



**APPLICATION FOR SAFETY
On Behalf of**

Shenzhen Yostand Technology Co., Ltd.

Li-ion Polymer Cell

Model No.: 655464PH

Prepared for: Shenzhen Yostand Technology Co., Ltd.

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Date of Test: August 04 to August 18, 2022

Date of Report: August 18, 2022

Report Number: A2207188-C01-R15

Version Number: V0

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 Reference No. : A2207188-C01-R15

Tested by (name + signature)..... : Walker Zhang

Approved by (name + signature)..... : Kaiden Guo

Date of issue : August 18, 2022

Total number of pages : 21

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Manufacturer's name..... : Guangdong Huami Times New Energy Technology Co.,Ltd

Address..... : 1F&2F, Building 1, No.155, Shima Jianshe Road, Tangxia Town Dongguang, Guangdong, China

Factory's name..... : Guangdong Huami Times New Energy Technology Co.,Ltd

Address..... : 1F&2F, Building 1, No.155, Shima Jianshe Road, Tangxia Town Dongguang, Guangdong, China

Test specification:

Standard : IEC 62133-2:2017+AMD1: 2021

Test procedure..... : N/A

Non-standard test method..... : N/A

Test item description..... : Li-ion Polymer Cell

Trade Mark..... : N/A

Model/Type reference : 665464PH

Ratings..... : 3.85Vdc, 4000mAh

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

- Photos documentation (1 page)

Summary of testing:**Tests performed (name of test and test clause):**Test items:

cl.5.6.2 Design recommendation
 cl.7.1 Charging procedure for test purposes (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 Forced internal short circuit (Cells)
 cl.8.2 Small cell and battery safety information (Cells)

Tests are made with the number of cells specified in IEC 62133-2: 2017+A1 Table 1.

Testing location:

All tests as described in Test Case and Measurement Sections were performed at the laboratory described on page 1.

Summary of compliance with National Differences:

N/A

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.

Li-ion Polymer Cell Model: 665464PH - 3.85Vdc 4000mAh YYMMDD ICP7/55/65 + Guangdong Huami Times New Energy Technology Co.,Ltd
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Remark:

1. For the YYMMDD, YY is for years, MM is for months, DD is for day.

Test item particulars	
Classification of installation and use.....	N/A
Supply connection.....	Electrode tab
Recommend charging method declared by the manufacturer	Charging the battery with 800mA constant current until 4.40V, then constant voltage until charge current reduces to 40mA at ambient 20°C ± 5°C
Discharge current(0.2 It A).....	800mA
Specified final voltage	3.0V
Upper limit charging voltage per cell	4.40V
Maximum charging current	4000mA
Charging temperature upper limit.....	45°C
Charging temperature lower limit.....	10°C
Polymer cell electrolyte type	<input type="checkbox"/> gel polymer <input type="checkbox"/> solid polymer <input checked="" type="checkbox"/> N/A
Test case verdicts	
Test case does not apply to the test object.....	N/A
Test item does meet the requirement.....	P(Pass)
Test item does not meet the requirement	F(Fail)
Testing	
Date of receipt of test item	July 21, 2022
Date(s) of performance of test.....	August 04 to August 18, 2022
General remarks	
The test results presented in this report relate only to the object tested.	
This report shall not be reproduced except in full without the written approval of the testing laboratory.	
Throughout this report a point (comma) is used as the decimal separator.	
Decision rules for the conclusion of this test report: decision by actual test data without considering measurement uncertainty.	

General product information:

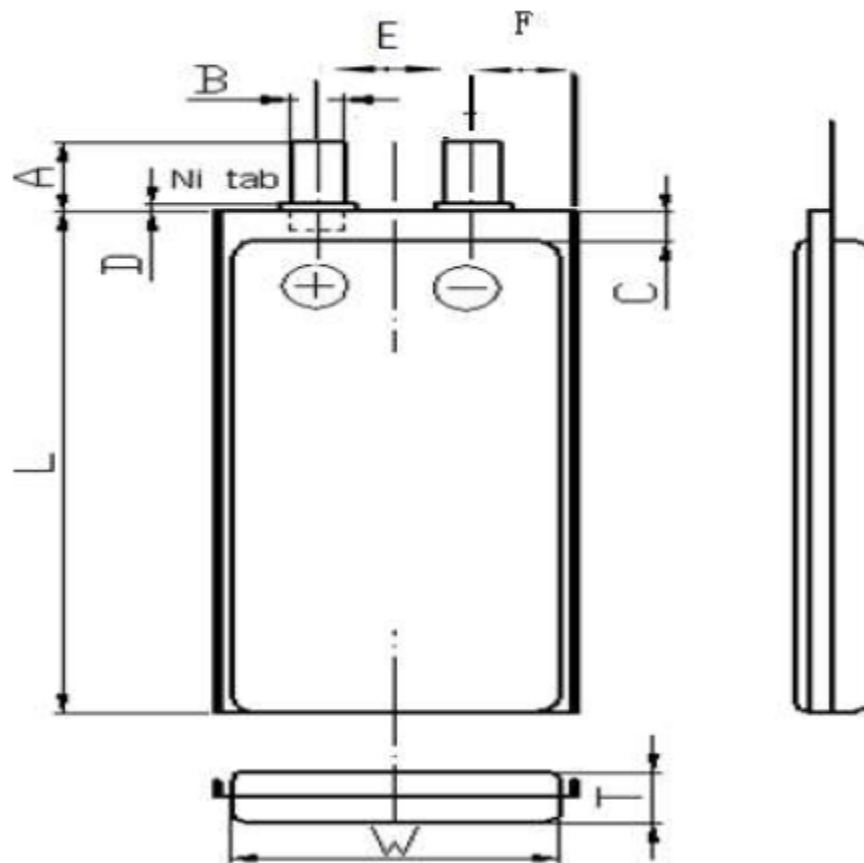
This cell consists of the positive electrode plate, negative electrode plate, separator and electrolyte. The positive and negative electrode plates are housed in the case in the state being separated by the separator.

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

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
665464PH	4000mAh	3.85V	800mA	800mA	4000mA	8000mA	4.40V	3.0V

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

Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
665464PH	4.40V	200mA	10°C	45°C

Construction:

Cell (T x W x L=6.6mm x 54.3mm x 64.7mm)

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		P
	The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ	No metal surface exists	N/A
	Insulation resistance (MΩ)..... :	N/A	—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		P
	Orientation of wiring maintains adequate clearances and creepage distances between conductors		P
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse		P
5.3	Venting		P
	Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition	Venting mechanism exists on the narrow side of pouch cell.	P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief		N/A
5.4	Temperature, voltage and current management	Cell only	N/A
	Batteries are designed such that abnormal temperature rise conditions are prevented		N/A
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer		N/A
	Batteries are provided with specifications and charging instructions for equipment manufacturers so that specified chargers are designed to maintain charging within the temperature, voltage and current limits specified		N/A
5.5	Terminal contacts		P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	Electrode tab complied with the requirements.	P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Terminal contacts are arranged to minimize the risk of short circuits		P
5.6	Assembly of cells into batteries		P
5.6.1	General	Cell only	P
	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	Cell only	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
	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

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 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	Cell only	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
	The manufacturer prepares and implements a quality plan that defines procedures for the inspection of materials, components, cells and batteries and which covers the whole process of producing each type of cell or battery	Complied.	P
5.8	Battery safety components	See TABLE: Critical components information	N/A
6	TYPE TEST AND SAMPLE SIZE		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	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	See page 3	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	See page 3	P
7.1.2	Second procedure		P
	This charging procedure applies only to 7.3.1, 7.3.4, 7.3.5, and 7.3.9		P
	After stabilization for 1 h 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: 10-45°C; 45°C used for upper limit tests; 10°C used for lower limit tests.	N/A
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 800mA.	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)		N/A

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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.3.6	Over-charging of battery	Cell only	N/A
	The supply voltage which is:		N/A
	- 1,4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6,0 V) for single cell/cell block batteries or		N/A
	- 1,2 times the upper limit charging voltage resented in Table A.1 per cell for series connected multi-cell batteries, and		N/A
	- Sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached		N/A
	Test was continued until the temperature of the outer casing:		N/A
	- Reached steady state conditions (less than 10 °C change in 30-minute period); or		N/A
	- Returned to ambient		N/A
	Results: no fire, no explosion		N/A
7.3.7	Forced discharge (cells)	Tested complied.	P
	Discharge a single cell to the lower limit discharge voltage specified by the cell manufacturer		P
	The discharged cell is then subjected to a forced discharge at 1 It A to the negative value of the upper limit charging voltage		P
	- The discharge voltage reaches the negative value of upper limit charging voltage within the testing duration. The voltage is maintained at the negative value of the upper limit charging voltage by reducing the current for the remainder of the testing duration		N/A
	- The discharge voltage does not reach the negative value of upper limit charging voltage within the testing duration. The test is terminated at the end of the testing duration		P
	Results: no fire, no explosion	(See appended table 7.3.7)	P
7.3.8	Mechanical tests (batteries)	Cell only	N/A
7.3.8.1	Vibration		N/A
	Results: no fire, no explosion, no rupture, no leakage or venting.....		N/A
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, Korea, Switzerland	—
	The pressing was stopped upon:		P

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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 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	P
	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
	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	The cell is marked in accordance with IEC 61960.	P
	Coin cells whose external surface area is too small to accommodate the markings on the cells show the designation and polarity		N/A
	By agreement between the cell manufacturer and the battery and/or end product manufacturer, component cells used in the manufacture of a battery need not be marked		P
9.2	Battery marking	Cell only	N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Batteries are marked as specified in IEC 61960, except for coin batteries		N/A
	Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity		N/A
	Batteries are marked with an appropriate caution statement		N/A
	- Terminals have clear polarity marking on the external surface of the battery, or		N/A
	- Not be marked with polarity markings if the design of the external connector prevents reverse polarity connections		N/A
9.3	Caution for ingestion of small cells and batteries		N/A
	Coin cells and batteries identified as small batteries include a caution statement regarding the hazards of ingestion in accordance with 8.2		N/A
	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		N/A
	Packaging for coin cells are not be small enough to fit within the limits of the ingestion gauge of Figure 3	Not coin cell	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	4.40V	P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		N/A

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied	4.40V applied.	N/A
A.4	Consideration of temperature and charging current		P
A.4.1	General		P
A.4.2	Recommended temperature range		P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	Charging temperature declared by client is: 10-45°C	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	45°C used.	N/A
A.4.3.4	Safety considerations when specifying a new upper limit in the high temperature range		N/A
A.4.4	Low temperature range	Charging low temperature declared by client is: 10°C	N/A
A.4.4.1	General		N/A
A.4.4.2	Explanation of safety viewpoint		N/A
A.4.4.3	Safety considerations, when specifying charging conditions in the low temperature range	10°C used.	N/A
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range		N/A
A.4.5	Scope of the application of charging current		P
A.4.6	Consideration of discharge		P
A.4.6.1	General		P
A.4.6.2	Final discharge voltage and explanation of safety viewpoint	Cell specified final voltage 3.0V.	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

IEC 62133-2			
Clause	Requirement + Test	Result - Remark	Verdict
A.5.6	Insertion of nickel particle in prismatic cell		P
A.6	Experimental procedure of the forced internal short-circuit test		P
A.6.1	Material and tools for preparation of nickel particle		P
A.6.2	Example of a nickel particle preparation procedure		P
A.6.3	Positioning (or placement) of a nickel particle		P
A.6.4	Damaged separator precaution		P
A.6.5	Caution for rewinding separator and electrode		P
A.6.6	Insulation film for preventing short-circuit		P
A.6.7	Caution when disassembling a cell		P
A.6.8	Protective equipment for safety		P
A.6.9	Caution in the case of fire during disassembling		P
A.6.10	Caution for the disassembling process and pressing the electrode core		P
A.6.11	Recommended specifications for the pressing device		P
ANNEX B	RECOMMENDATIONS TO EQUIPMENT MANUFACTURERS AND BATTERY ASSEMBLERS		N/A
ANNEX C	RECOMMENDATIONS TO THE END-USERS		N/A
ANNEX D	MEASUREMENT OF THE INTERNAL AC RESISTANCE FOR COIN CELLS		N/A
D.1	General		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

Tables

TABLE: Critical components information					P
Object / part No.	Manufacturer / trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
Cell	Guangdong Huami Times New Energy Technology Co.,Ltd	665464PH	3.85V, 4000mAh	IEC 62133-2:2017, IEC 62133-2:2017/AMD1:2021	Tested with appliance
-Electrolyte	JIANGXI XINGLI NEW ENERGY CO., LTD	XL-X05	Conductivity: 8.3±0.5mS/cm, LiPF6+DEC+EC	--	--
-Separator	SHENGZHEN DINGTAIXING NEW ENERGY TECHNOLOGY CO., LTD	DTX-13	PE+Al ₂ O ₃ , Shutdown temperature: 135°C	--	--
-Positive electrode	Guizhou Zhenhua Yilong New Material Co., Ltd	ZH5000B	LiMnNiCoO ₂ , D50= 7-13µm	--	--
-Negative electrode	QINGDAO TAIDA-HUARUN NEW ENERGY TECHNOLOGY CO.,LTD	TDM-MP	Graphite, D50=11.0~15.0µm	--	--
Supplementary information: ¹⁾ Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

Tables

7.2.1	TABLE: Continuous charging at constant voltage (cells)			P
Sample No.	Recommended charging voltage V_c , (Vdc)	Recommended charging current I_{rec} , (A)	OCV at start of test, (Vdc)	Results
Cell 01#	4.40	0.8	4.37	P
Cell 02#	4.40	0.8	4.37	P
Cell 03#	4.40	0.8	4.37	P
Cell 04#	4.40	0.8	4.38	P
Cell 05#	4.40	0.8	4.38	P
Supplementary information: -No fire or explosion -No leakage				

7.3.1	TABLE: External short circuit (cells)				P
Sample No.	Ambient, (°C)	OCV at start of test, (Vdc)	Resistance of circuit, (Ω)	Maximum case temperature rise ΔT , (°C)	Results
Samples charged at charging temperature upper limit (45°C)					
Cell 06#	57.9	4.38	0.087	109.7	P
Cell 07#	57.9	4.37	0.084	108.3	P
Cell 08#	57.9	4.37	0.093	117.6	P
Cell 09#	57.9	4.38	0.082	104.9	P
Cell 10#	57.9	4.38	0.086	116.9	P
Samples charged at charging temperature lower limit (10°C)					
Cell 11#	53.5	4.24	0.086	107.7	P
Cell 12#	53.5	4.24	0.088	102.5	P
Cell 13#	53.5	4.23	0.082	108.8	P
Cell 14#	53.5	4.25	0.086	117.9	P
Cell 15#	53.5	4.25	0.090	108.7	P
Supplementary information: -No fire or explosion					

Tables

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

7.3.5	TABLE: Crush				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)					
Cell 29#	4.37	4.37	13	P	
Cell 30#	4.37	4.37	13	P	
Cell 31#	4.38	4.37	13	P	
Cell 32#	4.38	4.38	13	P	
Cell 33#	4.37	4.37	13	P	
Samples charged at charging temperature lower limit(10°C)					
Cell 34#	4.24	4.24	13	P	
Cell 35#	4.24	4.24	13	P	
Cell 36#	4.23	4.23	13	P	
Cell 37#	4.25	4.24	13	P	
Cell 38#	4.25	4.24	13	P	
Supplementary information: -No fire or explosion					

7.3.6	TABLE: Over-charging of battery				N/A
Constant charging current (A).....:					—
Supply voltage (Vdc).....:					—
Sample No.	OCV before charging, (Vdc)	Total charging time (minute)	Maximum outer casing temperature(°C)	Results	
Supplementary information:					

7.3.7	TABLE: Forced discharge (cells)				P
Sample No.	OCV before application of reverse charge(Vdc)	Measured Reverse charge I_r (A)	Lower limit discharge voltage (Vdc)	Results	
Cell 39#	3.31	4.0	-4.40	P	
Cell 40#	3.34	4.0	-4.40	P	
Cell 41#	3.32	4.0	-4.40	P	
Cell 42#	3.35	4.0	-4.40	P	
Cell 43#	3.34	4.0	-4.40	P	
Supplementary information: -No fire or explosion					

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

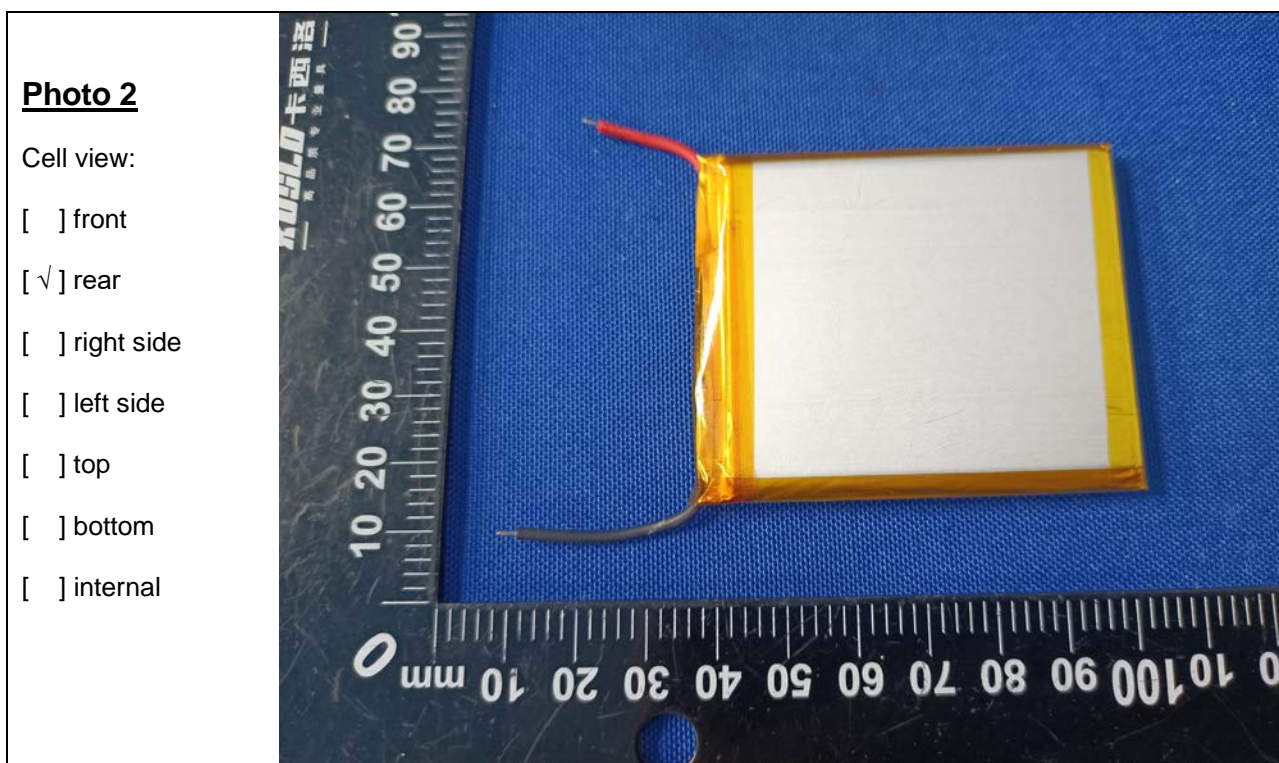
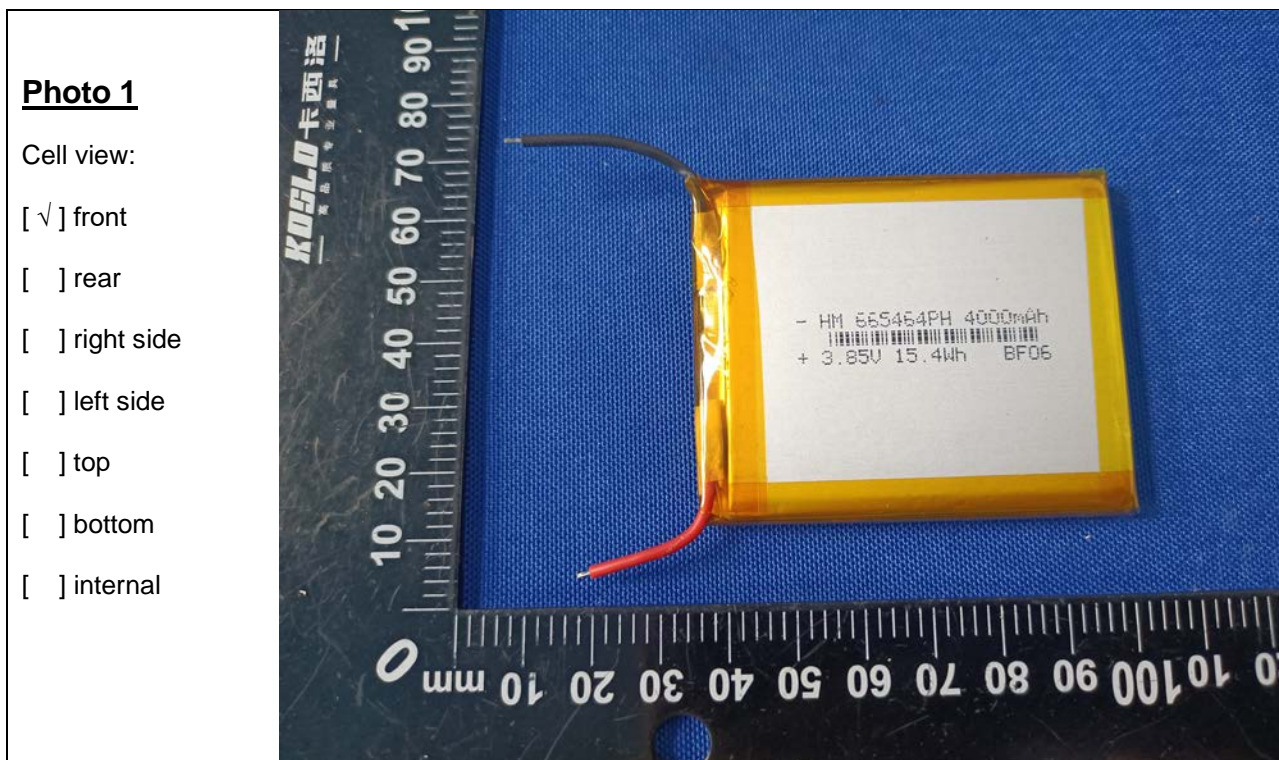
7.3.8.2	TABLE: Mechanical shock				N/A
Sample no.	OCV before test (Vdc)	OCV after test (Vdc)	Mass before test (g)	Mass after test(g)	Results
Supplementary information:					

Tables

7.3.9	TABLE: Forced internal short circuit (cells)				P
Sample No.	Chamber ambient, (°C)	OCV at start of test, (Vdc)	Particle location ¹⁾	Maximum applied pressure, (N)	Results
Samples charged at charging temperature upper limit (45°C)					
Cell 44#	45	4.37	1	400	P
Cell 45#	45	4.38	1	400	P
Cell 46#	45	4.38	1	400	P
Cell 47#	45	4.38	1	400	P
Cell 48#	45	4.37	1	400	P
Samples charged at charging temperature lower limit (10°C)					
Cell 49#	10	4.25	1	400	P
Cell 50#	10	4.25	1	400	P
Cell 51#	10	4.25	1	400	P
Cell 52#	10	4.24	1	400	P
Cell 53#	10	4.24	1	400	P
Supplementary information: ¹⁾ Identify one of the following: 1: Nickel particle inserted between positive and negative (active material) coated area. 2: Nickel particle inserted between positive aluminium foil and negative active material coated area. -No fire or explosion -Others (please explain)					

D.2	TABLE: Internal AC resistance for coin cells				N/A
Sample No.	Ambient T (°C)	Store time (h)	Resistance Rac (Ω)	Results ¹⁾	
Supplementary information: ¹⁾ Coin cells with internal resistance less than or equal to 3 Ω, see test result on corresponding tables					

Appendix 1
Photo documentation



---End of report---