

MATERIAL SAFETY DATA SHEET

REMS GmbH & Co KG

Art.-Nr. 175000, 175300

Product Name: Lithium Polymer Batteries pack

Issued and Revised Date: 12-April-2017

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Lithium Polymer Batteries Pack

Applicable Models: All

Supplier Identification:

REMS GmbH & Co KG · Maschinen- und Werkzeugfabrik

Stuttgarter Straße 83, 71332 Waiblingen, Deutschland

Telefon +49 7151 1707-0 · Telefax +49 7151 1707-110

www.rems.de · info@rems.de

2. COMPOSITION / INFORMATION ON INGREDIENTS

Information about the chemical nature of product:

INGREDIENTS	Weight Percentage/%(about)	CAS No.
Cobaltic lithium oxide	35.05%	12190-79-3
Graphite powder	15.98%	7782-42-5
Rubber	10.36%	69028-37-1
Carbon black	0.79%	1333-86-4
Styrene-butadiene rubber (SBR)	0.71%	61789-96-6
Polypropylene	1.74%	9003-07-0
Polyethylene	1.27%	9002-88-4
Lithium hexafluorophosphate	1.27%	21324-40-3
Ethylene carbonate (EC)	6.34%	96-49-1
Diethyl carbonate (DEC)	4.76%	105-58-8
Propylene carbonate (PC)	1.11%	108-32-7
Polycaprolactam (NYLON 6)	1.11%	25038-54-4
Copper	8.39%	7440-50-8
Aluminium	11.12%	7429-90-5

3. Independent Certification of Lithium-Polymer batteries pack 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	

4. PHYSICAL /CHEMICAL CHARACTERISTICS:

Specific Gravity :LiCoO₂:3.80 Graphite:2.0~2.2 (H₂O=1)

Melting Point: LiCoO₂:1130°C

Appearance and Odor: LiCoO₂ is a gray odorless powder; Graphite is a black or odorless powder;
Organic solvent is a colorless liquid; Lithium salt is a white, crystalline and odorless powder.

5. 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.

6. 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..
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7. FIRE-FIGHTING MEASURE

- ▶ 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: 38°C (CC) (100F)

Autolgnition Temperature: No Data.

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

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

8. 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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9. 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: -20-45C, 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.

10. EXPOSURE CONTROLS / 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: Robber gloves.

11. STABILITY AND REACTIVITY

Hazardous reactions may occur under some specific conditions.

▶ Conditions to avoid: When a battery pack 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 batteries pack should be performed by permitted, professional disposal Page:

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.

14. TRANSPORT INFORMATION

The consignment complies with the current edition-188 of IMDG

Description:Lithium ion battery (UN3480)

- 1) This consignment is comply with Section II of PI965-PI967 of 188 of IMDG
- 2) UN manual of Tests and criteria, part III,sub-section 38.3(withstanding a 1.2m drop test)
- 3) With content of lithium less than 20Wh per cell or 100Wh per battery.

The consignment can be shipped as “Not Restricted”in accordance with the current edition of 188 of IMDG

- A) This consignment packed in a clean,good and strong outer packing.
- B) This consignment does not contain any recalled and/or defective batteries.
- C) This consignment have been packed in comply with section II of PI966.
- D) Handle with care,Flammablilty hazard exists if the package is damaged.
- E) In any event of the package is fond damaged,please follow the special procedures.

If package is damaged,batteries must be protected so as to prevent short circuit.Batteries is completely enclosed by inner packaging(so) as to prevent from short circuit.

No	ITEMS	RESULT	REMARKS
1	Altitude simulation	Pass	Test 1 to 5 must be conducted in sequence on the same cell or battery
2	Thermal test	Pass	
3	Vibration	Pass	
4	Shock	Pass	
5	External short circuit	Pass	
6	Impact	Pass	
7	Overcharge	Pass	Only battery do need this test item
8	Forced Discharge	Pass	

The product is not classified as dangerous under current idition of the 55TH,2017of the 188 of IMDG DGR. Dangerous goods ragulations and according PI966 all applicable Carriers.The product is safe for transportation and not regulated by 188 of IMDG

Address: REMS GmbH & Co KG
 Maschinen- und Werkzeugfabrik
 Stuttgarter Straße 83
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 Deutschland
 Telefon +49 7151 1707-0
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