



BYD MATERIAL/PRODUCT SAFETY DATA SHEET

Part number: FNB-83 for Vertex Standard

1. Identification of the Substance or Preparation and Company

Product	Nickel Metal Hydride cells and batteries
Manufacturer	BYD Company Limited
Production sites	Yan An Road, KuiChong, Longgang, Shenzhen, 518119, P.R.China Tel: 86-755-89888888 Fax: 86-755-89773959
Emergency telephone number	Tel: 86-755-89888888

2. Composition & Information on Ingredients

Ingredients	Content	CAS No.	Classification
Nickel hydroxide	≈25 -- 40%	12054-48-7	Carc. Cat. 3; R40 Xn; R20/22 R43 N; R50-53
Metal Hydride Alloy	≈25 -- 40%		
Cobalt oxide	≈3%	1307-96-6	Xn; R22 R43 N; R50-53
Potassium hydroxide	≈6%	1310-58-3	Xn; R22 C; R35
Iron	≈15~25%	7439-89-6	---

3. Hazards Identification

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

Under normal conditions of use, the electrode materials and liquid electrolyte they contain are not exposed to the outside, provided the battery integrity is maintained and seals remain intact.

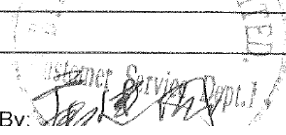
Effects of Overexposure

Eye Effects: In the case of a fire or cell rupture the electrolyte solution inside battery is extremely corrosive to eye tissue and may result in permanent blindness. Contact with nickel oxide may cause minor irritation.

Skin Effect: Contact with electrolyte solution inside battery may cause serious burns to skin tissues. Contact with nickel compounds may cause result in chronic eczema or nickel itch.

Ingestion: Ingestion of electrolyte solution causes tissue damage to throat area and gastro/respiratory tract. Ingestion of nickel compounds causes nausea and intestinal disorders.

Inhalation: No exposure possible except in the case of fire or abuse. Effects of inhalation of nickel compounds vary from mild irritation of nasal mucous membranes to damage of lung tissues proper.

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4. First Aid measures

The information below refers to exposure to the ingredients.

Battery Electrolyte:

Eye Contact: Flush with plenty of water for at least 15 minutes if abuse causes safety vents to activate. Get immediate medical attention.

Skin Contact: Remove contaminated clothing and flush effected areas with plenty of water for at least 15 minutes. Wash with soap and water.

Ingestion: Do not induce vomiting. Dilute by giving water. If available give several glasses of mild. Get immediate medical attention. Do not give anything by mouth to an unconscious person. Call a physician or Poison Control Centre immediately

Inhalation: Remove to fresh air. Give oxygen or artificial respiration if needed. Get immediate medical attention.

Further treatment: Show this safety data sheet to the doctor in attendance.

5. Fire-fighting measures

Suitable extinguishing media

Dry powder, carbon dioxide (CO₂), sand.

Extinguishing media which must not be used for safety reasons

Water, water spray.

Specific hazards

Risk of receptacle bursting.

Special protective equipment for firefighters

In the event of fire, wear self contained breathing apparatus. Wear personal protective equipment.

Hazardous decomposition products

Nickel and cobalt compounds.

6. Accident release measures

The information below refers to exposure to the ingredients.

Personal precautions

Remove personnel from area until fumes dissipate. Use personal protective equipment. Avoid contact with skin and eyes.

Environmental precautions

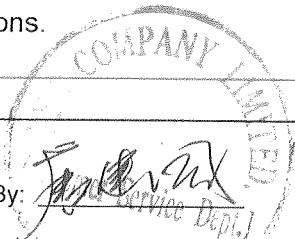
Prevent further leakage or spillage if safe to do so.

Do not allow material to contaminate ground water system.

Methods for cleaning up

Pick up and transfer to properly labelled containers. Dispose of in accordance with local regulations.

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7. Handling and Storage

Handling	The cells and batteries manufactured from them may be highly charged and are capable of high-energy discharge. Care should be taken to handle cells properly to avoid shorting or misuse that will result in rapid uncontrolled electrical, chemical, or heat energy release. Do not short circuit. Do not dispart cell. Do not allow an exposed flame or spark to come near the cells. Do not mix new and used batteries. Keep batteries in non conductive trays.
Storage	The cells and batteries shall not be stored in high temperature, the maximum temperature is 60°C (less than one month), otherwise the cells and batteries maybe leakage. Besides, the cells and batteries shall be protected from short circuit and protected from movement that could result in short circuit.
Other	Follow manufacturer's recommendations regarding maximum recommended currents and operating temperature range.

8. Exposure Controls & Personal Protection

Exposure Limit Values	Nickel hydroxide, 0.5mg(NI)/m3 TWA Potassium Hydroxide. 2mg/m3 MAC
Respiratory protection	Use NOISH/MSHA approved respirator if cell broken open during a fire to maintain exposure levels below the TWA for hydrogen absorbed alloy and nickel compounds.
Hand protection	If exposure to electrolyte solution, or dried salts is likely, use any water-insoluble non-performance glove, i.e., synthetic rubber. Do not use leather or wool.
Eye protection	Use splash goggles or face shield if cell activates due to abuse.
Other	Rubber apron or equivalent if exposure to electrolyte solution is likely.

9. Physical and Chemical Properties

Appearance	Sealed battery
Odour	Odourless
Color	N/A
PH	N/A
Flash Point	N/A unless individual components exposed
Flammability	N/A unless individual components exposed
Rlatetive density	N/A unless individual components exposed
Solutbility(Water)	N/A unless individual components exposed
Aolubility(other)	N/A unless individual components exposed

10. Stability and Reliability

Stability	Stable under normal conditions
Condition to avoid	Keep away from heat and sources of ignition
Material to avoid	Aluminum, zinc and other active metals, acid, chlorinated and aromatic hydrocarbons, nitro-carbons, halocarbons. Water.
Hazardous Polymerization	Hazardous Polymerization does not occur
Hazardous decomposition Products	Nickel oxide, and potassium hydroxide



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11. Toxicological Information

The information below refers to exposure to the ingredients	
Acute toxicity	Nickel hydroxide LD50/oral/rat = 1500mg/kg, potassium hydroxide LD50/oral/rat = 273mg/kg
Local effects	Causes severe burns. Risk of serious damage to eyes. Harmful by inhalation and if swallowed.
Long term toxicity	No data available. Avoid repeated exposure.
Specific effects	May cause sensitization by inhalation and skin contact. Limited evidence of a carcinogenic effect.

12. Ecological Information

Mobility	None known if used/disposed of correctly
Persistence and degradability	None known if used/disposed of correctly
Ecotoxicity effects	None known if used/disposed of correctly

13. Disposal Considerations

Waste from residues / unused products	The battery is a hazardous waste under RCRA. Dispose of in accordance with appropriate local regulations.. Should not be released into the environment.
Contaminated packaging	Not applicable

14. Transport Information

Not classified as dangerous in the meaning of sea and air transport regulations.

BYD sealed Nickel Metal Hydride batteries are not subject to dangerous goods regulation 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 Dangerous Goods regulations (IMDG). The only DOT requirement for shipping Nickel Metal Hydride batteries is Special Provision 130 which states: "Batteries, dry are not subject to the requirements of this subchapter only when they are offered for transportation in a manner that prevents the dangerous evolution of heat (for example, by the effective insulation of exposed terminals)." IATA requires that batteries being transported by air must be protected from short-circuiting and protected from movement that could lead to short-circuiting.

BYD batteries are not subject to these regulations and are exempted from UN2800 because:

- They are non-spillable as they are capable of passing a vibration test and a pressure differential
- At a temperature of 55°C, the electrolyte will not flow from a ruptured or cracked case and there is no free liquid to flow
- When packaged for transport, their terminals are protected from short-circuits.

IMDG(international Maritime Dangerous Goods Regulations), special Provision 304 which states: "batteries, dry, containing corrosive electrolyte which will not follow out of the battery when case is cracked are not subject to the provisions of this Code provided, but the batteries shall be securely packed and protected against short-circuits." Examples of such batteries include alkali-manganese, silver oxide, Zinc carbon, nickel metal hydride and nickel cadmium batteries.

International Civil Aviation Organization(ICAO) and International Air Transport Association (IATA) Special Provision A123 which states: "An electrical battery or battery

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powered device having the potential of dangerous evolutions of heat that is not prepared 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) is forbidden from transportation.”

15.Regulatory Information

The preparation is classified as dangerous in accordance with Directive 1999/45/EC.	
Symbol	C - Corrosive N - Dangerous for the environment
R-phrases	R35 - Causes severe burns. R40 - Limited evidence of a carcinogenic effect. R20/22 - Harmful by inhalation and if swallowed. R42/43 - May cause sensitization by inhalation and skin contact. R50/53 - Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S-phrases	S 1/2 - Keep locked up and out of the reach of children. S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection. S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S60 - This material and its container must be disposed of as hazardous waste. S61 - Avoid release to the environment. Refer to special instructions/safety data sheets.

16.Other information

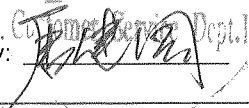
The data in this MSDS relates only to the specific material designed herein.

Date issued: 2004/06/20

Last Date Revised: 2011/10/21

Note: This information has been compiled from sources considered to be dependable and is accurate and reliable. It is the user's responsibility to satisfy himself as to the suitability and completeness of this information for his own particular use. We do not accept liability for any loss or damage that may occur, whether direct, indirect, incidental or consequential, from the use of this information nor do we offer warranty against patent infringement. Additional information is also available by contacting BYD.

Approved By:


G. James
Dept. I

Date:

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