

# MATERIAL SAFETY DATA SHEET (MSDS)

Product Name: Rechargeable Li-ion Battery

Issued and Revised Date: 1st January 2018

Report Number: PT832832-800mAh-2017

## 1. PRODUCTS AND COMPANY IDENTIFICATION

Product Name: Lithium-ion polymer battery

Applicable Models/Sizes: 3.7v 800mAh 2.9Wh

HL21 & HL22

Supplier Identification:

Cluson Engineering Limited Limited Unit 6 Bedford Road Petersfield Hampshire GU32 3LJ

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## 2. HAZARDS IDENTIFICATION

|                               |   |
|-------------------------------|---|
| Hazard categories             | Not dangerous with normal use. Do not dismantle, open or shred, Lithium ion Cell the ingredients contained within or their ingredients could be harmful.  |
| Appearance, Colour, Odour     | Solid object with no odour, no colour   |
| Primary Route (s) of Exposure | These chemicals are contained in a sealed stainless steel enclosure. Risk of exposure occurs only if the cell is mechanically, thermally or electrically abused to the point of compromising the enclosure. If this occurs, exposure to the electrolyte solution contained within can occur by inhalation, Ingestion, Eye contact and Skin content.   |
| Potential Health Effects      | <b>ACUTE</b> (Short term): see Section 8 for exposure controls In the event that this battery has been ruptured, the electrolyte solution contained within the battery would be corrosive and can cause burns.<br><b>Inhalation:</b> Inhalation of materials from a sealed battery is not an expected route of exposure. Vapours or mists from a ruptured battery may cause respiratory irritation.<br><b>Ingestion:</b> Swallowing of materials from a sealed battery is not an expected route of exposure. Swallowing the contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.<br><b>Skin:</b> Contact between the battery and skin will not cause any harm. Skin contact with contents of an open battery can cause severe irritation or burns to the skin.<br><b>Eye:</b> Contact between the battery and the eye will not cause any harm. Eye contact with contents of an open battery can cause severe irritation or burns to the eye.<br><b>NIC</b> (Long term): see Section 11 for additional toxicological data |

## 3 COMPOSITION / INFORMATION ON INGREDIENTS

Information about the chemical nature of product:

| Hazardous Ingredient Name<br>(Chemical Name) | Molecular Formular  | CAS No.    | Weight % |
|--|---|------------|----------|
| Lithium Cobalt Oxide                         | LiCoO <sub>2</sub>  | 12190-79-3 | 35-38    |
| Graphite powder                              | C   | 7782-42-5  | 23-25    |
| Electrolyte                                  | LiPF <sub>6</sub> C <sub>3</sub> H <sub>4</sub> O <sub>3</sub> C <sub>4</sub> H <sub>6</sub> O <sub>3</sub> C <sub>3</sub> H <sub>10</sub> O <sub>3</sub> | 21324-40-3 | 12-15    |
| Polyethylene                                 | (C <sub>2</sub> H <sub>4</sub> ) n  | 9002-88-4  | 0.5-1    |
| Cu   | Cu  | 7440-50-8  | 5-10     |
| Nickel                                       | Nickel  | 7440-02-0  | 2-3      |
| Polyvinylidene fluoride                      | (CH <sub>2</sub> CF <sub>2</sub> ) n  | 24937-79-9 | 0.5-2    |
| Polypropylene                                | (C <sub>3</sub> H <sub>6</sub> ) n  | 9003-07-0  | 2-5      |
| Aluminium Foils                              | Al  | 7429-90-5  | 7-10     |

Labelling according to EC directives

No symbol and risk phrase are required.

Note: CAS number is Chemical Abstract Service Registry Number.

N/A= Not apply.

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### 4. FIRST-AID MEASURES

- ▶ Inhalation: If contents of an opened battery are inhaled, remove contaminated clothes and rinse skin with plenty of water or shower for 15 minutes. Get medical aid.
- ▶ Skin: Remove contaminated clothing and immediately flush with lukewarm water for at least 30 minutes. If irritation persists, contact a medical doctor. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
- ▶ Eyes: Flush with lukewarm water for at least 30 minutes. Normal saline solution may be used as soon as it is available. If necessary continue flushing during transport to emergency care facility. If irritation occurs and persists, contact a medical doctor.
- ▶ Ingestion: If ingestion of contents of an open battery occurs, never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. Do not induce vomiting. Have victim drink 60 to 250ml (2-8oz.) of water. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Have victim rinse mouth with water again. Quickly transport victim to an emergency care facility.

### 5. FIRE-FIGHTING MEASURE

- ▶ Flammable Properties: In the event that this battery has been ruptured, the electrolyte solution contained within the battery would be flammable. Like any sealed container, battery cells may rupture when exposed to excessive heat; this could result in the release of flammable or corrosive materials.
  - ▶ Suitable extinguishing media: Use extinguishing media suitable for the materials that are burning.
  - ▶ Unsuitable extinguishing media: Not available
  - ▶ Explosion Data: Sensitivity to Mechanical Impact: This may result in rupture in extreme cases. Sensitivity to Static Discharge: N/A
  - ▶ Specific Hazards arising from the chemical: Fires involving Lithium ion Cell can be controlled with water. When water is used, however, hydrogen gas may evolve. In this situation, smothering agents are recommended to extinguish the fire.
  - ▶ Protective Equipment and precautions for firefighters: As for any fire, evacuate the area and fight the fire from a safe distance. Wear a pressure-demand, self-contained breathing apparatus and full protective gear. Fight fire from a protected location or a safe distance. Use NIOSH/MSHA approved full-face self-contained breathing apparatus (SCBA) with full protective gear.
- NFPA: Health: 0 Flammability: 0 Instability: 0

### 6. ACCIDENTAL RELEASE MEASURES

- ▶ Personal Precautions, protective equipment and emergency procedures: Restrict access to area until completion of clean-up. Do not touch the spilled material. Wear adequate personal protective equipment as indicated in Section 8.
- ▶ Environmental Precautions: Prevent material from contaminating soil and from entering sewers or waterways.
- ▶ Methods and materials for containment: Stop the leak if safe to do so. Contain the spilled liquid with dry sand or earth. Clean up spills immediately.
- ▶ Methods and materials for cleaning up: Absorb spilled material with an inert absorbent (dry sand or earth). Scoop contaminated absorbent into an acceptable waste container. Collect all contaminated absorbent and dispose of according to directions in Section 13. Scrub the area with detergent and water, collect all contaminated wash water for proper disposal.

### 7. HANDLING AND STORAGE

#### ▶ Handling

Specific safe handling advice: Don't handle Lithium ion Cell with metalwork. Do not open, damaged or burning, forbidden to damage the battery. Ensure good ventilation at the workplace. Prevent formation of dust. Information about protection against explosions and fires: keep away from sources of ignition - No smoking.

- ▶ Storage conditions: If the Lithium ion Cell is subject to storage for such a long term as more than 3 months, it is recommended to recharge the Lithium ion Cell periodically. 3 months: -10°C to 40°C, 45%RH to 85%RH; And recommended at 0°C to 35°C for long period storage. The voltage for a long time storage shall be 3.7V-4.2V range. Keep out of reach of children. Do not expose Lithium ion Cell to heat or fire. Avoid storage in direct sunlight. Do not store together with oxidizing and acidic materials.

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

- ▶ Engineering controls: Use local exhaust ventilation or other engineering control sources of dust, mist fumes and vapor. Keep away from heat and open flame. Store in a cool, dry place.
- ▶ Personal Protective: Respiratory Protection: Not necessary under normal circumstances. Skin and body Protection: Not necessary under normal conditions. Wear suitable protective clothing and gloves if handling an open or leaking battery. Hand protection: Wear suitable gloves if handling an open or leaking battery. Eye Protection: Not necessary under normal conditions. Wear safety glasses if handling an open or leaking battery.
- ▶ Other protective Equipment: Have a safety shower and eye wash fountain readily available in the immediate work area.
- ▶ Hygiene Measures: Do not eat, drink, or smoke in work area. Maintain good housekeeping.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Form: Appearance: Solid Colour: White Odour: Monotony  
pH, with indication of the concentration: N/A - Melting point/freezing point: N/A  
Boiling point, initial boiling point and boiling range: Not available - Flash point: Not available  
Upper/lower flammability or explosive limited: N/A - Vapor pressure: N/A - Vapor Density (Air=1) Not applicable  
Density/relative density: Not available - Solubility in water: Insoluble - n-octanol/water partition coefficient: Not available  
Auto-ignition temperature: 130° - Decomposition temperature: Not available - Odour threshold - Not available  
Evaporation rate: Not available - Flammability (soil, gas) - Not available - Viscosity: Not applicable

### 10. STABILITY AND REACTIVITY

- ▶ Stability: The product is stable under normal conditions.
- ▶ Conditions to Avoid: Do not subject li-ion battery to mechanical shock. Vibration encountered during transportation does not cause leakage, fire or explosion. Do not disassemble, crush, short or install with incorrect polarity. Avoid mechanical or electrical abuse.
- ▶ Incompatible Materials: Not available
- ▶ Hazardous Decomposition Products: This material may release toxic fumes if burned or exposed to fire
- ▶ Possibility of Hazardous Reaction: Not Available.

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### 11. TOXICOLOGICAL INFORMATION

- ▶ Irritation: Risk of irritation occurs only if the cell is mechanically, thermally or electrically abused to the point of compromising the enclosure. If this occurs, irritation to the skin, eyes and respiratory tract may occur.
- ▶ Sensitization: Not Available
- ▶ Neurological Effects: Not Available
- ▶ Teratogenicity: Not Available
- ▶ Reproductive Toxicity: Not Available
- ▶ Mutagenicity (Genetic Effects): Not Available
- ▶ Toxicologically Synergistic Materials: Not Available

### 12. ECOLOGICAL INFORMATION

- ▶ General Note: Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
- ▶ Anticipated behaviour of a chemical product in environment/possible environmental impact/ecotoxicity: Not Available
- ▶ Mobility of soil: Not available - Persistence and Degradability: Not available - Bioaccumulation potential: Not available
- ▶ Other adverse effects: Not available

### 13. DISPOSAL CONSIDERATIONS

- ▶ Product disposal recommendation: Recycle or dispose of in accordance with government, state & local regulations.
- ▶ Packaging disposal recommendation: be aware discarded batteries may cause fire, tape the battery terminals to insulate them. Don't disassembly the battery. Completely discharge containers may be recycled or re-used. Observe local, state and federal laws and regulations. The potential effects on the environment and human health of the substances used in batteries and accumulators, the desirability of disposing of waste batteries and accumulators as unsorted municipal waste and of participating in their separate collection so as to facilitate treatment and recycling.

### 14. TRANSPORT INFORMATION

- ▶ UN number: 3480
- ▶ UN Proper shipping name: Lithium ion Batteries (limited to a maximum of 30% SoC)
- ▶ Transport Hazard class(es): 9
- ▶ Marine pollutant (Yes/No) - No
- ▶ Label(s) / Placard Required: Miscellaneous Lithium battery or Lithium batteries

#### Transport information:

**ICAO /IATA:** Can be shipped by air in accordance with International Civil Aviation Organisation (ICAO), TI or International Air Transport Association (IATA), DGR Packaging Instructions (PI) 965 Section IB appropriate of IATA DGR 59th (2018 Edition) for transportation.

**IMDG CODE:** Shipping may be done in accordance with the IMDG Code 2016 Edition (Amdt 38-16).

**DOT:** Other requirements for the US Department of Transportation (DOT) Subchapter C, Hazardous Materials Regulations if shipped in compliance with 49 CFR 173.185.

**ADR/ADN:** Transport Requirements for United Nations Economic Commission for Europe (UNECE) ADR/ADN, Applicable as from 1st January 2017.

In addition, to be permitted in transport each lithium cell and battery types must have passed the applicable tests set out in Subsection 38.3 of the UN Manual of Tests and Criteria.

### 15. REGULATORY INFORMATION

Dangerous Goods Regulations

Recommendations on the Transport of Dangerous Goods-Model Regulations (20th revised edition)

Recommendations on the Transport of Dangerous Goods-Manual of Tests and Criteria.

International Air Transport Association (IATA)

International Maritime Dangerous Goods (IMDG Code 2016 Edition Amdt 38-16)

Technical Instructions for Safe Transport of Dangerous Good

Classification and code of dangerous goods (GB 6944-2012)

2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Toxic Substance Control Act (TSCA)

Code of Federal Regulations

In accordance with all Federal, State and local laws.

OSHA hazard communication standard (29 CFR 1910.1200)

Hazardous \_\_\_\_\_ V \_\_\_\_\_ Non-hazardous

### 16. ADDITIONAL INFORMATION

To the best of our knowledge, the information contained herein is accurate. However, neither the above name supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

The data/information contain herein has been reviewed and approved for general release on the basis that the document contains no export controlled information.

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