Test Report

Report No.	:	AGC03362231202-002

SAMPLE NAME	:	Li-polymer Battery
MODEL NAME	:	502030
APPLICANT	:	MID OCEAN BRANDS B.V
STANDARD(S)	:	Please refer to the following page(s).
DATE OF ISSUE	:	Jan. 02, 2024

Attestation of Global Compliance (Shenzhen) Std & Tech Co., Ltd.

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Applicant	:	MID OCEAN BRANDS B.V
Address	:	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.
Test Site	:	6/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Report on the submitted sample(s) said to be:

Sample Name	:	Li-polymer Battery
Model	:	502030
Vendor code	:	118144
Country of Origin	:	CHINA
Country of Destination	:	EUROPE
Sample Received Date	:	Dec. 28, 2023
Testing Period	:	Dec. 28, 2023 to Jan. 02, 2024
Test Requested	:	Selected test(s) as requested by client.

Test Requested:	**Conclusion**
European Regulation (EU) 2023/1542 - Lead, Cadmium and Mercury Content	Pass

Approved by :

Liangdan, Jessie.Liang

Technical Director

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Report Revise Record

Report Version	Issued Date	Valid Version	Notes
/	Jan. 02, 2024	Valid	Initial release

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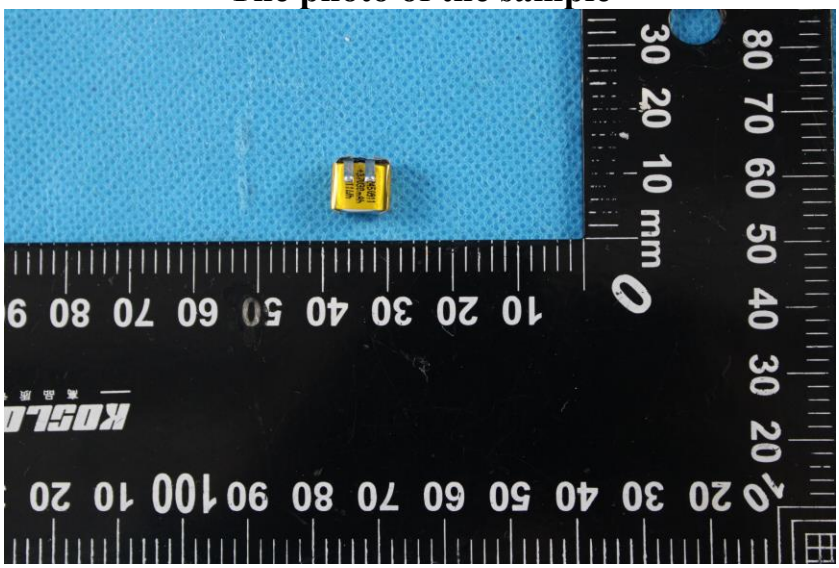
The photo of the sample



The photo of AGC03362231202-002 is for use only with the original report.

Test Point Description

Test point	Test point description
2	Battery

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Test Results:

Note: N.D.=Not Detected (less than method detection limit), MDL = Method Detection Limit, 1mg/kg=0.0001%

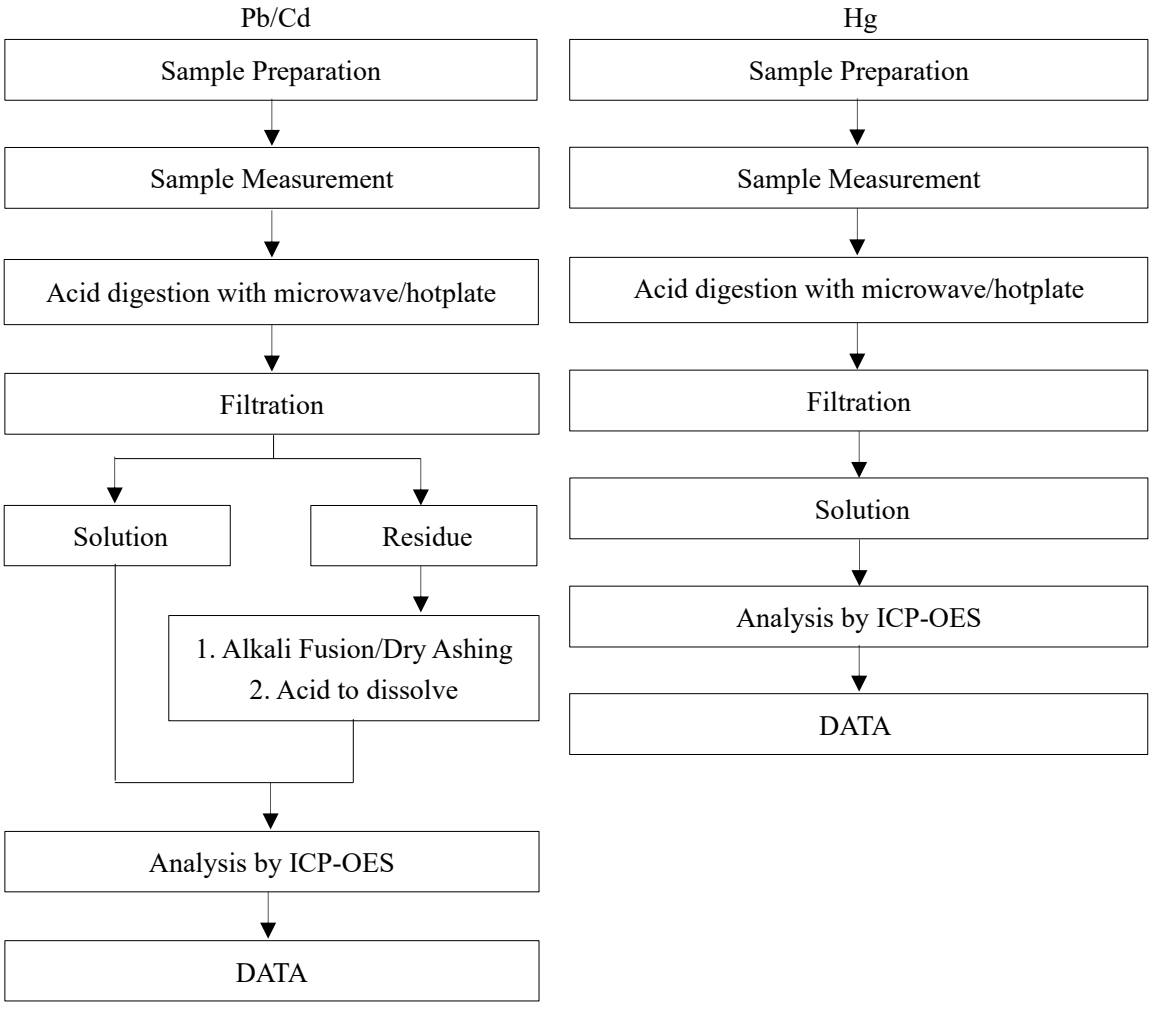
European Regulation (EU) 2023/1542

- Lead, Cadmium and Mercury Content

Test Methods and Equipment：IEC 62321-4:2013+A1:2017,IEC 62321-5:2013; ICP-OES

Test Item(s)	Unit	Limit	MDL	Test Result(s)
				2
Lead(Pb)	%	0.01	0.0005	N.D.
Cadmium(Cd)	%	0.002	0.0005	N.D.
Mercury(Hg)	%	0.0005	0.0001	N.D.
Conclusion				Conformity

Test Flow Chart of Lead, Cadmium and Mercury



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Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Std & Tech Co., Ltd. (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

*** End of Report ***

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Test Report

Report No.	:	AGC03362231202-001

SAMPLE NAME	:	Li-polymer Battery
MODEL NAME	:	401012
APPLICANT	:	MID OCEAN BRANDS B.V
STANDARD(S)	:	Please refer to the following page(s).
DATE OF ISSUE	:	Jan. 02, 2024

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Applicant	:	MID OCEAN BRANDS B.V
Address	:	7/F, Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong.
Test Site	:	6/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China

Report on the submitted sample(s) said to be:

Sample Name	:	Li-polymer Battery
Model	:	401012
Vendor code	:	118144
Country of Origin	:	CHINA
Country of Destination	:	EUROPE
Sample Received Date	:	Dec. 28, 2023
Testing Period	:	Dec. 28, 2023 to Jan. 02, 2024
Test Requested	:	Selected test(s) as requested by client.

Test Requested:	**Conclusion**
European Regulation (EU) 2023/1542 - Lead, Cadmium and Mercury Content	Pass

Approved by :

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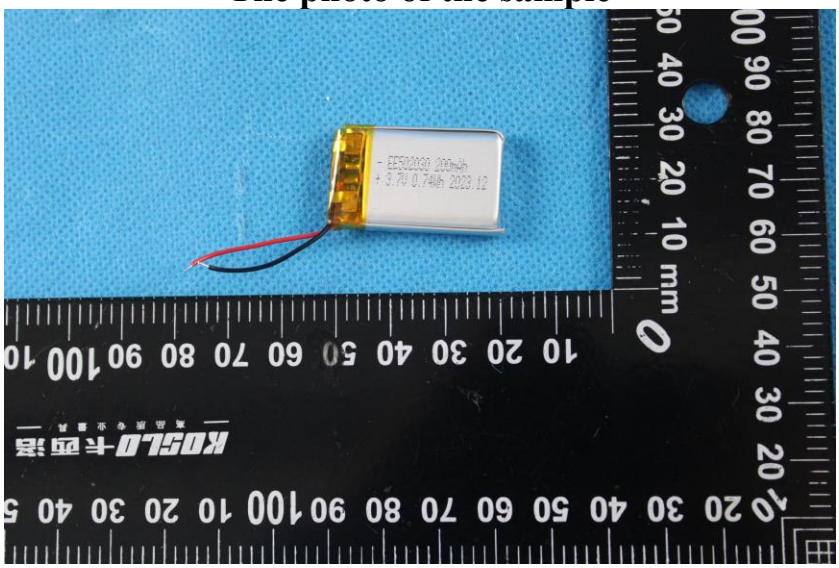

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Test Point Description

Test point	Test point description
1	Battery

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Test Results:

Note: N.D.=Not Detected (less than method detection limit), MDL = Method Detection Limit, 1mg/kg=0.0001%

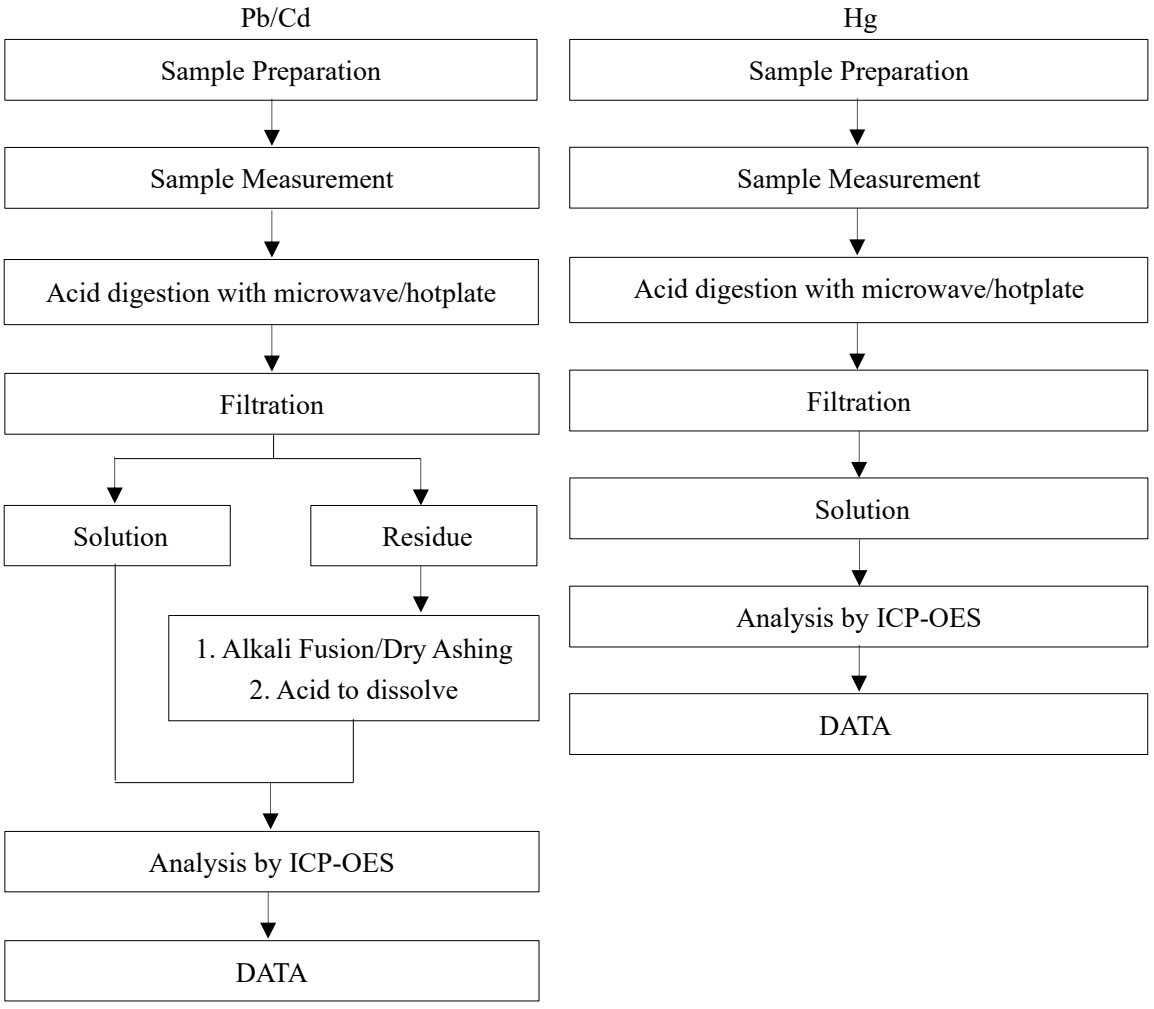
European Regulation (EU) 2023/1542

- Lead, Cadmium and Mercury Content

Test Methods and Equipment：IEC 62321-4:2013+A1:2017,IEC 62321-5:2013; ICP-OES

Test Item(s)	Unit	Limit	MDL	Test Result(s)
				1
Lead(Pb)	%	0.01	0.0005	N.D.
Cadmium(Cd)	%	0.002	0.0005	N.D.
Mercury(Hg)	%	0.0005	0.0001	N.D.
Conclusion				Conformity

Test Flow Chart of Lead, Cadmium and Mercury



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*** End of Report ***

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CMC TESTING
众检检验

中国认可
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检测
TESTING
CNAS L13807

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. :	CMC230106015
Date of issue :	2023-02-08
Total number of pages :	24 pages
Tested by (name, signature). :	Meiko Ma
Reviewed by (name, signature) :	Carol Xiong
Approved by (name, signature) :	Barry He
Name of Testing Laboratory preparing the Report :	**CMC Testing International (Shenzhen) Co., Ltd.**
Address :	101&104, Building B, Kaihuimao Industrial Park, Liyuan Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, Chin
Applicant's name :	
Address :	
Manufacturer's name :	
Address :	
Test specification:	
Standard :	IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021
Test procedure :	Type approved
Non-standard test method :	N/A
Test result :	Pass
Test item description :	Polymer Li-ion Cell
Trade Mark :	N/A
Model/Type reference :	401012
Ratings :	3.7V, 30mAh, 0.111Wh

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 CMC. The authenticity of this Test Report and its contents can be verified by contacting the CMC, responsible for this Test Report.

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

Attachment 1: Photo documentation (on page 23)

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
cl.7.1 Charging procedure for test purposes (for Cells); cl.7.2.1 Continuous charging at constant voltage (Cells); cl.7.3.1 External short circuit (Cells); cl.7.3.3 Free fall (Cells); cl.7.3.4 Thermal abuse (Cells); cl.7.3.5 Crush (Cells); cl.7.3.7 Forced discharge (Cells); cl.7.3.9 Design evaluation – Forced internal short circuit (Cells). The electrolyte type of this cell doesn't belong to polymer, and the addition test cl.7.3.9 was carried out to evaluate the cell. Tests are made with the number of cells specified in IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021 Table 1.	**CMC Testing International (Shenzhen) Co., Ltd.** 101&104, Building B, Kaihuimao Industrial Park, Liyuan Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, Chin

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

☒ **The product fulfils the requirements of: EN 62133-2:2017, EN 62133-2:2017/A1:2021.**

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: N/A (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:

- Polymer Li-ion Cell
  401012 ICP4/10/13
  3.7V 30mAh 0.111Wh
+
  Date: YYMM Made in China

WARNING: Risk of Fire and Burns. Do Not Open, Crush, Heat Above 60°C/140°F or Incinerate. Do not short circuit. If bulges severely, discontinue use. Follow Manufacturer's Instructions.

Date Code: YYMM

YY=year, MM=month

Information for safety mentioned on equipment's package:

Warning language

1.Keep small cells which are considered swallowable out of the reach of children.

2.Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2h of ingestion.

3.In case of ingestion of a cell, seek medical assistance promptly.

Test item particulars.....:	
Classification of installation and use .....:	To be defined in final product
Supply Connection.....:	Electrode plate
Recommend charging method declared by the manufacturer.....:	Charging the cell with 15mA constant current and 4.2V constant voltage until the current reduces to 0.6mA at ambient 20°C±5°C.
Discharge current (0,2 It A) .....:	6mA
Specified final voltage.....:	3.0V
Upper limit charging voltage per cell.....:	4.2V
Maximum charging current.....:	30mA
Charging temperature upper limit.....:	45°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.....:	2023-01-06
Date (s) of performance of tests.....:	2023-01-12 to 2023-02-02
Test Environment Condition .....:	Ambient temperature: 21.9ºC to 23.1ºC
Sample identification.....:	SN230106015C001 - SN230106015C053
General remarks:	
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 testing laboratory. “(CXXX)” refers to sample number of cells, “X” is 0~9; “(BXXX)” refers to sample number of batteries, “X” is 0~9; "(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.**	
Name and address of factory (ies) .....:	Same as applicant

General product information and other remarks:

The cell consists of positive electrode plate, negative electrode plate, separator, electrolyte, case. The positive and negative electrode plates are housed in the case in the state being separated by the separator.

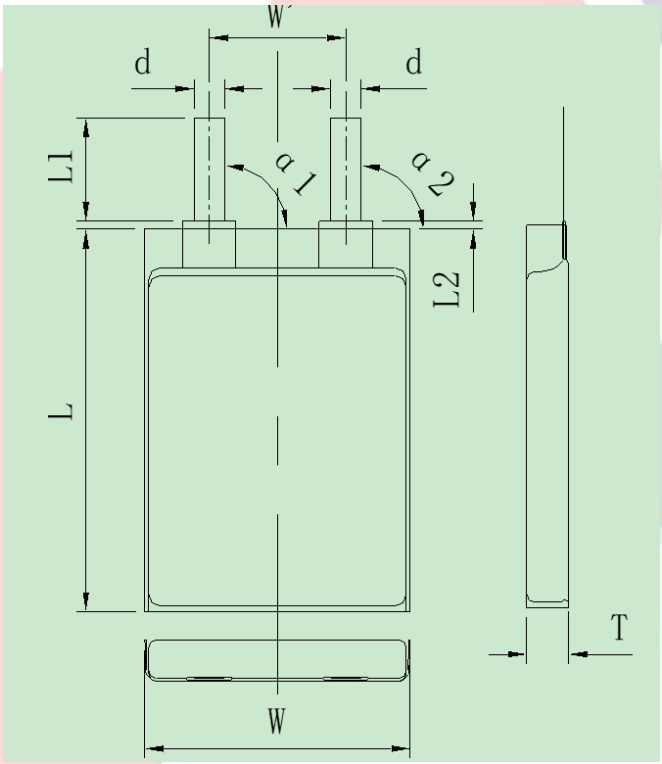
The main features of the cell are shown as below (clause 7.1.1):

Model (Cell)	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Final Voltage
401012	30mAh	3.7V	15mA	15mA	30mA	30mA	4.2V	3.0V

The main features of the cell are shown as below (clause 7.1.2):

Model (Cell)	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
401012	4.2V	1.5mA	0°C	45°C

Construction



T: 4.0max W: 10.0max L: 12.8max
Cell (Unit: mm)

Circuit diagram:
None, Cell only.

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**		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	Cell only.	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 clearance 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	Venting mechanism exists on the narrow side of pouch cell.	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**		N/A
	Batteries are designed such that abnormal temperature rise conditions are prevented	Cell only	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**		P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	Electrode plate contacts complied with the requirements.	P

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	Complied	P
	Terminal contacts are arranged to minimize the risk of short-circuit		P
5.6	**Assembly of cells into batteries**		N/A
5.6.1	General		N/A
	Each battery have 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	Cell only	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 have 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 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	Cell only.	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 not be 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 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 incorporated into the battery management system		N/A
5.6.3	Mechanical protection for cells and components of batteries	Cell only.	N/A
	Mechanical protection for cells, cell connections and control circuits within the battery 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 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 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	Complied. Quality plan provided.	P
5.8	**Battery safety components**	See TABLE: Critical components information	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		P
	Coin cells with resistance ≤ 3 Ω (measured according annex D) are tested according table 1	Not coin cells	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 overdischarge protection	Cell only.	N/A
	When conducting the short-circuit test, consideration 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	Cell only.	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 have 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
	After stabilization for 1 h and 4 h, respectively, at ambient temperature of highest test temperature and lowest test temperature, 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 voltage charging method	Charge temperature specified by manufacturer: 0-45°C. 0°C used for lower limit tests. 45°C used for upper limit tests.	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.2	**Intended use**		P
7.2.1	Continuous charging at constant voltage (cells)	Tested complied.	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	Charging for 7 days with 15mA.	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)	Tested complied.	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 conducted on one to four (depending upon the protection circuit) of the five samples before conducting the short-circuit test		N/A
	A single fault applies to protective component parts such as MOSFET, fuse, thermostat or positive temperature coefficient (PTC) thermistor		N/A
	Results: No fire. No explosion.....:		N/A
7.3.3	Free fall	Tested complied.	P
	Results: No fire. No explosion	No fire. No explosion.	P
7.3.4	Thermal abuse (cells)	Tested complied.	P
	Oven temperature (°C).....:	130°C	—
	Results: No fire. No explosion	No fire. No explosion.	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.3.5	Crush (cells)	Tested complied.	P
	The crushing force was released upon:		P
	- The maximum force of 13 kN ± 0,78 kN has been applied; or		N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained		P
	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)	Tested complied.	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
	- 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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
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)	Tested complied.	P
	The cells complied with national requirement for ..... :	France, Japan, Republic of Korea 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	400N for prismatic cell.	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	Information for safety mentioned in manufacturer's specifications.	P
	Manufacturers of batteries provides information regarding how to minimize and mitigate hazards to equipment manufacturers or end-users	Cell only.	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
8.2	**Small cell and battery safety information**	Small cell	P
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:		P
	- Keep small cells and batteries which are considered swallowable out of the reach of children		P
	- Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion		P
	- In case of ingestion of a cell or battery, seek medical assistance promptly		P
9	**MARKING**		P
9.1	**Cell marking**		P
	Cells marked as specified in IEC 61960, except coin cells	The cell is marked in accordance with IEC 61960.	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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		N/A
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 according to 8.2 include a caution statement regarding the hazards of ingestion in accordance with 8.2	Not coin cells and batteries.	N/A
	Small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion is given on the immediate package	Not intended for direct sale.	N/A
9.4	**Other information**	Cell only	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**		N/A
	Packaging for coin cells are not be small enough to fit within the limits of the ingestion gauge of Figure 3	Not coin cells.	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**	Complied.	P
A.3	**Consideration on charging voltage**	Complied.	P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
A.3.1	General		P
A.3.2	Upper limit charging voltage	4.2V applied.	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	4.2V applied.	N/A
A.4	**Consideration of temperature and charging current**		P
A.4.1	General		P
A.4.2	Recommended temperature range	See A.4.2.2.	P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	Charging temperature declared by client is: 0-45°C.	P
A.4.3	High temperature range	Charging high temperature declared by client is: 45°C.	N/A
A.4.3.1	General		N/A
A.4.3.2	Explanation of safety viewpoint		N/A
A.4.3.3	Safety considerations when specifying charging conditions in the high temperature range		N/A
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	Charging low temperature declared by client is: 0°C.	N/A
A.4.4.1	General		N/A
A.4.4.2	Explanation of safety viewpoint		N/A
A.4.4.3	Safety considerations, when specifying charging conditions in the low temperature range		N/A
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	Cell specified final voltage 3.0V, not exceed 3.0V specified by cell manufacturer.	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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
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
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**		N/A
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**	Not coin cells.	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 .....:	(See appended table D.2)	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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
ANNEX E	**PACKAGING AND TRANSPORT**		N/A
ANNEX F	**COMPONENT STANDARDS REFERENCES**		N/A

	TABLE: Critical components information				P
Object / part No.	**Manufacturer / trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
-Positive electrode	JIANGMEN KANHOO INDUSTRY CO., LTD	LCO-4	$LiCoO_2$, Carbon black, NMP, PVDF, Conductive Additive	--	--
-Negative electrode	SHANGHAI SHANSHAN TECHNOLOGY CO LTD	FSN-1	Graphite, CMC, SBR, Distilled Water, Conductive Additive	--	--
-Separator	T&S Change your life	F16BMS	PE, Shutdown temperature: 130°C	--	--
-Electrolyte	Zhuhai Saiwei Electronic Materials Co., Ltd	SW-B004	$LiPF_6$+EC+DEC+EMC +VC	--	--
Supplementary information:					

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
SN230106015C001	4.20	0.015	4.20	P
SN230106015C002	4.20	0.015	4.20	P
SN230106015C003	4.20	0.015	4.20	P
SN230106015C004	4.20	0.015	4.20	P
SN230106015C005	4.20	0.015	4.20	P

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 (45°C)					
SN230106015C006	55.1	4.18	86	96.6	P
SN230106015C007	55.1	4.17	85	99.8	P
SN230106015C008	55.1	4.18	86	91.7	P
SN230106015C009	55.1	4.17	87	95.8	P
SN230106015C010	55.1	4.18	87	100.2	P
Samples charged at charging temperature lower limit (0°C)					
SN230106015C011	55.3	4.13	87	95.8	P
SN230106015C012	55.3	4.14	85	99.3	P
SN230106015C013	55.3	4.14	86	101.2	P
SN230106015C014	55.3	4.13	85	93.6	P
SN230106015C015	55.3	4.14	87	95.4	P

Supplementary information:

-No fire or explosion

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~~, °C	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 (45°C)				
SN230106015C029	4.18	2.77	6.54	P
SN230106015C030	4.17	2.78	6.48	P
SN230106015C031	4.18	2.77	6.78	P
SN230106015C032	4.17	2.78	6.97	P
SN230106015C033	4.18	2.77	6.58	P
Samples charged at charging temperature lower limit (0°C)				
SN230106015C034	4.14	2.74	6.62	P
SN230106015C035	4.14	2.74	6.91	P
SN230106015C036	4.15	2.75	6.53	P
SN230106015C037	4.15	2.75	6.68	P
SN230106015C038	4.14	2.74	6.57	P

Note: A 13kN force applied at the wide side of prismatic cells. An abrupt voltage drop of one-third of the original voltage has been obtained.

Supplementary information:

- No fire or explosion

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:

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
SN230106015C039	3.23	0.03	3.0	P
SN230106015C040	3.22	0.03	3.0	P
SN230106015C041	3.22	0.03	3.0	P
SN230106015C042	3.23	0.03	3.0	P
SN230106015C043	3.23	0.03	3.0	P

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:

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:					

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 (45°C)					
SN230106015C044	45	4.18	1	400	P
SN230106015C045	45	4.17	1	400	P
SN230106015C046	45	4.17	1	400	P
SN230106015C047	45	4.18	1	400	P
SN230106015C048	45	4.18	1	400	P
Samples charged at charging temperature lower limit (0°C)					
SN230106015C049	0	4.15	1	400	P
SN230106015C050	0	4.14	1	400	P
SN230106015C051	0	4.15	1	400	P
SN230106015C052	0	4.14	1	400	P
SN230106015C053	0	4.15	1	400	P

Supplementary information:

[1)] Identify one of the following:

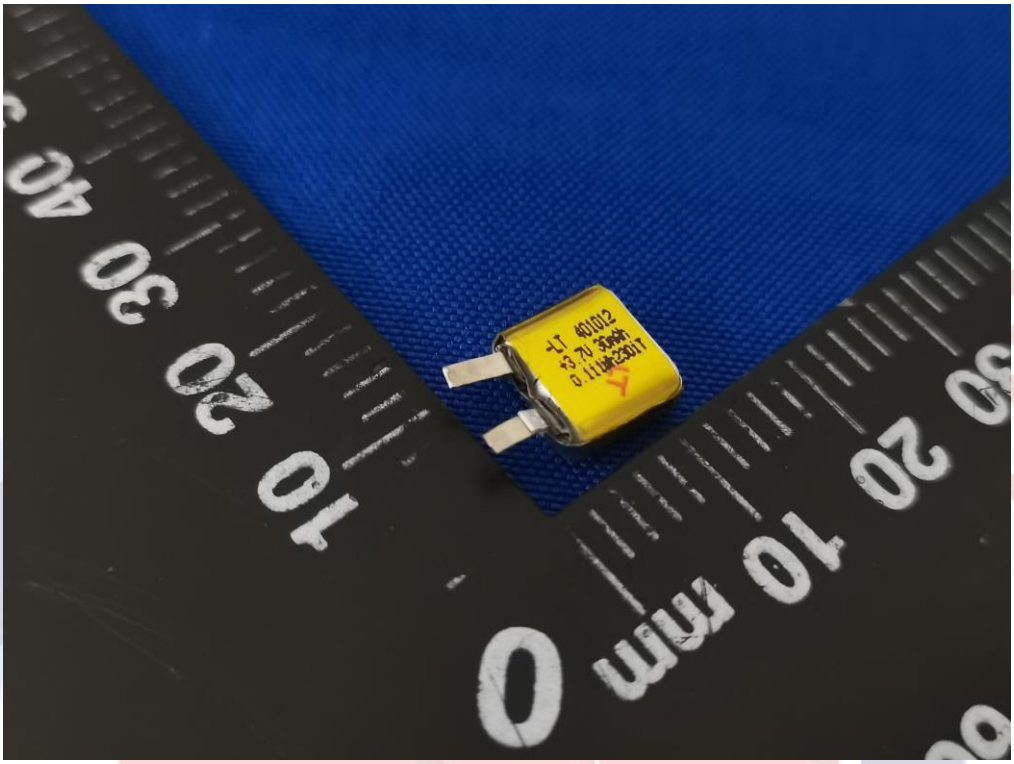
1: Nickel particle inserted between positive and negative (active material) coated area.

2: Nickel particle inserted between positive aluminium foil and negative active material coated area.

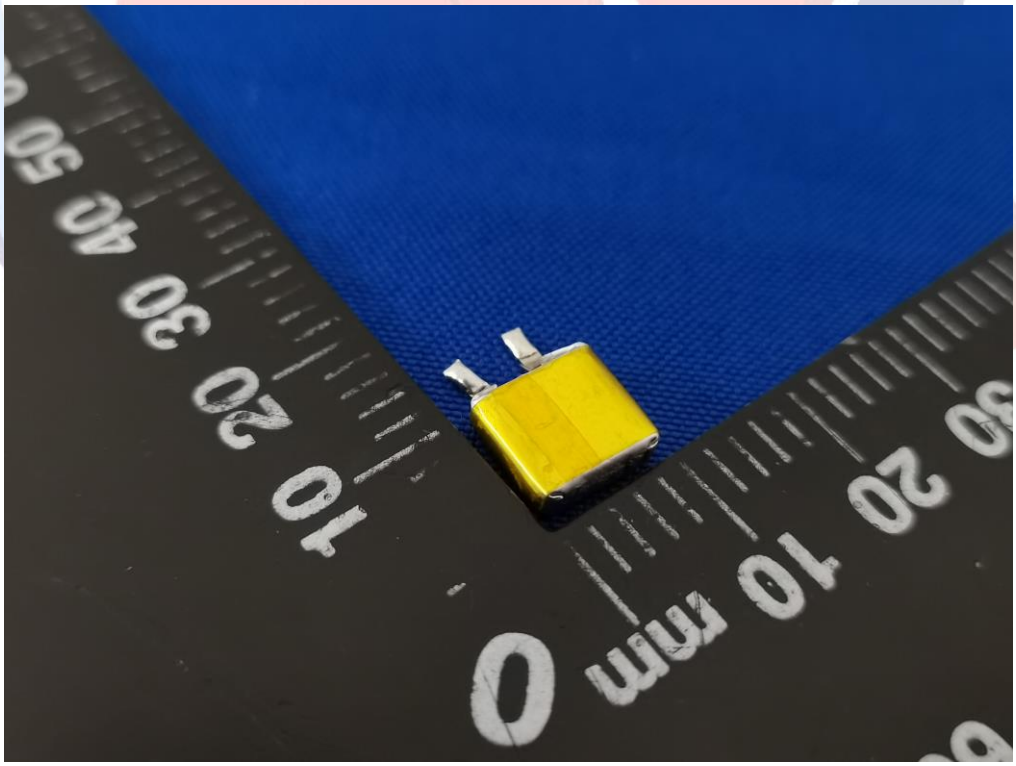
- No fire or explosion

D.2	TABLE: Internal AC resistance for coin cells			N/A
Sample no.	**Ambient T (°C)**	**Store time (h)**	**Resistance Rac (Ω)**	**Results [1)]**
Supplementary information:				

Attachment 1: Photo documentation



Picture 1. Front view of cell



Picture 2. Back view of cell

Important

1. The test report is invalid if it is not affixed the official seal of the laboratory to it.
2. Copies of the test report without the official seal of the laboratory are invalid.
3. It is forbidden to copy the test report partially without the written approval of the laboratory.
4. The test report is invalid without the signatures of Approver, Reviewer and Testing engineer.
5. The test report is invalid if it is blotted out.
6. Objections to the test report must be submitted to CMC within 15 days.
7. The test report is valid for the tested samples only.
8. As for the Verdict, “--” means “no need for judgement”, “P” means “pass” ,“F” means “fail” and “N/A” means “not applicable”.

Testing laboratory: CMC Testing International (Shenzhen) Co., Ltd.
Address: 101&104, Building B, Kaihuimao Industrial Park, Liyuan Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Tel: 400-1668-320
E-mail: info@cmczj-lab.com
http://www.cmczj-lab.com

-- End of Report --

Battery Test Report

Report No.: LA2023B0770002

Samples	Li-ion Polymer Battery
Model	JYZ 502025
Applicant	
Issue Date	2023-06-21

深圳市莱恩瑞斯科技有限公司

Shenzhen Lionaces Technology Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated and the sample(s) are retained for 30 days only. The document is issued by Lionaces, it cannot be reproduced except in full with our prior written permission. The document is available on request and the brief information for its validation can be assessable and confirmed on the website, http://www.lionaces.com

Shenzhen Lionaces Technology Co., Ltd.
Add: 301, Building B6, Junfeng Industrial Zone, Yonghe Road, Heping Community, Fuhai Street, Baoan, Shenzhen, Guangdong, China.
Tel: 0755-28280690 E-mail: service@lionaces.com
Website: www.lionaces.com

IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021

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 Reference No.	:	LA2023B0770002
Tested by (+ signature)	:	Yanyun Xie
Reviewed by (+ signature)	:	Ming Zhu
Approved by (+signature)	:	Rick Liu
Date of issue	:	2023-06-21
Contents	:	Total 26 pages.

Testing laboratory

Name	:	Shenzhen Lionaces Technology Co., Ltd.
Address	:	301, Building B6, Junfeng Industrial Zone, Yonghe Road, Heping Community, Fuhai Street, Baoan, Shenzhen, Guangdong, China
Testing location	:	Same as above.

Applicant

Name	:	
Address	:	

Manufacturer

Name	:	
Address	:	

Test specification

Standard	:	IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021
Test procedure	:	Type test
Procedure deviation	:	N/A
Non-standard test method	:	N/A

Test Report Form/blank test report

Test Report Form No.	:	IEC62133_2B
Test Report Form(s) Originator	:	Lionaces
Master TRF	:	Dated 2022-07

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Test item

Product designation	Li-ion Polymer Battery
Brand name	N/A
Test model	JYZ 502025
Rating(s)	3.7V, 200mAh, 0.74Wh

Test item particulars

Classification of installation and use	N/A
Supply connection	DC Lead wire
Recommend charging method declared by the manufacturer	Charge at constant current 40mA until the voltage reaches 4.2V, then charge at 4.2V till charge current is 2mA at ambient 20°C±5°C.
Discharge current(0.2I_tA)	40mA
Specified final voltage	2.42V
Chemistry	☐ nickel systems ☒ lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell	4.2V
Maximum charging current	200mA
Charging temperature upper limit	45°C
Charging temperature lower limit	0°C
Polymer cell electrolyte type	☐ gel polymer ☐ solid polymer ☒ N/A

Test case verdicts

Test case does not apply to the test object	N (/A)
Test item does meet the requirement	P (ass)
Test item does not meet the requirement	F (ail)

Testing

Date of receipt of test item	2023-06-07
Date(s) of performance of test	2023-06-07 to 2023-06-21

Attachment

Attachment A	Photos of product

General remarks

This report shall not be reproduced except in full without the written approval of the testing laboratory.
The test results presented in this report relate only to the item tested.
"(See remark #)" refers to a remark appended to the report.
"(See appended table)" refers to a table appended to the report.
Throughout this report a point is used as the decimal separator.
☒ The product fulfills the requirements of IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021. and EN 62133-2: 2017, EN 62133-2:2017/AMD1:2021.

Report Revise Record:

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2023-06-21	Valid	Original report

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General product information

	Cell	Battery
Model	JYZ 502025	JYZ 502025
Nominal capacity	200mAh	200mAh
Nominal voltage	3.7V	3.7V
Nominal charge current	40mA	40mA
Nominal discharge current	40mA	40mA
Maximum charge current	200mA	200mA
Maximum discharge current	100mA	100mA
Upper Limited Charging Voltage	4.2V	4.2V
Cut-off voltage	2.42V	2.42V

Copy of marking plate

This is reference label, final label should be including the content of it.

Red(+)	Black(-)
Li-ion Polymer Battery	JYZ 502025
3.7V, 200mAh, 0.74Wh	1INP6/21/26
Made in China	Date：YYMMDD
Warning: Risk of Fire and Burns.	
Follow Manufacturer's Instructions.	

Caution for ingestion of small batteries

- Keep small cells and batteries which are considered swallowable out of the reach of children.
- Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion.
- In case of ingestion of a cell or battery, seek medical assistance promptly.

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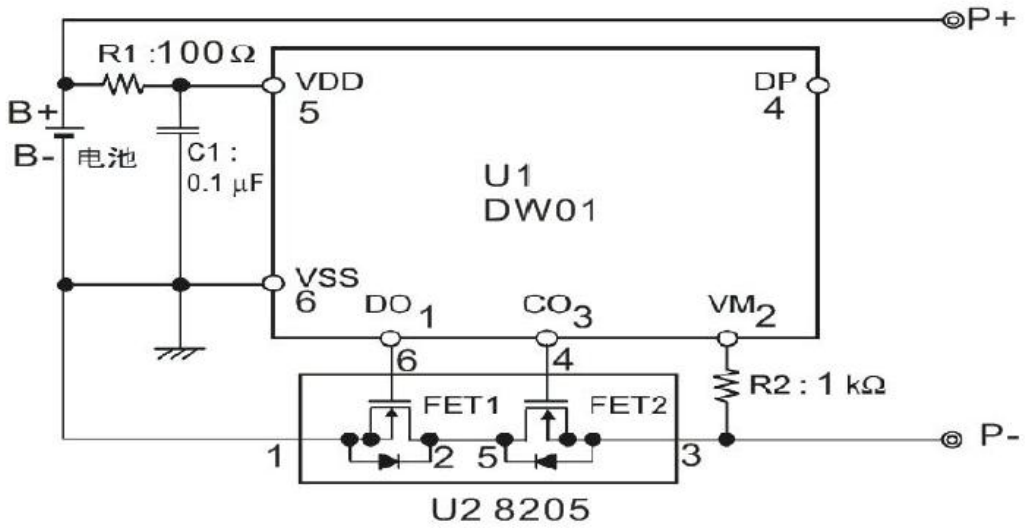
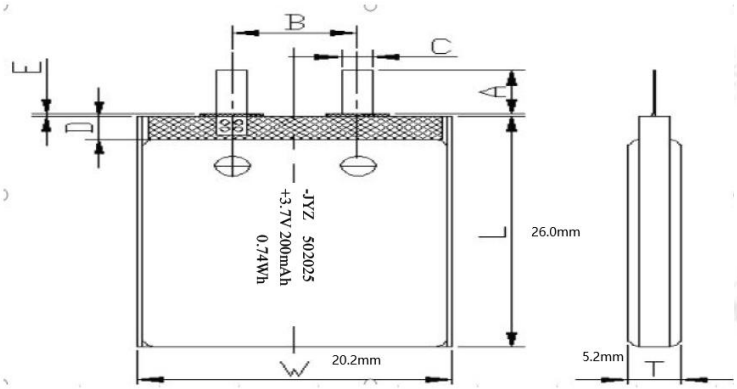
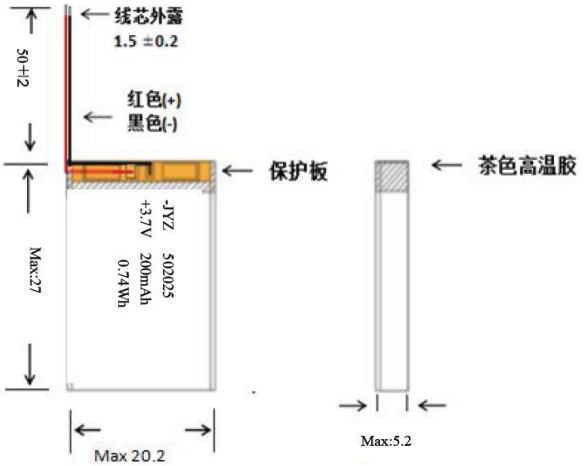
Circuit diagram



Construction



Cell(mm)



Battery (mm)

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IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021			
Clause	Requirement – Test	Result – Remark	Verdict
4	**Parameter measurement tolerances**		**P**
	Parameter measurement tolerances	Comply with relevant requirements.	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**		**P**
	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	No metal case exists.	N/A
	Insulation resistance (MΩ)..... :		—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		P
	Orientation of wiring maintains adequate clearance and creepage distances between conductors		P
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse		P
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	Venting mechanism exists on the narrow side of pouch cell.	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**		**P**
	Batteries are designed such that abnormal temperature rise conditions are prevented		P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	Overcharge, over discharge, over current and short-circuit proof circuit used in this battery. See tests of clause 7.	P
	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	The charging limits specified in the user manual.	P

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IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021			
Clause	Requirement – Test	Result – Remark	Verdict
5.5	**Terminal contacts**		P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	Complied. DC Lead wire.	P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		P
	Terminal contacts are arranged to minimize the risk of short-circuit		P
5.6	**Assembly of cells into batteries**		**P**
5.6.1	**General**		**P**
	Each battery have 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	Protective circuit equipped on Battery.	P
	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 have 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	Current, voltage and temperature limits specified by cell manufacturer.	P
	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 added as appropriate and consideration given to the end-device application		P
	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**		**P**
	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		P

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IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021			
Clause	Requirement – Test	Result – Remark	Verdict
	charging voltage specified in Table 2		
	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 not be 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 not discharged beyond the cell manufacturer's specified final voltage	Not exceed the final voltage specified by cell manufacturer.	P
	For batteries consisting of series-connected cells or cell blocks, cell balancing circuitry incorporated into the battery management system		N/A
5.6.3	**Mechanical protection for cells and components of batteries**		**P**
	Mechanical protection for cells, cell connections and control circuits within the battery provided to prevent damage as a result of intended use and reasonably foreseeable misuse	Mechanical protection for cell connections and control circuits provided.	P
	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	Build-in batteries, mechanical protection for cells should be provided by end product.	N/A
	The battery case and compartments housing cells designed to accommodate cell dimensional tolerances during charging and discharging as recommended by the cell manufacturer	To be evaluated in final system.	N/A
	For batteries intended for building into a portable end product, testing with the battery installed within the end product considered when conducting mechanical tests		N/A

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IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021			
Clause	Requirement – Test	Result – Remark	Verdict
5.7	**Quality plan**		**P**
	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	Complied.	P
5.8	**Battery safety components**		**N/A**
	According annex F		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		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	Prismatic cell	N/A
	Unless otherwise specified, tests are carried out in an ambient temperature of 20 °C ± 5 °C	Tests are carried out at 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 overdischarge protection		N/A
	When conducting the short-circuit test, consideration 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	See clause 7.3.2.	P

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	See page 3.	P
	Prior to charging, the battery have been discharged at 20 °C ± 5 °C at a constant current of 0,2 It A down to a specified final voltage	See page 3.	P
7.1.2	**Second procedure**		**P**

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IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021			
Clause	Requirement – Test	Result – Remark	Verdict
	This charging procedure applies only to 7.3.1, 7.3.4, 7.3.5, and 7.3.9		P
	After stabilization for 1 h and 4 h, respectively, at ambient temperature of highest test temperature and lowest test temperature, 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 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	Tested complied.	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)**	Tested complied.	**P**
	Oven temperature (°C)..... :	70	—
	Results: No physical distortion of the battery case resulting in exposure of internal protective components and cells	No physical distortion of the battery casing resulting in exposure if internal components	P
7.3	**Reasonably foreseeable misuse**		**P**
7.3.1	**External short-circuit (cell)**	Tested complied.	**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)**	Tested complied.	**P**
	The batteries 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
	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		P
	A single fault in the discharge protection circuit conducted on one to four (depending upon the		P

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IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021			
Clause	Requirement – Test	Result – Remark	Verdict
	protection circuit) of the five samples before conducting the short-circuit test		
	A single fault applies to protective component parts such as MOSFET, fuse, thermostat or positive temperature coefficient (PTC) thermistor	Single fault applies on MOSFET.	P
	Results: No fire. No explosion..... :	(See appended table 7.3.2)	P
7.3.3	**Free fall**		**P**
	Results: No fire. No explosion	No fire. No explosion	P
7.3.4	**Thermal abuse (cells)**		**P**
	Oven temperature (°C)..... :	130°C	—
	Results: No fire. No explosion	No fire. No explosion	P
7.3.5	**Crush (cells)**	Tested complied.	**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**	Tested complied.	**P**
	The supply voltage which is:		P
	- 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		P
	- 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		P
	Test was continued until the temperature of the outer casing:		P
	- Reached steady state conditions (less than 10 °C change in 30-minute period); or		N/A
	- Returned to ambient		P
	Results: No fire. No explosion..... :	(See appended table 7.3.6)	P
7.3.7	**Forced discharge (cells)**	Tested complied.	**P**
	Discharge a single cell to the lower limit discharge voltage specified by the cell manufacturer		P

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IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021			
Clause	Requirement – Test	Result – Remark	Verdict
	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
	- 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)**		**P**
7.3.8.1	**Vibration**		**P**
	Results: No fire, no explosion, no rupture, no leakage or venting.....:	(See appended table 7.3.8.1)	P
7.3.8.2	**Mechanical shock**		**P**
	Results: No leakage, no venting, no rupture, no explosion and no fire.....:	(See appended table 7.3.8.2)	P
7.3.9	**Design evaluation – Forced internal short-circuit (cells)**		P
	The cells complied with national requirement for.....:		P
	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	400N	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	Information for safety mentioned in manufacturer's specifications.	P
	Manufacturers of batteries provides information regarding how to minimize and mitigate hazards to equipment manufacturers or end-users	Information for safety mentioned in manufacturer's specifications.	P
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product		N/A

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IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021			
Clause	Requirement – Test	Result – Remark	Verdict
	As appropriate, any information relating to hazard avoidance resulting from a system analysis provided to the end user		N/A
8.2	**Small cell and battery safety information**	Small battery.	**P**
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:		P
	- Keep small cells and batteries which are considered swallowable out of the reach of children		P
	- Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion		P
	- In case of ingestion of a cell or battery, seek medical assistance promptly		P
9	**Marking**		**P**
9.1	**Cell marking**		**P**
	Cells marked as specified in IEC 61960, except coin cells	The final product is battery.	N/A
	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		N/A
9.2	**Battery marking**		**P**
	Batteries marked as specified in IEC 61960, except for coin batteries	See marking plate on page 4.	P
	Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity. Batteries also marked with an appropriate caution statement		N/A
	Batteries are marked with an appropriate caution statement		P
	- Terminals have clear polarity marking on the external surface of the battery, or		P
	- 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**

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IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021			
Clause	Requirement – Test	Result – Remark	Verdict
	Coin cells and batteries identified as small batteries according to 8.2 include a caution statement regarding the hazards of ingestion in accordance with 8.2		N/A
	When small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion given on the immediate package		N/A
9.4	**Other information**		**P**
	The following information are marked on or supplied with the battery:		**P**
	Storage and disposal instructions		P
	Recommended charging instructions		P

10	**Packaging and transport**		**N/A**
	Packaging for coin cells not 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	Charging voltage is 4.2V	P
A.3.2	Upper limit charging voltage	4.2V	P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint	4.2V applied.	N/A
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied		N/A
A.4	**Consideration of temperature and charging current**		**P**
A.4.1	General		P
A.4.2	Recommended temperature range	Charging temperature declared by client is: 0-45°C.	P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied		P
A.4.3	High temperature range	Not higher than the temperature range specified in this standard.	N/A

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IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021			
Clause	Requirement – Test	Result – Remark	Verdict
A.4.3.1	General		N/A
A.4.3.2	Explanation of safety viewpoint		N/A
A.4.3.3	Safety considerations when specifying charging conditions in the high temperature range		N/A
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	Charging low temperature declared by client 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	-5°C applied.	P
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

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IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021			
Clause	Requirement – Test	Result – Remark	Verdict
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
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**	**N/A**

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.....:	(See appended table D.2)	N/A
	Coin cells with an internal resistance of less than or equal to 3 Ω are subjected to the testing according to Clause 6 and Table 1		N/A
	Coin cells with an internal resistance greater than 3 Ω require no further testing		N/A

Annex E	**Packaging and transport**	**N/A**

Annex F	**Component standards references**	**N/A**

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Table: Critical components information					P
Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
PCB	Shenzhen Rong Chuang Yi Technology Co., Ltd.	JMK-1530	94-V0, 130°C	--	Tested with appliance
IC (U1)	Vimicro electronics Co., ltd	DW01	Overcharge detection voltage: 4.3±0.05V, overdischarge detection voltage: 2.5±0.008V, T_{opr}:-40--+85°C	--	Tested with appliance
MOS (U2)	SHEN ZHEN XIN FEI HONG ELECTRONICS CO., LTD	8205	V_{DS}: 20V, V_{GS}:±12V, I_D: 5A, T_J:-55-150°C	--	Tested with appliance
Wire	KIN DING TAI GROUP CO., LTD	1571	80°C, 30V, 30AWG, VW-1	--	Tested with appliance
Cell		JYZ 502025	3.7V, 200mAh, 0.74Wh	IEC 62133-2:2017/AMD1:2021	Tested with appliance
Positive electrode	DongGuan Liyu Energy Co., Ltd.	Kp-05	Li(NiCoMn)O_2, PVDF, NMP, Conductive Additive L:220*W:19*T:0.117	--	--
Negative electrode	DongGuan Liyu Energy Co., Ltd.	DHAG-14	Graphite, CMC, SBR, Distilled Water, Conductive L:245*W:19*T:0.120	--	--
Electrolyte	Dongguan Shanshan Battery Material Co., Ltd	LD-124B	$LiPF_6$, $C_3H_4O_3$, $C_4H_6O_3$, $C_3H_{10}O_3$, etc.	--	--
Separator	XinMingZhi city science and Technology Co., Ltd	PE-16	16μm(Thickness)×21(Width)×1050mm (Length) Shutdown temperature: 130°C	--	--
Supplementary information: 1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

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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**
C001	4.2	0.04	4.176	P
C002	4.2	0.04	4.179	P
C003	4.2	0.04	4.181	P
C004	4.2	0.04	4.182	P
C005	4.2	0.04	4.178	P
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: 45°C					
C006	55.5	4.183	83.2	113.7	P
C007	55.5	4.180	78.6	114.2	P
C008	55.5	4.182	81.4	119.1	P
C009	55.5	4.179	81.9	110.4	P
C010	55.5	4.177	79.7	106.3	P
Samples charged at charging temperature lower limit: -5°C					
C011	55.2	4.149	83.2	111.0	P
C012	55.2	4.147	78.6	109.8	P
C013	55.2	4.151	81.4	120.3	P
C014	55.2	4.150	81.9	117.6	P
C015	55.2	4.148	79.7	114.4	P
Supplementary information: - No fire or explosion					

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7.3.2	Table: External short-circuit (battery)					P
Sample no.	**Ambient T (°C)**	**OCV before test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature ~~rise ΔT~~ (°C)**	**Component single fault condition**	**Results**
B001	22.5	4.177	83.2	105.3	MOS U2 S-C	P
B002	22.5	4.176	78.6	112.0	MOS U2 S-C	P
B003	22.5	4.179	81.4	108.9	MOS U2 S-C	P
B004	22.5	4.181	81.9	109.7	MOS U2 S-C	P
B005	22.5	4.180	79.7	23.0	--	P
Supplementary information: - No fire or explosion						

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: 45°C				
C016	4.182	4.179	13	P
C017	4.177	4.175	13	P
C018	4.183	4.181	13	P
C019	4.179	4.179	13	P
C020	4.178	4.178	13	P
Samples charged at charging temperature lower limit: -5°C				
C021	4.155	4.154	13	P
C022	4.159	4.159	13	P
C023	4.157	4.155	13	P
C024	4.160	4.157	13	P
C025	4.158	4.156	13	P
Supplementary information: - No fire or explosion				

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7.3.6	Table: Over-charging of battery				P
Constant charging current (A).....:		0.4			—
Supply voltage (Vdc).....:		5.88			—
Sample no.	**OCV before charging (Vdc)**	**Total charging time (minute)**	**Maximum outer case temperature ~~rise ΔT~~ (°C)**		**Results**
B006	2.751	40	25.3		P
B007	2.754	40	25.8		P
B008	2.756	40	25.9		P
B009	2.755	40	25.1		P
B010	2.756	40	25.3		P
Supplementary information: - No fire or explosion					

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**
C026	2.751	0.2	-4.2	P
C027	2.754	0.2	-4.2	P
C028	2.756	0.2	-4.2	P
C029	2.755	0.2	-4.2	P
C030	2.756	0.2	-4.2	P
Supplementary information: - No fire or explosion				

7.3.8.1	Table: Vibration				P
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
B011	4.183	4.183	4.8891	4.8891	P
B012	4.178	4.178	4.8429	4.8429	P
B013	4.180	4.179	4.8632	4.8632	P
Supplementary information: - No fire or explosion - No rupture - No leakage - No venting					

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7.3.8.2	Table: Mechanical shock				P
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
B014	4.179	4.177	4.8543	4.8542	P
B015	4.180	4.179	4.8355	4.8354	P
B016	4.179	4.179	4.8717	4.8717	P

Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting

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 45°C					
C031	45	4.182	1	400/0	P
C032	45	4.176	1	400/0	P
C033	45	4.183	1	400/0	P
C034	45	4.176	2	400/0	P
C035	45	4.179	2	400/0	P
Samples charged at charging temperature lower limit -5°C					
C036	-5	4.149	1	400/0	P
C037	-5	4.145	1	400/0	P
C038	-5	4.150	1	400/0	P
C039	-5	4.147	2	400/0	P
C040	-5	4.151	2	400/0	P

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.

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D.2	Table: Internal AC resistance for coin cells			N/A
Sample no.	**Ambient T (°C)**	**Store time (h)**	**Resistance Rac (Ω)**	**Results [1)]**

Supplementary information:

[1)] Coin cells with internal resistance less than or equal to 3 Ω, see test result on corresponding tables

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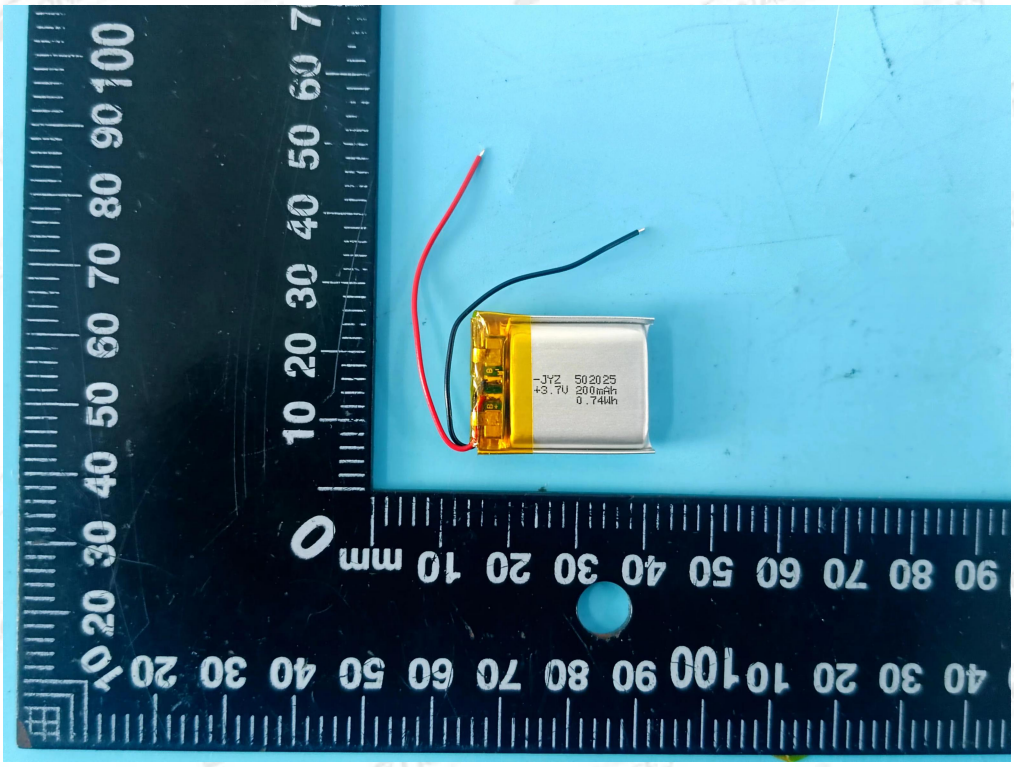
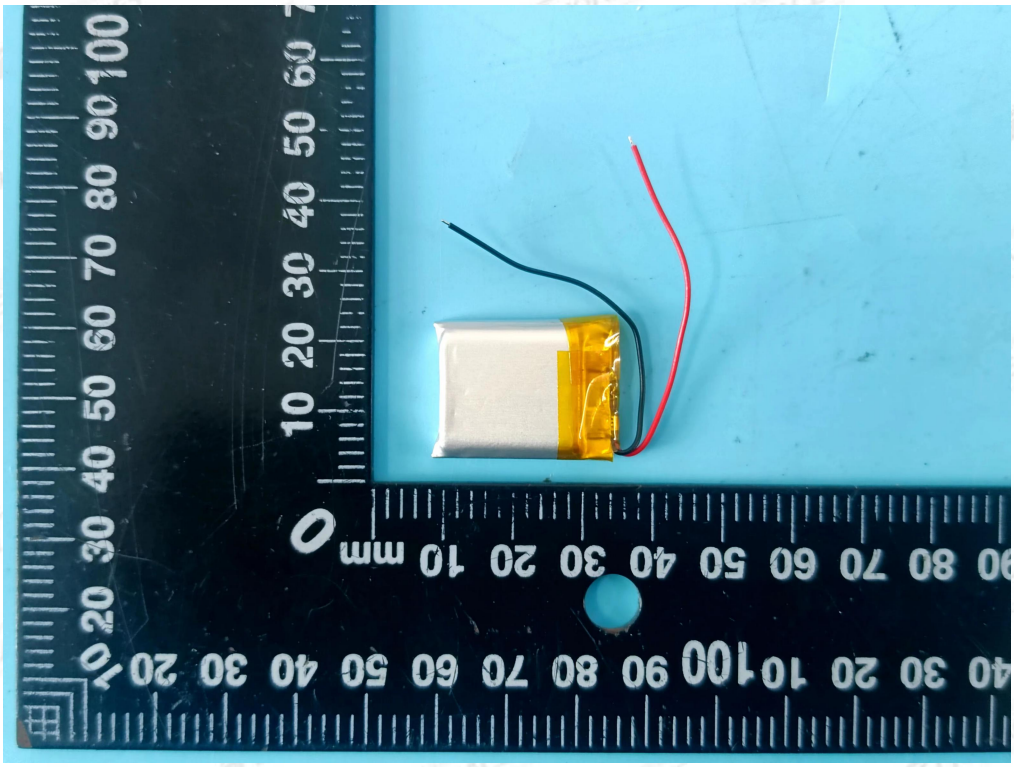
Attachment A
Photos of product



Front view of battery



Back view of battery

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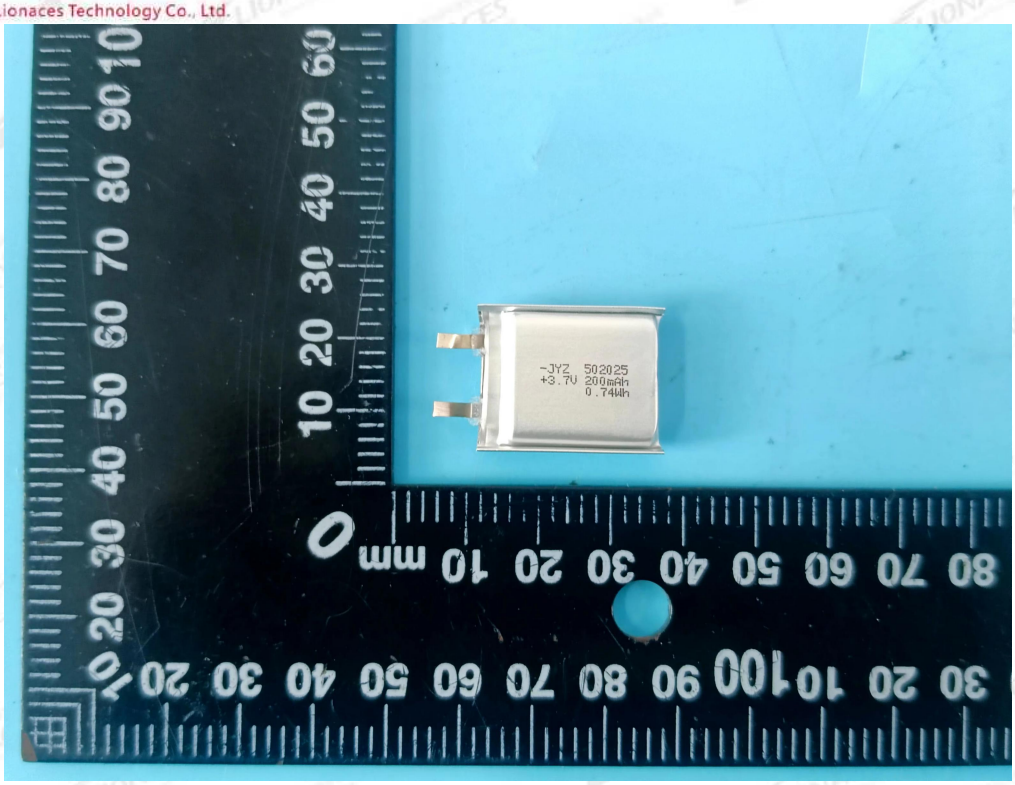
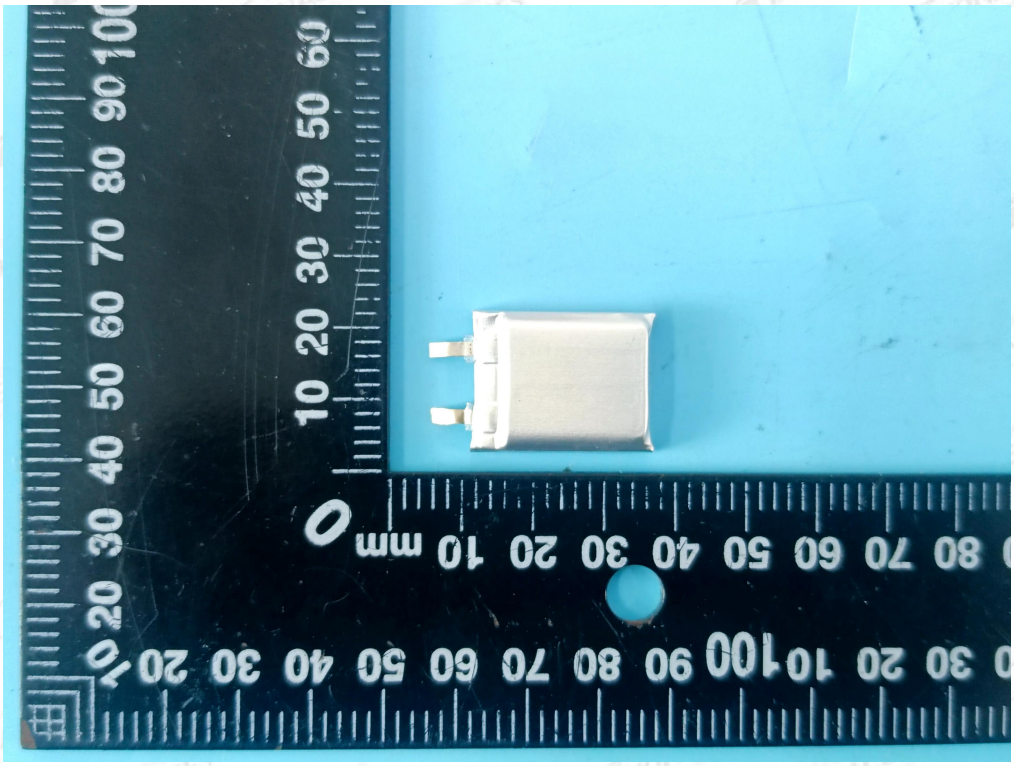


Front view of cell



Back view of cell

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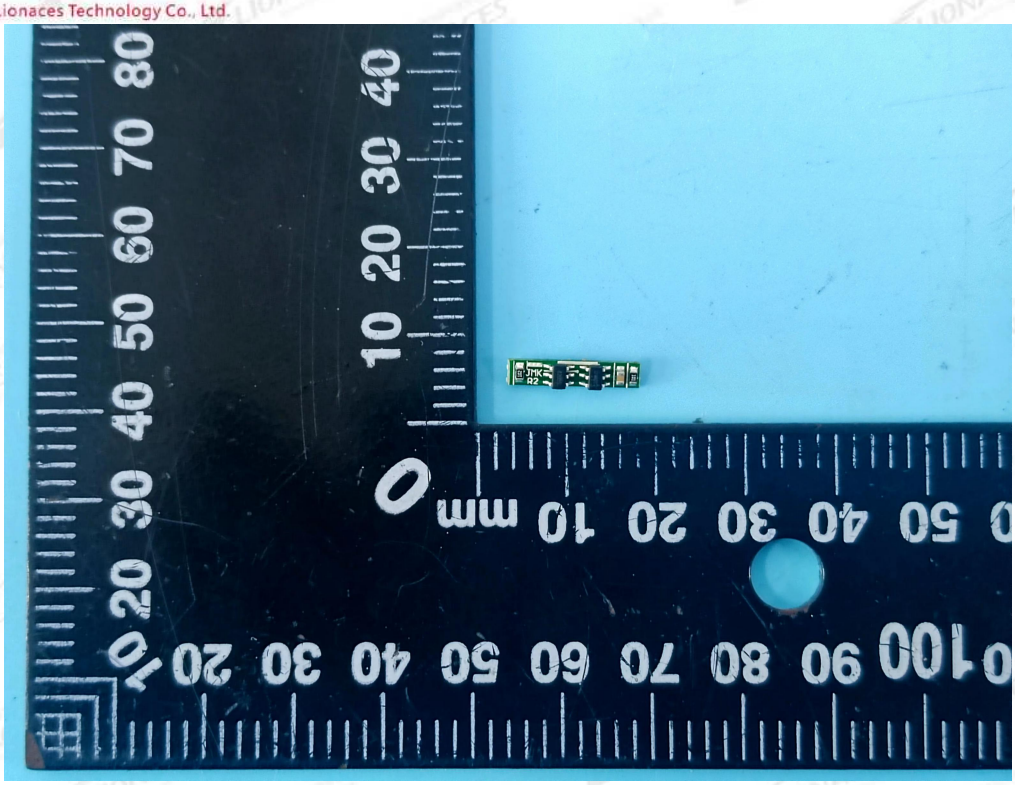
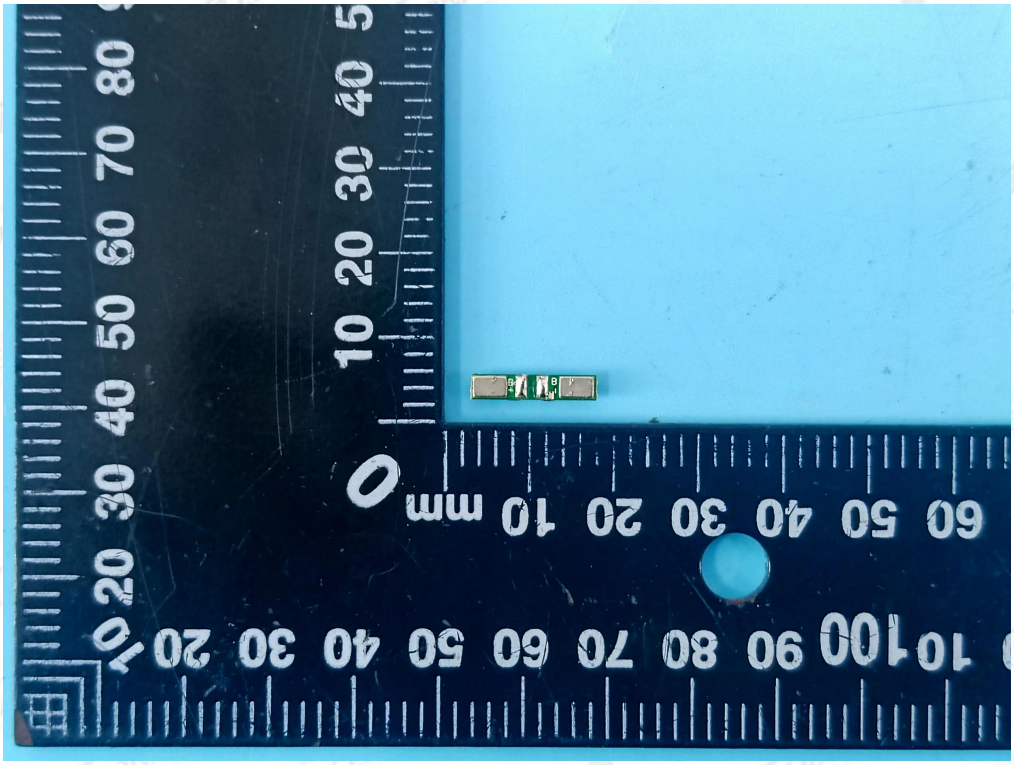
Shenzhen Lionaces Technology Co., Ltd.
Add: 301, Building B6, Junfeng Industrial Zone, Yonghe Road, Heping Community, Fuhai Street, Baoan, Shenzhen, Guangdong, China.
Tel: 0755-28280690 E-mail: service@lionaces.com
Website: www.lionaces.com



Front view of PCB



Back view of PCB

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Test Equipment

No	Name	Model specifications	Device Number	Calibration validity	Using (√)
1	High-performance battery detection system	CT-4008-5V6A-S1	LA-BT-E070	2023-12-06	√
2	Programmable fast temperature change test box	GX-3000-150LT	LA-BT-E072	2023-12-06	√
3	Digital temperature recorder	GL240	LA-BT-E096	2024-03-16	√
4	Battery short circuit tester	GX-055-B50	LA-BT-E097	2024-03-16	√
5	Drop test system	FH-03	LA-BT-E010	2023-12-06	√
6	Battery thermal shock test box	GX-3020-B	LA-BT-E085	2023-12-06	√
7	Battery crush test instrument	GX-5067-CSM	LA-BT-E084	2023-12-06	√
8	Electronic balance	JF2004	LA-BT-E078	2023-12-06	√
9	Electromagnetic vibration testing machine	EV203VT640	LA-BT-E013	2023-12-06	√
10	DC power supply	UTP1306S	LA-BT-E079 LA-BT-E080 LA-BT-E081 LA-BT-E082 LA-BT-E083	2023-12-06	√
11	Mechanical impact tester	HSKT10	LA-BT-E086	2023-12-06	√
12	Battery forced internal testing machine	FH-07	LA-BT-E006	2023-12-06	√
13	Gauge	H:57.1*h:25.4*R:31.7mm	LA-BT-E077	2023-12-08	√
14	DC power supply	PSW30-36	LA-BT-E091	2023-12-06	√

----END OF REPORT----

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Website: www.lionaces.com