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Report No.:
报告编号：FLS20231215MSDS02-2

MATERIAL SAFETY DATA SHEET

材料安全数据表

Product 产品	Lithium iron phosphate battery 磷酸铁锂电池
Type/Model 型号	FLA48500
Issue Date 签发日期	2024-04-24
Validity 有效期	2024-04-24 ～ 2024-12-31
Compiler 编写	Jinxing Liao
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广州邦禾检测技术有限公司

Guangzhou MCM Certification & Testing Co., Ltd.

Material Safety Data Sheet
材料安全数据表

SECTION 1 - CHEMICAL AND COMPANY IDENTIFICATION
第1节—化学品和公司标识

Product **产品**	Lithium iron phosphate battery 磷酸铁锂电池
Type/Model: **型号**	FLA48500
Parameter **参数**	51.2V, 500Ah, 25kWh
Usage **用途**	Used in Energy Storage System 用于储能系统
Company **公司**	Guangzhou Felicity Solar Technology Co., Ltd 广州菲利斯太阳能科技有限公司
Address **地址**	No.2, Donghua Huaye Road, Renhe Town, Baiyun Area, Guangzhou 广州市白云区人和镇东华华业路2号
Fax 传真	--
Zip code 邮编	--
E-mail 电子邮箱	hailin.wu@felicitysolar.com
Emergency Telephone 紧急联系电话 13580621578	
Manufacturer **制造单位**	Guangzhou Felicity Solar Technology Co., Ltd 广州菲利斯太阳能科技有限公司
Address **制造单位地址**	No.2, Donghua Huaye Road, Renhe Town, Baiyun Area, Guangzhou 广州市白云区人和镇东华华业路2号
Factory **生产单位**	Guangzhou Felicity Solar Technology Co., Ltd 广州菲利斯太阳能科技有限公司
Address **生产单位地址**	No.2, Donghua Huaye Road, Renhe Town, Baiyun Area, Guangzhou 广州市白云区人和镇东华华业路2号

SECTION 2 - HAZARDS IDENTIFICATION
第2节—危害识别

Classification 分类：

This chemical is not considered hazardous by the Regulation (EC) No 1272/2008 (CLP). This product is an article which is a sealed battery and as such does not require an SDS per the Regulation (EC) No 1272/2008 (CLP) unless ruptured. The hazards indicated are for a ruptured battery.

该化学品不被法规(EC)No.1272/2008(CLP)认为是危险的。本产品为密封电池，因此，除非破裂，不需要SDS (EC) No.1272/2008 (CLP)。以下提到的危险是电池破裂造成的。

Acute toxicity – Oral 急性毒性-口服	Category 4 第4类
Acute toxicity - Dermal 急性毒性-皮肤	Category 4 第4类
Skin corrosion/irritation 皮肤腐蚀/刺激	Category 1B 第1B类
Serious eye damage/eye irritation 严重眼睛损失/眼睛刺激	Category 2 第2类
Skin sensitization 皮肤致敏	Category 1 第1类
Carcinogenicity 致癌性	Category 2 第2类

Specific target organ toxicity (repeated exposure) 特异性靶器官毒性(重复暴露)	Category 1 第1类

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Label elements 标签要素：

Signal Word信号词:

Danger 危险

Hazard Statements 风险声明

H302	Harmful if swallowed. 吞食有害
H312	Harmful in contact with skin. 与皮肤接触有害
H332	Harmful if inhaled. 吸入有害
H318	Causes serious eye damage. 对眼睛造成严重损害
H317	May cause an allergic skin reaction. 可能导致皮肤过敏反应
H350	May cause cancer. 可能致癌
H371	May cause damage to organs. 可能对器官造成损害
H335	May cause respiratory irritation. 可能引起呼吸道刺激

Symbol标志



GHS08 GHS05 GHS07

This product is an article which contains a chemical substance. Safety information is given for exposure to the article as solid. Intended use of the product should not result in exposure to the chemical substance, This is a battery. In case of rupture: the above hazards exist.

这个产品是一种含有化学物质的物品。安全信息是为了固体物质的暴露而提供。这是一个电池，本产品的预期用途不应导致化学物质暴露。万一破裂，上述危害存在。

Precautionary Statements – Prevention **预防说明—预防**	
P201	Obtain special instructions before use. 在使用前获得特殊说明
P202	Do not handle until all safety precautions have been read and understood. 阅读和理解安全注意事项后再操作
P281	Use personal protective equipment as required. 按要求使用个人防护装备
P264	Wash face, hands and any exposed skin thoroughly after handling. 处理后彻底清洗脸、手和任何暴露的皮肤
P272	Contaminated work clothing should not be allowed out of the workplace. 不应让受污染的工作服离开工作场
P210	Keep away from heat/sparks/open flames/hot surfaces –no smoking. 远离热源/火花/明火/热表面——禁止吸烟
P270	Do not eat, drink or smoke when using this product. 使用本品时请勿吃、喝、吸烟

Precautionary Statements – Response **预防声明—响应**	
P301+ P330+ P308	If exposed or connected: Get medical advice/attention. Specific treatment(see supplemental first aid/instruction on this label). 如果暴露或接触：求医/就医。特殊治疗（见标签上的补充急救/说明） Skin: If on skin: wash with plenty of soap and water. Take off contaminated clothing and water before reuse, if skin irritation or rash occurs: get medical advice/attention if feel unwell. 皮肤：如果皮肤:用大量的肥皂和水清洗。如果出现皮肤刺激或皮疹，在重复使用前脱下受污染的衣服和水:如果感觉不适，请就医/就诊。 Eye: If in eyes: Rinse cautiously with water for several minutes, remove contact lenses, if present and easy to do, Continue rinsing. Call a POISON CENTER or doctor/physician if you feel unwell. 眼睛：如果进入眼睛：小心用水冲洗几分钟，取下隐形眼镜，如果存在且容易做到，继续冲洗；如果你感觉不舒服，打电话给中毒中心或医生/医生 Inhalation: If inhalation: if breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician if you feel unwell. 吸入：如果吸入，如果呼吸困难，将患者转移到空气新鲜的地方，保持一个适合呼吸的姿势休息；如果出现呼吸道症状，如果感觉不适，呼叫解毒中心或医生/内科医生。 Ingestion: If swallowed: rinse mouth, do not induce vomiting, Call a POISON CENTER or doctor/physician if you feel unwell. 食入：如吞下：漱口，不要催吐。如果感觉不适，呼叫解毒中心或医生/内科医生。
Precautionary Statements – Storage **预防声明—存储**	
P405	Store locked up 加锁存储
Precautionary Statements – Disposal **预防声明—处置**	
P501	Dispose of contents/container to an approved waste disposal plant. 内容物/容器处理到经批准的废物处理工厂

Hazards not otherwise classified (HNOC) 未分类的危险

Not applicable 不适用

Other information 其他信息

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

对水生生物有害，可能对水生环境造成长期不利影响。

Interactions with other chemicals与其他化学物质的相互作用

Use of alcoholic beverages may enhance toxic effect.

使用酒精饮料可能会增强毒性作用

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENT
第3节—成分信息

Ingredient 成分	Molecular formula 分子式	CAS No. CAS 号	Weigh 含量
Lithium Iron Phosphate /磷酸铁锂	$LiFePO_4$	15365-14-7	38.8%
Graphite /石墨	C	7782-42-5	19.8%
Polyethylene /聚乙烯	$(C_2H_4)_n$	9002-88-4	2.2 %
Aluminum /铝	Al	7429-90-5	11.4%
Styrene Butadiene Rubber /聚苯乙烯丁二烯共聚物	$(C_8H_8{\cdot}C_4H_6)_n$	9003-55-8	0.8%
Lithium Hexafluorophosphate /六氟磷酸锂	$LiPF_6$	21324-40-3	2.3%
Ethylene Carbonate /碳酸乙烯酯	$C_3H_4O_3$	96-49-1	5.6%
Ethyl Methyl Carbonate /碳酸甲乙酯	$C_4H_8O_3$	623-53-0	4.6%
Dimethyl Carbonate /碳酸二甲酯	$C_3H_6O_3$	616-38-6	5.6%
Copper /铜	Cu	7440-50-8	6.7%
Polyvinylidene Fluoride /聚偏二氟乙烯	$(C_2H_2F_2)_n$	24937-79-9	0.8%
Others /其他	/	/	1.4%

SECTION 4 - FIRST AID MEASURES
第4节—急救措施

Eye Exposure 眼睛接触:

In case of contact with eyes, flush with copious of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

如果与眼睛接触，用大量的水冲洗至少15分钟。用手指分开眼睑，确保充分的冲洗。寻求医生。

Skin Exposure 皮肤接触:

If the internal battery materials of an opened battery cell come into contact with skin, immediately flush with plenty of water or soap.

如果打开的电池的内部电池材料接触到皮肤，立即用大量的水或肥皂冲洗。

Inhalation Exposure 吸入:

If inhaled the internals of battery vomiting. Seeking Immediate medical attention.

如果吸入电池内部呕吐。立即就医。

Ingestion Exposure 吞咽:

If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

如果吞咽，请就医。除非医务人员指示，否则不要催吐。

SECTION 5 - FIRE FIGHTING MEASURES
第5节—消防措施

Danger characteristic 危险特性:

Exposure to excessive heat can cause venting of the liquid electrolyte.
暴露在过热的环境中会导致液体电解质的释放。
Battery may burst and release hazardous decomposition products when exposed to a fire situation.
当暴露在火灾环境中时，电池可能会爆裂并释放出危险的分解产物。

Hazardous combustion products 有害危险产物:

Corrosive and toxic gas may be emitted during fire.
着火期间可能会排放腐蚀性和有毒气体。

Fire-Fighting method 灭火措施:

The staff must equip with filtermask (full mask) or isolated breathing apparatus.
员工必须配备过滤器面罩或隔离式呼吸器。
The staff must wear the clothes which can defense the fire in the upwind direction.
工作人员必须穿能在逆风方向防火的衣服。
Remove the container to the open space as soon as possible.
尽快将容器移到空地上。
Spray water on the containers in the fireplace to keep them cool until finish extinguishment.
把水喷在壁炉里的容器上，使其降温，直到熄灭。

Fire-Fighting media 灭火介质:

Plenty of water, dry chemical powder or carbon dioxide.
大量的水，干粉或二氧化碳。

SECTION 6 - ACCIDENTAL RELEASE MEASURES
第6节—意外泄漏措施

Emergency treatment 紧急处理:

If the battery material is released, remove personnel from area until the batteries cool down and fumes dissipate.
如果电池材料被释放，请将人员从该区域撤离，直到电池冷却和烟雾消散。
Provide maximum ventilation to clear out hazardous gases and avoid skin and eye contact or inhalation of vapors.
提供最大的通风以清除有害气体和避免皮肤和眼睛接触或吸入蒸汽。
Remove spilled liquid with absorbent and incinerate waste.
用吸收剂除去溢出的液体并焚烧废物。

SECTION 7 - HANDLING AND STORAGE
第7节—处理和储存

Handling 处理:

1. Do not allow battery terminates to contact each other, or contact with other metals.
   不要让电池端子相互接触或与其他金属接触。
2. Do not put the cell or battery into a fire or heat it. Do not solder the cell directly. Do not use or leave the cell or battery in a place near fire or heaters.
   不要将电芯或电池放入火中或加热。不要直接焊接电池。不要将电芯或电池放在靠近火源或加热器等地方。
3. Do not expose the battery to excessive physical shock or vibration.
   不要让电池受到过度的物理冲击或振动。
4. Do not immerse, throw, and wet a battery in water.
   不要将电池浸入水中、投掷或弄湿。
5. Short-circuiting should be avoided. Short circuit will reduce the life of the battery and can lead to ignition of surrounding materials. Physical contact with to short- circuited battery can cause skin burn.
   应避免短路。短路会降低蓄电池的寿命，并可能导致周围材料着火。与短路电池的物理接触会导致皮肤灼伤。
6. The batteries should not be opened, destroyed or incinerate, since they may leak or rupture and release to

the environment the ingredients that they contain in the hermetically sealed container.
不应打开、销毁或焚烧电池，因为电池可能泄漏或破裂，并将密封容器中的成分释放到环境中。

7. Place the cell beyond the child packing and container.
将电池放置在儿童触及不到的地方。
8. Do not connect the battery directly to an electric outlet or cigarette socket in a car.
不要将电池直接连接到汽车的电源插座或香烟插座上。
9. Be sure to use the specified charger for battery, and follow the charging instructions correctly.
请务必使用指定的蓄电池充电器，并正确遵循充电说明。
10. Do not mix old and new batteries together, neither with Ni-Cd, dry batteries or another manufacturer batteries or product.
不要将新旧电池混合在一起使用，也不要与镍镉电池、干电池或其他制造商的电池或产品混合使用。

Storage 储存:

1. Batteries should be separated from other materials and stored in a noncombustible, well ventilated, sprinkler-protected structure with sufficient clearance between walls and battery stacks.
电池应与其他材料分开，并存放在不燃、通风良好、有洒水装置保护的结构中，墙壁和电池堆之间应有足够的间隙。
2. Keep the sample in the cool, dry and well-ventilated place (recommend storage temperature : -20~45ºC within one month, 0~35 ºC exceed one month; safety storage temperature: -30~50 ºC(Normal storage is not a security risk, and long-term storage above recommended temperatures can result in varying degrees of degradation of performance life), humidity: ≤85%). Do not exposure to direct sunlight for long periods. Keep away from fire and heating sources. Don't keep the samples with oxidizer and acid.
将样品置于阴凉、干燥、通风良好的地方（推荐存储温度：一个月内-20~45℃，超过一个月 0~35℃；安全存储温度-30~50℃（正常存储不存在安全风险，长期存储且超过推荐温度会导致性能寿命不同程度衰减）；湿度：≤85%）。不要长时间暴露在阳光直射下。远离火源和热源。不要用氧化剂和酸保存样品。
3. Equip with relevant types and quantities of the extinguishment instruments. The storage place should be equipped with suitable shelter materials for divulgence handling.
配备相应种类和数量的灭火器材。储存场所应配备适当的掩蔽材料，以便进行泄漏处理。
4. For rechargeable battery, check the battery every two weeks and charge it every three months to ensure that the SOC is between 40% and 60%, even if the battery is not used.
对于可充电电池，即使不使用电池，也应每2个星期检查一次并每3个月充一次以确保电池SOC保持在40%-60%。

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION
第8节—暴露控制与个人防护措施

Engineering Control 工程控制:
Keep away from heat and open flame. Supply with sufficient partial air exhaust. Store in a cool, dry place.
远离热源和明火。提供足够的局部排气。存放在阴凉干燥的地方。

Respiratory Protection 呼吸保护:
Not necessary under conditions of normal use. Wear self-contained breathing filtermask if the density exceed in the air. Wear breathing apparatus under the condition of emergency rescue or evacuation.
在正常使用条件下不需要。如果环境内气体密度超过空气中的密度，请佩戴自给式呼吸过滤器。在紧急救援或疏散的情况下，佩戴呼吸器。

Eyes Protection 眼睛保护:
Not necessary under conditions of normal use. Wear protective glasses if handling a leaking or ruptured battery.
在正常使用条件下不需要。如果处理泄漏或破裂的电池，请戴上防护眼镜。

Skin and Body Protection 皮肤和身体保护:
Not necessary under conditions of normal use. Wear fireproofing, gas defense clothes in case of handling a leaking or ruptured battery.
在正常使用条件下不需要。在处理泄漏或破裂的电池时，穿上防火防毒服。

Hands Protection 手部保护:
Not necessary under conditions of normal use. Wear chemical resistant rubber glove.
在正常使用条件下不需要。耐磨耐化学腐蚀橡胶手套。

Other Protections 其他保护:
No smoking, dining and drinking water in the workplace. Keep good habit of hygiene.
工作场所禁止吸烟、就餐和饮水。保持良好的卫生习惯。

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES
第9节—理化性质

Appearance 外观:	Black 黑色
Physical state 状态:	Solid 固体
Form 形状:	Prismatic 棱柱形
Odor 气味:	Odorless 无味
Solubility 溶解度:	Insoluble in water 不溶于水

SECTION 10 - STABILITY AND REACTIVITY
第10节—稳定性与反应性

Stability 稳定性:
Stable under normal temperature and pressure.
常温常压下稳定。

Distribution of Ban 禁配物:
Explosives, inflammables, strong oxidants and corrosives.
爆炸品、易燃物、强氧化剂和腐蚀剂。

Conditions to Avoid 应避免的条件:
Fire source, heating source, disassemble, external short circuit, crushes, deformation, high temperature above 100°C, direct sunlight and high humidity, immerse in water or overcharge.
火源、热源、拆卸、外部短路、压碎、变形、100°C 以上高温、阳光直射、高湿度、浸水或过充。

Hazardous Polymerization 危险聚合:
Will not occur.
不会发生。

Hazardous Decomposition Products 有害分解产物:
Metal oxides, carboxyl compound such as CO, CO_2, etc.
金属氧化物，碳化合物例如一氧化碳、二氧化碳，等等。

SECTION 11 - TOXICOLOGICAL INFORMATION
第11节—毒理学信息

Acute Toxicity 急性毒性:
No information is available.
没有可用的信息。

Sub-acute and Chronic Toxicity 亚急性和慢性毒性:
No information is available.
没有可用的信息。

Irritation Data 刺激性数据:
The internal battery materials may cause irritation to eyes and skin.
电池内部材料可能会对眼睛和皮肤造成刺激。

Sensitization 致敏作用:
The liquid in the battery may cause sensitization to some person.
电池中的液体可能会对某些人造成敏化。

Mutagenicity 致突变性:
No information is available.
没有可用的信息。

Carcinogenicity 致癌性:
No information is available.
没有可用的信息。

Others 其他:
Since the materials in this battery are sealed in the can, the potential for exposure to the components of the battery is negligible, when the battery is used as directed. However technical or electrical abuse of the battery may result in the release of battery contents.
由于该电池中的材料密封在罐体中，当按照指示使用电池时，接触电池组件的可能性可以忽略不计。但是，电池的技术或电气滥用可能会导致蓄电池内容物的释放。

SECTION 12 - ECOLOGICAL INFORMATION
第12节—生态信息

Eco-toxicity 生态毒性:
No information is available.
没有可用的信息。

Biodegradable 生物降解性:
No information is available.
没有可用的信息。

Mobility in soil 土壤流动性:
No information is available.
没有可用的信息。

Bioconcentration or biological accumulation 生物浓缩或生物积累:
No information is available.
没有可用的信息。

Other harmful effects 其他有害影响:
Don't abandon the battery into environment, may cause water or soil pollution.
不要将电池扔进环境中，可能造成水或土壤污染。

SECTION 13 - DISPOSAL CONSIDERATIONS
第13节—处置注意事项

Appropriate Method of Substance 物质处理方法:
The battery should be completely discharged prior to disposal in order to prevent short circuit.
为了防止短路，在处理前应将蓄电池完全放电。
The battery contains recyclable materials, and it is suggested recycle.
电池含有可回收材料，建议回收利用。
Refer to National or Local regulations before handling.
操作前请参阅国家或地方法规。
Disposal of the battery should be performed by permitted, professional disposal firms knowledgeable in National or Local regulations of hazardous waste treatment and hazardous waste transportation.
电池的处理应由获得国家或地方法规的许可的具有危险废物处理和危险废物运输的专业处理公司进行。

SECTION 14 - TRANSPORT INFORMATION
第14节—运输信息

The battery has passed the test items of UN Manual of Test and Criteria Section 38.3, and Report No.: FLS20231215U02-2.
电池已通过联合国《试验和标准手册》第38.3节的测试项目，报告编号：FLS20231215U02-2。

General packaging requirement 一般包装要求:

1. The cells or batteries must be protected so as to prevent short circuits.
电芯或电池必须加以保护，以防止短路。
2. The cells or batteries or equipment must be packed in suitable strong outer packaging.
电芯或电池或设备必须包装在合适的坚固的外包装中。
3. If batteries contained in equipment, equipment must be secured against movement within the outer packaging and be packed so as to prevent accidental activation.
如果电池包含在设备中，设备必须在外包装内固定，防止移动，并进行包装，以防止意外激活。

No. 序号	**UN numbers & Proper Shipping Name**, if applicable **联合国编号及运输专用名，如适用**		
(1)	**UN 3480, LITHIUM ION BATTERIES** **UN 3480，锂离子电池组**		
(2)	**UN 3481, LITHIUM ION BATTERIES PACKED WITH EQUIPMENT** **UN 3481，锂离子电池组同设备包装在一起**		
(3)	**UN 3481, LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT** **UN 3481，锂离子电池安装在设备中**		
(4)	**UN 3171, BATTERY-POWERED VEHICLE** **UN 3171，电池驱动的车辆**		
(5)	**UN 3166, VEHICLE, FLAMMABLE LIQUID POWERED** **UN 3166，易燃液体驱动的车辆**		
No. 序号	**Hazard Class** **危险等级**	**Packing Group** **包装组**	**Packaging requirement** **包装要求**
☐	**Air transportation, according to IATA-DGR 65th Edition (Effective 1 January-31 December 2024)** **空运，依据IATA-DGR第65版（2024年1月1日至12月31日生效）**		
(1)~(5)	--	--	--
☒	**Maritime transportation, according to IMO IMDG Code (Amend 41-2022)** **海运，依据IMO IMDG Code (Amend 41-2022)**		
(1)	Class 9	II	Package instruction P903 包装说明P903
☒	**Road transportation, according to ADR-2023** **公路运输，依据ADR-2023**		
(1)	Class 9	II	Package instruction P903 包装说明P903
Remark 备注	In "Hazard Class", "Class 9" means "Class 9 dangerous goods", and "Not restricted" means that they are not restricted “危险等级”中“Class 9”表示“第九类危险货物”，“Not restricted”表示不受限制 In "Packing Group", "II" means " Packing Group II" and "NIL" means "No requirement" “包装组”中“II”表示“二级包装”，“NIL”表示“无要求”		

SECTION 15 - REGULATORY INFORMATION
第15节—监管信息

Dangerous Goods Regulation (DGR)
Recommendations on the Transport of Dangerous Goods Model Regulations
International Maritime Dangerous Goods (IMDG)
Occupational Safety and Health Act (OSHA)
Toxic Substances Control Act (TSCA)
Code of Federal Regulations (CFR)
Technical Instructions for the Safe Transport of Dangerous Goods
California Proposition 65
Superfund Amendments and Reauthorization Act Title III (302/311/312/313) (SARA)
Globally Harmonized System of Classification and Labeling of Chemicals(GHS)
In accordance with all Federal, State and local laws. 符合所有联邦、州和地方法律。

SECTION 16 - ADDITIONAL INFORMATION
第16节—附加信息

According standard 标准依据:

GB/T 16483-2008 Safety data sheet for chemical products Content and order of sections
ISO 11014:2009(E) Safety data sheet for chemical products – Content and order of sections

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Other Information 其他信息:
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Sample Reference Photo
样品照片

Model: FLA48500, 51.2V, 500Ah, 25kWh





--End of the report--