

SAFETY DATA SHEET

The information in this Safety Data Sheet (SDS) is believed to be correct as of the date issued. ZINCFIVE MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR COURSE OF PERFORMANCE OR USAGE OF TRADE. User is responsible for determining whether the ZincFive product is fit for a particular purpose and suitable for user's method of use or application. This SDS is provided to customers as reference information for the safe handling and storage of the product. Customers should always exercise independent judgement relating to their use of the product. The information herein may change or require updating for a variety of reasons and user must always exercise their independent judgement.

Section 1: Identification

Product Name: Nickel Zinc Battery (Cell) Sizes: Sub-C and Prismatic

Chemical Name/Synonyms: None

Identified uses: Power storage

Company: ZincFive (dba PowerGenix in China)

Address: 20170 SW 112th Avenue Tualatin, OR 97062

Telephone: 001 503-399-3517

Emergency Phone number: 001 503-399-3517 (Within USA call 911)

For information about this SDS, use this department contact phone#: 503-399-3517

Section 2: Hazard(s) Identification

2.1 Hazard Classification: The following classification of hazards refer to the components that are present inside the sealed product container. If for some reason, the container opens, exposing the internal materials, they may pose the following hazards:

- Corrosive to metals (Category 1), H290
- Acute toxicity, Oral (Category 4), H302
- Skin corrosion (Category 1A), H314
- Skin sensitization (Category 1), H317
- Acute toxicity, Inhalation (Category 4), H332
- Respiratory sensitization (Category 1), H334
- Germ cell mutagenicity (Category 2), H341
- Carcinogenicity, Inhalation (Category 1A), H350i
- Reproductive toxicity (Category 1B), H360
- Specific target organ toxicity - repeated exposure (Category 1), H372
- Acute aquatic toxicity (Category 1), H400
- Chronic aquatic toxicity (Category 1), H410

2.2 Label elements

Pictograms:



Signal Word(s): Danger

Hazard Statements:

- H290 May be corrosive to metals.
- H302 Harmful if swallowed.
- H314 Causes severe skin burns and eye damage.
- H317 May cause an allergic skin reaction.
- H332 Harmful if inhaled
- H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
- H341 Suspected of causing genetic defects.
- H350i May cause cancer by inhalation.
- H360 May damage fertility or the unborn child.
- H372 Causes damage to organs through prolonged or repeated exposure.
- H410 Very toxic to aquatic life with long lasting effects.

Precautionary Statements:

When leaked liquid comes in contact with the skin, it may cause damage of the skin. When it gets into the eye, it may cause damage to the eye including loss of eyesight.

- P201 Obtain special instructions before use.
- P261 Avoid breathing dust.
- P273 Avoid release to the environment.
- P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
- P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
- P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
- P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P308 + P313 IF exposed or concerned: Get medical advice/ attention.
- P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Other hazards: Do not dispose of battery in fire. Stacking or jumbling of batteries may cause external short circuits and heat generation.

Section 3: Composition/ Information on Ingredients

MIXTURE: This is a manufactured product that does not fall under a chemical designation.

Component	CAS#	Classification	Conc.
Nickel Hydroxide	12054-48-7	Acute Tox. 4; Skin Irrit. 2;	<20%

		Resp. Sens. 1; Skin Sens. 1; Muta. 2; Carc. 1A; Repr. 1B; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H302, H332, H315, H334, H317, H341, H350i, H360, H372, H400, H410 M-Factor - Aquatic Acute: 10	
Potassium Hydroxide	1310-58-3	Met. Corr. 1; Acute Tox. 4; Skin Corr. 1A; H290, H302, H314	<10%
Lithium Hydroxide	1310-66-3	Acute Tox. 4; Skin Corr. 1B; H302, H314	<1%
Zinc Oxide	1314-13-2	Aquatic Acute 1; Aquatic Chronic 1; H400, H410 M-Factor - Aquatic Acute: 1	<19%
Nickel (Powder)	7440-02-0	Carc. 2; Skin Sens. 1; STOT RE 1; Aquatic Chronic 3; H351, H317, H372, H412 M-Factor - Aquatic Acute: 1	<2%
Cobalt	7740-48-4	Resp. Sens. 1; Skin Sens. 1; Aquatic Chronic 4; H334, H317, H413	<1%
Steel	N/A	N/A	<15%

Section 4: First-Aid Measures

4.1 Description of necessary measures

If inhalation: If vapors or mist are inhaled, provide fresh air and seek medical attention if respiratory irritation develops.

If eye contact: If liquid comes into contact with eyes, wash with copious amounts of water for 15 minutes, and contact a physician.

If skin contact: If liquid leakage occurs and makes contact with skin, flush area with water immediately.

If Ingestion: Never give anything by mouth to an unconscious person. Consult a physician.

4.2 Most important symptoms/effects, acute and delayed.

See section 2 & section 11

4.3 Indication of immediate medical attention and special treatment needed

No data available

Section 5: Fire-Fighting Measures

5.1 Suitable extinguishing media: Carbon Dioxide, Dry Chemical, or Foam extinguishers

5.2 Specific hazards arising from the chemical: Nickel/nickel oxides, Cobalt/cobalt oxides, Zinc/zinc oxides, Lithium oxides, Potassium oxides

5.3 Special protective equipment and precautions for fire-fighters: Wear Protective clothes and a positive pressure Self-Contained Breathing Apparatus (SCBA).

Section 6: Accidental Release Measures

6.1 Personal precautions, protective equipment, and emergency procedures: Steps to be taken in case material is released or spilled. Batteries that are leaking should be handled with rubber gloves. Avoid Direct contact with liquid. Wear Protective cloths and a positive pressure Self-Contained Breathing Apparatus (SCBA) if necessary, for instance, if there is a fire.

6.2 Methods and materials for containment and cleaning up: Wear full protective equipment, including goggles, neoprene or nitrile gloves, and respirator if necessary. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirators. Completely contain spilled material and prevent run-off into ground or surface waters or sewers. Recover as much material as possible into containers for disposal. Remaining material may be neutralized with dilute hydrochloric acid, citric acid, acetic acid or other media appropriate for caustic spills. Neutralization products, both liquid and solid, must be recovered for disposal. Discharge into the environment must be avoided.

Section 7: Handling and Storage

7.1 Precautions for safe handling: Batteries should be handled and stored carefully to avoid short circuits. NEVER disassemble a battery. Do not breathe any cell vapors, if present, or touch internal material with bare hands. Do not allow battery terminals to come into contact with each other, or to contact other metals. Do not deform the batteries or discard into fire.

7.2 Conditions for safe storage, including any incompatibilities: The ingredients are contained in a 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 ingredients contained within could be harmful under some circumstances. Do not store in disorderly fashion or allow metal objects to be mixed with stored batteries. Keep batteries between -30° and 35°C for prolonged storage. Lower temperature is better for stability of performance and battery life.

Section 8: Exposure Controls/Personal Protection

8.1 Control parameters

Chemical Name	OSHA PEL	OSHA PEL (ceiling)	ACGIH OEL (TWA)	ACGIH OEL (STEL)
No data available				

8.2 Appropriate engineering controls: Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and after work

8.3 Individual protection measures:

Breathing equipment: Wear a positive pressure Self-Contained Breathing Apparatus (SCBA) if fire is involved

Protection of hands/skin: Handle with gloves, wear protective cloths and use proper gloves to avoid skin contact with this product.

Eye protection: Use face shield and safety glasses. Use equipment for eye protection tested and approved under appropriate government standards

Section 9: Physical and Chemical Properties

Appearance: Cylindrical or Prismatic Shape

Odor: Odorless

Odor threshold: No data available

pH: No data available

Melting point/freezing point: No data available

Initial boiling point and boiling range: No data available

Flash point: No data available

Evaporation rate: No data available

Flammability: No data available

Upper/lower flammability or explosive limits: No data available

Vapor pressure: No data available

Vapor density: No data available

Relative density: No data available

Solubility: No data available

Partition coefficient: No data available

Auto-ignition temperature: No data available

Decomposition temperature: No data available

Viscosity: No data available

Section 10: Stability and Reactivity

10.1 Reactivity: External container is not reactive. However, the contained liquid is a strong base and therefore, if leaked, mixes exothermally with water and reacts with acids and many metals.

10.2 Chemical stability: see section 7. Battery performance will deteriorate over time in storage. In addition, if battery is not maintained within specified operational and environmental ranges (e.g. voltage or temperature) electrolyte leakage may occur and/or battery performance may be negatively affected.

10.3 Possibility of hazardous reactions: No data available

10.4 Conditions to avoid: Do not dispose of battery in fire – may explode

10.5 Incompatible materials: No data available

10.6 Hazardous decomposition products: No data available

Section 11: Toxicological Information

Acute toxicity: No data available

Potential routes of exposure/potential health effects

Skin: In case of liquid leakage, contact with skin can cause severe irritation and chemical burns.

Eye: Exposure to the liquid contained inside the battery may result in severe irritation and chemical burns

Inhalation: Inhalation of vapors in case of fire may cause irritation of the upper respiratory tract and lungs.

Ingestion: If the battery case is breached, and electrolyte is ingested, severe irritation and/or chemical burns of the mouth, throat, esophagus, and digestive tract may result.

Skin corrosion/irritations: No data available

Serious eye damage/eye irritation: No data available

Respiratory or skin sensitization: No data available

Germ cell mutagenicity: No data available

Carcinogenicity: Nickel has been identified by the National Toxicology Program (NTP) as reasonably anticipated to be a carcinogen. Cobalt has been identified by IARC as a 2B carcinogen.

Reproductive toxicity: No data available

Specific target organ toxicity - single exposure: No data available

Specific target organ toxicity - repeated exposure: Chronic overexposure to nickel may result in cancer; dermal contact may result in dermatitis in sensitive individuals.

Aspiration hazard: No data available

Section 12: Ecological Information (non-mandatory)

12.1 Ecotoxicity: Under normal use this battery is not hazardous to the ecology. If the battery case is compromised, the chemicals inside the battery are harmful to the environment and must be disposed of properly. Mercury, lead and cadmium are not used in the battery.

12.2 Persistence and degradability No data available

12.3 Bioaccumulative potential: No data available

12.4 Mobility in soil: No data available

12.5 Other adverse effects (such as hazardous to the ozone layer): No data available

Section 13: Disposal Considerations (non-mandatory)

13.1 Waste treatment methods

ZincFive cares about our environment. To recycle batteries at end-of-life, please contact ZincFive at 1-503-399-3517 or e-mail ZincFive at info@zincfive.com or visit <https://zincfive.com/contact/>. Nickel Zinc batteries must be handled in accordance with all applicable state and federal laws and regulations.

Section 14: Transport Information (non-mandatory)

14.1 UN number: No data available

14.2 UN proper shipping name: No data available

14.3 Transport hazard class(es): No data available

14.4 Packaging group: No data available

14.5 Environmental hazards: No data available

14.6 Special precautions for user

ZincFive batteries are considered to be "Dry Cell" batteries and are unregulated for the purpose of transportation by the U.S. Department of Transportation (DOT), International Civil Aviation Administration (ICAO), International Air Transport Association (IATA), and International Maritime Dangerous Goods Regulations (IMDG). The DOT requirement for shipping Nickel Zinc 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) Special Provision A123 in the IATA Dangerous Goods. Regulations and ICAO Technical Instructions and Special Provision 130 in 49 CFR 172.102 of the U.S. hazardous materials regulations requires batteries being transported by air must be protected from short-circuiting and protected from movement that could lead to short-circuiting. In addition, the words "Not Restricted" and "Special Provision A123" are required on the air waybill, when an air waybill is issued.

Section 15: Regulatory Information (non-mandatory)

US Federal Regulations

SARA Section 355 (extremely hazardous substances): No data available

SARA Section 313 (specific toxic chemical listings): No data available

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs): No data available

TSCA (Toxic Substances Control Act): No data available

Section 16: Other Information

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SDS date of preparation/update: 12/9/2022