Test Report issued under the responsibility of:

TEST REPORT
IEC 62133-2
Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications – Part 2: Lithium systems

Report Number. ..... :	QG2400970
Date of issue..... :	2024-06-05
Total number of pages ..... :	23 Pages
Name of Testing Laboratory preparing the Report ..... :	Guangdong Testing Institute of Product Quality Supervision
Applicant's name..... :	Jiangxi Huahao Lithium Energy Co., Ltd.
Address..... :	Yongxin County Industrial Park, Ji'an, Jiangxi, China
Test specification:	
Standard ..... :	IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
TRF template used ..... :	IECEE OD-2020-F1:2021, Ed.1.4
Test Report Form No. ..... :	IEC62133_2C
Test Report Form(s) Originator.... :	DEKRA Certification B.V.
Master TRF..... :	Dated 2022-07-01

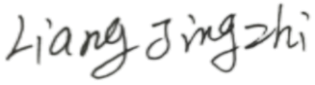
This report is not valid as a CB Test Report unless signed by an approved IECEE Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description ..... :	Li-ion Cell
Trade Mark(s) ..... :	--
Manufacturer ..... :	Same as applicant
Model/Type reference ..... :	955465-5000mAh
Ratings ..... :	Rated Voltage: 3,7 V d.c. Rated Capacity: 5000 mAh

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	Guangdong Testing Institute of Product Quality Supervision	
Testing location/ address ..... :		No.10, Science Avenue, Huangpu District, Guangzhou, Guangdong, China	
Tested by (name, function, signature) ..... :		Li Chun Nan / Engineer	
Approved by (name, function, signature) .. :		Liang Jing Zhi / Laboratory Chief	
☐	**Testing procedure: CTF Stage 1:**	N/A	
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**	N/A	
Testing location/ address ..... :			
Tested by (name + signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**	N/A	
☐	**Testing procedure: CTF Stage 4:**	N/A	
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

List of Attachments (including a total number of pages in each attachment):

Attachment 1: 2 pages of Photos;

Attachment 2: 1 page of Information for safety;

Attachment 3: 1 page of Packaging;

Attachment 4: 1 page of Product specification;

Attachment 5: 1 page of ISO9001 certificate;

Attachment 6: 3 pages of Deviations of Korea.

Summary of testing:

The sample(s) tested complies with the requirements of IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021.

Remark: Cell was considered and tested according to standard in this report.

Tests performed (name of test and test clause):

☐5.2 Insulation resistance

☒7.2.1 Continuous charging at constant voltage (cells)

☐7.2.2 Case stress at high ambient temperature (battery)

☒7.3.1 External short circuit (cell)

☐7.3.2 External short circuit (battery)

☒7.3.3 Free fall

☒7.3.4 Thermal abuse (cells)

☒7.3.5 Crush (cells)

☐7.3.6 Over-charging of battery

☒7.3.7 Forced discharge (cells)

☐7.3.8 Mechanical tests (batteries)

☒7.3.9 Design evaluation – Forced internal short circuit (cells)

☐Annex D Measurement of the internal AC resistance for coin cells

Testing location:

Guangdong Testing Institute of Product Quality Supervision

No.10, Science Avenue, Huangpu District, Guangzhou, Guangdong, China

Summary of compliance with National Differences (List of countries addressed):

EU Group Differences, GB, KR

☒The product fulfils the requirements of EN 62133-2:2017/A1:2021, BS EN 62133−2:2017+A1:2021 and KC62133-2(2020-07).

Use of uncertainty of measurement for decisions on conformity (decision rule) :

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other:… (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:

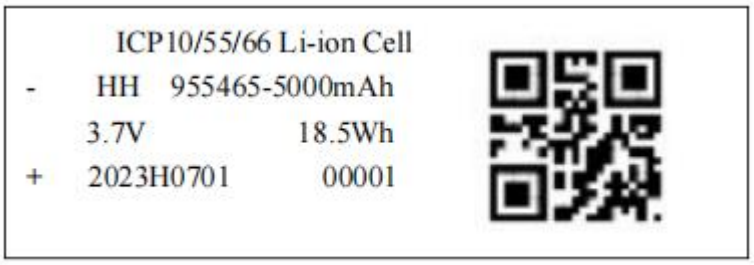
The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Remark: By agreement between the cell manufacturer and battery and/or end product manufacturer, cells used in the assembly of a battery need not be marked.

Test item particulars .....:	--
Classification of installation and use.....:	--
Supply Connection .....:	--
Recommend charging method declared by the manufacturer.....:	CC/CV
Discharge current (0,2 It A).....:	1,0 A
Specified final voltage.....:	3,0 V
Upper limit charging voltage per cell.....:	4,2 V
Maximum charging current.....:	5000 mA
Charging temperature upper limit.....:	55°C
Charging temperature lower limit .....:	0°C
Polymer cell electrolyte type.....:	☐ gel polymer ☐ solid polymer ☒ N/A
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing ..... :	
Date of receipt of test item..... :	2024-05-07
Date (s) of performance of tests ..... :	2024-05-07 to 2024-05-17

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)..... : Same as applicant	

General product information and other remarks:

Product description:	Rechargeable Li-ion Cell
Model of cell:	955465-5000mAh
Designation of cell:	ICP10/55/66
Rated voltage of cell:	3,7 V d.c.
Rated capacity of cell:	5000 mAh
Maximum charge current of cell:	5000 mA
Max. Charge Voltage	4,2 V
Discharge Cut-off Voltage	3,0 V
Nominal Charge Current	1000 mA
Nominal Discharge Current	1000 mA
Taper-off current	100 mA

Remark: See Attachment 4 for more detailed product specification.

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
4	**PARAMETER MEASUREMENT TOLERANCES**		P
	Parameter measurement tolerances		P
5	**GENERAL SAFETY CONSIDERATIONS**		P
5.1	**General**		P
	Cells and batteries so designed and constructed that they are safe under conditions of both intended use and reasonably foreseeable misuse		P
5.2	**Insulation and wiring**	Cell Only	N/A
	The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ		N/A
	Insulation resistance (MΩ) ..... :	--	—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		N/A
	Orientation of wiring maintains adequate clearances and creepage distances between conductors		N/A
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse		N/A
5.3	**Venting**		P
	Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition	Seal the seam around the aluminium foil as the venting mechanism.	P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief		N/A
5.4	**Temperature, voltage and current management**	Cell Only	N/A
	Batteries are designed such that abnormal temperature rise conditions are prevented		N/A
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer		N/A
	Batteries are provided with specifications and charging instructions for equipment manufacturers so that specified chargers are designed to maintain charging within the temperature, voltage and current limits specified		N/A
5.5	**Terminal contacts**	Cell Only	N/A
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		N/A
	Terminal contacts are arranged to minimize the risk of short circuits		N/A
5.6	**Assembly of cells into batteries**	Cell Only	N/A
5.6.1	General		N/A
	Each battery has an independent control and protection for current, voltage, temperature and any other parameter required for safety and to maintain the cells within their operating region		N/A
	This protection may be provided external to the battery such as within the charger or the end devices		N/A
	If protection is external to the battery, the manufacturer of the battery provide this safety relevant information to the external device manufacturer for implementation		N/A
	If there is more than one battery housed in a single battery case, each battery has protective circuitry that can maintain the cells within their operating regions		N/A
	Manufacturers of cells specify current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly		N/A
	Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate circuitry to prevent operation of cells outside the limits specified by the cell manufacturer		N/A
	Protective circuit components are added as appropriate and consideration given to the end-device application		N/A
	The manufacturer of the battery provide a safety analysis of the battery safety circuitry with a test report including a fault analysis of the protection circuit under both charging and discharging conditions confirming the compliance		N/A
5.6.2	Design recommendation		N/A
	For the battery consisting of a single cell or a single cellblock, it is recommended that the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 2		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, it is recommended that the voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Table 2, by monitoring the voltage of every single cell or the single cellblocks		N/A
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, it is recommended that charging is stopped when the upper limit of the charging voltage is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks		N/A
	For batteries consisting of series-connected cells or cell blocks, nominal charge voltage are not counted as an overcharge protection		N/A
	For batteries consisting of series-connected cells or cell blocks, cells have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer		N/A
	It is recommended that the cells and cell blocks are not discharged beyond the cell manufacturer's specified final voltage		N/A
	For batteries consisting of series-connected cells or cell blocks, cell balancing circuitry are incorporated into the battery management system		N/A
5.6.3	Mechanical protection for cells and components of batteries		N/A
	Mechanical protection for cells, cell connections and control circuits within the battery are provided to prevent damage as a result of intended use and reasonably foreseeable misuse		N/A
	The mechanical protection can be provided by the battery case or it can be provided by the end product enclosure for those batteries intended for building into an end product		N/A
	The battery case and compartments housing cells are designed to accommodate cell dimensional tolerances during charging and discharging as recommended by the cell manufacturer		N/A
	For batteries intended for building into a portable end product, testing with the battery installed within the end product is considered when conducting mechanical tests		N/A
5.7	**Quality plan**		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	The manufacturer prepares and implements a quality plan that defines procedures for the inspection of materials, components, cells and batteries and which covers the whole process of producing each type of cell or battery	ISO9001 certificate was submitted. See Attachment 5 for detail.	P
5.8	**Battery safety components**		N/A
6	**TYPE TEST AND SAMPLE SIZE**		P
	Tests are made with the number of cells or batteries specified in Table 1 using cells or batteries that are not more than six months old	The samples are not more than 6 months old. Manufactured date: Apr. 2024	P
	The internal resistance of coin cells are measured in accordance with Annex D. Coin cells with internal resistance less than or equal to 3 Ω are tested in accordance with Table 1		N/A
	Unless otherwise specified, tests are carried out in an ambient temperature of 20 °C ± 5 °C		P
	The safety analysis of 5.6.1 identify those components of the protection circuit that are critical for short-circuit, overcharge and over discharge protection		N/A
	When conducting the short-circuit test, consideration is given to the simulation of any single fault condition that is likely to occur in the protecting circuit that would affect the short-circuit test		N/A
7	**SPECIFIC REQUIREMENTS AND TESTS**		P
7.1	**Charging procedure for test purposes**		P
7.1.1	First procedure		P
	This charging procedure applies to subclauses other than those specified in 7.1.2		P
	Unless otherwise stated in this document, the charging procedure for test purposes is carried out in an ambient temperature of 20 °C ± 5 °C, using the method declared by the manufacturer		P
	Prior to charging, the battery has been discharged at 20 °C ± 5 °C at a constant current of 0,2 It A down to a specified final voltage		P
7.1.2	Second procedure		P
	This charging procedure applies only to 7.3.1, 7.3.4, 7.3.5, and 7.3.9		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	After stabilization for 1 h to 4 h, at an ambient temperature of the highest test temperature and the lowest test temperature, respectively, as specified in Table 2, cells are charged by using the upper limit charging voltage and maximum charging current, until the charging current is reduced to 0,05 It A, using a constant current to constant voltage charging method		P
7.2	**Intended use**		P
7.2.1	Continuous charging at constant voltage (cells)		P
	Fully charged cells are subjected for 7 days to a charge using the charging method for current and standard voltage specified by the cell manufacturer		P
	Results: no fire, no explosion, no leakage..... :	(See appended table 7.2.1)	P
7.2.2	Case stress at high ambient temperature (battery)	Cell only	N/A
	Oven temperature (°C) ..... :		—
	Results: no physical distortion of the battery case resulting in exposure of internal protective components and cells		N/A
7.3	**Reasonably foreseeable misuse**		P
7.3.1	External short-circuit (cell)		P
	The cells were tested until one of the following occurred:		P
	- 24 hours elapsed; or		N/A
	- The case temperature declined by 20 % of the maximum temperature rise		P
	Results: no fire, no explosion .....:	(See appended table 7.3.1)	P
7.3.2	External short-circuit (battery)	Cell only	N/A
	The batteries were tested until one of the following occurred:		N/A
	- 24 hours elapsed; or		N/A
	- The case temperature declined by 20 % of the maximum temperature rise		N/A
	In case of rapid decline in short circuit current, the battery pack remained on test for an additional one hour after the current reached a low end steady state condition		N/A
	A single fault in the discharge protection circuit is conducted on one to four (depending upon the protection circuit) of the five samples before conducting the short-circuit test		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	A single fault applies to protective component parts such as MOSFET (metal oxide semiconductor field-effect transistor), fuse, thermostat or positive temperature coefficient (PTC) thermistor		N/A
	Results: no fire, no explosion .....:		N/A
7.3.3	Free fall		P
	Results: no fire, no explosion		P
7.3.4	Thermal abuse (cells)		P
	Oven temperature (°C) ..... :	130°C	—
	Results: no fire, no explosion		P
7.3.5	Crush (cells)		P
	The crushing force was released upon:		P
	- The maximum force of 13 kN ± 0,78 kN has been applied; or		P
	- An abrupt voltage drop of one-third of the original voltage has been obtained		N/A
	Results: no fire, no explosion .....:	(See appended table 7.3.5)	P
7.3.6	Over-charging of battery	Cell only	N/A
	The supply voltage which is:		N/A
	- 1,4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6,0 V) for single cell/cell block batteries or		N/A
	- 1,2 times the upper limit charging voltage resented in Table A.1 per cell for series connected multi-cell batteries, and		N/A
	- Sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached		N/A
	Test was continued until the temperature of the outer casing:		N/A
	- Reached steady state conditions (less than 10 °C change in 30-minute period); or		N/A
	- Returned to ambient		N/A
	Results: no fire, no explosion .....:		N/A
7.3.7	Forced discharge (cells)		P
	Discharge a single cell to the lower limit discharge voltage specified by the cell manufacturer		P
	The discharged cell is then subjected to a forced discharge at 1 It A to the negative value of the upper limit charging voltage		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- The discharge voltage reaches the negative value of upper limit charging voltage within the testing duration. The voltage is maintained at the negative value of the upper limit charging voltage by reducing the current for the remainder of the testing duration		N/A
	- The discharge voltage does not reach the negative value of upper limit charging voltage within the testing duration. The test is terminated at the end of the testing duration		P
	Results: no fire, no explosion .....:	(See appended table 7.3.7)	P
7.3.8	Mechanical tests (batteries)	Cell Only	N/A
7.3.8.1	Vibration		N/A
	Results: no fire, no explosion, no rupture, no leakage or venting. .....:		N/A
7.3.8.2	Mechanical shock		N/A
	Results: no leakage, no venting, no rupture, no explosion and no fire.....:		N/A
7.3.9	Design evaluation – Forced internal short-circuit (cells)		P
	The cells complied with national requirement for ..... :	Japan, Korea, France and Switzerland.	—
	The pressing was stopped upon:		P
	- A voltage drop of 50 mV has been detected; or		N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached	Prismatic cells: 400 N	P
	Results: no fire .....:	(See appended table 7.3.9)	P

8	**INFORMATION FOR SAFETY**		P
8.1	**General**		P
	Manufacturers of secondary cells provides information about current, voltage and temperature limits of their products		P
	Manufacturers of batteries provides information regarding how to minimize and mitigate hazards to equipment manufacturers or end-users		N/A
	Systems analyses are performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product		N/A
	As appropriate, any information relating to hazard avoidance resulting from a system analysis is provided to the end user		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Do not allow children to replace batteries without adult supervision		N/A
8.2	**Small cell and battery safety information**		N/A
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:		N/A
	- Keep small cells and batteries which are considered swallowable out of the reach of children		N/A
	- Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion		N/A
	- In case of ingestion of a cell or battery, seek medical assistance promptly		N/A
9	**MARKING**		P
9.1	**Cell marking**		P
	Cells are marked as specified in IEC 61960, except coin cells		P
	Coin cells whose external surface area is too small to accommodate the markings on the cells show the designation and polarity		N/A
	By agreement between the cell manufacturer and the battery and/or end product manufacturer, component cells used in the manufacture of a battery need not be marked		P
9.2	**Battery marking**	Cell Only	N/A
	Batteries are marked as specified in IEC 61960, except for coin batteries		N/A
	Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity		N/A
	Batteries are marked with an appropriate caution statement		N/A
	- Terminals have clear polarity marking on the external surface of the battery, or		N/A
	- Not be marked with polarity markings if the design of the external connector prevents reverse polarity connections		N/A
9.3	**Caution for ingestion of small cells and batteries**		N/A
	Coin cells and batteries identified as small batteries include a caution statement regarding the hazards of ingestion in accordance with 8.2		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion is given on the immediate package		N/A
9.4	**Other information**		N/A
	The following information are marked on or supplied with the battery:		N/A
	- Storage and disposal instructions		N/A
	- Recommended charging instructions		N/A
10	**PACKAGING AND TRANSPORT**		P
	Packaging for coin cells are not be small enough to fit within the limits of the ingestion gauge of Figure 3		N/A
ANNEX A	**CHARGING AND DISCHARGING RANGE OF SECONDARY LITHIUM ION CELLS FOR SAFE USE**		P
A.1	**General**		P
A.2	**Safety of lithium ion secondary battery**		P
A.3	**Consideration on charging voltage**		P
A.3.1	General		P
A.3.2	Upper limit charging voltage		P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		P
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied	The upper limit charging voltage is 4.2 V during test.	N/A
A.4	**Consideration of temperature and charging current**		P
A.4.1	General		P
A.4.2	Recommended temperature range		P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	The recommended charging temperature range: 0-55°C in specification.	P
A.4.3	High temperature range	The upper charging temperature is 55 °C	P
A.4.3.1	General		P
A.4.3.2	Explanation of safety viewpoint		P
A.4.3.3	Safety considerations when specifying charging conditions in the high temperature range		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
A.4.3.4	Safety considerations when specifying a new upper limit in the high temperature range		N/A
A.4.4	Low temperature range	The lower charging temperature is 0 °C	P
A.4.4.1	General		P
A.4.4.2	Explanation of safety viewpoint		P
A.4.4.3	Safety considerations, when specifying charging conditions in the low temperature range		P
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range		N/A
A.4.5	Scope of the application of charging current		P
A.4.6	Consideration of discharge		P
A.4.6.1	General		P
A.4.6.2	Final discharge voltage and explanation of safety viewpoint		P
A.4.6.3	Discharge current and temperature range		P
A.4.6.4	Scope of application of the discharging current		P
A.5	**Sample preparation**		P
A.5.1	General		P
A.5.2	Insertion procedure for nickel particle to generate internal short		P
A.5.3	Disassembly of charged cell		P
A.5.4	Shape of nickel particle		P
A.5.5	Insertion of nickel particle in cylindrical cell		N/A
A.5.5.1	Insertion of nickel particle in winding core		N/A
A.5.5.2	Marking the position of the nickel particle on both ends of the winding core of the separator		N/A
A.5.6	Insertion of nickel particle in prismatic cell		P
A.6	**Experimental procedure of the forced internal short-circuit test**		P
A.6.1	Material and tools for preparation of nickel particle		P
A.6.2	Example of a nickel particle preparation procedure		P
A.6.3	Positioning (or placement) of a nickel particle		P
A.6.4	Damaged separator precaution		P
A.6.5	Caution for rewinding separator and electrode		P
A.6.6	Insulation film for preventing short-circuit		P
A.6.7	Caution when disassembling a cell		P
A.6.8	Protective equipment for safety		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
A.6.9	Caution in the case of fire during disassembling		P
A.6.10	Caution for the disassembling process and pressing the electrode core		P
A.6.11	Recommended specifications for the pressing device		P
ANNEX B	**RECOMMENDATIONS TO EQUIPMENT MANUFACTURERS AND BATTERY ASSEMBLERS**		P
ANNEX C	**RECOMMENDATIONS TO THE END-USERS**		N/A
ANNEX D	**MEASUREMENT OF THE INTERNAL AC RESISTANCE FOR COIN CELLS**		N/A
D.1	**General**		N/A
D.2	**Method**		N/A
	A sample size of three coin cells is required for this measurement		N/A
	Coin cells with an internal resistance greater than 3 Ω require no further testing ..... :		N/A
	Coin cells with an internal resistance less than or equal to 3 Ω are subjected to the testing according to Clause 6 and Table 1		N/A
ANNEX E	**PACKAGING AND TRANSPORT**		P
ANNEX F	**COMPONENT STANDARDS REFERENCES**		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.1	TABLE: Continuous charging at constant voltage (cells)	P

Sample no.	Recommended charging voltage Vc (Vdc)	Recommended charging current I_{rec} (A)	OCV before test (Vdc)	Results
Cell: 955465-5000mAh (1#)	4,2	5,0	4,199	Pass
Cell: 955465-5000mAh (2#)	4,2	5,0	4,199	Pass
Cell: 955465-5000mAh (3#)	4,2	5,0	4,199	Pass
Cell: 955465-5000mAh (4#)	4,2	5,0	4,199	Pass
Cell: 955465-5000mAh (5#)	4,2	5,0	4,199	Pass

Supplementary information:

- No fire or explosion
- No leakage

7.3.1	TABLE: External short-circuit (cell)	P

Sample no.	Ambient T (°C)	OCV before test (Vdc)	Resistance of circuit (mΩ)	Maximum case temperature rise ΔT (°C)	Results
Samples charged at charging temperature upper limit[1)]					
Cell: 955465-5000mAh (6#)	57,0	4,170	82,5	62,4	Pass
Cell: 955465-5000mAh (7#)	57,0	4,189	83,2	60,6	Pass
Cell: 955465-5000mAh (8#)	57,0	4,175	82,4	65,8	Pass
Cell: 955465-5000mAh (9#)	57,0	4,191	83,1	57,3	Pass
Cell: 955465-5000mAh (10#)	57,0	4,185	82,9	69,6	Pass
Samples charged at charging temperature lower limit[2)]					
Cell: 955465-5000mAh (11#)	57,0	4,168	83,9	51,8	Pass
Cell: 955465-5000mAh (12#)	57,0	4,176	82,7	45,1	Pass
Cell: 955465-5000mAh (13#)	57,0	4,169	82,4	47,8	Pass
Cell: 955465-5000mAh (14#)	57,0	4,174	82,1	51,6	Pass
Cell: 955465-5000mAh (15#)	57,0	4,180	83,4	48,4	Pass

Supplementary information:

- No fire or explosion

[1)] Cells charged at 55°C by using 4,2 V and 5000 mA until the charging current reduced to 250 mA.
[2)] Cells charged at 0°C by using 4,2 V and 5000 mA until the charging current reduced to 250 mA.

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.2	TABLE: External short-circuit (battery)					N/A
Sample no.	**Ambient T (°C)**	**OCV before test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature rise ΔT (K)**	**Component single fault condition**	**Results**
--	--	--	--	--	--	--
Supplementary information: --						

7.3.5	TABLE: Crush (cells)			P
Sample no.	**OCV before test (Vdc)**	**OCV at removal of crushing force (Vdc)**	**Maximum force applied to the cell during crush (kN)**	**Results**
Samples charged at charging temperature upper limit[1)]				
Cell: 955465-5000mAh (26#)	4,177	4,177	13,02	Pass
Cell: 955465-5000mAh (27#)	4,180	4,179	13,01	Pass
Cell: 955465-5000mAh (28#)	4,178	4,178	12,98	Pass
Cell: 955465-5000mAh (29#)	4,179	4,179	12,99	Pass
Cell: 955465-5000mAh (30#)	4,181	4,181	12,97	Pass
Samples charged at charging temperature lower limit[2)]				
Cell: 955465-5000mAh (31#)	4,160	4,160	13,02	Pass
Cell: 955465-5000mAh (32#)	4,157	4,157	13,01	Pass
Cell: 955465-5000mAh (33#)	4,164	4,164	12,99	Pass
Cell: 955465-5000mAh (34#)	4,159	4,159	13,02	Pass
Cell: 955465-5000mAh (35#)	4,162	4,161	13,02	Pass
Supplementary information: - No fire or explosion - The maximum force of 13 kN ± 0,78 kN has been applied first, the crushing force was released. [1)] Cells charged at 55°C by using 4,2 V and 5000 mA until the charging current reduced to 250 mA. [2)] Cells charged at 0°C by using 4,2 V and 5000 mA until the charging current reduced to 250 mA.				

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.6	TABLE: Over-charging of battery		N/A
Constant charging current (A) ..... :		--	—
Supply voltage (Vdc) ..... :		--	—

Sample no.	OCV before charging (Vdc)	Total charging time (minute)	Maximum outer case temperature (°C)	Results
--	--	--	--	--

Supplementary information:
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7.3.7	TABLE: Forced discharge (cells)			P
Sample no.	**OCV before application of reverse charge (Vdc)**	**Measured reverse charge I_t (A)**	**Lower limit discharge voltage (Vdc)**	**Results**
Cell: 955465-5000mAh (36#)	3,305	5,0	3,0	Pass
Cell: 955465-5000mAh (37#)	3,303	5,0	3,0	Pass
Cell: 955465-5000mAh (38#)	3,305	5,0	3,0	Pass
Cell: 955465-5000mAh (39#)	3,307	5,0	3,0	Pass
Cell: 955465-5000mAh (40#)	3,301	5,0	3,0	Pass

Supplementary information:
- No fire or explosion

7.3.8.1	TABLE: Vibration				N/A
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
--	--	--	--	--	--

Supplementary information:
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7.3.8.2	TABLE: Mechanical shock				N/A
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
--	--	--	--	--	--

Supplementary information:
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IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.9	TABLE: Forced internal short circuit (cells)	P

Sample no.	Chamber ambient T (°C)	OCV before test (Vdc)	Particle location [1]	Maximum applied pressure (N)	Results
Samples charged at charging temperature upper limit [2]					
Cell: 955465-5000mAh (41#)	55,0	4,182	1	400	Pass
Cell: 955465-5000mAh (42#)	55,2	4,178	1	400	Pass
Cell: 955465-5000mAh (43#)	55,1	4,180	1	400	Pass
Cell: 955465-5000mAh (44#)	55,1	4,181	1	400	Pass
Cell: 955465-5000mAh (45#)	55,2	4,177	1	400	Pass
Samples charged at charging temperature lower limit [3]					
Cell: 955465-5000mAh (46#)	0,1	4,156	1	400	Pass
Cell: 955465-5000mAh (47#)	0,1	4,164	1	400	Pass
Cell: 955465-5000mAh (48#)	0,2	4,160	1	400	Pass
Cell: 955465-5000mAh (49#)	0,1	4,157	1	400	Pass
Cell: 955465-5000mAh (50#)	0,2	4,162	1	400	Pass

Supplementary information:

[1] Identify one of the following:
1: Nickel particle inserted between positive and negative (active material) coated area.
2: Nickel particle inserted between positive aluminium foil and negative active material coated area.

[2] Cells charged at 55°C by using 4,2 V and 5000 mA until the charging current reduced to 250 mA.
[3] Cells charged at 0°C by using 4,2 V and 5000 mA until the charging current reduced to 250 mA.
- No fire.

D.2	TABLE: Internal AC resistance for coin cells	N/A

Sample no.	Ambient T (°C)	Store time (h)	Resistance Rac (Ω)	Results [1]
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Supplementary information:

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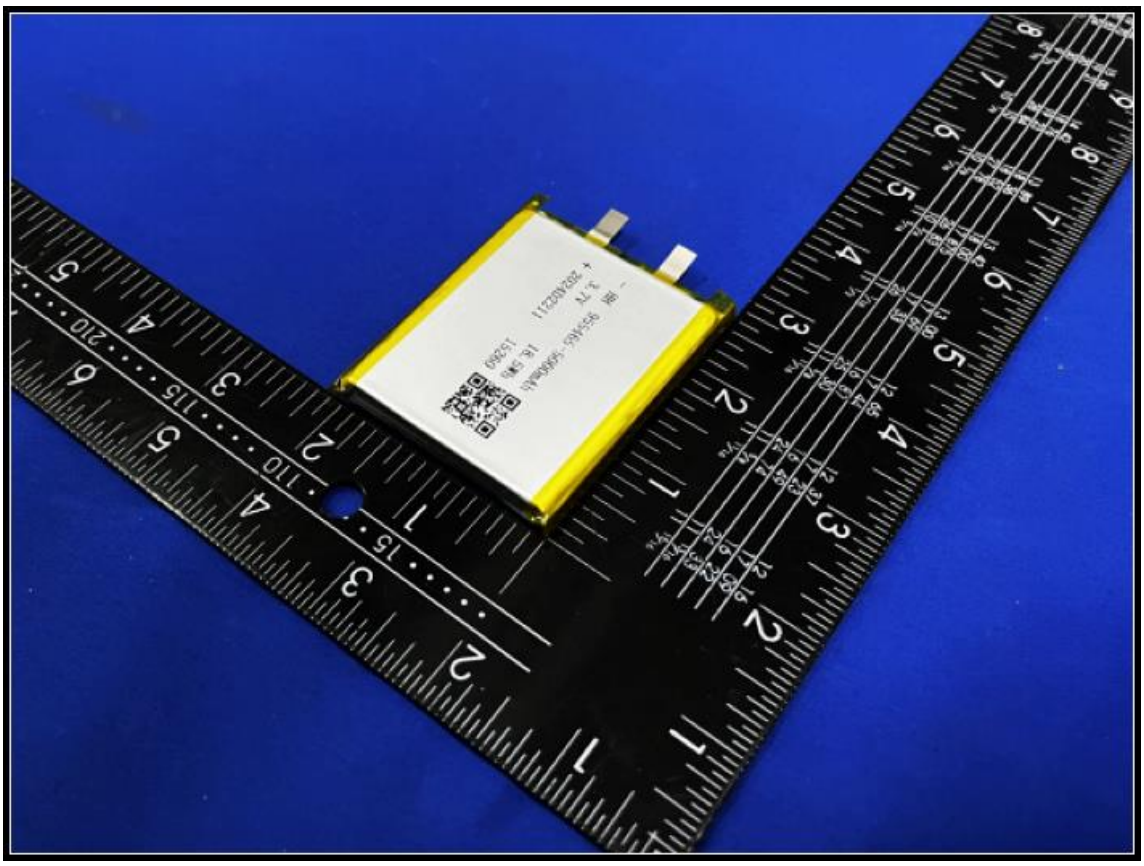
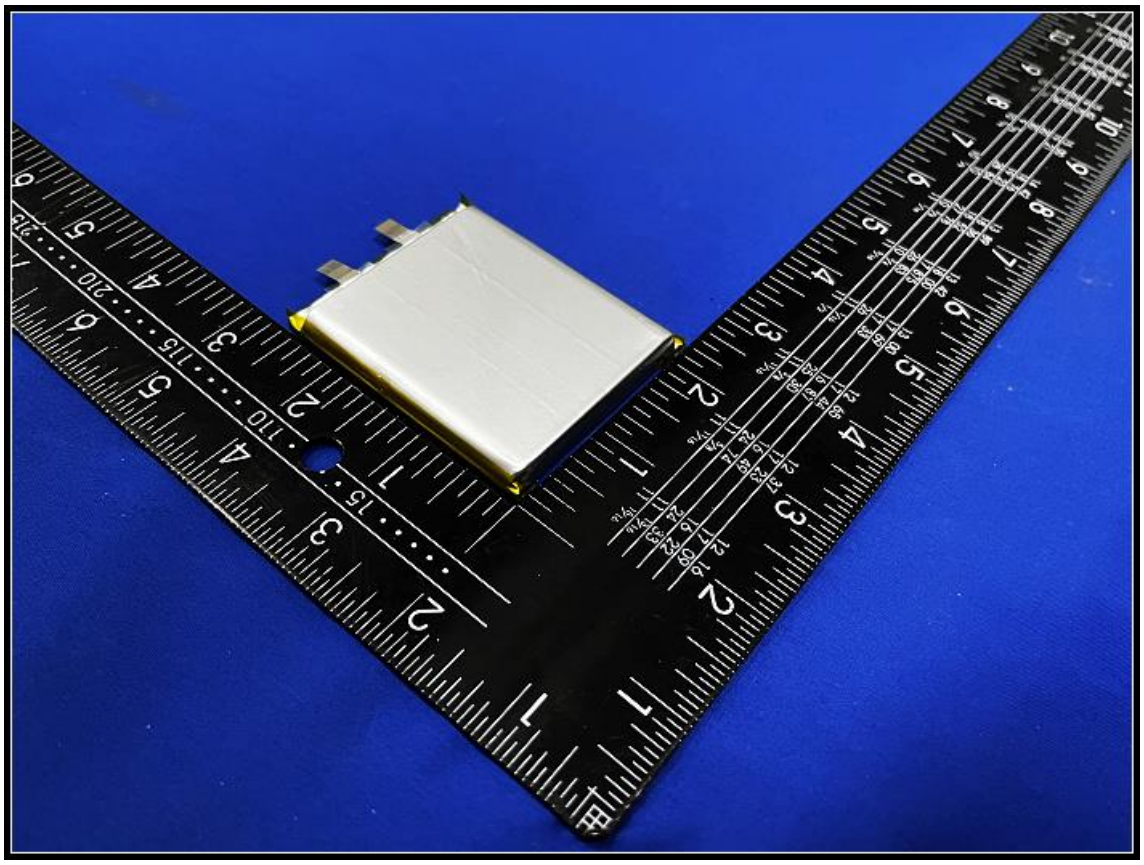
IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Critical components information				--
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Cell	JIANGXI HUAHAO NEW ENERGY CO., LTD	955465-5000mAh	3,7 V, 5000 mAh, 18,5 Wh	IEC 62133-2:2017, IEC 62133-2:2017/AMD 1:2021, EN 62133-2:2017/A1:2021	Tested with appliance
-Positive Electrode	Gelinmei (Hubei) Energy Material Co., Ltd.	L-6003B	$LiCoO_2$, NMP, PVDF, Conductive Additive, Aluminum Foil	--	--
-Negative Electrode	Qingdao TEDA Huarun Energy Technology Co., Ltd.	TDHB-1	Graphite, CMC, SBR, Conductive Additive, Copper foil	--	--
-Separator	Hu' nan shuopu new material Co., Ltd	12μm	PE+PVDF, Shutdown temperature: 135°C	--	--
-Electrolyte	Guizhou hang sheng Li neng technology Co., Ltd	SS-HH-017	DEC+EC	--	--
Supplementary information: [1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039					

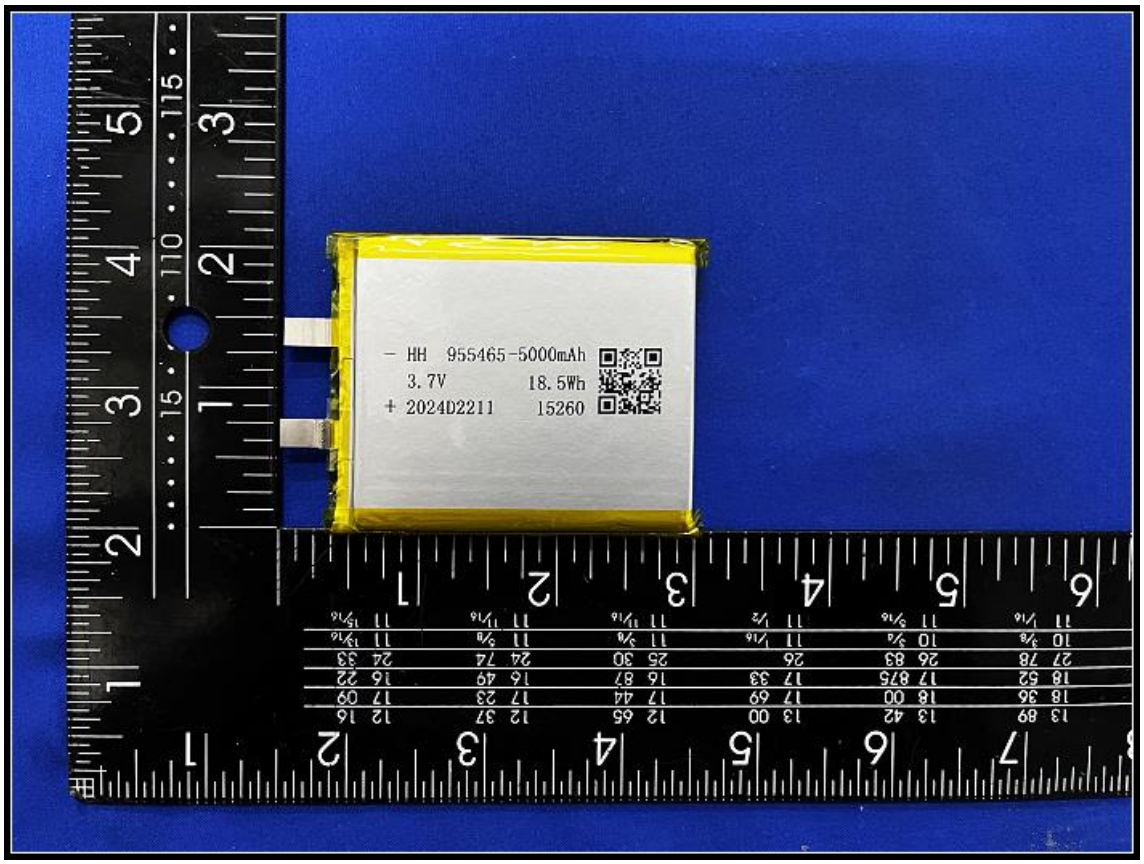
---End report---

Attachment 1 Photo documentation





Attachment 1 Photo documentation



- - - End of Attachment 1 - - -

Attachment 2 Information for safety

Danger!

危　　险!

— Do not immerse the battery in water or allow it to get wet.
— 勿将电池投入水中或将其弄湿!
— Do not use or store the battery near sources of heat such as a fire or heater.
— 禁止在火源或极热条件下给电池充电！勿在热源（如火或加热器）附近使用或贮存电池！如果电池泄漏或发出异味，应立即将其从接近明火处移开；
— Do not use any chargers other than those recommended by WISEWOD.
— 请使用专用充电器!
— Do not reverse the positive(+) and negative(-) terminals.
— 勿将正负极接反!
— Do not connect the battery directly to wall outlets or car cigarette-lighter sockets.
— 勿将电池直接连接到墙上插座或车载点烟式插座上!
— Do not put the battery into a fire or apply direct heat to it.
— 勿将电池投入火中或给电池加热!
— Do not short-circuit the battery by connecting wires or other metal objects to the positive(+) and negative(-) terminals.
— 禁止用导线或其它金属物体将电池正负极短路，禁止将电池与项链、发夹或其它金属物体一起运输或贮存!
— Do not pierce the battery casing with a nail or other sharp object, break it open with a hammer, or step on it.
— 禁止用钉子或其它尖锐物体刺穿电池壳体，禁止锤击或脚踏电池!
— Do not strike, throw or subject the battery to sever physical shock.
— 禁止撞击、投掷或者使电池受到机械震动
— Do not directly solder the battery terminals.
— 禁止直接焊接电池端子!
— Do not attempt to disassemble or modify the battery in any way.
— 禁止以任何方式分解电池!
— Do not place the battery in a microwave oven or pressurized container.
— 禁止将电池置入微波炉或压力容器中!
— Do not use the battery in combination with primary batteries (such as dry-cell batteries) or batteries of different capacity, type or brand.
— 禁止与一次电池（如干电池）或不同容量、型号、品种电池组合使用!
— Do not use the battery if it gives off an odor, generates heat, becomes discolored or deformed, or appears abnormal in any way. If the battery is in use or being recharged, remove it from the device or charger immediately and discontinue use.
— 如果电池发出异味、发热、变形、变色或出现其它任何异常现象时不得使用；如果电池正在使用或充电，应立即从用电器中或充电器上取出并停止使用!

5.1 Storage 储存:

The polymer Li-ion battery should be stored in a cool, dry and well-ventilated area, and should be far from the fire and the high temperature.
聚合物锂离子电池组应储存在阴凉、干燥、通风良好的地方。并应远离火和高温。
· The best capacity in storage is 30%-50% (voltage between 3.7-3.9V).
保持储容量最好是在30%-50% （在3.7- 3.9V 之间的电压）。
· The battery should be stored within the proper temperature and humidity range specified by specification.
电池应储存在产品规格书规定的温度和湿度范围内。
· If stored for more than six months or longer, the battery will be suggested to charge.
如果电池存放时间超过六个月以上或更长，建议对电池进行充电

Storage Temperature 贮存温度	within 1 month 1 个月内：-20℃~+45℃	Relative humidity: 相对湿度: ≤75%RH
	within 3 month 3 个月内：-20℃~+35℃	
	within 6 month 6 个月内：-20℃~+35℃	

— When disposing of secondary cells or batteries, keep cells or batteries of different electrochemical systems separate from each other.(电池处置信息)

- - - End of Attachment 2 - - -

Attachment 3 Packaging

- - - End of Attachment 3 - - -

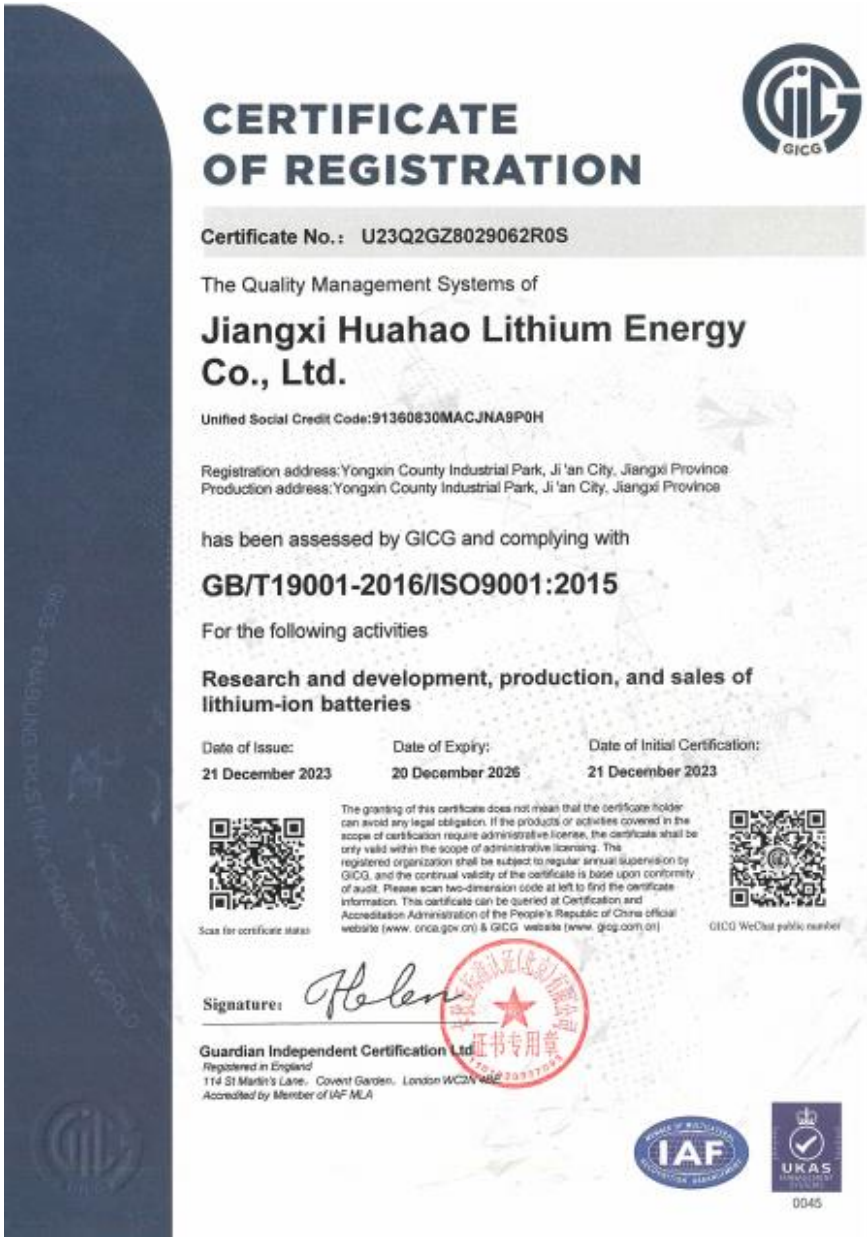
Attachment 4 Product specification

Specification of Cell

Item	Rating for cell
Rated Capacity	5000 mAh
Nominal Voltage	3.7 V
Discharge Cut-off Voltage	3.0 V
Max. Charge Voltage	4.2 V
Max. Charge Current	5000 mA
Charge Operating Temperature	0-55 °C
Nominal Charge Current	1000 mA
Nominal Discharge Current	1000 mA
Taper-off current	100 mA

- - - End of Attachment 4- - -

Attachment 5 ISO 9001 certificate



CERTIFICATE OF REGISTRATION

Certificate No.: U23Q2GZ8029062R0S

The Quality Management Systems of

Jiangxi Huahao Lithium Energy Co., Ltd.

Unified Social Credit Code:91360830MACJNA9P0H

Registration address:Yongxin County Industrial Park, Ji 'an City, Jiangxi Province
Production address:Yongxin County Industrial Park, Ji 'an City, Jiangxi Province

has been assessed by GICG and complying with

GB/T19001-2016/ISO9001:2015

For the following activities

Research and development, production, and sales of lithium-ion batteries

Date of Issue:	Date of Expiry:	Date of Initial Certification:
21 December 2023	**20 December 2026**	**21 December 2023**

The granting of this certificate does not mean that the certificate holder can avoid any legal obligation. If the products or activities covered in the scope of certification require administrative licenses, the certificate shall be only valid within the scope of administrative licensing. The registered organization shall be subject to regular annual supervision by GICG, and the continual validity of the certificate is base upon conformity of audit. Please scan two-dimension code at left to find the certificate information. This certificate can be queried at Certification and Accreditation Administration of the People's Republic of China official website (www. cnca.gov.cn) & GICG website (www. gicg.com.cn)

Scan for certificate status

GICG WeChat public number

Signature: Helen

Guardian Independent Certification Ltd
Registered in England
114 St Martin's Lane, Covent Garden, London WC2N 4AZ
Accredited by Member of IAF MLA

0045

- - - End of Attachment 5 - - -

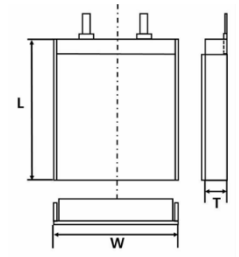
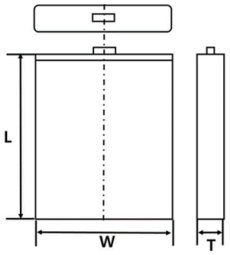
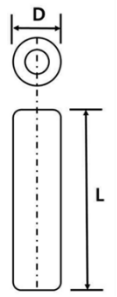
Report No.: QG2400970

ATTACHMENT to IEC62133_2C			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT IEC 62133-2 (Republic of Korea) NATIONAL DIFFERENCES (Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications - Part 2: Lithium systems)			
Differences according to.....:	National standard KC62133-2(2020-07)		
TRF template used:.....:	IECEE OD-2020-F3:2022, Ed. 1.2		
Attachment Form No. .....:	KR_ND_IEC62133_2C		
Attachment Originator .....:	KTR		
Master Attachment.....:	2023-08-02		
	National Differences		P
7.3.6	Over-charging of battery		N/A
(Revision)	[Add the bolded text] b) Test The test shall be carried out in an ambient temperature of 20 °C ± 5 °C. Each test battery shall be discharged at a constant current of 0,2 It A, to a final discharge voltage specified by the manufacturer. Sample batteries shall then be charged at a constant current of 2,0 It A, using a supply voltage which is: • 1,4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6,0 V) for single cell/cell block batteries or • 1,2 times the upper limit charging voltage presented in Table A.1 per cell for series connected multi-cell batteries, and • sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached. • In case the charging voltage specified by the manufacturer is higher than the overcharge test voltage, the maximum charging voltage specified by manufacturer should be applied with 2.0 It A, (e.g., quick charging power bank, etc.)		N/A

Report No.: QG2400970

ATTACHMENT to IEC62133_2C			
Clause	Requirement + Test	Result - Remark	Verdict
	[Replace to the following statement] c) Acceptance criteria Filling beyond the manufacturer's specified limits should not result in ignition or explosion		N/A
Annex G	Definition for shape and materials of outer case for cell		—
(Addition)	G.1 General Annex G provides definitions for shape and materials of outer case for cell G.2 Shape of outer case for cell G 2.1 Cylindrical cell Cell with a cylindrical shape in which the overall height is equal to or greater than diameter. G 2.2 Prismatic cell Cell having the shape of a parallelepiped whose faces are rectangular G.3 Materials of outer case for cell G.3.1 Soft case Non-metallic outer case or container for cell G.3.2 Hard case Metallic outer case or container for cell.	(Shape of outer cases) ☐ Cylindrical ☒ Prismatic (Materials of outer cases) ☐ Hard ☒ Soft	—
Annex H	Calculation method of the volumetric energy density for cell		—
(Addition)	Annex H provide a calculation method of the volumetric energy density for cell in use of smart phone, tablet, notebook. H.1 General Unless otherwise stated in the Annex E, the dimensions for calculation are based on these for cell before shipment and the volumetric energy density shall be calculated with a maximum values specified by manufacturer. If the specification for cell can't be provided a dimension for calculation, the manufacturer's other documentation shall be provided to demonstrate compliance for its calculation.	540,6 Wh / L	—

Report No.: QG2400970

ATTACHMENT to IEC62133_2C			
Clause	Requirement + Test	Result - Remark	Verdict
	H.2 Calculation Method  L : Length (max.) of cell (including terrace) W : Width (max.) of cell T : Thickness (max.) when shipping charge (For reference, Please Exclude the dimension of any tape that Is attached to cell) $Volumetric\ energy\ density\ (Wh/L) = \frac{Nominal\ voltage\ (V) \times Rated\ capacity\ (Ah)}{Length\ (L) \times Width\ (W)\ \times Thickness\ (T)}$ [H.1 – Prismatic cell using soft case]  L : Length (max.) of cell W : Width (max.) of cell T : Thickness when shipping charge (For reference, Please Exclude the dimension of any tape that Is attached to cell) $Volumetric\ energy\ density\ (Wh/L) = \frac{Nominal\ voltage\ (V) \times Rated\ capacity\ (Ah)}{Length\ (L) \times Width\ (W)\ \times Thickness\ (T)}$ [H.2 – Prismatic cell using hard case]  D : Diameter (max.) of cell L : Length (max.) of cell (According to shape of cell at shipping, The dimension of tube for cell may be included In overall dimension of cell) $Volumetric\ energy\ density\ (Wh/L) = \frac{Nominal\ voltage\ (V) \times Rated\ capacity\ (Ah)}{3.14159 \times \frac{Diameter\ (D)^2}{4} \times Length(L)}$ [H.3 – Cylindrical cell using hard case]		—

- - -End of Attachment 6- - -