



Material Safety Data Sheet

1. Product & Company Identification

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|--------------------------|---|
| Product: | Lithium Ion Rechargeable Battery for Digital Camera |
| Manufacturer: | Conrad Electronic SE |
| Nominal voltage: | 3,7 V |
| Nominal capacity: | 450 mAh |
| Address: | Klaus-Conrad-Str. 1, D-92240 Hirschau |
| Telephone: | +49 (0) 9604 / 40 - 8988 |
| Date of issue: | 10.04.2014 |

2. Composition/Information on Ingredients

Information about the chemical nature of product:

| Ingredient Name | CAS No. | Concentration | ACGIH-TLV** |
|--------------------------------|------------|---------------|---|
| Lithium Cobalt Dioxide | 12190-79-3 | 25 - 40 % | 0.02 mg/m ³ (Co, TWA) |
| Equivalent Max Lithium Content | 7439-93-2 | 0.95 g/pcs | — |
| Aluminum foil | 7429-90-5 | 2 - 6 % | 2 mg/m ³ (Soluble salts, TWA) |
| Graphite (various Carbons) | 7782-42-5 | 11 - 21 % | 2 mg/m ³ (Dust, TWA) |
| Copper foil | 7440-50-8 | 6 - 16 % | 0.2 mg/m ³ (Fume, TWA) |
| Organic electrolyte | — | 8 - 18 % | None established |
| Lithium hexafluorophosphate | 21324-40-3 | 1 - 4 % | 2.5 mg/m ³ (F, TWA) |
| Steel and inert components | 7439-89-6 | balance | — |

ACGIH: American Council of Government Industrial Hygienists.

TLV: Threshold Limit Value are Personal exposure limit determined by ACGIH.

TWA: Time Weighted Average Concentration



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3. Independent Certification of Lithium-Ion cell UN Transportation Model Regulation

| No | Test Item | Criteria | Result | Remark |
|----|------------------------|--|--------|--------------|
| T1 | Altitude Simulation | No mass loss,leakage,venting,disassembly,rupture,and fire. OCV should not be less than 90% before testing. | Passed | |
| T2 | Thermal Test | No mass loss,leakage,venting,disassembly,rupture,and fire. OCV should not be less than 90% before testing. | Passed | |
| T3 | Vibration | No mass loss,leakage,venting,disassembly,rupture,and fire. OCV should not be less than 90% before testing. | Passed | |
| T4 | Shock | No mass loss,leakage,venting,disassembly,rupture,and fire. OCV should not be less than 91% before testing. | Passed | |
| T5 | External Short Circuit | External temperature should not exceed 170 degC. No disassembly,rupture,and fire within six hours of this test. | Passed | |
| T6 | Impact | External temperature should not exceed 170 degC. No disassembly,and fire within six hours of this test. | Passed | |
| T7 | Overcharge | No disassembly,and fire within seven days of this test. | Passed | Battery only |
| T8 | Forced Discharge | No disassembly,and fire within seven days of this test. | Passed | |

We confirm the test results based on the UN manual of tests and criteria 383

4. Hazards Identification

All chemical materials of lithium ion battery cell are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. There is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage during normal use. However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress by miss-use, the gas release vent will be operated and hazardous materials may be released.

Potential Health Effects:

Cobalt and Cobalt compounds are considered to be possible human carcinogen(s). These chemicals may cause allergic skin sensitization (rash) and irritate eyes, skin, nose, throat, respiratory system.

Since electrolyte is flammable liquid, it does not bring close to fire. It may cause moderate to severe eye irritation, dryness of the skin. Breathing of its mist, vapor or fume may irritate nose, throat and lungs. Exposure of electrolyte material in the area which contains water may generate hydrofluoric acid, which can cause immediate burns on skin, severe eye burn. The ingestion of electrolyte can cause serious chemical burns of mouth, esophagus and gastrointestinal tract.



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5. First Aid Measures

Eyes:

Flush with water for at least 15 minutes. If irritation occurs and persists, contact a medical doctor.

Skin:

Remove contaminated clothing and thoroughly wash with soap and plenty of water. If irritation persists, contact a medical doctor.

Inhalation:

Remove to fresh air. If breathing difficulty or discomfort occurs and persists, see a medical doctor. If breathing has stopped, give artificial respiration and see a medical doctor IMMEDIATELY.

6. Firefighting Measures

Hazardous Combustion Products:

When burned, hazardous products of combustion including fumes of carbon monoxide, carbon dioxide, and fluorine can occur

Extinguishing Media:

Water, carbon dioxide, dry chemical, or foam.

Basic Fire Fighting Procedures:

Wear NIOSH/MSHA approved positive pressure self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Unusual Fire & Explosion Hazards:

This material does not represent an unusual fire or explosion hazard.

Flash Point: 65°C (CC) (149F)

Autoflammability Temperature: No Data.

Flammability Limits in Air, Lower, % by Volume: 1.4

Flammability Limits in Air, Upper, % by Volume: 11

7. Accidental Release Measures

Procedure for Release and Spill: Sweep up and place in a suitable container, dispose or waste according to all local, state and Federal Laws and Regulations.

Before cleanup measures begin, review the entire MSDS with particular attention Potential Health Effects; and on Recommended Personal Protective Equipment.



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8. Handling and Storage

Handling

Specific safe handling advice: Never throw out cells in a fire or expose to high temperatures. Do not soak cells in water and seawater. Do not expose to strong oxidizers. Do not give a strong mechanical shock or throw down. Never disassemble, modify or deform. Do not connect the positive terminal to the negative terminal with electrically conductive material.

Storage conditions (suitable, to be avoided):

Do not place the battery cell near heating equipment, nor expose to direct sunlight for long periods. Elevated temperatures can result in shortened battery cell life and degrade performance.

Store in cool place (temperature: -20-45°C, humidity: 45-75%).

Incompatible products: Conductive materials, water, seawater, strong oxidizers and strong acids

Packing material (recommended, not suitable): Insulative and tearproof materials are recommended.

9. Exposure Controls and Personal Protection

Engineering controls:

Investigate engineering techniques to reduce exposures use with adequate ventilation and recommended personal protective equipment.

Eye/Face protection:

Use good industrial practice to avoid eye contact. Processing of this product releases vapors or fumes which may cause eye irritation. Where eye contact may be likely wear chemical goggles and have eye flushing equipment available

Skin protection:

Minimize skin contamination by following good industrial hygiene practices. Wearing protective gloves is recommended. Wash hands and contaminated skin thoroughly after handling.

Respiratory protection:

Avoid breathing dust and processing vapors. When adequate ventilation is not available, wear a NIOSH/MSHA respirator approved for protection against inorganic dusts.

Special clothing:

Rubber gloves.

10. Physical and Chemical Properties

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|------------------------------|--|
| Physical state: | Solid |
| Form: | Geometric solid |
| Color: | Metallic color (without outer PVC cover) |
| Odor: | No odor |
| pH: | Not Applicable |
| Flash point: | Not Applicable |
| Explosion properties: | Not Applicable |
| Density: | Not Applicable |
| Solubility: | Not Soluble |



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11. Stability and Reactivity

Hazardous reactions may occur under some specific conditions.

Conditions to avoid:

When a battery cell is exposed to an external short-circuit, crushes, modification, high temperature above 100 degree C, it will be the cause of heat generation and ignition. Avoid to be exposed to direct sunlight and high humidity.

Materials to avoid:

Conductive materials, water, seawater, strong oxidizers and strong acids.

Hazardous decomposition products:

Acrid or harmful gas is emitted during fire.

12. Toxicological Information

Eco Toxicological Information:

No information available.

Local Environmental Effects:

Unknown.

Since some internal materials remain in the environment, do not bury or throw out into the environment.

13. Disposal Information

Waste disposal must be in accordance with the applicable regulations. Disposal of the lithium ion battery cells should be performed by permitted, professional disposal firms knowledgeable in State or Local requirements of hazardous waste treatment and hazardous waste transportation. Incineration should never be performed by battery but users, eventually by trained professional in authorized facility with proper gas and fume treatment.



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14. Transport/Shipping Information

US DOT

All the batteries are not subject to the requirements of the Department of Transportation (DOT) subchapter C, Hazardous Material Regulations since each battery meets the exceptions under 173.185 (b). The batteries are exempted from the US DOT regulations as long as they are separated to prevent short circuits and packed in strong packing for conditions normally encountered in transportation.

ICAO and IATA

All batteries are regulated as Hazardous Material by the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) when transporting more than 24 batteries or 12 batteries in a single package. They must be transported according to the requirement in Special Provision "A45".

IMO

All the batteries are regulated as Hazardous Material by the International Maritime Organization (IMO) when transporting more than 24 batteries or 12 batteries in a single package. These must be transported according to the requirement in Special Provisions "188" and "230".

ADR, RID

All the batteries are regulated as Hazardous Material by the ADR (road) and RID (rail) when transporting more than 24 batteries or 12 batteries in a single package. These must be transported according to the requirement in Special Provisions "188" and "230".

BUILDING OF NEW BATTERY PACK

If you build any of the lithium batteries into battery pack,, the consignment is fully by proper shipping name and packed, certify that the consignment is not classified as dangerous under the current edition of the IATA DANGEROUS GOODS REGULATIONS P1965" you must assure that they are being tested in accordance with the UN Model Regulation, Manual of Test and Criteria, Part III, subsection 38.3. and all applicable carrier and governmental regulations

Remark: The batteries are safe for transportation, and it is advised to use dry power powder fire extinguisher in case of explosion or inflammation.