SAFETY DATA SHEET

Legrand has assembled this battery without modifying it and in accordance with the battery manufacturer's instructions for the following finished products:

LG-662463
LG-661463
LG-661462
LG-660465
LG-660463
LG-660462
LG-062533
LG-062633
UR-130039
UR-130038
LG-660977
UR-111924

Material Safety Data Sheet For LiFePO4 Batteries

Issue Date: January 1, 2025

Section 1- Product Identification

Product Name: Lithium Iron Phosphate Battery
Nominal Voltage: HB00128TA 9,6V 3,2Ah 30,72Wh
Chemical System: $LiFePO_4/C$
Manufacturer Name: JYH Technology Co., Ltd.
Phone Number: +86-750-3808313
Fax Number: +86-750-3808133

Section 2- Composition /Information on Ingredients

Although the chemical composition of the various cell manufacturers is proprietary, the following is typical of the chemistry.

Chemical Name	CAS No.	%
Aluminum Foil	7429-90-5	5-10
Copper Foil	7440-50-8	10-15
dimethyl carbonate (DMC)	616-38-6	5-20
Diethyl carbonate (DEC)	105-58-8	5-20
Ethylene Carbonate (EC)	96-49-1	5-20
Graphite Powder	7440-44-0	15-20
Lithium Iron Phosphate ($LiFePO_4$)	14365-14-7	35-45
Lithium Hexaflurorphosphate	21324-40-3	1-5
Poly Vinylidene Fluoride (PVDF)	24937-79-9	0.1-1
Iron	7439-89-6	5-15
Nickel	7440-02-0	0.1-2

Section 3- Hazard Identification

3.1 Physical:

The Lithium Iron Phosphate batteries described in this Material Safety Data Sheet are sealed which are not hazardous when used according to the recommendations of the manufacturer.

Under normal conditions of use, electrode materials and liquid electrolyte they contain are non-reactive provided the battery integrity is maintained and seals remain intact, Risk of exposure only in case of abuse, e.g. mechanical, thermal, electrical, which leads to the activation of safety valves and/or the rupture of the battery containers. Electrolyte leakage, electrode materials reaction with moisture/water of battery vent/ explosion/fire may follow depending upon circumstances.

3.2 Chemical:

Classification of dangerous Substances Contained into the Product as per Directive

Substance	Chemical Symbol	Melting Point	Boiling point	Exposure limit	Indication of Danger	Special Risk*	Safety Advice**
Lithium Iron Phosphate	LiFePO4	>1000°C		0.1 mg/m3 OSHA		R22R43	S2 S22 S24 S26 S36 S37 S45
Organic Solvents	EC DMC DEC	EC: 38°C DMC: 4°C DEC: -43°	EC: 243°C DMC: 90°C DEC: 127°C	None established OSHA	Flammable	R21R22 R41 R42/43	S2 S24 S26 S36 S37 S45
	$LiPF_6$	N/A	N/A	None	Irritant	R14R21	S2 S8 S22

		(decomposes at 160°C)		established OSHA	Corrosive	R22 R41 R43	S24 S26 S36 S37 S45

***: Name of Special Risks:**

R14/15 Reacts with water and yields flammable gases
R21 Harmful in contact with skin
R22 Harmful us swallowed
R35 Causes severe burns
R41 Risk of serious damage to the eye
R42/43 May cause sensitization by inhalation and skin contact
R43 May cause sensitization by skin contact

****: Name of Safety Advices:**

S2 Keep out of reach from children
S8 Keep away from moisture
S22 Do not breathe dust
S24 Avoid contact with skin
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical attention
S36 Wear suitable protective clothing
S37 Wear suitable gloves
S45 In case of incident, seek medical attention

Section 4- First Aid Measures

In case of battery rupture or explosion, evacuate personnel from contaminated area and provide maximum ventilation to clear out corrosive fumes/gases and pungent odors.

In all case, seek immediate medical attention,

Eye contact: Flush with plenty of water(eyelids-held open)for at least 15 minutes

Skin contact: Remove all contaminated clothing and flush affected areas with plenty of water and sop for at least 15minutes.

Ingestion: Dilute by giving plenty of water and get immediate medical attention.
Assure that the victim does not aspirate vomited material by use of positional drainage.
Assure that mucus does not obstruct the airway.
Do not give anything by mouth to an unconscious person

Inhalation: Remove to fresh air and ventilate the contaminated area.
Give oxygen or artificial respiration if needed.

Section 5- Fire and explosion Hazard Data

Fire and explosion hazard	The batteries can leak and/or spout vaporized or decomposed and combustible electrolyte fumes in case of exposure above 90°C resulting from inappropriate use or from the environment. Possible formation of hydrogen fluoride (HF) and phosphorous oxides during fire.LiPF6 salt contained in the electrolyte releases hydrogen fluoride (HF) in contact with water.
Extinguishing media	Suitable: CO_2,

	Dry chemical or Foam extinguishers Not to be used: Type D extinguishers
Special exposure hazards:	Following cell overheating due to external source or due to improper use, electrolyte leakage or battery container rupture may occur and release inner component/material in the environment. Eye contact: The electrolyte solution contained in the battery is irritant to ocular tissues. Skin contact: The electrolyte solution contained in the battery causes skin irritation. Ingestion: The ingestion of electrolyte solution causes tissue damage to throat and gastro/respiratory tract. Inhalation: Contents of a leaking or ruptured battery can cause respiratory tract, mucus, membrane irritation and edema.
Special protective equipment	Use self-contained breathing apparatus to avoid breathing irritant fumes. Wear protective clothing and equipment to prevent body contact with electrolyte solution.

Section 6- Accidental Release or Spillage

Personal Precautions, protective equipment, and emergency procedures	Restrict access to area until completion of clean-up. Do not touch the spilled material. Wear adequate personal protective equipment as indicated in Section 8.
Environmental Precautions	Prevent material from contaminating soil and from entering sewers or waterways.
Methods and materials for Containment	Stop the leak if safe to do so. Contain the spilled liquid with dry sand or earth. Clean up spills immediately.
Methods and materials for cleaning up	Absorb spilled material with an inert absorbent (dry sand or earth). Scoop contaminated absorbent into an acceptable waste container. Collect all contaminated absorbent and dispose of according to directions in Section 13. Scrub the area with detergent and water; collect all contaminated wash water for proper disposal.

Section 7- Handling and Storage

The batteries should not be opened destroyed nor incinerated since they may leak or rupture and release in the environment the ingredients they contain.

Handling	Do not crush, pierce, short (+) and (-) battery terminals with conductive (i.e. metal) goods. Do not directly heat or solder. Do not throw into fire. Do not mix batteries of different types and models. Do not mix new and used batteries. Keep batteries in non-conductive (i.e. plastic) trays.
Storage	Store in a cool (preferably below 30°C) and ventilated area away from moisture, sources of heat, open flames, food and drink. Keep adequate clearance between walls and batteries. Temperature above 90°C may result in battery leakage and rupture. Since short circuit can

	cause burn, leakage and rupture hazard, keep batteries in original packaging until use and do not jumble them.
Other	Manufacturer recommendations regarding maximum recommended currents and operating temperature range. Applying pressure on deforming the battery may lead to disassembly followed by eye, skin and throat irritation.

Section 8- Exposure Controls / Person Protection

Respiratory protection	Not necessary under normal use. In case of battery rupture, use self-contained full-face respiratory equipment. equipment with type ABEK filter.
Hand protection	Not necessary under normal use. Use rubber gloves if handling a leaking or ruptured battery.
Eye protection	Not necessary under normal use. Wear safety goggles or glasses with side shields if handling a leaking or ruptured battery.
Skin protection	Not necessary under normal use. Use rubber apron and protective working in case of handling of a ruptured battery.

Section 9- Physical and Chemical Data

9.1 Appearance (Physical shape and color as supplied:)

$LiFePO_4$	Black odorless power
Graphite	Black odorless power
Organic solvent	Colorless liquid
Lithium salt	White, crystalline and odorless power

9.2 Specific gravity (H_2O=1)

$LiFePO_4$	3.63
Graphite	2.0-2.2

9.3 Melting point

$LiFePO_4$	> 1000°C
Graphite	3500-3900°C

Section 10-Stability and Reactivity Data

Stability	Stable under normal temperatures and pressures.
Conditions to avoid	Heat above 70°C or incinerate. Deform, mutilate, crush, pierce, disassemble. Short circuit. Prolonged exposure to humid conditions.
Materials to avoid	N/A
Hazardous decomposition products	Corrosive/Irritant Hydrogen fluoride (HF) is produced in case of reaction of lithium ($LiPF_6$) with water. Combustible vapors and formation of Hydrogen fluoride (HF) and phosphorous oxides during fire. Toxic fumes, and may form peroxides.

Section 11- Toxicological information

Irritation	In the event of exposure to internal contents, vapor fumes may be very irritating

	to the eyes and skin.
Sensitization	No data is available
Reproductive toxicity	No data is available
Toxicologically synergistic material	No data is available

Section 12- Ecological Information

General note	Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Mobility in soil	No data is available
Persistence and degradability	No data is available

Section 13- Disposal Method

Dispose in accordance with applicable regulations which vary from country to country.

(In more countries, the thrashing of used batteries is forbidden and the end-users are invited to dispose them properly, eventually through not-for-profit organizations, mandated by local governments or organized on a voluntary basis by professionals).

Lithium Iron Phosphate batteries should have their terminals insulated and be preferably wrapped in plastic bags prior to disposal.

13.1 Incineration: Incineration should never be performed by battery users but eventually by trained professionals in authorized facilities with proper gas and fumes treatment.

13.2 Land filling: Leach ability regulations (mg/l)

Component	Leach ability	EC limit	EPA	Other*
Iron	100	2		5
Nickel	500			0.5

13.3 Recycling: Send to authorized recycling facilities, eventually through licensed waste carrier.

Section 14- Transportation Information

14.1 UN number of Lithium Ion batteries: UN3480 or UN3481.

14.2 Lithium Ion batteries have been tested under provisions of the UN Manual of Tests and Criteria, the batteries are passed the UN 38.3 test, Part III, sub-section 38.3 (withstanding a 1.2m drop test) and are classified as Class 9: Miscellaneous dangerous substances and articles.

14.3 The package of battery by air should be complied with the requirements of Packing Instruction 965 (Section II/ Section IB) or 966/967 (Section II) of IATA DGR 66th Edition for transportation. The battery containing Watt-hour rating by air is not more than 100Wh.

14.4 The battery is not restricted according to IMO IMDG Code (inc Amdt 41-22). Need to meet the Special Provision International Maritime dangerous goods code (IMDG) 188.

14.5 The packaging is required to be strong and can prevent the products from short-circuit.

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

- The International Civil Aviation Organization (ICAO) Technical Instructions.

- The International Air Transport Association (IATA) Dangerous Goods Regulations.
- The International Maritime Dangerous Goods (IMDG) Code.
- The US Hazardous Materials Regulation (HMR) pursuant to a final rule issued by RSPA
- The Office of Hazardous Materials Safety within the US Department of Transportations' (DOT) Research and Special Programs Administration (RSPA).

Section 15- Regulatory Information

The transport of rechargeable Lithium Iron Phosphate batteries is regulated by various bodies (IATA, IMO, ADR, US-DOT) that follow the United Nations "Recommendations on the Transport of Dangerous Goods, Model Regulations, 23th Revised edition - Ref.ST/SG/AC.10/1 Rev. 23".

Depending on their lithium metal equivalent weight content, design, and ability to pass safety tests defined by the UN in the "Recommendations on the Transport of Dangerous Good - Manual of Tests and Criteria – 7th Revised edition - Ref. ST/SG/AC.10/11 Rev.7 Amendment 1 «Lithium Batteries»", the Lithium Iron Phosphate cells and the battery packs are not be assigned to the UN N°3480/3481 Class-9, that is restricted for transport.

Section 16- Other Information

This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein.

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