

Material -Safety -Data Sheet(MSDS)

for

JYH NiMH Batteries

Single cells and multi-cell battery packs

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Reference no.:MSDS-JYH06-NiMH

1. Product and Supplier Identification

Product name: JYH NiMH Battery
Type: Sealed rechargeable nickel-metal-hydride battery
Models / types: Prismatic and round cells
Electrochemical system: Nickel hydroxide (positive electrode)
Metal hydroxide (negative electrode)
Potassium hydroxide (electrolyte)

Supplier:

JYH Battery Company Limited

Address: Unit 1610, Yuen Long Trading Centre, 33 Wang Yip Street West, Yuen Long,
New Territories, Hong Kong.

2. Hazards Identification

The rechargeable NiMH batteries described in this Product Safety Data Sheet are sealed units which are not hazardous when used according to the recommendations of the manufacturer and as long as their integrity is maintained.

Do not short circuit, puncture, incinerate, crush, force discharge or expose to temperatures above the declared operating temperature range of the product. Risk of fire or explosion.

Under normal conditions of use, the active materials and liquid electrolyte contained in the cells and batteries are not exposed to the outside, provided the battery integrity is maintained and seals remain intact. Risk of exposure only in case of abuse (mechanical, thermal, electrical) which leads to the activation of safety valves and/or the rupture of the battery container. Electrolyte leakage or battery vent/explosion/fire may follow, depending upon the circumstances.



3. Composition and Information on Ingredients

Each cell consists of a hermetically sealed metallic container containing a number of chemicals and materials of construction of which the following could potentially be hazardous upon release.

Ingredient	Content	CAS No.	ACGIH (TLV)	OSHA (PEL)
Nickel (Ni) (powder)	30 - 45%	7440-02-0	1 mg/m ³ TWA	1 mg/m ³ TWA
Nickel Hydroxide Ni(OH) ₂	20 - 30%	12054-48-7	1 mg/m ³ TWA	1 mg/m ³ TWA
Cobalt (Co)	1 - 5%	7440-48-4	0.1 mg/m ³ TWA (as Co)	0.1 mg/m ³ TWA (as Co)
Manganese (Mn)	1 - 3%	7439-96-5	0.2 mg/m ³ TWA (asMn)	5 mg/m ³ dust ceiling limit
Zinc (Zn)	< 3%	7440-66-6	10 mg/m ³ TWA total dust	15 mg/m ³ TWA total dust
Aluminum (Al)	0 - 2%	7429-90-50	10 mg/m ³ metal dust	15 mg/m ³ dust 5 mg/m ³ respirable fraction
Lanthanum (Ln)	< 10%	7439-91-0	none established	none established
Cerium (Cer)	< 10%	7440-45-1	none established	none established
Neodymium (Nd)	< 10%	7440-00-8	none established	none established
Potassium Hydroxide (KOH)	5 - 10%	1310-58-3	2 mg/m ³ ceiling limit	none established
Sodium Hydroxide (NaOH)	0 - 5%	1310-73-2	2 mg/m ³ ceiling limit	2 mg/m ³ TWA
Lithium Hydroxide (LiOH)	0 - 4%	1310-65-2	none established	none established
Stainless Steel (Fe)	15 - 30%	7439-89-6	none established	none established

4. First Aid Measures

In case of accumulator breakage or burst, please evacuate employees from the contaminated area and ensure maximal ventilation in order to break-up corrosive gas, smoke and unpleasant odours.

If it occurs, by accident, following measures must be taken:

Inhalation: Provide fresh air. In severe cases obtain medical attention.

Skin Contact: Wash off skin thoroughly with water. Remove contaminated clothing and wash before re-use. In severe cases obtain medical attention.



Eye Contact: Irrigate thoroughly with water for at least 15 minutes. Lifting upper and lower lids, until no evidence of the chemical remains. Obtain medical attention.

Ingestion: Wash out mouth thoroughly with water. Do not induce vomiting or give food or drink. Seek medical attention immediately.

Further treatment: All cases of eye contamination, persistent skin irritation and casualties who have swallowed this substance or been affected by breathing its vapours should be seen by a doctor.

5. Fire Fighting Measures

If fire or explosion occurs when batteries are on charge, shut off power to charger.

In case of fire where nickel metal hydride batteries are present, apply a smothering agent such as METL-X, sand, dry ground dolomite, or soda ash, or flood the area with water. A smothering agent will extinguish burning nickel metal hydride batteries. Water may not extinguish burning batteries but will cool the adjacent batteries and control the spread of fire. Burning batteries will not burn themselves out. Virtually all fires involving nickel metal hydride batteries can be controlled with water. When water is used, however, hydrogen gas may evolve. In a confined space, hydrogen gas can form an explosive mixture. In this situation, smothering agents are recommended.

Fire fighters should wear self-contained breathing apparatus. Burning nickel metal hydride batteries can produce toxic fumes including oxides of nickel, cobalt, aluminum, lanthanum, cerium and neodymium

6. Accidental Release Measures

Remove personnel from area until fumes dissipate. Do not breathe vapours or touch liquid with bare hands. Provide sufficient room ventilation if required.

If the skin has come into contact with the electrolyte, it should be washed thoroughly with water.

Use neoprene or natural rubber gloves and protective glasses, if handling an open or leaking battery. Battery materials should be collected in a leak-proof container and disposed of as Special Waste in accordance with local regulations.

7. Precautions for safe Handling and Use

Storage: Store in a cool (preferable below 25°C), well ventilated area, away from moisture, sources of heat, and open flames.

Elevated temperatures can result in shortened battery life. Temperatures above 70°C may result in battery leakage and rupture.

Keep adequate clearance between walls and batteries.

Since short circuit can cause burn, leakage and rupture hazard, keep batteries in original packaging until use and do not jumble them.



Handling: Do not crush, pierce, short (+) and (-) battery terminals with conductive (i.e. metal) goods, which would end up into excessive heating.

Do not directly heat or solder. Do not throw into fire.

Do not mix batteries of different types and brands. Do not mix new and used batteries. Keep batteries in non conductive (i.e. plastic) trays.

Do not disassemble, mutilate or mechanically abuse cells and batteries.

In order to prevent seal or safety vent damage, never solder the batteries directly at the battery terminals.

Charging: This battery is made to be charged many times. Use only specified charger.

Follow manufacturer data in respect of charge current and charge time.

Note correct polarity. Improper charging can cause heat damage or even high pressure rupture.

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

8. Special Protection Information

Ventilation Requirements: Not necessary under normal conditions. Room ventilation may be required in areas where there are open or leaking batteries.

Respiratory Protection: Not necessary under normal conditions. Avoid exposure to electrolyte fumes from open or leaking battery. In all fire situations use self-contained breathing apparatus

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

Hand Protection: Not necessary under normal conditions. Use neoprene or natural rubber gloves if handling an open or leaking battery

9. Physical and Chemical Properties

Note: The following points are not applicable unless in case of leaking or damaged batteries with exposed internal components.

Appearance: Nickel plated steel cylindrical cell, eventually sleeved.

Odour: Odourless (unless in case of damaged product with leaking electrolyte)

Flashpoint: Not applicable

Flammability: Not applicable

Relative density: > 2 g/cm³

Specific energy: 30...90Wh/kg

Temperature range: Usage recommended between -40°C and +70°C.

10. Stability and Reactivity



Product is stable under conditions described in Section 7.

Conditions to avoid: Heat above 70° or incinerate. Deform. Mutilate. Crush. Pierce. Disassemble. Short circuit. Expose over a long period to humid conditions.

Materials to avoid: Strong mineral acids, alkali solutions, strong oxidising materials and conductive materials.

Hazardous decomposition products: Electrolyte solution is corrosive to all human tissues and will react violently with many organic chemicals. Electrolyte solution reacts with zinc, aluminum, tin and other materials releasing flammable hydrogen gas.

11. Toxicological Information

Nickel metal hydride batteries are not hazardous waste. Under normal conditions of use, Ni-MH batteries are non-toxic.

In case of can opening or destruction, the following substances can be released:

Substances			Hazards		
Name	N° EC N° CAS N° EINEC	Symbol	Effects	Dust exposure limits	Carcinogenicity mutagenicity protoxicity
Nickel	028-002-00-7 7440-02-0 231-111-4	Ni	Xn	Nocif	R 40-43 R 17
Nickel-Hydroxyde	028-008-x* 12054-48-7 235-008-5	Ni(OH) ₂	LD50/oral/rat: 1600mg/kg	VME: 1000µg/m ³ VLE: /	Occupational
Cobalt-Hydroxyde	- 21041-93-0 244-166-4	Co(OH) ₂	LD50/oral/rat: 795mg/kg	VME: 100µg/m ³ VLE: /	/
Alkaline-Hydroxydes	019-002-00-8 1310-58-3	KOH NaOH LiOH	LD50/oral/rat: 365mg/kg	KOH VME: 2mg/m ³ NaOH VME: 2mg/m ³ LiOH VME: 25µg/m ³	/

12. Ecological Information

The sealed NiMH cells as a product are not presenting ecotoxicological hazards. In case of product destruction or opening, the substances described in paragraph 11 can come in contact of the environment. The metals content in a NiMH battery are toxics for the environment.

If not recycled, it must be disposed of in accordance with all state and local regulations.



13. Disposal Considerations

USA: NiMH batteries are classified by the federal government as non-hazardous waste and are safe for

disposal in the normal municipal waste stream. These batteries, however, do contain recyclable materials and are accepted for recycling by the Rechargeable Battery Recycling Corporation's (RPBC) Battery Recycling Program. Please go to the RPBC website at www.rbrbc.org (www.call2recycle.org) for additional information.

In the European Union, manufacturing, handling and disposal of batteries is regulated on the basis of the DIRECTIVE 2006/66/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC.

Customers find detailed information on disposal in their specific countries using the web site of the European Portable Batteries Association (http://www.epbaeurope.net/legislation_national.html)

Importers and users outside EU should consider the local laws and rules.

In order to avoid short circuit and heating, used nickel metal hydride cylindrical cells and batteries should never be stored or transported in bulk. Proper measures against short circuit are:

- Storage of batteries in their original packaging
- Coverage of the terminals

14. Transport Information

JYH nickel metal hydride cylindrical cells/batteries are considered to be "dry cell" batteries and are unregulated of transportation by the U.S. Department of Transportation (DOT), International Civil Aviation Administration (ICAO), International Air Transport Association (IATA), the "Accord Européen Relatif au Transport International des Marchandises Dangereuses par Route" (ADR) and the "Règlement concernant le transport international ferroviaire de marchandises Dangereuses" (RID).

IATA DGR: Special Provision A123: "Examples of such batteries are: alkali-manganese, zinc-carbon, nickel metal hydride and nickel-cadmium batteries. Any electrical battery... having the potential of a dangerous evolution of heat must be prepared for transport as to prevent (a) a short-circuit (e.g. in the case of batteries, by the effective insulation of exposed terminals...) is forbidden from transport; and (b) accidental activation. The words "Not restricted" and the Special Provision number must be included in the description of the substance on the Air Waybill as required by 8.2.6, when an Air Waybill is issued.

The consignment is fully described by Proper Shipping Name is not classified as dangerous under the IATA DANGEROUS GOODS REGULATIONS. Also the consignment is packed with protection of exposed terminals so as to prevent the potential danger by short-circuiting, according to Special Provision A123 under IATA DANGEROUS GOODS REGULATION – 57th Edition 2016.



EU (ADR/RID): Chapter 3.2 Table A: "Batteries, nickel-metal-hydride, UN3496, not subject to ADR"

USA: 49 CFR § 172.102 Special Provisions 130 and 340: Nickel metal hydride cylindrical cells/batteries are not subject to requirements of this subchapter except for the following... "Batteries and battery-powered devices containing batteries must be prepared and packaged for transport in a manner to prevent: (1) A dangerous evolution of heat; (2) Short circuits, including but not limited to the following

methods:

- a) Packaging each battery or each battery-powered device when practicable, in fully enclosed inner packagings made of non-conductive material
- b) Separating or packaging batteries in a manner to prevent contact with other batteries, devices or conductive materials (e.g. metal) in the packagings"...

International Maritime Organization (IMO), IMDG Code: Regulated as "Batteries, nickel-metal hydride, UN 3496", Special Provision 963: "...nickel-metal hydride cells or batteries shall be securely packed and protected from short-circuit. They are not subject to other provisions of this Code provided that they are loaded in a cargo transport unit in a total quantity of less than 100kg gross mass. When loaded in a cargo transport unit in a total quantity of 100kg gross mass or more, they are not subject to other provisions of this Code except those of 5.4.1, 5.4.3 and column (16) of the dangerous goods list in Chapter 3.2."

15. Regulatory Information

Survey of Standards:	Regulatory Body	Special Provisions
	ADR	295 - 304, 598
	IMDG	UN 3496 - Special Provision SP 963
	UN	UN 3028 Provisions 295 - 304
	US DOT	49 CFR 172.102 Provision 130
	IATA	A123
	ICAO	UN 3028 Provisions 295 – 304

Ni-MH batteries are submitted to the European Community Directive 91-157/CE for recycling.
Substances contained are submitted to the REACH 06-1907/CE regulation

16. Other Information

This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein.

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