Test Report

Applicant :

Address :

Manufacturer :

Address :

The following sample(s) was /were submitted and identified on behalf of the clients as:

Sample Name	:	Polymer Li-ion Cell
Trade Name	:	
Sample Model	:	1260110-10000mAh (Additional models are on the next page)
Sample Received Date	:	Jan. 26, 2024
Testing Period	:	Jan. 26, 2024 To Jan. 31, 2024
Test Requested	:	With reference to Regulation (EU) 2023/1542 concerning batteries and waste batteries
Test Method	:	Please refer to next page(s).
Test Result	:	Please refer to next page(s).
Conclusion	:	**PASS** (Based on test results)

Signed for and on behalf of

Guangdong KEYS Testing Technology Co., Ltd.

Tony Qian/Approved Signatory

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Additional Models : 146074-10000mAh,146074-9500mAh,146074-8000mAh,1264130-10000mAh, 126280-10000mAh,126280-9300mAh,1260115-10000mAh,1260110-10000mAh, 1260110-9500mAh,1260110-9200mAh,1260110-9000mAh,1260110-8000mAh, 1260110-7000mAh,1260100-10000mAh,1260100-9000mAh,126090,124065, 123790-5000mAh,123790-4000mAh,1165110,1160110,1160100-10000mAh, 1160100-9000mAh,115570,115555,114371-4000mAh,114371-4500mAh, 114371-5000mAh,114273,114190,1064130,106168,1060110,1055125, 105573,105570,105568-5000mAh,105568-4000mAh,105555,105080, 104050-2500mAh,104050-2600mAh,104040,103665,103655,103450-2000mAh, 103450-1800mAh,103040-1200mAh,103040-1000mAh,103040-800mAh,9873129, 974058,9565125,956090,955570,955565-5000mAh,955565-4000mAh, 954292-5000mAh,954292-4000mAh,9373129-10000mAh,9373129-9500mAh, 9373129-9000mAh,9265115-10000mAh,9265115-9000mAh,9265115-8000mAh, 9260110,9065115,9060100,906090,903659,8961118-10000mAh, 8961118-9000mAh,8870129,805080,804050,803450,803540,803160,785767-5000mAh, 785767-4800mAh,7565121-7000mAh,7565121-8000mAh,755590,755060, 735590-4000mAh,735590-4200mAh,735590-3800mAh,735486,714359, 706075,695464,683982,676074,656090,656090,655063,654060,646380, 645464,635486,626090-5000mAh,626090-4000mAh,625885,6060110, 6060100,606090,606078-4800mAh,606078-4400mAh,605483,585575-2900mAh, 585575-2500mAh,565872-3000mAh,565872-3200mAh,565872-3380mAh, 553580,525778,525777-3500mAh,525777-3400mAh,525777-2500mAh, 525777-3200mAh,523759,523450,506758,505573,505060,503759,474854,454261, 433759,426389,3858131,385576,347095,337093,327090,317090,30100129, 30100134,30100100,307090,2880159

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Sample Description:

No.	Name
1	Battery

1. Batteries Directive 2023/1542/EU

Test Result:

Test Item(s)	Unit	Test Method	Result	MDL	Limit
Cadmium(Cd)	mg/kg	EPA 3052:1996, ICP-AES	N.D.	2	20
Mercury(Hg)	mg/kg	EPA 3052:1996, ICP-AES	N.D.	2	5
Lead(Pb)	mg/kg	EPA 3052:1996, ICP-AES	N.D.	2	100

Note: 1. mg/kg= ppm;

2. N.D.=Not Detected(<MDL);

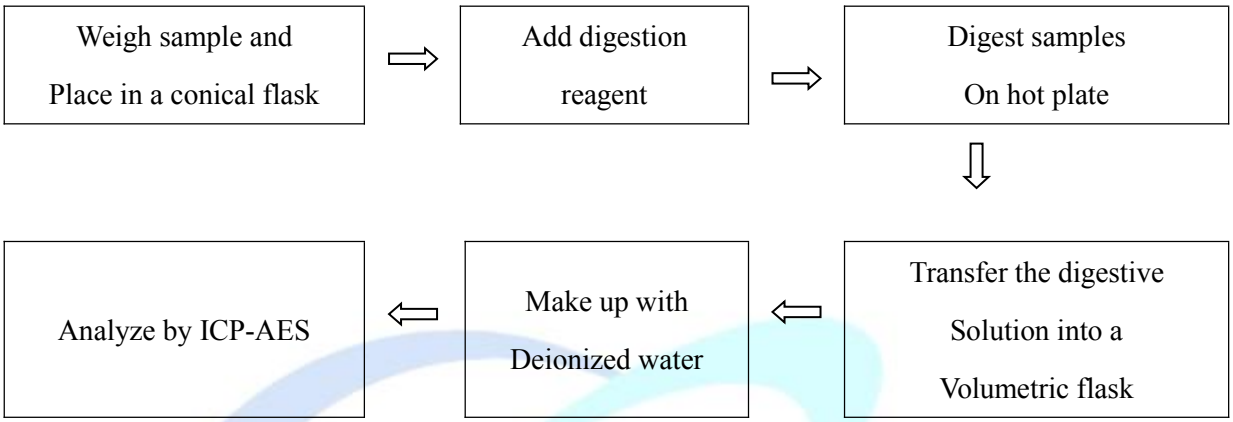
3. MDL =Method Detection Limit.

4. Batteries, accumulators and button cells containing more than 0.0005 % mercury, more than 0.002 % cadmium or more than 0.01 % lead, shall be marked with the chemical symbol for the metal concerned: Hg, Cd or Pb.

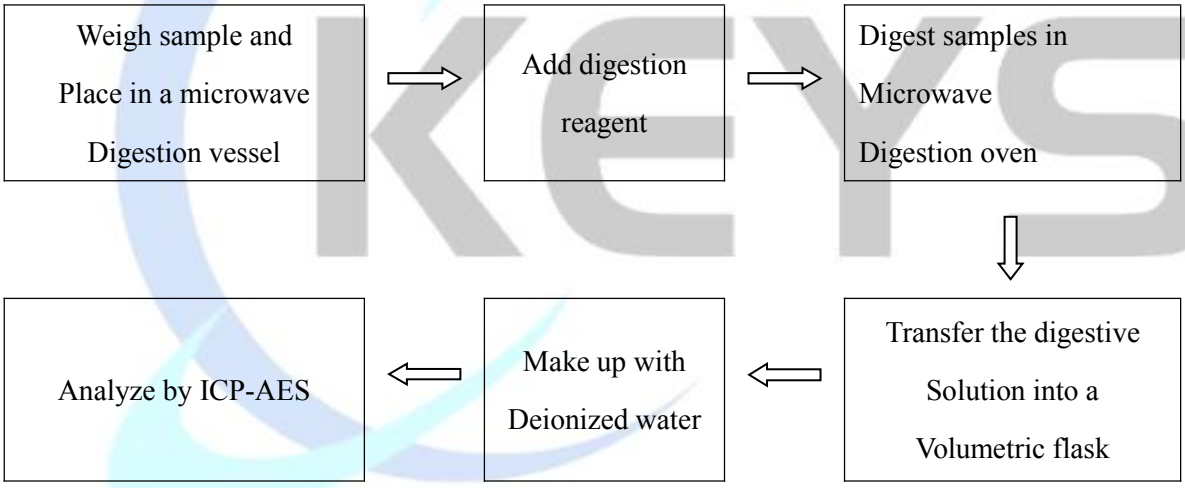
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Test Process:

1. Test for Cd/Pb Contents

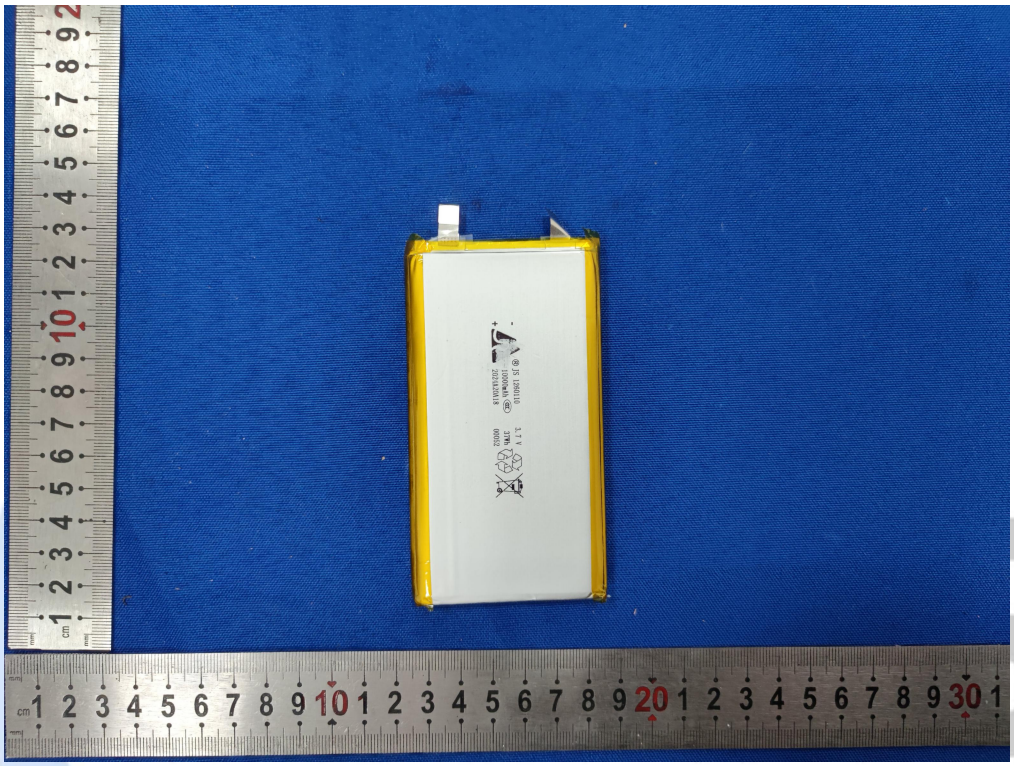


2. Test for Hg Contents



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Sample Photo:



*** End of Report ***

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Guangdong KEYS Testing Technology Co., Ltd.
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Test Report issued under the responsibility of:

UL Solutions

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. ..... :	**S03A23090219S001**
Date of issue ..... :	2023-10-20
Total number of pages ..... :	26
Name of Testing Laboratory preparing the Report ..... :	**Guangdong ESTL Technology Co., Ltd.**
Applicant's name ..... :	
Address ..... :	
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

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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.
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Test item description ..... :	Polymer Li-ion Cell		
Trade Mark(s) ..... :			
Manufacturer ..... :	Same as applicant		
Model/Type reference ..... :	676074		
Ratings ..... :	3.85V, 5000mAh, 19.25Wh		
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒ **CB Testing Laboratory:**	Guangdong ESTL Technology Co., Ltd.		
Testing location/ address.....:	No. 9 & 11 Headquarters 2nd Road, Songshan Lake Park, Dongguan, Guangdong 523808 China		
Tested by (name, function, signature).....:	Sunny Yan/ Project Handler	Sunny Yan	
Approved by (name, function, signature)...:	Jason Xu/ Reviewer	Jason.Xu	
☐ **Testing procedure: CTF Stage 1:**			
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐ **Testing procedure: CTF Stage 2:**			
Testing location/ address.....:			
Tested by (name + signature) .....:			
Witnessed by (name, function, signature) .:			
Approved by (name, function, signature)...:			
☐ **Testing procedure: CTF Stage 3:**			
☐ **Testing procedure: CTF Stage 4:**			
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):

- National Differences (3 pages)
- Enclosure (4 pages)

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
Test items: cl.7.2.1 Continuous charging at constant voltage (cells); cl.7.3.1 External short-circuit (cell); cl.7.3.3 Free fall (cell); cl.7.3.4 Thermal abuse (cells); cl.7.3.5 Crush (cells); cl.7.3.7 Forced discharge (cells); cl.7.3.9 Forced internal short-circuit (cells). Tests are made with the number of cells specified in IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021 Table 1.	Guangdong ESTL Technology Co., Ltd. No. 9 & 11 Headquarters 2nd Road, Songshan Lake Park, Dongguan, Guangdong 523808 China

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

EU Group* KR

*= No National or Group Differences declared

KR= Republic of Korea

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

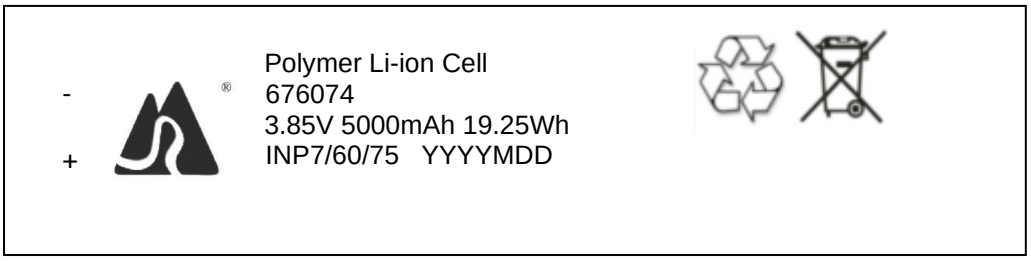
The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

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.



Date Code: YYYYMDD

YYYY: Four digitals represent year of manufacture.

M: One letter represent month of manufacture, eg: A=January, B=February, C=March……L=December.

DD: Two digitals represent day of manufacture.

Test item particulars.....:	
Classification of installation and use.....:	To be defined in final system
Supply Connection.....:	N/A
Recommend charging method declared by the manufacturer.....:	CC/CV
Discharge current (0,2 It A).....:	1000mA
Specified final voltage.....:	3.0V
Upper limit charging voltage per cell.....:	4.4V
Maximum charging current.....:	0~10°C: 4.2V, 1000mA 10~20°C: 4.2V, 2500mA 20~45°C: 4.4V, 5000mA 45~55°C: 4.2V, 2500mA
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 .....:	2023-09-08
Date (s) of performance of tests.....:	2023-09-09 to 2023-09-25

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) ..... :

General product information and other remarks:

Cell only

INP7/60/75 is the marking of IEC 61960 requirement for the model 676074.

The electrolyte type of this cell doesn't belong to polymer, and the additional test cl.7.3.9 was carried out to evaluate the cell.

The main features of the cell are shown as below:

Model	Rated Capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current*	Maximum Discharge Current	Limited Charge Voltage	Cut-off Voltage
676074	5000mAh	3.85V	2500mA	2500mA	5000mA	10000mA	4.4V	3.0V

The main features of the battery are shown as below:

Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
676074	4.4V	100mA	0°C	55°C

Remark:

*: the charge parameter limits declared by manufacturer is:
0°C to 10°C: 1000mA charge to 4.2V, then constant voltage until charging current reduces to 100mA;
10°C to 20°C: 2500mA charge to 4.2V, then constant voltage until charging current reduces to 100mA;
20°C to 45°C: 5000mA charge to 4.4V, then constant voltage until charging current reduces to 100mA;
45°C to 55°C: 2500mA charge to 4.2V, then constant voltage until charging current reduces to 100mA;

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		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	On the narrow side of the 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		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**

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current		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 circuits		P
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	Complied. ISO 9001:2015 certificate has been provided.	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		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	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 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	Charging temperature specified by client is 0~10°C: 4.2V, 1000mA 10~20°C: 4.2V, 2500mA 20~45°C: 4.4V, 5000mA 45~55°C: 4.2V, 2500mA Charging current: 0°C: 1000mA to 4.2V 10°C: 2500mA to 4.2V 20°C: 5000mA to 4.4V 45°C: 5000mA to 4.4V 55°C: 2500mA to 4.2V	P
7.2	**Intended use**		**P**
7.2.1	Continuous charging at constant voltage (cells)	Tests 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		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**	See below	P
7.3.1	External short-circuit (cell)	Tests 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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	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	Tests Complied.	P
	Results: no fire, no explosion	No fire. No explosion	P
7.3.4	Thermal abuse (cells)	Tests Complied.	P
	Oven temperature (°C) ..... :	130 ± 2	—
	Results: no fire, no explosion	No fire. No explosion	P
7.3.5	Crush (cells)	Tests 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	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)	Tests Complied.	P
	Discharge a single cell to the lower limit discharge voltage specified by the cell manufacturer		P

IEC 62133-2			
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)		N/A
7.3.8.1	Vibration	Cell Only.	N/A
	Results: no fire, no explosion, no rupture, no leakage or venting. ..... :		N/A
7.3.8.2	Mechanical shock	Cell Only.	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)	Tests Complied.	P
	The cells complied with national requirement for ..... :	France, Japan, Korea, 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 cells	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 is provided in manufacturer's specification.	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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	As appropriate, any information relating to hazard avoidance resulting from a system analysis is provided to the end user		N/A
	Do not allow children to replace batteries without adult supervision		N/A
8.2	**Small cell and battery safety information**	Not small cell	**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		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**	Not small cell	**N/A**

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Coin cells and batteries identified as small batteries include a caution statement regarding the hazards of ingestion in accordance with 8.2		N/A
	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**		**P**
	The following information are marked on or supplied with the battery:		P
	- Storage and disposal instructions	Information for storage and disposal instructions mentioned in manufacturer's specifications.	P
	- Recommended charging instructions	Information for recommended charging instructions mentioned in manufacturer's specifications.	P
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	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**		**P**
A.3	**Consideration on charging voltage**		**P**
A.3.1	General	Charging voltage is 4.4V.	P
A.3.2	Upper limit charging voltage	4.4V	P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		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	See A.4.2.2	P
A.4.2.1	General		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
A.4.2.2	Safety consideration when a different recommended temperature range is applied	0°C: 1000mA to 4.2V, 10°C: 2500mA to 4.2V, 20°C: 5000mA to 4.4V, 45°C: 5000mA to 4.4V, 55°C: 2500mA to 4.2V.	N/A
A.4.3	High temperature range		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		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		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**

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
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**		**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 .....:	(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
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**
C1	4.4	2.5	4.346	A
C2	4.4	2.5	4.339	A
C3	4.4	2.5	4.335	A
C4	4.4	2.5	4.342	A
C5	4.4	2.5	4.325	A

Supplementary information:

A - No fire. No explosion. No leakage.

B - Fire.

C - Explosion.

D - Leakage.

E - Bulge.

F - Others (please explain).

7.3.1	TABLE: External short circuit (cell)				P
Sample No.	**Ambient (°C)**	**OCV at start of test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature rise ΔT (K)**	**Results**
Samples charged at charging temperature upper limit (55°C)					
C6	56.1	4.172	82	39.3	A, E, H
C7	56.1	4.168	87	29.2	A, E, H
C8	56.4	4.175	79	46.3	A, E, H
C9	56.5	4.171	92	63.0	A, E, H
C10	56.6	4.166	90	66.6	A, E, H
Samples charged at charging temperature (45°C)					
C11	55.9	4.342	85	38.8	A, E, H
C12	57.9	4.338	81	58.3	A, E, H
C13	57.9	4.334	89	56.9	A, E, H
C14	58.1	4.340	94	58.7	A, E, H
C15	58.1	4.329	87	60.4	A, E, H
Samples charged at charging temperature (20°C)					
C16	58.0	4.348	76	52.8	A, E, H
C17	57.8	4.350	79	47.2	A, E, H
C18	58.0	4.350	93	57.0	A, E, H

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

C19	57.4	4.345	84	33.2	A, E, H
C20	57.4	4.350	72	33.0	A, E, H
Samples charged at charging temperature (10°C)					
C21	55.9	4.094	85	45.1	A, E, H
C22	55.1	4.098	83	68.8	A, E, H
C23	55.3	4.075	84	59.4	A, E, H
C24	54.7	4.091	87	67.0	A, E, H
C25	54.7	4.079	82	68.2	A, E, H
Samples charged at charging temperature lower limit (0°C)					
C26	58.1	4.075	90	33.4	A, E, H
C27	58.2	4.068	92	46.6	A, E, H
C28	58.2	4.080	84	40.8	A, E, H
C29	58.2	4.067	85	42.1	A, E, H
C30	58.2	4.076	79	34.7	A, E, H

Supplementary information:

A - No fire. No explosion.

B - Fire.

C - Explosion.

D – Leakage.

E - Bulge.

F - Others (please explain).

G – The test was completed after 24 h.

H – The test was completed after the cell casing cooled to 20% of the maximum temperature rise.

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**

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

Supplementary information:

SC: short-circuit.

OC: open-circuit.

A - No fire. No explosion.

B - Fire.

C - Explosion.

D - Leakage.

E - Bulge.

F - Others (please explain). -rapid decline in short circuit current, the battery pack should remain on test for an additional one hour after the current reaches a low end steady state condition.

G – The test was completed after 24 h.

H – The test was completed after the cell casing cooled to 20% of the maximum temperature rise

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 (55°C)				
C54	4.171	--	13.0	A, G
C55	4.172	--	13.0	A, G
C56	4.169	--	13.0	A, G
C57	4.167	--	13.0	A, G
C58	4.170	--	13.0	A, G
Samples charged at charging temperature (45°C)				
C59	4.340	--	13.0	A, G
C60	4.335	--	13.0	A, G
C61	4.338	--	13.0	A, G
C62	4.342	--	13.0	A, G
C63	4.336	--	13.0	A, G
Samples charged at charging temperature (20°C)				
C64	4.351	--	13.0	A, G
C65	4.352	--	13.0	A, G
C66	4.347	--	13.0	A, G
C67	4.349	--	13.0	A, G
C68	4.350	--	13.0	A, G
Samples charged at charging temperature (10°C)				
C69	4.085		13.0	A, G
C70	4.091		13.0	A, G

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Clause	Requirement + Test	Result - Remark	Verdict

C71	4.081		13.0	A, G
C72	4.078		13.0	A, G
C73	4.082		13.0	A, G
Samples charged at charging temperature lower limit (0°C)				
C74	4.072	--	13.0	A, G
C75	4.069	--	13.0	A, G
C76	4.068	--	13.0	A, G
C77	4.078	--	13.0	A, G
C78	4.067	--	13.0	A, G

Supplementary information:

A - No fire. No explosion.

B - Fire.

C - Explosion.

D - Leakage.

E - Bulge.

F - Others (please explain).

G – Force released after maximum level reached.

H – Force released after abrupt voltage drop of one-third the original value.

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:

A - No fire. No explosion.

B - Fire.

C - Explosion.

D - Leakage.

E - Bulge.

F - Others (please explain).

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

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**
C79	3.382	5	3.0	A, E, H
C80	3.391	5	3.0	A, E, H
C81	3.381	5	3.0	A, E, H
C82	3.386	5	3.0	A, E, H
C83	3.395	5	3.0	A, E, H

Supplementary information:

A - No fire. No explosion.

B - Fire.

C - Explosion.

D - Leakage.

E - Bulge.

F - Others (please explain).

G – The voltage reached negative value of upper limit charging voltage within 90 min.

H - The voltage did not reach negative value of upper limit charging voltage.

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:

A - No fire. No explosion. No leakage. No venting. No rupture.

B - Fire.

C - Explosion.

D - Leakage.

E – Venting.

F – Rupture.

G - Bulge.

H - Others (please explain).

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**

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

Supplementary information:

A - No fire. No explosion. No leakage. No venting. No rupture.

B - Fire.

C - Explosion.

D - Leakage.

E – Venting.

F – Rupture.

G - Bulge.

H - Others (please explain).

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 (55°C)					
C84	55	4.161	1	400	A, H
C85	55	4.162	1	400	A, H
C86	55	4.156	1	400	A, H
C87	55	4.159	1	400	A, H
C88	55	4.163	1	400	A, H
Samples charged at charging temperature (45°C)					
C89	45	4.332	1	400	A, H
C90	45	4.328	1	400	A, H
C91	45	4.326	1	400	A, H
C92	45	4.329	1	400	A, H
C93	45	4.335	1	400	A, H
Samples charged at charging temperature (20°C)					
C94	20	4.335	1	400	A, H
C95	20	4.338	1	400	A, H
C96	20	4.333	1	400	A, H
C97	20	4.337	1	400	A, H
C98	20	4.327	1	400	A, H
Samples charged at charging temperature (10°C)					
C99	10	4.084	1	400	A, H
C100	10	4.062	1	400	A, H
C101	10	4.075	1	400	A, H

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

C102	10	4.071	1	400	A, H
C103	10	4.065	1	400	A, H
Samples charged at charging temperature lower limit (0°C)					
C104	0	4.054	1	400	A, H
C105	0	4.061	1	400	A, H
C106	0	4.059	1	400	A, H
C107	0	4.063	1	400	A, H
C108	0	4.062	1	400	A, H

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.

A – No fire

B – Fire

C - Explosion.

D - Leakage.

E - Bulge.

F - Others (please explain).

G – Test concluded when 50 mV voltage drop occurred prior to reaching force limit

H – Test concluded when 400 N pressure was reached and 50 mV voltage drop was not achieved

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 an internal resistance less than or equal to 3 Ω, see test result on corresponding tables according to Clause 6 and Table 1.

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

	TABLE: Critical components information				**P**
Object / part No.	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Cell		676074	3.85V, 5000mAh	IEC 62133-2: 2017, IEC 62133-2:2017/AMD1: 2021	Tested with appliance
-Positive electrode	Jiangmen Kahoo Industry Co., LTD	TE613DE	$LiNi_{0.6}Mn_{0.3}Co_{0.1}O_2$	--	--
-Negative electrode	Ganzhou RFT Technology Co., LTD	AGL-1	Graphite	--	--
-Separator	Shenzhen Dingtaixiang New Energy Technology Co., Ltd	12+2+1	PE+ Ceramic Shutdown temperature: 135°C	--	--
-Electrolyte	Dongguan Shanshan Battery Material Co., Ltd	SS-GDJT010	EC: DEC: EMC=1:1:2 $LiPF_6$ 1mol/L	--	--
Supplementary information: [1)] Provided evidence ensures the agreed level of compliance. See OD-2039.					

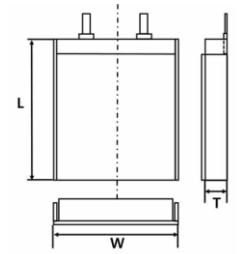
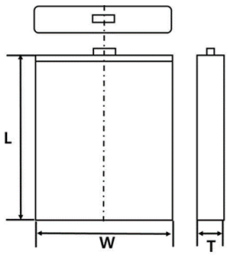
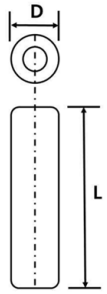
Report No.: **S03A23090219S001**

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. ..... : **Attachment Originator**..... : **Master Attachment**..... :	KR_ND_IEC62133_2C KTR 2023-08-02		
Copyright © 2022 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.			
	National Differences		
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 I_t A, to a final discharge voltage specified by the manufacturer. Sample batteries shall then be charged at a constant current of 2,0 I_t 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 I_t 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 I_t A**.** **(e.g., quick charging power bank, etc.)**		N/A

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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.	633.3Wh/L	—

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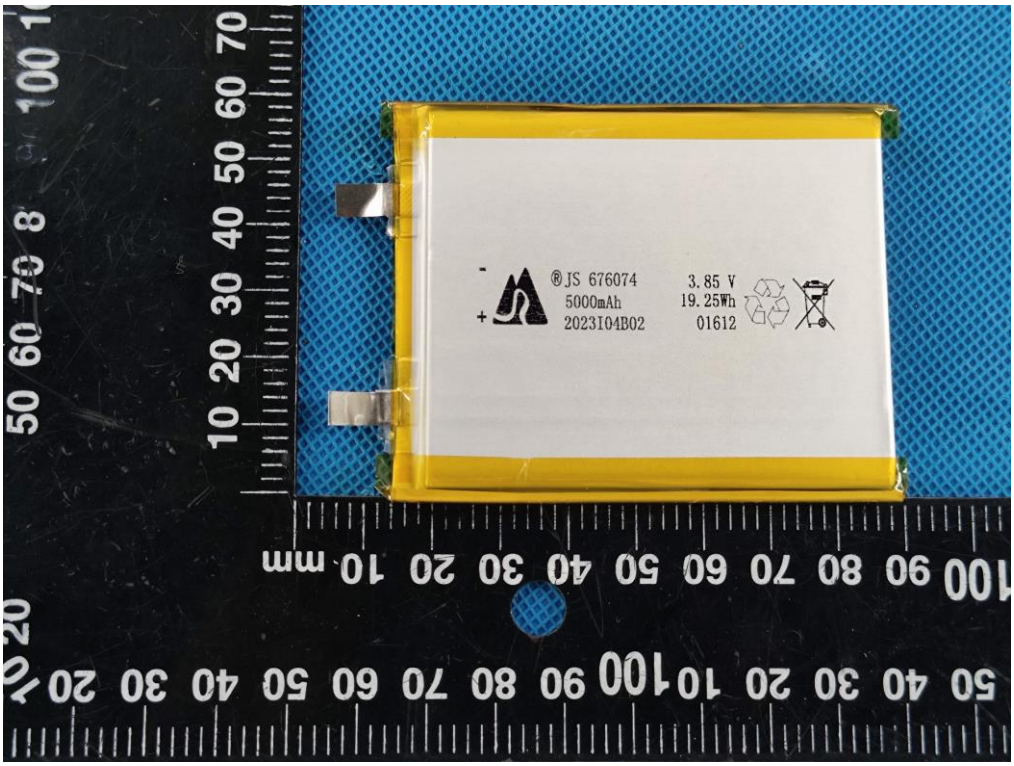
ATTACHMENT to IEC62133_2C			
Clause	Requirement + Test	Result - Remark	Verdict
	H.2 Calculation Method  L : Length (max.) of cell (including terrace) W : Width (max.) of cell T : Thickness (max.) when shipping charge (For reference, Please Exclude the dimension of any tape that Is attached to cell) $Volumetric\ energy\ density\ (Wh/L) = \frac{Nominal\ voltage\ (V) \times Rated\ capacity\ (Ah)}{Length\ (L) \times Width\ (W)\ \times Thickness\ (T)}$ [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]		—

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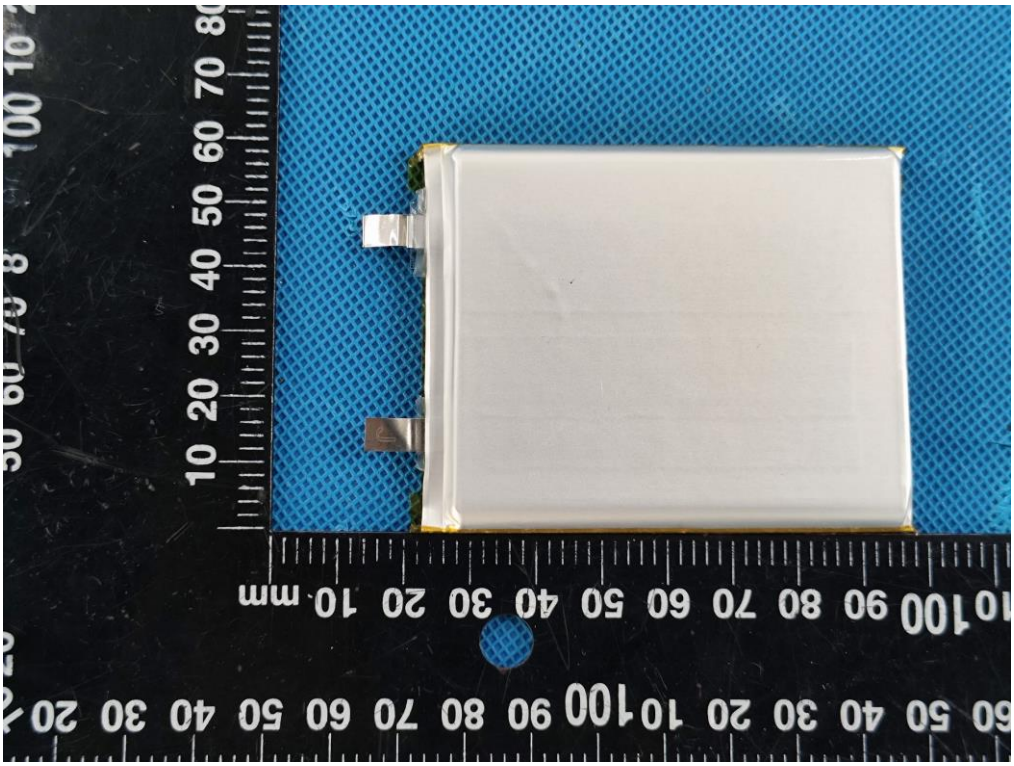
ENCLOSURE

Supplement ID	Description
01-1	Overall View 1 of Cell
01-2	Overall View 2 of Cell
02	Enclosure drawing

ID 01-1

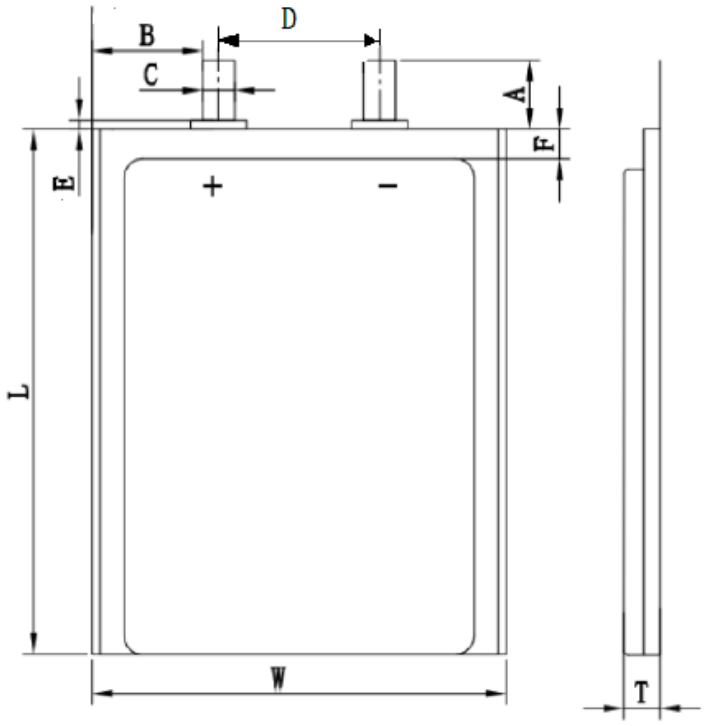


ID 01-2



ID 02

Cell Drawing:



T(Max.): W(Max.): L(Max.) = 6.8mm: 60.0mm: 74.5mm