MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT IDENTIFICATION

Product Identification

Lithium-Ion Rechargeable Battery	
Nominal Voltage(V):	3.65
Cell P/N:	LP44147272
Minimum Cell Capacity(Ah):	130
Cell UL NO:	
Customer P/N:	N/A

PACK P/N:	N/A
PACK Capacity(mAh):	N/A
PACK UL NO:	N/A
Customer Project Name:	N/A

Manufacture Identification

Tianjin Lishen Battery Joint-Stock CO. LTD.
6 Lanyuan Road, Huayuan Hi-Tech
Industry Park, Tianjin 300384, China
Http://www.lishen.com.cn

86 - 22 - 83710366
Phone Number (For Information)
86 - 22 - 83710366
Emergency Phone Number Telex'
86 - 22 - 83710366

Note: Blank spaces are not permitted. If any item is not applicable or no information is available, the space must be marked to indicate that.

SECTION 2 HAZARDS IDENTIFICATION

Primary Routes of Entry	■ Inhalation ■ Ingestion ■ Skin Absorption ■ Eye contact	**CARCINOGEN LISTED IN**	□ NTP □ OSHA □ LARC Monogra □ NOT Listed

Health Hazards	**Acute and chronic** All chemicals are contained in a sealed can. Risk of exposure occurs only,if the battery is mechanically or electrically abused(mechanical, thermal, electrical), which leads to the rupture of the battery container. Electrolyte leakage, electrode materials reaction with moisture/water or battery vent/fire may follow, depending upon the circumstances.

Medical Conditions Generally Aggravated By Exposure

An acute exposure will not generally aggravate any medical condition.

Symptoms of Exposure	Skin contact, no effect under routine handling and use.
Eye Contact	No effect under routine handling and use
Skin Contact	No effect under routine handling and use
Ingestion	No effect under routine handling and use
Inhalation	No
Reported as carcinogen	Not applicable

SECTION 3 COMPOSITION & INFORMATION ON INGREDIENTS

Equivalent lithium content per cell（g）			42.000	OSHA	ACGIH	CAS Number	OTHER LIMITS
COMPONENTS-Chemical Name and Common Names (Hazardous Components 1% or greater, Carcinogens 0.1% or greater)			%	PEL	TLV		RECOMMENDED
Hazardous Ingredients:	**Cathode active material**	**Lithium iron phosphate**	24.5%			12190-79-3	
	Anode active material	**Graphite Carbon**	13.7%			7782-42-5	
	Electrolyte	**$LiPF_6$ 13.3%**	2.6%			21324-40-3	
		EC 38.2%	7.3%			96-49-1	
		EMC 40.1%	7.7%			623-53-0	
		PC 4.4%	0.8%			108-32-7	
		VC 1.0%	0.2%			137-66-6	
		PS 3.0%	0.6%			1120-71-4	
Non-Hazardous Ingredients:	**Anode current collector**	**Copper**	2.6%			7440-50-8	
	Cathode current collector	**Aluminum**	0.9%			7429-90-5	
	AL foil	**Aluminum**	4.9%			7429-90-5	
	Cu foil	**Copper**	8.6%			7440-50-8	
	Conductive additive	**Carbon**	1.1%			7440-44-0	
	Adhesive	**Polyvinylidene fluoride**	1.7%			24937-79-9	
	Tape	**Polyimide**	0.1%			62929-02-6	
		Polypropylene	0.2%			9003-07-0	
	Separator	**Polypropylene**	4.4%			9003-07-0	
		Polyethylene				9002-88-4	
	Plastic spacer	**Polypropylene**	1.3%			9003-07-0	
	Cap	**Stainless steel**	4.2%			12597-68-1	
		Aluminum				7429-90-5	
	Can	**Stainless steel**	12.7%			7429-90-5	
Total			100%				

SECTION 4 FIRST-AID MEASURES

If exposure to internal materials in cell due to damaged outer casing, the following actions are recommended.

Eye Contact	In case of eye contact, flush with lot of water for 15 minutes, and get medical help.
Skin Contact	In case of skin contact with contents of battery, flush immediately with water.
Inhalation	In case of light inhalation ,move to an area with flash air immediately, if irritation persists, get medical help.
Ingestion	In case of ingestion, drink milk/water to induce vomiting and wash out, get medical help.

SECTION 5 FIREFIGHTING MEASURES

Extinguisher Media:

CO_2 or dry chemical power

Special Fire-Fighting Procedures:

In case of fire in cell original containers, use CO2 or dry chemical extinguisher; For fire in an adjacent area, water can be used.

SECTION 6 ACCIDENTAL RELEASE MEASURES

On Land:

Place material into suitable containers, If the skin has come into contact with the electrolyte, it should be washed thoroughly with water, Sand or earth should be used to absorb any exuded material. Seal leaking battery and contaminated absorbent material should be treated by local regulation, and call local fire/police department to ask for help.

In Water:

If possible, remove from water far from body in special fixture, and call local fire/police department to ask for help

SECTION 7 HANDING AND STORAGE

Handling:

Take all precautions mentioned in this document and operate the battery within the temperature ranges as follows: Charge: 0 ℃~45 ℃; Discharge: -20 ℃~60 ℃; Storage:-20 ℃~35 ℃.
No special protective clothing required for handling individual cells in corrective operational method.

Improper handling of lithium ion battery may result in injury or damage from electrolyte leakage, heating, ignition or explosion.

Storage:

Store the battery in a cool, drying place, without chemical vapor or excessive humidity.

SECTION 8 EXPOSURE CONTROLS & PERSONAL PROTECTION

Engineering Controls:

keep away from heat and open flame, prevent hard & sharp thing penetration, store in a cool & dry place.

Personal Protection:

Respiratory Protection: Not necessary under normal operations condition. SCAB required in the event of a fire.
Eye/Face Protection: Not necessary under normal operation condition.
Glove protection: Not necessary under normal operation condition
Foot Protection: Steel toed shoes recommended for Large container handling.

Ventilation to Be Used	□ **Local Exhaust** Not necessary under conditions of Normal use.	□ **Mechanical (General)** Not necessary under conditions of Normal use.
		□ **Special** Not necessary under conditions of Normal use.
	□ **Other (Specify)** Not necessary under normal operation conditions.	

Other Protective Clothing and Equipment

Not necessary under normal operation conditions.

Hygienic Work Practices

Not necessary under normal operation conditions.

SECTION 9 PHYSICAL /CHEMICAL PROPERTIES

Specific Gravity (H2O=1):

LiFeO4:2.80 Graphite:2.0~2.2

Melting Point:

LiFeO4: > 1000℃ Graphite:3500-3900℃

Appearance and Odor:

LiFeO4 is a gray odorless power; Graphite is a black or odorless power;

Organic solvent is a colorless liquid; Lithium salt is a white, crystalline and odorless power.

SECTION 10 STABILITY & REACTIVITY DATA

Stability	**Conditions to Avoid:**
■ Stable	Do not heat or incinerate the battery，Never impact, pierce or crush the battery.
	Do not disassemble or modify the battery，
□ Unstable	Do not charge the battery under high temperature conditions such as near a fire or in the direct sunlight.
	Do not shot-circuit the battery by connect the positive and negative terminals with a metal material.
	Do not allow the battery to get wet or be immersed in water.

Incompatibility (Materials to Avoid)

Water, salted water, other solvent with water

Hazardous Decomposition Products

N/A

Hazardous Polymerization	Conditions to Avoid
□ May Occur	
■ Will Not Occur	

SECTION 11 TOXICOLOGICAL INFORMATION

This product does not elicit toxicological properties during routine handling and use.

SECTION 12 ECOLOGICAL INFORMATION

Cobalt and its compounds can pose a threat if released to environment. The detail information are showed in waste disposal method in Section 13 "Disposal Consideration".

SECTION 13 DISPOSAL CONSIDERATIONS

There is no contamination during normal operation and use. Lithium batteries should have their terminals insulated prior to disposal, do not throw away a used battery and provide them for recycling company.

Open cells should be treated as hazardous waste. If the leakage or other material is Released, we should take actions as follows:

Leave the area, allow the batteries to cool down, let the vapors to dissipate .
Avoid skin and eye contact or inhalation of vapors. Remove spiller liquid with absorbent and incinerate after.

Waste Disposal method Opened cells should be treated as hazardous waste.

Incineration: incineration should never be performed by battery users but eventually by trained professionals in authorized facilities with proper gas and fumes treatment.
Landfilling:According to the proper laws and regulations in different countries or areas, the battery should be buried deeply in the specified place;
Recycling: Send to authorized recycling facilities to get Cu and Al,eventually through licensed waste carrier;

SECTION 14 Transportation

Lishen's LP44147272 Lithium-Ion cells are considered to be "Rechargeable Lithium Ion Batteries" and meet the requirements of transportation by the United States Department of Transportation (DOT),International Civil Aviation Administration (ICAO), 2013 International Air Transportation Association (IATA) ,be assigned to Class 9 Dangerous Goods and consigned as UN 3480 (Lithium ion batteries).The mentioned batteries are complied with the special provision, Section IA of PI965.

14.1 The requirement of air transportation

The lithium battery should according with the International Air Transport Association(IATA DGR 54 editon) requirements for transportation.IATA 54th defined the lithium battry as Class 9 Dangerous Goods and require class Ⅱ packaging.Do not damage or mishandle this package.If package is damaged,batteries must be quarantined.inspected,and repacked.Cells and batteries identified by the manufactureras being defective for safety reasons,or that have been damaged,that have the potential of producing a dangerous evolution of heat,fire or short circuit are forbidden for transport.Waste lithium batteries and lithium batteries being shipped for recycling or disposal are prohibited from air transport unless approved by the appropriate national authority of the State of origin and the State of the operator.

The lithium battery should pass the UN38.3 test ,if the battery can not pass the testing,it can not transpor,should redesign.If the battery through the test,for the lithium battery only,follow the UN3480 and the packing requirements for PI965,for the lithium battery which installed in equipment ,follow the UN3481 and the packing requirments for PI967.

The lithium battery testing meets all requirments under UN Mannal of Tests and Criteria Part Ⅲ，subsection 38.3.

14.2 The requirement of ocean shipping

According to International Maritime Dangerous Goods Code to transport and according to the requirments of UN NO3480/3481 to management the goods.

International Maritime Dangerous Goods Code require the dangerous goods operators on shore should be trained.The untrained operators can not handle the dangerous goods whithout training person guide.

The goods should accord with Test and standard manual test standards.Firmly installation.mutual isolation.avoid short circuits. If the package contain more than 24 lithium batteries of more than 12 lithium battery packs,must provide the special program if package damage.

SECTION 15 REGULATORY INFORMATION

IATA DGR

☑ Hazardous ☐ Non-hazardous

SECTION 16 OTHER INFORMATION

There is no hazards in accordance with the UN recommendations test.(UN manual of tested and criteria 38.3)

Cell Part Number	**LP44147272**
Nominal Voltage	**3.65V**
Minimum Cell Capacity	**130Ah**
Cell Mass	**3900g**
Equivalent Lithium Content	**42g**

Test NO	Test Item	Criteria	Result
38.3.4.1	Altitude Test	No mass loss,leakage,venting,disassembly,rupture,and fire.OCV should not be less than 90% before testing	Passed
38.3.4.2	Thermal Test	No mass loss,leakage,venting,disassembly,rupture,and fire.OCV should not be less than 90% before testing	Passed
38.3.4.3	Vibration	No mass loss,leakage,venting,disassembly,rupture,and fire.OCV should not be less than 90% before testing	Passed
38.3.4.4	Shock	No mass loss,leakage,venting,disassembly,rupture,and fire.OCV should not be less than 90% before testing	Passed
38.3.4.5	External Short Circuit	External temperature should not exceed 170degC.No disassembly, and fire within six hours of this test.	Passed
38.3.4.6	Impact	External temperature should not exceed 170degC.No disassembly, and fire within six hours of this test.	Passed
38.3.4.7	Overcharge	No disassembly, and fire within seven days of this test.	Passed
38.3.4.8	Forced Discharge	No disassembly, and fire within seven days of this test.	Passed