NiMH Material Safety Data Sheet

Product Name: Nickel Metal Hydride Battery
Document No.: ESP (2020 MH)
Issue Date: January 2nd, 2020
Chemical Systems: Nickel Metal Hydride
Designed for Recharge: Yes

Transport Regulations

ESP nickel metal hydride batteries (sometimes referred to as" Dry cell" batteries) are not defined as dangerous goods under the IATA Dangerous Goods Regulations 58th edition 2017. ICAO Technical Instructions and the U.Shazardous materials regulations (49 CFR).
These batteries are not subject to be the dangerous goods regulations under 100k.
See page 5 for more information

SECTION II - HAZARDOUS INGREDIENTS

IMPORTANT NOTE:

The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

A) The content of elements are based on homogeneous materials level of NiMH battery:

Element	Lead	Cadmium	Hexavalent Chromium (Cr_{6+})	Mercury	Polybrominated Biphenyls (PBBs)	Polybrominated Diphenyls Ethers(PBDEs)
% W. t.	<0.004	<0.002	<0.1	<0.0005	<0.1	<0.1

B) The content of elements are based on total weight of NiMH battery:

Ingredients information

Ingredient name	CAS No.	Classification under DSD	Classification under CLP	% (w/w)
Nickel dihydroxide	12054-48-7	Carc. Cat. 1; R49 Repr. Cat. 2; R61 Muta. Cat. 3; R68 T; R48/23 Xn; R20/22 Xi; R38 R42/43 N; R50-53	Carc. 1A; H350i Repr. 1B; H360D Muta. 2; H341 STOT RE 1; H372 Acute Tox. 4; H332 Acute Tox. 4; H302 Skin Irrit. 2; H315 Resp. Sens. 1; H334 Skin Sens. 1; H317 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	22.7

Cobalt oxide	1307-96-6	Xn;R22 R43 N; R50-53	Acute Tox. 4; H302 Skin Sens. 1; H317 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	1.8
Nickel powder	7440-02-0	Carc. Cat. 3; R40 T; R48/23 R43 R52-53	Carc. 2; H351 STOT RE 1; H372 Skin Sens. 1; H317 Aquatic Chronic 3; H412	0.8
Hydrogen storage alloy	N/A	Not classified.	Not classified.	34.4
Potassium hydroxide	1310-58-3	Xn; R22 C; R35	Acute Tox. 4; H302 Skin Corr. 1A; H314	4.4
Lithium hydroxide	1310-65-2	Xn; R22 C; R34 R52/53	Acute Tox. 4; H302 Skin Corr. 1B; H314 Aquatic Chronic 3; H412	0.4
Nickel	7440-02-0	Carc. Cat. 3; R40 T; R48/23 R43 R52-53	Carc. 2; H351 STOT RE 1; H372 Skin Sens. 1; H317 Aquatic Chronic 3; H412	5.5
Polypropylene	9003-07-0	Not classified.	Not classified.	3.4
Iron	7439-89-6	Not classified.	Not classified.	26.6

SECTION III - PHYSICAL / CHEMICAL CHARACTERISTICS

Boiling Point N.A.	Specific Gravity (H2O=1) N.A.
Vapor Pressure (mm Hg) N.A.	Melting Point N.A.
Vapor Density (AIR=1) N.A.	Evaporation Rate (Butyl Acetate) N.A.
Solubility in Water N.A.	
Appearance and Odor Cylindrical Shape, odorless	

SECTION IV - REACTIVITY DATA

Stability	Unstable		Conditions to Avoid
	Stable	X	
Incompatibility (Materials to Avoid)			
Hazardous Decomposition or Byproducts			
Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	

SECTION V -FIRE AND EXPLOSION HAZARD DATA

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 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, manganese, lanthanum, cerium, neodymium, and praseodymium.

SECTION VI - HEALTH HAZARD DATA

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. Provide fresh air and seek medical attention.

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. Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.

Eye Contact:

Contents of an open battery can cause severe irritation and chemical burns. Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

SECTION VII- PRECAUTIONS FOR SAFE HANDLING AND USE

Storage:

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

Mechanical Containment:

Never seal or encapsulate nickel 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.

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. There 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.

SECTION VIII-ACCIDENTAL RELEASE OR SPILLAGE

Steps to Be Taken in Case Material is Released or Spilled
Batteries that are leakage should be handled with rubber gloves. Avoid direct contact with electrolyte. Wear protective clothing and a positive pressure Self-Contained Breathing Apparatus (SCBA)

SECTION IX-SPECIAL PROTECTION INFORMATION

Ventilation Requirements:

Not necessary under normal conditions.

Respiratory Protection:

Not necessary under normal conditions.

Eye Protection:

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

Gloves:

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

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.

Keep batteries between -20℃ and 35℃ for prolong storage.

When the cells are closed to fully charged, the storage temperature should be between -20℃ and 30℃ and should be controlled at 10-20℃ during transportation and packed with efficient air ventilation.

SECTION X-EXPOSURE CONTROLS / PERSON PROTECTION

Occupational Exposure Limits: LTEP N.A.		STEP N.A.
Respiratory Protection (Specify Type) N.A.		
Ventilation	Local Exhausts N.A.	Special N.A.
	Mechanical (General) N.A.	Other N.A.
Protective Gloves N.A.		Eye Protection N.A.
Other Protective Clothing or Equipment N.A.		
Work / Hygienic Practices N.A.		

SECTION XI-ECOLOGICAL INFORMATION

N.A.

SECTION XII - DISPOSAL METHOD

Dispose of batteries according to government regulations.

SECTION XIII – TRANSPORTATION INFORMATION

a) In general, all batteries in all forms of transportation (ground, air, or ocean) must be packed 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 contained in “strong outer packaging” that prevents spillage of contents. All original packaging for ESP nickel hydride batteries has been designed to be compliant with these regulatory concerns.

ESP nickel metal hydride batteries (sometimes referred to as “Dry cell” batteries) are not defined as dangerous goods under the IATA Dangerous Goods Regulations 61st edition 2020; ICAO Technical Instructions and the U.S hazardous materials regulations (49 CFR). These batteries are not subject to be the dangerous goods regulations as they are compliant with the requirements contained in the following special provisions:

Regulatory Body	Special Provisions
ADR	295-304,598
IMO	UN3496 SP117 and SP963
UN	UN3496
US DOT	49 CFR 172, 102 Provision 130
IATA	A199

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.

b) International Maritime Organization (IMO) IMDD code regulated these products as UN3496 BATTERIES, NICKEL METAL HYDREIDE, class 9 dangerous goods with Special Provision 117 and 963 assigned.

SP117
Only regulated when transported by sea.

SP963
Nickel-metal hydride button cells or nickel-metal hydride cells or batteries packed with or contained in equipment are not subject to the provisions of this Code.
All other 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 100 kg gross mass. When loaded in a cargos transport unit in a total quantity of 100 Kg gross mass or more, they are subject to other provisions of this Code except those of 5.4.1, 5.4.3 and column (16) of the dangerous good list in Chapter 3.2,

The requirements of these sections are:

(1) dangerous goods transport documentation to accompany the shipment,
(2) the shipment must be described as “UN3496, BATTERIES, NICKEL-METAL HYDRIDE, CLASS 9” on the shipper’s declaration of dangerous goods.
(3) the dangerous goods description must also be entered on the Dangerous Cargo Manifest and /or the detailed stowage plan in compliance with IMDG Code requirements of shipboard documentation.

SECTION XIV –REGULATORY INFORMATION

Special requirement be according to the local regulatories.

SECTION XV – OTHER INFORMATION

The data in this Material Safety Data Sheet relates only to the specific material designated herein.

SECTION XVI –MEASURES FOR FIRE EXTINCTION

In case of fire, it is permissible to use any class of extinguishing medium on these batteries or their packing material. Cool exterior of batteries if exposed to fire to prevent rupture.
Fire fighters should wear self-contained breathing apparatus.