classification: ☐**Top Secret** ☐**Secret** ☑ **Confidential**

Cell Specification Confirmation Sheet of Ampace Technology Limited

Ampace 电芯产品规格书

Product Part Number / 产品编号 : GC-CST-21700B-103L/H

Model Name / 产品型号: JP50P1

Prepared by PD	Approved by CRD	Approved by PRJ	Approved by QA	Approved by PD
Alex Wu				

Customer Confirmation	**Authorized Signatory**		**Date**
	Signature	**Print Name**	
	Company Name Of Customer:		
	Company Stamp Of Customer:		

Document revision resume

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1. Scope/适用范围:

The purpose of this document ("Document") is to specify the specifications of the Lithium ion rechargeable battery cells with AMPACE Part Number GC-CST-21700B-103L/H ("Product" or "Cell") to be supplied by AMPACE to Customer under Customer's purchase order and AMPACE's confirmation relevant to the Product. For the avoidance of doubt, the specifications specified herein do not apply to any Host Device, apparatus, instrument, equipment or hardware device containing Product or Cell ("Host Device").

本产品规格书描述了 AMPACE 依据客户采购订单生产的可充电锂离子电池芯的产品性能指标，AMPACE 产品代码号 GC-CST-21700B-103L/H ("产品" 或 "电芯")。为避免疑问，本产品规格书不适用于任何包含该产品或电芯的主机设备、仪器、仪表、器件、硬件设备等 ("主机")。

For civil use only, and shall not be used for weapon or military purpose.

仅供民用，不得用于武器或者军事目的。

2. Model Name/型号:

JP50P1

3. Standard Environmental Test Conditions/标准环境测试条件:

3.1 Unless otherwise specified, all tests stated in this Product Specification are conducted at below conditions:除非特别指定，本产品规格书所有的测试遵循如下条件:

Temperature/温度: 25±2℃ ("Temperature Condition"/"温度条件")

Humidity/湿度: 65±20% RH ("Humidity Condition"/"湿度条件")

3.2 In this product specification, all items marked with "*" apply only to products that are unused and within 30 days from the manufacturing date at AMPACE. If the product has been used by the customer or stored for more than 30 days, it may exhibit performance below the standard specifications. The customer agrees and accepts that the product does not constitute a non-conformance to the specifications

在本产品规格书中，所有标有"*"的项目是指仅适用于"未使用的且从AMPACE制造日起30天内的产品"。如果产品已被客户使用或存储时间超过30天，可能表现出低于标准规格，客户同意并接受产品不构成不符合规格。

4. Specifications/规格:

No.	Items/项目	Specifications/规格
4.1	*Standard discharge capacity /标称容量	Mean 5000mAh Minimum 4900mAh - Charge: 0.5C(2.5A), 4.2V, 0.02C(100mA) cut-off-@ 25±2℃ - Discharge: 0.2C(1A), 2.5V cut-off @ 25±2℃ /25±2℃下恒流 0.5C(2.5A)充电到 4.2V，恒压至 0.02C(100mA)；然后以 0.2C(1A)放电到 2.5V，放电均值容量≥5000mAh，放电最小容量≥4900mAh
4.2	Nominal voltage /标称电压	3.58V
4.3	Standard charge /标准充电	0.5C(2.5A) CC (constant current) charge to 4.20V, then CV(constant voltage) charge till charge current decline to 0.02C(100mA) /0.5C(2.5A)恒流充电至 4.20V, 然后恒压充电直到充电电流下降到≤0.02C(100mA)
4.4	Standard discharge /标准放电	0.2C(1A) CC (constant current) discharge to 2.5V 0.2C(1A)恒流放电至2.5V
4.5	Operating Voltage/工作电压	Cell Surface Temperature＞0℃, 2.5~4.2V 电芯温度＞0℃，2.5~4.2V
		Cell Surface Temperature≤0℃, 2.5~4.2V

		电芯温度≤0℃，2.5~4.2V
4.6	Operating temperature (Surface) /工作电芯表面温度	Charge: -10℃ ~ 60℃ (recommended recharge release < 45℃) Discharge: -20℃ ~ 80℃ (温度保护点/ Temperature protection threshold) (must re-discharge release < 60℃) /充电温度区间：-10℃ ~ 60℃(起充温度需要< 45℃)， 放电温度区间：-20℃ ~ 80℃(起放温度需要< 60℃)
4.7	*Initial Impedance /初始内阻	Max 4 mΩ -Internal resistance measured at AC 1KHz after charge to shipment voltage /出货状态电压下，1KHz 交流测试内阻≤4 mΩ
4.8	Cell Weight /电芯重量	72.0g Max /重量最大 72.0g
4.9	Cell Dimension(with tube) /电芯尺寸（含套膜）	Height : Max 70.45mm Diameter : Max 21.35mm /高度最大 70.45mm，直径最大 21.35mm
4.10	Max. continuous discharge (Surface temperature) /最大持续放电电流（电芯表面温度）	40A (Not trigger 80℃ temperature cut) /40A(不触发80℃ 温度截止) 60A (With 80℃ temperature cut) /60A(80℃ 温度截止)
4.11	Max pulse discharge /最大脉冲放电	180A 5s @ 25±2℃
4.12	*Cycle life /循环寿命	25℃/15A/30A: Capacity Retention≥60% @ after 600 cycles -Charge : 15A CC to 4.2V, CV to 250mA @ 25±2℃ -Discharge: 30A , 2.5V cut-off ; (if the temperature＞80℃, then cool down to 50℃, 30A continuous DC to 2.5V) @ 25±2℃ -Rest time： ≥30min after charge and ≥30min after discharge /25±2℃下15A恒流充电至4.2V，恒压充电至250mA，30A恒流放电至2.5V(若放电温度＞80℃，则降温至50℃，30A继续放电，按此条件，直至电压<2.5V)，循环600圈后容量保持率≥60%；充电后静置≥30min，放电后静置≥30min
		25℃/15A/40A: Capacity Retention≥60% @ after 400 cycles -Charge : 15A CC to 4.2V, CV to 250mA @ 25±2℃ -Discharge: 40A , 2.5V cut-off ; (if the temperature＞80℃, then cool down to 50℃, 40A continuous DC to2.5V) @ 25±2℃ -Rest time： ≥30min after charge and ≥30min after discharge /25±2℃下15A恒流充电至4.2V，恒压充电至250mA，40A恒流放电至2.5V(若放电温度＞80℃，则降温至50℃，40A继续放电，按此条件，直至电压<2.5V)，循环400圈后容量保持率≥60%；充电后静置≥30min，放电后静置≥30min
4.13	*Capacity Retention characteristics /容量保持特性	Capacity retention rate (100%SOC 60℃ 30 days storage) ≥ 80% Capacity recovery rate (100%SOC 60℃ 30 days storage) ≥ 90%

		(≥ 90% of the standard discharge capacity @ 25±2℃) -Charge : Standard Charge @ 25±2℃ -Storage : 30 days @ 60±3℃ -Discharge : 0.2C(1A), 2.5V cut-off @ 25±2℃ /25±2℃按照标准充电模式满充后，60℃存储30D，使用0.2C(1A)放电至2.5V，残余容量保持率≥ 80%，可恢复容量保持率≥ 90%
4.14	* Self-discharge 自放电	Capacity retention rate > > 98% of Cmin 25±2℃, After the charging specified in the Specifications, stored the cells for 28 days, then measured the capacity with 0.2Cmin till 2.50V. 残余容量保持率> 98% Cmin 25±2℃下指定方式充电后，常温存储28天，再以0.2Cmin放电到2.50V测试残余容量
4.15	Storage Condition /存贮条件	Temperature: 0°C~60°C within 1 month; 0°C~45°C within 3 months; 0°C~25°C within 12 months Humidity: ≤75%RH /温度：0°C~60°C：出货状态下存储 1 个月内；0°C~45°C，存储 3 个月内；0°C~25°C：存储 12 个月内 湿度：≤75%RH

5. Cell Characteristics/电芯性能

5.1 Electrical Tests/电性能测试:

5.1.1 Temperature dependence of maximum charging Current/不同温度区间下最大充电电流

Cell Surface Temperature Range /电芯表面温度	Charge Method/充电方法
-10℃≤T＜0℃	2A CC to 4.1V
0℃≤T＜10℃	2.5A CC to 4.2V, CV to 250mA
10℃≤T＜25℃	8.0A CC to 4.2V, CV to 250mA
25℃≤T≤60℃	15A CC to 4.2V, CV to 250mA

5.1.2 Temperature dependence of discharge capacity/放电容量随温度变化特性

Capacity comparison at each temperature, measured with discharge constant current 30A and 2.5V cut-off after the standard charge is as follows.

/以标准充电模式充电后，分别在不同温度下以 30A 电流放电至 2.5V，对比不同温度下放电容量

Item/项目	Discharge temperature/放电温度				
Temperature/温度	-20℃	-10℃	0℃	25℃	45℃
Relative capacity/相对容量	85%	90%	92%	100%	95%

Note: If charge temperature and discharge temperature is not the same, the interval for temperature change is 3 hours. Percentage index of the discharge at 25±2℃ at 30A is 100%.

备注：如果充放电起始温度不同，那么静置温度变化的间隔是 3 小时。以 25±2℃下 30A 放电容量作为 100%基准

5.1.3 Discharge rate capabilities/倍率放电能力

Discharge capacity is measured with the various currents in below table and 2.5V cut-off after the standard charge.

按标准充电后以如下表放电至 2.5V，对比放电容量

Item/项目	Discharge current / 放电电流			
Current/电流	1A	20A	30A	40A
Relative capacity/相对容量	100%	90%	92%	92%

Note: Percentage index of the discharge at 25±2℃ at 1A is 100%.

备注: 以 25±2℃下 1A 放电容量作为 100%基准

5.1.4 Status of the cell as of ex-factory/电芯出厂状态

The cell should be shipped in 3.40V to 3.55V

电芯出货电压应该在 3.40V 至 3.55V 之间

5.2 Mechanical Abuse Tests/机械滥用测试:

No.	Items/项目	Test Method and Condition/测试方法和条件	Criteria/判定标准
5.2.1	Drop Test 跌落测试	Each fully charged Cell is dropped three times from a height of 1.0m onto a concrete floor. The Cells or batteries are dropped so as to obtain impacts in random orientations. 将满充电后的电芯从 1.0m 高度自由跌落至水泥地面上 3 次。电芯跌落时应保证在每个随机方向均受到冲击。	No fire /不起火 No explosion /不爆炸
5.2.2	Vibration Test 振动测试	A Cell is to be subjected to simple harmonic motion with amplitude of 0.8mm (0.03inch) [1.6mm (0.06inch) total maximum excursion], The frequency is to be varied at the rate of 1 hertz per minute between10 and55 hertz, and return in not less than 90 or more than 100 minutes. The Cell is to be tested in three mutually perpendicular directions. For a Cell that has only two axes of symmetry, the Cell is to be tested perpendicular to each axis. 在电芯上施加振幅为 0.8mm 的简谐振动，最大行程为 1.6mm。振动频率从 10Hz~55Hz 间以 1Hz/min 的速率变化。频率变化范围为从 10Hz 升至 55Hz，然后再从 55Hz 返回到 10Hz 。每个安装位置（振动方向）上的振动应在 90±5min 内完成。按照相互垂直的三个方向进行振动试验。对于只有 2 个对称轴的电芯沿着轴向和径向两个方向进行振动试验。	No fire /不起火 No explosion /不爆炸
5.2.3	Shock Test 冲击测试	The Cell is to be secured to the testing machine by means of a rigid mount which supports all mounting surfaces of the Cell. Each Cell shall be subjected to a total of three shocks of equal magnitude. The shocks are to be applied in each of three mutually perpendicular directions unless it has only two axes of symmetry in which case only two directions shall be tested. Each shock is to be applied in a direction normal to the face of the Cell. For each shock the Cell is to be accelerated in such a manner that during the initial 3milliseconds the minimum average acceleration is 75g (where g is the local acceleration due to gravity).The peak acceleration shall be between 125and175g.Cells shall be tested at a temperature of 20±5°C (68±9°F). 电芯通过刚性的方法固定在测试机器上，该方法应能支撑电芯。所有固定面。电芯要承受等值的三次冲击。冲击应在相互垂直的三个方向上实施，至少有一个方向应当垂直于水平面。电芯承受的加速度应满足如下方式：在最初的 3ms 内，最小平均加速度为 75g，峰值加速度在 125g 和 175g 之间。电芯应在 20±5°C 的环境温度下进行测试。.	No fire /不起火 No explosion /不爆炸

5.3 Electrical Abuse Tests/电滥用测试:

No.	Items	Test Method and Condition	Criteria
5.3.1	Forced-Discharge 强制放电测试	A cell in a multi-cell application shall withstand polarity reversal without causing fire or explosion. A discharged cell is subjected to a reverse charge at 1 Cmin for 90min. 多电芯应用中的电芯应能抵抗极性反转而不起火和爆炸。完全放电的电芯以 1 Cmin 反向充电 90min。	No fire /不起火 No explosion /不爆炸
5.3.2	External Short Test 外短路测试	Each test sample Cell, in turn, is to be short-circuited by connecting the positive and negative terminals of the Cell with a circuit load having a resistance load of 80±20mohm.The Cell is to discharge until a fire or explosion is obtained, or until it has reached a completely discharged state of less than 0.2volts and the Cell case temperature has returned to ±10°C(18°F) of ambient temperature， tests are to be conducted at 20±5°C(68±9°F) and at 55±5°C (131±9°F) 每个测试样品电芯，使用一根阻抗为 80±20mohm 的导线将电芯正负极端子链接起来。电芯放电直到起火或爆炸，或电压低于 0.2V 且电芯表面温度达到室温±10°C 时，试验结束。测试应在 20±5°C 和 55±5°C 温度下进行。	No fire /不起火 No explosion /不爆炸

5.4 Visual inspection/外观检查:

No such defects as crack, and leakage is allowed, which may adversely affect the performance & safety of cell.

不允许有任何影响电芯性能和安全性的外观缺陷，如裂缝、泄漏等。

5.5 Warranty period/质保期:

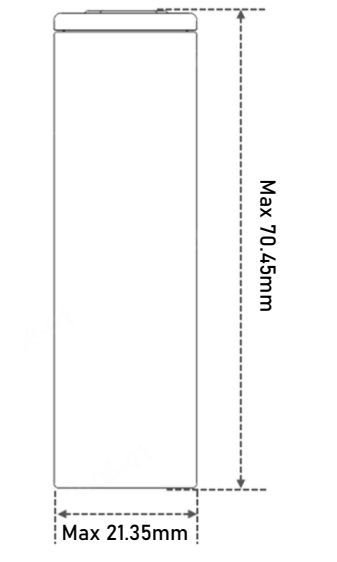
The warranty period of Cell is 12 Months after the manufactured date.

电芯的保质期是从制造日算起 12 个月内。

6. Drawing (all unit in mm, not in scale) /图纸（单位mm，不按比例）:

6.1 Outline dimensions/外观尺寸:

Drawing is for reference only/图纸仅供参考:



6.2 Identification and Marking/标识和标记:

The code is printed on a surface of the cell.

代码印在电芯的表面上。

6.2.1 Size information / 尺寸信息

INR21700

6.2.2 Polarity/极性

+ -

6.2.3 Manufacturer Name/生产厂名称

Ampace

6.2.4 Cell Model Name/电芯型号

JP50P1

6.2.5 Nominal Discharge Capacity/标称容量

5Ah

6.2.6 Nominal Voltage/标称电压

3.58V

6.2.7 Nominal Discharge Energy/标称能量

17.9Wh

6.2.8 Barcode/流水号

Example in mass production：FAJ401ND0001 / 量产示例：FAJ401ND0001

Number 1~3: FAJ, MI (manufacture instruction) number	第 1~3 位：FAJ 代表 MI 号
Number 4: 4, Year, 2024→4, 2025→5, …	第 4 位：4 代表年份，4 对应 2024，5 对应 2025 (4)
Number 5~5: 01, Week in year	第 5~6 位：代表周次，01 代表第 1 周，以此类推
Number 7: N, Weekday, Sunday(H), Monday (J) , Tuesday (K) , Wendesday (L) , Thursday (M) , Friday (N) , Saturday(P)	第 7 位：N 代表星期，星期天(H)，星期一(J)，星期二(K)，星期三(L)，星期四(M)，星期五(N)，星期六(P)
Number 8~12: D0001, Serial number	第 8~12 位，D0001 代表流水号

6.2.9 Internal Code/内部代码

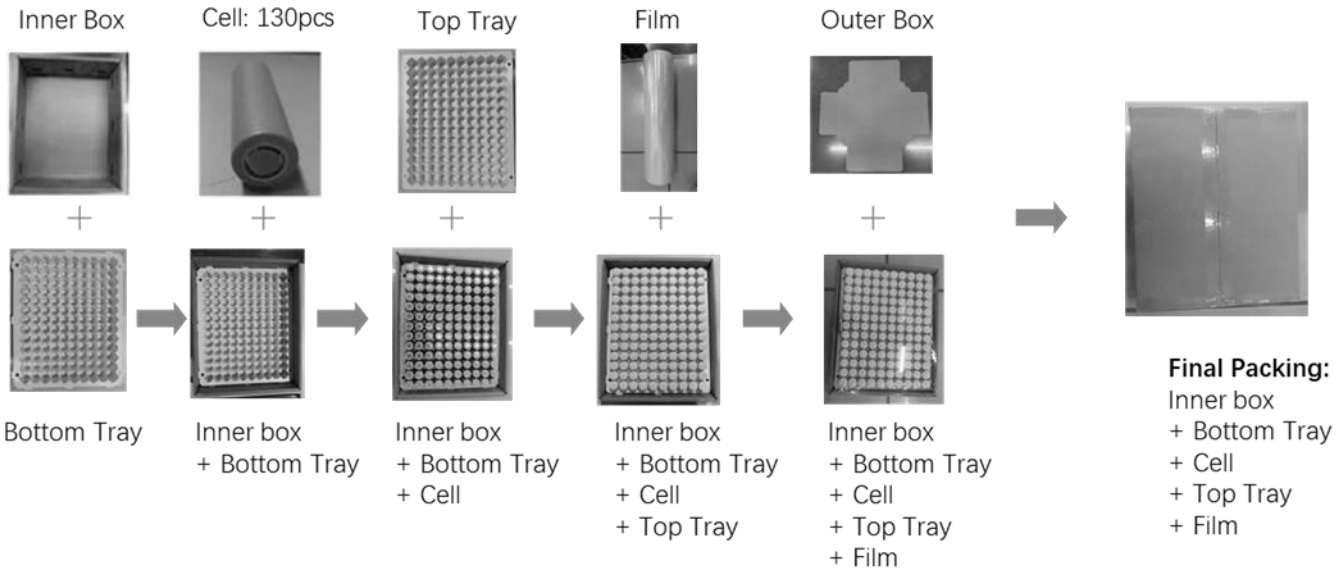
Example in mass production: 5A05

6.3 Packing/包装:

6.3.1 Packing for Sea & Land Transportations/海运&陆运包装

130pcs cells are packed into the carton box and its size is 380mm(L) * 323mm(W) * 85mm(T).

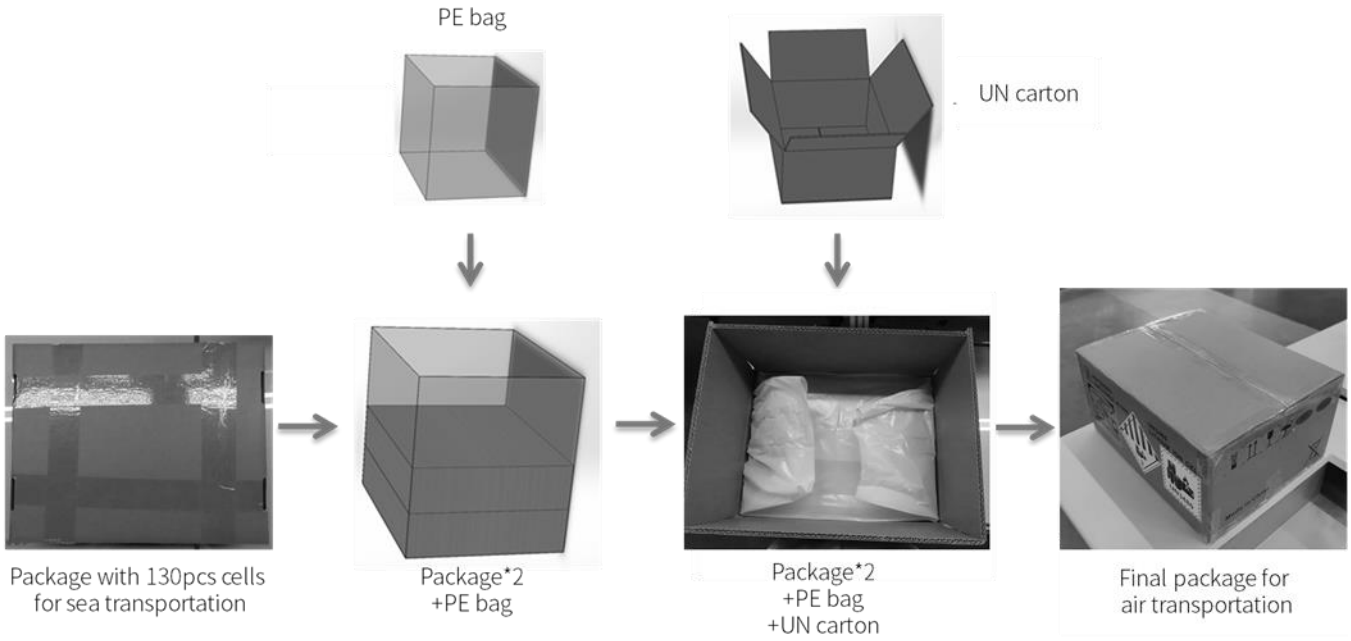
每纸箱装130pcs电芯，纸箱尺寸为380mm(L) * 323mm(W) * 85mm(T),一体化打包。



6.3.2 Packing for Air Transportations/空运包装

130pcs cells are packed into the carton box, then 2 carton boxes are packed into the UN carton box and its size is 404mm(L) * 344mm(W) * 205mm(T).

每纸箱装130pcs电芯，每两个纸箱装在1个UN箱中，UN箱尺寸为404mm(L) * 344mm(W) * 205mm(T),一体化打包。



7.Cell certification requirement/电芯认证要求

No.	Items	Applicable Area
1	PSE Appendix 12	Japan/日本
2	CB (IEC62133-2:2017 + 2021 Appendix)	European & Korea/欧盟 & 韩国
3	IEC62619-2022	European/欧盟
4	EU Battery Directive, ROHS, REACH	European/欧盟
5	BSMI (CNS 15364)	Taiwan, China/中国台湾
6	BIS (IS16046)	India/印度
7	CCC, CQC (GB 31241-2022)	China/中国
8	UL1642	North America/北美
9	UN38.3	Global/全球

8. Appendix Handling Precautions and Guidelines for Rechargeable Lithium Ion Batteries/锂离子充电电芯操作指示及注意事项:

Foreword: These Handling Precautions and Guidelines for Lithium Ion Batteries shall apply to the Product manufactured by AMPACE.

本文件《锂离子充电电池操作指示及注意事项》仅适用于新能安科技有限公司生产的电池。

Statement 1): Customer is requested to contact AMPACE in advance, if and when the customer needs other applications or operating conditions than those described in this Document. Additional experimentation may be required to verify performance and safety under such conditions.

声明 1)：客户若需要将电池用于超出文件规定以外的设备，或在文件规定以外的使用条件下使用电池，应事先联系"新能安"，因为需要进行特定的实验测试以核实电芯在该使用条件下的性能及安全性。

Statement 2): AMPACE will take no responsibility for any accident when the Product is used under conditions other than those described in this Document.

声明 2)：对于在超出文件规定以外的条件下使用电池而造成的任何意外事故，新能安概不负责。

8.1 Charge/充电:

8.1.1 Charge Current/充电电流:

Charge current should be less than the maximum value specified in the Specifications. Charging with higher current than the recommended value may cause damage to cell's electrical, mechanical and safety performance and could lead to heat generation or leakage.

充电电流不得超过本产品规格书中规定的最大充电电流。使用高于推荐值的电流充电将可能引起电芯的充放电性能、机械性能和安全性能等问题，并可能会导致发热或泄漏。

8.1.2 Charge Voltage/充电电压:

Charging shall be done by voltage less than that specified in the Specifications. The protection circuit of battery pack shall be designed to comply with this requirement. It is very dangerous to charge over the maximum voltage, which may cause damage to the cell's electrical performance and mechanical integrity. It may also lead to heat generation or electrolyte leakage. Charging voltage is allowed to accidentally overshoot within 0.5% when controlled to Charge Cut-off Voltage during charging solely to accommodate the unavoidable voltage migration due to the limited charger control precisions.

充电电压不得超过本标准规格书中规定的充电截止电压，电池保护电路的设计应满足此条件。电芯电压高于额定电压值时，将可能引起电芯的充放电性能、机械性能和安全性能的问题，可能会导致发热或泄漏。

考虑到充电器电压精度限制导致不可避免的电压波动，可以允许充电电压在偶发条件下超出充电截止电压，但最多不可超出0.5%充电截止电压。

8.1.3 Charge Temperature/充电温度:

Cells shall be charged according to the Temperature Condition specified in the Specifications. Charging at less than -10°C temperature shall be prohibited.

电芯必须在指定环境温度范围内才能进行正常充电。当环境温度低于-10°C 时，应禁止充电。

8.1.4 Prohibition of Charge/充电限制:

It is prohibited to charge the cells which are used for single with less than 1.5V voltage.

禁止对低于电压1.5V的单颗应用电芯进行充电。

It is prohibited to charge the cells which are used for series with less than 2.0V voltage.

禁止对电压低于2.0V的多串应用电芯进行充电。

8.1.5 Prohibition of Reverse Charge/禁止反向充电:

Reverse charge is prohibited. Cells shall be connected correctly. The polarity has to be confirmed before wiring. If a cell is connected improperly, the cell cannot be charged. Simultaneously, the reverse charging may cause damage to the

cell which may lead to degradation of cell performance and damage the cell safety, and could cause heat generation or leakage.

正确连接电池的正负极，严禁反向充电。若电池正负极接反，将无法对电芯进行充电。同时，反向充电会降低电芯的充放电性能、安全性，并会导致发热、泄漏。

8.1.6 Floating charge (continuous constant voltage control by the end of charging step) for a long term shall be avoided.

避免长期浮充

8.2 Discharge放电:

*(**DISCLAIMER**: FOR INFORMATION ONLY, NOT PART OF THIS DOCUMENT; as 'Discharge' is dependent on end-user usage and environment.) See Chapter8- Disclaimer*

（免责声明：仅供参考，不属于本产品规格书部分；因为"放电"取决于终端用户的用法和环境）见第 9 章免责声明

8.2.1 Discharge Current/放电电流:

The cells shall be discharged at less than the maximum discharge current specified in the Specifications. High discharging current may reduce the discharge capacity significantly or cause over-heating.

放电电流不得超过本规格书规定的最大放电电流，大电流放电会导致电芯容量剧减并导致过热。

8.2.2 Discharge Temperature/放电温度:

Cells shall be discharged according to the Temperature Condition specified in the Specifications.

电芯必须在规定的温度范围内进行放电。

8.2.3 Over-discharge/过放电:

It should be noted that cells would be at an over-discharged status due to self-discharge characteristics if they were not used for a long time. In order to prevent over-discharging, Cells shall be charged periodically(more than 3 months) to maintain the voltage between 3.40V and 3.55V. Over-discharging may cause the loss of cell performance, characteristics, or battery functions.

需要注意的是，在电芯长期未使用期间，它可能会因其自放电特性而处于某种过放电状态。为防止过放电的发生，电芯应定期充电(超过 3 个月)，将其电压维持在 3.40V 至 3.55V 之间。过放电会导致电芯性能、电池功能的丧失。

8.3 Protection Function Requirements for Battery and Host Device/电池和主机对电芯的保护功能要求:

Battery pack and Host Device shall be designed with the following protection functions to make sure that the Cells would be under safe usage conditions: Over-charge protection; Over-discharge protection; Over current protection; Over-heat protection; Short circuit protection.

电池和主机应具备下列保护功能，以确保电芯处于安全使用状态：过充电保护；过放电保护；过流保护；过热保护；短路保护。

8.3.1 Overcharge Protection/过充电保护:

The Host Device and battery pack shall be designed to indefinitely withstand the maximum voltage from the adapter, under a single fault condition, to prevent a cascading failure through the system to the battery pack and/or Cell.

主机和充电器的设计必须保证能够承受来自适配器的不确定大电压并防止超过电池承受能力的大电压向电池传播。

8.3.2 Over-discharge Protection/过放电保护:

When the voltage of any Cell in a battery pack is lower than 2.5V, over-discharge protection function shall work and stop discharging to prevent the Cells from over-discharge. It is recommended that the dissipation current of PCM shall be less than 1.0uA. The voltage of each Cell in a battery pack shall be monitored and current shall be controlled by the PCM at all times.

当电池任何一个电芯的电压降至 2.5V 以下时，过放保护功能应启动并停止放电以避免电芯的深度放电。推荐 PCM 的静态电流小于 1.0uA，并具有过放保护功能。该保护功能应实时监控所有电芯。

8.3.3 Over Current Protection/过流保护:

In case the charge current is over the limitation specified in Specifications, the charging must be cut off. The battery pack shall have at least one over current protection circuitry or devices designed to meet the specification to avoid the Cell from becoming charged with current greater than the Specifications.

The Host Device shall be designed to indefinitely withstand the maximum current from the adapter, under a single fault condition, to prevent a cascading failure through the system to the battery pack and/or Cell.

当充电电流大于本产品规格书规定的最大过流保护电流时，保护板应截止充电，以避免过大电流向电芯充电。

为了预防单一故障导致的级联失效，主机应该有能无限期承受充电器最大电流的设计。

8.3.4 The Requirements to the Components of Protection Circuit/保护电路元件的要求:

Cells, components, and materials used in the battery pack shall meet the minimum and maximum temperature requirements with adequate margin. Protection circuit components (excluding thermal devices designed to activate at specific temperatures) shall be rated for a minimum operating range of -25℃-+85℃.

电芯、元件以及用于电池的材料必须符合最大和最小温度的要求且具备足够的余量。保护电路板的元器件（热敏装置除外）的正常工作温度范围必须在-25℃-+85℃之间。

8.3.5 Over Temperature Protection/过热保护:

The battery pack or Host Device shall contain at least one thermal protection device or mechanism independent of internal Cell devices or mechanisms. For a thermistor type temperature protection circuit, all packs of the same model shall have the same voltage to temperature translation (acceptable tolerance no more than ±10%), with consideration for any temperature lag over time.

During charge and discharge, the temperature of the Cell shall be monitored. When temperature limitations are exceeded, action shall be taken to mitigate hazards. Action should include shutdown, or disabling of charging, or other protective action. The action may be taken by the battery pack and/or host.

无论电芯本身是否具有过热保护装置，电池和主机至少必须包含一个过热保护装置或机构。用于过热保护的热敏元件必须具备一致的温度-电压对应关系，可接受误差应≤±10%。

充放电过程中，电芯温度必须通过过热保护装置（如 PTC、热敏电阻等）实施监控，当电芯温度超过规定温度范围时，主机或电池的保护电路必须终止充/放电。

8.3.6 The Limitation of Charge Time/充电时间限制:

In order to prevent abnormal Cells or battery packs, charge time shall be limited according to the Specifications. When time limitations are exceeded, action shall be taken by the Host Device or the battery pack to shutdown or disable the charging.

为防止不正常电芯或电池的出现，应对充电时间予以限制。当充电时间超过了限制时间，主机或电池保护电路必须动作以切断充电。

8.3.7 Pre-charge Function/预充电功能:

The system shall not initiate normal charging if the battery voltage is below the over-discharge protection voltage defined in the Specifications. In this case, the system may support a pre-charging function to bring the battery voltage above the required threshold. The recommended pre-charge procedure is as below:

The Cell battery pack charging shall start with a low current (≤0.02Cmin mA) for approximately 30 minutes before rapid charging starts. The normal charging shall be started after the（individual）Cell voltage has been reached above 3.0V within approximately 30 minutes that can be determined with the use of an appropriate timer for pre-charging. In case the (individual) Cell voltage does not rise to 3.0V within the pre-charging time, then the charger shall have functions to stop further charging and display that the Cell/pack is at an abnormal state.

当电芯电压低于过放保护电压时，电池保护电路或主机应具备预充电功能，建议充电步骤如下：

电池在快速充电之前，应先以一小电流（0.02Cmin mA）预充电~30 分钟，以使（每个）电芯的电压达到 3.0V 以上，再进行快速充电。可用一记时器来实现该预充电步骤。如果在预充电规定时间内，（个别）电芯的电压仍

未升到 3.0V 以上，充电器应能够停止下一步快速充电，并显示该电芯/电池正处于非正常状态。

8.3.8 The Other Requirements to Main Device Designation/主机设计的其它注意事项：

1）If the source of the fault is in the Host Device, it shall not disable the safety features inside the battery pack(s).

主机设计必须保证防止主机故障向电池蔓延。

2）The charging system, or any Part of the Host Device, shall not disable or override the safety features inside the battery pack(s).

充电系统或主机的任何部分不能使得电池的安全保护功能失效。

8.4 Notice for Designing Battery Pack/电池结构设计注意事项:

8.4.1 Pack Design/电池外壳设计:

1）Battery pack should have sufficient strength to make sure the Cell inside is protected from mechanical shock..

电池外壳应有足够的机械强度以保证其内部电芯免受机械损伤。

2）No sharp edge components should be inside the pack containing the battery Cells.

外壳内安装电芯的部位周围不应有锋利的边角。

8.4.2 Cell Fixing/电芯安装:

1）Movement of Cell in the battery pack should not be allowed.

电芯不得在壳内活动

2）Short circuit of Cell in a battery pack or Host Device should not be allowed：Enough insulation layers between wiring and the Cell shall be used to maintain extra safety protection. The battery pack or Host Device shall be structured without any potential Short circuit, which may cause generation of smoke or firing.

防止电芯在电池包装或主机内产生短路：引线与电芯之间要有足够的绝缘层以保证绝对安全。电池壳内不得有任何短路发生隐患，以防止冒烟或着火。

8.5 Storage/存贮:

The Cell shall be stored at the Storage Condition specified in the Specifications at all times.

电芯必须在本产品规格书规定的存贮环境下进行存贮。

8.6 User's Guideline for Safety Handling:

8.6.1 The following information, or equivalent statements, shall be made available to the Customer's users of battery with the Cells incorporated inside through one or more of the following means, as appropriate: printed on the label for the battery, printed on the label for Host Device, printed in the owner's manual, or posted in a help file or Internet website:

下列信息或类似的申明必须通过一种或多种适当的途径让用户知晓，可选择的途径包括：电池标签、主机标签、用户手册、储存于帮助文档或互联网：

1) Do not disassemble or open, crush, bend or deform, puncture, or shred.

请勿拆解或打开、挤压、弯折、变形、刺穿、敲碎；

2) Do not modify or remanufacture, attempt to insert foreign objects into the battery, immerse or expose to water or other liquids, or expose to fire, explosion, or other hazard.

请勿修改或改装，不要试图将外物插入电池，不要浸入或暴露在水或其它液体中，远离火源、爆炸物和其他危险；

3) Only use the battery for the system for which it was specified.

系统只能使用其规定的电池；

4) Only use the battery with a charging system that has been qualified with the system per standard. Use of an unqualified battery or charger may present a risk of fire, explosion, leakage, or other hazard.

只能使用通过标准认证的具有充电管理系统的电池，使用未经认证的电池或充电器可能存在起火、爆炸、或其它危险；

5) Do not Short circuit a battery or allow metallic or conductive objects to contact the battery terminals.

请勿使电池短路，也不要让金属或其它导体接触电池接电端子；

6) Replace the battery only with another battery that has been qualified with the system per standard. Use of an unqualified battery may present a risk of fire, explosion, leakage, or other hazard.

更换电池时只能使用通过标准认证的电池，使用未经认证的电池可能存在起火、爆炸、或其它危险；

7) Do not keep a battery at rest for a long time (over 6 months). Safety accident may happen when re-charging a battery which has a rest for a long time.

避免电池长时间放置不用，长期放置不用的电池重新充电时可能会发生安全问题。

8) Dispose of used batteries in accordance with applicable local regulations.

按当地法规迅速处理报废电池；

9) Battery usage by children should be supervised.

儿童使用电池应受到监督；

10) Avoid dropping the device or battery. If the device or battery is dropped, especially on a hard surface, and the user suspects damage, take it to a service center for inspection.

不要跌落主机或电池，如果主机或电池不慎跌落（尤其在硬表面上），用户怀疑电池损坏，则应找服务中心检查；

11) Improper battery use may result in a fire, explosion, or other hazard.

不正确使用电池可能发生燃烧、爆炸或其它危险。

12) In the event of a battery leak, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with large amounts of water and seek medical advice.

如果电池发生漏液，不要让电池接触皮肤和眼睛，如果接触不幸发生，则用大量的水冲洗接触部位或寻求医生帮助；

13) Seek medical advice immediately if a battery has been swallowed.

如果电池被吞食了，立即就医；

14) Communicate the appropriate steps to be taken if a hazard occurs.

告知用户如果危险发生，应采取什么步骤。

8.6.2 The following indications, notifications, and dialog/messages, at the system level, or an equivalent statement, may be displayed along with recommended actions as appropriate:

下列指示、通告、语句/信息或类似的申明应通过适当途径让用户知悉：

1) Abnormal battery temperature alert.

不正常电池温度警示

2) Abnormal Host Device and/or battery dc input voltage alert.

不正常的主机或电池的直流输入电压警示

1) Abnormal current draw alert.

不正常的电流警示

2) Battery communication fail/time-out alert.

电池通讯失败或超时警示

3) Incompatible battery alert.

不相容电池警示

4) Alert for other malfunctions that may lead to hazards.

可能导致危险的其它故障警示

8.7 Others/其他事项:

8.7.1 Prohibition of Disassembly/严禁拆卸电芯:

1) Never disassemble the Cell. The disassembling may generate internal Short circuit in the Cell, which may cause swelling, firing, or other problems.

在任何情况下不得拆卸电芯。拆卸电芯可能会导致内部短路，进而引起鼓气、着火及其它问题。

2) Electrolyte is harmful. If the electrolyte comes into contact with the skin, or eyes, physicians shall flush the electrolyte immediately with fresh water and medical advice is to be sought.

电解液有害，万一有电解液泄漏而接触到皮肤、眼睛或身体其它部位，应立即用清水冲洗电解液并就医。

8.7.2 Never incinerate nor dispose the Cell in fire. This may cause firing of the Cell, which is very dangerous.

在任何情况下，不得燃烧电芯或将电芯投入火中，否则会引起电芯燃烧，这是非常危险的，应绝对禁止。

8.7.3 The Cell shall never be soaked with liquids such as water, seawater, or drinks such as soft drinks, juices, coffee or other beverages.

不得将电芯浸泡液体，如淡水、海水、饮料（果汁、咖啡等）。

8.7.4 The battery replacement shall be done only by either Cell supplier or device supplier and never be done by the user.

更换电芯应由电芯供应商或设备供应商完成，用户不得自行更换。

8.7.5 Prohibition of use of damaged Cell:

禁止使用已损坏的电芯

The Cell might be damaged during shipping by shock. If any abnormal features of the Cell are found such as damages in a plastic envelop of the Cell, deformation of the Cell package, smelling of an electrolyte, an electrolyte leakage and others, the Cell shall never be used any more. The Cell with a smell of the electrolyte or a leakage shall be placed away from fire to avoid firing.

电芯在运输过程中可能因撞击等原因而损坏，若发现电芯有任何异常特征，如电芯塑料封边损坏，外壳破损，闻到电解液气味，电解液泄漏等，该电芯不得使用。有电解液泄漏或闻到异常味道的电池应远离火源以避免着火。

8.8 Transportation/运输

Lithium and lithium ion cells and batteries are regulated in the United States in accordance with Part 49 of the Code of Federal Regulations (49 CFR Sections 105-180) of the United States Hazardous Materials Regulations. Pursuant to the Pipeline and Hazardous Materials Safety Administration (PHMSA) published by the United States Department of Transportation, while lithium batteries are classified as hazardous materials, there are exceptions for common small sizes of these batteries that simplify the rules for shipping lithium batteries. Shipment or Transportation of small lithium ion cells with a Watt-hour rating not more than 20 Wh can be exempted from the restrictions imposed by the PHMSA. However, the capacity of the Cells herein exceeds such Watt-hour rating and therefore should be handled and transported as dangerous goods - use Class 9 Miscellaneous Dangerous Goods and UN Identification labels for Transportation of the Cells.

锂和锂离子电池的监管在美国与联邦法规（49 CFR 49 部分按照章节 105-180）对美国有害物质的法规。根据管道和危险材料安全管理（PHMSA）由美国交通运输部公布，而锂电池被列为危险品，有常见的小尺寸的这些电池的简化规则运输锂电池的例外。装运或运输的小型锂离子电池和额定瓦特小时不超过 20 Wh 可以免除由 PHMSA 限制。然而，电池容量超过此瓦特小时额定值，应作为危险品使用和运输，使用 9 类危险品和联合国识别标签来运输电池。

9. Disclaimer/免责声明

9.1 Customer Responsibility/客户责任

9.1.1 The Customer hereby agrees that it has carefully read and understand any and all terms and conditions, safety precautions and measures set forth in this Document, furthermore, the Customer waives claiming any liability against Ampace and agrees to bear full responsibilities of the risks for any accidents, injury to persons, or property damage that may occur due to non-compliance with any of the above.

客户在此确认并同意，其已认真阅读并理解本产品规格书中所阐明的条款、所有安全规范及措施，并且对其违反上述条款、规范及措施等因此可能产生的任何意外事故、人身伤害及财产损失等风险，将完全地承担责任而不会向 Ampace 主张任何责任。

9.1.2 Regarding a Particular Product with the properties, the Customer is obligated to verify the fitness for a Particular

purpose of such Product described in this Document under certain application. The parameters provided in this Document may vary in different applications and performance may vary from time to time. All operating parameters, including typical parameters, must be validated for each customer application by the Customer's technical experts.

客户有责任验证具有本产品规格书中描述的特性的特定产品在特定应用情况下的适用性。本产品规格书中提供的参数在不同的应用中可能会有所不同，并且性能可能随时间而变化。客户的技术专家必须就每次应用对所有操作参数（包括典型参数）进行验证。

9.1.3 The Customer takes full responsibility to verify all requirements (whether voluntary or mandatory) necessary to enter into a certain market or territory, including but not limited to technical, environmental, safety certification or other requirements. Unless expressly provided herein, Ampace shall in no event be liable for any failure of the Product to fit for a certain application or to meet any requirement necessary to enter into a specific market or territory. The Parties agree that the certification items and certification institutions are designated or agreed by Customer. Ampace will assist the designated certification institutions to conduct testing and issue ce25±2°Cificates for the Products by providing all necessary documentations for certification, including specification, product label, application form and samples. The Parties further agree that all expenses and liabilities in connection with or arising from the certification shall be borne by Customer, and Ampace shall in no event be liable for any costs or expenses in connection with or resulting from any failure to pass the certification or the non-compliance with any voluntary or mandatory certification requirement in any specific territory.

客户有责任对市场准入的各项要求（不论自愿或强制）进行确认，包括但不限于技术、环保、安全认证等要求。除本产品规格书明定外，Ampace 对本产品是否符合特定应用和市场准入要求不负任何责任。本产品之认证项目及认证机构经客户选定或同意，Ampace 配合客户向其指定或同意的认证机构提出安全规格认证所需资料，包含规格书、产品标识、申请表及样品等，由认证机构进行测试和发证。双方同意，与本产品认证相关的所有风险及责任（包含未通过认证或未取得销售区域自愿或强制认证所产生之风险及责任），由客户承担，Ampace 不负任何责任。

9.1.4 The Product is produced and supplied to the Customer for Business to Business nature, and is not for direct consumer use. Buyer should verify the fitness for a Particular purpose of such Product described hereof under certain application. Except as provided in the Specifications, Seller makes no representation or warranty of any kind, whether express or implied, including with respect to any warranty as to merchantability, compatibility, fitness for use or for any Particular purpose.

买方应当验证规格书定义的产品在客户特定终端（或应用）满足特定用途的适用性。 除规格书中有明确规定的情况外，卖方不作任何明示或暗示的陈述或保证，包括关于适销性、兼容性、适用性或任何特定目的的任何保证。

9.1.5 Customer agrees to take full responsibility for recycling the Product in accordance with the local laws and regulations in the respective Permitted Territory and shall bear the costs arising therefrom.

客户应当按当地法律法规之规定，再循环本产品并自负由此产生的费用和风险。

9.2 Products can only be used and installed within the safety certification area as set forth in this Document ("Permitted Territory"). The Product warranty is null and void in the event Products are resold, used or installed outside of the Permitted Territory.

本产品仅供使用及安装于本产品规格书载明的安规认证区域（"适用区域"）。若本产品被转售、使用或安装于适用区域以外的地区，则本产品的相关质保规定将全部取消并失效。

9.3 Except as expressly set forth in this document, ampace makes no representations and grants no warranties, whether express or implied, including without limitation any warranty of quality, any implied warranties of merchantability, fitness for a particular use or purpose, and non-infringement.

除本规格书明定外，Ampace 不因本协议对提供客户之产品内容（包括品质性能、适销性、特定用途的使用目的、兼容性、不侵权等）提供任何不论明示或默示的其他保证或承担任何风险。

9.4 The Parties agree that Ampace shall have no liability or obligation with respect to any infringement, claim or action which is based upon:

双方同意对于下列的侵权、索赔或诉讼，Ampace 无须承担任何责任：

9.4.1 Ampace's incorporation or use of materials, designs, technology or intellectual property designed, designated or instructed by Customer, its affiliates, contract manufacturers, customer, or end user into the Products;

Ampace 在其产品上结合或使用客户、客户之关联方、分包方、客户或终端用户的设计、指定或指示的材料、设计、技术或知识产权；

9.4.2 The combination, assembly, operation, or use of the Products with materials, devices, Parts, or software not supplied by Ampace;

客户将 Ampace 的产品与非 Ampace 提供的材料、设备、组件或软件进行结合、组装使用/运行；

9.4.3 Modifications, disassembly, repair, and rework to the Products made by Customer or any third Party without the prior written consent of Ampace;

客户或其他第三人未经 Ampace 授权而对 Ampace 的产品进行的修改、拆解、维修或重工；

9.4.4 Ampace’s modification of the Products in compliance with the design, specification, requirements, or instructions of Customer;

Ampace 依照客户的设计、规格、要求或指示而对其产品进行的修改；

9.4.5 The claim or action arising from non-compliance with the requirements for use, storage, delivery, assembly, and disposal of the Products designated by Ampace;

客户或任何第三方未依据 Ampace 指定的产品使用方式对 Ampace 的产品进行使用或未按照 Ampace 指定的标准对产品进行安置、贮存、运输、组装或处理而导致的任何侵权或索赔事项；

9.4.6 Use of the Products outside the scope of intended use under this Document;

客户或任何第三方未依据本产品规格书中约定的使用范围对 Ampace 的产品进行使用；

9.4.7 Any defect that may exist before the Product enters the market or any defect that is unable to be detected by the existing technology at the time the Product enters market.

引起损害发生的缺陷于 Ampace 产品投入流通前即已存在或投入流通时的技术水平尚不能发现缺陷的存在的。

9.4.8 Knockoff or counterfeit battery/仿制或虚假产品。

9.4.9 Any inconsistency between serial number, model number, and product code./产品型号、序列号和产品编码之间存在不一致。

9.4.10 PACK malfunction or deterioration caused by traffic accident./交通事故造成的产品故障或功能衰减。

9.4.11 Failure to recharge after using PACK for over three months./使用期间超过三个月未补电。

9.4.12 Damages caused by drop/产品跌落造成的损害。

9.4.13 Damages caused by water immersion or sealing damages./由于浸水或者气密性损坏导致电池受损。

9.5 For any product liability related claim raised against Ampace, the Customer bears the burden of proof to evidence that 1) the Customer and its contractors, agents, customers or end users have followed the requirements of this Document, 2) there is a product defect, and 3) the accident, claim or liability is solely and directly caused by such product defect. Ampace is entitled to reject any claim and be released from any liability in the event of Customer’s failure to meet the aforesaid burden of proof.

就任何对 Ampace 提出的有关产品责任的主张或请求，客户需针对以下事项负举证责任: 1) 客户及客户的代理人、外包商、客户或终端用户已遵守本产品规格书的要求；2) 产品缺陷存在；3) 意外事故、主张和责任单独且直接由该产品缺陷所引起。若客户未能证明上开事项之存在，则 Ampace 有权拒绝任何因此产生的请求并且据此免责。

9.6 Ampace shall have no liability or obligation with respect to any Products which have been subjected to abuse, misuse, improper use, negligence, accident, alternation, repair or rework performed by any unauthorized persons or entities other

than Ampace.

对于任何未经授权的个人或非 Ampace 实体所滥用，不当使用，疏忽，意外，改动，修理或返工的产品，Ampace 概不承担任何责任或义务。

9.7 Neither Party shall be liable for any indirect, special, incidental, punitive or consequential damages of any kind (including lost profits), regardless of the form of action, whether in contract, tort (including negligence), strict liability or otherwise, even if informed of the possibility of such damages in advance.

即便对方已提前通知一方下述损失发生的可能性，双方同意并确认，任何一方均不对任何间接的、特别的、附带的、惩罚性的或结果性的损失（包括可得利益损失）承担赔偿责任，无论是基于何种追诉方式、无论是基于合同或侵权之债（包含过失侵权行为）、无论是否基于严格责任。

9.8 The maximum overall liability of each Party, alone or in the aggregate with respect to all claims of any kind, if any, whether in contract, tort (including negligence) , strict or product liability, damages, reimburse, indemnification or otherwise, shall not exceed 200% of the goods price paid by Customer allocable to the specific Product upon which the claim is directly based.

任一方所应承担的全部责任，无论是基于合同、侵权（包括过失）、严格责任或产品责任、损害、补偿、赔偿或其他任何原因，单次及累计金额应不超过客户为引发该索赔的特定产品所支付的货款的两倍。

10. Miscellaneous/其他

In the event of any conflict, ambiguity or discrepancy between the Chinese version and English version of this Document, both parties agree that the Chinese version of this Document shall prevail.

本产品规格书之中文文本与英文文本如有任何矛盾，歧义或者不一致之处，双方同意应以中文文本优先适用。