1. Product information and company name

Product: Nickel Metal Hydride Battery **Designated for Recharge**: Yes
Chemical System: Nickel Metal Hydride **Nominal Voltage**: 1.2V

Company Information: Vapex Technology Limited
Add: Room 802, 8/F, Chevalier House, 45-51 Chatham Road South, Tsimshatsui, Kowloon Hong Kong
Tel: +852-2789 8737 Fax: 852-3007 2084

2. Composition / information on ingredients

The ingredients are contained in a hermetically sealed case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, hazardous materials are fully contained inside the battery. The battery should not be opened or exposed to heat because exposure to the following ingredients contained within could be harmful under some circumstances. The following information is provided for the user's information only.

Chemical nature:	Wt.%	CAS No.	EEC No.	Index No.	Classification
Nickel	55-70	7440-02-0	231-111-4	028-002-00-7	Carc. Cat. 3; R40, R43
Cobalt	5-10	7440-48-4	231-158-0	027-001-00-9	R; 42/43, R53
Potassium Hydroxide	1-5	1310-58-3	215-181-3	019-002-00-8	Xn; R22, C; R35
Sodium Hydroxide	1-5	1310-73-2	215-185-5	011-002-00-6	C; R35
Aluminum	1-5	7429-90-5	231-072-3	013-002-00-1	F; R15, R10

3. Physical Data for Battery

Melting point (℃): N/A Boiling point (℃): N/A %Volatile by Volume: N/A
Vapor Pressure (mm Hg): N/A Evaporation Rate (Butyl Acetate): N/A
Vapor Density (Air=1): N/A Specific Gravity (H_2O=1): N/A Solubility in Water: N/A
Appearance and Odor: Cylindrical Shape, odorless

4. Possible hazards

Critical hazards to man: if battery is leaking, exposure to caustic ingredients may occur. Sensitization may occur upon skin contact.
Critical hazards to the environment: Not available
Other Information: Keep batteries away from small children.

5. First aid measures

General advice: These chemicals and metals are contained in a sealed can. For consumer use, adequate hazard warnings are included on both the package and on the battery. Potential for exposure should not exist unless the battery leaks, is exposed to high temperature or is mechanically, physically, or electrically abused. Contains concentrated (~35%) potassium and sodium hydroxides, which are caustic. Anticipated potential leakage of potassium and sodium hydroxides is 1~2 gms. In case of accident or if you feel unwell, seek medical advice immediately (show label where possible).

If inhaled: Not anticipated. Respiratory (and eye) irritation may occur if fumes are released due to heat or an abundance of leaking batteries. Remove to fresh air. Contact physician if irritation persists.

On skin contact: Not anticipated. Irritation, including caustic burns/injury, may occur. If battery is leaking, irrigate exposed skin with copious amounts of clear, tepid water for at least 15 minutes. If irritation, injury or pain persists, consult a physician.

On contact with eyes: Not anticipated. Irritation, including caustic burns/injury, may occur. If battery is leaking and material contacts eyes, flush with copious amounts of clear, tepid water for 30 minutes. Contact a physician at once.

On ingestion: Not anticipated due to size of batteries. Irritation, including caustic burns/injury may occur following exposure to a leaking battery. Rinse mouth and surrounding area with clear, tepid water for at least 15 minutes. Consult a physician immediately for treatment and to rule out involvement of the esophagus and other tissues.

Notes to Physician: 1) The acutely toxic ingredients are concentrated (35%) potassium and sodium hydroxides and nickel.

2) Chronic exposure to nickel has been reported to be carcinogenic and disposal processes resulting in nickel exposure may be hazardous.
3) Anticipated potential leakage of potassium and sodium hydroxides is 1-2 grams.
4) If the cell is abusively opened the electrodes may react with air and ignite.

6. Fire and Explosion Hazard Data

Flash Point: N/A
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A

Extinguishing Media: Any class of extinguishing medium may be used on the batteries or their packing material

Special Fire Fighting Procedures: Exposure to temperatures of above 212℉ can cause venting of the liquid electrolyte. Internal shorting could venting of the electrolyte. There is potential for exposure to iron, nickel, cobalt, rare earth metals (cerium, lanthanum, neodymiun, and praseodymium), manganese, and aluminum fumes during fire; use self-contained breathing apparatus.

7. Accidental release measures

Personal precautions: Irritating vapours may be released from leaking or ruptured batteries. Avoid eye or skin contact and inhalation of vapours. Increase ventilation. Clean-up personnel should wear appropriate protective gear.
Environmental precautions: Notify safety personnel of large spills.

Methods for cleaning up: Contain for disposal.

8. Handling and storage

Safe Handling and storage advice

Batteries should be handled and stored carefully to avoid short circuits. Do not store in disorderly fashion, or allow metal objects to be mixed with stored batteries. Never disassemble a battery. Do not breathe cell vapors or touch internal material with bare hands. Keep batteries between –30℃ and 35℃ for prolong storage.

9. Exposure controls and personal protection

8-Hour TWAS: Nickel (insoluble as Ni) – 1.0mg/m^3 (OSHA); 0.2mg/m^3 (ACGIH);
0.05mg/m^3 (Vapex)
Nickel (Elemental) – 1.5mg/m^3 (ACGIH); 1.0mg/m^3 (OSHA)
Nickel (soluble compounds, as Ni) – 0.1mg/m^3 (OSHA/ACGIH);
Cobalt (and cobalt compounds, fume and dust) – 0.1mg/m^3 (U.K./OSHA);
Cobalt (elemental and inorganic compounds, as Co) – 0.02mg/m^3 (ACGIH);
Potassium Hydroxide – 2.0mg/m^3 (STEL) (U.K.); Ceiling) (ACGIH)

Aluminum (dust)-- 10mg/m^3 (U.K./ACGIH); 15mg/m^3 (total dust, OSHA);
4mg/m^3 (respirable, U.K.); 5mg/m^3 (respirable, OSHA);
Sodium Hydroxide – 2.0mg/m^3 (STEL) (U.K.); 2.0mg/m^3(Ceiling) (ACGIH)
Manganese: – 5mg/m^3 (U.K.) (Ceiling) (OSHA); 0.2mg/m^3 (ACGIH) (Vapex)

This levels are not anticipated under foreseeable use conditions.

Personal protective equipment

Respiratory equipment: None required under normal consumer use conditions.
Hand protection: None required under normal use conditions. Use neoprene, rubber or nitrile gloves when handling leaking batteries.

Eye protection: None under normal use conditions. Wear safety glasses when handling leaking batteries.

Gerneral safety and hygiene measures: Use only as directed.

10. Stability and reactivity

Thermal decomposition: Batteries may burst and release hazardous decomposition products when exposed to a fire situation.
Substance(s) to avoid: Strong oxidizers

Hazardous reactions: Contents incompatible with strong oxidizing agents.

Hazardous decompositions products: Thermal degradation may produce hazardous metal fumes; hydrogen gas; caustic vapours of potassium and sodium hydroxides and other toxic by-products.

11. Toxicological information

Toxicity information is available on the battery ingredients noted in Section 2, but, generally not applicable to intact batteries as used by customers.

Chronic Health Effects: Not applicable to intact batteries.

12. Ecological information

See item 2 & 3.

13. Disposal considerations

Dispose of batteries according to government regulations.

14. Transportation information

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 Vapextech Nickel Metal Hydride batteries has been designed to be compliant with these regulatory concerns.

Vapextech Nickel Metal Hydride batteries (sometimes referred to as “Dry cell” batteries) are not defined as dangerous goods under the IATA Dangerous Goods Regulations, ICAO Technical Instructions and the U.S. hazardous materials regulations (49 CFR). 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.
By ocean the international Maritime Organization (IMO) regulates Nickel Metal Hydride batteries as Class 9 Dangerous Goods under UN3496 and Special Provision 963.

According to the IMO International Maritime Dangerous Goods Code (2010Edition), If the product pack complies with SP117 and SP963, the product are not regulated for Maritime transportation as "dangerous goods".

Regulatory Body	**Special Provisions**
ADR	295 - 304, 598
IMDG	UN3496 SP117 & SP963
UN	UN 3028 Provisions 295 - 304
US DOT	49 CFR 172.102 Special Provision 130
IATA	Special Provision A199, IATA DGR 58th Edition
ICAO	UN 3028 Provisions 295 - 304

As of 1/1/97 IATA requires that batteries being transported by air must be protected from short-circuiting and protected from movement that could lead to short-circuiting. (1)The batteries are disconnected and prepared so as to prevent a short circuit during transportation. (2) The batteries are non-Dangerous goods and safe for air transportation.

15. Regulatory information

Special requirement be according to the local regulatories.

16. Other information:

Preparation of MSDS:

Prepared by: Vapex Technology Limited
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The information contained in the Material Safety Data Sheet is based on data considered to be accurate, however, no warranty is expressed or implied regarding the accuracy of the data or the results to be obtained from the use thereof.