



# DATASHEET

Single-Phase Hybrid/AC Inverter

HI-3.0-E-G2 / 3.7 / 4.6 / 5.0 / 6.0

AC1-3.0-E-G2 / 3.7 / 4.6 / 5.0 / 6.0



## H1(G2)&AC1(G2) HYBRID/AC INVERTER

Harness the power of the sun day and night with the ground-breaking range of Hybrid & AC inverters from FOX.

Full of advanced features and compatible with our very own range of high-voltage batteries, the hybrid range from FOX. It is a new class of Inverter.



FOX storage solutions are available with advanced and intuitive app based remote control and monitoring functionality.



### Easy Installation

Flexible configuration, plug and play set-up, built-in fuse protection.



### High Voltage

Connects to high-voltage batteries for maximum round-trip efficiency.



### IP65 Rated

Engineered to last with maximum flexibility. Suitable for outdoor installation.



### Remote Monitoring

Monitor your system remotely via smartphone app or web portal.



up to  
**6kW**  
charge/  
discharge

REFINED – POWERFUL – FLEXIBLE

## BATTERY EXPANSION EASY UPGRADE



Expand your system easily by simply adding additional batteries. There are six battery size options, and Max. seven batteries can be installed in series, providing up to 33.24kWh of storage capacity.

For more about the FOX range, visit:

[WWW.FOX-ESS.COM](http://WWW.FOX-ESS.COM)



# TECHNICAL SPECIFICATIONS

Model	H1-3.0-E-G2 AC1-3.0-E-G2	H1-3.7-E-G2 AC1-3.7-E-G2	H1-4.6-E-G2 AC1-4.6-E-G2	H1-5.0-E-G2 AC1-5.0-E-G2	H1-6.0-E-G2 AC1-6.0-E-G2
<b>INPUT PV (ONLY FOR HYBRID)</b>					
Max. Input Power [W]	4500	5500	6900	7500	9000
Max. Input Voltage [V]			600		
Start-up Input Voltage [V]			75		
Rated Input Voltage [V]			360		
MPPT Operating Voltage Range [V]			80 ~ 550		
Max. Input Current [A]			16 / 16		
Max. Short-circuit Current [A]			20 / 20		
No. of Independent MPP Trackers	2	2	2	2	2
No. of Strings per MPP Tracker	1	1	1	1	1
<b>BATTERY CONNECTION</b>					
Battery Type	Lithium Battery (LFP)				
Battery Voltage [V]	80 ~ 480				
Max. Charge/Discharge Current [A]	40				
Communication Interface	CAN(communicate with inverter, upgrade BMS)				
<b>AC INPUT AND OUTPUT (GRID)</b>					
Max. AC Input Power [VA]	7000	7680	9600	10000	12000
Max. AC Input Current (per phase) [A]	31.8	34.9	43.6	45.5	54.5
Rated Output Power [W]	3000	3680	4600	5000	6000
Max. Output Apparent Power [VA]	3300	4048/3680 <sup>1</sup>	5060	5500	6600
Rated Output Current (per phase) [A]	13.6	16.7/16 <sup>1</sup>	20.9	22.7	27.3
Max. Output Current [A]	15.0	18.4	23.0	25.0	30
Rated Grid Voltage [V]	220/230/240				
Rated Grid Frequency [Hz]	50/60				
Power Factor	1 ( Adjustable from 0.8 leading to 0.8 lagging )				
THDi [%]	<3 @rated power				
<b>EPS OUTPUT (WITH BATTERY)</b>					
Max. Output Apparent Power [VA]	5000	5000	6000	6000	6000
Peak Output Apparent Power (60s) [VA]	6000	6000	7200	7200	7200
Max. Current (per phase) [A]	22.7	22.7	27.3	27.3	27.3
Rated Output Voltage [V]	220/230/240				
Rated Output Frequency [Hz]	50/60				
Power Factor	1 ( Adjustable from 0.8 leading to 0.8 lagging )				
THDv ( linear Load) [%]	<2 @rated power				
Parallel operation [PCS]	10				
Switch time [ms]	<20				
<b>EFFICIENCY</b>					
Euro Efficiency [%]	97.00				
Max. Efficiency [%]	97.80				
Max. Battery Charge Efficiency (PV to BAT) (@full load) [%]	98.50				
Max. Battery Discharge Efficiency (BAT to AC) (@full load) [%]	97.00				
<b>PROTECTION</b>					
Insulation Monitoring	YES				
Residual Current Monitoring	YES				
DC Reverse Polarity Protection	YES				
Anti-islanding Protection	YES				
AC Short-circuit Protection	YES				
AC Overcurrent/Overvoltage Protection	YES				
DC Switch	YES				
Battery Wack-up Function	YES				
SPD	DC: Type II, /AC: Type III				
AFCl	Optional				
<b>GENERAL DATA</b>					
Dimensions (WxHxD) [mm]	434*418*185				
Weight [kg]	23				
Installation	Wall-Mounted				
Topology	Non-isolated				
Cooling Method	Natural				
Noise Emission [dB]	35				
Max. Operating Altitude [m]	2000				
Operating Temperature Range [°C]	-25 ~ 60				
Humidity ( No Condensation ) [%]	0 ~ 100				
Protection Degree	IP65				
Standby consumption[W]	<10				
Monitoring Module	WiFi, LAN(optional) , 4G(optional) , GPRS (optional)				
Communication	RS485, DRM, Ripple Control, USB, CAN				
Display	LCD, App, Website				
<b>STANDARD COMPLIANCE (MORE AVAILABLE UPON REQUEST)</b>					
Safety	EN 62109-1, EN 62109-2				
EMC	EN 61000-6-2, EN 61000-6-3				
Grid Regulation	ENS0549-1, C10 / 11, VDE-AR-N 4105, G98, G99, CEI 0-21, NRS 097-2-1, AS / NZS 4777.2				

\* More technical characteristics are available on demand and customized.

1、 3680 for G98. 2、 4600 for German and Belgium. 3、 5000 for Australia and Belgium

V1.0 2023/02/20

# Fox ESS ECS BATTERY STORAGE SYSTEM



## HIGH VOLTAGE BATTERY FROM Fox ESS

The ECS is a high-performance, scalable battery storage system. The modular design allows for maximum flexibility, making it suitable for a broad range of storage applications.

Additional batteries can be installed in series, allowing for a maximum storage capacity of 19.35 kWh. Installation is easy, with a plug and play solution that can save valuable time for installers.

- 2.76kWh capacity
- Scalable to 19.35 kWh
- 90% Depth of Discharge
- Large temperature tolerance
- Easy installation
- CAN/RS485 communication
- High voltage



High Voltage



Simple Installation



Height Efficiency



Expandable System



90% DoD

# Fox ESS

## ECS SERIES

### ECS2800-H2/H3/H4/H5/H6/H7

MODEL	ECS2800 -H2	ECS2800 -H3	ECS2800 -H4	ECS2800 -H5	ECS2800 -H6	ECS2800 -H7
<b>ELECTRICAL CHARACTERISTICS</b>						
Battery Type	LiFePO4 Prismatic Cell					
Battery Module	1*CM2800 1*CS2800	1*CM2800 2*CS2800	1*CM2800 3*CS2800	1*CM2800 4*CS2800	1*CM2800 5*CS2800	1*CM2800 6*CS2800
Nominal Capacity[Wh]	5530	8290	11060	13820	16590	19350
Nominal Voltage [V]	115.2	172.8	230.4	288	345.6	403.2
Operating Voltage[V]	104.4 ~ 132.4	156.6 ~ 198.7	208.8 ~ 264.9	261.0 ~ 331.2	313.2 ~ 397.4	365.4 ~ 463.6
Recommend Discharge Current [A]	24					
Max.Charge/Discharge Current [A]	48					
Peak Discharge Current [A]	65 @60sec					
Battery Pack Round-Trip Efficiency [%]	>95					
Depth of discharge [%]	90					
Cycle Life* <sup>1</sup>	≥6000					
Communication	CAN					
Display	CS: LED*1, CM: LED*6					
Scalability	Max. 7 Modules in Series					
<b>OPERATING CONDITIONS</b>						
Installation Location	Outdoor/ Indoor (Stand)					
Operating Temperature [°C]* <sup>2</sup>	Charge: 0 ~ 55 Discharge: -10 ~ 55					
Storage Temperature [°C]	-20 ~ 55					
Cooling method	Natural Convection					
Humidity [%]	5 ~ 95 (No Condensing)					
Altitude [m]	Max. 2,000					
<b>MECHANICAL CHARACTERISTICS</b>						
Dimensions (W*H*D) [mm]	570*350*380	570*470*380	570*590*380	570*710*380	570*830*380	570*950*380
Weight [kg]	65±1	95.5±1.5	126±2	157±2.5	187±3	217±3.5
<b>CERTIFICATES</b>						
Safety	IEC 62619					
EMC	IEC 61000-6-1/2/3/4					
Transportation	UN38.3					
Ingress Protection	IP65					

\*1, 25°C, @90% DOD, 0.5C charging/discharging.

\*2, Charge derating will occur between 0°C and +15°C.



## Design Report of Safety Data Sheet

正本/ORIGINAL

Report No.:	HGBZ2301S622-R1	 防伪码: Q6XV	
Inspection date:	2023/01/11		
Issue date:	2023/03/03		
Version:	V2.0.0.2		
*Product Name:	Lithium ion Battery Module CM4800		
*Applicant:	FOXESS CO., LTD.		
Supplier:	FOXESS CO., LTD.		
*Composition of the product:	Lithium Iron Phosphate: 35%; Graphite: 18%; Aluminium: 15%; Copper: 7%; Dimethyl carbonate: 6%; Ethyl methyl carbonate: 6%; Ethylene carbonate: 6%; Polyethylene: 4%; Carbon: 1%; Poly(1Details on the next page		
Warranty of Design:	GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS) Ninth revised edition		
*Information materials:	HGBZ2301S62-R1 《Application》、P106919 《Declaration of consistency of components of the sample submitted for inspection》、P106919 《UN 38.3》、P106919-Product Picture		
<b>Design Result of SDS please see next page.</b>			
Designer:	江帆	Auditor: 叶江莉	Approver: 戎霄
<b>常州合規思远产品安全技术服务有限公司</b> Changzhou Hegui Siyuan Products Safety Technology Service Co., Ltd.			

名称: 常州合規思远产品安全技术服务有限公司 (简称: 合規化學)

Name: Changzhou HeguiSiyuan Products Safety Technology Service Co., Ltd. (CRchemical)

地址: 江苏省常州市新北区太湖东路9号4幢1205室

Address: 4-1205, Creative Industries Park, No.9, East Taihu Road, Xinbei District, Changzhou, 213022, Jiangsu P.R.China.


网址|Web: www.hgmsds.com

电话|Tel: +86-519-8515 0306

邮箱|E-mail: msds@hgmsds.com

# 合規化學

Contd. of Prev. page: Complete sample component information.

Report No.:	HGBZ2301S622-R1	 防伪码: Q6XV
Inspection date:	2023/01/11	
Issue date:	2023/03/03	
Version:	V2.0.0.2	
<b>*Composition of the product:</b>	Lithium Iron Phosphate: 35%; Graphite: 18%; Aluminium: 15%; Copper: 7%; Dimethyl carbonate: 6%; Ethyl methyl carbonate: 6%; Ethylene carbonate: 6%; Polyethylene: 4%; Carbon: 1%; Poly(1,1-difluoroethylene): 1%; Polymerized Styrene Butadiene Rubber: 0.7%; Carboxymethylcellulose Sodium: 0.3%	

名称: 常州合规思远产品安全技术有限公司 (简称: 合规化学)

Name: Changzhou HeguiSiyuan Products Safety Technology Service Co., Ltd. (CRchemical)

地址: 江苏省常州市新北区太湖东路9号4幢1205室

Address: 4-1205, Creative Industries Park, No.9, East Taihu Road, Xinbei District, Changzhou, 213022, Jiangsu P.R.China.

网址|Web: www.hgmsds.com

电话|Tel: +86-519-8515 0306

邮箱|E-mail: msds@hgmsds.com

## Terms of the Using of the Report

1. According to the needs of issuing the report, the company requires the client to provide true and complete samples and data (see the report tape ★ for details). The Company will not bear any consequences caused by the wrong information provided by the Client. If the chemical information, authoritative database and relevant policy changes submitted by the client affect the conclusions of this report, this report will automatically become invalid. Unless otherwise specified, the data in this report are only responsible for the samples submitted for inspection, and the accuracy of sample composition information is the responsibility of the client. The hazard characteristics, transportation information and emergency measures of samples need to focus on the corresponding parts of this report.
2. The data source of this report is based on the relevant materials and information submitted by the client, the test results of international authoritative databases, laboratories and the current relevant knowledge of the company. We try our best to ensure the correctness of all information during the audit. However, due to the diversity of information sources and the limitations of the Company's knowledge, users of this report should make further judgments on the reasonableness of relevant information based on the purpose of use.
3. This report will be effective only after it is signed by the inspector, approver and stamped by our company.
4. Our company guarantees the objectivity and fairness of this report, and carries out confidentiality obligations on business secrets such as business information, technical documents and so on.
5. This report does not consider the differences between countries and operators.
6. The partly duplicating of this report is prohibited without the written approver.
7. The report is invalid when anything of the following happens-illegal transfer, embezzlement, imposture, modification or tampering in any media form.
8. This report is valid before the implementation of the new version of the standard.





## Safety Data Sheet

# Lithium ion Battery Module CM4800

Version : V2.0.0.1

Report No. : HGBZ2301S622-R1

Creation Date : 2023/01/11

Revision Date : 2023/03/03

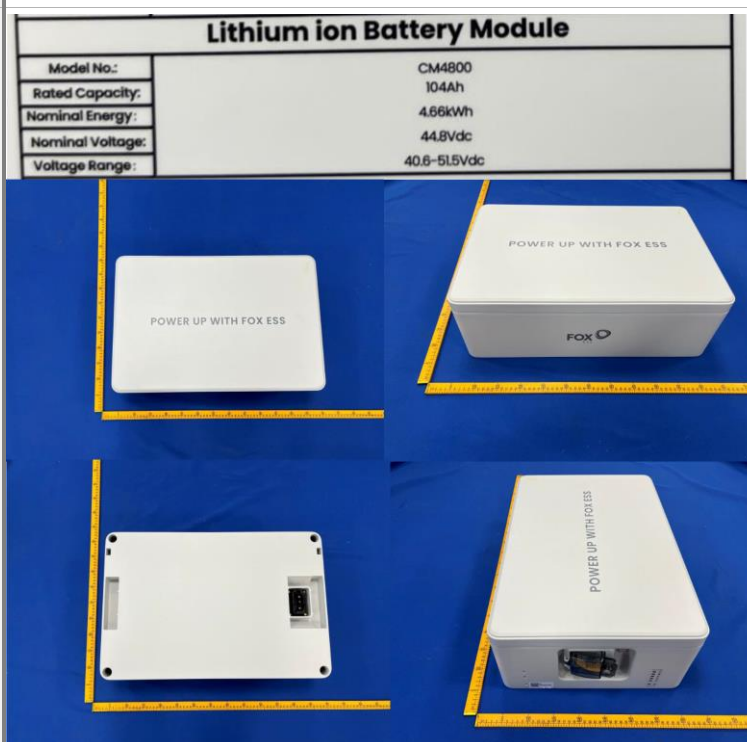
\*According to GHS (Ninth Revised Edition)

## 1 Identification

### Product identifier

Product Name	Lithium ion Battery Module CM4800
Product Model	CM4800
CAS No.	Not applicable
EC No.	Not applicable
Molecular Formula	Not applicable

### Product Picture



### Recommended use of the product and restrictions on use

Relevant identified uses	Please consult manufacturer.
Uses advised against	Please consult manufacturer.

### Details of the supplier

Applicant Name	FOXESS CO., LTD.
Applicant Address	No.939, Jinhai Third Road, New Airport Industry Area, Longwan District, Wenzhou, Zhejiang, China
Applicant Post Code	325025
Applicant Telephone	0510-68092998
Applicant Fax	—
Applicant E-mail	foxrd@fox-ess.com



<b>Supplier Name</b>	FOXESS CO., LTD.
<b>Supplier Address</b>	No.939, Jinhai Third Road, New Airport Industry Area, Longwan District, Wenzhou, Zhejiang, China
<b>Supplier Post Code</b>	325025
<b>Supplier Telephone</b>	0510-68092998
<b>Supplier Fax</b>	—
<b>Supplier E-mail</b>	foxrd@fox-ess.com

### | Emergency phone number

<b>Emergency phone number</b>	0510-68092998
-------------------------------	---------------

## 2 Hazard(s) identification

### | Hazard classification according to GHS

The product meets the definition of "article". In the Globally Harmonized Chemical Classification and Labeling System (GHS), the "articles" defined by the US Occupational Safety and Health Administration "Hazard Communication Standard" (29 CFR 1910.1200) or similar definitions do not fall within the scope of this system. [Rev. 9 (2021) Part 1.3.2.1.1]. According to GHS system (9th revised edition), not classified as a hazardous chemical.

### | GHS Label elements

<b>Hazard pictograms</b>	Not applicable
<b>Signal word</b>	Not applicable

### | Hazard statements

<b>Hazard statements</b>	Not applicable
--------------------------	----------------

### | Precautionary statements

#### ◆ Prevention

<b>Prevention</b>	Not applicable
-------------------	----------------

#### ◆ Response

<b>Response</b>	Not applicable
-----------------	----------------

#### ◆ Storage

<b>Storage</b>	Not applicable
----------------	----------------

#### ◆ Disposal

<b>Disposal</b>	Not applicable
-----------------	----------------

### | Hazard description

#### ◆ Physical and chemical hazards

	When the outer enclosure and safety circuits have been compromised or have been significantly damaged, it is likely to contain substantial electrical charge and can cause injury or death if mishandled. Mechanical damage can lead to danger. Battery products exposed to high temperature conditions, may produce heat out of control, causing fire.
--	---

#### ◆ Health hazards

<b>Inhaled</b>	According to the material form, it is not the normal way of contacting.
<b>Ingestion</b>	Accidental ingestion of the product may be harmful to the health of the individual.
<b>Skin Contact</b>	No harm in general situation.

<b>Eye</b>	This product may cause temporary discomfort following direct contact with the eye.
◆ Environmental hazards	
	Please refer to 12th chapter of SDS.

### 3 Composition/information on ingredients

#### Substance/mixture

	Mixture
--	---------

Component	CAS No.	EC No.	Concentration (wt, %)
Lithium Iron Phosphate	15365-14-7	604-917-2	35
Graphite	7782-42-5	231-955-3	18
Aluminium	7429-90-5	231-072-3	15
Copper	7440-50-8	231-159-6	7
Dimethyl carbonate	616-38-6	210-478-4	6
Ethyl methyl carbonate	623-53-0	613-014-2	6
Ethylene carbonate	96-49-1	202-510-0	6
Polyethylene	9002-88-4	618-339-3	4
Carbon	7440-44-0	231-153-3	1
Poly(1,1-difluoroethylene)	24937-79-9	607-458-6	1
Polymerized Styrene Butadiene Rubber	9003-55-8	618-370-2	0.7
Carboxymethylcellulose Sodium	9004-32-4	618-378-6	0.3

### 4 First-aid measures

#### Description of first aid measures

<b>General advice</b>	Immediate medical attention is required. Show this safety data sheet (SDS) to the doctor in attendance.
<b>Eye contact</b>	Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician if feel uncomfortable.
<b>Skin contact</b>	No harm in general situation. First aid is not needed.
<b>Ingestion</b>	Never give anything by mouth to an unconscious person. Call a physician immediately.
<b>Inhalation</b>	Move victim into fresh air. If breathing is difficult, give oxygen and consult a physician immediately.
<b>Protecting of first-aiders</b>	Ensure that medical personnel are aware of the substance involved. Take precautions to protect themselves and prevent spread of contamination.

#### Most important symptoms/effects, acute and delayed

1	Please see section 11.
---	------------------------

#### Indication of any immediate medical attention and special treatment needed

1	Treat symptomatically.
2	Symptoms may be delayed.

## 5 Fire-fighting measures

### Extinguishing media

Suitable extinguishing media	Use extinguishing media suitable for surrounding area.
Unsuitable extinguishing media	There is no restriction on the type of extinguisher which may be used.

### Specific hazards arising from the substance or mixture

1	Development of hazardous combustion gases or vapor possible in the event of fire.
2	May expand or decompose explosively when heated or involved in fire.

### Special protective equipment and precautions for fire-fighters

1	As in any fire, wear self-contained breathing apparatus (MSHA/NIOSH approved or equivalent) and full protective gear.
2	Fight fire from a safe distance, with adequate cover.
3	Prevent fire extinguishing water from contaminating surface water or the ground water system.

## 6 Accidental release measures

### Personal precautions, protective equipment and emergency procedures

1	Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.
2	Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.
3	Use personal protective equipment, do not breathe dust/fume.

### Environmental precautions

1	Prevent further leakage or spillage if safe to do so.
2	Discharge into the environment must be avoided.

### Methods and materials for containment and cleaning up

1	Cut off the source of the leak as much as possible.
2	Keep leaks in a ventilated place.
3	Isolation of contaminated areas and restrictions on access.
4	It is recommended that emergency personnel wear dust masks.
5	Collect the spill with a clean shovel and place it in a clean, dry, loosely closed container and move the container away from the leak.
6	Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

## 7 Handling and storage

### Precautions for safe handling

1	Handling is performed in a well ventilated place.
2	Wear suitable protective equipment.
3	Avoid contact with skin and eyes.
4	Keep away from heat/sparks/open flames/ hot surfaces.

### Conditions for safe storage, including any incompatibilities

1	Keep containers tightly closed.
---	---------------------------------

2	Keep containers in a dry, cool and well-ventilated place.
3	Keep away from heat/sparks/open flames/hot surfaces.
4	Store away from incompatible materials and foodstuff containers.

## 8 Exposure controls/personal protection

### Control parameters

Component	Country/Region	Limit value - Eight hours		Limit value - Short term	
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Graphite	USA - OSHA		15		
	South Korea		2		
	Ireland		10		
	Germany (DFG)		4		
	Denmark		2.5		5
	Australia		3 (4)		
	USA-ACGIH		2		
Aluminium	USA - OSHA		15		
	South Korea		10		
	Ireland		1		
	Germany (DFG)		4		
	Denmark		5		10
	Australia		10		
	USA-ACGIH		1		
Copper	The Netherlands		0.1		
	Poland		0.2		
	Latvia		0.5		1
	Germany (DFG)		0.01		0.02

#### ◆ Biological limit values

<b>Biological limit values</b>	No relevant regulations
--------------------------------	-------------------------

#### ◆ Monitoring methods

1	EN 14042 Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
2	GBZ/T 300 series standard Determination of toxic substances in workplace air.

### Engineering controls

1	Ensure adequate ventilation, especially in confined areas.
2	Ensure that eyewash stations and safety showers are close to the workstation location.
3	Set up emergency exit and necessary risk-elimination area.
4	Handle in accordance with good industrial hygiene and safety practice.

### Personal protection equipment

<b>General requirement</b>	No special requirements, please see the description below.
<b>Eye protection</b>	In general situation, eye protection is not needed. In the production process, when contacting with vapour or dust, tightly fitting safety goggles.
<b>Hand protection</b>	In general situation, hand protection is not needed.
<b>Respiratory protection</b>	In general situation, respiratory protection is not needed. If exposure limits are exceeded or if irritation or other symptoms are experienced, wear dust proof mask or gas defence mask.
<b>Skin and body protection</b>	In general situation, skin and body protection are not needed.

## 9 Physical and chemical properties and safety characteristics

### Physical and chemical properties

<b>Physical state</b>	Solid (see picture for details)
<b>Colour</b>	White
<b>Odor</b>	No special odor
<b>Odor threshold</b>	No information available
<b>pH</b>	No information available
<b>Melting point/freezing point(°C)</b>	No information available
<b>Initial boiling point and boiling range(°C)</b>	No information available
<b>Flash point(Closed cup,°C)</b>	Not applicable
<b>Evaporation rate</b>	Not applicable
<b>Flammability</b>	Not flammable
<b>Upper/lower explosive limits[%(v/v)]</b>	Upper limit : No information available ; Lower limit : No information available
<b>Vapor pressure</b>	Not applicable
<b>Relative vapour density(Air = 1)</b>	Not applicable
<b>Relative density(Water=1)</b>	No information available
<b>Solubility</b>	Insoluble in water
<b>n-octanol/water partition coefficient</b>	No information available
<b>Auto-ignition temperature(°C)</b>	No information available
<b>Decomposition temperature(°C)</b>	No information available
<b>Kinematic viscosity</b>	Not applicable
<b>Particle characteristics</b>	No information available

## 10 Stability and reactivity

### Stability and reactivity

<b>Reactivity</b>	Contact with incompatible substances can cause decomposition or other chemical reactions.
<b>Chemical stability</b>	Stable under proper operation and storage conditions.
<b>Possibility of hazardous reactions</b>	No information available.
<b>Conditions to avoid</b>	Incompatible materials, heat, flame and spark.

<b>Incompatible materials</b>	Metal acetylide, halogen, interhalogen, halogen oxides, nitric acid, nitrous oxide, nitrates, nitrites, halogen oxyacid salts, chromates, permanganates, inorganic peroxides, metal oxides and peroxyformic acid. Oxidants, halogen, interhalogen and mercury. Halogen, interhalogen, strong oxidant, water and acids.
<b>Hazardous decomposition products</b>	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## 11 Toxicological information

### | Acute toxicity

Component	LD <sub>50</sub> (oral)	LD <sub>50</sub> (dermal)	LC <sub>50</sub> (inhalation,4h)
Dimethyl carbonate	13000mg/kg(Rat)	> 5000mg/kg(Rabbit)	No information available
Carboxymethylcellulose Sodium	27000mg/kg(Rat)	> 2000mg/kg(Rabbit)	> 5.8mg/L(Rat)
Ethylene carbonate	10000mg/kg(Rat)	> 3000mg/kg(Rabbit)	No information available

### | Carcinogenicity

Component	List of carcinogens by the IARC Monographs	Report on Carcinogens by NTP
Lithium Iron Phosphate	Not Listed	Not Listed
Graphite	Not Listed	Not Listed
Aluminium	Not Listed	Not Listed
Copper	Not Listed	Not Listed
Dimethyl carbonate	Not Listed	Not Listed
Ethyl methyl carbonate	Not Listed	Not Listed
Ethylene carbonate	Not Listed	Not Listed
Polyethylene	Category 3	Not Listed
Carbon	Not Listed	Not Listed
Poly(1,1-difluoroethylene)	Not Listed	Not Listed
Polymerized Styrene Butadiene Rubber	Category 3	Not Listed
Carboxymethylcellulose Sodium	Not Listed	Not Listed

### | Others

Lithium ion Battery Module CM4800	
<b>Skin corrosion/irritation</b>	Based on available data, the classification criteria are not met
<b>Serious eye damage/irritation</b>	Based on available data, the classification criteria are not met
<b>Skin sensitization</b>	Based on available data, the classification criteria are not met
<b>Respiratory sensitization</b>	Based on available data, the classification criteria are not met
<b>Reproductive toxicity</b>	Based on available data, the classification criteria are not met
<b>STOT-single exposure</b>	Based on available data, the classification criteria are not met
<b>STOT-repeated exposure</b>	Based on available data, the classification criteria are not met
<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met
<b>Germ cell mutagenicity</b>	Based on available data, the classification criteria are not met

**Reproductive  
toxicity(additional)**

Based on available data, the classification criteria are not met

**12 Ecological information**
**Acute aquatic toxicity**

Component	Fish	Crustaceans	Algae
Lithium Iron Phosphate	LC <sub>50</sub> : > 28mg/L (96h)(Fish)	EC <sub>50</sub> : > 28mg/L (48h)( $\emptyset$ )	No information available
Aluminium	LC <sub>50</sub> : 1.55mg/L (96h)(Fish)	No information available	No information available
Dimethyl carbonate	LC <sub>50</sub> : $\geq$ 100mg/L (96h)(Fish)	EC <sub>50</sub> : > 100mg/L (48h)( $\emptyset$ )	No information available
Ethyl methyl carbonate	LC <sub>50</sub> : > 100mg/L (96h)(Fish)	EC <sub>50</sub> : > 100mg/L (48h)( $\emptyset$ )	No information available
Copper	LC <sub>50</sub> : 0.665mg/L (96h)(Fish)	EC <sub>50</sub> : 0.02mg/L (48h)( $\emptyset$ )	ErC <sub>50</sub> : 7.9mg/L (96h)( $\emptyset$ )
Carboxymethylcellulose Sodium	No information available	EC <sub>50</sub> : 87.3mg/L (48h)( $\emptyset$ )	No information available
Graphite	LC <sub>50</sub> :100mg/L (96h)(Fish)	No information available	No information available
Ethylene carbonate	LC <sub>50</sub> : > 100mg/L (96h)(Fish)	EC <sub>50</sub> : > 100mg/L (48h)( $\emptyset$ )	No information available

**Chronic aquatic toxicity**

Chronic aquatic toxicity	No information available
--------------------------	--------------------------

**Persistence and degradability**

Component	Persistence (water/soil)	Persistence (air)
Graphite	Low	Low
Ethyl methyl carbonate	High	High
Ethylene carbonate	High	High
Polyethylene	Low	Low

**Bioaccumulative potential**

Component	Bioaccumulative potential	Comments
Graphite	Low	Log Kow=0.5294
Ethyl methyl carbonate	Low	Log Kow=0.7247
Ethylene carbonate	Low	Log Kow=-0.3388
Polyethylene	Low	Log Kow=1.2658

**Mobility in soil**

Component	Mobility in soil	Soil Organic Carbon-Water Partitioning Coefficient (Koc)
Graphite	Low	23.74
Ethyl methyl carbonate	Low	15.22



Ethylene carbonate	Low	9.168
Polyethylene	Low	14.3

### Results of PBT and vPvB assessment

Component	Results of PBT and vPvB assessment [according to (EC) No 1907/2006]
Lithium Iron Phosphate	Not available
Graphite	Not applicable
Aluminium	Not applicable
Copper	Not applicable
Dimethyl carbonate	Not PBT/vPvB
Ethyl methyl carbonate	Not PBT/vPvB
Ethylene carbonate	Not PBT/vPvB
Polyethylene	Not available
Carbon	Not available
Poly(1,1-difluoroethylene)	Not available
Polymerized Styrene Butadiene Rubber	Not available
Carboxymethylcellulose Sodium	Not available


## 13 Disposal considerations

### Disposal considerations

Waste chemicals	Before disposal should refer to the relevant national and local laws and regulation. Recommend the use of incineration disposal.
Contaminated packaging	Containers may still present chemical hazard when empty. Keep away from hot and ignition source of fire. Return to supplier for recycling if possible.
Disposal recommendations	Refer to section waste chemicals and contaminated packaging.

## 14 Transport information

### Label

Transporting Label	
--------------------	---

### IMDG-CODE

UN number	3480
UN proper shipping name	LITHIUM ION BATTERIES (including lithium ion polymer batteries)
Transport hazard class	9
Transport subsidiary hazard class	None
Packing group	Packagings shall conform to the packing group II performance level
Marine pollutant ( Yes or no )	No

**ICAO/IATA-DGR**

<b>UN number</b>	3480
<b>UN proper shipping name</b>	LITHIUM ION BATTERIES (including lithium ion polymer batteries)
<b>Transport hazard class</b>	9
<b>Transport subsidiary hazard class</b>	None
<b>Packing group</b>	Packagings shall conform to the packing group II performance level

**UN-ADR**

<b>UN number</b>	3480
<b>UN proper shipping name</b>	LITHIUM ION BATTERIES (including lithium ion polymer batteries)
<b>Transport hazard class</b>	9
<b>Transport subsidiary hazard class</b>	None
<b>Packing group</b>	Packagings shall conform to the packing group II performance level

**15** Regulatory information**International chemical inventory**

Component	EC inventory	TSCA	DSL	IECSC	NZIoC	PICCS	KECI	AIICS	ENCS
Lithium Iron Phosphate	×	√	√	√	×	×	√	×	√
Graphite	√	√	√	√	√	√	√	√	×
Aluminium	√	√	√	√	√	√	√	√	√
Copper	√	√	×	√	√	√	√	√	√
Dimethyl carbonate	√	√	√	√	√	√	√	√	√
Ethyl methyl carbonate	×	√	×	√	×	√	√	×	√
Ethylene carbonate	√	√	√	√	√	√	√	√	√
Polyethylene	×	√	√	√	√	√	√	√	√
Carbon	√	√	√	√	√	√	√	√	√
Poly(1,1-difluoroethylene)	×	√	√	√	√	√	√	√	√
Polymerized Styrene Butadiene Rubber	×	√	√	√	√	√	√	√	√
Carboxymethylcellulose Sodium	×	√	×	√	√	√	√	√	√

[EC inventory] European Inventory of Existing Commercial Chemical Substances

[TSCA] United States Toxic Substances Control Act Inventory

[DSL] Canadian Domestic Substances List

[IECSC] China Inventory of Existing Chemical Substances

[NZIoC] New Zealand Inventory of Chemicals

[PICCS] Philippines Inventory of Chemicals and Chemical Substances

[KECI] Korea Existing Chemicals Inventory

[AIICS] Australian Inventory of Industrial Chemical (AIICS)

[ENCS] Japan Inventory of Existing &amp; New Chemical Substances

Note:

- “√” Indicates that the substance included in the regulations.  
 “x” No data or not included in the regulations.

## 16 Other information

### Information on revision

Creation Date	2023/01/11
Revision Date	2023/03/03
Reason for revision	-

### Reference

- [1] IPCS: The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>.
- [2] IARC, website: <http://www.iarc.fr/>.
- [3] OECD: The Global Portal to Information on Chemical Substances, website: <https://www.echemportal.org/echemportal/substancesearch/index.action>.
- [4] CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>.
- [5] NLM: ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>.
- [6] EPA: Integrated Risk Information System, website: <http://cfpub.epa.gov/iris/>.
- [7] U.S. Department of Transportation: ERG, website: <http://www.phmsa.dot.gov/hazmat/library/erg>.
- [8] Germany GESTIS-database on hazard substance, website: <http://gestis-en.itrust.de/>.

### Abbreviations and acronyms

CAS	Chemical Abstracts Service	UN	The United Nations
PC-STEL	Short term exposure limit	OECD	Organization for Economic Co-operation and Development
PC-TWA	Time Weighted Average	IMDG-CODE	International Maritime Dangerous Goods CODE
MAC	Maximum Allowable Concentration	IARC	International Agency for Research on Cancer
DNEL	Derived No Effect Level	ICAO	International Civil Aviation Organization
PNEC	Predicted No Effect Concentration	IATA	International Air Transportation Association
NOEC	No Observed Effect Concentration	ACGIH	American Conference of Governmental Industrial Hygienists
LC <sub>50</sub>	Lethal Concentration 50%	NFPA	National Fire Protection Association
LD <sub>50</sub>	Lethal Dose 50%	NTP	National Toxicology Program
EC <sub>50</sub>	Effective Concentration 50%	PBT	Persistent, Bioaccumulative, Toxic
EC <sub>x</sub>	Effective Concentration X%	vPvB	very Persistent, very Bioaccumulative
P <sub>OW</sub>	Partition coefficient Octanol: Water	CMR	Carcinogens, mutagens or substances toxic to reproduction
BCF	Bioconcentration factor	RPE	Respiratory Protective Equipment
ED	Endocrine disruptor		

### Disclaimer

This Safety Data Sheet (SDS) was prepared according to UN GHS (the 9th revised edition). The data included was derived from international authoritative database and provided by the enterprise. Other information was based on the present state of our knowledge. We try to ensure the correctness of all information. However, due to the diversity of information sources and the limitations of our knowledge, this document is only for user's reference. Users should make their independent judgment of suitability of this information for their particular purposes. We do not assume responsibility for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.

UN 38.3

# 检测报告

## Test Report

新申请

New Application

变更

Modification

其他:

Other:

报告编号: 20221106J34188

Report ID

样品名称: 锂离子电池模组

Sample Name Lithium ion Battery Module

型号规格: CM4800

Model/Type

44.8V 104Ah 4.66kWh

委托单位: 麦田能源有限公司

Applicant

FOXESS CO., LTD.



中认英泰检测技术有限公司

CQC Intime Testing Technology Co.,Ltd.

<b>检测报告</b> <b>TEST REPORT</b>			
报告编号: Report ID	20221106J34188		
样品名称: Sample Name	锂离子电池模组 Lithium ion Battery Module	商 标 : Trade Mark	FOXESS
型号规格: Model/Type	CM4800 44.8V 104Ah 4.66kWh	样品状态: Sample status	完好 Good
委托单位: Applicant	麦田能源有限公司 FOXESS CO., LTD.		
地址: Applicant Address	浙江省温州市龙湾区空港新区金海三道939号 No.939, Jinhai Third Road, New Airport Industry Area, Longwan District, Wenzhou, Zhejiang, China		
生产单位: Manufacturer	麦田能源有限公司 FOXESS CO., LTD.		
地址: Manufacturer Address	浙江省温州市龙湾区空港新区金海三道939号 No.939, Jinhai Third Road, New Airport Industry Area, Longwan District, Wenzhou, Zhejiang, China		
试验单位: Test Lab	中认英泰检测技术有限公司 CQC Intime Testing Technology Co., Ltd		
地址: Lab Address	苏州吴中经济开发区吴中大道 1368号东太湖科技金融城 East Taihu Technology and Finance City, No.1368 Wuzhong Dadao Rd., Wuzhong Economic Development Zone, Suzhou, Jiangsu.		
试验标准: Standard Specification	《关于危险货物运输的建议书 试验和标准手册》第七版修订1第38.3节 Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, ST/SG/AC.10/11/Rev.7/Amend.1/Section 38.3		
试验项目: Test Item	高度模拟; 温度试验; 振动; 冲击; 外部短路; 挤压; 过度充电; 强制放电 Altitude Simulation, Thermal Test, Vibration, Shock, External Short Circuit, Crush, Overcharge, Force Discharge		
接样日期: 2022-11-21 Receiving Date	完成时间: 2023-01-06 Completing Date		
试验结论 : Conclusion	所检样品符合上述标准要求 The Submitted Sample(s) Meet the Requirement of the Standard.		
检测环境: Test Condition	环境温度: 20°C±5°C Ambient temperature		
项目: Engineer	王利通	CQCIT印章 Seal of CQCIT  签发日期: Data of issue 2023-01-06	
审核: Auditor	侯逢文		
签发: Approver	赵润生		

试验样品描述 Description of the sample		
测试项目 Test Item	样品编号 Sample No.	样品状态 Sample State
T1~T5	B1~ B2	第1个充放电循环，完全充电状态 At first cycle, in fully charged states
	B3~ B4	第25个充放电循环后，完全充电状态 After 25 cycles ending in fully charged states
T6	C1~C5	第1个充放电循环，50%设计额定容量状态 At first cycle at 50% of the design rated capacity
	C6~C10	第25个充放电循环后，50%设计额定容量状态 After 25 cycles ending at 50% of the design rated capacity
T7	B5-B6	第1个充放电循环，完全充电状态 At first cycle, in fully charged states
	B7-B8	第25个充放电循环后，完全充电状态 After 25 cycles ending in fully charged states
T8	C11~C20	第1个充放电循环，完全放电状态 At first cycle, in fully discharged states
	C21~C30	第25个充放电循环后，完全放电状态 After 25 cycles ending in fully discharged states
备注 Remarks		
<p>1, 该样品为大型电池组 This sample is large battery</p> <p>2, 样品的电压测量和短路试验是通过将电池模组底座接口连接后进行测试的。 Voltage measurements and short circuit tests of the sample were performed by connecting the battery Module's bottom interface.</p>		

样品基本信息 Sample Fundamental Parameters			
项目 Item	参数 Parameters	项目 Item	参数 Parameters
额定容量(Ah) Rated capacity(Ah)	104	标称电压(V) Nominal voltage(V)	44.8
额定瓦特-小时(kWh) Watt-hour rating(kWh)	4.66	充电限制电压(V) Limited charge voltage(V)	51.5
充电电流(A) Charge current(A)	30	最大连续充电电流(A) Maximum continous charging current (A)	50
充电截止电流(A) End charge current(A)	5.3	放电电流(A) Discharge current(A)	30
放电终止电压(V) End of discharging voltage (V)	40.6	内含电池芯个数(个) Cell numbers(pcs)	14
最大放电电流(A) Maximum discharge current(A)	65	电池芯型号 Model of cell	CB52E8B2B
电池芯容量(Ah) Capacity of cell(Ah)	104	电池芯排列方式 Permutation of cell	1P14S
电池芯形状 Shape of cell	<input type="checkbox"/> 圆柱形 $\Phi \geq 18\text{mm}$ <input type="checkbox"/> 圆柱形 $< 18\text{mm}$ Cylindrical $\Phi \geq 18\text{mm}$ Cylindrical $\Phi < 18\text{mm}$  <input checked="" type="checkbox"/> 棱柱形 <input type="checkbox"/> 袋装电池 <input type="checkbox"/> 纽扣电池 Prismatic    Pouch Cell    Button Cell		



样品照片  
Photos of Sample

样品图片 (Sample photograph) -1



样品图片 (Sample photograph) -2



样品照片  
Photos of Sample

样品图片 (Sample photograph) -3



样品图片 (Sample photograph) -4

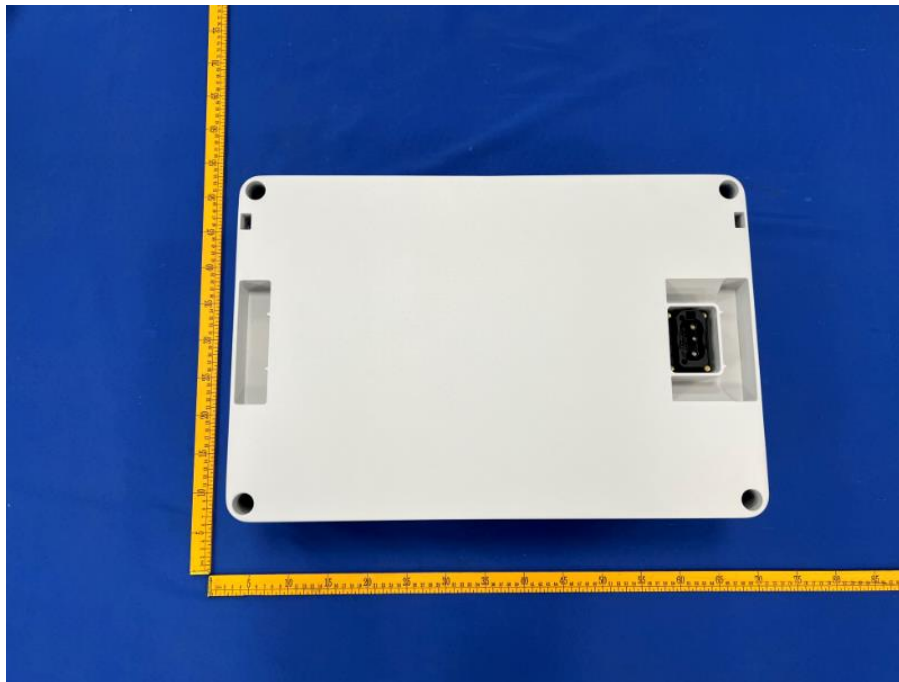


样品照片  
Photos of Sample

样品图片 (Sample photograph) -5

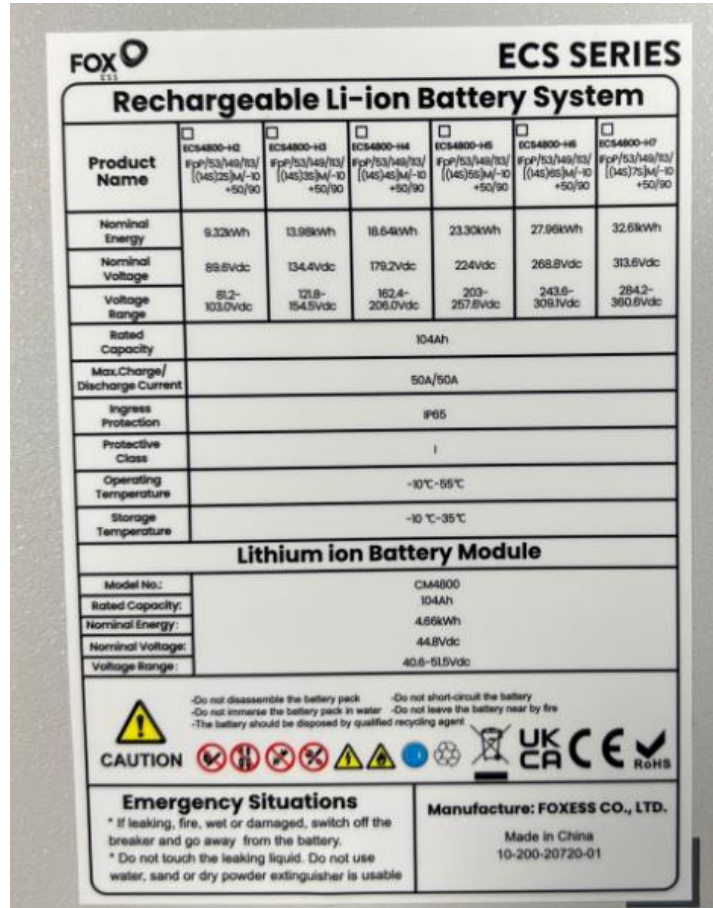


样品图片 (Sample photograph) -6



样品照片  
Photos of Sample

样品图片 (Sample photograph) -7

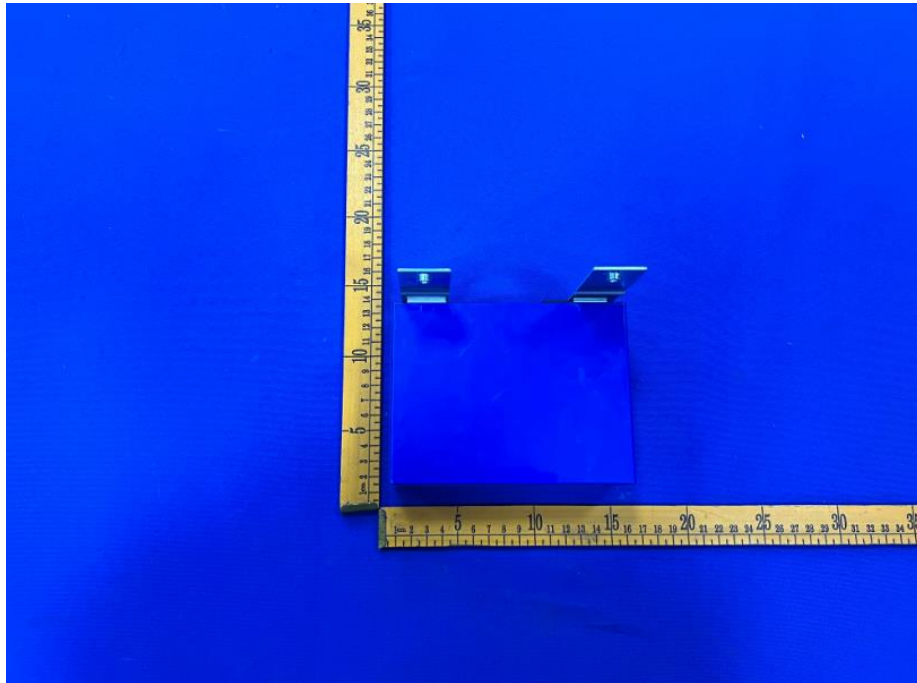


样品图片 (Sample photograph) -8

Lithium ion Battery Module	
Model No.:	CM4800
Rated Capacity:	104Ah
Nominal Energy:	4.66kWh
Nominal Voltage:	44.8Vdc
Voltage Range:	40.6-51.5Vdc

样品照片  
Photos of Sample

样品图片 (Sample photograph) -9



样品图片 (Sample photograph) -10



中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.1高度模拟试验</b> <b>38.3.4.1 Altitude simulation</b>
测试步骤 Test Procedure	试验电池和电池组应在压力等于或低于11.6千帕和环境温度(20 ± 5°C)下存放至少6小时。 Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature(20±5°C).
技术要求 Test requirement	不漏液、不泄放、不解体、不破裂、不着火(测试完电池的开路电压不小于测试前电压的90%，质量损失限值0.1%) No leakage, no venting, no disassembly, no rupture and no fire. The open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. Mass loss limit 0.1%.
检测结果 Test results	不漏液、不泄放、不解体、不破裂、不着火，具体数据详见附表1 No leakage, no venting, no disassembly, no rupture and no fire. Test data is shown in Annex 1.
结论 Pass/Fail Conclusion	P



中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.2温度试验</b> <b>38.3.4.2 Thermal test</b>
测试步骤 Test Procedure	<p>试验电池和电池组应先在试验温度等于<math>72 \pm 2^{\circ}\text{C}</math>的条件下存放至少6小时，接着再在试验温度等于<math>-40 \pm 2^{\circ}\text{C}</math>的条件下存放至少6小时。两个极端试验温度之间的最大时间间隔为30分钟。此程序重复进行，共完成10次，接着将所有试验电池和电池组在环境温度(<math>20 \pm 5^{\circ}\text{C}</math>)下存放24小时。</p> <p>对于大型电池和电池组，暴露于极端试验温度的时间至少应为12小时。</p> <p>Test cells and batteries are to be stored for at least six hours at a test temperature equal to <math>72 \pm 2^{\circ}\text{C}</math>, followed by storage for at least six hours at a test temperature equal to <math>-40 \pm 2^{\circ}\text{C}</math>. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (<math>20 \pm 5^{\circ}\text{C}</math>).</p> <p>For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.</p>
技术要求 Test requirement	<p>不漏液、不泄放、不解体、不破裂、不着火(测试完电池的开路电压不小于测试前电压的90%，质量损失限值0.1%)</p> <p>No leakage, no venting, no disassembly, no rupture and no fire. The open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. Mass loss limit 0.1%.</p>
检测结果 Test results	<p>不漏液、不泄放、不解体、不破裂、不着火，具体数据详见附表2</p> <p>No leakage, no venting, no disassembly, no rupture and no fire. Test data is shown in Annex 2.</p>
结论 Pass/Fail Conclusion	P



中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.3 振动试验</b> <b>38.3.4.3 Vibration</b>
测试步骤 Test Procedure	<p>电池和电池组紧固于振动机平台，但紧固程度不能造成电池变形以致不能准确传递振动。振动应是正弦波形，对数频率扫描从7Hz到200Hz，再回到7Hz，跨度为15分钟。</p> <p>对电池和小型电池组：从7 Hz开始，保持1gn 的最大加速度，直到频率达到18 Hz。然后将振幅保持在0.8 毫米(总偏移1.6 毫米)，并增加频率直到最大加速度达到8 gn (频率约为50 Hz)。将最大加速度保持在8 gn 直到频率增加到200 Hz。</p> <p>对大型电池组：从7Hz开始，保持1 gn 的最大加速度，直到频率达到18Hz。然后将振幅保持在0.8 毫米(总偏移1.6 毫米)，并增加频率直到最大加速度达到2 gn (频率约为25 Hz)。将最大加速度保持在2 gn 直到频率增加到200Hz。</p> <p>这一振动过程须对三个互相垂直的电池安装方位的每一方向重复进行12次，总共为时3小时。其中一个振动方向必须与端面垂直。</p> <p>Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes.</p> <p>For cells and small batteries: from 7 Hz a peak acceleration of 1 gn is maintained until 18Hz is reached. The amplitude is then maintained at 0.8 mm(1.6 mm total excursion ) and the frequency increased until a peak acceleration of 8 gn occurs (approximately 50 Hz). A peak acceleration of 8 gn is then maintained until the frequency is increased to 200 Hz</p> <p>For large batteries: from 7Hz to a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm(1.6 mm total excursion) and the frequency increased until a peak acceleration of 2 gn occurs (approximately 25 Hz). A peak acceleration of 2 gn is then maintained until the frequency is increased to 200Hz</p> <p>This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.</p>
技术要求 Test requirement	<p>不漏液、不泄放、不解体、不破裂、不着火(测试完电池的开路电压不小于测试前电压的90%，质量损失限值0.1%)</p> <p>No leakage, no venting, no disassembly, no rupture and no fire. The open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. Mass loss limit 0.1%.</p>
检测结果 Test results	<p>不漏液、不泄放、不解体、不破裂、不着火，具体数据详见附表3</p> <p>No leakage, no venting, no disassembly, no rupture and no fire. Test data is shown in Annex 3.</p>
结论 Pass/Fail Conclusion	P

中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.4 冲击试验</b> <b>38.3.4.4 Shock</b>
测试步骤 Test Procedure	<p>试验电池和电池组用坚固支架紧固在试验机上，支架支撑着每个试验电池组的所有安装面。</p> <p>每个电池须经受最大加速度150 gn 和脉冲持续时间6 毫秒的半正弦波冲击。大型电池须经受最大加速度50 gn 和脉冲持续时间11 毫秒的半正弦波冲击。</p> <p>小型电池组以峰值为 150gn（或与<math>\sqrt{\left(\frac{100850}{\text{mass}}\right)}</math> 中的较小值）的半正弦的加速度撞击，脉冲持续 6 毫秒，大型电池组须经受最大加速度 50gn（或与<math>\sqrt{\left(\frac{30000}{\text{mass}}\right)}</math> 中的较小值）和脉冲持续时间 11 毫秒的半正弦波冲击。</p> <p>每个电池或电池组须在三个互相垂直的电池安装方位的正方向经受三次冲击，接着在反方向经受三次冲击，总共经受 18 次冲击。</p> <p>Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery.</p> <p>Each cell shall be subjected to a half-sine shock of peak acceleration of 150 gn and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock acceleration of 50 gn and pulse duration of 11 milliseconds.</p> <p>Small batteries shall be subjected to a half-sine shock of peak acceleration of 150 gn (or Acceleration(gn) = <math>\sqrt{\left(\frac{100850}{\text{mass}}\right)}</math>, which is smaller) and pulse duration of 6 milliseconds. Large batteries shall be subjected to a half-sine of peak acceleration of 50 gn (or Acceleration(gn) = <math>\sqrt{\left(\frac{30000}{\text{mass}}\right)}</math>, which is smaller) and pulse duration of 11 milliseconds.</p> <p>Each battery shall be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the battery for a total of 18 shocks.</p>
技术要求 Test requirement	<p>不漏液、不泄放、不解体、不破裂、不着火(测试完电池的开路电压不小于测试前电压的90%，质量损失限值0.1%)</p> <p>No leakage, no venting, no disassembly, no rupture and no fire. The open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. Mass loss limit 0.1%.</p>
检测结果 Test results	<p>不漏液、不泄放、不解体、不破裂、不着火，具体数据详见附表4</p> <p>No leakage, no venting, no disassembly, no rupture and no fire. Test data is shown in Annex 4.</p>
结论 Pass/Fail Conclusion	P

中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.5 外部短路</b> <b>38.3.4.5 External short circuit</b>
测试步骤 Test Procedure	<p>电池和电池组的外壳温度稳定在<math>57\pm 4^{\circ}\text{C}</math>后，在此温度下对电池进行外部短路，外电路的总阻值应小于<math>0.1\Omega</math>，持续短路至样品外壳温度回落到<math>57\pm 4^{\circ}\text{C}</math>后至少再继续短路1 h；对于大型电池组，外壳温度降幅达试验中所观察的的最高温升幅的二分之一并保持低于该数值。电池组必须再观察6h结束试验。</p> <p>The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches <math>57\pm 4^{\circ}\text{C}</math> and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than <math>0.1\ \text{ohm}</math> at <math>57\ \pm 4^{\circ}\text{C}</math>. This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to <math>57\pm 4^{\circ}\text{C}</math>. In the case of the large batteries, has decreased by half of the temperature increase observed during the test and remains below that value. The cell and battery must be observed for a further six hours for the test to be concluded.</p>
技术要求 Test requirement	<p>外壳温度不超过<math>170^{\circ}\text{C}</math>，不解体、不破裂、不着火。</p> <p>External temperature does not exceed <math>170^{\circ}\text{C}</math>. No disassembly, no rupture and no fire.</p>
检测结果 Test results	<p>外壳温度不超过<math>170^{\circ}\text{C}</math>，不解体、不破裂、不着火，具体数据详见附表5</p> <p>External temperature does not exceed <math>170^{\circ}\text{C}</math>. No disassembly, no rupture and no fire. Test data is shown in Annex 5.</p>
结论 Pass/Fail Conclusion	P

中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.6 撞击/挤压</b> <b>38.3.4.6 Impact/Crush</b>
测试步骤 Test Procedure	<p>□撞击（适用于直径不小于18.0毫米的圆柱形电池） Impact(applicable to cylindrical cells not less than 18.0 mm in diameter) 将样品电池置于平板上，将一直径为15.8mm±0.1mm的不锈钢棒横放在样品中心，一块9.1Kg±0.1Kg的重锤从61 ± 2.5 cm高度落到试样上。圆柱形电池受撞击时，其长轴应平行于平板并且垂直于放在受检电池中心的直径为 15.8mm的棒。每一试样只经受一次撞击，电池必须再观察6h结束试验。 The sample cell or component cell is to be placed on a flat smooth surface. A 15.8 mm ± 0.1mm diameter stainless steel bar is to be placed across the centre of the sample. A 9.1 kg ± 0.1 kg mass is to be dropped from a height of 61 ± 2.5 cm on to the sample. The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8 mm ± 0.1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact. The battery must be observed for a further six hours for the test to be concluded.</p> <p>■挤压(适用于棱柱形、袋装、硬币/纽扣电池和直径小于18.0毫米的圆柱形电池) Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18.0 mm in diameter) 将试样电池放在两个平面之间挤压，挤压力度逐渐增大，速度大约为1.5cm/s.挤压持续进行，直到出现以下三种情况之一：(a)施加的力量达到13kN±0.78kN;(b)电池的电压下降至少100mV;(c)电池变形达到原始厚度的50%或以上。棱柱形和袋装电池应从最宽的一面施压。硬币/纽扣电池应从平坦表面施压。圆柱形电池应从与纵轴垂直的方向施压。每个试样电池只做一次挤压试验，电池必须再观察6h结束试验。 A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5 cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached. (a) The applied force reaches 13 kN ± 0.78 kN; (b) The voltage of the cell drops by at least 100 mV; or (c) The cell is deformed by 50% or more of its original thickness. A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis. Each test cell or component cell is to be subjected to one crush only. The battery must be observed for a further six hours for the test to be concluded.</p>
技术要求 Test requirement	外壳温度不超过170°C，不解体、不破裂、不着火。 External temperature does not exceed 170°C.. No disassembly, no rupture and no fire.
检测结果 Test results	外壳温度不超过170°C，不解体、不破裂、不着火，具体数据详见附表6 External temperature does not exceed 170°C. No disassembly, no rupture and no fire. Test data is shown in Annex 6.
结论 Pass/Fail Conclusion	P

中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.7 过度充电</b> <b>38.3.4.7 Overcharge</b>
测试步骤 Test Procedure	<p>充电电流必须是制造商推荐的最大持续充电电流的两倍。试验的最小电压应为如下： （a）当制造商推荐的充电电压不超过18 V时，试验的最小电压应为2倍于电池的最大充电电压或为22 V二者中较小者；（b）当制造商推荐的充电电压超过18 V时，试验的最小电压应为最大充电电压的1.2倍。该试验应在环境温度下进行。进行试验的时间应为24 小时。在过充电结束后观察被检电池7天。</p> <p>The charge current shall be the twice the manufactures recommended maximum continuous charge current. The minimum voltage of the test shall be follows:(a)When the manufactures recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V.(b)When the manufactures recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage. Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours. The test sample shall be observed for a further 7 days.</p>
技术要求 Test requirement	不解体、不着火。 No disassembly, no fire.
检测结果 Test results	不解体、不着火,具体数据详见附表7 No disassembly, no fire. Test data is shown in Annex 7.
结论 Pass/Fail Conclusion	P

中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.8 强制放电</b> <b>38.3.4.8 Forced discharge</b>
测试步骤 Test Procedure	<p>电池在环境温度下与12V 直流电源串联连接，以电池制造商规定的最大持续放电电流作为初始电流强制放电。</p> <p>将一个大小和功率合适的电阻负载与被检电池以及直流电源串联以获得规定的放电电流。每个电池强制放电的时间应等于其额定容量除以起始试验电流。在强制放电结束后观察被检电池7 天。</p> <p>Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer.</p> <p>The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere). The test sample shall be observed for a further 7 days.</p>
技术要求 Test requirement	不解体、不着火。 No disassembly, no fire.
检测结果 Test results	不解体、不着火,具体数据详见附表8 No disassembly, no fire. Test data is shown in Annex 8.
结论 Pass/Fail Conclusion	P













中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

附表6 撞击/挤压试验  
Annex 6. Impact/Crush

样品编号 Sample No.	试验前电压 Voltage before test (V)	初始温度 Initial Temperature (°C)	最高温度 Max Temperature (°C)	备注 Remarks
C1	3.302	23.4	23.5	-
C2	3.301	23.3	23.4	-
C3	3.302	23.3	23.4	-
C4	3.302	23.4	23.5	-
C5	3.302	23.3	23.4	-
C6	3.301	23.5	23.6	-
C7	3.302	23.4	23.5	-
C8	3.301	23.3	23.4	-
C9	3.301	23.3	23.4	-
C10	3.302	23.4	23.5	-
以下空白 Blank below				



中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

附表8强制放电试验  
Annex 8. Forced discharge

样品编号 Sample No.	试验前电压 Voltage before test (V)	初始温度 Initial Temperature (°C)	最高温度 Max Temperature (°C)	备注 Remarks
C11	3.067	23.4	47.3	-
C12	3.086	23.5	44.9	-
C13	3.076	23.4	47.3	-
C14	3.075	23.4	45.4	-
C15	3.141	23.7	43.6	-
C16	3.079	23.5	45.9	-
C17	3.121	23.6	44.6	-
C18	3.070	23.4	47.0	-
C19	3.067	23.4	47.0	-
C20	3.089	23.4	44.1	-
C21	3.077	23.4	47.1	-
C22	3.054	23.6	47.5	-
C23	3.072	23.7	46.5	-
C24	3.094	23.6	44.1	-
C25	3.091	23.5	44.0	-
C26	3.068	23.4	46.9	-
C27	3.079	23.6	45.9	-
C28	3.084	23.4	44.7	-
C29	3.092	23.5	46.8	-
C30	3.086	23.4	45.7	-
以下空白 Blank below				

——报告结束 End——

# 声明

## Statement

1. 未经本机构书面批准不得部分复制本报告，除非全部复制。

Don't copies the report partly, if you don't obtain the laboratory allow you to do that, unless you copy the whole report.

2. 检验结果仅对所检样品有效。

The test report is only valid to the sample which has been tested

3. 若对检测结果有异议，请在收到报告后十日内向本机构书面提出。

If you have any objection to the test result, please submit it to the laboratory in writing within 10 days after receiving the report.

4. 受检样品务必在收到检测报告三十日内领取，逾期本机构将作为废弃物自行处理。

The sample must be collected within 30 days after receiving the test report. The overdue sample will be disposed of as waste by the laboratory itself.

5. 此报告仅作为委托方参考，不作为诉讼、仲裁等依据。

This report only as a reference for client, can't be considered as a basis for litigation, arbitration and so on.

检测机构：中认英泰检测技术有限公司

Test Lab.: CQC Intime Testing Technology Co.,Ltd.

总部地址：苏州市吴中经济开发区吴中大道1368号东太湖科技金融城

Headquarter address: East Taihu Hi-Tech & Finance Town, No.1368, Wuzhong Road, Wuzhong Economic Development Zone, Suzhou, China

邮政编码：215104

电 话：0512-66303621

传 真：0512-66303625

E-mail: cqc\_jszlb@126.com

苏州胥口实验室地址：胥口镇曹丰路236号

慈溪办事处地址：浙江省慈溪市水南路19号中央大厦北楼10层1020室

电话：0574-63895313

深圳办事处地址：深圳市福田区新洲十一街139号中央西谷大厦13A层

电话：0755-82889188-8118

广州办事处地址：广州市海珠区赤岗西路266号小聪科技园9楼

电话/传真：020-84147422

UN 38.3

# 检测报告

## Test Report

新申请

New Application

变更

Modification

其他:

Other:

报告编号: 20221106J34189

Report ID

样品名称: 锂离子电池模组

Sample Name Lithium ion Battery Module

型号规格: CS4800

Model/Type

44.8V 104Ah 4.66kWh

委托单位: 麦田能源有限公司

Applicant

FOXESS CO., LTD.



中认英泰检测技术有限公司

CQC Intime Testing Technology Co.,Ltd.



<b>检测报告</b> <b>TEST REPORT</b>			
报告编号: Report ID	20221106J34189		
样品名称: Sample Name	锂离子电池模组 Lithium ion Battery Module	商 标 : Trade Mark	FOXESS
型号规格: Model/Type	CS4800 44.8V 104Ah 4.66kWh	样品状态: Sample status	完好 Good
委托单位: Applicant	麦田能源有限公司 FOXESS CO., LTD.		
地址: Applicant Address	浙江省温州市龙湾区空港新区金海三道939号 No.939, Jinhai Third Road, New Airport Industry Area, Longwan District, Wenzhou, Zhejiang, China		
生产单位: Manufacturer	麦田能源有限公司 FOXESS CO., LTD.		
地址: Manufacturer Address	浙江省温州市龙湾区空港新区金海三道939号 No.939, Jinhai Third Road, New Airport Industry Area, Longwan District, Wenzhou, Zhejiang, China		
试验单位: Test Lab	中认英泰检测技术有限公司 CQC Intime Testing Technology Co., Ltd		
地址: Lab Address	苏州吴中经济开发区吴中大道 1368号东太湖科技金融城 East Taihu Technology and Finance City, No.1368 Wuzhong Dadao Rd., Wuzhong Economic Development Zone, Suzhou, Jiangsu.		
试验标准: Standard Specification	《关于危险货物运输的建议书 试验和标准手册》第七版修订1第38.3节 Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, ST/SG/AC.10/11/Rev.7/Amend.1/Section 38.3		
试验项目: Test Item	高度模拟; 温度试验; 振动; 冲击; 外部短路; 挤压; 强制放电 Altitude Simulation, Thermal Test, Vibration, Shock, External Short Circuit, Crush, Force Discharge		
接样日期: 2022-11-21 Receiving Date	完成时间: 2023-01-06 Completing Date		
试验结论 : Conclusion	所检样品符合上述标准要求 The Submitted Sample(s) Meet the Requirement of the Standard.		
检测环境: Test Condition	环境温度: 20°C±5°C Ambient temperature		
项目: Engineer	王利通	CQCIT印章 Seal of CQCIT  签发日期: Data of issue 2023-01-06	
审核: Auditor	侯逢文		
签发: Approver	赵润生		

试验样品描述 Description of the sample		
测试项目 Test Item	样品编号 Sample No.	样品状态 Sample State
T1~T5	B1~ B2	第1个充放电循环，完全充电状态 At first cycle, in fully charged states
	B3~ B4	第25个充放电循环后，完全充电状态 After 25 cycles ending in fully charged states
T6	C1~C5	第1个充放电循环，50%设计额定容量状态 At first cycle at 50% of the design rated capacity
	C6~C10	第25个充放电循环后，50%设计额定容量状态 After 25 cycles ending at 50% of the design rated capacity
T7	/	第1个充放电循环，完全充电状态 At first cycle, in fully charged states
	/	第25个充放电循环后，完全充电状态 After 25 cycles ending in fully charged states
T8	C11~C20	第1个充放电循环，完全放电状态 At first cycle, in fully discharged states
	C21~C30	第25个充放电循环后，完全放电状态 After 25 cycles ending in fully discharged states
备注 Remarks		
<p>1, 该样品为大型电池组 This sample is large battery</p> <p>2, 电池组未设计过充电保护装置, 按设计要求只能作为部件用在另一个带过度充电保护装置的电池组中, T7 项目不适用 The battery is not designed with overcharge protection and only used as a component in another battery which affords overcharge protection. T7 item is not applicable</p> <p>3, 样品的电压测量和短路试验是通过将电池模组底座接口连接后进行测试的。 Voltage measurements and short circuit tests of the sample were performed by connecting the battery Module's bottom interface.</p>		

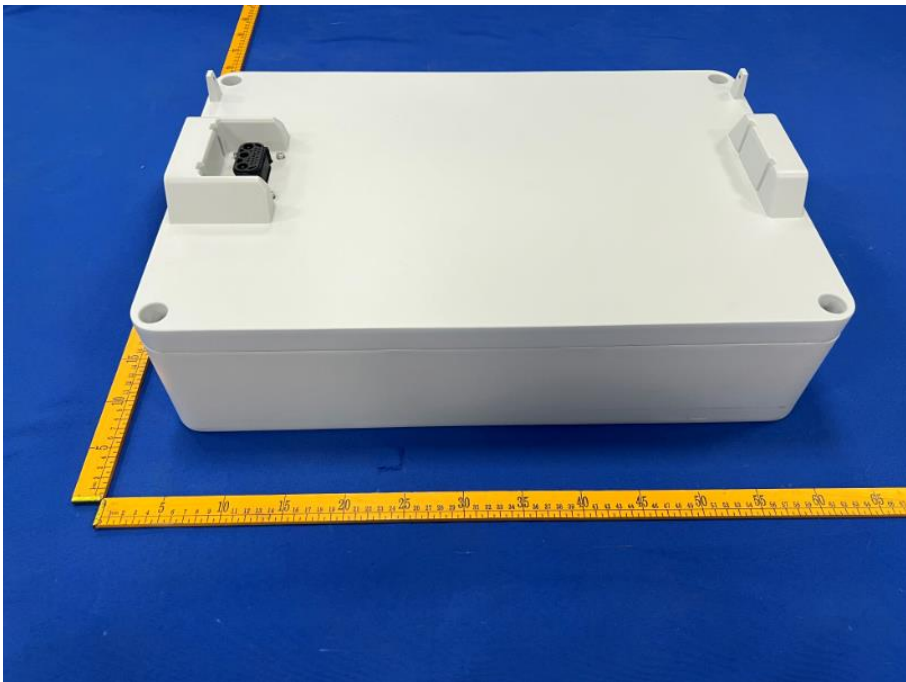
样品基本信息 Sample Fundamental Parameters			
项目 Item	参数 Parameters	项目 Item	参数 Parameters
额定容量(Ah) Rated capacity(Ah)	104	标称电压(V) Nominal voltage(V)	44.8
额定瓦特-小时(kWh) Watt-hour rating(kWh)	4.66	充电限制电压 (V) Limited charge voltage(V)	51.5
充电电流(A) Charge current(A)	30	最大连续充电电流(A) Maximum continous charging current (A)	50
充电截止电流(A) End charge current(A)	5.3	放电电流(A) Discharge current(A)	30
放电终止电压(V) End of discharging voltage (V)	40.6	内含电池芯个数(个) Cell numbers(pcs)	14
最大放电电流 (A) Maximum discharge current(A)	65	电池芯型号 Model of cell	CB52E8B2B
电池芯容量(Ah) Capacity of cell(Ah)	104	电池芯排列方式 Permutation of cell	1P14S
电池芯形状 Shape of cell	<input type="checkbox"/> 圆柱形 $\Phi \geq 18\text{mm}$ <input type="checkbox"/> 圆柱形 $< 18\text{mm}$ Cylindrical $\Phi \geq 18\text{mm}$ Cylindrical $\Phi < 18\text{mm}$  <input checked="" type="checkbox"/> 棱柱形 <input type="checkbox"/> 袋装电池 <input type="checkbox"/> 纽扣电池 Prismatic    Pouch Cell    Button Cell		

样品照片  
Photos of Sample

样品图片 (Sample photograph) -1

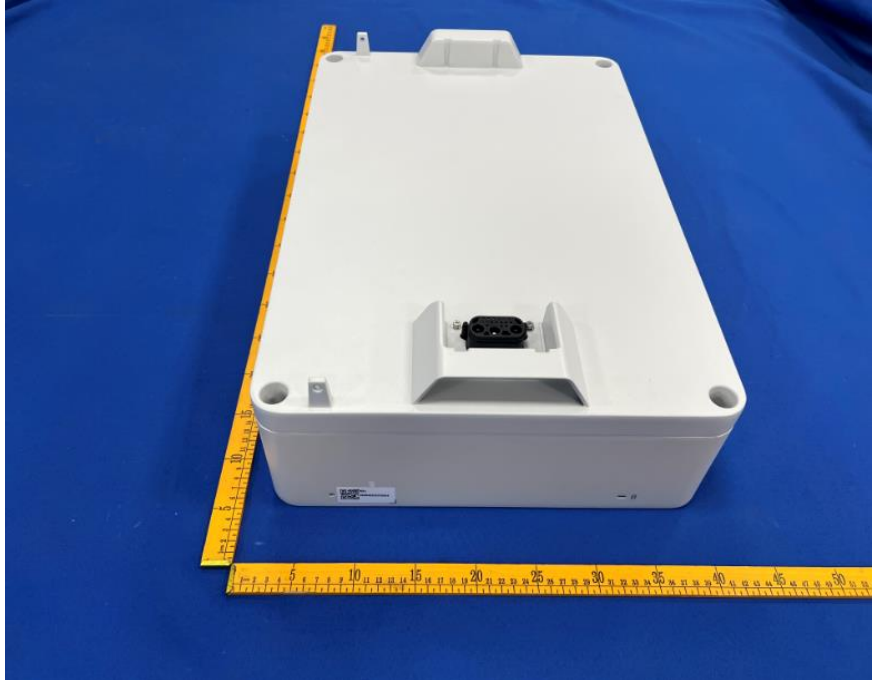


样品图片 (Sample photograph) -2

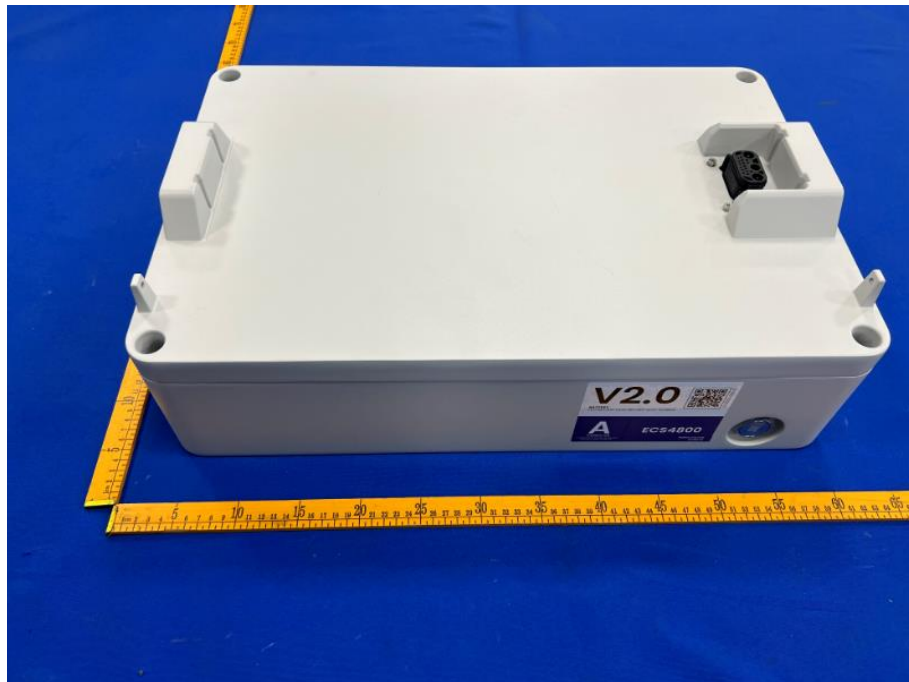


样品照片  
Photos of Sample

样品图片 (Sample photograph) -3



样品图片 (Sample photograph) -4



样品照片  
Photos of Sample

样品图片 (Sample photograph) -5



样品图片 (Sample photograph) -6



样品照片  
Photos of Sample

样品图片 (Sample photograph) -7



样品图片 (Sample photograph) -8





样品照片  
Photos of Sample

样品图片 (Sample photograph) -9





中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.1高度模拟试验</b> <b>38.3.4.1 Altitude simulation</b>
测试步骤 Test Procedure	试验电池和电池组应在压力等于或低于11.6千帕和环境温度(20 ± 5°C)下存放至少6小时。 Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature(20±5°C).
技术要求 Test requirement	不漏液、不泄放、不解体、不破裂、不着火(测试完电池的开路电压不小于测试前电压的90%，质量损失限值0.1%) No leakage, no venting, no disassembly, no rupture and no fire. The open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. Mass loss limit 0.1%.
检测结果 Test results	不漏液、不泄放、不解体、不破裂、不着火，具体数据详见附表1 No leakage, no venting, no disassembly, no rupture and no fire. Test data is shown in Annex 1.
结论 Pass/Fail Conclusion	P

中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.2温度试验</b> <b>38.3.4.2 Thermal test</b>
测试步骤 Test Procedure	<p>试验电池和电池组应先在试验温度等于<math>72 \pm 2^{\circ}\text{C}</math>的条件下存放至少6小时，接着再在试验温度等于<math>-40 \pm 2^{\circ}\text{C}</math>的条件下存放至少6小时。两个极端试验温度之间的最大时间间隔为30分钟。此程序重复进行，共完成10次，接着将所有试验电池和电池组在环境温度(<math>20 \pm 5^{\circ}\text{C}</math>)下存放24小时。</p> <p>对于大型电池和电池组，暴露于极端试验温度的时间至少应为12小时。</p> <p>Test cells and batteries are to be stored for at least six hours at a test temperature equal to <math>72 \pm 2^{\circ}\text{C}</math>, followed by storage for at least six hours at a test temperature equal to <math>-40 \pm 2^{\circ}\text{C}</math>. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (<math>20 \pm 5^{\circ}\text{C}</math>).</p> <p>For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.</p>
技术要求 Test requirement	<p>不漏液、不泄放、不解体、不破裂、不着火(测试完电池的开路电压不小于测试前电压的90%，质量损失限值0.1%)</p> <p>No leakage, no venting, no disassembly, no rupture and no fire. The open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. Mass loss limit 0.1%.</p>
检测结果 Test results	<p>不漏液、不泄放、不解体、不破裂、不着火，具体数据详见附表2</p> <p>No leakage, no venting, no disassembly, no rupture and no fire. Test data is shown in Annex 2.</p>
结论 Pass/Fail Conclusion	P

中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.3 振动试验</b> <b>38.3.4.3 Vibration</b>
测试步骤 Test Procedure	<p>电池和电池组紧固于振动机平台，但紧固程度不能造成电池变形以致不能准确传递振动。振动应是正弦波形，对数频率扫描从7Hz到200Hz，再回到7Hz，跨度为15分钟。</p> <p>对电池和小型电池组：从7 Hz开始，保持1gn 的最大加速度，直到频率达到18 Hz。然后将振幅保持在0.8 毫米(总偏移1.6 毫米)，并增加频率直到最大加速度达到8 gn (频率约为50 Hz)。将最大加速度保持在8 gn 直到频率增加到200 Hz。</p> <p>对大型电池组：从7Hz开始，保持1 gn 的最大加速度，直到频率达到18Hz。然后将振幅保持在0.8 毫米(总偏移1.6 毫米)，并增加频率直到最大加速度达到2 gn (频率约为25 Hz)。将最大加速度保持在2 gn 直到频率增加到200Hz。</p> <p>这一振动过程须对三个互相垂直的电池安装方位的每一方向重复进行12次，总共为时3小时。其中一个振动方向必须与端面垂直。</p> <p>Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes.</p> <p>For cells and small batteries: from 7 Hz a peak acceleration of 1 gn is maintained until 18Hz is reached. The amplitude is then maintained at 0.8 mm(1.6 mm total excursion ) and the frequency increased until a peak acceleration of 8 gn occurs (approximately 50 Hz). A peak acceleration of 8 gn is then maintained until the frequency is increased to 200 Hz</p> <p>For large batteries: from 7Hz to a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm(1.6 mm total excursion) and the frequency increased until a peak acceleration of 2 gn occurs (approximately 25 Hz). A peak acceleration of 2 gn is then maintained until the frequency is increased to 200Hz</p> <p>This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.</p>
技术要求 Test requirement	<p>不漏液、不泄放、不解体、不破裂、不着火(测试完电池的开路电压不小于测试前电压的90%，质量损失限值0.1%)</p> <p>No leakage, no venting, no disassembly, no rupture and no fire. The open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. Mass loss limit 0.1%.</p>
检测结果 Test results	<p>不漏液、不泄放、不解体、不破裂、不着火，具体数据详见附表3</p> <p>No leakage, no venting, no disassembly, no rupture and no fire. Test data is shown in Annex 3.</p>
结论 Pass/Fail Conclusion	P

中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.4 冲击试验</b> <b>38.3.4.4 Shock</b>
测试步骤 Test Procedure	<p>试验电池和电池组用坚固支架紧固在试验机上，支架支撑着每个试验电池组的所有安装面。</p> <p>每个电池须经受最大加速度150 gn 和脉冲持续时间6 毫秒的半正弦波冲击。大型电池须经受最大加速度50 gn 和脉冲持续时间11 毫秒的半正弦波冲击。</p> <p>小型电池组以峰值为 150gn（或与<math>\sqrt{\left(\frac{100850}{\text{mass}}\right)}</math> 中的较小值）的半正弦的加速度撞击，脉冲持续 6 毫秒，大型电池组须经受最大加速度 50gn（或与<math>\sqrt{\left(\frac{30000}{\text{mass}}\right)}</math> 中的较小值）和脉冲持续时间 11 毫秒的半正弦波冲击。</p> <p>每个电池或电池组须在三个互相垂直的电池安装方位的正方向经受三次冲击，接着在反方向经受三次冲击，总共经受 18 次冲击。</p> <p>Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery.</p> <p>Each cell shall be subjected to a half-sine shock of peak acceleration of 150 gn and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock acceleration of 50 gn and pulse duration of 11 milliseconds.</p> <p>Small batteries shall be subjected to a half-sine shock of peak acceleration of 150 gn (or</p> <p>Acceleration(gn) = <math>\sqrt{\left(\frac{100850}{\text{mass}}\right)}</math>, which is smaller) and pulse duration of 6 milliseconds. Large batteries shall be subjected to a half-sine of peak acceleration of 50 gn (or Acceleration(gn) = <math>\sqrt{\left(\frac{30000}{\text{mass}}\right)}</math>, which is smaller) and pulse duration of 11 milliseconds.</p> <p>Each battery shall be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the battery for a total of 18 shocks.</p>
技术要求 Test requirement	<p>不漏液、不泄放、不解体、不破裂、不着火(测试完电池的开路电压不小于测试前电压的90%，质量损失限值0.1%)</p> <p>No leakage, no venting, no disassembly, no rupture and no fire. The open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. Mass loss limit 0.1%.</p>
检测结果 Test results	<p>不漏液、不泄放、不解体、不破裂、不着火，具体数据详见附表4</p> <p>No leakage, no venting, no disassembly, no rupture and no fire. Test data is shown in Annex 4.</p>
结论 Pass/Fail Conclusion	P

中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.5 外部短路</b> <b>38.3.4.5 External short circuit</b>
测试步骤 Test Procedure	<p>电池和电池组的外壳温度稳定在<math>57\pm 4^{\circ}\text{C}</math>后，在此温度下对电池进行外部短路，外电路的总阻值应小于<math>0.1\Omega</math>，持续短路至样品外壳温度回落到<math>57\pm 4^{\circ}\text{C}</math>后至少再继续短路1 h；对于大型电池组，外壳温度降幅达试验中所观察到的最高温升幅的二分之一并保持低于该数值。电池组必须再观察6h结束试验。</p> <p>The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches <math>57\pm 4^{\circ}\text{C}</math> and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than <math>0.1\ \text{ohm}</math> at <math>57\pm 4^{\circ}\text{C}</math>. This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to <math>57\pm 4^{\circ}\text{C}</math>. In the case of the large batteries, has decreased by half of the temperature increase observed during the test and remains below that value. The cell and battery must be observed for a further six hours for the test to be concluded.</p>
技术要求 Test requirement	<p>外壳温度不超过<math>170^{\circ}\text{C}</math>，不解体、不破裂、不着火。</p> <p>External temperature does not exceed <math>170^{\circ}\text{C}</math>. No disassembly, no rupture and no fire.</p>
检测结果 Test results	<p>外壳温度不超过<math>170^{\circ}\text{C}</math>，不解体、不破裂、不着火，具体数据详见附表5</p> <p>External temperature does not exceed <math>170^{\circ}\text{C}</math>. No disassembly, no rupture and no fire. Test data is shown in Annex 5.</p>
结论 Pass/Fail Conclusion	P

中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.6 撞击/挤压</b> <b>38.3.4.6 Impact/Crush</b>
测试步骤 Test Procedure	<p>□撞击（适用于直径不小于18.0毫米的圆柱形电池） Impact(applicable to cylindrical cells not less than 18.0 mm in diameter) 将样品电池置于平板上，将一直径为15.8mm±0.1mm的不锈钢棒横放在样品中心，一块9.1Kg±0.1Kg的重锤从61 ± 2.5 cm高度落到试样上。圆柱形电池受撞击时，其长轴应平行于平板并且垂直于放在受检电池中心的直径为 15.8mm的棒。每一试样只经受一次撞击，电池必须再观察6h结束试验。 The sample cell or component cell is to be placed on a flat smooth surface. A 15.8 mm ± 0.1mm diameter stainless steel bar is to be placed across the centre of the sample. A 9.1 kg ± 0.1 kg mass is to be dropped from a height of 61 ± 2.5 cm on to the sample. The test sample is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8 mm ± 0.1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact. The battery must be observed for a further six hours for the test to be concluded.</p> <p>■挤压(适用于棱柱形、袋装、硬币/纽扣电池和直径小于18.0毫米的圆柱形电池) Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18.0 mm in diameter) 将试样电池放在两个平面之间挤压，挤压力度逐渐增大，速度大约为1.5cm/s.挤压持续进行，直到出现以下三种情况之一：(a)施加的力量达到13kN±0.78kN;(b)电池的电压下降至少100mV;(c)电池变形达到原始厚度的50%或以上。棱柱形和袋装电池应从最宽的一面施压。硬币/纽扣电池应从平坦表面施压。圆柱形电池应从与纵轴垂直的方向施压。每个试样电池只做一次挤压试验，电池必须再观察6h结束试验。 A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5 cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached. (a) The applied force reaches 13 kN ± 0.78 kN; (b) The voltage of the cell drops by at least 100 mV; or (c) The cell is deformed by 50% or more of its original thickness. A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis. Each test cell or component cell is to be subjected to one crush only. The battery must be observed for a further six hours for the test to be concluded.</p>
技术要求 Test requirement	外壳温度不超过170°C，不解体、不破裂、不着火。 External temperature does not exceed 170°C.. No disassembly, no rupture and no fire.
检测结果 Test results	外壳温度不超过170°C，不解体、不破裂、不着火，具体数据详见附表6 External temperature does not exceed 170°C. No disassembly, no rupture and no fire. Test data is shown in Annex 6.
结论 Pass/Fail Conclusion	P

中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.7 过度充电</b> <b>38.3.4.7 Overcharge</b>
测试步骤 Test Procedure	<p>充电电流必须是制造商推荐的最大持续充电电流的两倍。试验的最小电压应为如下： （a）当制造商推荐的充电电压不超过18 V时，试验的最小电压应为2倍于电池的最大充电电压或为22 V二者中较小者；（b）当制造商推荐的充电电压超过18 V时，试验的最小电压应为最大充电电压的1.2倍。该试验应在环境温度下进行。进行试验的时间应为24 小时。在过充电结束后观察被检电池7天。</p> <p>The charge current shall be the twice the manufactures recommended maximum continuous charge current. The minimum voltage of the test shall be follows:(a)When the manufactures recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V.(b)When the manufactures recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage. Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours. The test sample shall be observed for a further 7 days.</p>
技术要求 Test requirement	不解体、不着火。 No disassembly, no fire.
检测结果 Test results	/
结论 Pass/Fail Conclusion	/

中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

检测结果  
Test results

条款 Clause	<b>38.3.4.8 强制放电</b> <b>38.3.4.8 Forced discharge</b>
测试步骤 Test Procedure	<p>电池在环境温度下与12V 直流电源串联连接，以电池制造商规定的最大持续放电电流作为初始电流强制放电。</p> <p>将一个大小和功率合适的电阻负载与被检电池以及直流电源串联以获得规定的放电电流。每个电池强制放电的时间应等于其额定容量除以起始试验电流。在强制放电结束后观察被检电池7 天。</p> <p>Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer.</p> <p>The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere). The test sample shall be observed for a further 7 days.</p>
技术要求 Test requirement	不解体、不着火。 No disassembly, no fire.
检测结果 Test results	不解体、不着火,具体数据详见附表8 No disassembly, no fire. Test data is shown in Annex 8.
结论 Pass/Fail Conclusion	P













中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

附表6 撞击/挤压试验  
Annex 6. Impact/Crush

样品编号 Sample No.	试验前电压 Voltage before test (V)	初始温度 Initial Temperature (°C)	最高温度 Max Temperature (°C)	备注 Remarks
C1	3.301	23.5	23.6	-
C2	3.300	23.4	23.5	-
C3	3.300	23.6	23.7	-
C4	3.301	23.4	23.5	-
C5	3.301	23.5	23.6	-
C6	3.300	23.4	23.5	-
C7	3.301	23.4	23.5	-
C8	3.300	23.4	23.5	-
C9	3.301	23.7	23.8	-
C10	3.301	23.5	23.6	-
以下空白 Blank below				



中认英泰检测技术有限公司  
CQC Intime Testing Technology Co.,Ltd  
检测报告  
Test Report

附表8强制放电试验  
Annex 8. Forced discharge

样品编号 Sample No.	试验前电压 Voltage before test (V)	初始温度 Initial Temperature (°C)	最高温度 Max Temperature (°C)	备注 Remarks
C11	3.136	23.5	40.1	-
C12	3.129	23.4	41.0	-
C13	3.121	23.7	41.3	-
C14	3.130	23.5	39.8	-
C15	3.119	23.5	41.5	-
C16	3.133	23.5	40.2	-
C17	3.130	23.3	40.4	-
C18	3.127	23.4	41.9	-
C19	3.131	23.7	40.3	-
C20	3.124	23.4	41.7	-
C21	3.127	23.4	40.5	-
C22	3.132	23.6	39.6	-
C23	3.135	23.7	40.0	-
C24	3.129	23.6	40.9	-
C25	3.124	23.7	41.1	-
C26	3.133	23.5	40.4	-
C27	3.136	23.7	40.2	-
C28	3.133	23.4	40.3	-
C29	3.127	23.4	41.4	-
C30	3.124	23.4	40.9	-
以下空白 Blank below				

——报告结束 End——



# 声明

## Statement

1. 未经本机构书面批准不得部分复制本报告，除非全部复制。

Don't copies the report partly, if you don't obtain the laboratory allow you to do that, unless you copy the whole report.

2. 检验结果仅对所检样品有效。

The test report is only valid to the sample which has been tested

3. 若对检测结果有异议，请在收到报告后十日内向本机构书面提出。

If you have any objection to the test result, please submit it to the laboratory in writing within 10 days after receiving the report.

4. 受检样品务必在收到检测报告三十日内领取，逾期本机构将作为废弃物自行处理。

The sample must be collected within 30 days after receiving the test report. The overdue sample will be disposed of as waste by the laboratory itself.

5. 此报告仅作为委托方参考，不作为诉讼、仲裁等依据。

This report only as a reference for client, can't be considered as a basis for litigation, arbitration and so on.

检测机构：中认英泰检测技术有限公司

Test Lab.: CQC Intime Testing Technology Co.,Ltd.

总部地址：苏州市吴中经济开发区吴中大道1368号东太湖科技金融城

Headquarter address: East Taihu Hi-Tech & Finance Town, No.1368, Wuzhong Road, Wuzhong Economic Development Zone, Suzhou, China

邮政编码：215104

电 话：0512-66303621

传 真：0512-66303625

E-mail: cqc\_jszlb@126.com

苏州胥口实验室地址：胥口镇曹丰路236号

慈溪办事处地址：浙江省慈溪市水南路19号中央大厦北楼10层1020室

电话：0574-63895313

深圳办事处地址：深圳市福田区新洲十一街139号中央西谷大厦13A层

电话：0755-82889188-8118

广州办事处地址：广州市海珠区赤岗西路266号小聪科技园9楼

电话/传真：020-84147422

## Design Report of Safety Data Sheet

正本/ORIGINAL

Report No.:	HGBZ23013QX2-R1	 防伪码: GG94	
Inspection date:	2023/01/11		
Issue date:	2023/03/03		
Version:	V2.0.0.2		
*Product Name:	Lithium ion Battery Module CS4800		
*Applicant:	FOXESS CO., LTD.		
Supplier:	FOXESS CO., LTD.		
*Composition of the product:	Lithium Iron Phosphate: 35%; Graphite: 18%; Aluminium: 15%; Copper: 7%; Dimethyl carbonate: 6%; Ethyl methyl carbonate: 6%; Ethylene carbonate: 6%; Polyethylene: 4%; Carbon: 1%; Poly(1Details on the next page		
Warranty of Design:	GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS) Ninth revised edition		
*Information materials:	HGBZ23013QX-R1 《Application》、P106920 《Declaration of consistency of components of the sample submitted for inspection》、P106920 《UN 38.3》、P106920-Product Picture		
<b>Design Result of SDS please see next page.</b>			
Designer:	江帆	Auditor: 叶江波	Approver: 戎霄
<b>常州合規思远产品安全技术服务有限公司</b> Changzhou Hegui Siyuan Products Safety Technology Service Co., Ltd.			

名称: 常州合規思远产品安全技术服务有限公司 (简称: 合規化學)

Name: Changzhou HeguiSiyuan Products Safety Technology Service Co., Ltd. (CRchemical)

地址: 江苏省常州市新北区太湖东路9号4幢1205室

Address: 4-1205, Creative Industries Park, No.9, East Taihu Road, Xinbei District, Changzhou, 213022, Jiangsu P.R.China.


网址|Web: www.hgmsds.com

电话|Tel: +86-519-8515 0306

邮箱|E-mail: msds@hgmsds.com

# 合規化學

Contd. of Prev. page: Complete sample component information.

Report No.:	HGBZ23013QXD R1	
Inspection date:	2023/01/11	
Issue date:	2023/03/03	
Version:	V2.0.0.2	
*Composition of the product:	Lithium Iron Phosphate: 35%; Graphite: 18%; Aluminium: 15%; Copper: 7%; Dimethyl carbonate: 6%; Ethyl methyl carbonate: 6%; Ethylene carbonate: 6%; Polyethylene: 4%; Carbon: 1%; Poly(1,1-difluoroethylene): 1%; Polymerized Styrene Butadiene Rubber: 0.7%; Carboxymethylcellulose Sodium: 0.3%	



防伪码: GG94

## Terms of the Using of the Report

1. According to the needs of issuing the report, the company requires the client to provide true and complete samples and data (see the report tape ★ for details). The Company will not bear any consequences caused by the wrong information provided by the Client. If the chemical information, authoritative database and relevant policy changes submitted by the client affect the conclusions of this report, this report will automatically become invalid. Unless otherwise specified, the data in this report are only responsible for the samples submitted for inspection, and the accuracy of sample composition information is the responsibility of the client. The hazard characteristics, transportation information and emergency measures of samples need to focus on the corresponding parts of this report.
2. The data source of this report is based on the relevant materials and information submitted by the client, the test results of international authoritative databases, laboratories and the current relevant knowledge of the company. We try our best to ensure the correctness of all information during the audit. However, due to the diversity of information sources and the limitations of the Company's knowledge, users of this report should make further judgments on the reasonableness of relevant information based on the purpose of use.
3. This report will be effective only after it is signed by the inspector, approver and stamped by our company.
4. Our company guarantees the objectivity and fairness of this report, and carries out confidentiality obligations on business secrets such as business information, technical documents and so on.
5. This report does not consider the differences between countries and operators.
6. The partly duplicating of this report is prohibited without the written approver.
7. The report is invalid when anything of the following happens-illegal transfer, embezzlement, imposture, modification or tampering in any media form.
8. This report is valid before the implementation of the new version of the standard.



## Safety Data Sheet

# Lithium ion Battery Module CS4800

Version : V2.0.0.1

Report No. : HGBZ23013QX2-R1

Creation Date : 2023/01/11

Revision Date : 2023/03/03

\*According to GHS (Ninth Revised Edition)

## 1 Identification

### Product identifier

Product Name	Lithium ion Battery Module CS4800																				
Product Model	CS4800																				
CAS No.	Not applicable																				
EC No.	Not applicable																				
Molecular Formula	Not applicable																				
Product Picture	 <p><b>FOX</b> EST Lithium ion Battery Module</p> <table><tr><td>Model No:</td><td>CS4800</td></tr><tr><td>Rated Capacity:</td><td>104Ah</td></tr><tr><td>Nominal Energy:</td><td>4.66kWh</td></tr><tr><td>Nominal Voltage:</td><td>44.8Vdc</td></tr><tr><td>Voltage range:</td><td>40.6-51.5Vdc</td></tr><tr><td>Max charge/ discharge Current:</td><td>50A/50A</td></tr><tr><td>Ingress Protection:</td><td>IP65</td></tr><tr><td>Protective Class:</td><td>I</td></tr><tr><td>Operating Temperature:</td><td>-10-55 °C</td></tr><tr><td>Storage Temperature:</td><td>-10-35 °C</td></tr></table> <p><b>CAUTION</b> - Do not disassemble the battery pack. - Do not short-circuit the battery. - Do not immerse the battery pack in water. - Do not leave the battery near fire.</p> <p><b>Emergency</b> - If heating, fire, smell or damaged, switch off the breaker and go away from the battery. <b>Situations</b> - Do not touch the leaking liquid. Do not use water extinguisher. Please use sand or dry powder extinguisher.</p> <p>Manufacture: FOXESS CO., LTD. Made in China 10-200-20721-01</p> 	Model No:	CS4800	Rated Capacity:	104Ah	Nominal Energy:	4.66kWh	Nominal Voltage:	44.8Vdc	Voltage range:	40.6-51.5Vdc	Max charge/ discharge Current:	50A/50A	Ingress Protection:	IP65	Protective Class:	I	Operating Temperature:	-10-55 °C	Storage Temperature:	-10-35 °C
Model No:	CS4800																				
Rated Capacity:	104Ah																				
Nominal Energy:	4.66kWh																				
Nominal Voltage:	44.8Vdc																				
Voltage range:	40.6-51.5Vdc																				
Max charge/ discharge Current:	50A/50A																				
Ingress Protection:	IP65																				
Protective Class:	I																				
Operating Temperature:	-10-55 °C																				
Storage Temperature:	-10-35 °C																				

### Recommended use of the product and restrictions on use

Relevant identified uses	Please consult manufacturer.
Uses advised against	Please consult manufacturer.

### Details of the supplier

Applicant Name	FOXESS CO., LTD.
Applicant Address	No.939, Jinhai Third Road, New Airport Industry Area, Longwan District, Wenzhou, Zhejiang, China
Applicant Post Code	325025
Applicant Telephone	0510-68092998
Applicant Fax	—
Applicant E-mail	foxrd@fox-ess.com
Supplier Name	FOXESS CO., LTD.
Supplier Address	No.939, Jinhai Third Road, New Airport Industry Area, Longwan District, Wenzhou, Zhejiang, China

Supplier Post Code	325025
Supplier Telephone	0510-68092998
Supplier Fax	—
Supplier E-mail	foxrd@fox-ess.com

### Emergency phone number

Emergency phone number	0510-68092998
------------------------	---------------

## 2 Hazard(s) identification

### Hazard classification according to GHS

The product meets the definition of "article". In the Globally Harmonized Chemical Classification and Labeling System (GHS), the "articles" defined by the US Occupational Safety and Health Administration "Hazard Communication Standard" (29 CFR 1910.1200) or similar definitions do not fall within the scope of this system. [Rev. 9 (2021) Part 1.3.2.1.1]. According to GHS system (9th revised edition), not classified as a hazardous chemical.

### GHS Label elements

Hazard pictograms	Not applicable
Signal word	Not applicable

### Hazard statements

Hazard statements	Not applicable
-------------------	----------------

### Precautionary statements

#### ◆ Prevention

Prevention	Not applicable
------------	----------------

#### ◆ Response

Response	Not applicable
----------	----------------

#### ◆ Storage

Storage	Not applicable
---------	----------------

#### ◆ Disposal

Disposal	Not applicable
----------	----------------

### Hazard description

#### ◆ Physical and chemical hazards

	When the outer enclosure and safety circuits have been compromised or have been significantly damaged, it is likely to contain substantial electrical charge and can cause injury or death if mishandled. Mechanical damage can lead to danger. Battery products exposed to high temperature conditions, may produce heat out of control, causing fire.
--	---

#### ◆ Health hazards

Inhaled	According to the material form, it is not the normal way of contacting.
Ingestion	Accidental ingestion of the product may be harmful to the health of the individual.
Skin Contact	No harm in general situation.
Eye	This product may cause temporary discomfort following direct contact with the eye.

#### ◆ Environmental hazards

	Please refer to 12th chapter of SDS.
--	--------------------------------------

### 3 Composition/information on ingredients

#### Substance/mixture

Substance/mixture		Mixture	
Component	CAS No.	EC No.	Concentration (wt, %)
Lithium Iron Phosphate	15365-14-7	604-917-2	35
Graphite	7782-42-5	231-955-3	18
Aluminium	7429-90-5	231-072-3	15
Copper	7440-50-8	231-159-6	7
Dimethyl carbonate	616-38-6	210-478-4	6
Ethyl methyl carbonate	623-53-0	613-014-2	6
Ethylene carbonate	96-49-1	202-510-0	6
Polyethylene	9002-88-4	618-339-3	4
Carbon	7440-44-0	231-153-3	1
Poly(1,1-difluoroethylene)	24937-79-9	607-458-6	1
Polymerized Styrene Butadiene Rubber	9003-55-8	618-370-2	0.7
Carboxymethylcellulose Sodium	9004-32-4	618-378-6	0.3

### 4 First-aid measures

#### Description of first aid measures

General advice	Immediate medical attention is required. Show this safety data sheet (SDS) to the doctor in attendance.
Eye contact	Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician if feel uncomfortable.
Skin contact	No harm in general situation. First aid is not needed.
Ingestion	Never give anything by mouth to an unconscious person. Call a physician immediately.
Inhalation	Move victim into fresh air. If breathing is difficult, give oxygen and consult a physician immediately.
Protecting of first-aiders	Ensure that medical personnel are aware of the substance involved. Take precautions to protect themselves and prevent spread of contamination.

#### Most important symptoms/effects, acute and delayed

1	Please see section 11.
---	------------------------

#### Indication of any immediate medical attention and special treatment needed

1	Treat symptomatically.
2	Symptoms may be delayed.

### 5 Fire-fighting measures

#### Extinguishing media

<b>Suitable extinguishing media</b>	Use extinguishing media suitable for surrounding area.
<b>Unsuitable extinguishing media</b>	There is no restriction on the type of extinguisher which may be used.

### **| Specific hazards arising from the substance or mixture**

1	Development of hazardous combustion gases or vapor possible in the event of fire.
2	May expansion or decompose explosively when heated or involved in fire.

### **| Special protective equipment and precautions for fire-fighters**

1	As in any fire, wear self-contained breathing apparatus ( MSHA/NIOSH approved or equivalent) and full protective gear.
2	Fight fire from a safe distance, with adequate cover.
3	Prevent fire extinguishing water from contaminating surface water or the ground water system.

## **6** Accidental release measures

### **| Personal precautions, protective equipment and emergency procedures**

1	Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.
2	Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.
3	Use personal protective equipment,do not breathe dust/fume.

### **| Environmental precautions**

1	Prevent further leakage or spillage if safe to do so.
2	Discharge into the environment must be avoided.

### **| Methods and materials for containment and cleaning up**

1	Cut off the source of the leak as much as possible.
2	Keep leaks in a ventilated place.
3	Isolation of contaminated areas and restrictions on access.
4	It is recommended that emergency personnel wear dust masks.
5	Collect the spill with a clean shovel and place it in a clean, dry, loosely closed container and move the container away from the leak.
6	Adhered or collected material should be promptly disposed of, in accordance with appropriate laws and regulations.

## **7** Handling and storage

### **| Precautions for safe handling**

1	Handling is performed in a well ventilated place.
2	Wear suitable protective equipment.
3	Avoid contact with skin and eyes.
4	Keep away from heat/sparks/open flames/ hot surfaces.

### **| Conditions for safe storage, including any incompatibilities**

1	Keep containers tightly closed.
2	Keep containers in a dry, cool and well-ventilated place.
3	Keep away from heat/sparks/open flames/hot surfaces.
4	Store away from incompatible materials and foodstuff containers.



## 8 Exposure controls/personal protection

### Control parameters

Component	Country/Region	Limit value - Eight hours		Limit value - Short term	
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Graphite	USA - OSHA		15		
	South Korea		2		
	Ireland		10		
	Germany (DFG)		4		
	Denmark		2.5		5
	Australia		3 (4)		
	USA-ACGIH		2		
Aluminium	USA - OSHA		15		
	South Korea		10		
	Ireland		1		
	Germany (DFG)		4		
	Denmark		5		10
	Australia		10		
	USA-ACGIH		1		
Copper	The Netherlands		0.1		
	Poland		0.2		
	Latvia		0.5		1
	Germany (DFG)		0.01		0.02

#### ◆ Biological limit values

<b>Biological limit values</b>	No relevant regulations
--------------------------------	-------------------------

#### ◆ Monitoring methods

1	EN 14042 Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
2	GBZ/T 300 series standard Determination of toxic substances in workplace air.

### Engineering controls

1	Ensure adequate ventilation, especially in confined areas.
2	Ensure that eyewash stations and safety showers are close to the workstation location.
3	Set up emergency exit and necessary risk-elimination area.
4	Handle in accordance with good industrial hygiene and safety practice.

### Personal protection equipment

<b>General requirement</b>	No special requirements, please see the description below.
<b>Eye protection</b>	In general situation, eye protection is not needed. In the production process, when contacting with vapour or dust, tightly fitting safety goggles.

<b>Hand protection</b>	In general situation, hand protection is not needed.
<b>Respiratory protection</b>	In general situation, respiratory protection is not needed. If exposure limits are exceeded or if irritation or other symptoms are experienced, wear dust proof mask or gas defence mask.
<b>Skin and body protection</b>	In general situation, skin and body protection are not needed.

## 9 Physical and chemical properties and safety characteristics

### Physical and chemical properties

<b>Physical state</b>	Solid (see picture for details)
<b>Colour</b>	White
<b>Odor</b>	No special odor
<b>Odor threshold</b>	No information available
<b>pH</b>	No information available
<b>Melting point/freezing point(°C)</b>	No information available
<b>Initial boiling point and boiling range(°C)</b>	No information available
<b>Flash point(Closed cup,°C)</b>	Not applicable
<b>Evaporation rate</b>	Not applicable
<b>Flammability</b>	Not flammable
<b>Upper/lower explosive limits[%(v/v)]</b>	Upper limit : No information available ; Lower limit : No information available
<b>Vapor pressure</b>	Not applicable
<b>Relative vapour density(Air = 1)</b>	Not applicable
<b>Relative density(Water=1)</b>	No information available
<b>Solubility</b>	Insoluble in water
<b>n-octanol/water partition coefficient</b>	No information available
<b>Auto-ignition temperature(°C)</b>	No information available
<b>Decomposition temperature(°C)</b>	No information available
<b>Kinematic viscosity</b>	Not applicable
<b>Particle characteristics</b>	No information available

## 10 Stability and reactivity

### Stability and reactivity

<b>Reactivity</b>	Contact with incompatible substances can cause decomposition or other chemical reactions.
<b>Chemical stability</b>	Stable under proper operation and storage conditions.
<b>Possibility of hazardous reactions</b>	No information available.
<b>Conditions to avoid</b>	Incompatible materials, heat, flame and spark.
<b>Incompatible materials</b>	Metal acetylide, halogen, interhalogen, halogen oxides, nitric acid, nitrous oxide, nitrates, nitrites, halogen oxyacid salts, chromates, permanganates, inorganic peroxides, metal oxides and peroxyformic acid. Oxidants, halogen, interhalogen and mercury. Halogen, interhalogen, strong oxidant, water and acids.

**Hazardous decomposition products**

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

**11 Toxicological information****Acute toxicity**

Component	LD <sub>50</sub> (oral)	LD <sub>50</sub> (dermal)	LC <sub>50</sub> (inhalation,4h)
<b>Carboxymethylcellulose Sodium</b>	27000mg/kg(Rat)	> 2000mg/kg(Rabbit)	> 5.8mg/L(Rat)
<b>Ethylene carbonate</b>	10000mg/kg(Rat)	> 3000mg/kg(Rabbit)	No information available
<b>Dimethyl carbonate</b>	13000mg/kg(Rat)	> 5000mg/kg(Rabbit)	No information available

**Carcinogenicity**

Component	List of carcinogens by the IARC Monographs	Report on Carcinogens by NTP
<b>Lithium Iron Phosphate</b>	Not Listed	Not Listed
<b>Graphite</b>	Not Listed	Not Listed
<b>Aluminium</b>	Not Listed	Not Listed
<b>Copper</b>	Not Listed	Not Listed
<b>Dimethyl carbonate</b>	Not Listed	Not Listed
<b>Ethyl methyl carbonate</b>	Not Listed	Not Listed
<b>Ethylene carbonate</b>	Not Listed	Not Listed
<b>Polyethylene</b>	Category 3	Not Listed
<b>Carbon</b>	Not Listed	Not Listed
<b>Poly(1,1-difluoroethylene)</b>	Not Listed	Not Listed
<b>Polymerized Styrene Butadiene Rubber</b>	Category 3	Not Listed
<b>Carboxymethylcellulose Sodium</b>	Not Listed	Not Listed

**Others**

<b>Lithium ion Battery Module CS4800</b>	
<b>Skin corrosion/irritation</b>	Based on available data, the classification criteria are not met
<b>Serious eye damage/irritation</b>	Based on available data, the classification criteria are not met
<b>Skin sensitization</b>	Based on available data, the classification criteria are not met
<b>Respiratory sensitization</b>	Based on available data, the classification criteria are not met
<b>Reproductive toxicity</b>	Based on available data, the classification criteria are not met
<b>STOT-single exposure</b>	Based on available data, the classification criteria are not met
<b>STOT-repeated exposure</b>	Based on available data, the classification criteria are not met
<b>Aspiration hazard</b>	Based on available data, the classification criteria are not met
<b>Germ cell mutagenicity</b>	Based on available data, the classification criteria are not met
<b>Reproductive toxicity(additional)</b>	Based on available data, the classification criteria are not met

**12 Ecological information**

**Acute aquatic toxicity**

Component	Fish	Crustaceans	Algae
<b>Carboxymethylcellulose Sodium</b>	No information available	EC <sub>50</sub> : 87.3mg/L (48h)(Crustaceans)	No information available
<b>Graphite</b>	LC <sub>50</sub> :100mg/L (96h)(Fish)	No information available	No information available
<b>Ethylene carbonate</b>	LC <sub>50</sub> : > 100mg/L (96h)(Fish)	EC <sub>50</sub> : > 100mg/L (48h)(Crustaceans)	No information available
<b>Copper</b>	LC <sub>50</sub> : 0.665mg/L (96h)(Fish)	EC <sub>50</sub> : 0.02mg/L (48h)(Crustaceans)	ErC <sub>50</sub> : 7.9mg/L (96h)(Algae)
<b>Aluminium</b>	LC <sub>50</sub> : 1.55mg/L (96h)(Fish)	No information available	No information available
<b>Dimethyl carbonate</b>	LC <sub>50</sub> : ≥ 100mg/L (96h)(Fish)	EC <sub>50</sub> : > 100mg/L (48h)(Crustaceans)	No information available
<b>Ethyl methyl carbonate</b>	LC <sub>50</sub> : > 100mg/L (96h)(Fish)	EC <sub>50</sub> : > 100mg/L (48h)(Crustaceans)	No information available
<b>Lithium Iron Phosphate</b>	LC <sub>50</sub> : > 28mg/L (96h)(Fish)	EC <sub>50</sub> : > 28mg/L (48h)(Crustaceans)	No information available

**Chronic aquatic toxicity**

Chronic aquatic toxicity	No information available
--------------------------	--------------------------

**Persistence and degradability**

Component	Persistence (water/soil)	Persistence (air)
<b>Graphite</b>	Low	Low
<b>Ethyl methyl carbonate</b>	High	High
<b>Ethylene carbonate</b>	High	High
<b>Polyethylene</b>	Low	Low

**Bioaccumulative potential**

Component	Bioaccumulative potential	Comments
<b>Graphite</b>	Low	Log Kow=0.5294
<b>Ethyl methyl carbonate</b>	Low	Log Kow=0.7247
<b>Ethylene carbonate</b>	Low	Log Kow=-0.3388
<b>Polyethylene</b>	Low	Log Kow=1.2658

**Mobility in soil**

Component	Mobility in soil	Soil Organic Carbon-Water Partitioning Coefficient (Koc)
<b>Graphite</b>	Low	23.74
<b>Ethyl methyl carbonate</b>	Low	15.22
<b>Ethylene carbonate</b>	Low	9.168
<b>Polyethylene</b>	Low	14.3

**Results of PBT and vPvB assessment**

Component	Results of PBT and vPvB assessment [according to (EC) No 1907/2006]
Lithium Iron Phosphate	Not available
Graphite	Not applicable
Aluminium	Not applicable
Copper	Not applicable
Dimethyl carbonate	Not PBT/vPvB
Ethyl methyl carbonate	Not PBT/vPvB
Ethylene carbonate	Not PBT/vPvB
Polyethylene	Not available
Carbon	Not available
Poly(1,1-difluoroethylene)	Not available
Polymerized Styrene Butadiene Rubber	Not available
Carboxymethylcellulose Sodium	Not available


### 13 Disposal considerations

#### Disposal considerations

Waste chemicals	Before disposal should refer to the relevant national and local laws and regulation. Recommend the use of incineration disposal.
Contaminated packaging	Containers may still present chemical hazard when empty. Keep away from hot and ignition source of fire. Return to supplier for recycling if possible.
Disposal recommendations	Refer to section waste chemicals and contaminated packaging.

### 14 Transport information

#### Label

Transporting Label	
--------------------	---

#### IMDG-CODE

UN number	3480
UN proper shipping name	LITHIUM ION BATTERIES (including lithium ion polymer batteries)
Transport hazard class	9
Transport subsidiary hazard class	None
Packing group	Packagings shall conform to the packing group II performance level
Marine pollutant ( Yes or no )	No

#### ICAO/IATA-DGR

UN number	3480
UN proper shipping name	LITHIUM ION BATTERIES (including lithium ion polymer batteries)

Transport hazard class	9
Transport subsidiary hazard class	None
Packing group	Packagings shall conform to the packing group II performance level

### UN-ADR

UN number	3480
UN proper shipping name	LITHIUM ION BATTERIES (including lithium ion polymer batteries)
Transport hazard class	9
Transport subsidiary hazard class	None
Packing group	Packagings shall conform to the packing group II performance level

## 15 Regulatory information

### International chemical inventory

Component	EC inventory	TSCA	DSL	IECSC	NZIoC	PICCS	KECI	AIICS	ENCS
Lithium Iron Phosphate	×	√	√	√	×	×	√	×	√
Graphite	√	√	√	√	√	√	√	√	×
Aluminium	√	√	√	√	√	√	√	√	√
Copper	√	√	×	√	√	√	√	√	√
Dimethyl carbonate	√	√	√	√	√	√	√	√	√
Ethyl methyl carbonate	×	√	×	√	×	√	√	×	√
Ethylene carbonate	√	√	√	√	√	√	√	√	√
Polyethylene	×	√	√	√	√	√	√	√	√
Carbon	√	√	√	√	√	√	√	√	√
Poly(1,1-difluoroethylene)	×	√	√	√	√	√	√	√	√
Polymerized Styrene Butadiene Rubber	×	√	√	√	√	√	√	√	√
Carboxymethylcellulose Sodium	×	√	×	√	√	√	√	√	√

[EC inventory] European Inventory of Existing Commercial Chemical Substances

[TSCA] United States Toxic Substances Control Act Inventory

[DSL] Canadian Domestic Substances List

[IECSC] China Inventory of Existing Chemical Substances

[NZIoC] New Zealand Inventory of Chemicals

[PICCS] Philippines Inventory of Chemicals and Chemical Substances

[KECI] Korea Existing Chemicals Inventory

[AIICS] Australian Inventory of Industrial Chemical (AIICS)

[ENCS] Japan Inventory of Existing & New Chemical Substances

Note:

“√” Indicates that the substance included in the regulations.

“×” No data or not included in the regulations.

## 16 Other information

## Information on revision

Creation Date	2023/01/11
Revision Date	2023/03/03
Reason for revision	-

## Reference

- [1] IPCS: The International Chemical Safety Cards (ICSC), website: <http://www.ilo.org/dyn/icsc/showcard.home>.
- [2] IARC, website: <http://www.iarc.fr/>.
- [3] OECD: The Global Portal to Information on Chemical Substances, website: <https://www.echemportal.org/echemportal/substancesearch/index.action>.
- [4] CAMEO Chemicals, website: <http://cameochemicals.noaa.gov/search/simple>.
- [5] NLM: ChemIDplus, website: <http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp>.
- [6] EPA: Integrated Risk Information System, website: <http://cfpub.epa.gov/iris/>.
- [7] U.S. Department of Transportation: ERG, website: <http://www.phmsa.dot.gov/hazmat/library/erg>.
- [8] Germany GESTIS-database on hazard substance, website: <http://gestis-en.itrust.de/>.

## Abbreviations and acronyms

CAS	Chemical Abstracts Service	UN	The United Nations
PC-STEL	Short term exposure limit	OECD	Organization for Economic Co-operation and Development
PC-TWA	Time Weighted Average	IMDG-CODE	International Maritime Dangerous Goods CODE
MAC	Maximum Allowable Concentration	IARC	International Agency for Research on Cancer
DNEL	Derived No Effect Level	ICAO	International Civil Aviation Organization
PNEC	Predicted No Effect Concentration	IATA	International Air Transportation Association
NOEC	No Observed Effect Concentration	ACGIH	American Conference of Governmental Industrial Hygienists
LC <sub>50</sub>	Lethal Concentration 50%	NFPA	National Fire Protection Association
LD <sub>50</sub>	Lethal Dose 50%	NTP	National Toxicology Program
EC <sub>50</sub>	Effective Concentration 50%	PBT	Persistent, Bioaccumulative, Toxic
EC <sub>x</sub>	Effective Concentration X%	vPvB	very Persistent, very Bioaccumulative
P <sub>OW</sub>	Partition coefficient Octanol: Water	CMR	Carcinogens, mutagens or substances toxic to reproduction
BCF	Bioconcentration factor	RPE	Respiratory Protective Equipment
ED	Endocrine disruptor		

## Disclaimer

This Safety Data Sheet (SDS) was prepared according to UN GHS (the 9th revised edition). The data included was derived from international authoritative database and provided by the enterprise. Other information was based on the present state of our knowledge. We try to ensure the correctness of all information. However, due to the diversity of information sources and the limitations of our knowledge, this document is only for user's reference. Users should make their independent judgment of suitability of this information for their particular purposes. We do not assume responsibility for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.