UN38.3 检测报告

UN38.3 TEST REPORT

委托单位名称 **Client Name**	大秦数字能源技术股份有限公司 Dyness Digital Energy Technology Co., LTD.
产 品 名 称 **Name of product**	储能系统 Energy storage system
制 造 厂 商 **Manufacturer**	大秦新能源科技（泰州）有限公司 Daqin New Energy Tech(Taizhou) Co., Ltd.
商 标 型 号 **Trade mark & model**	DYNESS/EnerCore-DH200Y
检 测 类 别 **Test sort**	委托试验 Safety Entrust Test

中检集团南方测试股份有限公司
CCIC Southern Testing Co., Ltd.

地址：深圳市南山区西丽街道沙河路 43 号电子检测大厦 邮政编码/P.C.：518055
Address: Electronic Testing Building No.43 Shahe Road, Xili Road, Nanshan District, ShenZhen, Guangdong, China
电话/TEL：86-755-86913552 传真/FAX：86-755-26627238
网址/Internet：http://www.ccic-set.com 电子信箱/E-Mail：luther.lu@ccic-set.com

中检集团南方测试股份有限公司
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检测报告
TEST REPORT

样品名称 Name of sample	储能系统 Energy storage system		商标 Trade mark	DYNESS	
制造厂商 Manufacturer	大秦新能源科技（泰州）有限公司 Daqin New Energy Tech(Taizhou) Co., Ltd.		型号规格 Model/Type	EnerCore-DH200Y (内部模组型号：HV166280Y) (内部电池单体型号：L173F280A)	
委托单位 Client	大秦数字能源技术股份有限公司 Dyness Digital Energy Technology Co., LTD.		取样方式 Sampling method	Sent by client	
送检日期 Application date	2023/11/09		检测日期 Test Date	2023/12/28-2024/02/02	
样品数量 Quantity of samples	4 个模组，30 个电芯 4 modules, 30 Cells		检验环境 Environment condition	20～25℃ 50～75%RH	
标称电压 Nominal voltage (module/system)	166.4V/832V	充电限制电压 Limited Charge Voltage (module/system)	187.2V/936V	额定能量/容量 Rate Energy/ Capacity (module/system)	46.6kWh /280Ah 232kWh/280Ah
标准充电电流 Standard charge Current (module/system)	140A/140A	最大充电电流 Max. Charge Current (module/system)	140A/140A	充电截止电流 End Charge Current (module/system)	14A/14A
放电截止电压 Cut-off Voltage (module/system)	150.8V/754V	最大放电电流 Max Discharge Current (module/system)	140A/140A	电池数量 Component cells Number	260PCS (52S1P)*5

检验项目(Test item):

UN38.3.4.1：高度模拟 Altitude simulation

UN38.3.4.2：温度试验 Thermal Test

UN38.3.4.3：振动 Vibration

UN38.3.4.4：冲击 Shock

UN38.3.4.5：外部短路 External short circuit

UN38.3.4.6：撞击/挤压 Impact/Crush

UN38.3.4.8：强制放电 Forced discharge

UN38.3.3(g)：电池组件保护功能验证 Verification of the assembled battery‘s’ protection equipment（过度充电保护 Overcharge protection、短路保护 Short circuits protection、电池组间过度放电保护 Over discharge protection between the batteries）

检测依据(Reference documents):

联合国《试验和标准手册》（第 7 版修订 1）38.3 节

United Nations "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend1/Subsection 38.3

检验概况(Summary):

对电池或电池组进行了 T1 至 T8 项试验，试验 T1 至 T5 按顺序进行，使用相同电池或电池组，试验 T6 至 T8 使用未另外试验过的电池或电池组。

Each Cell/battery type is subjected to tests 1 to 8,Tests 1 to 5 are conducted in sequence on the same Cells/batteries,Tests 6 to 8 are conducted using not otherwise tested Cells/batteries.

质量损失 Mass loss%=$(M_1-M_2)/M_1\times100$

式中：M1 是实验前的质量，M2 是试验后的质量，如果质量损失不超过表 3.8.3.1 所列的数值，视

为“无质量损失”。

Where M_1 is the mass before the test and M_2 is the mass after the test. When mass loss does not exceed the values in Table 38.3.2.2, it shall be considered as "no mass loss".

Mass M of cell or battery	Mass loss limit
M＜1g	0.5%
1g≤M≤75g	0.2%
M＞75g	0.1%

试验 T1 至 T4 如果电池组无渗漏、无排气、无解体、无破裂和无起火，并且每个试验电池组在试验后的开路电压不小于其在进行这一试验前电压的 90%则认为符合要求。

In test 1 to 4 batteries meet this requirement if there is no leakage,no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test battery after testing is not less than 90% of its voltage immediately prior to this procedure.

备注（Remark）:

储能系统(EnerCore-DH200Y，832V 280Ah 232kWh)，由 5 个型号为 HV166280Y（166.4V 280Ah 46.6kWh）的电池模块串联而成，该电池组件内部电池组已通过 UN38.3 测试，报告编号为 SET-20231106B15213X。

针对电池组件，对其内部 1 个模组（HV166280Y）与高压盒进行组装，代替储能电池系统，对其内部是否装有能够防止过度充电、短路、电池组间过度放电的装置进行验证，样品编号：20231106B15216X-S1。

本报告中，内部电池模块（HV166280Y）和电芯（L173F280A）的照片和测试数据均引用自编号为 SET-20231106B15213X 的报告。

对 4 个电池组分别编号为 20231106B15213X-B1 ~ 20231106B15213X-B4，30 个电池分别编号为 20231106B15213X-C5 ~ 20231106B15213X-C34。

以下测试项目的电池组样品编号用后缀 B1~B4 指代 20231106B15213X-B1 ~20231106B15213X-B4，电池的样品编号用 C5~C34 指代 20231106B15213X-C5 ~20231106B15213X-C34。

本报告与编号为 SET-20231106B15213X 的报告一同使用，才能证明电池组件完全符合 UN38.3 的要求。

检验结论(Test conclusion):

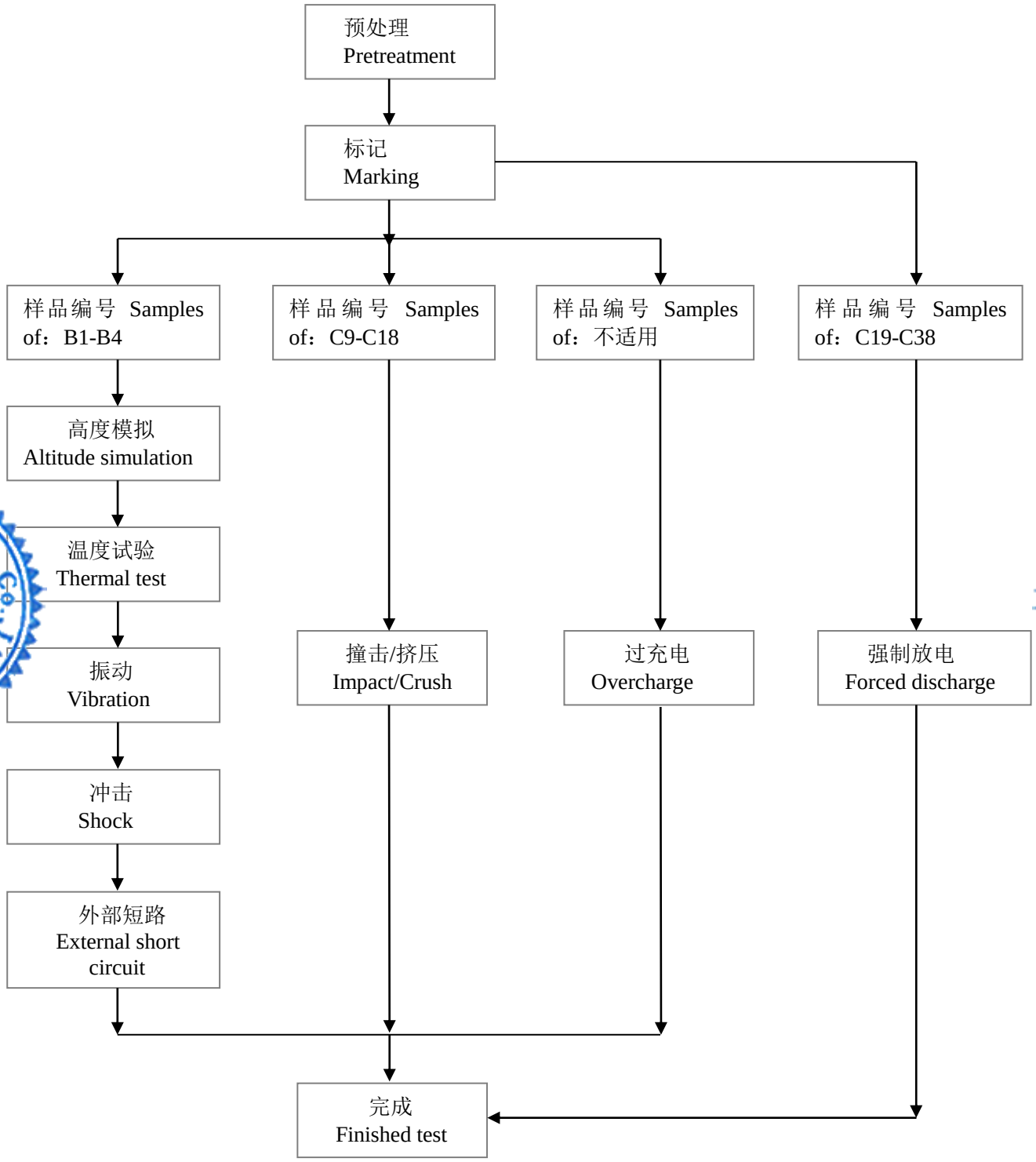
测试样品符合联合国《试验和标准手册》（第 7 版修订 1）38.3 节要求。

The test samples comply with United Nations "Manual of Tests and Criteria" ST/SG/AC.10/11/Rev.7/Amend1/Subsection 38.3.

（检测单位盖章 stamp）

检 测：Tested by	唐美贤	日期 Date	2024 年 02 月 02 日
审 核：Reviewed by		日期 Date	2024 年 02 月 02 日
批 准：Approved by		日期 Date	2024 年 02 月 02 日

测试流程 Test Procedure



测试结果 Test results:

UN38.3.4.1 高度模拟 Altitude simulation

测试方法 Test method;
电池或电池组在压力等于或低于 11.6 千帕和环境温度(20±5℃)下存放至少 6 小时。
Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature (20 ± 5 ℃).
要求 Requirement;
电池或电池组如无渗漏、无排气、无解体、无破裂和无燃烧，并且每个试验电池或电池组在试验后的开路电压不小于其在进行这一试验前电压的 90%，即符合这一要求。
Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire a nd if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.

测试数据如下表 Test Date showed in table below;

样品状态 State of sample	序号 No.	试验前 Pre-test		试验后 After test		质量损失 Mass loss (%)	电压比 Voltage after test/Voltage pre-test(%)	判定 Status
		质量 Mass (kg)	电压 Voltage (V)	质量 Mass (kg)	电压 Voltage (V)			
第一个充放电周期后完全充电 At first cycle in fully charged states	B1	329.54	173.796	329.54	173.792	0.00	100.00	PASS
	B2	329.42	171.461	329.42	171.458	0.00	100.00	PASS
25 个充放电周期后，完全充电 After 25 cycles ending in fully charged states	B3	329.60	174.150	329.59	174.146	0.00	100.00	PASS
	B4	329.25	174.072	329.25	174.069	0.00	100.00	PASS

备注 Notes:
试验后电池无渗漏、无排气、无解体、无破裂和无燃烧。
After the test,thecells are no leakage,no venting, no disassembly, no rupture and no fire.

UN38.3.4.2 温度试验 Thermal test

测试方法 Test method;
电池或电池组在试验温度等于 72±2℃下存放至少 6 小时，接着在试验温度等于-40±2℃下存放至少 6 小时。两个极端试验温度之间的最大时间间隔为 30 分钟。这一程序重复 10 次，接着将所有试验电池在环境温度(20±5℃)下存放 24 小时。对于大型电池和电池组，暴露于极端试验温度的时间至少应为 12 小时。
Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72 ± 2 °C, followed by storage for at least six hours at a test temperature equal to -40 ± 2 °C. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20 ± 5 °C). For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.
要求 Requirement;
电池或电池组如无渗漏、无排气、无解体、无破裂和无燃烧，并且每个试验电池或电池组在试验后的开路电压不小于其在进行这一试验前电压的 90%，即符合这一要求。
Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

测试数据如下表 Test Date showed in table below;

样品状态 State of sample	序号 No.	试验前 Pre-test		试验后 After test		质量损失 Mass loss (%)	电压比 Voltage after test/Voltage pre-test(%)	判定 Status
		质量 Mass (kg)	电压 Voltage (V)	质量 Mass (kg)	电压 Voltage (V)			
第一个充放电周期后完全充电 At first cycle in fully charged states	B1	329.54	173.792	329.48	171.712	0.02	98.80	PASS
	B2	329.42	171.458	329.37	169.427	0.02	98.82	PASS
25 个充放电周期后，完全充电 After 25 cycles ending in fully charged states	B3	329.59	174.146	329.54	172.095	0.02	98.82	PASS
	B4	329.25	174.069	329.19	172.039	0.02	98.83	PASS

备注 Notes:
试验后电池无渗漏、无排气、无解体、无破裂和无燃烧。
After the test,the cells are no leakage,no venting, no disassembly, no rupture and no fire.

UN38.3.4.3 振动 Vibration

测试方法 Test method；

电池或电池组紧固在振动机平台，但不得造成电池变形，并能准确可靠地传播振动。正弦波形振动，频率在 7 赫兹和 200 赫兹之间摆动再回到 7 赫兹的对数扫频为时 15 分钟。这一振动过程须对三个互相垂直的电池安装方位的每一个方向都重复进行 12 次，总共为时 3 小时。其中一个振动方向必须与端面垂直。作对数式频率扫描，对总质量不超过 12kg 的电池或电池组（电池和小型电池组），和对 12Kg 及更大的电池组（大型电池组）有所不同。

对电池和小型电池组：从 7 赫兹开始，保持 1gn 的最大加速度直到频率达到 18 赫兹。然后将振幅保持在 0.8 毫米(总偏移 1.6 毫米)，并增加频率直到最大加速度达到 8gn(频率约为 50 赫兹)。将最大加速度保持在 8gn 直到频率增加到 200 赫兹。

对大型电池组：从 7 赫兹开始，保持 1gn 的最大加速度直到频率达到 18 赫兹。然后将振幅保持在 0.8 毫米(总偏移 1.6 毫米)，并增加频率直到最大加速度达到 2gn(频率约为 25 赫兹)。将最大加速度保持在 2gn 直到频率增加到 200 赫兹。

Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.

The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12 kg (cells and small batteries), and for batteries with a gross mass of more than 12 kg (large batteries).

For cells and small batteries: from 7 Hz a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 8 gn occurs (approximately 50 Hz). A peak acceleration of 8 gn is then maintained until the frequency is increased to 200 Hz.

For batteries with a gross mass of more than 12 kg (large batteries)：from 7 Hz a peak acceleration of 1 gn is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 2 gn occurs (approximately 25 Hz). A peak acceleration of 2 gn is then maintained until the frequency is increased to 200 Hz.

要求 Requirement；
样品无渗漏、无排气、无解体、无破裂和无燃烧，并且每个试验电池或电池组在试验后的开路电压不小于其在进行这一试验前电压的 90％，电池即符合这一要求。
Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire during the test and after the test and if the open circuit voltage of each test cell or battery after testing in its perpendicular mounting position is not less than 90% of its voltage immediately prior to this procedure.

测试数据如下表 Test Date showed in table below；

样品状态 State of sample	序号 No.	试验前 Pre-test		试验后 After test		质量损失 Mass loss (%)	电压比 Voltage after test/Voltage pre-test(%)	判定 Status
		质量 Mass (kg)	电压 Voltage (V)	质量 Mass (kg)	电压 Voltage (V)			
第一个充放电周期后完全充电 At first cycle in fully charged states	B1	329.48	171.712	329.47	171.706	0.00	100.00	PASS
	B2	329.37	169.427	329.37	169.420	0.00	100.00	PASS
25 个充放电周期后，完全充电 After 25 cycles ending in fully charged states	B3	329.54	172.095	329.54	172.078	0.00	99.99	PASS
	B4	329.19	172.039	329.16	172.031	0.01	100.00	PASS

备注 Notes:
试验后电池无渗漏、无排气、无解体、无破裂和无燃烧。
After the test,the cells are no leakage,no venting, no disassembly, no rupture and no fire.

UN38.3.4.4 冲击 Shock

测试方法 Test method;
电池或电池组用坚硬支架紧固在试验装置上，支架支撑着每个试验电池的所有安装面。
每个电池经受最大加速度 150gn 和脉冲持续时间 6 毫秒的半正弦波冲击。大型电池需经受最大加速度 50gn 和脉冲持续时间 11ms 的半正弦冲击。
Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery.
Each cell shall be subjected to a half-sine shock of peak acceleration of 150 gn and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock of peak acceleration of 50 gn and pulse duration of 11 milliseconds.
每个电池组应受到半正弦冲击峰值加速度取决于电池组的质量。小电池组脉冲时间为 6 毫秒，大电池组脉冲时间为 11 毫秒。下面的公式用于计算适当的最小峰值加速度。
Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of the battery. The pulse duration shall be 6 milliseconds for small batteries and 11 milliseconds for large batteries. The formulas below are provided to calculate the appropriate minimum peak accelerations.

Battery	Minimum peak acceleration	Pulse duration
Small batteries	150 g_n or result of formula $Acceleration(g_n) = \sqrt{\left(\frac{100850}{mass*}\right)}$ whichever is smaller	6 ms
Large batteries	50 g_n or result of formula $Acceleration(g_n) = \sqrt{\left(\frac{30000}{mass*}\right)}$ whichever is smaller	11 ms

* Mass is expressed in kilograms.

每个电池在三个互相垂直的电池组安装方位的正方向经受三次冲击，接着在反方向经受三次冲击，总共经受 18 次冲击。
Each cell or battery shall be subjected to three shocks in the positive direction and to three shocks in the negative di rection in each of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.

要求 Requirement;
样品无渗漏、无排气、无解体、无破裂和无燃烧，并且每个试验电池在试验后的开路电压不小于其在进行这一试验前电压的 90%，电池即符合这一要求。
Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cells after testing is not less than 90% of its voltage immediately prior to thisprocedure.
The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

测试数据如下表 Test Date showed in table below；

样品状态 State of sample	序号 No.	试验前 Pre-test		试验后 After test		质量损失 Mass loss (%)	电压比 Voltage after test/Voltage pre-test(%)	判定 Status
		质量 Mass (kg)	电压 Voltage (V)	质量 Mass (kg)	电压 Voltage (V)			
第一个充放电周期后完全充电 At first cycle in fully charged states	B1	329.47	171.706	329.47	171.705	0.00	100.00	PASS
	B2	329.37	169.420	329.37	169.417	0.00	100.00	PASS
25 个充放电周期后，完全充电 After 25 cycles ending in fully charged states	B3	329.54	172.078	329.53	172.077	0.00	100.00	PASS
	B4	329.16	172.031	329.16	172.031	0.00	100.00	PASS

备注 Notes:
试验后电池无渗漏、无排气、无解体、无破裂和无燃烧。
After the test,the cells are no leakage,no venting, no disassembly, no rupture and no fire.

UN38.3.4.5 外部短路 External short circuit

测试方法 Test method;
电池或电池组的应加热一段时间使外壳达到 57±4℃的均匀稳定温度，加热时间应通过评估电池或电池组的尺寸和设计决定。对于无法评估的，小型电池和电池放置时间应至少 6 小时，大型电池和电池组应至少 12 小时。然后电池或电池组在 57±4℃下经受总外阻小于 0.1 欧姆的短路条件。
电池或电池组外壳温度回到 57±4℃后保持短路状态 1 小时以上，对于大型电池，电池温度降低至最高温升值一半时试验结束。
The cell or battery to be tested shall be shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of 57 ± 4 ℃, measured on the external case. This period of time depends on the size and design of the cell or battery and should be assessed and documented. If this assessment is not feasible, the exposure time shall be at least 6 hours for small cells and small batteries, and 12 hours for large cells and large batteries. Then the cell or battery at 57 ± 4 ℃ shall be subjected to one short circuit condition with a total external resistance of less than 0.1 ohm.
This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 57 ± 4 ℃, or in the case of the large batteries, has decreased by half of the maximum temperature increase observed during the test and remains below that value.
The short circuit and cooling down phases shall be conducted at least at ambient temperature.

要求 Requirement;
外壳温度如不超过 170℃，并且在试验过程后 6 小时内无解体、无破裂、无起火，即符合这一要求。
Cellsand batteries meet this requirement if their external temperature does not exceed 170℃ and there is no disassembly, no rupture and no fire within six hours after test.

测试数据如下表 Test Date showed in table below;

样品状态 State of sample	序号 No.	最高温度 Highest temperature（℃）	短路电阻 Short-circuit resistance (mΩ)	判定 Status
第一个充放电周期后完全充电 At first cycle in fully charged states	B1	57.0	78	PASS
	B2	56.5	79	PASS
25 个充放电周期后，完全充电 After 25 cycles ending in fully charged states	B3	56.3	78	PASS
	B4	56.7	78	PASS

备注 Notes:
试验后电池 6 小时内无解体、无破裂、无起火。
After the test,the cells are no disassembly ,no rupture and no fire within six hours.

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UN38.3.4.6 撞击/挤压 Impact/Crush

撞击 Impact
(适用于直径不小于 18mm 的圆柱形电池 applicable to cylindrical cells not less than 18mm in diameter)

测试方法 Test method;
试样电池或元件电池放在平坦光滑的表面上，一根 316 型不锈钢棒横放在试样中心，钢棒直径 15.8mm±0.1mm，长度至少 6cm，或电池最长端的尺度，取二者之长者，将一块 9.1kg±0.1kg 的重锤从 61cm±2.5cm 高处跌落到钢棒和试样交叉处，使用一个几乎没有摩擦的、对落体重锤阻力最小的垂直轨道或管道加以控制。垂直轨道或管道用于引导落锤沿与水平支撑表面呈 90 度落下。
接受撞击的试样，纵轴应与平坦表面平行并与横放在试样中心的直径 15.8mm±0.1mm 完全表面的纵轴垂直、每一试样只经受一次撞击。
The sample cell or component cell is to be placed on a flat smooth surface. A 15.8 mm ±0.1mm diameter, at least 6 cm long, or the longest dimension of the cell, whichever is greater, Type 316 stainless steel bar is to be placed across the centre of the sample. A 9.1 kg ± 0.1 kg mass is to be dropped from a height of 61 ± 2.5 cm at the intersection of the bar and sample in a controlled manner using a near frictionless, vertical sliding track or channel with minimal drag on the falling mass. The vertical track or channel used to guide the falling mass shall be oriented 90 degrees from the horizontal supporting surface.
The test sample is to be impacted with its longitudinal axis parallel to the flat surface andperpendicular to the longitudinal axis of the 15.8 mm ± 0.1mm diameter curved surface lying across the centre of the test sample. Each sample is to be subjected to only a single impact.

挤压/Crush
(适用于棱柱形、袋装、硬币/纽扣电池和直径小于 18mm 的圆柱形电池 applicable to prismatic, pouch, coin/button cells and cylindrical cells not more than 18 mm in diameter)

注：此处直径指设计参数(例如，18650 电池的直径为 18.0 毫米)。
NOTE: Diameter here refers to the design parameter (for example the diameter of 18 650 cells is 18.0 mm).

测试方法 Test method;
将电池或元件电池放在两个平面之间挤压，挤压力度逐渐加大，在第一个接触点上的速度大约为 1.5 厘米/秒，直到出现下列的情况之一；
Cells or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately 1.5 cm/s at the first point of contact，The crushing is to be continueduntil the first of the three options below is reached.

(a) 施加的力量达到 13 千牛±0.78 千牛；
The applied force reaches 13 kN ± 0.78 kN;
(b) 电池的电压下降至少 100mV；或
The voltage of the cell drops by at least 100 mV; or
(c) 电池变形达原始高度的 50%或以上。
The cell is deformed by 50% or more of its original thickness.

一旦达到最大压力、电压下降 100 毫伏或更多，或电池变形至少达原厚度的 50%，即可解除压力。
Once the maximum pressure has been obtained, the voltage drops by100 mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.

棱柱形或袋装电池应从最宽的一面施压。纽扣/硬币形电池应从其平坦表面施压。圆柱形电池应从与纵轴垂直的方向施压。
A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis.

每个试样电池或元件电池只做一次挤压试验。试样应继续观察 6 小时。试验应使用之前未做过其他试验的电池或元件电池进行。
Each test cell or component cell is to be subjected to one crush only. The test sample shall be observed for a further 6 h. The test shall be conducted using test cells or component cells that have not previously been subjected to other tests.

要求 Requirement;
外壳温度如不超过 170℃，并且在试验过程中及试验后 6 小时内无解体、无破裂、无起火，即符合这一要求。
Cells or component cellmeet this requirement if their external temperature does not exceed 170 ℃ and there is no disassembly, no rupture and no fire during the test and within six hours after test.

试数据如下表 Test Date showed in table below;

样品状态 State of sample	测试项目 Test item	序号 No.	判定 Status
一个充放电周期 50%设计额定容量状态 At first cycle at 50% of the design rated capacity	挤压 Crush	C9	PASS
		C10	PASS
		C11	PASS
		C12	PASS
		C13	PASS
25 个充放电周期 50%设计额定容量状态 At 25 cycles at 50% of the design rated capacity		C14	PASS
		C15	PASS
		C16	PASS
		C17	PASS
		C18	PASS

备注 Notes:
电池或元件电池在试验过程中和试验后 6 小时内无解体、无破裂、无起火。
Cells or component cell are no disassembly and no fire during the test and within six hours after test.

UN38.3.4.8 强制放电 Forced discharge

测试方法 Test method；
电池在环境温度下与 12V 直流电电源串联在起始电流等于制造商给的最大放电电流条件下强制放电
Each cells is forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer.

将适当大小和额定值的电阻负荷与试验电池串联，计算得出给定的放电电流。对每个电池进行强制放电，放电时间(小时)应等于其额定容量除以初始试验电流(安培)。
The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).

要求 Requirement；
充电电池如在试验过程中和试验后 7 天内无解体，无起火，即符合本项要求。
Recharged cells meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

测试数据如下表 Test Date showed in table below；

样品状态 State of sample	序号 No.	判定 Status
第一个充放电周期后完全放电 At first cycle in fully discharged states	C19	PASS
	C20	PASS
	C21	PASS
	C22	PASS
	C23	PASS
	C24	PASS
	C25	PASS
	C26	PASS
	C27	PASS
	C28	PASS
25 个充放电周期后，完全放电 After 25 cycles ending in fully discharged states	C29	PASS
	C30	PASS
	C31	PASS
	C32	PASS
	C33	PASS
	C34	PASS
	C35	PASS
	C36	PASS
	C37	PASS
	C38	PASS

备注 Notes:
试验后充电电池在试验过程中和试验后 7 天内无解体、无起火。
After the test, the recharged cells are no disassembly and no fire during the test and within seven days Ambient.

38.3.3(g) 电池组件保护功能验证 Verification of the assembled battery‘s’ protection equipment

过度充电保护 Overcharge protection

测试方法 Test method；
按照制造商推荐的电流对电池组件进行恒流充电；
The assembled battety is charged using the current specified by the manufacturer;
观察电池组件的保护功能是否动作。
The protective device shall be observed whether it works

短路保护 Short circuits protection

测试方法 Test method；
按照与制造商商定的短路内阻用连接线短路电池组件的正负极
The assembled battety is subjected to one short circuit condition with a external resistance agreed with the manufacturer;
观察电池组件的保护功能是否动作。
The protective device shall be observed whether it works.

电池组间过度放电保护 Over discharge protection between the batteries

测试方法 Test method；
按照制造商推荐的电流对电池组件进行恒流放电；
The assembled battety is discharged using the current specified by the manufacturer;
观察电池组件的保护功能是否动作。
The protective device shall be observed whether it works.

要求 Requirement；
电池组件应装有相应的保护装置。
Equipped with a protective device

测试数据如下表 Test Date showed in table below；

样品编号	试验项目 Test Item	试验参数 Test Parameter	启动保护动作时的电压 Voltage when the protective device works（V）	判定 Status
20231106B15216X-S1	过度充电保护 Overcharge protection	充电电流：140A	177.6119V	PASS
	短路保护 Short circuits protection	短路电阻：5mΩ	/	PASS
	电池组间过度放电保护 Over discharge protection between the batteries	放电电流：140A	165.8873V	PASS

样品照片 Photo document

图片 Photo 1

样品照片 Photo document

图片 Photo 2

样品照片 Photo document

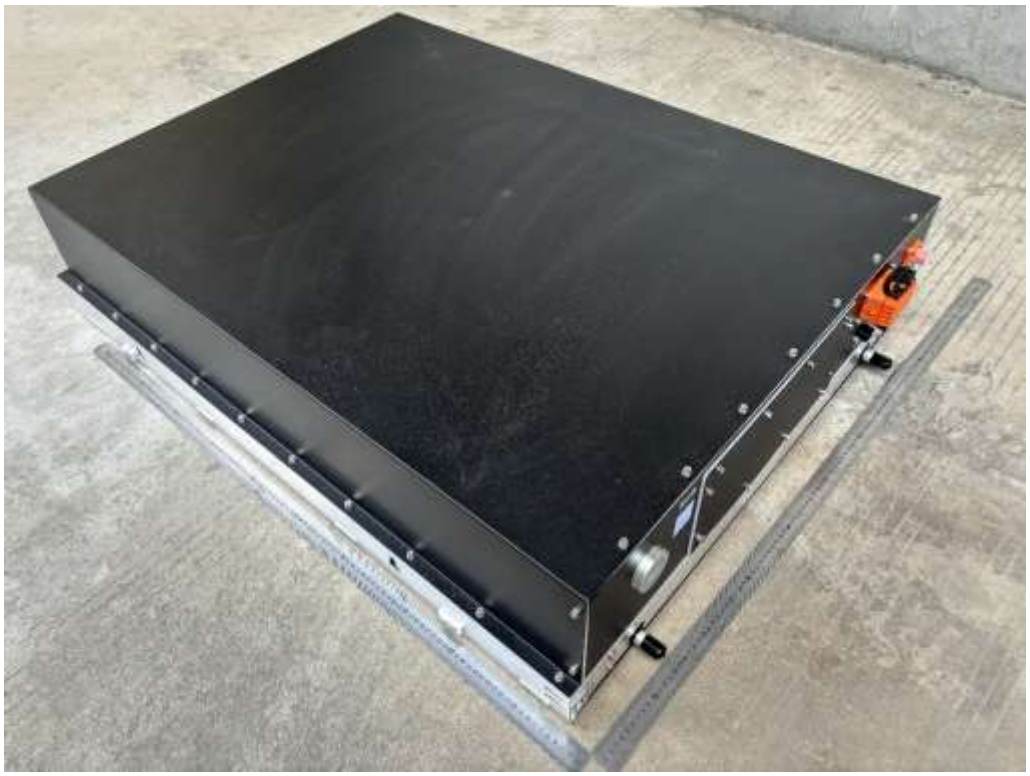
图片 Photo 3

样品照片 Photo document

图片 Photo 4

样品照片 Photo document

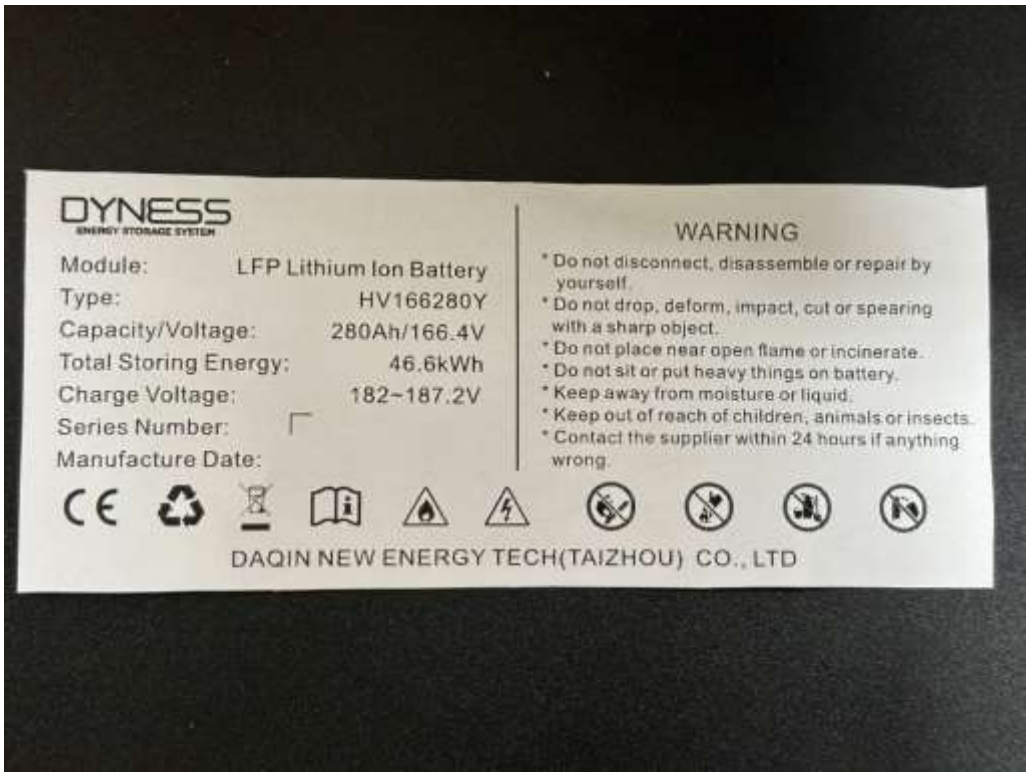
图片 Photo 5



图片 Photo 6

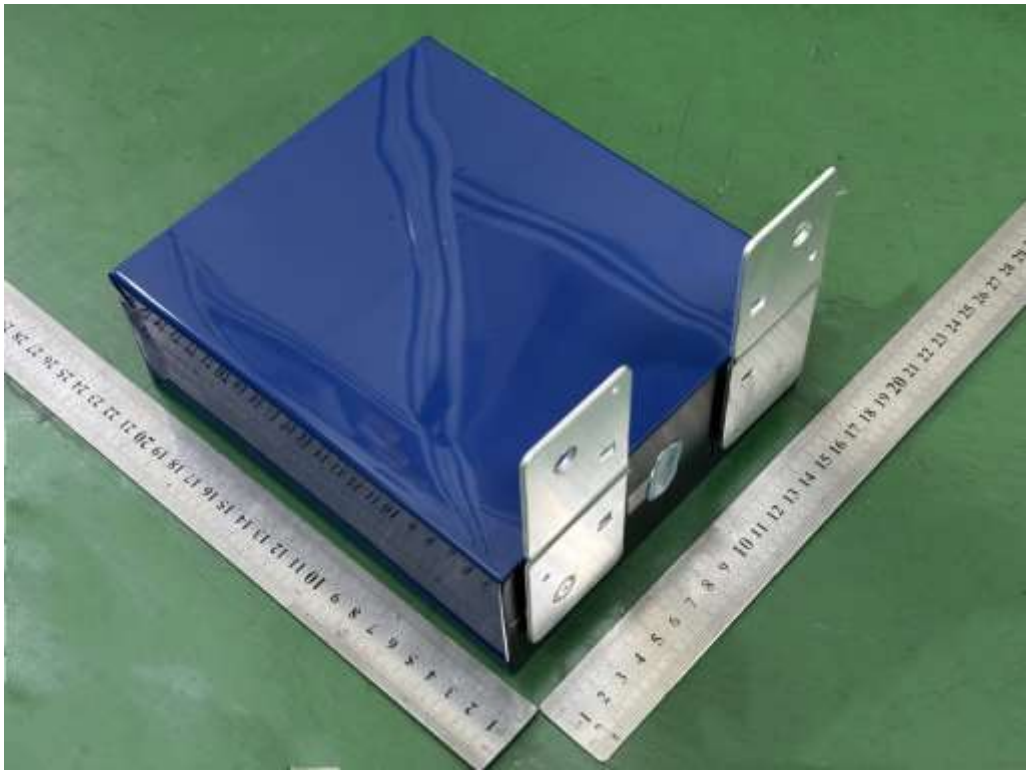
样品照片 Photo document

图片 Photo 7



图片 Photo 8

样品照片 Photo document



图片 Photo 9

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试验仪器设备清单

序号	名称	型号	编号	校准有效期至	本次使用(√)
1	电池包（模组）充放电系统	CHROMA 17040	A200503588	2024/06/07	√
2	充放电模拟器	Neware CE-100V300A	L220200169	2024/03/20	√
3	电芯能量回馈充放电测试系统	NEBULA LCT-05300-V010	L220200170	2024/02/13	√
4	充放电测试系统	BAT-NEEFLCT-103001K5-V010	A221104031	2024/10/25	√
5	电子负载	IT8816	L210300071	2024/03/14	√
6	手持式万用表	U1241C	A211003881	2024/10/23	√
7	电动振动台系统	DC-8000-80	A190403502	2024/10/24	√
8	智能直流低电阻测试仪	YG2512	A211003772	2024/03/14	√
9	步入式环境箱	HSY-BRS-6000L-A	L211000143	2024/7/17	√
10	低气压试验箱	OK-ZK-1200	A220903967	2024/07/13	√
11	电芯强制内部短路试验机	BE-6045W	A180803174	2024/06/07	√
12	电子台秤	E218C	C210900393	2024/07/18	√
13	数据采集仪(主机)	34972A	C211000456	2024/02/13	√
14	数据采集开关单元	34901A	C211000457	2024/02/13	√
15	电池簇充放电系统	BT1800V700AC1-T	L230200198	2024/03/02	√
16	冲击试验系统	CL-50	A211003717	2024/11/23	√

注：以上仪器设备在计量检定周期内。

****** 报告结束 END OF REPORT ******

声明

STATEMENT

1. 报告未加盖“检验检测专用章”无效。
   The test report is invalid without stamp of laboratory.
2. 报告无检测、批准人员签字无效。
   The test report is invalid without signatureof person(s) testing and authorizing.
3. 报告涂改无效。
   The test report is invalid if erased and corrected.
4. 自送样品的检测结论仅对送检样品有效。
   Test results of the report is valid to the test samplesif sampling by client.
5. “☆”号项目未通过 CNAS 认可。
   “☆”item to be outside the scope of authorized by CNAS.
6. 未加盖资质认定标志的报告，不具有对社会的证明作用。
   The report without the”CMA”stamp shall not have a certifying effect on the society.
7. 未经本实验室书面同意，不得部分地复制本报告。
   The test reportshall not be reproduced except in full, without written approval of the laboratory.
8. 如对本报告有异议，可在收到报告后 15 天内向本单位申诉，逾期不予受理。
   If there is any objection to report,the client should inform issuing laboratory within 15 days from the date of receiving test report.

地址：深圳市南山区西丽街道沙河路 43 号电子检测大厦 邮政编码/P.C.：518055
Address: Electronic Testing Building No.43 Shahe Road, Xili Road, Nanshan District, ShenZhen, Guangdong, China
电话/TEL：86-755-86913552 传真/FAX：86-755-26627238
网址/Internet：http://www.ccic-set.com 电子信箱/E-Mail：luther.lu@ccic-set.com