280Ah 产品规格书

Product Specification of 280Ah Cell

电芯型号 Cell Model： CB310

电芯容量 Cell Capacity： 280Ah

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
Yang Longfei	Zheng Xianfeng				

客 户 确 认	签名	日期
	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			Yang Longfei	New release

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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 CATL 生产的 280Ah 3.2V 储能用磷酸铁锂电池。 Means the 280Ah 3.2V rechargeable lithium ion cells produced by CATL
客户 Customer	指《CATL 产品销售合同》中的买方 Means the customer in the 《CATL product sales contract》
CATL	宁德时代新能源科技股份有限公司 Means Contemporary Amperex Technology Co. Limited
PN	为了区别电池应用于不同的使用区域或不同的应用条件下，CATL 为 280Ah 3.2V 可充电锂电池定义的物料编号。 Means the unique part number provided by CATL to identify the product supplied by CATL;.
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 CATL 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	充电功率与电池管理系统多次测量的电池的能量值的比率。例如：电池能量为 896Wh，充电功率为 224W 时，则充电倍率为 0.25P；当电池能量衰减为 716.8Wh，充电电流为 179.2W 时，则充电倍率为 0.25P。 The ratio of charging power to the energy of batteries measured repeatedly by BMS. For example, when the battery energy is 896Wh and the charging power is 224W, the charging rate is 0.25P; when the battery energy fades to 716.8Wh and the charging power is 179.2W, the charging rate is 0.25P.
放电倍率 D-Rate	放电功率与电池管理系统多次测量的电池的能量值的比率。例如：电池能量为 896Wh，放电功率为 224W 时，则放电倍率为 0.25P； The ratio of discharging power to the energy of batteries measured repeatedly by BMS. For example, when the battery energy is 896Wh and the discharging power is 224W, the discharging rate is 0.25P.
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”.

术语 Terms	定义 Definition
标准放电 Standard Discharge	符合本技术协议第 2.3.1 条所述的 0.25P 的放电功率以及本技术协议第 2.3.5 条所述的最小 2.5V 电压的放电模式。 Means the default discharging method as set out in paragraph 2.3.1 of 0.25P with a discharge cut-off voltage of 2.5 V as set out in paragraph 2.3.5;
充电状态(SOC) State of Charge	电池实际充电量与满充充电量的比值，表征电池的充电状态。100%SOC 的充电状态表示电池满充到 3.65V，0%SOC 的充电状态表示电池完全放电到 2.5V。 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 3.65V, and the state of charge of 0% SOC indicates that the battery is completely discharged to 2.5V.
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.
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” “℃” (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 CATL 生产的 3.2V 280Ah 储能用磷酸铁锂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 280Ah 3.2V lithium iron cells for energy storage system with CATL (“Product”) to be supplied by CATL.

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	280 Ah	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	标准能量 Typical Energy	896 Wh	参考 2.2 与 2.3 标准充放电模式测试
2.1.3	工作电压 Operating voltage	2.5~3.65V 2.0~3.65V	电芯温度 T>0°C Cell temperature T>0°C 电芯温度 T≤0°C Cell temperature T≤0°C
2.1.4	电池内阻 Impedance (1KHz)	0.17±0.05mΩ	新电池状态（40%SOC） Fresh cell （40%SOC）
2.1.5	出货容量 Shipping capacity	112±1Ah	40% SOC

No.	参数 Parameter	产品规格 Specification	条件 Condition
2.1.6	月自放电 Residual capacity loss	≤3.0%/月 Per month ≤3.0%	出货三个月以后的电芯，标准充电到40%SOC，25±2℃储存 Fresh cell after 3month, 40%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
2.1.8	工作温度(放电) Operating temperature (discharge)	-20~60°C	参考第 2.3 节 Reference to paragraph 2.3
2.1.9	电池重量 Cell Weight	5.34±0.30Kg	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)：173.9±0.8mm 高度(Height)：207.2±0.8mm 厚度(Thickness)：71.7±0.8mm	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	≥6000Cycles	25±2°C 初始夹紧力 300Kgf，标准充放电测试 25±2°C, cycle test by the standard charge and discharge method under 300±20Kgf preload
2.1.15	循环衰减 Cycle fading	⩽5%	25±2°C 初始夹紧力 300Kgf，标准充放电测试循环 180 圈 25±2°C, cycle test by the standard charge and discharge method under 300±20Kgf preload for 180 cycles
2.1.16	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	标准充电功率 Standard charge Power	0.25P	25±2℃
2.2.2	标准充电电压 Standard charge voltage	单体电池最大 3.65V Cell max voltage 3.65V	N.A.
2.2.3	标准充电模式 Standard charge method	0.25P 恒功率充电至 3.65V，静置 5min，0.1P 恒功率充至 3.65V 0.25P constant power charge to 3.65 V, rest 5min, 0.1P constant power charge to 3.65V	
2.2.4	标准充电温度 Standard charge temperature	25±2°C	电芯温度 Cell Temperature
2.2.5	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.
2.2.6	绝对充电电压 Absolute charging voltage	最大 3.65V Max 3.65V	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)

电芯温度/°C Cell Temperature/°C		**0**	**5**	**10**	**15**	**20**	**25**	**45**	**50**	**55**	**60**
最大充电功率（P） Max charge power(P)	0%~<100% SOC	0	0.05	0.10	0.20	0.35	0.5	0.5	0.5	0.5	0

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	标准放电功率 Standard discharge power	0.25P	25±2℃
2.3.2	最大持续放电功率 Maximum discharge power (continuous)	0.5P	N.A.
2.3.3	放电截止电压 Discharge cut-off voltage	2.5V 2.0V	温度（Temp.）T>0°C 温度（Temp.）T≤0°C
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	-20~60°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) C-Rate Other discharge Condition (C-Rate)

电芯温度/°C Cell Temperature/°C		**0**	**5**	**10**	**15**	**20**	**25**	**45**	**50**	**55**	**60**
最大放电功率（P） Max discharge power(P)	0%~<10 0%SOC	0.1	0.1	0.2	0.5	0.5	0.5	0.5	0.5	0.5	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	55°C 的容量 Capacity@55°C	≥280Ah	新电池状态，55°C，0.25P，2.5V~3.65V Fresh cell，55°C，0.25P，2.5V~3.65V
2.4.2	-20°C 的容量 Capacity@-20°C	≥155Ah	新电池状态，-20°C，0.25P，2.0V~3.65V Fresh cell，-20°C，0.25P，2.0V~3.65V

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.
2.5.2	脉冲放电温升 Pulse discharge temperature rise	≤5°C	在任何充电状态下，每个电池以 500A 电流放电 10 秒 The cell is discharged at 500A for 10 s under any state of charge.

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.

2.6.2 存在风险项目:此样品仍处于 C 样开发阶段，暂未完成工艺冻结，量产阶段产品规格需重新定义，提供正式产品规格书。此样品仍处于 C 样开发阶段，暂未完成工艺可靠性验证，存在批次稳定性风险。量产阶段产品规格需重新定义，提供正式产品规格书。

Risk Project: this sample is still in the development stage, the process freeze has not been completed yet, and the product specifications in the mass production phase need to be redefined to provide formal product specifications.

Due to during the development stage, the process reliability verification of the sample has not been completed yet, and there is a risk of batch stability. Product specifications for the mass production phase need to be redefined to provide formal product specifications.

2.6.3 限制使用规定：此样品仍处于 C 样开发阶段，可在标准充放电条件下进行循环测试，测试次数少于 500 循环，电芯仅供公告、测试等使用，禁止出售至终端客户。

Restricted use regulations: this sample is still in the development stage and can be used for cycle tested under standard charge and discharge method. Now the cycle number of tests is less than 500 cycles. The cell are only used for announcements, tests, etc., and are prohibited from being sold to customers.

2.6.4 产品在使用过程中会产生膨胀力，电芯在15mm钢板测试条件下衰减至60%时膨胀力约为40000N，客户在产品设计过程中需要考虑结构强度可靠性。

The cell will generate swelling force during attenuation. The swelling force of the cell at 60% SOH under the test condition of 15mm steel plate, which is about 40000N. The customer needs to consider the reliability of structural strength in the product design process.

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 CATL 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 CATL 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. CATL and its customer shall come into agreement about internal resistance and capacity measurement methods, CATL 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 (168Ah) @25℃. Failure to comply with this requirement shall render CATL's warranties under the Contract inapplicable, thereby releasing CATL 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 CATL. 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 CATL 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 CATL 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 CATL for design review and record keeping.

4.3. 未经 CATL 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 CATL, customer shall not modify or change the design, features, setting or data file format of the BMS without the prior written agreement by CATL.

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，CATL 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	3.65V	电池的电压达到 3.65V 时，BMS 申请终止充电 Stop charging when cell voltage reaches 3.65 V
4.5.2	第一级过充电保护 First overcharge protection	≥3.69V	当电池电压达到 3.69V，BMS 强制终止充电 Stop charging when cell voltage reaches 3.69 V
4.5.3	第二级过充电保护 Second overcharge protection	≥3.8V	当电池电压达到 3.8V，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 3.8V, 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 2.6V Minimum 2.6V	当电池的电压到达 2.6V， BMS 申请终止放电 Minimize the discharging current when cell voltage reaches 2.6 V.
4.5.5	第一级过放保护 First over discharge protection	最小 2.5V Minimum 2.5V	当电池的电压到达 2.5V， BMS 强制终止放电 Stop discharging when cell voltage reaches 2.5V
4.5.6	第二级过放保护 Second over discharge protection	最小 2.0V Minimum 2.0V	当电池电压低于 2.0V 时，BMS 强制终止放电，应及时以 0.1C 回充至 50% SOC，且 BMS 应锁定直到技术人员解决问题 When the cell voltage is less than 2.0V, the cell should be charged back to 50% SOC at 0.1C in time, and the BMS should be locked until technicians solve the problem.
4.5.7	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.
4.5.8	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

4.5.9	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、4.5.6 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，CATL 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, 4.5.6 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 CATL shall not take any responsibility for the damage in connection therewith.

4.6. 避免电池到达过放状态。电池电压低于 2.0V 时，电池内部可能会遭到永久性的损坏，此时 CATL 的产品质量保证责任失效。根据本技术协议第 2.3.3 条，当实际放电截止电压低于标准放电截止电压时，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，防止电池进入过放状态。

Prevent draining any product down to over discharge state. A product may be permanently damaged internally when the cell voltage is lower than 2.0 V and which shall be strictly prohibited, failing what CATL’s warranties under the contract shall cease to apply, thereby releasing the CATL from any liability in connection therewith. After discharge cut-off in accordance with paragraph 2.3.3, internal power consumption of the system should be reduced to a minimum to prolong the idle time before recharge. Customer undertakes to 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.

4.7. 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).

4.8. 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 CATL 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, CATL will not undertake the

responsibility of quality assurance.

4.9. 电箱设计中应充分考虑电芯的散热问题，由于电箱散热设计问题导致的电芯或电池过热损坏，CATL 不承担质量保证责任。

The design of the electric box must fully consider the heat dissipation problem of the cell. CATL does not take the responsibility due to the overheating of the cell or batteries caused by the thermal design problem of the electric box.

4.10. 电箱设计中应充分考虑电芯的防水、防尘问题，电箱必须满足 UL 和 IEC 有关标准规定的防水、防尘等级。由于防水、防尘问题而导致的电芯或电池的损坏（如腐蚀、生锈等），CATL 不承担质量保证责任。

The design of the electric box must fully consider the waterproof and dustproof problems of the cells. The electric box must meet the waterproof and dustproof grade stipulated by the relevant national standards. The CATL does not take the responsibility due to damage to the cell or batteries (such as corrosion, rust, etc.) caused by water and dust.

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

It is forbidden to mix different P/N batteries in the same battery system, otherwise, CATL 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℃，如果电芯温度超过 60℃，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 ℃, 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 connections.

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。在电池安装和使用中，硬件和软件需实行多重过充失效安全保护。最低保护要求见本技术协议第 4.5.1、4.5.2、4.5.3、4.5.9 条。

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. See paragraph 4.5.1、4.5.2、4.5.3、4.5.9 for minimum requirement to be adopted by the BMS for protection.

5.6. 根据本技术协议第 4.5.9 条充电后，应结束正常充电。当持续充电时间超过合理的时间限制，电池会出现过热现象可能会引起热失控和火灾。应安装上一个定时器加以保护。一旦充电电流达到过充状态而不能终止，定时器将会起作用从而终止充电，见本规格书第 5.11 条。

After charging according to article 4.5.9 of this technical agreement, normal charging shall be terminated. When the continuous charging time exceeds the reasonable time limit, the battery will overheat, which may cause thermal runaway and fire. A timer should be implemented in the charger circuit and set up properly. In case charging does not terminate normally within charging time out limit, ensure that the timer will intervene and stop the charging. See also paragraph 5.11.

5.7. 客户应将电池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.

5.8. 严禁用塑料封装电池或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池使用过程中发生过热现象。

Do not service cells and electrical connections within plastic package of cell. Improper electrical connection within a cell may cause overheating in service.

5.9. 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.

5.10. 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.

5.11. 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”.

5.12. 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 CATL 的声誉造成影响的，CATL 将会追究产品需求单位的责任。根据对 CATL 造成的影响程度，产品需求单位需向 CATL 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 CATL, CATL will investigate the responsibility of the product demand unit. According to the degree of impact on CATL, the product demander should provide compensation to CATL.

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

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

6.3. 此样品仍处于 B 样开发阶段，电芯仅供公告、测试等使用，具体测试项目需与 CATL 协商确定，禁止出售至终端客户。

This sample is still in development stage. The cell is only used for announcement, testing, etc. The specific test items need to be negotiated with CATL and prohibited from being sold to the customer.

6.4. 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. 警示声明 Waring statement

警 告

电池存在潜在的危险，在操作和维护时必须采取适当的防护措施!

不正确地滥用测试实验，可能导致严重的人身伤害和财产损失!

必须使用正确的工具和防护装备操作电池。

电池的维护必须由具有电池专业知识并经过安全培训的人士执行。

不遵守上述警告可能造成多种灾难。

CELLS ARE POTENTIALLY DANGEROUS AND PROPER PRECAUTIONS MUST BE OBSERVED IN HANDLING AND MAINTENANCE.

RUNNING TESTS ON THE CELLS IMPROPERLY MAY RESULT IN SEVERE PERSONAL BODY INJURY OR PROPERTY DAMAGES.

WORK ON CELLS MUST BE PERFORMED ONLY WITH PROPER TOOLS AND PROTECTIVE EQUIPMENT MUST BE USED.

CELL MAINTENANCE MUST BE CARRIED OUT BY PERSONNEL KNOWLEDGEABLE OF CELLS AND TRAINED IN THE SAFETY PRECAUTIONS INVOLVED.

FAILURE TO OBSERVE THE ABOVE MAY CAUSE VARIOUS HAZARDS.

7.2. 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:

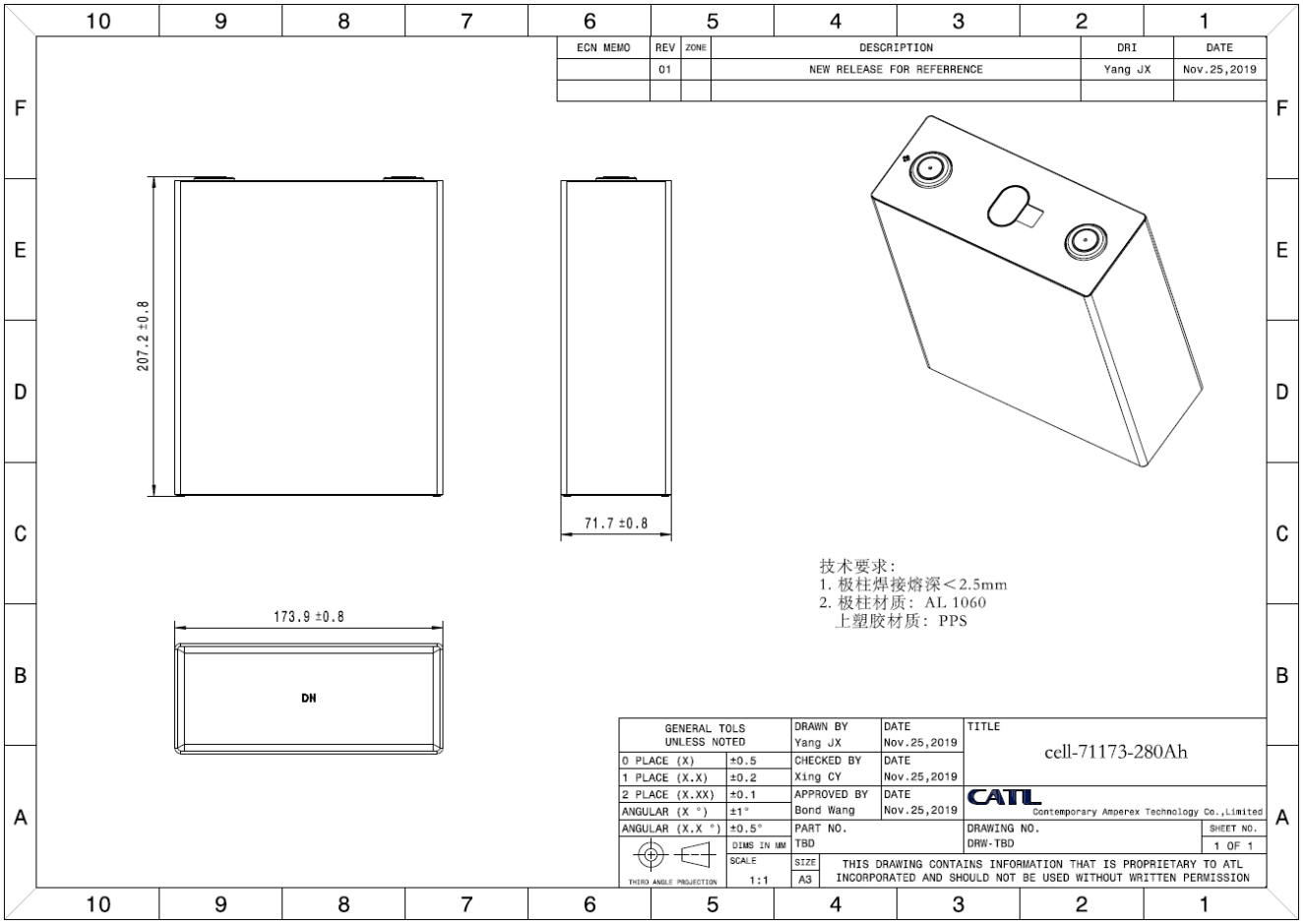
7.2.1 操作者在操作时可能会受到化学品、电击或者电弧的伤害。尽管人体对遭受直流电与交流电的反应不同，但是高于 50V 的直流电压与交流电对人体的伤害是同样严重的，因此客户必须在操作中采取保守的姿势以避免电流的伤害。

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.

8. 电芯图纸 Mechanical Drawing