

Material Safety Data Sheet

Lithium Rechargeable Battery

Model: YT Series

Material Safety Data Sheet

1. Identification of the Product and of the Company

Product Information

Trade Name : YUNTONG Lithium Battery

Model : YT Series

Chemical System : Graphite/Lithium Cobalt Oxide

Company : YUNTONG Power Co., Ltd

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2. Composition/Information on Ingredients

Ingredient Name	CAS#
Carbon (C)	1333-86-4
Lithium Cobalt Oxide (LiCoO ₂)	12057-24-8 1308-04-9
Lithium Hexafluorophosphate (LiPF ₆)	21340-40-3
Organic Carbonates(EC/EMC/DEC)	N/A
Polyvinylidene Fluoride (PVDF)	24937-79-9
PP+PE	9003-07-0 9002-88-4
Copper (Cu)	7440-50-8
Aluminum (Al)	7429-50-5
Nickel	7440-02-0

3. Hazard Identification

a. Lithium cobalt oxide: Blue-black powder (odorless), cobalt and cobalt compounds are considered to be possible human carcinogen(s). By IARC: May irritate eyes, skin, nose, throat and respiratory system and may cause allergic skin sensitization.

b. Carbon: Black powder (odorless), no cases of carbon being harm to human have been reported. WHO and ILO have never verified that carbon irritation of the skin and mucous membrane, etc.

c. Electric agent: Black powder (Garlic-Like), Toxicity (Am. Conf. Of Gov. Ind. Hygienists ACGIH 2000 Edition): Simple Asphyxiant, Flammability limits in air (STP conditions):2.4-83 vol% (The upper limit could reach 100%).

d. Bond: White powder (odorless), inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. As a finished product, it is a synthetic, high molecular weight polymer. Due to its chemical and physical properties, this material does not require special handling other than the good industrial hygiene and safety practices employed with any industrial material of this type. Under normal processing conditions, this material releases fume or vapor components of these releases may vary with processing time and temperature. These processes may produce eye, skin and/or respiratory tract irritation and, with repeated or prolonged exposures, nausea, drowsiness, headache and weakness. Although unlikely under normal handling conditions, if this material is heated in excess of 600F(315°C), hazardous decomposition products will be produced. Hazardous decomposition products include hydrogen fluoride and oxides of carbon, the concentrations of which vary with temperature and heating regimes.

e. Electrolyte: Liquid (colorless), may cause moderate to severe irritation, burning, and dryness of the skin. May cause eye irritation or burning. Breathing of the mists, vapors or fumes may irritate the nose, throat and lungs or fumes may irritate the nose, throat and lungs. Exposure of material with areas which contain water may generate hydrofluoric acid which can cause immediate burns on skin, severe eye burns to the mouth and gastrointestinal tract if inhaled. Direct exposure to areas of the body needs to be treated immediately to prevent injury.

Under normal conditions of use the battery is hermetically sealed article. The products referenced herein are exempt article and are not subject to OSHA's Hazard Communication Standard requirements for preparation of material safety data sheets. This information is provided as a service to our customers.

4. First Aid Measures

General advice: Burning and disassembly batteries may emit acrid smoke, irritating fumes, and toxic fumes of hazardous oxides of carbons, hydrofluoric acid and other toxic by-products.

Inhalation: Remove to fresh air, if breathing difficulty or discomfort occurs and persists, see a medical doctor. If breathing stopped, give artificial respiration and see a medical doctor immediately.

Skin contact: Remove contaminated clothing and thoroughly wash with soap and plenty of water. If irritation persists, consult a physician.

Eye contact: Rinse thoroughly with plenty of water for at least 15 minutes. If symptoms persist, call a physician. Ingestion: Swallowing a battery can be harmful. Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract. If open battery is ingested, do not induce vomiting or give food or drink. Seek medical attention immediately.

5. Fire-fighting 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: In the event of fire, wear self-contained breathing apparatus and protective clothing to avoid fume inhalation.

Unusual fire & explosion hazards: This material does not represent an unusual fire or explosion hazard.

Flash point: N/A

Auto ignition temperature: N/A

Flammability limits in air, lower: N/A

Flammability limits in air, upper: N/A

6. Accidental Release Measures

Personal precautions: Evacuate personnel to safe areas, ventilate the area. refer to protective measure listed in section 7 and 8.

Environment precautions: Sweep up and place in a suitable container, dispose or waste according to local, state and federal laws and regulations.

7. Handling and Storage

Handling

Battery charge: Charge according to manufacture's specifications.

Battery disassembly: The batteries should never be disassembled, or mechanically abused. Should a batter unintentionally crushed or opened, thus releasing its content, rubber gloves should be used to handle battery components. The inhalation of any vapor that may be emitted should be avoided.

Short circuiting of a battery: As with any battery, short circuit causes heating. in addition, short circuit reduces the life of the battery and can lead to ignition of surrounding materials. physical contact with to short-circuited battery can cause skin burns.

Reverse polarity: Avoid revering the battery polarity within a battery pack, this can cause the battery or the battery to be damaged or flame.

Storage

Storage preferably in cool, dry and ventilated area, don't place the battery near heating equipment, nor expose to direct sunlight for long periods. Elevated temperatures can result in shortened battery life and degrade performance.

8. Exposure Controls/Personal Protection

Respiratory protection: No necessary under normal use. In case electrolyte leakage from battery, protect hand with chemical resistant rubber gloves. If battery is burning, leave the area immediately. In abuse, use NIOSH approved acid gas filter mask or self-contained breathing apparatus.

Ventilation: No necessary under normal use. In case of abuse, use adequate mechanical ventilation for battery that vent gas or fumes.

Protective gloves: None under normal use. in case of spill use PVC, neoprene or nitrile gloves of 15mils(0.015 inch) or thicker.

Eye protection: None required under normal conditions. Use ANSI approved chemical work safety goggles or face shield, if handling a leaking or rupture battery.

Skin protection: No necessary under normal use. Use rubber apron and protective working

in case of handling of a rupture battery.

Other protective equipment: Chemical resistance clothing is recommended along with eye wash station and safety shower should be available meeting ANSI design criteria.

Work hygienic practices: Use good chemical hygiene practice. Wash hands after use and before drinking, eating or smoking. Wash hands thoroughly after cleaning-up a battery spill caused by leaking battery. No eating, drinking, or smoking in battery storage area. Launder contaminated cloth before reuse.

Supplementary safety and health data: If the battery is broken or leaked the main hazard is the electrolyte. The electrolyte is mainly solution of LiPF₆, EC, EMC and DEC.

9. Physical and Chemical Properties

Physical state : Solid-article

Freezing point : N/A

Boiling point : N/A

Density : N/A

Vapor pressure : N/A

Vapour density : N/A

Flash point : N/A

Evaporation rate : N/A

10. Stability and Reactivity

Stability: Stable during normal operation conditions.

Conditions/materials to avoid: Incompatible with water, moisture, strong oxidizing agents, reducing agents, acids and bases.

Hazardous decomposition or byproducts: None under normal operating conditions. Carbon dioxide and hydrogen fluoride gas may be generated during combustion of battery.

Ventilation requirements: Not necessary under normal conditions of use.

11. Toxicological Information

Not applicable under normal conditions of use. Chemicals within the battery have the following properties:

Cobalt in lithium cobalt oxide is considered as a class 2B carcinogen by IARC. Organic carbonated (electrolyte) vapors are categorized as corrosive, flammable and irritants.

12. Ecological Information

a. When properly used or disposed, the YUNTONG batteries do not present environmental hazard.

b. The battery does not contain mercury, cadmium or lead.

c. Do not let internal components enter marine environment. Avoid release to waterways, wastewater or groundwater.

13. Disposal Considerations

- a. Waste disposal must be in accordance with the applicable regulations.
- b. Disposal of the YUNTONG lithium rechargeable batteries should be performed by permitted, professional disposal firms knowledgeable in federal, state or local requirements of hazardous waste treatment and hazardous waste transportation.
- c. Incineration should never be performed by battery use.
- d. The YUNTONG batteries contained recyclable materials. Recycling options available in your local area should be considered when disposing of this product, through licensed waste carrier.
- e. The YUNTONG batteries should have their terminal insulated in order to prevent short circuits during transportation to the disposal site.

14. Transportation Information

Lithium batteries with a watt-hour rating of 20wh/cell or less and 100wh/battery pack or less can be treated as "Non-dangerous goods" under the United Nations Recommendations on the Transport of Dangerous Goods, Special provision A88, provided that packaging is strong and prevent the products from short-circuit. Lithium batteries meet the requirements of UN38.3 (UN Manual of Tests and Criteria, Part III, Subsection 38.3.)

The lithium battery is according to Section II of packing instructions 965-970 of IATA DGR 51st Edition for transportation.

With regard to air transport, the following regulations are cited and considered:

- The international Civil Aviation Organization (ICAO) Technical Instructions (2010, 51 Edition),
- The International Air Transport Association (IATA) Dangerous Goods Regulations (51 Edition, Special Provisions A88)
- The US Hazardous Materials Regulation (HMR) pursuant to a final rule issued by RSPA (Part 49 CFR Sections 100-185),
- The Office of Hazardous Materials Safety within the US Department of Transportation's (DOT) Research and Special Programs Administration (RSPA), and
- The UN Recommendations on the Transport of Dangerous Goods Model Regulations and the Manual of Tests and Criteria.

15. Regulatory Information

1. The transportation of the lithium batteries is regulated by the United Nations, "Model Regulations on Transport of Dangerous Goods".
2. Lithium batteries and cells are subjected to shipping requirements exceptions under 49 CFR 173.185.
3. Shipping of lithium batteries in aircrafts are regulated by the international civil aviation organization (ICAO) and the international air transport association (IATA) requirements in special provision "A88".
4. Shipping of lithium batteries on sea are regulated the international maritime dangerous goods (IMDG) requirements of UN3480.
5. Cobalt compounds are considered hazardous and are subjected to reporting requirements of section 313 of title III of the superfund amendments and reauthorization act of 1986(SARA) and 40 CFR part 372.

16. Other Information

The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. YUNTONG makes no warranty expressed or implied with respect to this information and recommendations and disclaims all liability from reliance on it. "Equivalent lithium content" information is available from YUNTONG on request.