



## Material Safety Data Sheet

### 1. Identification of the Substance/Preparation and of the Company/Undertaking

|                          |                                       |
|--------------------------|---------------------------------------|
| <b>Product:</b>          | Rechargeable Polymer Li-Ion Battery   |
| <b>Manufacturer:</b>     | Conrad Electronic SE                  |
| <b>Nominal voltage:</b>  | 11,1 V                                |
| <b>Nominal capacity:</b> | 5500 mAh                              |
| <b>Address:</b>          | Klaus-Conrad-Str. 1, D-92240 Hirschau |
| <b>Telephone:</b>        | +49 (0) 9604 / 40 - 8988              |
| <b>Date of issue:</b>    | 17.03.2016                            |

#### Other means of identification

Synonyms:none

#### Recommended use of the chemical and restrictions on use

Recommended Use: Used in portable electronic equipments;

- a) Do not dismantle, open or shred secondary cells or batteries.
- b) Do not expose cells or batteries to heat or fire. Avoid storage in direct sunlight.
- c) Do not short-circuit a cell or a battery. Do not store cells or batteries haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects.
- d) Do not remove a cell or battery from its original packaging until required for use.
- e) Do not subject cells or batteries to mechanical shock.
- f) In the event of a cell leaking, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.
- g) Do not use any charger other than that specifically provided for use with the equipment.
- h) Observe the plus (+) and minus (-) marks on the cell, battery and equipment and ensure correct use.
- i) Do not use any cell or battery which is not designed for use with the equipment.
- j) Do not mix cells of different manufacture, capacity, size or type within a device.
- k) Battery usage by children should be supervised.
- l) Seek medical advice immediately if a cell or a battery has been swallowed.
- m) Always purchase the battery recommended by the device manufacturer for the equipment.
- n) Keep cells and batteries clean and dry.
- o) Wipe the cell or battery terminals with a clean dry cloth if they become dirty.
- p) Secondary cells and batteries need to be charged before use. Always use the correct charger and refer to the manufacturer's instructions or equipment manual for proper charging instructions.
- q) Do not leave a battery on prolonged charge when not in use.
- r) After extended periods of storage, it may be necessary to charge and discharge the cells or batteries several times to obtain maximum performance.
- s) Retain the original product literature for future reference.
- t) Use only the cell or battery in the application for which it was intended.
- u) When possible, remove the battery from the equipment when not in use.
- v) Dispose of properly.



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### 2. Hazards Identification

#### Preparation hazards and classification

Not dangerous with normal use. Do not dismantle, open or shred Polymer Li-ion Battery, the ingredients contained within or their ingredients products could be harmful.

#### Appearance, Color, Odor

Solid object with no odor, no color.

#### 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 contact.

#### Potential Health Effects

Acute (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.

Inhalation: Inhalation of materials from a sealed battery is not an expected route of exposure. Vapors or mists from a ruptured battery may cause respiratory irritation.

Ingestion: 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.

Skin: 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.

Eye: 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.

Chronic (long term): see Section 11 for additional toxicological data.

Medical Conditions: Aggravated by Exposure: Not applicable

Reported as carcinogen: Not applicable

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### 3. Composition, Information on Ingredients

Chemical characterixation: Mixtures

**Description:**

Product: Consisting of the following components.

| Common Chemical Name                       | Concentration (%) | CAS Number | EC No.    |
|--|-------------------|------------|-----------|
| Lithium Cobalt Oxide (LiCoO <sub>2</sub> ) | 35.5              | 12190-79-3 | 235-362-0 |
| Aluminum Foil (Al)                         | 9                 | 7429-90-5  | 231-072-3 |
| 1,1-Difluoroethylene polymer               | 1                 | 24937-79-9 | ----      |
| Graphite (C)                               | 18                | 7782-42-5  | 231-955-3 |
| Copper Foil (Cu)                           | 15                | 7440-50-8  | 231-159-6 |
| Styrene-Butadiene polymer                  | 1.5               | 9003-55-8  | ----      |
| Phosphate(1-), hexafluoro-, lithium        | 2.8               | 21324-40-3 | 244-334-7 |
| Ethylene carbonate                         | 5                 | 96-49-1    | 202-510-0 |
| Dimethyl carbonate                         | 5                 | 616-38-6   | 210-478-4 |
| Carbonate, methyl ethyl                    | 5                 | 623-53-0   | ---       |
| Nickel                                     | 2.2               | 7440-02-0  | 231-111-4 |

Note: CAS number is Chemical Abstract Service Registry Number.

### 4. First Aid Measures

**First aid measures**

- Eye Contact:** Rinse thoroughly with plenty of water, also under the eyelids. If symptoms persist, call a physician.
- Skin Contact:** Remove contaminated clothing and shoes. Wash skin with soap and water. In the case of skin irritation or allergic reactions see a physician.
- Inhalation:** Move to fresh air. If symptoms persist, call a physician.
- Ingestion:** Do NOT induce vomiting. Drink plenty of water. If symptoms persist, call a physician.  
Most important symptoms and effects: Both acute and delayed
- Swallowing:** Do not induce vomiting. Get medical attention.  
Most Important symptoms and effects: No information available.

**Indication of any immediate medical attention and special treatment needed**

Notes to Physician: Treat symptomatically



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### 5. Fire-Fighting Measures

**Suitable Extinguishing Media:**

CO<sub>2</sub>, dry chemical powder, water spray.

**Unsuitable Extinguishing Media:**

No information available.

**Specific Hazards Arising from the Chemical:**

Formation of toxic gases is possible during heating or in case of fire.

**In case of fire, the following can be released:**

Carbon monoxide (CO)

Carbon dioxide

Other irritating and toxic gases.

**Hazardous Combustion Products:**

Carbon oxides.

Explosion Data

Sensitivity to Mechanical Impact: No

Sensitivity to Static Discharge: No

**Protective Equipment and Precautions for Firefighters:**

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. For example: Wear self-contained respiratory protective device. Wear suitable protective clothing and eye/face protection.

**Special hazards arising from the substance or mixture:**

Battery may burst and release hazardous decomposition products when exposed to a fire situation. Lithium ion batteries contain flammable electrolyte that may vent, ignite and produce sparks when subjected to high temperature (>150 °C), When damaged or abused (e.g. mechanical damage or electrical overcharging); may burn rapidly with flare-burning effect; may ignite other batteries in clothes proximity.

### 6. Accidental Release Measures

**Personal precautions, protective equipment and emergency procedures:**

Personal Precautions: Avoid contact with eyes.

Refer to section 8 for personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition.

Evacuate personnel to safe areas.

**Environmental precautions:**

Refer to protective measures listed in Sections 7 and 8.

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Dispose contaminated material as waste according to Section 13.

**Methods and material for containment and cleaning up**

Methods for Containment: Prevent further leakage or spillage if safe to do so.

Methods for Cleaning up: Use personal protective equipment. Dam up. Cover liquid spill with sand, earth or other Non combustible absorbent material. Pick up and transfer to properly labeled containers. Clean contaminated surface thoroughly.



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### 7. Handling and Storage

#### Precautions for safe handling:

Handling: Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Wear personal protective equipment.

Wash thoroughly after handling. Use this material with adequate ventilation.

The product is not explosive.

#### Conditions for safe storage, including any incompatibilities:

If the Lithium-ion Battery is subject to storage for such a long term as more than 3 months, it is recommended to recharge the Lithium-ion Polymer Battery periodically.

3 months: -10 °C to +40 °C, 45 to 85% RH

Recommended at 0 °C to +35 °C for long period storage.

The capacity recovery rate in the delivery state (50% capacity of fully charged) after storage is assumed to be 80% or more.

The voltage for a long time storage shall be 3.7 V to 4.2 V range per cell.

Do not storage Lithium-ion Battery haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects.

Keep out of reach of children.

Do not expose Lithium-ion Polymer Battery to heat or fire. Avoid storage in direct sunlight.

Do not store together with oxidizing and acidic materials.

Keep ignition sources away- Do not smoke.

Store in cool, dry and well-ventilated place.

#### Incompatible Products:

None known.

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### 8. Exposure Controls and Personal Protection

**Control parameters:**

|   |                        |
|---|------------------------|
| Ingredients with limit values that require monitoring at the workplace: |                        |
| 12190-79-3 Lithium Cobalt Oxide   |                        |
| TLV (USA)   | 0.02 mg/m <sup>3</sup> |
| MAK (Germany)   | 0.1 mg/m <sup>3</sup>  |

**Other Exposure Guidelines:**

Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

**Appropriate engineering controls:**

- Engineering Measures:**
- Showers
  - Eyewash stations
  - Ventilation systems

Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Ensure adequate ventilation.

**Individual protection measures, such as personal protective equipment:**

**Eye/Face Protection:** Tightly sealed goggles



**Body protection:** Protective work clothing.

**Skin protection:** Protective gloves



**Material of gloves:**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

**Penetration time of glove material:**

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

**Respiratory Protection:**

No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

**Hygiene Measures:**

Handle in accordance with good industrial hygiene and safety practice.



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### 9. Physical and Chemical Properties

|  |  |
|--|--|
| <b>Physical State:</b>                       | Form: prismatic                            |
|  | Color: Silver-white                        |
|  | Odour: Odourless                           |
|  | Odor Threshold: No information available   |
| <b>Change in condition:</b>                  |  |
| pH, with indication of the concentration     | Not determined.                            |
| Melting point/freezing point                 | Not determined.                            |
| Initial boiling point and Boiling range      | Not determined.                            |
| Flash Point                                  | Not determined.                            |
| Evaporation rate                             | Not determined.                            |
| Flammability (solid, gas)                    | Not determined.                            |
| Upper/lower flammability or explosive limits | Not determined.                            |
| Vapor Pressure                               | Not determined.                            |
| Vapor Density                                | Not determined.                            |
| Relative density                             | Not determined.                            |
| Solubility in Water                          | Not determined.                            |
| Solubility in other solvents                 | Not determined.                            |
| n-octanol/water partition coefficient        | Not determined.                            |
| Auto-ignition temperature                    | Product is not self-igniting.              |
| Decomposition temperature                    | Not determined.                            |
| Odour threshold                              | Not determined.                            |
| Evaporation rate                             | Not determined.                            |
| Viscosity                                    | Not determined.                            |
| Other Information                            | No further relevant information available. |

### 10. Stability and Reactivity

**Reactivity:** Stable under recommended storage and handling conditions (see section 7, Handling and storage).

**Chemical stability:** Stable under normal conditions of use, storage and transport.

**Thermal decomposition/conditions to be avoided:** No decomposition if used according to specifications.

**Possibility of Hazardous Reactions:** None under normal processing.

**Hazardous Polymerization:** Hazardous polymerization does not occur.

**Conditions to avoid:** Strong heating, fire, Incompatible materials.

**Incompatible materials:** Strong oxidizing agents. Strong acids. Base metals.

**Hazardous Decomposition Products:** Carbon oxides, Other irritating and toxic gases.



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### 11. Toxicological Information

**Acute toxicity:** No data available.

**LD/LC50 values relevant for classification:** Not available.

**Skin corrosion/irritation:** No irritant effect.

**Serious eye damage/irritation:** Cause serious eye irritation.

**Respiratory or skin sensitization:** No sensitizing effects known.

**Specific target organ system toxicity:** No information available.

**CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction):** No information available.

### 12. Ecological Information

**Toxicity:**

**Aquatic toxicity:** No further relevant information available.

**Persistence and degradability:** No further relevant information available.

**Bioaccumulative potential:** No further relevant information available.

**Mobility in soil:** No further relevant information available.

**Results of PBT and vPvB assessment:** PBT: Not applicable.  
vPvB: Not applicable.

**Other adverse effects:** No information available.

### 13. Disposal Considerations

**Waste treatment methods:**

Recommendation: Must not be disposed together with household garbage.

Do not allow product to reach sewage system

**Uncleaned packaging:**

Recommendation: Disposal must be made according to official regulations.





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### 14. Transport Information

#### Land transport

ADR/RID class: Not regulated.

UN-Number: UN3480 or UN3481.

#### Maritime transport

IMDG Class: Class 9.

UN Number: UN3480 or UN3481.

Marine pollutant: No

#### Air transport

ICAO/IATA Class: Class 9

UN/ID Number: UN3480 or UN3481

Environmental hazards: Not applicable.

Special precautions for user: Not applicable.

Transport/Additional information: Not restricted goods according to the above specifications.

The Lithium-Ion battery had been tested according to the requirements of the UN manual of tests and Criteria, Part III, subsection 38.3.

The lithium ion batteries according to Section II/Section IB of PACKING INSTRUCTION 965, or Section II of PACKING INSTRUCTION 966~967 of the Dangerous Goods regulations 57th Edition may be transported.

The packaging shall be adequate to avoid mechanical damage during transport, handling and stacking. The materials and pack design shall be chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of moisture.

Meets requirements of DOT Special Provision 188 to be transported as non-dangerous goods.

Meets the requirements of 49CFR173.185 to be transported as non-dangerous goods for road, rail, air, and vessel (Effective August 6, 2014 per HM224F).

The package must be handled with care and that a flammability hazard exists if the package is damaged.



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### 15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

EU Regulation:

**Authorisations:** No information available.

**Restrictions on use:** No information available.

**Regulatory information:**

| CAS No.    | EU<br>(EINECS) | US<br>(TSCA) | Japan<br>(ENCS) | Canada<br>(DSL/NDSL) | Austria<br>(AICS) | Korea<br>(ECL) | China<br>(IECSC) |
|------------|----------------|--------------|-----------------|----------------------|-------------------|----------------|------------------|
| 12190-79-3 | Listed         | Not listed   | Not listed      | NDSL                 | Not listed        | Not listed     | Not listed       |
| 7429-90-5  | Listed         | Listed       | Listed          | DSL                  | Listed            | Listed         | Listed           |
| 24937-79-9 | Listed         | Listed       | Listed          | DSL                  | Listed            | Listed         | Listed           |
| 7782-42-5  | Not listed     | Listed       | Not listed      | DSL                  | Listed            | Listed         | Listed           |
| 7440-50-8  | Not listed     | Listed       | Not listed      | DSL                  | Listed            | Listed         | Listed           |
| 9003-55-8  | Listed         | Listed       | Listed          | DSL                  | Listed            | Listed         | Listed           |
| 21324-40-3 | Listed         | Not listed   | Not listed      | Not listed           | Not listed        | Not listed     | Listed           |
| 96-49-1    | Listed         | Listed       | Not listed      | NDSL                 | Not listed        | Not listed     | Not listed       |
| 616-38-6   | Listed         | Listed       | Listed          | DSL                  | Listed            | Listed         | Listed           |
| 623-53-0   | Listed         | Listed       | Listed          | DSL                  | Listed            | Listed         | Listed           |
| 7440-02-0  | Listed         | Listed       | Listed          | DSL                  | Listed            | Listed         | Listed           |

**Chemical safety assessment** A Chemical Safety Assessment has not been carried out.

### 16. Other Information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.