

测试报告 Test Report

报告编号 : AGC11598220201-001
Report No.

样品名称 : 聚合物锂离子电芯 Polymer Li-ion Cell
SAMPLE NAME

样品型号 : 请参见后续页(Please refer to the following page(s)).
MODEL NAME

委托单位 :
APPLICANT

检测标准 : 请参见后续页(Please refer to the following page(s)).
STANDARD(S)

签发日期 : 2022/02/28
DATE OF ISSUE

深圳市鑫宇环标准技术有限公司

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



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委托单位(Applicant)

单位地址(Address)

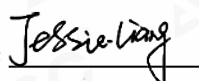
测试地址(Test Site) : 6/F., Building 2, Sanwei Chaxi Industrial Park, Sanwei Community,
Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China**样品信息(Report on the submitted sample(s) said to be):**样品名称(Sample Name) : 聚合物锂离子电池芯 Polymer Li-ion Cell
1260110,1160100,1260100,9065115,9858102,1055125,
955465,105568,6060100,954390,606090,955465,105573,
型号(Model) : 656090,5565110,1165110,9565125,1376074,126280,115570,
7565121,126090

制造商(Manufacturer) :

地址(Address) :

收样日期(Sample Received Date) : 2022/02/23

测试周期(Testing Period) : 2022/02/23-2022/02/28

Approved by: 

签发: 梁丹(Jessie.Liang)

技术总监(Technical Director)

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测试要求
Test Requested:

根据客户要求, 依据欧盟电池指令 2006/66/EC 及其修订指令 2013/56/EU 对送检样品中铅、镉、汞的含量进行测定。

As specified by client, to determine Lead(Pb), Cadmium(Cd), Mercury(Hg) content in the submitted sample in accordance with European Directive 2006/66/EC and its amendments 2013/56/EU on batteries and accumulators.

结论
Conclusion
合格
Pass
测试结果(Test Result):

测试项目 Test Item	测试方法/仪器 Test Method/ Instrument	方法检出限 MDL	最大限值 Maximum Limit
铅 Lead (Pb)	IEC 62321-5:2013/ ICP-OES	0.0005%	/
镉 Cadmium (Cd)	IEC 62321-5:2013/ ICP-OES	0.0005%	0.002%
汞 Mercury (Hg)	IEC 62321-4: 2013+A1:2017/ ICP-OES	0.0001%	0.0005%

测试点 Test point	测试结果 Test result (%)			结论 Conclusion
	铅 Lead(Pb)	镉 Cadmium(Cd)	汞 Mercury(Hg)	
1	N.D.	N.D.	N.D.	符合 Conformity

注释 Note:

%= 百分比 percentage

N.D.= 未检出 (小于方法检出限) (Not Detected (less than method detection limit))

MDL =方法检出限 Method Detection Limit

测试点描述(Test Point Description)

测试点 Test point	测试点描述 Test point description
1	电芯 Electric core

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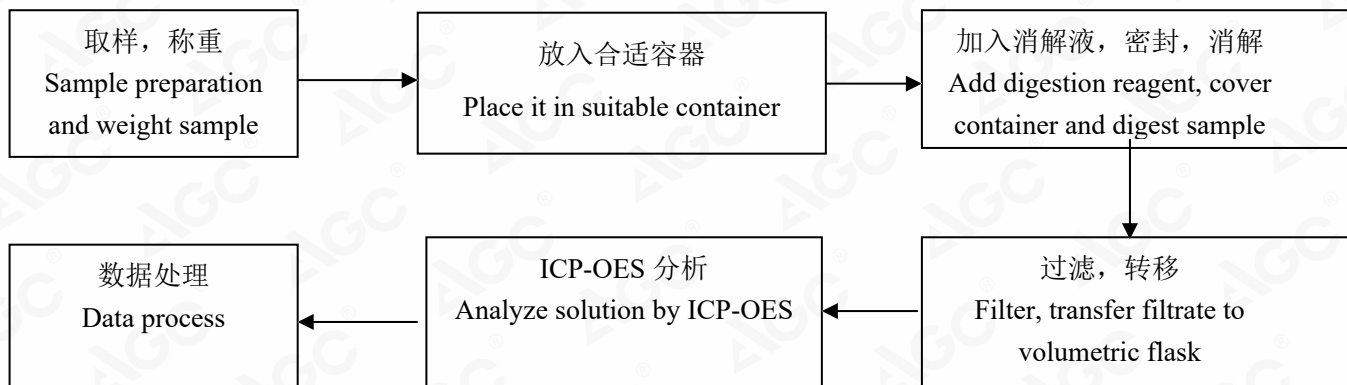
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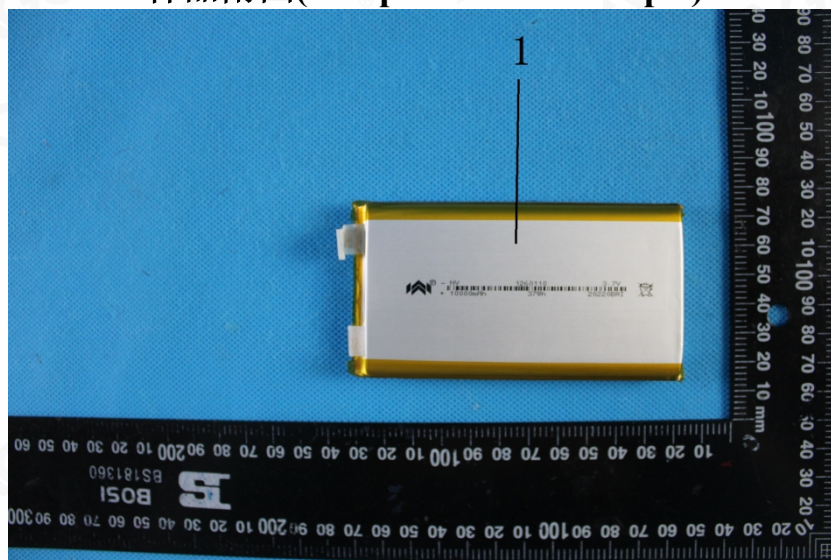
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测试流程图 (Test Flow Chart)



样品附图(The photo of the sample)



AGC11598220201-001

此图片仅限于随 AGC 正本报告使用
AGC authenticate the photo only on original report

报告结束

*** End of Report ***

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签发测试报告条款 Conditions of Issuance of Test Reports

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3. 除非相关政府部门、法律或法院要求, 否则未经公司预先书面同意, 本公司毋需也无义务到法院对有关报告作证。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. 如果本公司确定报告被不当地使用, 本公司保留撤回报告的权利, 并有权要求其它适当的额外赔偿。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. 本公司接受样品进行测试的前提是, 该测试报告不能作为针对本公司法律行动的依据。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. 如因使用本公司任何报告内的资料, 或任何传播信息所描述与之有关的测试或研究导致的任何损失或损害, 本公司概不负责。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. 若需要在法院审理程序或仲裁过程中使用测试报告, 客户必须在提交测试样品前将该意图告知本公司。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.

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8. 电子版报告更改后将不被追回，客户有义务将更改后的报告提供给使用原报告的相关方。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. 该测试报告的支持数据和信息本公司保存 6 年。个别评审机构有特别要求的，检测数据和报告的保存期可依情况变动。一旦超过上述提交的保存期限，数据和信息将被处理掉。任何情况下，本公司不必提供任何被处理的过期数据或信息。即使本公司事先被告知可能会发生相关的损害，本公司在任何情况下也不必承担任何损害，包括(但不限于)补偿性赔偿、利润损失、数据遗失、或任何形式的特殊损害、附带损害、间接损害、从属损害或任何违反约定、违反承诺、侵权(包括疏忽)、产品责任或其他原因的惩罚性损害。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.

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Test Report issued under the responsibility of:



TEST REPORT IEC 62133-2 Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications – Part 2: Lithium systems	
Report Number.....	CN21FACV 001
Date of issue.....	2022-01-19
Total number of pages	24 pages
Name of Testing Laboratory preparing the Report	Shenzhen TCT Testing 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_2B
Test Report Form(s) Originator	DEKRA Certification B.V.
Master TRF	Dated 2021-08-31
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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. This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

Test item description	Rechargeable Polymer Li-ion Cell	
Trade Mark(s)		
Manufacturer	Same as applicant	
Model/Type reference	1160100	
Ratings	3.7V, 10000mAh, 37Wh	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	Shenzhen TCT Testing Technology Co., Ltd.
Testing location/ address	1B/F, Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China	
Tested by (name, function, signature)	David Lu (Project Engineer)	<i>David Lu</i>
Approved by (name, function, signature) ...	Aiden Liu (Reviewer)	<i>Aiden Liu</i>
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	
Testing location/ address		
Tested by (name, function, signature)		
Approved by (name, function, signature) ...		
<input type="checkbox"/>	Testing procedure: CTF Stage 2:	
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name, function, signature) .:		
Approved by (name, function, signature) ...		
<input type="checkbox"/>	Testing procedure: CTF Stage 3:	
<input type="checkbox"/>	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) :		

<p>List of Attachments (including a total number of pages in each attachment): Attachment 1: (Republic of Korea) NATIONAL DIFFERENCES (3 pages); Attachment 2: Photo documentation (1 page);</p>	
<p>Summary of testing:</p>	
<p>Tests performed (name of test and test clause): 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);</p> <p>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.</p> <p>Tests are made with the number of cells and batteries specified in IEC 62133-2:2017+A1 Table 1.</p>	<p>Testing location: Shenzhen TCT Testing Technology Co., Ltd. 1B/F, Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China</p>
<p>Summary of compliance with National Differences (List of countries addressed): KR KR= Korea, Republic of</p> <p><input checked="" type="checkbox"/> The product fulfils the requirements of <u>EN 62133-2:2017+A1</u>.</p>	

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:

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.

+ Rechargeable Polymer Li-ion Cell 
Model: 1160100 INP11/60/100
- 3.7V 10000mAh 37Wh

Date:YYYYMMDD Made in China

WARNING: Risk of Fire and Burns. Do Not Open, Crush, Heat Above 60°C/140°F or Incine rate. Do not short circuit. If bulges severely, discontinue use.

Date code: YYYYMMDD

YYYY=Year, MM=Month, DD=Day

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 2000mA constant current and 4.2V constant voltage until the current reduces to 200mA at ambient 20°C±5°C.
Discharge current (0,2 It A)	2000mA
Specified final voltage.....:	3.0V
Upper limit charging voltage per cell.....:	4.25V
Maximum charging current	7000mA
Charging temperature upper limit	45°C
Charging temperature lower limit.....:	0°C
Polymer cell electrolyte type.....:	<input type="checkbox"/> gel polymer <input type="checkbox"/> solid polymer <input checked="" type="checkbox"/> 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	2021-11-15
Date (s) of performance of tests	2021-12-16 to 2021-12-27
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 <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60080-02:	
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	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)	Same as applicant

General product information and other remarks:

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.

Recommend charging voltage declared by the manufacturer: 4.2V.

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

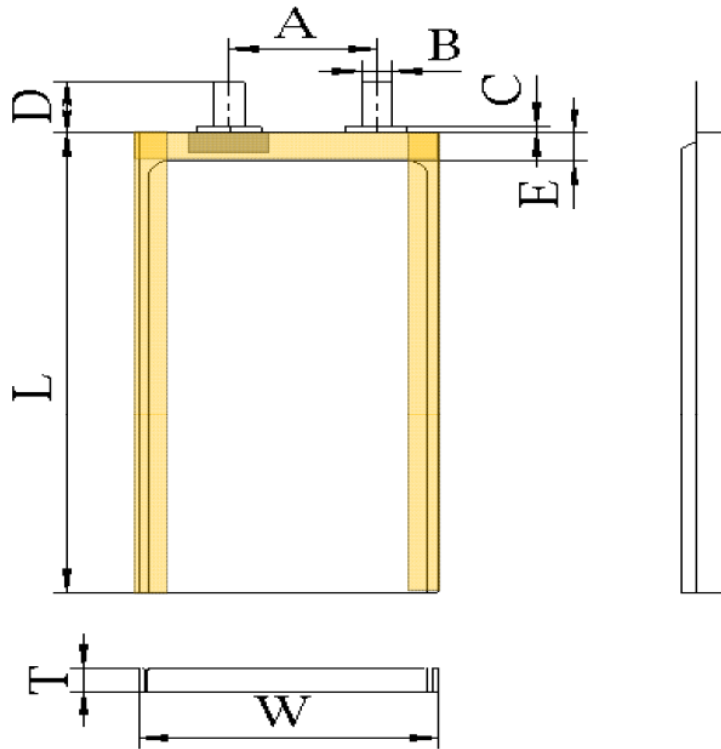
Model (Cell)	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Final Voltage
1160100	10000mAh	3.7V	2000mA	2000mA	7000mA	10000mA	4.25V	3.0V

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
1160100	4.25V	500mA	0°C	45°C

Remark: As client's requirements, all tests are carried out under more stringent conditions of 4.25V.

Construction:



(Maximum) Dimension: T×W×L: 11.0mm×60.0mm×100.0mm
Cell

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 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	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		P
	Terminal contacts are arranged to minimize the risk of short circuits		P
5.6	Assembly of cells into batteries		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	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 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	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 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 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
	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 \pm 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	Cell only.	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	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 \pm 5 °C, using the method declared by the manufacturer	See page 6.	P
	Prior to charging, the battery has been discharged at 20 °C \pm 5 °C at a constant current of 0,2 It A down to a specified final voltage	See page 6.	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

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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	Charge temperature specified by manufacturer: 0-45°C. -5°C used for lower limit tests. 45°C used for upper limit tests.	P
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 2000mA.	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 is conducted on one to four (depending upon the protection circuit) of the five samples before conducting the short-circuit test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	A single fault applies to protective component parts such as MOSFET (metal oxide semiconductor field-effect transistor), fuse, thermostat or positive temperature coefficient (PTC) thermistor		N/A
	Results: no fire, no explosion..... :		N/A
7.3.3	Free fall	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
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	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	Lower limit discharge voltage 3.0V	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

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Clause	Requirement + Test	Result - Remark	Verdict
	- The discharge voltage reaches the negative value of upper limit charging voltage within the testing duration. The voltage is maintained at the negative value of the upper limit charging voltage by reducing the current for the remainder of the testing duration		N/A
	- The discharge voltage does not reach the negative value of upper limit charging voltage within the testing duration. The test is terminated at the end of the testing duration		P
	Results: no fire, no explosion..... :	(See appended table 7.3.7)	P
7.3.8	Mechanical tests (batteries)	Cell only.	N/A
7.3.8.1	Vibration		N/A
	Results: no fire, no explosion, no rupture, no leakage or venting. :		N/A
7.3.8.2	Mechanical shock		N/A
	Results: no leakage, no venting, no rupture, no explosion and no fire :		N/A
7.3.9	Design evaluation – Forced internal short-circuit (cells)	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	Not small cells.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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	The cell is marked in accordance with IEC 61960, also see page 5.	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 cells.	N/A
	Coin cells and batteries identified as small batteries include a caution statement regarding the hazards of ingestion in accordance with 8.2	Not coin cells.	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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
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		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	Complied.	P
A.3	Consideration on charging voltage	Complied.	P
A.3.1	General		P
A.3.2	Upper limit charging voltage	4.25V applied.	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	4.25V 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	Not higher than the temperature specific in this standard.	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 lower temperature declared by client is: 0°C.	P

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Clause	Requirement + Test	Result - Remark	Verdict
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	No documents provided by manufacturer explaining the lower limit exceed 10°C, -5°C applied for testing in this report for safety considerations.	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	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
A.5.2	Insertion procedure for nickel particle to generate internal short		P
A.5.3	Disassembly of charged cell		P
A.5.4	Shape of nickel particle		P
A.5.5	Insertion of nickel particle in cylindrical cell		N/A
A.5.5.1	Insertion of nickel particle in winding core		N/A
A.5.5.2	Marking the position of the nickel particle on both ends of the winding core of the separator		N/A
A.5.6	Insertion of nickel particle in prismatic cell		P
A.6	Experimental procedure of the forced internal short-circuit test		P
A.6.1	Material and tools for preparation of nickel particle		P
A.6.2	Example of a nickel particle preparation procedure		P
A.6.3	Positioning (or placement) of a nickel particle		P
A.6.4	Damaged separator precaution		P
A.6.5	Caution for rewinding separator and electrode		P
A.6.6	Insulation film for preventing short-circuit		P
A.6.7	Caution when disassembling a cell		P
A.6.8	Protective equipment for safety		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
A.6.9	Caution in the case of fire during disassembling		P
A.6.10	Caution for the disassembling process and pressing the electrode core		P
A.6.11	Recommended specifications for the pressing device		P
ANNEX B	RECOMMENDATIONS TO EQUIPMENT MANUFACTURERS AND BATTERY ASSEMBLERS		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		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		N/A
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
TS20211014023C1#	4.25 ¹⁾	2.0	4.23	P
TS20211014023C2#	4.25 ¹⁾	2.0	4.23	P
TS20211014023C3#	4.25 ¹⁾	2.0	4.23	P
TS20211014023C4#	4.25 ¹⁾	2.0	4.23	P
TS20211014023C5#	4.25 ¹⁾	2.0	4.23	P
Supplementary information:				
- No fire or explosion				
- No leakage				
1): As client's requirements, all tests are carried out under more stringent conditions of 4.25V.				

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), °C	Results
Samples charged at charging temperature upper limit (45°C)					
TS20211014023 C6#	55.1	4.23	85	109.4	P
TS20211014023 C7#	55.1	4.23	83	107.9	P
TS20211014023 C8#	55.1	4.23	85	110.6	P
TS20211014023 C9#	55.1	4.23	83	106.8	P
TS20211014023 C10#	55.1	4.23	83	111.3	P
Samples charged at charging temperature lower limit (-5°C)					
TS20211014023 C11#	55.1	4.18	81	109.6	P
TS20211014023 C12#	55.1	4.18	80	110.1	P
TS20211014023 C13#	55.1	4.18	83	106.7	P
TS20211014023 C14#	55.1	4.18	81	102.8	P
TS20211014023 C15#	55.1	4.18	80	104.7	P

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

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:

- 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)					
TS20211014023C29#	4.24	4.24	13.01	P	
TS20211014023C30#	4.23	4.23	13.03	P	
TS20211014023C31#	4.24	4.24	13.03	P	
TS20211014023C32#	4.23	4.23	13.03	P	
TS20211014023C33#	4.23	4.23	13.03	P	
Samples charged at charging temperature lower limit (-5°C)					
TS20211014023C34#	4.18	4.18	13.02	P	
TS20211014023C35#	4.17	4.17	13.03	P	
TS20211014023C36#	4.18	4.18	13.03	P	
TS20211014023C37#	4.19	4.19	13.04	P	
TS20211014023C38#	4.18	4.18	13.02	P	

Note: A 13kN force applied at the wide side of prismatic cells. No voltage abrupt occurred.

Supplementary information:

- No fire or explosion

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

7.3.6	TABLE: Over-charging of battery			N/A
Constant charging current (A)				—
Supply voltage (Vdc)				—
Sample No.	OCV before charging (Vdc)	Total charging time (minute)	Maximum outer case temperature (°C)	Results
Supplementary information:				
- 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_r (A)	Lower limit discharge voltage (Vdc)	Results
TS20211014023C39#	3.38	10.0	3.0	P
TS20211014023C40#	3.38	10.0	3.0	P
TS20211014023C41#	3.38	10.0	3.0	P
TS20211014023C42#	3.39	10.0	3.0	P
TS20211014023C43#	3.39	10.0	3.0	P
Supplementary information:				
- No fire or explosion				

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

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:

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

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:

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

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

7.3.9	TABLE: Forced internal short circuit (cells)					P
Sample No.	Chamber ambient T (°C)	OCV before test (Vdc)	Particle location ¹⁾	Maximum applied pressure (N)	Results	
Samples charged at charging temperature upper limit (45°C)						
TS20211014023C44#	45	4.23	1	400	P	
TS20211014023C45#	45	4.24	1	400	P	
TS20211014023C46#	45	4.24	1	400	P	
TS20211014023C47#	45	4.23	1	400	P	
TS20211014023C48#	45	4.22	1	400	P	
Samples charged at charging temperature lower limit (-5°C)						
TS20211014023C49#	-5	4.18	1	400	P	
TS20211014023C50#	-5	4.18	1	400	P	
TS20211014023C51#	-5	4.18	1	400	P	
TS20211014023C52#	-5	4.18	1	400	P	
TS20211014023C53#	-5	4.18	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						

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⁾
Positive electrode	Jiangmen Kanhoo Industry Co., Ltd.	TE515	Li(Ni _{0.55} Co _{0.15} Mn _{0.3})O ₂ , NMP, PVDF, Carbon Black, Conductive Additive	--	--
Negative electrode	Ganzhou RFT Technology Co., Ltd.	RFT-W	Graphite, CMC, SBR, Distilled Water, Conductive Additive	--	--
Electrolyte	Dongguan Shanshan Battery Material Co., Ltd.	17582	LiPF ₆ +EMC+EC+DEC+VC+PS	--	--
Separator	Shenzhen YuTu New Materials Industry Co., Ltd	16μm	PE+Ceramic, Shutdown temperature: 135°C	--	--
Supplementary information:					
1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

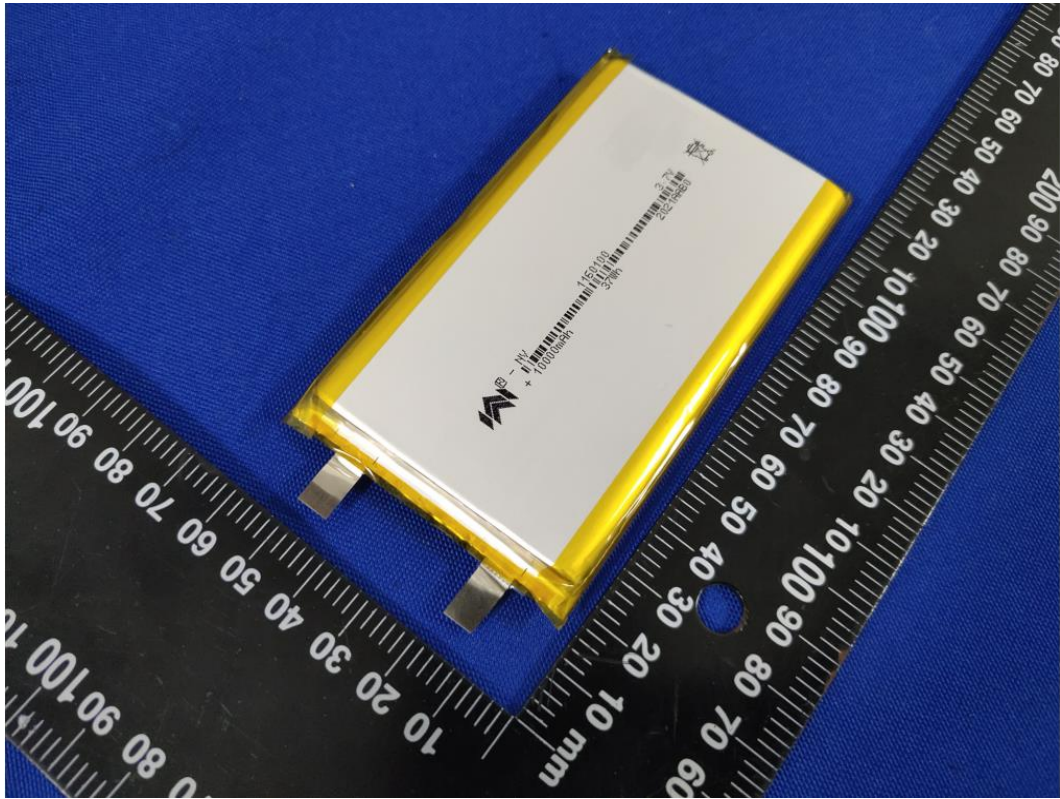
IEC62133_2A ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT IEC 62133-2 (Republic of Korea) NATIONAL DIFFERENCES (Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary lithium cells, 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, Ed. 1.1			
Attachment Form No. : KR_ND_IEC62133_2A			
Attachment Originator : KTR			
Master Attachment..... : Dated 2020-09-25			
Copyright © 2020 IEC System for Conformity Testing and Certification of Electrical Equipment (IECEE), Geneva, Switzerland. All rights reserved.			
	National Differences		P
7.3.6	Over-charging of battery		N/A
(Revision)	[Add the bolded text] b) Test The test shall be carried out in an ambient temperature of 20 °C ± 5 °C. Each test battery shall be discharged at a constant current of 0,2 It A, to a final discharge voltage specified by the manufacturer. Sample batteries shall then be charged at a constant current of 2,0 It A, using a supply voltage which is: <ul style="list-style-type: none"> • 1,4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6,0 V) for single cell/cell block batteries or • 1,2 times the upper limit charging voltage presented in Table A.1 per cell for series connected multi-cell batteries, and • sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached. <u>• 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 ItA,</u> <u>(e.g., quick charging power bank, etc.)</u>		N/A

IEC62133_2A ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>[Replace to the following statement]</p> <p>c) Acceptance criteria</p> <p>Overcharging exceeding to the limits specified by the manufacturer should not result in fire or explosion.</p>		
Annex G	Definition for shape and materials of outer case for cell		—
<i>(Addition)</i>	<p>G.1 General</p> <p>Annex G provides definitions for shape and materials of outer case for cell</p> <p>G.2 Shape of outer case for cell</p> <p>G 2.1 Cylindrical cell</p> <p>Cell with a cylindrical shape in which the overall height is equal to or greater than diameter.</p> <p>G 2.2 Prismatic cell</p> <p>Cell having the shape of a parallelepiped whose faces are rectangular</p> <p>G.3 Materials of outer case for cell</p> <p>G.3.1 Soft case</p> <p>Non-metallic outer case or container for cell</p> <p>G.3.2 Hard case</p> <p>Metallic outer case or container for cell.</p>	<p>(Shape of outer cases)</p> <p><input type="checkbox"/> Cylindrical</p> <p><input checked="" type="checkbox"/> Prismatic</p> <p>(Materials of outer cases)</p> <p><input type="checkbox"/> Hard</p> <p><input checked="" type="checkbox"/> Soft</p>	—
Annex H	Calculation method of the volumetric energy density for cell		—
<i>(Addition)</i>	<p>Annex H provide a calculation method of the volumetric energy density for cell in use of smart phone, tablet, notebook.</p> <p>H.1 General</p> <p>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.</p>	560.6Wh/L	—

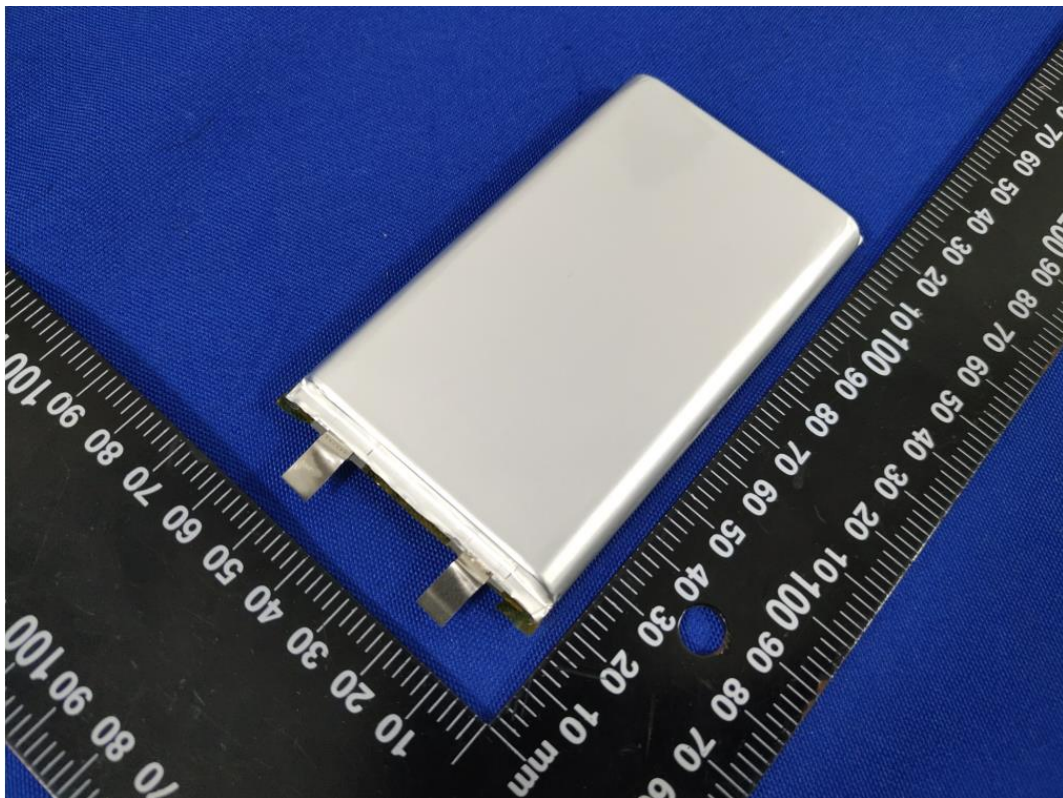
IEC62133_2A ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	<p>H.2 Calculation Method</p> <p>L : Length (max.) of cell (including terrace) W : Width (max.) of cell T : Thickness (max.) when shipping charge (For reference, Please Exclude the dimension of any tape that is attached to cell)</p> $\text{Volumetric energy density (Wh/L)} = \frac{\text{Nominal voltage (V)} \times \text{Rated capacity (Ah)}}{\text{Length (L)} \times \text{Width (W)} \times \text{Thickness (T)}}$ <p>[H.1 – Prismatic cell using soft case]</p> <p>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)</p> $\text{Volumetric energy density (Wh/L)} = \frac{\text{Nominal voltage (V)} \times \text{Rated capacity (Ah)}}{\text{Length (L)} \times \text{Width (W)} \times \text{Thickness (T)}}$ <p>[H.2 – Prismatic cell using hard case]</p> <p>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)</p> $\text{Volumetric energy density (Wh/L)} = \frac{\text{Nominal voltage (V)} \times \text{Rated capacity (Ah)}}{3.14159 \times \frac{\text{Diameter (D)}^2}{4} \times \text{Length(L)}}$ <p>[H.3 – Cylindrical cell using hard case]</p>		

Product: Rechargeable Polymer Li-ion Cell

Type Designation: 1160100



Picture 1. Front view of cell



Picture 2. Back view of cell