电芯技术规格书

Cell Technical Specification

1175Ah 磷酸铁锂锂离子电芯(储能型)产品

LFP 1175Ah Cell for Energy Storage

型号 Model：MC1175P025A

版本 Version：V1.0

客户名称： Client:
客户确认（盖章）：对本规格书内容无异议。 Client confirmation (seal): There is no objection to the content of this specification.
客户确认日期： Client confirmation date:

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1. 术语定义 Definition

海辰 Hithium	厦门海辰储能科技股份有限公司 Xiamen Hithium Energy Storage Technology Co., Ltd.
客户 Customer	电芯的采购方 Cell purchaser in the sales contract
产品 Product	若无特别说明，产品指客户向海辰采购的电芯产品 Unless otherwise specified, the product refers to the cell purchased by the Customer from Hithium.
电芯 Cell	本规格书未特别说明均指下线态电芯（27%SOC，包绝缘膜） Unless otherwise specified in this Specification, it refers to the cell at the end of production line (27% SOC, covered with insulation film)
电池管理系统 Battery management system (BMS)	用于监测和记录产品在整个服务期限内的运行参数的一种有效的追踪和控制系统。其追踪和记录的参数包括但不限于电压、电流、温度等，以控制产品的运行并确保产品运行环境及运行条件符合本规格书的规定 An effective tracking and control system to monitor and record the operating parameters of the product throughout the service life. The parameters tracked and recorded include but are not limited to voltage, current, and temperature, controlling the operation of the product and ensuring that the product's operating environment and conditions meet the requirements of this Specification.
电芯温度 Cell temperature	由接入电芯的温度传感器测量的电芯的温度，温度传感器和测量线路的选择由海辰和客户共同商定 The temperature of the cell measured by the temperature sensor connected to the cell. The selection of the temperature sensor and measurement circuit is determined through mutual agreement between Hithium and the Customer.
新电芯状态 Fresh cell	指客户收货 15 天以内(仅限国内运输)且循环充放次数少于 5 次的电芯状态 Fresh cells are charged and discharged less than 5 times within 15 days after Customer has received (for domestic transportation only).
充/放电倍率 CH/DCH-rate	充/放电功率与电池管理系统多次测量的电芯的能量值的比率。例如:电芯能量为 3760Wh，充/放电功率为 940W 时，则充/放电倍率为 0.25P； The ratio of charging/discharging power to the cell energy measured by BMS. For example, when the cell energy is 3760Wh and the charging/discharging power is 940W, the charging/discharging rate is 0.25P.
生产日期 Production date	电芯的生产日期，每个电芯顶盖刻码所包含的明确的生产日期代码为生产日期 The production date of the cell, which is marked on the top of the cell by specified code.
标准充电 Standard charge	在室温下（25±2）℃，以 0.25P 恒功率充电至终止电压 3.65V，停止充电，静置 10min At room temperature (25±2)℃, charge with 0.25P constant power to 3.65V, stop charging, rest for 10 min.

标准放电 Standard discharge	在室温下（25±2）℃，以 0.25P 恒功率放电至终止电压 2.5V，停止放电，静置 10min At room temperature (25±2)℃, discharge with 0.25P constant power to 2.5V, stop discharging, rest for 10 min.
开路电压 Open circuit voltage (OCV)	没有接入任何负载和电路时测得的电芯的电压 The open circuit voltage is the cell voltage measured without any load or circuit connected.
荷电状态 State of charge (SOC)	电芯实际充电容量与满充容量的比值或实际放电至标准截止电压时的容量与满充容量的比值，表征电芯的荷电状态。100%SOC 的荷电状态表示电芯满充到 3.65V，0%SOC 的荷电状态表示电芯完全放电到截止电压 2.5V(T＞0℃) & 2.0V(T≤0℃)。 State of charge: indicates the state of charge of the cell. It refers to the ratio of the actual capacity to the full capacity value or the ratio of the actual capacity after the cell discharges to the standard cut-off voltage to the full capacity value of the cell. 100% SOC indicates that the cell is fully charged to 3.65 V, and 0% SOC indicates that the cell is completely discharged to the cut-off voltage 2.5V(T＞0℃) & 2.0V(T≤0℃).
温度上升 Temperature rise	按照特定充放电条件下，电芯充电或者放电过程中电芯温度的升高 The rise of the cell temperature during the cell's charging or discharging process, following the specified charging and discharging conditions.
测量单位 Units of measure	电压 Voltage， 单位：伏特 Volt (V)； 电流 Current， 单位：安培 Ampere (A)； 功率 Power， 单位：瓦特 Watt (W)； 容量 Capacity， 单位：安培-小时 Ampere-Hour (Ah)； 能量 Energy， 单位：瓦特-小时 Watt-Hour (Wh)； 内阻 Internal resistance， 单位：毫欧姆 Milliohm (mΩ)； 温度 Temperature， 单位：摄氏度 Degree Celsius (°C)； 长度 Length， 单位：毫米 Millimeter (mm)； 时间 Time， 单位：秒 Second (s)； 频率 Frequency， 单位：赫兹 Hertz (Hz)； 质量 Mass， 单位：千克 Kilogram (kg)； 力 Force， 单位：牛顿 Newton (N)

2. 适用范围 Scope of Application

本技术规格书规定了 MC1175P025A 型锂离子电芯的性能要求、试验方法、运输、贮存要求和注意事项等。

This Technical Specification specifies the performance requirements for MC1175P025A Lithium-ion Cell and lists out the information such as the test methods, transportation, storage requirements, and precautions.

3. 规范性引用文件 Normative References

GB/T 36276-2023 电力储能用锂离子电池

GB/T 36276-2023 Lithium-ion battery for electrical energy storage

IEC 62619-2022 蓄电池和含碱或其他非酸性电解质蓄电池组在工业应用中使用二次锂电池和蓄电池组的安全要求

IEC 62619-2022 Secondary cells and batteries containing alkaline or other non-acid electrolytes-Safety requirements for secondary lithium cells and batteries, for use in industrial applications

UL 1973-2022 用于固定和动力辅助电源应用的电池

UL 1973-2022 Batteries for Use in Stationary and Motive Auxiliary Power Applications

UL 9540A-2019 评估电池储能系统中热失控火灾传播的测试方法

UL 9540A-2019 Test Method for Evaluating Thermal Runaway Propagation in Battery Energy Storage System

UN38.3-2019 《试验和标准手册》 ST/SG/AC.10/11/Rev.7/Amend.1, section38.3

UN38.3-2019 Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/Amend.1, section 38.3

4. 测试条件 Test Condition

若无特别说明，电芯的参数均为新电芯状态下的参数，测试对象为新电芯状态的电芯。除非有其他说明，实验和测量需在室温（25±2）℃、相对湿度（55±20）%以及大面装配预紧力为（3000±200）N 条件下进行。

The cell parameters are got with the fresh cell in the standard test procedure, the cell test is carried out under the conditions of room temperature (25±2)℃, relative humidity (55±20)% and assembly force of (3000±200)N, unless exceptions are stated.

4.1. 测量设备及精度 Test Equipment and Accuracy

1) 测试设备精度 Test equipment accuracy: ±0.1%

2) 电流测量精度≥0.5 级 Current measurement accuracy:≥0.5 level，

3) 电压测量精度≥0.5 级 Voltage measurement accuracy: ≥0.5 level

4) 温度测量精度 Temperature measurement accuracy: ±0.5℃

5) 时间测量精度 Time measurement accuracy: ±0.1%

6) 尺寸测量精度 Dimensional measurement accuracy: ±0.1%

7) 重量测量精度 Weight measurement accuracy: ±0.1%

若无特别说明，充放电模式均应为标准充电/放电模式。

The charge and discharge procedure should be standard charge/discharge procedure, unless exceptions are stated.

4.2. 极柱与 Busbar 焊接推荐参数 Recommended Welding Parameters for Cell Terminal and Busbar

序号 No	项目 Items	推荐标准 Recommended Standards
1	焊接输出能量 Welding output energy	≤2200J
2	焊接功率 Welding power	内环 4500~6000W 外环 1800~3000W
3	焊接速度 Welding speed	40~80mm/s
4	熔深 Depth of fusion	0.5mm~1.5mm
5	极柱塑胶件温度 The temperature of the terminal plastic part	200℃持续小于 30s 200℃ duration time≤30s
6	极柱承受压力 Overwhelming force of the terminal	≤1000N

5. 电芯技术参数 Cell Technical Parameter

5.1. 电芯基本参数 Cell Key Parameter

项目 Item	参数 Parameter	条件 Condition
化学体系 Chemistry	磷酸铁锂电芯 LFP	N.A.
电芯型号 Model	MC1175P025A	N.A.
外形尺寸（长 X 宽 X 高） Dimension (L x W x H)	见成品电芯图纸 Refer to 2D drawings	详细见第 10 章电芯图纸 Refer to chapter.10 drawing
电芯质量 Weight	(20.4±0.50)kg	包绝缘膜后 Taking the insulation film weight into account
出厂内阻（1kHz） Impedance (1kHz)	(0.23±0.05)mΩ	27%SOC，以产线在线测试数据为准 27%SOC, based on the online testing data of the production line
标称容量 Nominal capacity	1175Ah	(25±2)℃，标准充放电 (25±2)℃, standard charging and discharging
标称电压 Nominal voltage	3.20V	(25±2)℃，标准充放电 (25±2)℃, standard charging and discharging
标称能量 Nominal energy	3760Wh	(25±2)℃，标准充放电 (25±2)℃, standard charging and discharging
工作电压 Operation voltage	2.5-3.65V (T>0℃) 2.0-3.65V (T≤0℃)	
下线电压范围 Voltage range of the cell at end of production line	3.27～3.30V	(25±2)℃，27%SOC 电芯开路电压 (25±2)℃, OCV, 27%SOC
能量密度 Energy density	≥180Wh/kg	(25±2)℃，标准充放电 (25±2)℃, standard charging and discharging
月自放电 Self-discharge / per month	⩽3.0%	出货三个月以后的电芯， 27%SOC，(25±2)℃储存 Fresh cell after 3 months, (25±2)℃, 27%SOC
标准充电功率 Nominal continuous charge power	0.25P	(25±2)℃
标准放电功率 Nominal continuous discharge power	0.25P	(25±2)℃
放电温度范围 Operation temperature(discharge)	-30~60℃	N.A.
充电温度范围 Operating temperature(charge)	0~60℃	N.A.

注：若无特别说明，电芯的参数均为新鲜电芯状态下的参数；

Note: Unless other specifications, the parameters of the cells are for the fresh cells.

5.2. 电芯性能参数 Cell Performance

项目 Item	参数 Parameter	测试方法 Test procedure
持续充/放电温升 Continuous charge/discharge temperature rise	≤5℃	(25±2)℃，标准充放电，感温线贴在电芯大面(电芯不带夹具测试)，高低温箱中测试，电芯开始充（放）电到充（放）电完成温升记为持续充（放）电温升 (25±2)℃, standard charging and discharging, the temperature sensor is attached to the large surface of the cell. The cell is charged (discharged) to the end voltage in test chamber. Temperature rise is recorded during process.
-20℃放电容量 -20℃ discharge capacity	≥70%标称容量 ≥70% nominal capacity	电芯标准充电后，在（-20±2）℃条件下，静置 24h，将电芯以 0.25P 恒功率放电至 2.0V 并记录放电容量(Ah) After standard charging，rest for 24h at (-20±2)℃, discharge the cell with 0.25P to 2.0V and record capacity (Ah).
55℃放电容量 55℃ discharge capacity	≥95%标称容量 ≥95% nominal capacity	电芯标准充电后，在（55±2）℃条件下静置 5h，将电芯以 0.25P 恒功率放电至 2.5V 并记录放电容量(Ah) After standard charging，rest for 5h at (55±2)℃, discharge the cell with 0.25P to 2.5V and record capacity(Ah).
安全性能 Safety performance	单体满足 GB/T 36276-2023 IEC 62619-2022, UL1973-2022, UL 9540A-2019, UN 38.3.	Refer to GB/T 36276-2023, IEC 62619-2022, UL 1973-2022, UL 9540A-2019, UN 38.3

5.3. 电芯寿命 Cell cycle life

项目 Item	参数 Parameter	测试方法 Test procedure
室温充放电循环寿命 25℃ cycle life	≥11000 次(cls)@70%SOH	(25±2)℃，电芯采用 25mm 钢板夹紧大面，夹具力为(3000±200)N，在高低温箱中测试，以 0.25P 恒功率充电至 3.65V，搁置 30min，以 0.25P 恒功率放电至 2.5V，搁置 30min，重复如上充放电，直至容量衰减为标称容量的 70%截止 At(25±2)℃, the cell is fixed with 25mm thickness steel plate, the assembly force is 3000±200N, in test chamber, charge to 3.65V with 0.25P, rest for 30min, discharge to 2.5V with 0.25P, rest for 30 minutes, and repeat the process of charge and discharge until the cell actual capacity fading to 70% of the nominal capacity, record the cycle number.

6. 电芯标识、包装、运输及存储要求 Requirement of Identification, Package, Transportation and Storage

1) 电芯顶盖刻码符合海辰《电芯产品编码规则》；

The code on the top cover of the cell shall comply with *Battery Product Coding Rules* of Hithium.

2) 包装箱和装箱规格按照客户和海辰双方约定执行。若双方未约定，建议按海辰标准执行；

The size and type of package shall follow the agreement between the customer and Hithium. If there is no agreement, it will be recommended to follow Hithium standards.

3) 电芯标识（刻码区和目视区信息）按照客户和海辰双方约定标准执行。若双方未约定，建议按海辰标准执行；

The cell identification shall (information in the marking area and visual inspection area) follow the agreement by the customer and Hithium. If there is no agreement, it will be recommended to follow Hithium standards.

4) 电芯出货报告包含抽样电芯的容量，电压，内阻，尺寸数据；

The cell shipment sampling report contains data of cell capacity, voltage, internal resistance, dimension, and so on.

5) 电芯存储时，应放在空气流通，可防水、防腐、防尘的仓库中并满足以下要求：相对湿度≤80%RH，环境温度-20℃~35℃，海拔≤5000m，电芯 SOC 10%~50%；

For cell storage, it is recommended the warehouse with good ventilation, waterproof, anticorrosive, dustproof and comply with the following requirements as well:

Relative humidity: ≤80%RH

Ambient temperature: -20℃~35℃

Altitude: ≤5000m

Cell storage SOC: 10%~50%.

6) 包装箱应标有“小心轻放”、“防水”、“防倒置”、“不可堆叠”等字样；

The package shall be marked with words such as “Handle with care”, “Keep Dry”, “Anti-upside down”, “No Stackable”, etc.

7) 包装箱或包装盒在运输过程中应小心轻放，避免碰撞和敲击，严禁与酸碱等腐蚀物品放在一起；

The package shall be handled carefully during transportation to avoid collision, it is strictly forbidden to put cell together with corrosive materials.

8) 来货电芯箱卡板，在正常托运或放置时，不允许出现倾斜、塌陷等不良。

The card board of the cell carton shall not be inclined or collapsed during normal consignment or placement.

7. 应用条件 Application Condition

客户应当确保严格遵守以下与电芯相关的应用条件:

Customer shall ensure that the following application conditions in connection with the products are strictly observed:

1) 客户端收到到货电芯后，应在 15 天内完成入库检验，具体参考双方协商的检验规范；

The warehouse inspection of cell shall be completed within 15 days after customer receive the cell. The inspection is referred to the specifications negotiated by both parties.

2) 系统成组设计需对电芯施加一定的预紧力，新鲜电芯预紧力范围 (3000±200)N。

There is assembly force on cell during cell integrated to module or system. The recommended assembly force is (3000±200) N.

3) 电芯在使用过程中会产生膨胀力，电芯在 25mm 钢板初始大面夹具力为(3000±200)N 测试条件下，EOL 膨胀力约为 120000N。海辰建议客户应将电芯膨胀力作为模组和系统机械结构设计输入关键因素之一。

There is swelling force during cell usage. Under the conditions that the cell is fixed with 25mm thickness steel plate, and the assembly force is (3000±200)N, the cell swelling force should be ~120000N. Hithium recommends customer shall consider the cell swelling force during mechanical and structural design of module or system design.

4) 客户应配置电池管理系统，严密监控、管理与保护每个电芯;

Customer shall provide BMS to control, monitor, and protect the cell during usage.

5) 客户最终采用的电池管理系统方案应符合技术规格书里的 7.7 条款中的相关参数和保护动作。

The BMS provided by customer shall follow the parameter and protection action (shown in 7.7).

6) 客户应保存完整的电芯运转的监测数据，用作产品质量责任划分的参考。

Customer shall maintain the complete monitoring data of cell operation as a reference for product quality responsibility allocation.

7) 电池管理系统需满足以下最基本的检测和控制要求:

The BMS shall include the following monitoring and control features as a minimum requirement.

No.	项目 Item	参数 Parameter	保护动作 Protection action
7.7.1	充电终止 Stop charging	3.65V	当电芯的电压达到 3.65V 时电池管理系统申请终止充电 Stop charging when cell voltage reaches 3.65V
7.7.2	第一级过充电保护 First overcharge protection	≥3.7V	当电芯的电压达到 3.7V 时电池管理系统强制终止充电 BMS is forced to stop charging by when cell voltage reaches 3.7V
7.7.3	第二级过充电保护 Second level of overcharge protection	≥3.8V	当电芯的电压达到 3.8V 时电池管理系统强制终止充电，并锁定电池管理系统直到技术人员解决问题 BMS is forced to stop charging when the cell voltage reaches 3.8V, and BMS should be locked until technicians solve the problem.

7.7.4	放电终止 Stop discharging	2.5V(T>0℃) 2.0V(T≤0℃)	当电芯的电压达到 2.5V(T>0℃)或 2.0V(T≤0℃)时，电池管理系统申请终止放电 Stop discharging when cell voltage reaches 2.5V (T>0℃) or 2.0V (T≤0℃)
7.7.5	第一级过放保护 First level of over discharge protection	2.4V(T>0℃) 1.8V(T≤0℃)	当电芯的电压达到 2.4V(T>0℃)或 1.8V(T≤0℃)时，电池管理系统强制终止放电 BMS is forced to stop discharging when cell voltage reaches 2.4V (T>0℃) or 1.8V (T≤0℃)
7.7.6	第二级过放保护 Second level of over discharge protection	2.0V(T>0℃) 1.6V(T≤0℃)	当电芯电压低于 2.0V(T>0℃)或 1.6V(T≤0℃) 时，电池管理系统强制终止放电。然后及时用 117.5A (0.1C)的电流将电池充电至 50% SOC。且电池管理系统应锁定直到技术人员解决问题 BMS is forced to stop discharging when the cell voltage is less than 2.0V(T>0℃) or 1.6V(T≤0℃) . Then the cell should be charged to 50% SOC with 117.5A (0.1C) in time. BMS should be locked until technicians solve the problem.
7.7.7	短路保护 Short circuit protection	不允许短路 No short circuit allowed	发生短路时，由继电器断开回路 When a short circuit occurs, the cell should be disconnected by the overcurrent protection device.
7.7.8	过流保护 Overcurrent protection	电流≤752.0A Current≤752.0A	电池管理系统控制充放电电流符合规格 BMS controls the charge and discharge current to meet the specification
7.7.9	过热保护 Overheat protection	电芯温度≤60℃ Cell temperature≤60℃	当温度超过规定时，终止充电/放电 Stop charging and discharging when temperature exceeds specification
7.7.10	低温保护 Low temperature protection	充电温度>0℃ 放电温度≥-30℃ Charging: T>0℃; Discharge: T≥-30℃	当温度低于规定时，终止充电/放电 Stop charging and discharging when temperature exceeds specification

备注：以上 No.7.7.2、7.7.3、7.7.5、7.7.6 为警示条款，提请客户注意：当电芯达到上述任何一项条款描述的指标和参数状态时，意味着电芯已超出本规格书规定的使用条件，客户需依“保护动作”及本规格书其他相关规定对电芯采取保护措施。

Note: The above No. 7.7.2、7.7.3、7.7.5、7.7.6 are the warning clauses: When the battery cell reaches any of the terms described in the above, it means that the battery has been used beyond the specification. The customer shall take protective measures on the battery in accordance with the protection action and other relevant provisions of this specification.

8) 客户及第三方应避免在放电过程中电芯达到过放状态。根据本规格书第 5.1 条，当放电截止电压低于 2.5V 时，系统内部能耗降低到最小，并在重新充电之前延长休眠时间。客户需要培训使用者在最短的时间内重新充电，防止电芯进入过放状态。

The customer and the third party shall avoid cell over discharge during the discharging process. After discharge cut-off in accordance with paragraph 5.1, internal power consumption of the system should be reduced to a minimum to prolong the idle time before recharge. Customer shall educate the users of the products or other parties who may come to handle the products to recharge the cells at minimum time intervals to prevent reaching the over-discharge state.

9) 电芯存储 SOC 建议保持在 10～50% 范围内。客户若预计在质保期开始后将电芯存放 1~6 个月，应提前做一次充放电，将 SOC 调整为 10～50%。

The storage SOC of the cell is recommended to keep at 10~50%. If the Customer expects to store the cell for 1~6 months after the warranty period starts, they shall charge and discharge once and adjust the SOC to 10~50%in advance.

10) 客户在对电芯进行搬运及电池模组设计、组装的过程中，要做好防护措施，避免绝缘膜破损。

During the process of handling cells and designing and assembling battery modules, customers shall take protective measures to avoid damage to the insulation film.

11) 电池模组设计中应保证电芯间最大接触面受力均匀，如果因为模组设计存在问题，可能导致电池失效的风险，客户可与海辰协商模组设计建议。

The battery module design shall ensure that the maximum contact surface between cells is evenly subjected to force. If there is any issue with the module design which may lead to the potential failure of the cell, the Customer may negotiate with Hithium about the advice of module design.

12) 电池模组或系统设计应充分考虑电芯的散热问题，如果存在系统冷却设计问题导致的电芯有损坏的风险，客户需与海辰协商系统冷却设计建议。

The design of battery module or system shall consider the heat dissipation of the cell. If there is issue on system cooling design which may lead the potential failure of cell, customer need to negotiate with Hithium about the design advice of system.

13) 电池模组设计中应充分考虑电芯的防水、防尘、绝缘等问题，电池模组必须满足国家有关标准规定的防水、防尘、绝缘等等级。

The design of the module or system shall meet the waterproof、dustproof and insulation grade required by relevant national standards.

14) 海辰出货时会根据双方协商的配组要求进行配组，并以集装箱为最小单位进行标识和出货。不同集装箱电芯不能混用，若有特殊需求可与海辰沟通详细解决方案。

Hithium products are shipped with specified label in container based on the agreement by both parties. Cells from different containers cannot be mixed for usage. Customer need to negotiate with Hithium in advance if there is any special requirement on cell usage. It is forbidden to mix different cells in the same battery system.

15) 电芯的使用期限是有限的，客户应该建立有效的跟踪系统监测并记录每个使用期限内电芯的容量。容量的测试方法可与海辰讨论沟通。当使用中的电芯容量小于等于标称容量 60%(25℃)，应停止使用电芯。

The service life of cell is limited. Customer shall establish an effective tracking system to monitor and record the capacity of the cell during service life. The capacity calculation methods need to be discussed by two parties. When the capacity is less than or equal to 60% of the nominal capacity (25°C), the cell shall be stopped using.

8. 注意事项 Safety Attention

1) 禁止将电芯浸入水中。

Do not put the cell into water.

2) 电芯非正确使用和存放，存在火灾、爆炸和烧伤的风险，勿将电芯分解、压碎、焚化、加热和投入火中。

Incorrect use and storage of the cell may result in the risk of fire, explosion and burns. Do not disassemble, crush, incinerate, heat or throw the cell into fire.

3) 禁止将电芯投入火中或长时间暴露在超过本规格书规定的温度条件的高温环境中，否则可能会导致火灾。在任何正常的使用情况下，电芯温度不能超过 60℃，如果电芯温度超过 60℃，电池管理系统需关闭电芯，停止电芯运行。

Do not drop the cell into fire or expose it to any high temperature environment exceeding operation temperature, otherwise it may cause fire. At all use time, cell temperature should not exceed 60℃, shut down system by BMS when it occurs.

4) 勿擅自以任何方式拆解、拆卸或修整电芯。

Do not disassemble or repair the cell in any way without authorization.

5) 勿将不同规格、不同品牌的锂离子电芯混合使用。

Do not mix different types and brands of the cell.

6) 如果电芯发出异味、发热、变形、变色或出现其它任何异常现象时不得使用并将电芯转移到安全的位置。

If the cell occurs peculiar smell, heat, deformation, discoloration or any other abnormal phenomenon, do not use it and move the cell to a safe location.

7) 禁止电芯正负极短接，否则强电流和高温可能导致人身伤害或者火灾。

Do not short circuit cell terminals. Otherwise, the strong current and high temperature may cause personal injuries or fire.

8) 严格按照标示和说明连接电芯正负极，禁止反向或串线充电。

Shall connect cell terminals according to cell's polarity. Reverse charging is strictly prohibited.

9) 禁止电芯过充/过放，否则，可能引起电芯过热和火灾事故的发生。在电芯安装和使用中，需实行硬件和软件的多重过充过放失效安全保护（包括安装充放电定时器保护）。最低保护要求见本规格书第 7.7.3 条和第 7.7.6 条。

It is forbidden to overcharge the cell, otherwise, it may cause cell to overheat and fire accidents. In the battery installation and use, the hardware and software need to implement multiple level of overcharge-failure safety protection. See paragraph 7.7.3 and 7.7.6.

10) 电芯充电过程中可能发生不适当的终止充电现象。如超出允许的充电时间，充电电压过高而终止充电或充电电流过强而终止充电。上述现象被定义为"不适当的终止充电"。当发生以上现象时，可能意味着电池系统出现漏电或某些部件出现故障。在没有找到根本原因并彻底解决之前继续对该电芯充电可能会引起电芯过热或发生火灾。当发生以上现象时，电池管理系统应该通过自动锁定功能，禁止后续充电。该电芯只有经过有认证资格的技术人员全面检查，确定根本原因并彻底解决、改善后方可恢复充电。

When cell charging is terminated improperly for reasons such as exceeding allowable charging time, cut-off due to exceeding charging voltage or cut-off due to exceeding charging current, all these events are defined as “improper charge termination”. Such event may indicate that there is current leaking within a cell system or some components have started to malfunction and subsequent charging of such cell systems without finding and fixing root cause of problem may cause potential overheat or fire hazards. When such event occurs, the BMS should lock itself up to prevent subsequent charging and notice should only be given to user after the system has been thoroughly checked by qualified technician who can identify and fix root cause attributed to the “improper charge termination”.

11) 客户应将电芯安全地固定在固体平面上，并将电源线安全地束缚在合适的位置、以避免摩擦而引起电弧和火花。

Products should be securely fixed to solid platform, and power cables should be securely attached by fastener to avoid intermittent contact which may cause arcing and sparks.

12) 严禁用塑料进行电气连接。不正确的电气连接方式可能会造成电芯使用过程中发生过热现象。

Do not use plastic part to connect the cells. Improper electrical connection within a cell may cause overheating in service.

13) 当电解液泄露时，应避免皮肤和眼睛接触电解液。如有接触，应使用大量的清水清洗接触到的区域并向医生寻求帮助。禁止任何人或动物吞食电芯的任何部件或电芯所含物质。

When the electrolyte leaks, skin and eye contact with the electrolyte should be avoided. In case of contact, a large amount of clean water should be used to clean the contact area and seek help from the doctor. It is forbidden for any person or animal to swallow any part or substance contained in the battery.

14) 电芯应有保护措施，使其免受机械震动、碰撞及压力冲击，否则电芯内部可能短路，产生高温和火灾。电芯存在潜在的危险，在操作和维护时必须采取适当的防护措施；本规格书第 5.2 安全性能描述的测试实验如操作不当可能会引起电芯起火或者爆炸，该测试实验只能由配备适当的防护装备的专业人员在专业的实验室进行。否则，可能会导致严重的人身伤害和财产损失。不遵守上述警告可能造成多种灾难。

Protect cells from mechanical shock, impact and pressure. Internal electrical circuit may short circuit to generate high temperature and fire hazards. The cell is potentially dangerous, and appropriate protective measures must be taken during operation and maintenance; improper operation of the test experiment described paragraph 5.2, may cause the cell to catch fire or explode. The test can only be carried out in a professional laboratory by professionals equipped with appropriate protective equipment. Otherwise, it may lead to serious personal injury and property loss. Failure to comply with the above warnings can cause a variety of disasters.

15) 客户知悉在电芯使用和操作过程中存在以下潜在的危险:操作者在操作时可能会受到化学品、电击或者电弧的伤害；尽管人体对遭受直流电与交流电的反应不同，但是高于 50V 的直流电压与交流电对人体的伤害是同样严重的，因此客户必须在操作中采取保守的姿势以避免电流的伤害。存在来自电芯中的电解液的化学风险。在操作电芯和选择个人防护装备时，客户及其雇员必须考虑到以上潜在的风险防止发生意外短路，造成电弧、爆炸或热失控。

Customer acknowledges the following potential hazards in connection with the usage and handling of products: Working with battery can expose the handler to chemical, shock and arcing hazards. Although a person’s body might react to contact with direct current voltage differently than from contact with alternate current voltage. Customer shall take a conservative position and consider the risk of shock or electrocution to be the same for both alternate current and direct current exposures greater than 50V. When selecting work practices and personal protective equipment, customer and its employees should consider potential exposure to these hazards and therefore prevent accidental short-circuit that can result in electrical arcing, explosion, and/or “thermal runaway” of the cells.

9. 免责声明 Disclaimer

1) 客户应严格按照本规格书的内容使用电芯，客户并应确保电芯的使用者按本规格书的内容使用电芯，否则发生的电芯参数不符、电芯质量问题、电芯故障及任何损失，海辰均不承担责任；且若因此对海辰的声誉造成影响的，海辰保留要求客户赔偿的权利。

Customer should use the cell in strict accordance with this Specification. Customer should also ensure that users of the cell would comply this Specification during use. Otherwise, Hithium shall not be liable with regard to resultant cell parameter discrepancies, quality issues, failures and any losses. If this damages Hithium's reputation, Hithium reserves the right to claim compensation from the Customer.

2) 海辰保留对产品的规格及性能参数修改的权利。买方在订购海辰产品前，需要与海辰提前确认产品的最新状态。

Hithium reserves the right to modify the specifications and performance parameters of the product. Before ordering Hithium products, the customer needs to confirm the latest status of the products in advance with Hithium.

3) 客户对本规格书的内容负有保密义务，客户不得擅自向任何第三方泄露，具体约定见双方签订的保密协议。

The customer shall be responsible for the confidential of this document, and the customer shall not disclose it to any third party without authorization. For details, please refer to the confidentiality agreement signed by both parties.

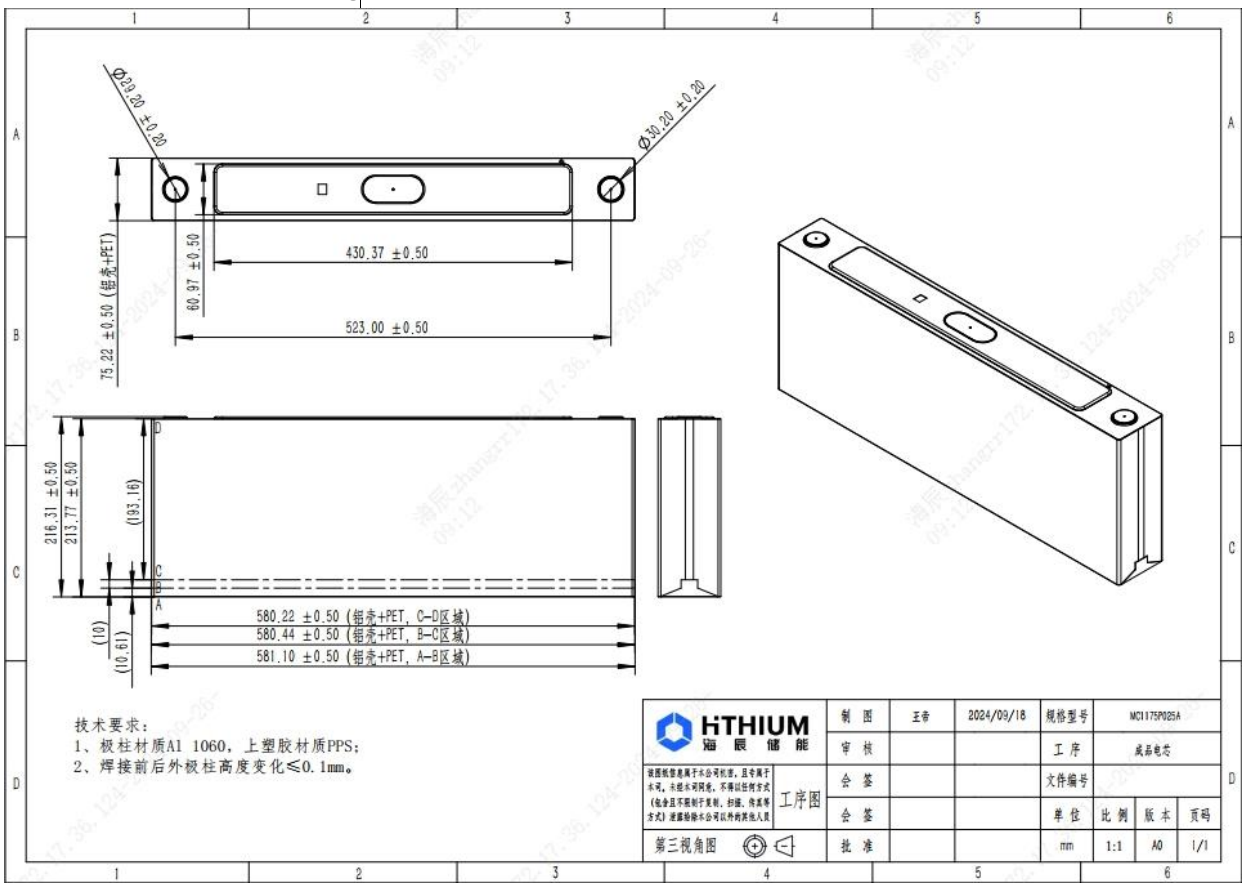
4) 产品的售后质保，均以技术规格书中关于产品使用、测试等的条件、方法、要求等规定为前提条件；

The product warranty is predicated on the conditions, methods, and requirements for product use and testing as stipulated in the technical specification.

5) 产品的故障等问题的判断均以技术规格书为准，所有产品的故障等问题的结论需经双方均认可后方可生效。

The determination of product malfunctions and other issues shall be governed by the technical specification. All conclusions regarding product malfunctions and other issues shall become effective only upon mutual consent of both parties.

10. 电芯图纸 Cell 2D Drawing



项目 Items	标准 Standard	公差 Tolerance
高度（不含极柱） Height (without terminal)	213.77mm（含绝缘膜、含外垫片） 213.77mm（with insulating film, with outer gasket）	±0.50mm
高度（含极柱） Height (with terminal)	216.31mm（含绝缘膜） 216.31mm（with insulation film）	±0.50mm
厚度 Thickness	75.22mm（含绝缘膜） 75.22mm（with insulation film）	±0.50mm
宽度 Width	581.10mm（A-B，含绝缘膜） 581.10mm（A-B section, with insulation film）	±0.50mm
	580.22mm（C-D，含绝缘膜） 580.22mm（C-D section, with insulation film）	±0.50mm
极柱焊接区域 Terminal welding area	Φ27.00mm（不含极柱外塑胶） Φ27.00mm (without the plastic enclosure of terminal)	±0.20mm

注：厚度在大面预紧力为（3000±200）N 条件下测试

Note: The cell dimension test result is got under the preload force on the large surface of cell, the assembly force is (3000±200)N.

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