TEST REPORT
IEC 62133
Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealedsecondary cells, and for batteries made from them, for use in portable applications

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Applicant's name :	
Address :	
Test specification:	
Standard :	☒IEC 62133: 2012 (Second Edition) ☐ EN 62133:2013
Test item description :	Li-ion battery
Trade Mark :	/
Manufacturer :	
Address :	
Model/Type reference :	CXY 18650
Ratings :	3.7V, 2000mAh, 7.4Wh

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

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Summary of testing:

The unit is charging the empty cell and discharging the full charged cell according to the rating.

Note:

Charging procedures for test purposes:

(1) Unless otherwise stated, the charging procedure for test purposes is carried out in an ambient temperature of 20±5°C, using the method declared by the manufacturer.Prior to charging, the battery/cell shall have been discharged at 20±5°Cat a constant current of 0.2 It A down to a specified final voltage.

(2) After stabilization for 1 to 4 hours respectively at ambient temperature of highest testtemperature 45°C and lowest test temperature -5°C.

Tests performed (name of test and test clause):	**Testing location:**
- 8.1.1 Chargingprocedures for test purposes (First procedure) - 8.1.2Chargingprocedures for test purposes (Second procedure) - 8.2.1Continuous charging test (cells) - 8.3.1External short circuittest (cells) - 8.3.2 External short circuittest (battery) - 8.3.3Free fall test - 8.3.4Thermal abusetest (cells) - 8.3.5Crushtest (cells) - 8.3.6Over-charging test (battery) - 8.3.7 Forced dischargetest (cells) -8.3.8 Transport tests(cells) - 8.3.9Forced internal shorttest (cells)	Dongguan Precise Testing & Certification Corp.,Ltd. Building D, Baoding Technology Park, Guangming Road 2, Guangming Community, Dongcheng District, Dongguan, Guangdong, China

Copy of marking plate

-	CXY 186501ICR19/66 3.7V, 2000mAh, 7.4Wh Li-ion battery
+	YYMMDD

Importer: XXX

Address: XXXXXX

Remark: “YY” means to years; “MM” means to months; “DD” means to days.

Test item particulars..... :	Li-ion battery
Classification of installation and use..... :	To be defined in final product
Supply connection..... :	Lead wire connection
Recommend charging method declaired by the manufacturer..... :	Maximum charge constant current2.0A. Maximum charge constant voltage 4.2V
Discharge current (0,2 I_t A) ..... :	40mA
Specified final voltage..... :	End of charge 4.2V; End of discharge 2.75V
Chemistry ..... :	☐nickel systems ..... ☒lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell..... :	4.2V
Maximum charging current ..... :	2.0A
Charging temperature upper limit ..... :	45°C
Charging temperature lower limit..... :	0°C
Polymer cell electrolyte type ..... :	☐gel polymer ..... ☐solid polymer☒ N/A
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing..... :	
Date of receipt of test item ..... :	August11, 2017
Date (s) of performance of tests ..... :	August11, 2017-August27, 2017

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(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.

General product information:

1. Physical Size: Max. 23mm (Ø) xMax.67.5mm (H).
2. The maximum ambient temperature is specified as 45°C for Charging and 60°C forDischarging.

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
4	**Parameter measurement tolerances**		**P**
	Parameter measurement tolerances	All control and measure values were within the tolerances.	P
5	**General safety considerations**		**P**
5.1	General	See below.	P
5.2	Insulation and wiring		P
	The insulation resistance between the positive terminal and externally exposed metal surfacesof 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 creepage and clearance distances between conductors		N/A
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse		N/A
5.3	Venting	See below.	P
	Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition	Seal the seam around the aluminium foil as the venting mechanism.	P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief	No such outer case used, and will be evaluated in the final product.	N/A
5.4	Temperature/voltage/current management		P
	Batteries are designed such that abnormal temperature rise conditions are prevented	Overcharge, over discharge, over current and short-circuit proof circuit used in this battery. See tests of clause 8.	P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	See above.	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Batteries are provided with specifications and charging instructions for equipment manufacturers so that associated chargers are designed to maintain charging within the temperature, voltage and current limits specified	The charging limits specified in the user manual.	P
5.5	Terminal contacts		P
	Terminals have a clear polarity marking on the external surface of the battery	Lead wire used.	P
	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		P
5.6.1	If there is more than one battery housed in a single battery case, cells used in the assembly of each battery have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer		P
	Each battery has an independent control and protection		P
	Manufacturers of cells make recommendations about current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly		P
	Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate separate circuitry to prevent the cell reversal caused by uneven discharges		P
	Protective circuit components are added as appropriate and consideration given to the end-device application		P
	When testing a battery, the manufacturer of the battery provides a test report confirming the compliance according to this standard		P
5.6.2	Design recommendation for lithium systems only		P

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Clause	Requirement + Test	Result - Remark	Verdict
	For the battery consisting of a single cell or a single cellblock: - Charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Clause 8.1.2, Table 4; or		N/A
	- Charging voltage of the cell does not exceed the different upper limit of the charging voltage determined through Clause 8.1.2, NOTE 1.		N/A
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks: - The voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Clause 8.1.2, Table 4, by monitoring the voltage of every single cell or the single cellblocks; or	4.25V	P
	- The voltages of any one of the single cells or single cellblocks does not exceed the different upper limit of the charging voltage, determined through Clause 8.1.2, NOTE 1, by monitoring the voltage of every single cell or the single cellblocks		P
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks: - Charging is stopped when the upper limit of the charging voltage, specified in Clause 8.1.2, Table 4, is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks; or		P
	- Charging is stopped when the upper limit of the different charging voltage, determined through Clause 8.1.2, NOTE 1, is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks		P
5.7	Quality plan	See below	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	ISO 9001 certificate was submitted which cover both design and processes of the product.	P
6	**Type test conditions**		**P**

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Tests were made with the number of cells or batteries specified in Table 1 for nickel-cadmium and nickel-metal hydride systems and Table 2 for lithium systems, using cells or batteries that are not more than six months old	Tests are performed according to specified in Table 2 of the standard.	P
	Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C.	The test are conducted in an ambient of 15°C to 25°C.	P
7	**Specific requirements and tests (nickel systems)**		**N/A**
7.1	Charging procedure for test purposes	lithium systems battery	N/A
7.2	Intended use	lithium systems battery	N/A
7.2.1	Continuous low-rate charging (cells)	lithium systems battery	N/A
	Results: No fire. No explosion	lithium systems battery	N/A
7.2.2	Vibration	lithium systems battery	N/A
	Results: No fire. No explosion. No leakage	lithium systems battery	N/A
7.2.3	Moulded case stress at high ambient temperature	lithium systems battery	N/A
	Oven temperature (°C) .....:		—
	Results: No physical distortion of the battery casing resulting in exposure if internal components	lithium systems battery	N/A
7.2.4	Temperature cycling	lithium systems battery	N/A
	Results: No fire. No explosion. No leakage.	lithium systems battery	N/A
7.3	Reasonably foreseeable misuse	lithium systems battery	N/A
7.3.1	Incorrect installation cell	lithium systems battery	N/A
	The test was carried out using: - Four fully charged cells of the same brand, type, size and age connected in series, with one of them reversed; or	lithium systems battery	N/A
	- A stabilized dc power supply.	lithium systems battery	N/A
	Results: No fire. No explosion.....:	lithium systems battery	N/A
7.3.2	External short circuit	lithium systems battery	N/A
	The cells or batteries were tested until one of the following occurred: - 24 hours elapsed; or	lithium systems battery	N/A
	- The case temperature declined by 20% of the maximum temperature rise	lithium systems battery	N/A
	Results: No fire. No explosion.....:	lithium systems battery	N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
7.3.3	Free fall	lithium systems battery	N/A
	Results: No fire. No explosion.	lithium systems battery	N/A
7.3.4	Mechanical shock (crash hazard)	lithium systems battery	N/A
	Results: No fire. No explosion. No leakage.	lithium systems battery	N/A
7.3.5	Thermal abuse	lithium systems battery	N/A
	Oven temperature (°C) .....:		—
	Results: No fire. No explosion.	lithium systems battery	N/A
7.3.6	Crushing of cells	lithium systems battery	N/A
	The crushing force was released upon: - The maximum force of 13 kN ± 1 kN has been applied; or	lithium systems battery	N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained	lithium systems battery	N/A
	The cell is prismatic type and a second set of samples was tested, rotated 90° around longitudinal axis compared to the first set	lithium systems battery	N/A
	Results: No fire. No explosion.....:	lithium systems battery	N/A
7.3.7	Low pressure	lithium systems battery	N/A
	Chamber pressure (kPa).....:		—
	Results: No fire. No explosion. No leakage.	lithium systems battery	N/A
7.3.8	Overcharge	lithium systems battery	N/A
	Results: No fire. No explosion.....:	lithium systems battery	N/A
7.3.9	Forced discharge	lithium systems battery	N/A
	Results: No fire. No explosion.....:	lithium systems battery	N/A

8	**Specific requirements and tests (lithium systems)**		**P**
8.1	Charging procedures for test purposes	See below	P
8.1.1	First procedure: This charging procedure applied to tests other than those specified in 8.1.2		P
8.1.2	Second procedure: This charging procedure applied to the tests of 8.3.1, 8.3.2, 8.3.4, 8.3.5, and 8.3.9	See below	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	If a cell's specified upper and/or lower charging temperature exceeds values for the upper and/or lower limit test temperatures of Table 4, the cells were charged at the specified values plus 5 °C for the upper limit and minus 5 °C for the lower limit		P
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1) .....:	- Specified charge temperature 0-45°C; - Tested upper limit temperature: 45°C; - Tested lower limit temperature:-5°C;	P
	For a different upper limit charging voltage (i.e. other than for lithium cobalt oxide systems at 4,25 V), the applied upper limit charging voltage and upper limit charging temperatures were adjusted accordingly		P
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1) .....:	4.25V	P
8.2	Intended use	See below	P
8.2.1	Continuous charging at constant voltage (cells)	Complied	P
	Results: No fire. No explosion.....:	(See Table 8.2.1)	P
8.2.2	Moulded case stress at high ambient temperature (battery)	No moulded case used.	N/A
	Oven temperature (°C) .....:		—
	Results: No physical distortion of the battery casing resulting in exposure if internal components		N/A
8.3	Reasonably foreseeable misuse	See below	P
8.3.1	External short circuit (cell)	See below	P
	The cells were tested until one of the following occurred: - 24 hours elapsed; or		P
	- The case temperature declined by 20% of the maximum temperature rise		N/A
	Results: No fire. No explosion.....:	(See Table 8.3.1)	P
8.3.2	External short circuit (battery)		P
	The cells were tested until one of the following occurred: - 24 hours elapsed; or		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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
	Results: No fire. No explosion.....:		P
8.3.3	Free fall	See below	P
	Results: No fire. No explosion.	No fire. No explosion.	P
8.3.4	Thermal abuse (cells)	See below	P
	The cells were held at 130°C ± 2°C for: - 10 minutes; or		P
	- 30 minutes for large cells (gross mass of more than 500 g as defined in IEC 62281)	Not large cells	N/A
	Oven temperature (°C).....:	130.0°C	—
	Gross mass of cell (g).....:	Small cell(<500g)	—
	Results: No fire. No explosion.	No fire. No explosion.	P
8.3.5	Crush (cells)	See below	P
	The crushing force was released upon: - The maximum force of 13 kN ± 1 kN has been applied; or		P
	- An abrupt voltage drop of one-third of the original voltage has been obtained; or		N/A
	- 10% of deformation has occurred compared to the initial dimension		N/A
	Results: No fire. No explosion.....:	(See Table 8.3.2)	P
8.3.6	Over-charging of battery	See below	P
	Test was continued until the temperature of the outer casing: - Reached steady state conditions (less than 10°C change in 30-minute period); or		N/A
	- Returned to ambient		P
	Results: No fire. No explosion.....:	(See Table 8.3.6)	P
8.3.7	Forced discharge (cells)		P
	Results: No fire. No explosion.....:	(See Table 8.3.7)	P
8.3.8	Transport tests		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Manufacturer's documentation provided to show compliance with UN Recommendations on Transport of Dangerous Goods		P
8.3.9	Design evaluation – Forced internal short circuit (cells)	See below	P
	The cells complied with national requirement for .....:	France, Japan, Korea and Switzerland	—
	The pressing was stopped upon: - 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		P
	Results: No fire .....:	(See Table 8.3.9)	P

9	**Information for safety**		**P**
	The manufacturer of secondary cells ensures that information is provided about current, voltage and temperature limits of their products.	Provided in cell specification	P
	The manufacturer of batteries ensures that equipment manufacturers and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards.	Provided in cell specification and safety instruction	P
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product	Provided in cell specification and safety instruction	P
	As appropriate, information relating to hazard avoidance resulting from a system analysis is provided to the end user.....:		N/A

10	**Marking**		**P**
10.1	Cell marking		N/A
	Cells marked as specified in the applicable cell standards: IEC 61951-1, IEC 61951-2 or IEC 61960.		N/A
10.2	Battery marking		P
	Batteries marked in accordance with the requirements for the cells from which they are assembled.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Batteries marked with an appropriate caution statement.		P
10.3	Other information		P
	Storage and disposal instructions marked on or supplied with the battery.	In cell technical documents	P
	Recommended charging instructions marked on or supplied with the battery.	In cell technical documents	P
11	**Packaging**		**P**
	The materials and packaging design are chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants.		P
Annex A	**Charging 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	4.2V	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
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		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 high temperature range		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
A.4.3.4	Safety consideration when specifying new upper limit in high temperature range		N/A
A.4.4	Low temperature range	Charging low temperature declared by client is: 0°C.	P
A.4.4.1	General		P
A.4.4.2	Explanation of safety viewpoint		P
A.4.4.3	Safety considerations, when specifying charging conditions in low temperature range		P
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range	-5°C is applied during testing.	P
A.4.5	Scope of the application of charging 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
	The insertion procedure carried out at 20°C±5°C and under -25 °C of dew point		P
A.5.3	Disassembly of charged cell		P
A.5.4	Shape of nickel particle		P
A.5.5	Insertion of nickel particle to cylindrical cell		P
A.5.5.1	Insertion of nickel particle to winding core		P
A.5.5.2	Mark the position of nickel particle on the both end of winding core of the separator		P
A.5.6	Insertion of nickel particle to prismatic cell		P

IEC 62133			
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)]**
- Insulation tape	Interchangeable	Interchangeable	Min. 130ºC	UL 510	UL approved
PCB	Interchangeable	Interchangeable	V-0, Min. 130ºC	UL94	UL approved
Protective IC (U1)	Interchangeable	Interchangeable	--	IEC/EN62133	Tested with appliance
Protective IC (U2)	Interchangeable	Interchangeable	--	IEC/EN62133	Tested with appliance
Protective IC (U3)	Interchangeable	Interchangeable	--	IEC/EN62133	Tested with appliance
Cord	Interchangeable	Interchangeable	22AWG 2468 80℃	IEC/EN62133	Tested with appliance
Cell					
Positive Electrode	Interchangeable	Interchangeable	LiCoO2 , NMP, Conductive Additive, PVDF, Aluminium Foil	IEC/EN62133	Tested with appliance
Negative Electrode	Interchangeable	Interchangeable	Graphite, CMC, SBR, Copper Foil, Conductive Additive	IEC/EN62133	Tested with appliance
Separator	Interchangeable	Interchangeable	PE, Shutdown temperature: 130℃	IEC/EN62133	Tested with appliance
Electrolyte	Interchangeable	Interchangeable	LiPF6,EC,DEC, EMC	IEC/EN62133	Tested with appliance
Supplementary information: **[1)] Provided evidence ensures the agreed level of compliance.**					

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.1	TABLE: Continuous low rate charge (cells)				N/A
Model	**Recommended charging method, (CC, CV, or CC/CV)**	**Recommended charging voltage V_c, (Vdc)**	**Recommended charging current I_{rec}, (A)**	**OCV at start of test, (Vdc)**	**Results**
--	--	--	--	--	--
Supplementary information: - No fire or explosion					

7.2.2	TABLE: Vibration		N/A
Model	**OCV at start of test, (Vdc)**	**Results**	
--	--	--	
Supplementary information: - No fire or explosion - No leakage			

7.3.1	TABLE: Incorrect installation (cells)		N/A
Model	**OCV of reversed cell, (Vdc)**	**Results**	
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Supplementary information: - No fire or explosion			

7.3.2	TABLE: External short circuit					N/A
Model	**Ambient (at 20°C ± 5°C or 55°C ± 5°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (Ω)**	**Maximum case temperature rise ΔT, (°C)**	**Results**	
--	--	--	--	--	--	
Supplementary information: - No fire or explosion						

7.3.6	TABLE: Crush			N/A
Model	**OCV at start of test, (Vdc)**	**OCV at removal of crushing force, (Vdc)**	**Results**	
--	--	--	--	
Supplementary information: - No fire or explosion				

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.8	TABLE: Overcharge				N/A
Model	**OCV prior to charging, (Vdc)**	**Maximum charge current, (A)**	**Time for charging, (hours)**	**Results**	
--	--	--	--	--	
Supplementary information: - No fire or explosion					

7.3.9	TABLE: Forced discharge (cells)			N/A
Model	**OCV before application of reverse charge, (Vdc)**	**Measured reverse charge I_t, (A)**	**Time for reversed charge, (minutes)**	**Results**
--	--	--	--	--
Supplementary information: - No fire or explosion				

8.2.1	TABLE: Continuous charging at constant voltage (cells)			P
Number of sample	**Recommended charging voltage V_c, (Vdc)**	**Recommended charging current I_{rec}, (A)**	**OCV at start of test, (Vdc)**	**Results**
#1	4.20	1.0	4.17	Pass
#2	4.20	1.0	4.16	Pass
#3	4.20	1.0	4.18	Pass
#4	4.20	1.0	4.18	Pass
#5	4.20	1.0	4.17	Pass
Supplementary information: - No fire or explosion - No leakage				

8.3.1	TABLE: External short circuit (cell)				P
Number of sample	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (mΩ)**	**Maximum case temperature rise ΔT, (~~°C~~)**	**Results**
Samples charged at charging temperature upper limit(45°C)					
#1	23.4	4.16	92	122.7	Pass

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

#2	24.2	4.17	92	123.5	Pass
#3	24.5	4.18	92	124.2	Pass
#4	24.3	4.19	92	123.1	Pass
#5	23.4	4.17	92	121.2	Pass
Samples charged at charging temperature lower limit(-5°C)					
#6	24.5	4.13	92	119.1	Pass
#7	24.4	4.14	92	118.5	Pass
#8	24.4	4.15	92	118.7	Pass
#9	24.1	4.15	92	117.5	Pass
#10	23.2	4.13	92	117.2	Pass
Supplementary information: - No fire or explosion					

8.3.2	TABLE: External short circuit (battery)				P
Number of sample	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (mΩ)**	**Maximum case temperature rise ΔT, (°C)**	**Results**
Samples charged at charging temperature upper limit(45°C)					
#1	55.8	4.18	92	56.4	Pass
#2	55.1	4.17	92	57.6	Pass
#3	55.2	4.17	92	56.8	Pass
#4	55.4	4.16	92	56.5	Pass
#5	55.0	4.7	92	56.7	Pass
Samples charged at charging temperature lower limit(-5°C)					
#6	55.1	4.14	92	57.8	Pass
#7	56.1	4.13	92	57.5	Pass
#8	56.0	4.15	92	57.7	Pass
#9	55.2	4.14	92	56.5	Pass
#10	55.6	4.15	92	56.7	Pass
Supplementary information: - No fire or explosion					

8.3.5	TABLE: Crush	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

Number of sample	OCV at start of test, (Vdc)	OCV at removal of crushing force, (Vdc)	Width/ diameter of cell before crush, (mm)	Required deformation for crush, (mm)	Results
Samples charged at charging temperature upper limit(45°C)					
#1	4.17	4.17	--	--	Pass
#2	4.17	4.16	--	--	Pass
#3	4.16	4.16	--	--	Pass
#4	4.18	4.17	--	--	Pass
#5	4.17	4.16	--	--	Pass
Supplementary information: - No fire or explosion					

8.3.6	TABLE: Over-charging of battery	P
Constant charging current (A) .....:	2.0A	—
Supply voltage (Vdc) .....:	5VDC	—

Number of sample	OCV before charging, (Vdc)	Resistance of circuit, (mΩ)	Maximum outer casing temperature, (°C)	Results
#1	2.92	92	24.2	Pass
#2	2.93	92	24.4	Pass
#3	2.95	92	24.7	Pass
#4	2.91	92	24.2	Pass
#5	2.92	92	24.8	Pass
Supplementary information: - No fire or explosion				

8.3.7	TABLE: Forced discharge (cells)	P

Number of sample	OCV before application of reverse charge, (Vdc)	Measured Reverse charge I_t, (A)	Time for reversed charge, (minutes)	Results
#1	4.17	0.5	90	Pass
#2	4.19	0.5	90	Pass
#3	4.18	0.5	90	Pass

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

#4	4.18	0.5	90	Pass
#5	4.17	0.5	90	Pass

Supplementary information:
- No fire or explosion

8.3.8(T-5)	TABLE: External short circuit (battery)				P
Number of sample	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (mΩ)**	**Maximum case temperature rise ~~ΔT~~, (°C)**	**Results**
#1	57.5	4.19	92	58.9	Pass
#2	57.4	4.17	92	58.3	Pass
#3	57.6	4.18	92	58.1	Pass
#4	57.4	4.17	92	58.0	Pass
#5	57.1	4.16	92	58.3	Pass
#6	57.5	4.14	92	58.6	Pass
#7	56.6	4.15	92	57.8	Pass
#8	57.2	4.13	92	56.7	Pass
#9	57.4	4.14	92	58.4	Pass
#10	57.2	4.15	92	58.3	Pass

Supplementary information:
- No fire or explosion

8.3.9	TABLE: Forced internal short circuit (cells)				P
Number of sample	**Chamber ambient, (°C)**	**OCV at start of test, (Vdc)**	**Particle location [1)]**	**Maximum applied pressure, (N)**	**Results**
#1	10	4.18	1	400	Pass
#2	10	4.17	1	400	Pass
#3	10	4.16	1	400	Pass
#4	10	4.17	1	400	Pass
#5	10	4.16	1	400	Pass

IEC 62133					
Clause	Requirement + Test			Result - Remark	Verdict
#6	45	4.18	1	400	Pass
#7	45	4.17	1	400	Pass
#8	45	4.17	1	400	Pass
#9	45	4.16	1	400	Pass
#10	45	4.17	1	400	Pass

Supplementary information:

[1)]Identify one of the following**:**

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

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

- No fire or explosion

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
National differences **Canada** IEC 62133: 2012 (Second Edition)			**P**
1	[Add the following] This Standard covers secondary cells and batteries that are intended to be installed or used in accordancewith CSA C22.1, Canadian Electrical Code, Part I.		P
2	**2 Normative references** [Add the following] Where reference is made to CSA Group publications, such reference shall be considered to refer to the latest edition and all amendments published to that edition. This Standard refers to the following publications, and the years shown indicate the latest editions available at the time of printing: **CSA Group** C22.1-12 *Canadian Electrical Code, Part I* CAN/CSA-C22.2 No. 0-10 *General requirements — Canadian Electrical Code, Part II* C22.2 No. 0.15-01 (R2012) *Adhesive labels* CAN/CSA-C22.2 No. 0.17-00 (R2013) *Evaluation of properties of polymeric materials* C22.2 No. 39-12 *Fuseholder assemblies* C22.2 No. 127-09 *Equipment and lead wires* CAN/CSA-C22.2 No. 198.1-06 (R2010) *Extruded insulating tubing* C22.2 No. 235-04 (R2013) *Supplementary protectors* Certification Informs, Component Acceptance Service No. 53 (January 2013) *Positive temperature coefficient (PTC) thermistors*		P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
3A	[Add the following clause] **3A General requirements** General requirements applicable to these products are provided in CAN/CSA-C22.2 No. 0.		P
5	**5 General safety considerations** **5.1 General** [Add the following at the end of Clause 5.1] All safety components shall be suitable for use in accordance with the applicable CSA Group Standards where available. Examples of such components and subassemblies are as follows: a) wiring in accordance with CSA C22.2 No. 127; b) insulation tubing in accordance with CAN/CSA-C22.2 No. 198.1; c) protection devices such as fuses in accordance with CSA C22.2 No. 235, and PTC thermistors in accordance with CSA Component Acceptance Service No. 53; d) fuseholders in accordance with CSA C22.2 No. 39; and e) printed wiring boards and outer plastic enclosures shall be flammability rated a minimum of V-1 in accordance with CAN/CSA-C22.2 No. 0.17.	The manufacturer commits to fulfil the requirement when the product will be sold in Canada.	N/A
10	**10 Marking** **10.1 Cell marking** [Add the following after the first paragraph] Cell marking shall also include the model or type number. Cautions and warnings shall be in English and French in accordance with CAN/CSA-C22.2 No. 0. If external labels are used, they shall be a suitable type in accordance with CSA C22.2 No. 0.15. **10.2 Battery marking** [Add the following after the first paragraph] Cautions and warnings shall be in English and French in accordance with CAN/CSA-C22.2 No. 0. If external labels are used, they shall be a suitable type in accordance with CSA C22.2 No. 0.15.	The manufacturer commits to fulfil the requirement when the product will be sold in Canada.	N/A

Photos

Fig. 1

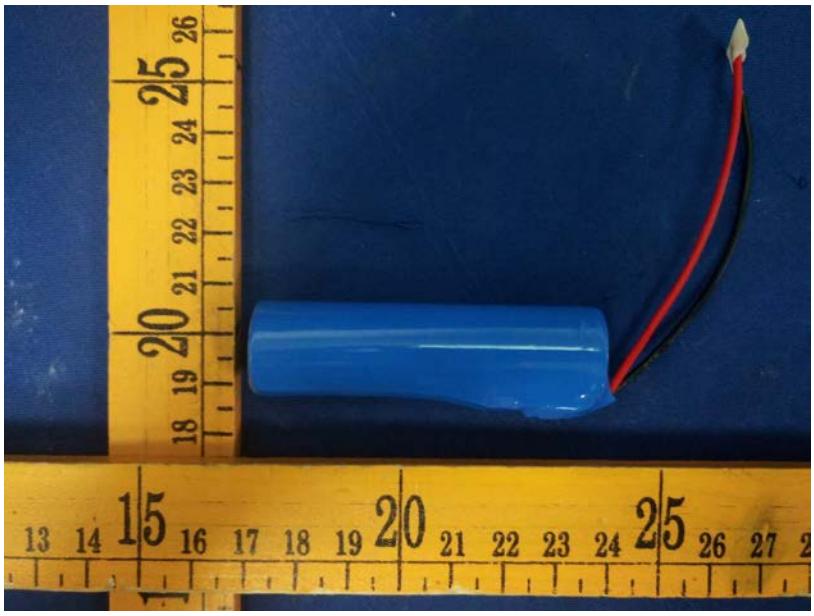

Fig. 2

Photos

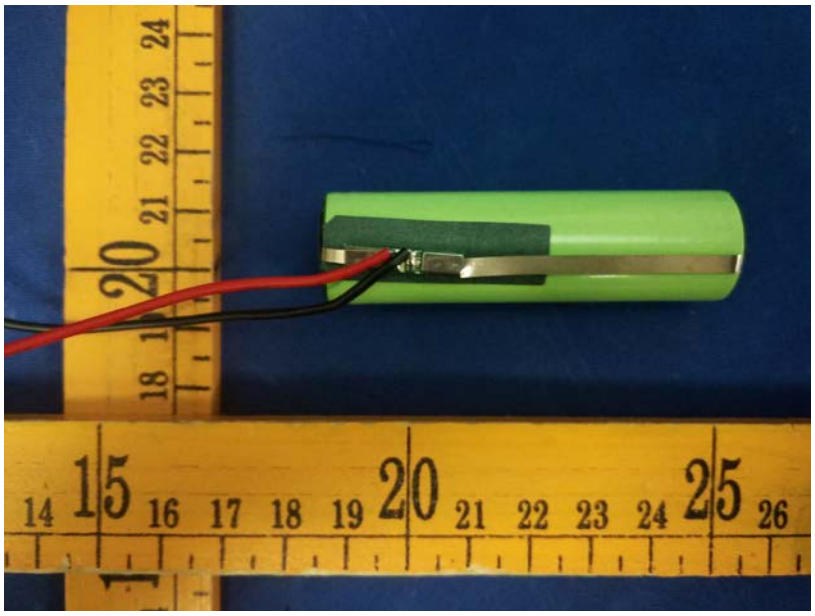

Fig. 3

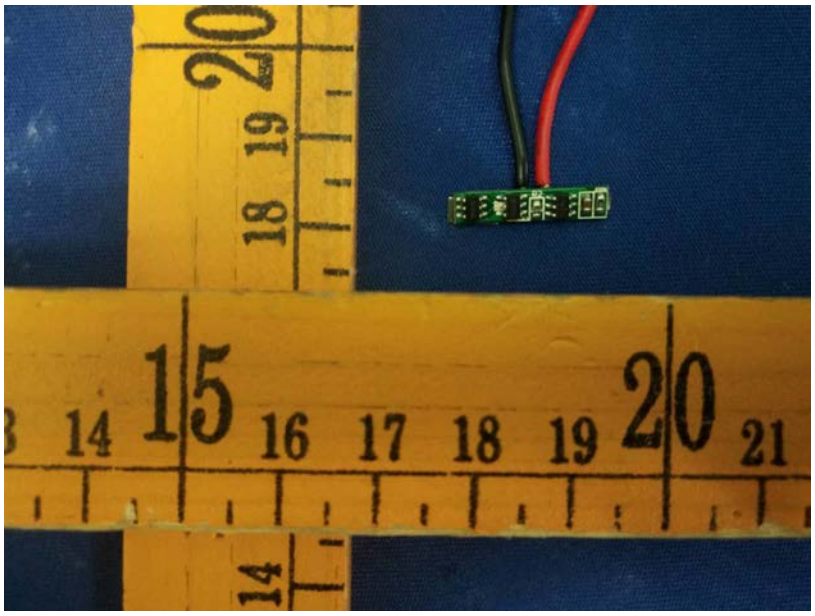

Fig. 4

Photos

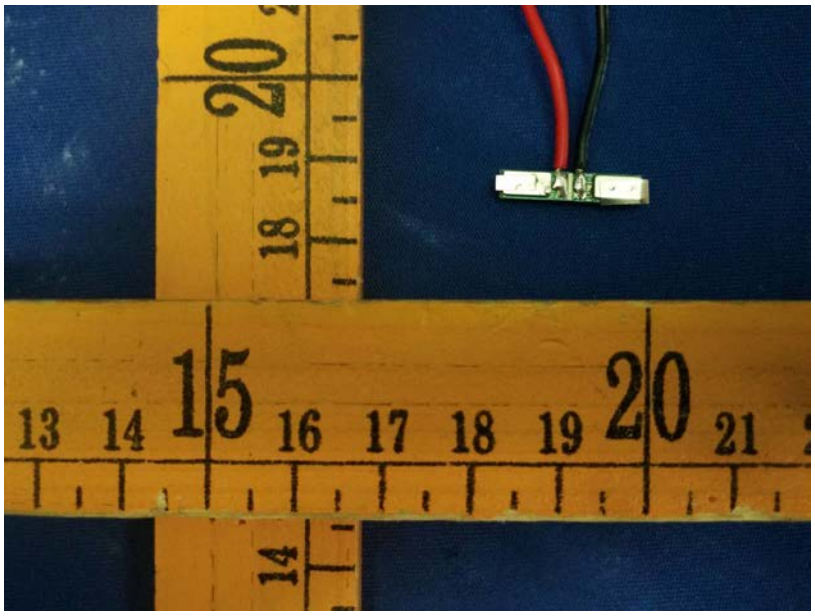

Fig. 5

Fig. 6

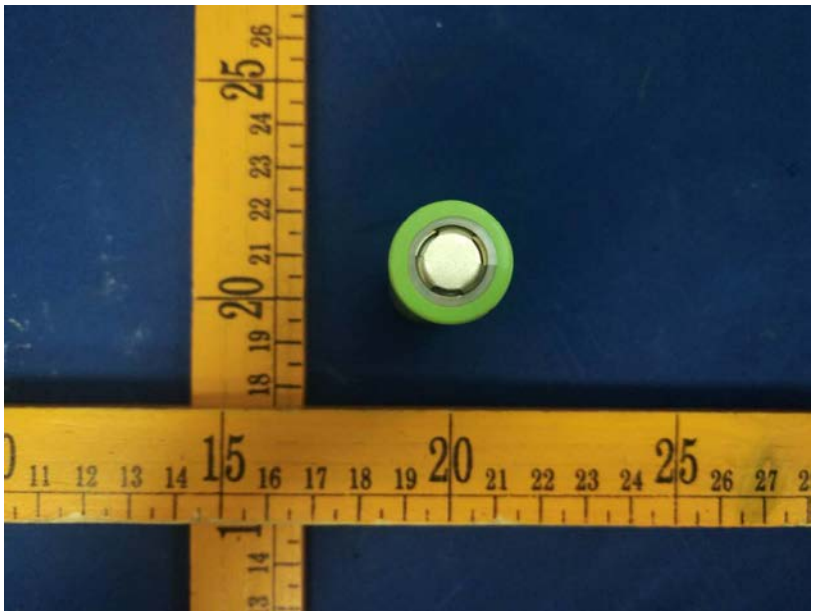

Fig. 7

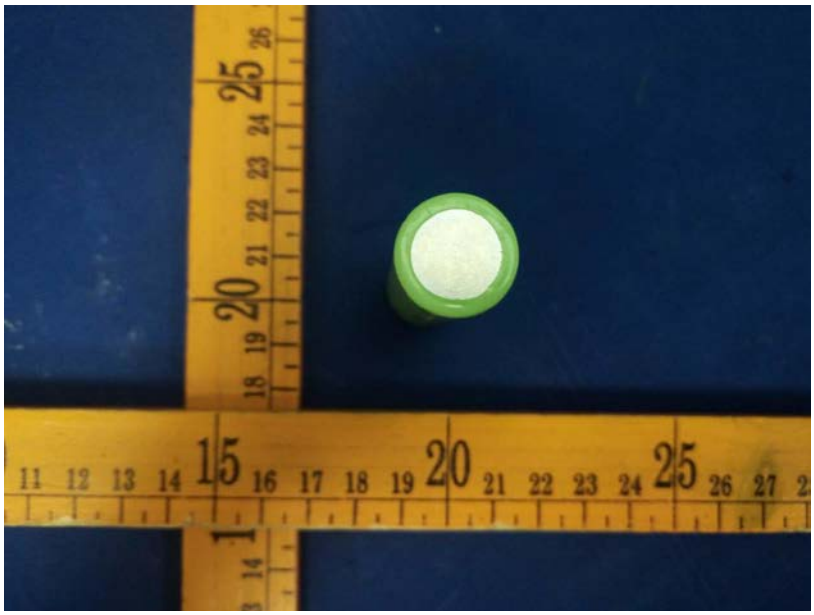

Fig. 8

--- End of Report ---