检 测 报 告

TEST REPORT

委托单位名称 **Client Name**	福建飞毛腿动力科技有限公司 Fujian SCUD Power Technology Co., Ltd.
产 品 名 称 **Name of product**	锂离子电池组 Li-ion BATTERY PACK
制 造 厂 商 **Manufacturer**	福建飞毛腿动力科技有限公司 Fujian SCUD Power Technology Co., Ltd.
商 标 型 号 **Trade mark & model**	LS3612
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.

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中检集团南方测试股份有限公司
CCIC Southern Testing CO., Ltd.
检 测 报 告
TEST REPORT

样品名称 Name of sample	锂离子电池组 Li-ion BATTERY PACK		商标 Trade mark	——	
制造厂商 Manufacturer	福建飞毛腿动力科技有限公司 Fujian SCUD Power Technology Co., Ltd.		型号规格 Model/Type	LS3612 (电池型号：EVE18650/33V)	
委托单位 Client	福建飞毛腿动力科技有限公司 Fujian SCUD Power Technology Co., Ltd.		取样方式 Sampling method	Sent by client	
送检日期 Application data	2022/02/21		检测日期 Test date	2022/02/21-2022/03/23	
样品数量 Quantity of samples	16 个电池组，30 个电池 16 Batteries,30 Cells		检验环境 Environment condition	20～25℃ 45～75%RH	
标称电压 Nominal voltage (cell/battery)	3.6V/36V	充电限制电压 Limited Charge Voltage (cell/battery)	4.2V/42V	额定容量/能量 Rate Capacity/ Energy (cell/battery)	3200mAh 12Ah/432Wh
标准充电电流 Standard charge Current (cell/battery)	1.55A/2.0A	最大充电电流 Max. Charge Current (cell/battery)	3.1A/4.0A	充电截止电流 End Charge Current (cell/battery)	62mA/248mA
放电截止电压 Cut-off Voltage (cell/battery)	2.5V/27.8V	最大放电电流 MaxDischarge Current (cell/battery)	10A/20A	电池数量 Component cells Number	40PCS (10S4P)

检验项目(Test item):

Test1：高度模拟 Altitude simulation

Test2：温度试验 Thermal Test

Test3：振动 Vibration

Test4：冲击 Shock

Test5：外部短路 External short circuit

Test6：撞击/挤压 Impact/Crush

Test7：过充电 Overcharge

Test8：强制放电 Forced discharge

检测依据(Reference documents):

联合国《关于危险货物运输的建议书-试验和标准手册》（第 7 版）38.3 节

UN Recommendations on the Transport of Dangerous Goods Manual of Tests and Criteria ST/SG/AC.10/11/Rev.7/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，试验 T7 使用原先试验 T1 至 T5 中使用过的未损坏的电池组进行试验。

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,Test 7 using undamaged batteries previously used in Tests 1 to 5.

质量损失 Mass loss%=$(M_1-M_2)/M_1 \times 100$

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）:

对 16 个电池组分别编号为 22-01773-B1 ~ 22-01773-B8，22-01773-B19 ~ 22-01773-B26，30 个电池分别编号为 22-01773-C9 ~ 22-01773-C18，22-01773-C27 ~ 22-01773-C46。

以下测试项目的电池组样品编号用 B01#~B08#，B19#~B26# 指代 22-01773-B1 ~ 22-01773-B8，22-01773-B19 ~ 22-01773-B26。电池的样品编号用 C09#-~C18#，C27#~C46# 指代 22-01773-C9 ~ 22-01773-C18，22-01773-C27 ~ 22-01773-C46。

检验结论(Test conclusion):

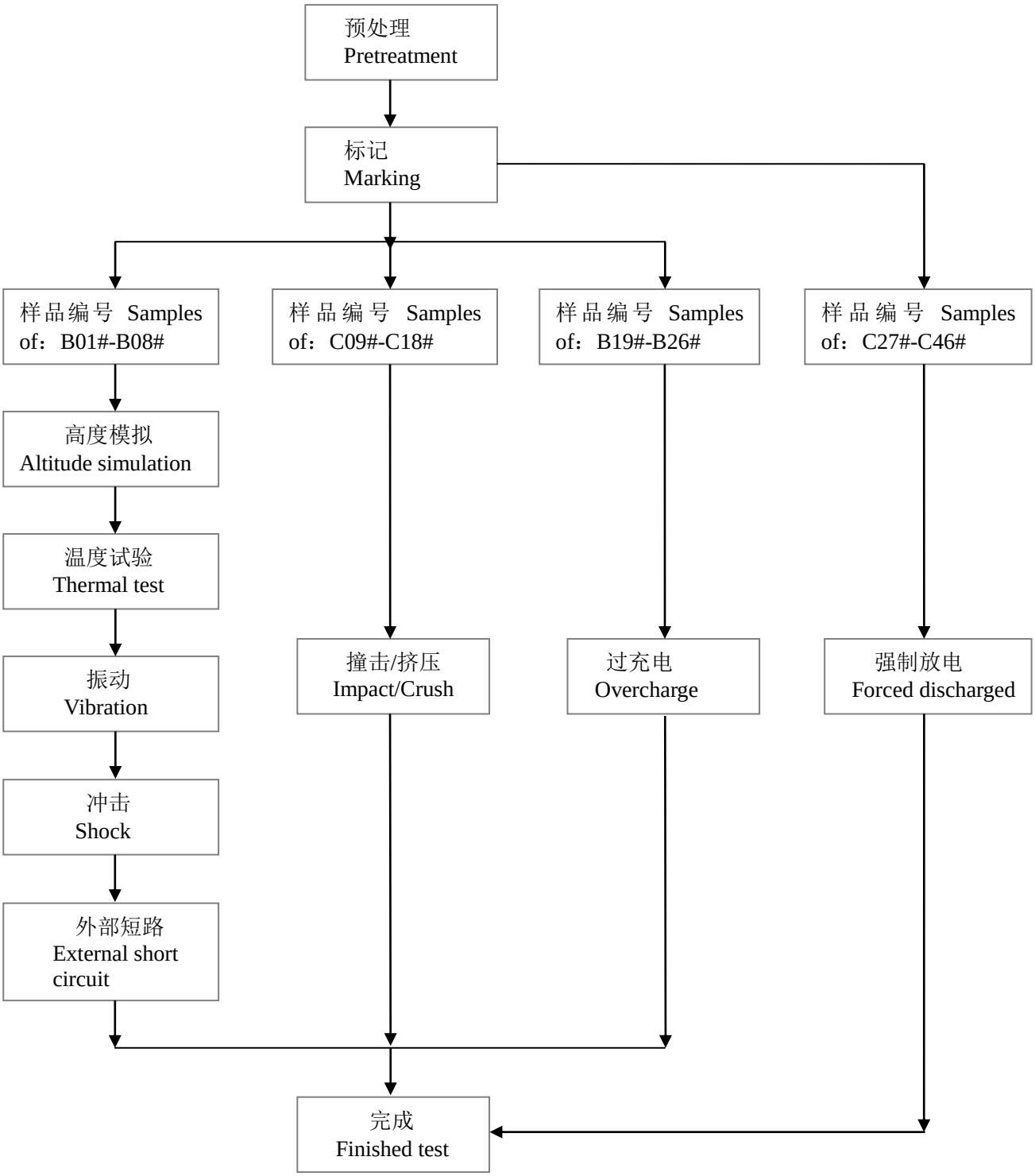
测试样品符合联合国《关于危险货物运输的建议书试验和标准手册》38.3 要求。

The test samples comply with section 38.3 of Recommendations on the Transport of Dangerous Goods,Manual of Test and Criteria.

（检测单位盖章 stamp）

检测：Tested by	审核：Reviewed by	批准：Approved by
2022 年 03 月 29 日	2022 年 03 月 29 日	2022 年 03 月 29 日

测试流程 Test Procedure



测试结果 Test results:

Test T.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	B01#	2.582	41.212	2.582	41.212	0.00	100.00	PASS
	B02#	2.579	41.223	2.579	41.221	0.00	100.00	PASS
	B03#	2.577	41.222	2.577	41.218	0.00	99.99	PASS
	B04#	2.583	41.215	2.583	41.214	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	B05#	2.585	41.211	2.585	41.208	0.00	99.99	PASS
	B06#	2.578	41.218	2.578	41.218	0.00	100.00	PASS
	B07#	2.575	41.217	2.575	41.212	0.00	99.99	PASS
	B08#	2.581	41.220	2.581	41.217	0.00	99.99	PASS

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

Test T.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。
Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72 ±2 ℃, followed by storage for at least six hours at a test temperature equal to -40 ±2 ℃. 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 ℃). 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	B01#	2.582	41.212	2.581	40.754	0.04	98.89	PASS
	B02#	2.579	41.221	2.578	40.769	0.04	98.90	PASS
	B03#	2.577	41.218	2.577	40.766	0.00	98.90	PASS
	B04#	2.583	41.214	2.582	40.758	0.04	98.89	PASS
25 个充放电周期后，完全充电 After 25 cycles ending in fully charged states	B05#	2.585	41.208	2.584	40.741	0.04	98.87	PASS
	B06#	2.578	41.218	2.578	40.755	0.00	98.88	PASS
	B07#	2.575	41.212	2.575	40.762	0.00	98.91	PASS
	B08#	2.581	41.217	2.580	40.761	0.04	98.89	PASS

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

Test T.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。

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.

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	B01#	2.581	40.754	2.581	40.754	0.00	100.00	PASS
	B02#	2.578	40.769	2.578	40.769	0.00	100.00	PASS
	B03#	2.577	40.766	2.577	40.766	0.00	100.00	PASS
	B04#	2.582	40.758	2.582	40.758	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	B05#	2.584	40.741	2.584	40.741	0.00	100.00	PASS
	B06#	2.578	40.755	2.578	40.755	0.00	100.00	PASS
	B07#	2.575	40.762	2.575	40.762	0.00	100.00	PASS
	B08#	2.580	40.761	2.580	40.761	0.00	100.00	PASS

备注 Notes:

试验后电池组无渗漏、无排气、无解体、无破裂和无燃烧。

After the test,the batteries are no leakage,no venting, no disassembly, no rupture and no fire.

Test T.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	B01#	2.581	40.754	2.581	40.754	0.00	100.00	PASS
	B02#	2.578	40.769	2.578	40.765	0.00	99.99	PASS
	B03#	2.577	40.766	2.577	40.764	0.00	100.00	PASS
	B04#	2.582	40.758	2.582	40.757	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	B05#	2.584	40.741	2.584	40.741	0.00	100.00	PASS
	B06#	2.578	40.755	2.578	40.752	0.00	99.99	PASS
	B07#	2.575	40.762	2.575	40.758	0.00	99.99	PASS
	B08#	2.580	40.761	2.580	40.757	0.00	99.99	PASS

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

Test T.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	B01#	55.5	74	PASS
	B02#	56.1	75	PASS
	B03#	55.9	77	PASS
	B04#	55.8	74	PASS
25 个充放电周期后，完全充电 After 25 cycles ending in fully charged states	B05#	55.4	74	PASS
	B06#	55.3	75	PASS
	B07#	55.6	73	PASS
	B08#	55.9	75	PASS

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

Test T.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	撞击 Impact	C09#	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:
样品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.

Test T.7:过充电 Overcharge

测试方法 Test method;
充电电流为制造商建议的最大持续充电电流的两倍，试验的最小电压如下：
The charge current shall be twice the manufacturer's recommended maximum continuouscharge current. The minimum voltage of the test shall be as follows:

(a)制造商建议的充电电压不大于 18V 时，试验的最小电压应是电池组最大充电电压的两倍或者 22V 中的较小者。
(a) when the manufacturer's recommended charge voltage is not more than 18V, theminimum voltage of the test shall be the lesser of two times the maximum chargevoltage of the battery or 22V.
(b)制造商建议的充电电压大于 18V 时，试验的最小电压应为最大充电电压的 1.2 倍。
(b) when the manufacturer's recommended charge voltage is more than 18V, theminimum voltage of the test shall be 1.2 times the maximum charge voltage.
试验应在环境温度下进行。进行试验的时间应为 24 小时。
Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours.

要求 Requirement;
电池组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。
Batteries 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 Test Date showed in table below;

过充电流 Overcharge current: 2×4.0A =8.0A	过充电压 Overcharge voltage : 1.2×42V=50.4V	充电总时间 Total time of charging: 24hours
样品状态 State of sample	序号 No.	判定 Status
第一个充放电周期后完全充电 At first cycle in fully charged states	B19#	PASS
	B20#	PASS
	B21#	PASS
	B22#	PASS
25 个充放电周期后，完全充电 After 25 cycles ending in fully charged states	B23#	PASS
	B24#	PASS
	B25#	PASS
	B26#	PASS

备注 Notes:
电池组在试验过程中和试验后 7 天内无解体、无起火。
The Batteries are no disassembly and no fire during the test and within seven days after the test.

Test T.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).

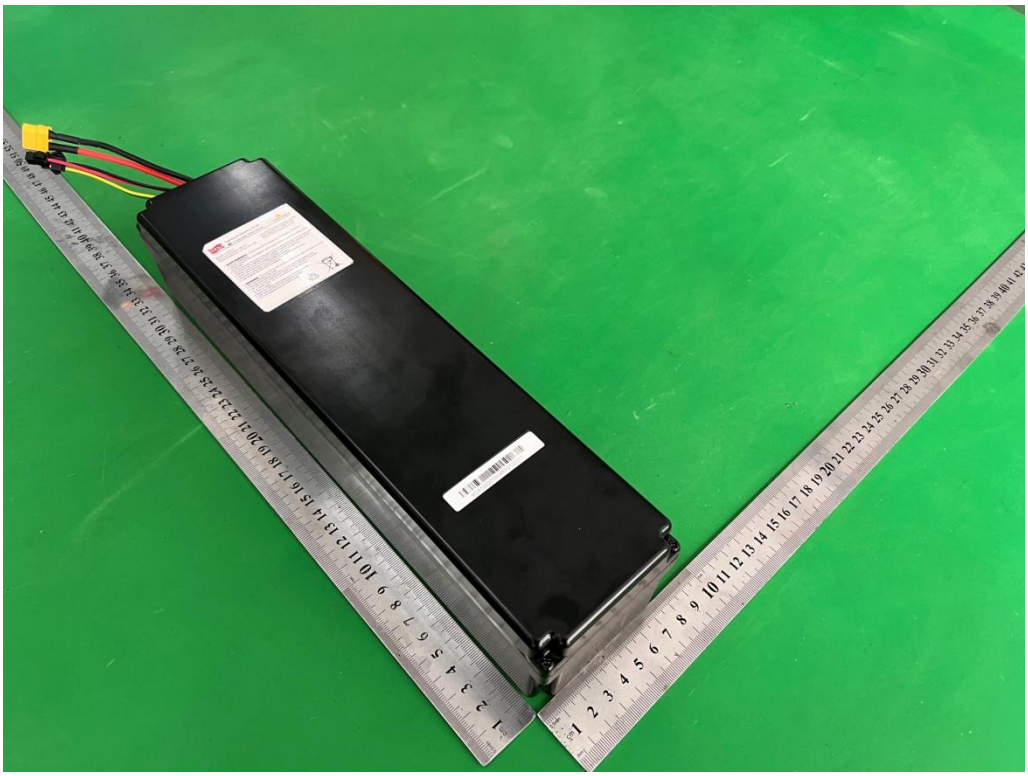
要求 Requirement；
充电电池如在试验过程中和试验后 7 天内无解体，无起火，即符合本项要求。
Recharged cells meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.

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

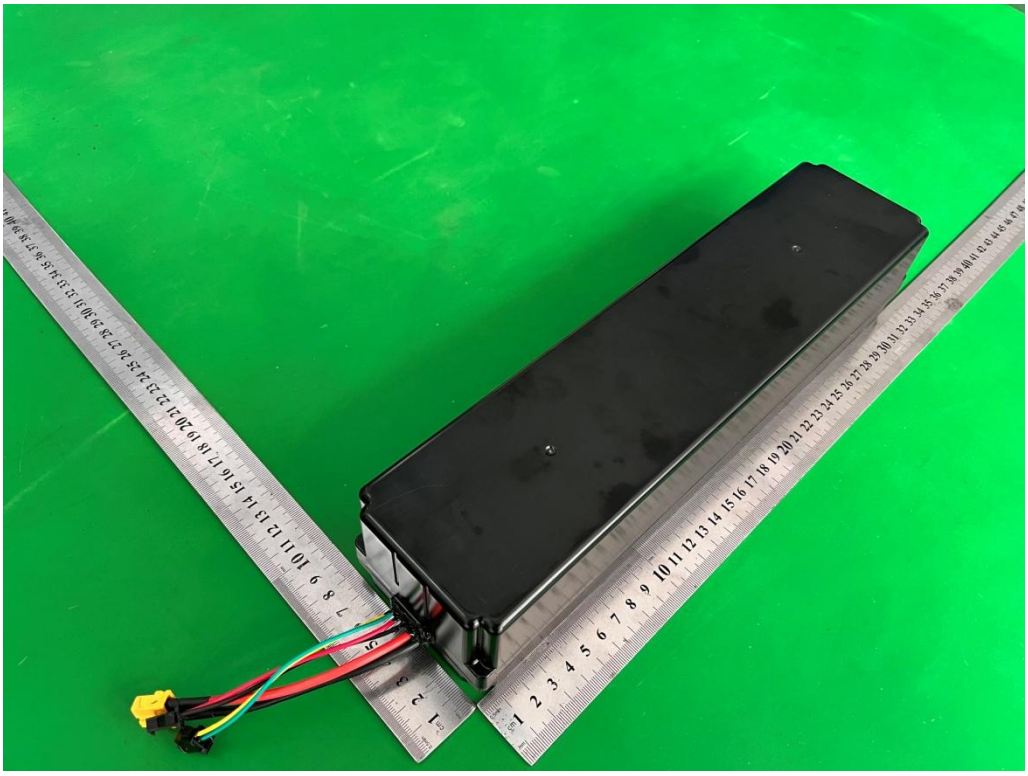
样品状态 State of sample	序号 No.	判定 Status
第一个充放电周期后完全放电 At first cycle in fully discharged states	C27#	PASS
	C28#	PASS
	C29#	PASS
	C30#	PASS
	C31#	PASS
	C32#	PASS
	C33#	PASS
	C34#	PASS
	C35#	PASS
	C36#	PASS
25 个充放电周期后，完全放电 After 25 cycles ending in fully discharged states	C37#	PASS
	C38#	PASS
	C39#	PASS
	C40#	PASS
	C41#	PASS
	C42#	PASS
	C43#	PASS
	C44#	PASS
	C45#	PASS
	C46#	PASS

备注 Notes:
试验后元件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 Component cells are no disassembly and no fire during the test and within seven days.

样品照片 Photo document

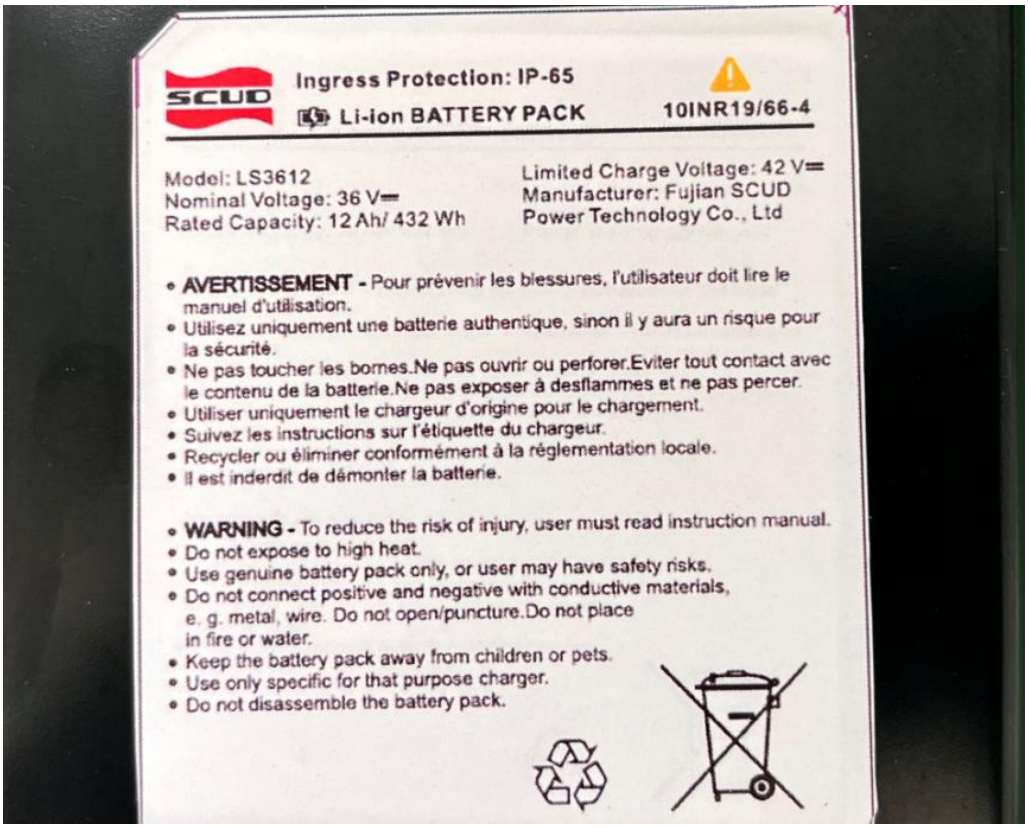


图片 Photo 1

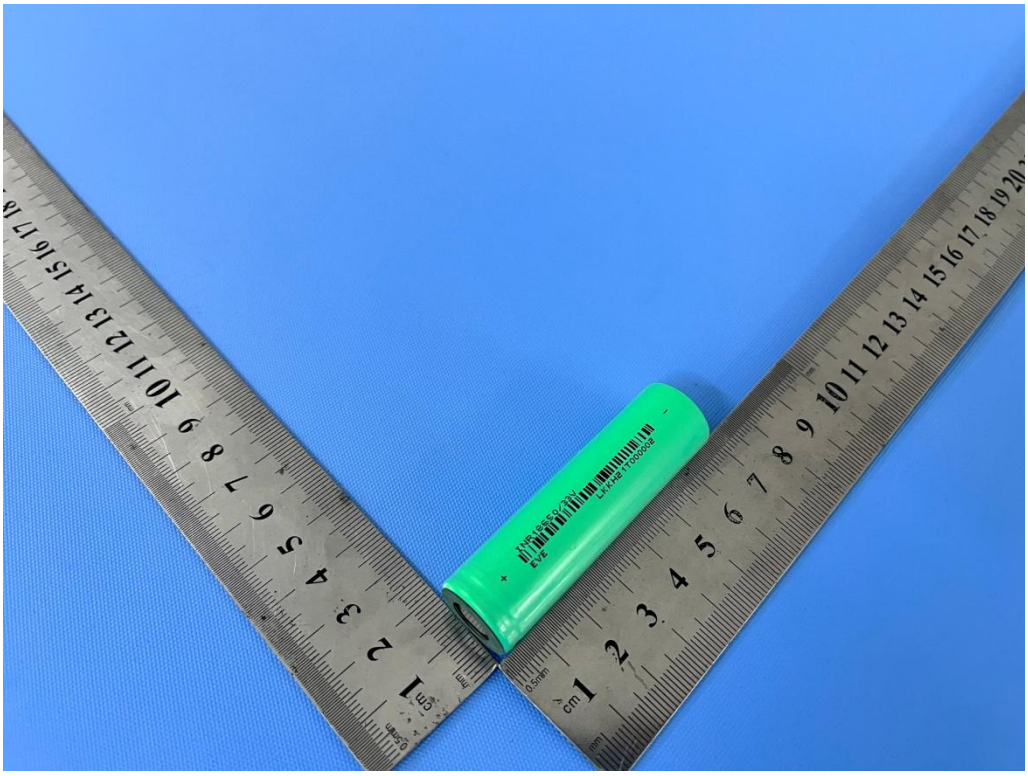


图片 Photo 2

样品照片 Photo document



图片 Photo 3



图片 Photo 4

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	电池测试仪	BT2000	A0812588	2022/04/20	√
2	能源回收式电池模组测试系统	CHROMA 17020	A171102799	2022/08/22	√
3	直流电阻测试仪	YG2512	A211003772	2022/05/23	√
4	振动台	EV203VT640VCSusb-2	A180703116	2022/05/23	√
5	万用表	34465A	A211003880	2022/12/19	√
6	电子秤	BWS-30-SXR	C211000458	2022/12/20	√
7	冲击试验台	CL-50	A211003717	2022/05/23	√
8	温控短路试验机	BE-8102S	A180803175	2022/05/23	√
9	数据采集仪(主机）	34972A	C211000456	2022/04/21	√
10	数据采集开关单元	34901A	C211000457	2022/04/21	√
11	重物冲击试验机	XSM-8016	A211003764	2022/05/23	√
12	电池低压高空模拟试验机	GX-3020-ZC1M	L211000142	2022/10/07	√
13	直流稳压电源	62024P-100-25	A200503591	2022/04/25	√
14	电子负载	IT8816	L210300071	2022/05/23	√
15	线性高低温试验箱	XSMS4-225C	A211003759	2022/11/18	√
16	双层积架式高低温箱	TOD-B165FXS-4K	A181003256	2022/11/18	√

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.

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