

	Rev: 1.0
型号: Product Specification of 50 Ah Cell 50Ah 产品规格书	

# 50Ah 产品规格书

## Product Specification of 50Ah Cell

电芯容量 Cell Capacity: 50Ah

产品设计准备	产品设计审批	销售审批	项目工程审批	品质保证审批	产品经理审批
Yanan Zhou	Weiwei Zha				

	签名	日期
客 户 确 认		
	客户代码:	
	公司印章:	

## 修改记录

### AMENDMENT RECORDS

Rev.	ECN No.	Effective Date	Author	Description of Revision
1.0			Yanan Zhou	New release

## 0 术语定义 Definitions

术语 Terms	定义 Definition
产品 Product	本技术协议中的“产品”是指超钠生产的 50Ah 2.9V 钠离子电池。 Means the 50Ah 2.9V rechargeable sodium-ion battery produced by Horizontal na.
客户 Customer	指《超钠产品销售合同》中的买方。 Means the customer in the 《Horizontal na product sales contract》
超钠 Horizontal na	湖州超钠新能源科技有限公司。 Means Hu zhou Horizontal na energy Technology Co., Ltd
周围环境温度 Ambient Temperature	电池所处的周围环境温度。 Means the ambient temperature of the environment which the products are exposed to.
电池管理系统 Battery Management System(BMS)	客户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技术协议的规定。 Means an active tracking and control system to be developed and implemented by Horizontal na to monitor and record the operating parameters, including but not limited to voltage, current and temperature, of each product in its entire service life, and to control the operation of each product to ensure a safe operation of product.
电芯温度 Cell Temperature	由接入电池的温度传感器测量的电芯大面温度。 Means the temperature of the cell measured by the temperature sensor connected to the main part of cell.
新电池状态 Fresh State	是指客户收货的7天以内的状态(仅限国内运输)。 Means the state within 7 days after customer received the product (domestic only)
充电倍率 C-Rate	充电电流与电池管理系统多次测量的电池的容量值的比率。例如：电池容量为50Ah，充电电流为25A时，则充电倍率为0.5C。 The ratio of charging current to the capacity of batteries measured repeatedly by BMS. For example, when the battery capacity is 50Ah and the charging current is 25A, the charging rate is 0.5C.
放电倍率 D-Rate	放电电流与电池管理系统多次测量的电池的容量值的比率。例如：电池容量为50Ah，放电电流为25A时，则放电倍率为0.5C； The ratio of discharging current to the capacity of batteries measured repeatedly by BMS. For example, when the battery capacity is 50Ah and the discharging Current is 25A, the discharging rate is 0.5C.
循环 Cycle	电池按规定的充放标准充放一次为一个循环。充电可以由一些部分充电组合在一起形成。放电可以由一些部分放电组合在一起形成。 Means a state when a total of charge and discharge according to rules from a cell as recorded by BMS and it may consist of a summation of a few segments of partial charge and discharges.
生产日期 Production date	电池的制造日期，每个相关的电池的顶端刻码上标示的明确的日期代码为制造日期。 Means the production date of the cell marking on the top of the cell by date code.
标准充电 Standard Charge	本技术协议第 2.2.3 条所述的充电模式。 Means the default charging method set out in paragraph 2.2.3 titled “Standard Charging method”.
标准放电 Standard Discharge	符合本技术协议第 2.3.1 条所述的放电模式。 Means the default discharging method as set out in paragraph 2.3.1 titled “Standard Discharging method”.
温度上升 Temperature Rise	在本技术协议规定的条件如充电过程或者放电过程中电芯温度的升高。 Means the temperature of the cell rises during the conditions specified in this document, such as the charging process or the discharging process.

术语 Terms	定义 Definition
充电状态(SOC) State of Charge	<p>电池实际充电量与满充电量的比值，表征电池的充电状态。100%SOC 的充电状态表示电池满充到3.9V，0%SOC 的充电状态表示电池完全放电到1.5V。</p> <p>Means the ratio of the actual battery charge to the full charge, characterizing the state of charge of the battery. The state of charge of 100% SOC indicates that the battery is fully charged to 3.9V, and the state of charge of 0% SOC indicates that the battery is completely discharged to 1.5V.</p>
测量单位 Units of Measure	“V” (Volt)伏特(V)，电压单位
	“A” (Ampere)安培(A)，电流单位“A” “W” (Watt)瓦特(W)，功率单位“W”
	“Ah” (Ampere-Hour)安培-小时(Ah)，负荷单位“Ah” “Wh” (Watt-Hour)瓦特-小时(Wh)，能量单位“Wh”
	“Ω” (Ohm) 欧姆(Ω)，电阻单位“Ω” “mΩ” (MilliOhm) 毫欧姆(mΩ)，电阻单位“mΩ”
	“°C” (Degree Celsius) 摄氏度(°C)，温度单位“°C” “mm” (Millimeter) 毫米(mm)，长度单位“mm” “s” (Second) 秒(s)，时间单位“s”
	“Hz” (Hertz)赫兹(Hz)，频率单位“Hz”

### 1. 适用范围 Scope of application

本技术协议详细描述了超钠生产的2.9V 50Ah钠离子电池的产品性能指标以及产品使用条件及风险警示。

The purpose of this document is to specify the specifications of 50Ah 2.9V sodium-ion cells supplied by Horizontal na energy.

### 2. 产品电性能指标 Electrical specification

#### 2.1. 概要 General

No.	参数 Parameter	产品规格 Specification	条件 Condition
2.1.1	标准容量 Typical capacity	50Ah	参考 2.2 与 2.3 标准充放电模式测试 Refer to 2.2&2.3 standard charge and discharge procedure
2.1.2	平台电压 Platform voltage	2.9V	参考 2.2 与 2.3 标准充放电模式测试 Refer to 2.2&2.3 standard charge and discharge procedure
2.1.3	工作电压 Operating voltage	1.5~3.9V	N.A
2.1.4	电池内阻 Impedance (1KHz)	0.60±0.05mΩ	新电池状态(50% SOC) Fresh cell(50% SOC)
2.1.5	出货状态 Shipping status	50% SOC	N.A
2.1.6	月自放电 Residual capacity loss	≤3.5%/月 Per month ≤3.5%	出货三个月以后的电芯，标准充电到 50% SOC，25±2°C 储存 Fresh cell after 3month, 50% SOC, 25±2°C storage
2.1.7	工作温度(充电) Operating temperature (charging)	0~60°C	参考第 2.2 节 Reference to paragraph 2.2

No.	参数 Parameter	产品规格 Specification	条件 Condition
2.1.8	工作温度(放电) Operating temperature (discharge)	-40~60°C	参考第 2.3 节 Reference to paragraph 2.3
2.1.9	电池重量 Cell Weight	1.12±0.05Kg	N.A.
2.1.10	存储温度 Storage Temp.	-30~60°C	存储环境湿度≤85%ROH, 无凝露 Storage ambient humidity < 85% ROH, no condensation
2.1.11	电池尺寸 Typical dimension (W*H*T)	宽度(Width): 148±0.5mm 高度(Height): 102±0.5mm 厚度(Thickness): 39.5±0.5mm	300±20Kgf 压力下, 新鲜电池 (详见本技术协议第 8 条) Thickness with compression force (300±20 Kgf), Height with Terminal, BOL(Reference to item 8)
2.1.12	静置SOC Rest SOC	≥5%	无负载或充电时的 SOC 区间 SOC interval without load or charging
2.1.13	应用海拔 Altitude	≤2000m	N.A.
2.1.14	可充放电次数 Cycle performance	≥4000Cycles	25±2°C 初始夹紧力300Kgf, 1.8-3.8V 25±2°C, cycle test by 1.8-3.8V charge and discharge method under 300±20Kgf preload
2.1.15	存储衰减 Storage fading	≤5%	25±2°C 初始夹紧力300Kgf, 标准充电 至 100%SOC 存储 6 个月 25±2°C, standard charging to 100% SOC storage under 300±20Kgf preload for six month

## 2.2. 充电模式/参数 Charging/Parameter

No.	参数 Parameter	产品规格 Specification	条件 Condition
2.2.1	标准充电电流 Standard charge current	0.5C	25±2°C
2.2.2	最大持续充电电流 Maximum charge current(continuous)	1C	25±2°C
2.2.3	标准充电电压 Standard charge voltage	单体电池最大 3.9V Cell max voltage 3.9V	25±2°C
2.2.4	标准充电模式 Standard charge method	0.5C恒流恒压充电至 3.9V, 截止电流0.05C, 静置30min 0.5C constant current constant voltage charge to 3.9V, cut-off current 0.05C, rest 30min.	
2.2.5	标准充电温度 Standard charge temperature	25±2°C	电芯温度 Cell Temperature
2.2.6	绝对充电温度 (电芯温度) Absolute charging temperature (Cell Temperature)	0~60°C	无论电芯处在何种充电模式, 一旦发现电芯温度超过绝对充电温度范围即停止充电。 No matter what charge mode the battery is in, stop charging once the cell temperature exceeds absolute charge temperature range.
2.2.7	绝对充电电压 Absolute charging voltage	最大 3.9V Max3.9V	无论电芯处在何种充电模式, 一旦发现电芯电压超过绝对充电电压范围即停止充电。 No matter what charge mode the battery is in, stop charging once the cell voltage exceeds absolute charge voltage.

### 2.2.7 其他充电条件(模式) C-Rate Other charge Condition (C-Rate)

#### 2.2.7.1 充电 Charge

电芯温度/°C Cell Temperature/°C		0	5	10	15	20	25	45	50	55	60
最大充电倍率(C) Max charge Rate(C)	0%~100%SOC	0.1	0.5	0.5	0.5	1.0	1.0	0.5	0.25	0.1	0.1

## 2.3. 放电模式/参数 Discharging/Parameter

No.	参数 Parameter	产品规格 Specification	条件 Condition
2.3.1	标准放电电流 Standard discharge current	0.5C	25±2°C
2.3.2	最大持续放电电流 Maximum discharge current (continuous)	2C	25±2°C
2.3.3	放电截止电压 Discharge cut-off voltage	1.5V	N.A.

2.3.4	标准放电温度 Standard discharge temperature	25±2°C	电芯温度 Cell temperature
2.3.5	绝对放电温度 Absolute discharge temperature	-40~60°C	无论电芯处在持续放电模式或脉冲放电模式，若电芯温度超过绝对放电温度，则停止放电 Stop discharging once cell temperature is outside this range regardless of whether continuous or pulse current is adopted.

#### 2.2.6 其他放电条件(模式) D-Rate Other discharge Condition (D-Rate)

电芯温度/°C Cell Temperature/°C		-40	-20	0	5	10	15	20	25	45	50	55	60
最大放电倍率 (C) Max discharge rate (C)	0%~<10 0%SOC	0.5	0.5	1.0	1.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0	1.0

#### 2.4. 高低温容量 High/Low temperature capacity

No.	参数 Parameter	产品规格 Specification	条件 Condition
2.4.1	60°C 的容量 Capacity@60°C	≥50Ah	新电池状态, 60°C, 0.5C, 1.5V~3.9V Fresh cell, 60°C, 0.5C, 1.5V~3.9V
2.4.2	-20°C 的容量 Capacity@-20°C	≥40Ah	新电池状态, -20°C, 0.5C, 1.5V~3.9V Fresh cell, -20°C, 0.5C, 1.5V~3.9V
2.4.3	-40°C 的容量 Capacity@-40°C	≥38Ah	新电池状态, -40°C, 0.5C, 1.5V~3.9V Fresh cell, -40°C, 0.5C, 1.5V~3.9V

#### 2.5 电芯温升 Cell temperature rise

本规格书中温升是指放电后的电池表面温度减去放电前的电池表面温度。电池温升的测量应在环境温度较为稳定且空间足够大的房间里进行。每个电池温度测量应选取经过校正的可以记录时间数据的温度感应器。

The temperature rise refers to the surface temperature of the cell after discharge minus the surface temperature of the cell before discharge. The measurement of the temperature rise of the cell should be carried out in a room where the ambient temperature is relatively stable and the space is large enough. For each cell temperature measurement, a calibrated temperature sensor that records time data should be selected.

No.	参数 Parameter	产品规格 Specification	条件 Condition
2.5.1	持续放电温升 Continuous discharge temperature rise	≤10°C	电池以标准放电模式进行放电 The cell is discharged in the standard discharge method.

#### 2.6. 安全与可靠性 Safety and reliability

2.6.1 使用条件说明：安全测试、寿命测试、系统成组设计需要施加预紧力，新鲜电芯的预紧力范围为500N~5000N，建议的预紧力控制公差为±200N。

Description of service conditions: safety test、cycle life test and pack design need to add preload force, and the range of preload force of fresh cell is 500N~5000N, the recommended preload tolerance is ±200N.



### 3. 产品寿命终止管理 Product end of life management

3.1. 电池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池的内阻和容量。内阻以及容量的测量方法和计算方法需要客户和超钠共同讨论和双方同意。当使用中的电池的内阻超过这个电池最初内阻的 200% 或容量小于等于标称容量 60% (25°C)，应停止使用电池。违反该项要求，将免除超钠依据产品销售协议以及本技术协议所应承担的产品质量保证责任。

This cell is designed to service with a finite life time. The customer shall develop and implement an active tracking system to monitor and record impedance of each Product in its entire service life. Horizontal na and its customer shall come into agreement about internal resistance and capacity measurement methods, Horizontal na and/or its customer shall stop using any of the products when its resistance exceeds 200% of its internal resistance or it capacity fading to 60% of typical capacity @25C. Failure to comply with this requirement shall render Horizontal na's warranties under the Contract inapplicable, thereby releasing Horizontal na from any liability in connection therewith.

3.2. 电芯寿命判定条件参考 2.1.14 循环寿命。

The cell life determination conditions can refer to paragraph 2.1.14 cycle life.

### 4. 应用条件 Application conditions

客户应当确保严格遵守以下与电池相关的应用条件：

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

4.1. 客户应配置电池管理系统，严密监控、管理与保护每个电池。电芯初次使用必须进行小电流满充满放以激活，以保证后续使用中容量的充分发挥。

Customer shall procure that each product shall be used under the strict monitor, control and protection by the BMS incorporated by Horizontal na. When the cell is first used, it must be fully charged and discharged for activating it and giving fully capacity.

4.2. 客户应向超钠提供电池管理系统详细的设计方案、系统特点、框架、系统数据、格式等相关信息，以供超钠对该系统进行设计评估，并建立电池管理档案。

Customer shall provide detailed information of the BMS, including but not limited to its design, features, setting, and data file format to Horizontal na for design review and record keeping.

4.3. 未经超钠同意，客户不可擅自修改或者改变电池管理系统的设计和框架，以免影响电池的使用性能。

Once the detailed information of the BMS has been reviewed and agreed by Horizontal na, customer shall not modify or change the design, features, setting or data file format of the BMS without the prior written agreement by Horizontal na.

4.4. 客户应保存完整的电池运转的监测数据，用作产品质量责任划分的参考。不具备完整的电池系统使用期限内的监测数据的，超钠不承担产品质量保证责任。

Customer shall keep relevant records of the BMS monitoring data throughout the entire service life of each product, including keeping record of number of occurrence of rush charge, which could be used in the determination and judgment of any product warranty and liability claim entitlement. No warranty or liability claim should be considered without BMS diagnosis records (at a regular basis, esp. during maintenance) of the relevant product.

4.5. 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.	参数 Parameter	产品规格 Specification	保护动作 Action
4.5.1	充电终止 Stop charging	3.9V	电池的电压达到 3.9V 时 , BMS 申请终止充电 Stop charging when cell voltage reaches 3.9 V
4.5.2	第一级过充电保护 First overcharge protection	≥3.95V	当电池电压达到 3.95V , BMS 强制终止充电 Stop charging when cell voltage reaches 3.95 V
4.5.3	第二级过充电保护 Second overcharge protection	≥4.0V	当电池电压达到 4.0V , BMS 强制终止充电 , 且 BMS 应锁定直到技术人员解决问题 When the battery voltage reaches 4.0V, the BMS is forced to terminate charging, and the BMS should be locked until technicians solve the problem.
4.5.4	放电终止 Stop discharge	最小1.5V Minimum 1.5V	当电池的电压到达 1.5V, BMS 申请终止放电 Minimize the discharging current when cell voltage reaches 1.5 V.
4.5.5	第一级过放保护 First over discharge protection	最小1.4V Minimum 1.4V	当电池的电压到达1.4V, BMS 强制终止放电 Stop discharging when cell voltage reaches1.4V
4.5.6	短路保护 Short circuit protection	不允许短路 No short circuit allowed	发生短路时, 由过流保护装置断开电池(电池) When a short circuit occurs, the battery (cell) is disconnected by the overcurrent protection device
4.5.7	过流保护 Over current protection	参考第 2.2 和 2.3条 See paragraph 2.2&2.3	电池管理系统控制充放电电流符合规格 Control discharge current by BMS to values within specification
4.5.8	过热保护 Over temperature protection	参考第 2.2 和 2.3条 See paragraph 2.2&2.3	当温度超过本技术协议规定时, 终止充电/放电 Stop charging and discharging when temperature exceeds specification
4.5.10	充电时间过长保护 Charging time out limit	充电时间在8小时内 Charging completes within 8 hours	充电时间长于 8 小时, 则终止充电 Stop charging if changing time exceeds specification

备注: 以上 No.4.5.2、4.5.3、4.5.5为警示条款, 提请客户注意: 当电池达到上述任何一项条款描述的指标和参数状态时, 意味着电池已超出本技术协议规定的使用条件, 客户需依“保护动作”及本技术协议其他相关规定对电池采取保护措施, 同时, 超钠声明对上述使用状态的电池质量不承担任何保证责任, 并对因此而导致的客户及第三方的任何损失不予赔偿。

Note: The above No. 4.5.2, 4.5.3, 4.5.5, are the warning clause, draw the attention of customers: When the battery reaches any of the terms described in the above, means that the battery has been used beyond

the specifications, the customer shall take protective measures on the battery in accordance with the "protection action" and other relevant provisions of this specification. At the same time, the Horizontal na shall not take any responsibility for the damage in connection therewith.

4.6. 若预计将电池存放 30 天以上的, 应定期 (建议每隔 3 个月) 将 SOC 调整为50%左右。

When the Products are intended to be stored for a prolonged period of time (more than one month), the SOC of cells should be adjusted to around 50% periodically(every three months is recommended).

4.7. 电池避免在本技术协议禁止的低温条件下充电(包括标准充电, 快充, 紧急情况充电), 否则可能出现意外的容量降低现象。电池管理系统应依照最小的充电温度进行控制。禁止在低于本技术协议规定的温度条件下充电, 否则超钠不承担质量保证责任。

Batteries should avoid charging at low temperatures prohibited by this Technical Agreement (including standard charging, fast charging and emergency charging), otherwise accidental capacity reduction may occur. Battery management system should be controlled according to the minimum charging temperature. It is forbidden to charge under the temperature stipulated in this technical agreement. Otherwise, Horizontal na will not undertake the responsibility of quality assurance.

4.8. 禁止不同 P/N 料号电芯在同一电池系统中混用, 否则, 超钠不承担质量保证责任。

It is forbidden to mix different P/N batteries in the same battery system, otherwise, Horizontal na will not be responsible for quality assurance.

## 5. 安全防范 Safety Precautions

5.1. 禁止将电池浸入水中。

Do not immerse cells into water.

5.2. 禁止将电池投入火中或长时间暴露在超过本技术协议第 2.1.7 条, 第 2.1.8 条和第 2.1.10 条规定的温度条件的高温环境中, 否则可能会导致火灾。在任何正常的充放电使用情况下, 电芯温度不能超过 60°C, 如果电芯温度超过 60°C, 电池管理系统需关闭电池, 停止电池运行。

Do not drop cells into fire or expose them to any high temperature environment exceeding operation temperature as set out in paragraphs 2.1.7、2.1.8&2.1.10, otherwise it may cause fire. At all use time, cell temperature should not exceed 60 °C, shut down system by BMS when it occurs.

5.3. 禁止电池正负极短路, 否则强电流和高温可能导致人身伤害或者火灾。在电池系统组装和连接时, 应有足够的安全保护, 以避免短路。

Do not short circuit cell terminals, otherwise high current and temperature may cause body injury or fire hazards. Metallic cell terminals exposed from plastic packaging and ample safety precautions should be implemented to avoid short circuiting them during system integration or connection

5.4. 严格按照标示和说明连接电池正负极, 禁止反向充电。

Always connect cell terminals according to its label(s) in right polarity. Reverse charging is strictly prohibited.

5.5. 禁止超过最大功率进行电池充电, 和禁止电池过充。否则, 可能引起电池过热和火灾事故的发生。

It is extremely dangerous to overcharge a cell which may cause overheating and fire hazards. Multiple level of fail-safe overcharge protection should be implemented by hardware and software.

5.6. 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池的任何部件或电池所含物质。

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.

5.7. 尽力保护电池，使其免受机械震动、碰撞及压力冲击，否则电池内部可能短路，产生高温和火灾。

Protect cells from mechanical shock, impact and pressure. Internal electrical circuit may short circuit to generate high temperature and fire hazards.

5.8. 电池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，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池充电可能会引起电池过热或发生火灾。当发生以上现象时，电池管理系统应该通过自动锁定功能，禁止后续的充电，并提醒使用者将装载有该电池的交通工具退回到经销商处进行系统维护。该电池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 cells 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 system 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 be given to the user to return the vehicle to dealer for servicing. Subsequent charging should only be resumed after the system has been thoroughly checked by qualified technician who can identify and fix root cause attributed to the “improper charge termination”.

5.9. 在进行滥用测试实验时如操作不当可能会引起电池起火或者爆炸。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。

Battery fire or explosion may be caused by improper operation during abuse test. 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.

## 6. 免责声明 Disclaimer

6.1. 如果由于产品需求单位不按本说明书中的规定进行使用，造成社会性影响，并对超钠的声誉造成影响，超钠将会追究产品需求单位的责任。根据对超钠造成的影响程度，产品需求单位需向超钠提供赔偿。

If the product demand unit does not use the product according to the provisions of this specification, causing social impact and affecting the reputation of Horizontal na, Horizontal na will investigate the responsibility of the product demand unit. According to the degree of impact on Horizontal na, the product demander should provide compensation to Horizontal na.

6.2. 超钠保留对产品的规格及性能参数修改的权利。买方在订购超钠产品前，需要与超钠提前确认产品的最新状态。

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

6.3. 英文规格释义仅供参考，请以中文版技术规格要求为准。

English specifications are for reference only. Please refer to the technical specifications of the Chinese version.

## 7. 风险警告 Risk Warning

### 7.1. 危险类型: Types of Hazards

客户知悉在电池使用和操作过程中存在以下潜在的危险:

Customer acknowledges the following potential hazards in connection with the usage and handling of the Products:

7.2.1. 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。

Working with battery can expose the handler to chemical, shock and/or 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 50 V.

7.2.2. 存在来自电池中的电解液的化学风险。

Cells expose its handler to chemical hazards associated with the electrolyte used in the cell.

7.2.3. 在操作电池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。

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.