Hydride batteries has been designed to be compliant with these regulatory concerns.

TDRFORCE Nickel Metal Hydride batteries (sometimes referred to as 'dry cell' batteries) are not defined as hazardous materials (dangerous goods) under International Air Transport Association (IATA) Dangerous Goods Regulations, International Civil Aviation Organization (ICAO) Technical Instructions and U.S. Department of Transportation (DOT) hazardous materials regulations (49 CFR). Nickel Metal Hydride batteries are defined as dangerous goods under the IMDG code. For air and ground transportation, these batteries are not subject to the dangerous goods regulations as they are compliant with the requirements contained in the following special provisions.

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Regulatory Body	Special Provisions
ADR	295-304, 598
IMDG	UN3496 SP 963
UN	UN3028 Provisions 295-304

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**Tdrforce Technology Co., Ltd.**

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US DOT	49 CFR 172.102 Provision 130
IATA	A199
ICAO	UN3028 Provisions 295-304

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In addition, the IATA Dangerous Goods Regulations and ICAO Technical Instructions require the words 'not restricted' and the Special Provision number A199 be provided on the air waybill, when an air waybill is issued.

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**15. Regulatory information**

The transportation of dry cell batteries manufactured or sold by TDRFORCE Technology Company is not regulated by the China Department of Transportation or the major international regulatory bodies.

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**16. Other information**

**Make people :** Professional post : R&D Engineer                      Name(sign) : Jacky Lee  
**Make unit :** Name : R&D Department                                      Phone : 0086-20-39196888  
Address : R&D Dept., Panyu Plant.,

**Date of issue :** 2017/01/01

**DISCLAIMER :**                      **The information and recommendations set forth are made in good faith and believed to be accurate as of the date of preparation. Tdrforce Technology Co.,Ltd makes no warranty, expressed or implied, with respect to this information and disclaims all liabilities from reliance on it.**