

MATERIAL SAFETY DATA SHEET

The batteries are exempt articles and are not subject to the OSHA Hazard Communication Standard Requirement. This sheet is only provided as technical information and is referred normal use of the product in question. Zeus makes no warranty expressed or implied.

SECTION 1 - Product and Company Identification

⚡ Product Name: Lithium Iron Phosphate Batteries	Rating: PCLFPXX-12.8 (F2 or M6)
⚡ Company: PowerCell LLC dba ZEUS Battery Products	Telephone Number: +1 (630) 295-6800
⚡ Address: 191 Covington Dr. Bloomington, IL 60108 USA	Fax Number: +1 (630) 295-6801
	Date of Preparation: February 19th, 2019

SECTION 2 - Composition Information

Chemical Composition	Chemical Formula	CAS#	Weight (%)
Lithium Iron Phosphate	LiFePO ₄	15365-14-7	26 - 28
Polyvinylidene Fluoride	[-CH ₂ -CF ₂ -] _n	24937-79-9	0.9 - 1.1
Sodium Carboxymethyl Cellulose	[C ₆ H ₇ O ₂ (OH) ₂ OCH ₂ COONa] _n	9000-11-7	0.15 ~ 0.25
Styrene Butadiene Rubber	C ₁₂ H ₁₄	9003-55-8	0.35 ~ 0.45
Graphite	C	1333-86-4	14 ~ 15.5
Polypropylene	(C ₃ H ₆) _n	9003-07-0	2 ~ 3
Lithium Hexafluorophosphate	LiPF ₆	21324-40-3	1.4 - 1.7
Dimethyl Carbonated (DMC)	C ₃ H ₆ O ₃	616-38-6	2.8 ~ 3.4
Methyl-Ethyl Carbonate (EMC)	C ₄ H ₈ O ₃	623-53-0	4.5 ~ 6.5
Ethylene Carbonate (EC)	C ₃ H ₄ O ₃	96-46-1	2.3 ~ 2.7
Copper Foil	Cu	7440-50-8	9.0 ~ 10.0
Aluminum Foil	Al	7429-90-5	3.9 ~ 4.4
Iron	Fe	7439-89-6	20 ~ 24

SECTION 3 - Hazards Identification

Explosive risk:	This article does not belong to the explosion dangerous goods
Flammable risk:	This article does not belong to the flammable material
Oxidation risk:	This article does not belong to the oxidation of dangerous goods
Toxic risk:	This article does not belong to the toxic dangerous goods
Radioactive risk:	This article does not belong to the radiation of dangerous goods
Mordant risk:	This article does not belong to the corrosion of dangerous goods

SECTION 4 - First Aid Measures

Inhalation	Remove from exposure and move to fresh air immediately. Use oxygen if available.
Skin	Remove contaminated clothes and rinse skin with plenty of water or shower for 15 minutes. Get medical aid.
Eyes	Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Ingestion	Give at least 2 glasses of milk or water. Induce vomiting unless patient is unconscious. Call a physician.

SECTION 5 - Fire Fighting Measures

Flash Point:	N/A
Auto-Ignition Temperature:	N/A
Extinguishing Media:	Water, CO ₂
Special Fire-Fighting Procedures:	Self-contained breathing apparatus
Unusual Fire and Explosion Hazards:	Cell may vent when subjected to excessive heat-exposing battery contents
Hazardous Combustion Products:	Carbon monoxide, carbon dioxide, lithium oxide fumes

SECTION 6 - Accidental Release Measures

Steps to be Taken in case Material is Released or Spilled: If the battery material is released, remove personnel from area until fumes dissipate. Provide maximum ventilation to clear out hazardous gases. Wipe it up with a cloth, and dispose of it in a plastic bag and put into a steel can. The preferred response is to leave the area and allow the battery to cool and vapors to dissipate. Provide maximum ventilation. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.

Waste Disposal Method: It is recommended to discharge the battery to the end, to use up the metal lithium inside the battery, and to bury the discharged battery in soil.

SECTION 7 - Handling and Storage

The battery should not be opened, destroyed or incinerated, since they may leak or rupture and release to the environment the ingredients that they contain in the hermetically sealed container. Do not short circuit terminals, over charge the battery, forced over-discharge, or throw into fire. Do not crush, puncture the battery, or immerse in liquids.

Precautions to be taken in handling and storing - Avoid mechanical or electrical abuse. Storage preferably in cool, dry and ventilated area, which is subject to little temperature change. Storage at high temperatures should be avoided. Do not place the battery near heating equipment, nor expose to direct sunlight for long periods.

Other Precautions - The battery may explode or cause burns if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.

SECTION 8 - Exposure Controls / Personal Protection

Respiratory Protection - In case of battery venting, provide as much ventilation as possible. Avoid confined areas with venting cell cores. Respiratory Protection is not necessary under conditions of normal use.

Ventilation - Not necessary under conditions of normal use.

Protective Gloves - Not necessary under conditions of normal use.

Other Protective Clothing or Equipment - Not necessary under conditions of normal use.

Personal Protection is recommended for venting battery - Respiratory Protection, Protective Gloves, Protective Clothing and safety glass with side shields.

SECTION 9 - Physical / Chemical Properties

Appearance:	Quadrate shape
No.:	19PNS010084 01001
Odor:	If leaking, smells of medical ether
pH:	Not applicable as supplied
Flash Point:	Not applicable unless individual components exposed
Flammability:	Not applicable unless individual components exposed
Relative density:	Not applicable unless individual components exposed
Solubility (water):	Not applicable unless individual components exposed
Solubility (other):	Not applicable unless individual components exposed

SECTION 10 - Stability and Reactivity

Stability:	Product is stable under conditions described in Section 7.
Conditions to Avoid:	Heat above 70°C or incinerate. Deform. Mutilate. Crush. Disassemble. Overcharge. Short circuit. Expose over a long period to humid conditions.
Materials to Avoid:	Oxidising agents, alkalis, water.
Hazardous Decomposition Products:	Toxic Fumes, and may form peroxides.
Hazardous Polymerization:	If leaked, forbid contact with strong oxidizers, mineral acids, strong alkalies, and/or halogenated hydrocarbons.

SECTION 11 - Toxicological Information

Signs & Symptoms:	None, unless battery ruptures. In the event of exposure to internal contents, vapor fumes may be very irritating to the eyes and skin.
Inhalation:	Lung irritant.
Skin Contact:	Skin irritant.
Eye Contact:	Eye irritant.
Ingestion:	Poisoning if swallowed.

Medical conditions generally aggravated by exposure: In the event of exposure to internal contents, moderate to severe irritation, burning and dryness of the skin may occur. Target organs, nerves, liver and kidneys.

SECTION 12 - Ecological Information

Mammalian Effects:	None known at present.
Eco-toxicity:	None known at present.
Bioaccumulation Potential:	Slowly Bio-degradable.
Environmental Fate:	None known environmental hazards at present.

SECTION 13 - Disposable Consideration

Do not incinerate, or subject cells to temperature in excess of 70°C. Such abuse can result in loss of seal leakage, and/or cell explosion. Dispose of in accordance with appropriate local regulations.

SECTION 14 - Transport Information

Label for Conveyance:	Lithium Battery Mark
UN Number:	UN3480 or UN3481
Packaging Group:	N/A
EmS No:	F-A, S-I
Marine Pollutant:	No
Proper Shipping Name:	1) Lithium ion batteries; 2) Lithium ion batteries packed with equipment; 3) Lithium ion batteries contained in equipment. (Including lithium ion polymer batteries)
Hazard Classification:	The goods shall comply with the requirements of Section II (or Section IB) of Packing Instructions 965~967 of 60th DGR Manual of IATA (2019 Edition) and Special Provision 188 of IMDG CODE (Amdt. 39-18) 2018 Edition, including the passing of the UN38.3 test.

SECTION 15 - Regulatory Information

Law Information

- Dangerous Goods Regulation
- Recommendations on the Transport of Dangerous Goods Model Regulations
- International Maritime Dangerous Goods
- Technical Instructions for the Safe Transport of Dangerous Goods
- Classification and Code of Dangerous Goods
- Occupational Safety and Health Act (OSHA)
- Toxic Substances Control Acts (TSCA)
- Consumer Product Safety Act (CPSA)
- Federal Environmental Pollution Control Act (FEPCA)
- The Oil Pollution Act (OPA)
- Superfund Amendments and Reauthorization Act Title III (302/311/312/313) (SARA)
- Resource Conservation and Recovery Act (RCRA)
- Safety Drinking Water Act (CWA)
- California Proposition 65
- Code of Federal Regulations (CFR)

In accordance with all Federal, State and Local laws.

SECTION 16 - Other Information

This file is only effective to the batteries (PCLFPXX-12.8 (F2 of M6)) provided by ZEUS BATTERY PRODUCTS. The commissioner provides the composition information of batteries, and promises its integrity and accuracy. Users should read this file carefully, and use the batteries in correct method. Zeus Battery doesn't assume responsibility for any damage or loss because of misuse of batteries.