Material Safety Data Sheets

TEIG NICKEL CADMIUM BATTERY

Section 1 - Product and Company Identification

Date of MSDS: 08/10/2002 **Technical Review Date:** 07/20/2015
Product Category: Nickel Cadmium Rechargeable Battery
Product Name: TELB0605N, TELB0608N, TELB1208N1, TELB0607NF, TELB0701N, TELB0604N1, TELB0604N4, TELB06045N, TELB4814N.
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Note : MSDS is not applicable to the product hermetically sealed as dry battery. The battery has no risk to life and health under normal use or transportation because ingredients of battery are not leaked out by virtue of hermetical sealing with metal case.
This MSDS notify possible risks of our battery under abnormal use but mainly aim to provide information about ingredients, notification of handling and transportation regulations as a useful reference.

Section 2 - Hazards Identification

The Nickel Cadmium Rechargeable Battery described in this MSDS are hermetically sealed units, which are not hazardous when used according to the recommendations of the manufacturer. Under normal condition of use of the batteries, the electrode materials and the liquid electrolyte they contained are non-reactive provided the battery integrity is maintained. Risk of exposure exists only in case of mechanical, electrical or thermal abuse. Thus the batteries should not short circuit, recharge, puncture, incinerate, crush, immerse in water, force discharge, or expose to temperatures above the temperature range of the cell or battery. In these cases there is risk of fire or explosion.

Inhalation:

During normal use inhalation is an unlikely route of exposure due to containment of hazardous materials within the battery case. However, should the batteries be exposed to extreme heat or pressures causing a breach in the battery cell case, cadmium dusts and fumes may be emitted. Inhalation of cadmium dusts or fumes may cause throat dryness, respiratory irritation, headache, nausea, vomiting, chest pain, extreme restlessness and

irritability, pneumonitis, and bronchopneumonia. In the case of high concentration exposures (e.g., above 1 to 5 MG/M3 during an eight hour period) death may occur within several days after the exposure.

Ingestion:

If the battery case is broken in the digestive tract, the electrolyte may cause localized burns. Ingestion of cadmium compounds may result in increased salivation, choking, nausea, persistent vomiting, diarrhea, abdominal pain, anemia, tenesmus, and kidney dysfunction.

Skin Absorption:

No evidence of adverse effects from available data.

Skin Contact:

Exposure to the electrolyte contained inside the battery may result in chemical burns. Exposure to nickel may cause dermatitis in some sensitive individuals.

Eye Contact:

Exposure to the electrolyte contained inside the battery may result in severe irritation and chemical burns.

Carcinogenicity:

Cadmium and nickel have been identified by the National Toxicology Program (NTP) as reasonably anticipated to be carcinogens. U.S. EPA classified cadmium as a "B1" probable human carcinogen. The International Agency for Research On Cancer (IARC) recommended that cadmium be listed as a "A2" probable human carcinogen, and the American Conference of Government Industrial Hygienists (ACGIH) has proposed listing cadmium as an "A2" carcinogen.

Other Effects of Repeated (Chronic) Exposure:

Repeated over-exposures to cadmium may result in lung cancer; lung, kidney, and liver dysfunction; Skeletal disease (e.g. osteoporosis) and reproductive toxicity. Chronic overexposure to nickel may result in cancer; dermal contact may result in dermatitis in sensitive individuals.

Medical Conditions Aggravated by Exposure:

A knowledge of the available toxicology information and of the physical and chemical properties of the material suggests that overexposure in unlikely to aggravate existing medical conditions.

Section 3 - Composition/Information on Ingredients

The following components are found in a TEIG Nickel Cadmium Rechargeable Battery:

Material	Formula	Content	CAS#	OSHA PEL	NIOSH PEL
NICKEL HYDROXIDE	$Ni(OH)_2$	23~30%	12054-48-7	1.0 g/m3	N/A
COBALT	Co	1~2%	7440-48-4	0.1 g/m3	0.05 g/m3
CADMIUM	Cd	18~25%	7440-43-9	0.005 g/m3	N/A
POTASSIUM HYDROXIDE	KOH	<6%	1310-58-3	2.0 g/m3	2.0 g/m3
SODIUM HYDROXIDE	NAOH	<6%	1310-73-2	2.0 g/m3	2.0 g/m3

Section 4 - First Aid Measures

Swallowing: Do not induce vomiting. Seek medical attention immediately.

Skin contact: If the internal cell materials of an opened battery cell come into contact with the skin, immediately flush with water. If irritation continues, seek medical attention immediately.

Inhalation: If potential for exposure to cadmium or nickel fumes or dusts occurs, remove immediately to fresh air and seek medical attention.

Eye contact: If the contents from an opened battery come into contact with the eyes, immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention.

Neutralizing Agent: Acetic Acid

Section 5 - Fire Fighting Measures

Fire Fighting Procedures: If incinerated, wear NIOSH/MSHA approved SCBA and full protective equipment (FP N).

Unusual Fire or Explosion Hazard: Exposure to temperature of above 212°F can cause evaporation of the liquid content of the potassium hydroxide electrolyte resulting in the rupture of the cell. Potential for exposure to cadmium fumes during fire.

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

Section 6 - Accidental Release Measures

Chemical contents are sealed in metal can. But if the battery is mechanically or electrically abused, contents may leak out. In such case, take action as showing below.

Personal precautions: Temporary inhalation of odor and attaching of electrolyte to skin does not cause serious health hazard. Be sure the ventilation and washing out of electrolyte quickly.

Environmental precautions: Clean up it quickly. Specific environmental precaution is not necessary.

Method and materials for containment and methods and materials for cleaning up:

Contain and collect spillage and place in container for disposal according to local regulations.

Section 7 - Handling and Storage

Handling: Do not charge, short-circuit, disassemble, deform, heat above 100℃ or incinerate.
Do not pile up or mingle batteries with each other.
Do not place battery on metal case, metal plate or antistatic material.
In case of multi-cell application, replace all batteries to new at once when replacing used batteries.

Storage: Be sure to store batteries in well-ventilated, dry and cool conditions.But prevent condensation on cell or battery terminals. Elevated temperatures may result in

reduced battery life. Optimum storage temperatures are between -31°F and 95°F.

Keep away from water, rain, snow, frost or dew condensation.

Do not store batteries near source of heat or nozzle of hot air.

Do not store batteries in direct sunshine.

Take care not to get wet packing by dew condensation when packing is removed from cold to warm and humid condition.

Enough number of fire fighting apparatuses should be installed in warehouse.

Soldering/welding: If soldering or welding to the case of the battery is required, consult your TEIG NICKEL CADMIUM BATTERY representative for proper precautions to prevent seal damage or external short circuit.

Charging: This battery is designed for recharging. A loss of voltage and capacity of batteries due to self-discharge during prolonged storage is unavoidable. Charge battery before use. Observe the specified charge rate since higher rates can cause a rise in internal gas pressure which may result in damaging heat generation or cell rupture and or venting.

Section 8 - Exposure Controls & Personal Protection

Ventilation: Not required under normal handling conditions. Battery should not be opened. Should a cell become disassembled, the electrode should be stored in a fireproof cabinet, away from combustibles.

Respiratory Protection: None required under normal handling conditions. If respiratory irritation occurs, wear a respirator suitable for protection against acid mist.

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

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

Other Protective Equipment: None required under normal handling conditions.

Section 9 - Physical & Chemical Properties

Appearance (Physical state & color):	Solid & metallic
Shape:	Cylindrical
Odor:	Odorless
Solubility:	Insoluble in water
Odor Threshold:	Not applicable
PH:	Not applicable
Melting Point/Freezing Point:	Not applicable
Initial Boiling Point and Boiling Range:	Not applicable
Flash Point:	Not applicable
Flammability (Solid, Gas):	Not determined
Upper/Lower Flammability or Explosive Limits:	Not determined
Auto-Ignition Temperature:	Not applicable
Decomposition Temperature:	Not applicable

Section 10 - Stability & Reactivity Data

Stability: Stable on regular handling

Conditions to avoid: External short circuit of battery, deformation by crush, exposure at high temperature of more than 100 degree C (may cause heat generation and ignition), direct sunlight, high humidity.

Materials to avoid: Substances that cause short circuit.

Section 11 - Toxicological Information

Health Hazard Acute and Chronic: Inhalation, skin contact, eye contact and ingestion are not likely by exposure to sealed battery. Inhalation, skin contact and eye contact are possible when the battery is opened.Exposure to internal contents, the corrosive fumes will be very irritating to skin, eyes and mucous membranes. Overexposure can cause symptoms of non-fibrotic lung injury and membrane irritation.

The information of the internal cell materials is as follows.

NICKEL HYDROXIDE

- Acute toxicity:
  - Oral GHS: out of Category
  - Skin Unknown
  - Inhalation (gas） GHS: exempt from a classification
  - Inhalation (steam） Unknown
  - Inhalation (mist） Unknown
- Skin corrosivity: Unknown
- Serious damage and irritant property for eyes: Unknown.
- Respiratory or skin sensitization:
  - Respiratory sensitization: GHS: Category
    - The allergy, asthma or breathing difficulties might be caused when inhaling.
  - Skin sensitization: GHS: Category 1
    - The allergic skin reaction might be caused.
- Germline mutagenicity: GHS: It is not possible to classify it due to data deficiency.
- Carcinogenicity: GHS: Category 2
  - ACGIH: (Metal) A5 – Not suspected as a human carcinogen
  - ACGIH: (water-soluble compounds) A4 - Not classified as a human carcinogen
    - obviously ACGIH: (Insoluble compounds) A1 - Confirmed human carcinogen
  - NIOSH: Potential occupational carcinogen
  - NTP: Reasonably anticipated to be human carcinogen
  - IARC: (Metal) Group 2B possibly carcinogenic to human
  - IARC: (Compounds) Group 1 carcinogenic to human
- Reproduction Toxicity: GHS: It is not possible to classify it due to data deficiency.
- Certain target organ/ Systemic toxicity (single exposure):
  - GHS: Category 1(respiratory organ and kidney).
    - The disorder of the respiratory organ and the kidney is caused.

- Certain target organ/ Systemic toxicity (repeated exposure):

GHS: Category 1(respiratory organ).

The disorder of the respiratory organ is caused by long-term or repeated exposure.

CADMIUM

- Acute toxicity:

Oral	GHS: Category 4 (Swallowing is harmful.)
Skin	Unknown
Inhalation (dust）	GHS: Category 1 (It is dangerous in the life when inhaling.)

- Skin corrosivity: Unknown
- Serious damage and irritant property for eyes: Unknown
- Respiratory or skin sensitization: Unknown
- Germline mutagenicity: GHS: Category 2

The hereditary disorder might be caused.

- Carcinogenicity:

GHS:	Category 1A
ACGIH:	A2 – Suspected human carcinogen
NIOSH:	Potential occupational carcinogen
NTP:	Known to be a human carcinogen
IARC:	Group 1 carcinogenic to human

- Reproduction Toxicity: GHS: Category 2

Harmful effects on reproductive capacity or fetus might be exerted.

- Certain target organ/ Systemic toxicity (single exposure):

GHS: Category 1

Damage of lungs and the respiratory organ is caused.

Overexposure causes the pulmonary disorder.

- Certain target organ/ Systemic toxicity (repeated exposure):

GHS: Category

The disorder of the kidney, lungs, blood, bone, and respiratory organ is caused by long-term or repeated exposure.

COBALT

-Acute toxicity:

Oral	GHS: out of Category.
Skin	Unknown
Inhalation (gas）	GHS: exempt from a classification.
Inhalation (steam）	Unknown
Inhalation (mist）	GHS: It is not possible to classify it due to data deficiency.

- Skin corrosivity: Unknown
- Serious damage and irritant property for eyes: Unknown
- Respiratory or skin sensitization:

Respiratory sensitization: GHS: Category 1

The allergy, asthma or breathing difficulties might be caused when inhaling.

Skin sensitization: GHS: Category 1

The allergic skin reaction might be caused.

- Germline mutagenicity: Unknown.
- Carcinogenicity: GHS: Category 2

ACGIH: A3

Confirmed animal carcinogen but relevance to human carcinogen is unknown.

IARC: Group 2B possibly carcinogenic to human.

The cancer might be caused.

- Reproduction Toxicity: GHS: Category 2.

The adverse effect on reproductive competence or the fetus might occur.

- Certain target organ/ Systemic toxicity (single exposure):

GHS: Category 3(respiratory tract irritating properties).

The respiratory organ might be stimulated.

- Certain target organ/ Systemic toxicity (repeated exposure):

GHS: Category 1(respiratory organ).

The disorder of the respiratory organ is caused by long-term or repeated exposure.

POTASSIUM HYDROXIDE

- Acute toxicity:

Oral	GHS: Category 3. Harmful if swallowed
Skin	GHS: It is not possible to classify
Inhalation (steam）	GHS: It is not possible to classify
Inhalation (dust）	GHS: It is not possible to classify

- Skin corrosivity: GHS: Category 1B.

Serious chemical wound of the skin and damage of eyes is caused. ·Serious damage and irritant property for eyes: GHS: Category 1

- Respiratory or skin sensitization:

Respiratory sensitization:GHS: It is not possible to classify

Skin sensitization: GHS: out of Category

- Germline mutagenicity: GHS: out of Category
- Carcinogenicity: It is not possible to classify
- Reproduction Toxicity: It is not possible to classify
- Certain target organ/ Systemic toxicity (single exposure):

GHS: Category 1

The disorder of the respiratory system is caused

- Certain target organ/ Systemic toxicity (repeated exposure)

GHS: It is not possible to classify

SODIUM HYDROXIDE

- Acute toxicity:

Oral	GHS: It is not possible to classify
Skin	GHS: It is not possible to classify
Inhalation (gas）	GHS: out of Category
Inhalation (steam）	Unknown

Inhalation (dust） Unknown

- Skin corrosivity: GHS: Category 1

Serious chemical wound of the skin and damage of eyes is caused.

- Serious damage and irritant property for eyes:

GHS: Category 1

Serious damage of eyes is caused

- Respiratory or skin sensitization:

Respiratory sensitization: GHS: It is not possible to classify

Skin sensitization: GHS: out of Category

- Germline mutagenicity: GHS: out of Category
- Carcinogenicity: GHS: It is not possible to classify.
- Reproduction Toxicity: GHS: It is not possible to classify.
- Certain target organ/ Systemic toxicity (single exposure):

GHS: Category 1(respiratory system).

The disorder of the respiratory organ is caused.

- Certain target organ/ Systemic toxicity (repeated exposure):

GHS: It is not possible to classify

Medical Condition Aggravated by Exposure: Preexisting skin,asthma and respiratory diseases are generally aggravated by exposure to liquid electrolyte vapors or liquid. For further information refer to section 4.

Section 12 - Ecological Information

If used as directed, and if the integrity of the battery casing and security vent are maintained, the ingredients are not expected to pose a significant risk to the environment. But if the battery is mechanically or electrically abused, contents may leak out. In such case, take action as showing below.

Mobility: Potassium hydroxide as Partition Coefficient of 0.65~0.83.

Persistence and degradability: Not determined.

Bioaccumulation: Not determined.

Ecotoxicity effects: The information below refers to exposure to the ingredients

Nickel hydroxide and sodium hydroxide: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Section 13 – Recycling and Disposal

All TEIG Nickel Cadmium Rechargeable Batteries are classified by the federal government as a hazardous waste and must be recycled. The waste code is D006, Cadmium.

Dispose of batteries in accordance with applicable federal, state and local regulations.

SEND TO A CERTIFIED HAZARDOUS WASTE DISPOSAL SITE.

For safety precaution, battery should be insulated in proper manner; covering both terminals by tape, wrapping of battery in insulative bag or packing battery in original package is recommended in order to prevent ignition or explosion due to short-circuit.

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.

Section 14 - Transportation Information

TEIG sealed Nickel Cadmium batteries are considered to be "dry cell" batteries and are not subject to dangerous goods regulation for the purpose of transportation by the U.S. Department of Transportation (DOT), the International Civil Aviation Administration (ICAO), the International Air Transport Association (IATA) or the International Maritime Dangerous Goods regulations (IMDG). The only DOT requirement for shipping Nickel Cadmium 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.

Section 15 - Regulatory Information

CALIFORNIA PROPOSITION 65 WARNING: This product has been evaluated and requires a warning labeling under California Proposition 65. The Cadmium Compound has been found to cause cancer.

SARA TITLE III: The contents of this product are not subject to the reporting requirements of the Emergency Planning and Community Right-To-Know Act of 1986 (40CFR 355 and 372).

TSCA: This product contains a chemical or chemicals which are subject to the reporting requirements of United States Toxic Substances Control Act Section 8(b) Inventory.

Section 16 - Other Information

The information and the recommendations set forth are made in good faith, based on the data of which we are aware and believed to be correct as of the data hereof. The present file refers to normal use of the product in question. Since this information may be applied under conditions beyond our control and with which may be unfamiliar and since data made available subsequent to the data hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose. TEIG Nickel Cadmium Rechargeable Batteries make no warranty expressed or implied.

Assembly of battery packs:

The design and assembly of battery packs require special skills, expertise and experience. Therefore it is not recommended that the end user will attempt to self-assemble battery packs. It is preferable that any battery pack using TEIG Nickel Cadmium Rechargeable Batteries will be assembled by Xuzhou ATP Power to ensure proper battery design and construction. A full assembly service is available from Xuzhou ATP Power who can be contacted for further

information. If for any reason, this is not possible, Xuzhou ATP Power can review the pack design in confidential to ensure that the design is safe and capable of meeting the stated performance requirements.

For further information on TEIG Rechargeable batteries visit our web site: www.atp.com.cn.