



# Lithium Iron Phosphate Battery

## Safety Data Sheet

Version: 1.0

### SECTION 1. Product and Company identification

Product Name	: Lithium Iron Phosphate Battery
Synonyms	: Li-Ion – [See APPENDIX A]
Use of the substance/preparation	: Lithium Iron Phosphate rechargeable cells
Company identification	: Vertical Partners West 14028 North Ohio Street Rathdrum, ID 83858
Telephone number for information	: 1-800-705-0620 (USA)
24 hour emergency contact	: Chemtrec 1-800-424-9300

### SECTION 2. Hazards identification

#### 2.1. OSHA Regulatory Status

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

#### 2.2. Potential health effects

**Lithium Iron Phosphate:** (LiFePO<sub>4</sub>): black powder(odorless), no cases of Lithium Iron Phosphate being harm to human have been reported.

**Carbon:** Odorless black powder - no cases of carbon being harmful to humans have been reported. World Health Organization (WHO), and International Labour Organization (ILO) have never verified that carbon causes irritation of the skin and mucous membrane, etc.

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

**Bond:** Odorless white powder - 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. Process releases may produce eye, skin and/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 600°F (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 regimens.

**Electrolyte:** Colorless liquid - 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. 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.

#### 2.3. Potential environmental effects

No additional information available.

### SECTION: 3. Composition/information on ingredients

Name	CAS number	%
Lithium Iron Phosphate (LiFePO <sub>4</sub> )	15365-14-7	30-33%
Carbon, as Graphite	7440-44-0	15-17%
Organic Carbonates(EC/EMC/DEC)	N/A	15-20%
Polyvinylidene Fluoride(PVDF)	24937-79-9	1-6%
PP+PE	9003-07-0 9002-88-4	4-6%
Copper(Cu)	7440-50-8	7-10%
Aluminum(Al)	7429-50-5	5-8%
Nickel	7440-02-0	0.5-1%

### SECTION: 4. First aid measures

#### 4.1. First aid procedures

First-aid measures general	: The following first aid measures are required in the case of exposure to interior battery components after damage of the external battery casing. Undamaged, closed cells do not represent a danger to health.
First-aid measures after inhalation	: Assure fresh air breathing. If breathing difficulty or discomfort occurs and persists, see a physician. If breathing stops, give artificial respiration and see a physician immediately.
First-aid measures after skin contact	: Remove contaminated clothing and thoroughly wash with soap and plenty of water. If irritation persists, consult a physician.
First-aid measures after eye contact	: Rinse thoroughly with plenty of water for at least 15 minutes. If symptoms persist contact a physician.
First-aid measures after ingestion	: 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.

### SECTION: 5. Firefighting measures

#### 5.1. Extinguishing media

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

**Fire and explosion:** This material does not represent an unusual fire or explosion hazard.

**Flash point:** N/A

**Auto ignition:** N/A

**Flammability limits:** N/A

#### 5.2. Extinguishing media

Suitable extinguishing media	: Water, Carbon dioxide, dry chemical or foam
Protection during firefighting	: Wear protective clothing and self-contained breathing apparatus to avoid fume inhalation.

## SECTION: 6. Accidental release measures

### 6.1. Personal precautions

Evacuate personnel to safe areas, ventilate the area. Refer to protective measure listed in section 7 and 8.

#### 6.1.1. For non-emergency personnel

Emergency procedures : Evacuate unnecessary personnel.

#### 6.1.2. For emergency responders

Protective equipment : Inhalation of any vapor that may be emitted should be avoided. Wear self-contained breathing apparatus to avoid fume inhalation. Rubber gloves should be used to handle the contents of crushed or opened batteries.

### 6.2. Environmental precautions

Sweep up and place in a suitable container, dispose of waste according to local, state and federal laws and regulations.

## SECTION: 7. Handling and storage

### 7.1. Handling

**Battery charge:** Charge according to manufacturer's specifications.

**Battery disassembly:** The batteries should never be disassembled, or mechanically abused. Should a battery unintentionally be 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 a short-circuited battery can cause skin burns.

**Reverse polarity:** Avoid reversing the battery polarity of a battery pack, which can cause the battery to be damaged and potentially cause a fire.

### 7.2. Storage

Storage conditions : Store in a cool, dry and ventilated area. Do not place the battery near heating equipment, or expose to direct sunlight for long periods of time. Elevated temperatures can result in shortened battery life and degrade performance.

## SECTION: 8. Exposure controls/personal protection

Personal protective equipment : None required under normal use.

Eye protection : Use ANSI approved chemical work safety goggles or face shield, when handling a leaking or ruptured battery.

Skin protection : Use rubber apron and protective gloves if working with or handling a ruptured battery.

Hand protection : In case of spill use PVC, neoprene or nitrile gloves of 15 mils (0.015 inch) or thicker.

Work hygienic practice : 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 re-use.

Supplementary safety and health data : If the battery case is broken or cells leaking, the main hazard is the electrolyte. The electrolyte is a solution of LiPF<sub>6</sub>, EC, EMC and DEC.

## SECTION: 9. Physical and chemical properties

Physical state	: Solid article
Freezing point	: N/A
Boiling point	: N/A
Density	: N/A
Vapor pressure	: N/A
Vapor density	: N/A
Flash point	: N/A
Evaporation rate	: N/A

## SECTION: 10. Stability and reactivity

### 10.1. Stability

Stable during normal operating conditions.

### 10.2. Conditions to avoid

Keep away from open flames, hot surfaces, and sources of ignition. Do not puncture, crush, or incinerate.

### 10.3. Incompatible materials

Incompatible with water, moisture, strong oxidizing agents, reducing agents, acids and bases.

### 10.4. Hazardous decomposition products

None, under normal operating conditions. Carbon dioxide and hydrogen fluoride gas may be generated during combustion of battery.

## SECTION: 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.

## SECTION: 12. Ecological information

### 12.1 Ecotoxicity

The batteries when properly used or disposed of do not present environmental hazard. The batteries do not contain mercury, cadmium or lead.

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

## SECTION: 13. Disposal considerations

### 13.1. Waste treatment methods

Do not incinerate. Waste disposal must be in accordance with any and all applicable regulations. Disposal of lithium rechargeable batteries should be performed by permitted, professional disposal firms knowledgeable in federal, state or local requirements. Lithium batteries should be discharged to 0.00mAh prior to disposal.

## SECTION: 14. Transport information

### 14.1. Basic shipping description

UN3480 Lithium ion batteries, Class 9

### 14.2 Additional information

Other information : These batteries must be prepared for transportation as defined by DOT, IATA, and IMDG regulations based on the mode of transportation. This consignment has passed UN 38.3 test report.

Customer service telephone number for information: 1-800-705-0620

	Section IA	Section IB	Section II
<b>Capacity of Cell/Batteries</b>	<u>Cells</u> : greater than 20 Wh <u>Batteries</u> : greater than 100 Wh	<u>Cells</u> : no more than 20 Wh <u>Batteries</u> : no more than 100 Wh	* <u>Cell/Batteries</u> : no more than 2.7 Wh * <u>Cells</u> : more than 2.7 but no more than 20 Wh * <u>Batteries</u> : more than 2.7 Wh but not more than 100 Wh
<b>Package Limitation</b>	PAX: 5 kg CAO: 35 kg	10 kg Gross	* 2.5 kg * 8 cells * 2 batteries *must not be loaded in same package

### SECTION: 15. Regulatory information

The transportation of the lithium batteries is regulated by the United Nations "Model Regulations on Transport of Dangerous Goods".

Exceptions from shipping requirements for lithium cells and batteries are provided in 49 CFR 173.185.

Shipping of lithium batteries in aircrafts are regulated by the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) requirements. See special provision A88.

Shipping of lithium batteries by vessel are regulated by the International Maritime Dangerous Goods (IMDG).

### SECTION: 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. Venom makes no warranty expressed or implied with respect to this information. Venom does not accept liability for any loss or damage that may occur, whether direct, incidental or consequential, from the use of this information.

## APPENDIX A

ITEM	DESCRIPTION
15151	10C 2S 850mAh 6.6V LiFE Receiver Pack