## **APPLICATION REPORT**

## ON BEHALF OF

## FOSHAN ZHAONENG BATTERY INDUSTRIAL CO., LTD.

## LITHIUM POLYMER BATTERY

Model: ZN-103450

Prepared For	:	FOSHAN ZHAONENG BATTERY INDUSTRIAL CO., LTD. No.8 Nanda Road, Jinsha Chengnan Industrial Zone, Danzao T Nanhai District, Foshan city, Guangdong, China	own,
Prepared By	3. 33 36 36	Shenzhen LCS Compliance Testing Laboratory Ltd. 1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, I District, Shenzhen, Guangdong, China	Bao'an
Date of Test	B	2016.06.20 – 2016.06.30	
Date of Report	:	2016.06.30	
Report Number		LCS1606221802S	

Version:V1.0

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ACC MEA CNA	国际日前 AAM IEG 62133: 2012(2 <sup>nd</sup> Edition)			
Report reference No	LCS1606221802S			
Tested by (+ signature)	Jim Deng			
Approved by (+ signature)	Hart Qiu			
Contents	28 pages	ľ		
Date of issue	2016.06.30			
Testing Laboratory Name	Shenzhen LCS Compliance Testing Laboratory Ltd.			
Address	1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao District, Shenzhen, Guangdong, China	o'an		
Testing location	Same as above	2.4		
Address	Same as above.			
Applicant's Name	FOSHAN ZHAONENG BATTERY INDUSTRIAL CO., LTD.			
Address	No.8 Nanda Road, Jinsha Chengnan Industrial Zone, Danzao Town, Nanhai District, Foshan city, Guangdong, China			
Standard	IEC 62133: 2012(2 <sup>nd</sup> Edition)			
Test procedure	. Type Approval			
Procedure deviation	. N/A			
Non-standard test method	. N/A	14		
Manufacturer	. FOSHAN ZHAONENG BATTERY INDUSTRIAL CO., LTD.	23		
Address	No.8 Nanda Road, Jinsha Chengnan Industrial Zone, Danzao To Nanhai District, Foshan city, Guangdong, China	wn,		
Test item description	LITHIUM POLYMER BATTERY			
Trade Mark	ZN	5		
Model/type reference	ZN-103450			
Ratings	. 3.7V 1800mAh 6.66Wh			
Classification	Li-ion Battery			
Dimension	L : 50.00mm W: 33.56mm T : 9.55mm			
Shape	Cuboid			
Mass of apparatus	32.85g			
	terre and the second seco			

Possible test case verdicts:	
Test case does not apply to the test object	N/A
Test item does meet the requirement	P(ass)
Test item does not meet the requirement	F(ail)
Testing:	Real Real Real
Date of receipt of test item :	2016.06.20
Date(s) of performance of test :	2016.06.20 – 2016.06.30
General remarks:	3 Para Para Para

"(see remark #)" refers to a remark appended to the report,

"(see appended table)" refers to a table appended to the report,

Throughout this report a point is used as the decimal separator,

The 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,

Clause numbers between brackets refer to clauses in IEC 62133(Optional remark).

## General product information:

The battery, model no.: ZN-103450 is used in portable applications and consists of one Li-ion cell, the cell model no.: 103450

The cells and batteries have been tested and evaluated according to their specified working conditions (as given below), which are provided by client;

Details information of the battery and the cell built in the battery, as following:

Product	LITHIUM POLYMER CELL	LITHIUM POLYMER BATTERY	
Model No.	103450	ZN-103450	
Nominal voltage	3.7V	3.7V	
Rated capacity	1800mAh	1800mAh	
Charge method	<ul><li>0.2C constant current charge to</li><li>4.2V, then constant voltage until the charge current decrease to 0.01C.</li></ul>	0.2C constant current charge to 4.2V, then constant voltage until the charge current decrease to 0.01C.	
Charging Current	180mA	180mA	
Max. Charging Current	540mA	540mA	
Maximum Discharge Current	1800mA	Protective plate to allow the maximum discharge current 6000mA	
Max. Charging voltage	4.2V	4.2V	
End of discharge voltage	3.0V	3.0V	
Dimension	50.00*33.50*9.55mm	50.00*33.56*9.55mm	
Weight	34g	37g	
Lower charge temperature	<b>10</b> ℃		
Upper charge temperature	4	<b>5</b> °C	

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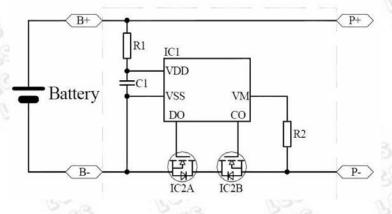
1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China         1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China         1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China         1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China         1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China         1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China         1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China         1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China         1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China         1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China         1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District, Shenzhen, Guangdong, China         1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Ba	Tests Performed (name of test and test clause):	Testing Location:	k Tanada Daad	Declan Avenue F	) a c'an
Cl.6 type test conditionsCl.8.1 Charging procedures for test purposesCl.8.2.1 Continuous charging at constant voltage (cells)Cl.8.2.2 Moulded case stress at high ambient temperature (battery)Cl.8.3.1 External short circuit(cell)Cl.8.3.2 External short 	samples specified in Table 2 of IEC			, Bao an Avenue, E	sao an
Cl.8.1 Charging procedures for test purposes Cl.8.2.1 Continuous charging at constant voltage (cells) Cl.8.2.2 Moulded case stress at high ambient temperature (battery) Cl.8.3.1 External short circuit(cell) Cl.8.3.2 External short circuit(cell) Cl.8.3.2 External short circuit(battery) Cl.8.3.3 Free fall Cl.8.3.4 Thermal abuse (cells) Cl.8.3.5 Crush(cells) Cl.8.3.5 Crush(cells) Cl.8.3.6 Over-charging of battery Cl.8.3.7 Forced discharge(cells) Cl.8.3.8 Transport Cl.8.3.9 Forced internal short	Test items:	Jes Jes			
purposes         Cl.8.2.1 Continuous charging at constant voltage (cells)         Cl.8.2.2 Moulded case stress at high ambient temperature (battery)         Cl.8.3.1 External short circuit(cell)         Cl.8.3.2 External short circuit(cell)         Cl.8.3.3 Free fall         Cl.8.3.4 Thermal abuse (cells)         Cl.8.3.5 Crush(cells)         Cl.8.3.7 Forced discharge(cells)         Cl.8.3.8 Transport         Cl.8.3.9 Forced internal short	CI.6 type test conditions	1600 BC			
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CI.8.3.4 Thermal abuse (cells) CI.8.3.5 Crush(cells) CI.8.3.6 Over-charging of battery CI.8.3.7 Forced discharge(cells) CI.8.3.8 Transport CI.8.3.9 Forced internal short		163 15			
CI.8.3.5 Crush(cells) CI.8.3.6 Over-charging of battery CI.8.3.7 Forced discharge(cells) CI.8.3.8 Transport CI.8.3.9 Forced internal short	CI.8.3.3 Free fall	ies b			
CI.8.3.6 Over-charging of battery CI.8.3.7 Forced discharge(cells) CI.8.3.8 Transport CI.8.3.9 Forced internal short	CI.8.3.4 Thermal abuse (cells)	163			
CI.8.3.7 Forced discharge(cells) CI.8.3.8 Transport CI.8.3.9 Forced internal short	CI.8.3.5 Crush(cells)	3 LGD			
CI.8.3.8 Transport CI.8.3.9 Forced internal short	CI.8.3.6 Over-charging of battery	23 3.23			
CI.8.3.9 Forced internal short	CI.8.3.7 Forced discharge(cells)	(3) (3)			
	CI.8.3.8 Transport	163 163			
		163 163			
		LGO			

The LITHIUM POLYMER BATTERY submitted by FOSHAN ZHAONENG BATTERY INDUSTRIAL CO., LTD. are tested according to IEC 62133: 2012(2<sup>nd</sup> edition) 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.

Test result: Pass.

Version	Report No.	<b>Revision Data</b>	Summary
V1.0	LCS1606221802SS	SP-3	Original Versior
Bra.	Bar Bar	1900	1,90

ZN-103450		
3.7V 1800	MAh 6.66Wh 11	CP10/34/52
RED (+)	Black(-)	201606



## Critical components information :

3	<b>Item</b> 序号	<b>Reference</b> 名称	Material name 规格	Model/Specification 描述	Quantity 用量	
500	1	<b>Cell</b> 电芯	103451	3.7V 1800 mAh	1	3
	2	PCM 保护板	ZN-Pcm	9.9*34.5*52mm	1	300
	3	Red wire 红线	UL1007 22# 硅胶 线	Red	1	8
N 100 1	4	Black wire 黑线	UL1007 22# 硅胶 线	Black	1	
1	25	Y aR	V R	50 50	1625	F .

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Clause	Requirement – Test	Result – Remark	Verdic
Jiause		Result – Remark	veruic
5	General safety considerations	(GS	Р
162	Cells and batteries subject to intended use be safe and continue to function in all respects	Refer to the following clauses.	Ρ
LES	Cells and batteries subject to reasonably foreseeable misuse do not present significant hazards.	Refer to the following clauses.	Р
5.2	Insulation and wiring	B Bass B	Р
S. S.	-Insulation Resistance between an accessible metal case (excluding electrical contacts) and positive terminals $\ge 5M\Omega$ .	LES LES	N/A
යි ප්රි	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements	See tests of clause 8.	P
162 162 162	Orientation of wiring maintains adequate creepage and clearance distances between conductors. Mechanical integrity of internal connections is sufficient to accommodate conditions of reasonably foreseeable misuse.	See tests of clause 8.	P
5.3	Venting	3 63	Р
3	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.	65 165 165 165	P
33 33 33	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation no inhibit pressure relief.	163 163 163 163	N/A
5.4	Temperature/voltage/current management	123 628	Р
LEE	The batteries are designed such that abnormal temperature rise conditions are prevented.	133 19	P
0	Means is provided to limit current to safe levels during charge and discharge.		P
	The batteries are designed such that within temperature, voltage and current limits specified by the cell manufacturer.		P
55 55 55 155 155	Batteries 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;	See battery specifications;	Ρ
5.5	Terminal contacts	CS N	S P
B	Terminals have a clear polarity marking on the external surface of the battery	"+" for positive polarity and "-" for negative polarity marking on the label near the terminal	CS CP
	The size and shape of the terminal contacts ensure that	103 CS	Р

Clause	Requirement Test	Result – Remark	Verdic
Jause	Requirement – Test	Result – Remark	veruic
32	they can carry the maximum anticipated current.	63 63	3
691 183	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance.	165 163 16 <sup>5</sup> 16 <sup>5</sup>	Ρ
BE	Terminal contacts are arranged to minimize the risk of short circuits.	163 LG	S P
8	the external connector prevents reverse polarity connections, Battery packs with keyed external connectors designed for connection to specific end products need not be marked with polarity marking;		S. S. S.
5.6	Assembly of cells into batteries	Single cell battery	Р
5.6.1	Cells used in the battery assembly have closely matched capacities, are of the same design, and are of the same chemistry and same manufacturer.	163 163 163 163	N/A
799	The battery incorporates separate circuitry to prevent cell reversal from uneven charges as the pack is designed for the selective discharge of a portion of its series connected cells.		N/A
5.6.2	Design recommendation for lithium system only	B BCO	Р
3	The voltage of each cell or each cellblock consisting of parallel-connected plural cell, should not exceed 4.20V, excepting the case where the portable electronic devices or the likes have the equivalent function;	143 143 145 145	N/A
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	Considered at the battery pack level and by the device designer:	See below;	Ρ
JCS CS	- for the battery consisting of a single cell or a single cellblock	LES LES	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 4, by monitoring the voltage of every single cell or the single cellblocks;		N/A
53 563 563 563	- 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
5.7	Quality plan	i jes	<b>P</b>
5	The manufacture has prepared a quality plan defining the procedures for the inspection of materials, components, cells and batteries and which covers the	The manufacturer has ISO 9001:2008 certificate and such quality plan.	Leo Leo

Clause	Requirement – Test	Result – Remark	20	Verdict
63	process of producing each type of cell and battery.	893 8	200	Re

6	Type test conditions	Res Res	Р
Re	Tests were conducted with the number of cells or batteries as outlined in Table 2 of IEC 62133 with cells or batteries that were not more than six months old.	Tests are made with the number of batteries specified in Table 2. battery are not more than six months old.	S S P
	Unless noted otherwise in the test methods, testing was conducted in an ambient of $20^{\circ}C \pm 5^{\circ}C$ .	Tests are carried out at $20^{\circ}C \pm 5^{\circ}C$ .	Ρ

2,25	Specific requirements and tests (nickel systems)				Rea	2	N/A	
7.1	Charging proce	Charging procedure for test purposes				3 20	28	N/A
7.2	Intended use					28 5	20	N/A
7.2.1	Continuous low	v-rate charging (	B	23	Po.	N/A		
<u>s</u>		cells are subjecter the manufacture	ed for 28 days to er.	a charge	3	LES	20	es S
	Results: No fire	e. No explosion	L'es	Pa	28	Bac		N/A
Sample No.	Model	Recommen ded Charging Method, CC, CV, or CC/CV	Recommend ed Charging Voltage Vc, Vdc	Chargin	nmended ng Current c, mA	OCV at Start of Test, Vdc	R	esults
100	- 09	23 - 3	55	Res	- Be	2 - 1	3	_
150	3 - 3	13 -		600	- 0	33-	Pa	2
- 0	zS –	13-	F	S.C.	5	285	P	23
_	133 -	133	( <del>C</del> S	5	£3	æ	3	23
s	Neg-	1 Car	-652	5	63	133		-10

## supplementary information:

- NF: No Fire

- NE: No Explosion

NL: No Leakage
Fire: the emission of flames from a cell or battery.
Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.

- Leakage: visible escape of liquid electrolyte.

7.2.2	Vibration	133 133	N/A
9	Fully charged cells or batteries are subjected to a	(G2) (G2)	N/A

3	5 aB	Bag	IEC 62133: 2012	Bass	Bess	L'GO
Clause	Requirement	– Test	Beeg.	Result – Re	emark	Verdict
	62133:2012 maximum ex varied at the and 55 Hz. T Hz) and retur	cursion of 1.52 mr rate of 1 Hz/min b he entire range of	).76 mm and a total n. The frequency was etween the limits of 10 l frequencies (10 Hz to 5 ) was traversed in 90 m	5	3 5 5 35 5 56 5 56 5 56 5 5 5 5 5 5 5 5 5 5 5 5	
	Results: No f	ire. No explosion.	No leakage	25		N/A
Sample No.	62	OC/	/ at Start of Test, Vdc	CS .	Results	2S
	TCD T	1.CS	183	623	623 -	ES.
2	-160	CS)	EST.	135	18S-	200
52	- NGS	1CS	3	133	6.03	5
60	- 100	n Con	- 163	nGE	143 143	
Res	- NGO	N.S.	65	10	3 6	3
Res	BC	No No	2 - 103		60 <u>4</u>	25
130	- 0	35	S S.		135 <u> </u>	62
Re		622	nes_ nes	3	~C3 _	ES
B		Res	Bes I	35	nes -	103
7	1992 a	130	1000	1CS	ic3	ES.
- No Fire or - No Leakage - Leakage - Fire - Explosion - Bulge				LES LES		23 23 23
LG.	23	163	Jes Je	2 28	JSS G	LES
7.2.3	Moulded cas	e stress at high a	mbient temperature	23	Bass	N/A
Ş		d batteries were p nperature of 70℃	laced in an aircirculating $\pm 2^{\circ} \mathbb{C}$ for 7 hours.	and a start	163	N/A
3		physical distortion	of the battery casing	C3	LGS CS	N/A

resulting in exposure if internal components Sample No. Status supplementary information:

No Fire or Explosion
No Leakage
Leakage
Fire

- Explosion

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Clause	Deminent Test	Desuit Dements	Manaliat
Clause	Requirement – Test	Result – Remark	Verdict

Bulge
 Other (Please Explain): No physical distortion of the battery casing resulting in exposure if internal components

ιĒ.

7.2.4	Temperature cyclin	g	Base		Ree	N/A
200	Fully charged cells temperature cycling chambers. After the were stored for 24h	g (-20 $^\circ \!$	n forced draught s or batteries	3 165 3 167	19 19 19	N/A
2	Results: No fire. No	explosion. No leak	kage.	63	CS	N/A
Sample No.	Beeg	Bee	150 -	- 30	NGS -	
Results	600	Real	Rea	150 -	100 -	-
Sample No.	1900	Read	Ben	Res-	Pes-	_
Results	Tax	1 Go	1.00	190	160	

supplementary information:

- No Fire or Explosion - No Leakage					
- Leakage					
- Fire					
- Explosion					
- Bulge					
- Other (Please Explain)	100	620	6.5	~ CS	2.0

7.3	Reasonably for	eseeable n	nisuse	Bess	Bas	B.Co	N/A
7.3.1	Incorrect install	ation cell	Bee	Read	Rea	BC	N/A
20		ged cells o	sing: of the same brand es, with one of the		B BSS	3 V 33	N/A
3	- A stabilized do	power su	pply.	S.	25	100	N/A
S	Results: No fire	. No explo	sion	i	33	Bees	N/A
Sa Sa	mple No.	5	OCV at Start of 7	Fest, Vdc	Bag	Results	Ba
also	3	2	23 - 5	.cS	See B	Barger	0
133	- 63	1	~ ES -	ES.	323	Page 1	5
1.C	5- ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	5	~ CS -	acs.	63	The second	3
20	52 TC	S	~ C3 -	ES.	25	- 50	23
0	ES ES	ලුව	~C3-	63	0.00	S - V	Ses
,							

supplementary information:

No Fire or Explosion No Leakage

3		IEC 62133: 2012		
Clause	Requirement – Test	Bess	Result – Remark	Verdict
Leakage	10-12 110-1	190	160	CP CP

# Leakage Fire Explosion Bulge

Other (Please Explain)

7.3.2	External short circ	uit		S. C.	3	N/A
0	The cells or batteri following occurred - 24 hours elapsed	CS.	until one of the	33	es. Es	N/A
3	- The case temper maximum tempera		y 20% of the	LGS LGS	NGS NGS	N/A
30	Results: No fire. N	o explosion		NGS .	1 GS	N/A
Sample No.	Ambient temperature (At 20°C ± 5°C)	OCV at start of test (Vdc)	Maximum case temperature rise $\Delta T$ , (°C)	Resistance of Circuit (m $\Omega$ )	Results	N/A
-de	5 <u> </u>	- 20	3 - 68	-5-23	- 130	S-
	25 - ~ ~ ~	5 - 2	23 - 20	3 - 52	3 - 3	-
~	23 - 2	<u> s – v</u>	<u>es - 5</u>	<u>13 - 5</u>	3	Poz-
- )	<u> 25 - 5</u>	23-	Bag - V	- B		Par
<u></u>	3-B-	200	Bas	1000- 1	3	1 the
Sample No.	Ambient temperature (At 55°C ± 5°C)	OCV at start of test (Vdc)	Maximum case temperature rise ∆T, (°C)	Resistance of Circuit (m $\Omega$ )	Results	B
ES.	at 3	ST.	Es-	STRS .	300	_
133	Es -	4.23	5.63	503	1000	e –
Tes	- 3	- 29	5 -5 28	Bas	-Be	a
- C	5 - 68	- 59	3 - 500	- 490	- Br	-
_ 0	3 - 50		68 - 19	e - 350	2 - 2	50-

supplementary information:

No Fire or Explosion
No Leakage
Leakage
Fire
Explosion
Bulge
Other (Please Explain)

7.3.3	Free fall	LGD LG	N/A
2	Each fully charged cell or battery is dropped three times from a height of 1.0m onto a concrete floor. The cells or batteries are dropped so as to obtain impacts in random orientations.	3 163 53 163	N/A
S	Results: No fire. No explosion.	63 63	N/A

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	5-33 B-33	IEC 62133: 2012	Real Real	RGO
Clause	Requirement – Test	350	Result – Remark	Verdict
Sample No.	133 - 133	133-	10 B	23 19
Results	103 - 103	-25	33	TES S
Sample No.	139 - 18	S CS	1 BB	Es.
Results	132	GP (85	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	2.03
- No Fire or - No Leakag - Leakage - Fire - Explosion - Bulge		LGS LG LGS LGS LGS LGS		

7.3.4	Mechanical shock	(crash hazard)	CS .		N/
199 199	Fully charged cells of three shocks of three mutually perp directions was perp initial 3 millisecond was 75 gn. The pea and 175 gn.	equal magnitude ap pendicular direction pendicular to a flat f s, the minimum ave	oplied in each of s. At least on of the face. During the erage acceleration		S 5
	Results: No fire. No	o explosion. No leal	kage.	ES_	N/.
Sample No.	Res -	Rea-	162 -	CS -	133 - V
Results	Rezo	Real	BGD_	- CO1	133 -
Sample No.	Press.	Res	Res	LCD_	- CS/
Results	400	Fee	Been a	N.C.D	LG2
No Fire or No Leakag Leakage Fire Explosion					

7.3.5	Thermal abuse				
222	Fully charged cells were placed in a gravity or circulating air-convention oven. The oven temperature was raised at a rate of $5^{\circ}$ C/min $\pm 2^{\circ}$ C/min to a temperature of $130^{\circ}$ C $\pm 2^{\circ}$ C. The cell remained at that temperature for 10 minutes before the test was discontinued.	165 163 165 16	N/A		
2	Results: No fire. No explosion.	62) 62	N/A		
Sample No.	199 - 199 - 1	() - () -	- 225		

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	533 5	e IEC	62133: 2012	Pore		160
Clause	Requirement – Test	2S	190	Result – Rem	ark	Verdict
Results	1.CB	135-	- C3-	63	- 528	- Be
suppleme	ntary information:	LCS .	JCS.	LCS		3
- No Fire o - No Leak	or Explosion					
- Leakage						
- Fire	as as					
- Explosio - Bulge						
	lease Explain)					

7.3.6	Crushing of collo	Rea	l'es	160	N/A	
7.3.0	Crushing of cells	C21	~ CS	R.C.S.	N/A	
	Fully charged cells were crushed surfaces with a hydraulic ram exe ±1 kN.		1,63		9	
LES	The crushing is performed in a manner that will cause the most adverse result.					
	- Once the maximum force has be	en applied,	J.G		N/A	
Ba	- or an abrupt voltage drop of one-third of the original voltage has been obtained,					
	The cell is prismatic type and a set was tested, rotated 90°around lon compared to the first set				N/A	
25	Results: No fire. No explosion		Beeg	Biss	N/A	
Model	OCV at start of test, (Vdc)	OCV at removal of c (Vdc)	crushing force,	Results	N/A	
103	13 - 6	S Bas	Ress	-Bes		
1 march	3 533- 60	and have	Ree	- 69	_	
Ro	s bet	Se Bres	e NS		50-	
-6	Te Nor	Place Pa		50 - 1	62	
	100	- (G)	6.5	635	100	

No Fire or Explosion No Leakage Leakage Fire Explosion Bulge Other (Please Explain)

7.3.7	Low pressure	5	N/A
3	Each fully charged cell is placed in a vacuum chamber, in an ambient temperature of $20^{\circ}C \pm 5^{\circ}C$ , its internal	33 163	N/A

	1.02	30	25		25	
Clause	Requirement – Test	RS V	28	Result – Remark	2	Verdict
33	pressure is gradually reduced to a pressure equal to o less than 11.6kPa held at that value for 6h			or c3		Re
	Results: No fire. No e	explosion. No leaka	ige.	BGD		N/A
Sample No.	199	100	Ree	Res-	Res	>
Results	-5-03	Ten	Piece B	Read	P.G	2
- No Fire or I						
No Leakag Leakage Fire						
- Explosion - Bulge						

- Other (Please Explain)

7.3.8	Overcharge			New			N/A
202	A discharged cell of charge of 2.5 time for a time that proor rated capacity).	s the recom	ging current	7 C C	N/A		
	Results: No fire. N	o explosion		: Blos			N/A
Sample no.	Model	OCV at start of test (Vdc)	Maximum Charging Current (2.0 <i>I</i> t A)	Maximum Charging Voltage (Vdc)	Total Time of Charging (h)	temperature of the outer casing (°C)	Results
3	Read	Fier	s - 3	50-	Pes-	533	-
Es	Es cs	-20	s -	355	Bas	-Bees	1
Tes	5.63	- 2	25	(ES	Los S	- 20	3
-BB	2 -	- 1	1.CS	EST		3 - 5	25
1 -	92 - NC	2	623	35		2S - <sup>3</sup>	103

supplementary information:

- NF: No Fire - NE: No Explosion

Fire: the emission of flames from a cell or battery.
Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled. n. 183

Remark: Total time of	charging ≤0.1h means the P	CB protection in a flas	h.

7.3.9	Forced discharge	163 A	N/A
Re	A discharged cell is subjected to a reverse charge at 1 I <sub>t</sub> A for 90 min	Les Le	3
	Results: No fire. No explosion	CGS U	N/A

)	193 AC	IEC 62133: 20	223	Bag G	5-00
Clause	Requirement – Test	23 5.23	Result – Rema	ark	Verdict
Sample no.	Model	OCV before application of reverse charge (Vdc)	Measured Reverse Charge It (A)	Total Time for Reversed Charge Application (Min)	Results
Barg	B2-S	Bas - Ba	- Bes	- 600	
1000	100	Read D	Se - Be	2 - ba	
-50	B - 3	3000	Pres - B	So - Be	2
- 6-	S - 3	B-aS	Rec	1900 - 1	Sol
0	as - 10	E AS	Real	Baa	Res

supplementary information:

NF: No Fire

NE: No Explosion

Fire: the emission of flames from a cell or battery. Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.

Remark: Total time of charging ≤0.1h means the PCB protection in a flash.

8	Specific requirements and tests	5 63 9	Р
8.1	Charging procedure for test purposes	ES (3)	P
8.1.1	First procedure	Nes Pas	1 CS
33	Test is carried out at $20^{\circ}C \pm 5^{\circ}C$ . Charging method declared by the manufacturer.	Les Les	Р
163	Prior to charging, the battery shall have been discharged at 20 $^{\circ}$ C ± 5 $^{\circ}$ C at a constant current of 0,2 It A down to a specified final voltage.	163 163 163 163	Р
8.1.2	Second procedure	Res Res	-
8.1.2	For clause 8.3.1, 8.3.2, 8.3.4, 8.3.5, and 8.3.9 charging procedure After stabilization for 1 to 4 hours respectively at ambient temperature of highest test temperature and lowest test temperature, as specified in Table 4		S S S S S S S S S S S S S S S S S S S
3 33	cells are charged by using the upper limited charging voltage and maximum charging current, until the charging current is reduced to 0,05 <i>k</i> A, using a constant voltage charging method.	160 160 163 163 163 163	Re
	- Upper limit charging voltage	4.25V	- 1
LG	- Maximum charging current Specified by the manufacturer of cells	1800mA	5 -
	Charging temp. Upper limit	<b>45</b> ℃	S -
0	Charging temp. Lower limit	<b>10</b> ℃	2S-

Ρ

			IEC 62133:	2012				
Clause	Requirement -	- Test	Bes B		Result – Ren	nark		Verdict
8.2.1	Continuous ch	arging at consta	nt voltage (cells)	3	C3	3.68	6	Р
LES	Fully charged cells are subjected for 7 days to a charge as specified by the manufacturer.				LES LE			Р
Res	Results:: No fi	re, no explosion,	no leakage	CS.	See below t	able;	3	Р
Sample No.	Model	Recommen ded Charging Method, CC, CV, or CC/CV	Recommend ed Charging Voltage Vc, Vdc	Char	commended ging Current Irec, mA	OCV at Start of Test, Vdc	No. of	Results
C01#	103450	CC/CV	4.20	į.,	180	4.17	NF	, NE, NL
C02#	103450	CC/CV	4.20	3	180	4.17	NF	, NE, NL
C03#	103450	CC/CV	4.20	32	180	4.18	NF	, NE, NL
C04#	103450	CC/CV	4.20	193	180	4.18	NF	, NE, NL
C05#	103450	CC/CV	4.20	Rea	180	4.18	NF	, NE, NL

supplementary information:

- NF: No Fire

- NE: No Explosion

- NL: No Leakage

Fire: the emission of flames from a cell or battery.
Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.

- Leakage: visible escape of liquid electrolyte.

8.2.2	Moulded case stress at high ambient tempe	erature (battery)	See yes	Р	
350	Fully charged batteries according to the firs 8.1.1, the batteries were placed in an air-cin temperature of $70^{\circ}C \pm 2^{\circ}C$ for 7 hours. After removed and allowed to return to room temperature of the return to room temperature to return to room temperature temperatu	rculating oven at a erwards, they are	163 10 163 1	Р	
s S	Results: no physical distortion of the batter in exposure if internal components.	y casing resulting	LES	PS	
Sample N	No. B01#	B02#	B03#	Po	
Status	Status         No evidence of mechanical damage           Status         No physical distortion of the battery case resulting in exposu components.		finternal	Р	
8.3	Reasonably foreseeable misuse	LOS I	is le	P	
8.3.1	External short circuit (cell)				
5	Fully charged each cell according to the se 8.1.2;	cond procedure in	163	SP	
	0.1.2,				

5	323	Bag	IEC 621	33: 2012	B	3	LG5
Clause	Requirement	– Test	Bes	Resul	t – Remark		Verdict
3	$20^{\circ}C \pm 5^{\circ}C.$	1.C	3 5	63 4	25	See.	R
Res	The external r	esistance of 8	30±20 mΩ.	133	(CS	1CB	Р
Res			h or until the ca	the second se	163	760	Р
Re	Results: no fire	e, no explosic	on. 333	1,CS	LCS_	6	S P
B	After the test	Beeg	Bass	P COD	See below	2	P
Sample No.	Ambient temperature (At 20°C ± 5°C)	OCV at start of test (Vdc)	Maximum case temperature rise ∆T, (°C)	Resistance of Circuit (mΩ)	Charging temp. Upper limit (°C)	Results	Р
C06	23.5	4.17	76.8	80	45	NF, NE	P
C07	24.3	4.17	81.2	80	45	NF, NE	Р
C08	23.6	4.18	79.6	80	45	NF, NE	Р
C09	23.7	4.18	83.5	80	45	NF, NE	Р
C10	23.9	4.18	85.9	80	45	NF, NE	Р
Sample No.	Ambient temperature (At 20°C ± 5°C)	OCV at start of test (Vdc)	Maximum case temperature rise ∆T, (°C)	Resistance of Circuit (mΩ)	Charging temp. Lower limit (°C)	Results	Р
C11	23.7	4.15	80.8	80	10	NF, NE	Р
C12	23.9	4.15	82.5	80	10	NF, NE	Р
C13	24.3	4.15	84.3	80	10	NF, NE	Р
C14	24.0	4.15	83.8	80	10	NF, NE	P
C15	24.8	4.14	85.2	80	10	NF, NE	SP

supplementary information

- NF: No Fire

- NE: No Explosion

Fire: the emission of flames from a cell or battery.
Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.

8.3.2	External short circuit (battery)	3 Bas Ba	Р
0	Fully charged each battery according to the second procedure in 8.1.2;	23 LES	СЭР
5	Fully charged batteries were subjected to a short circuit test at $55^{\circ}C \pm 5^{\circ}C$ .	Les Les	Р

Clause	Requirement -	– Test	Leo		Result	– Remark	69	Verdict
Jiause	Requirement	1031	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Result	Remark	aB	Verdict
32	The external r	esistance of 8	80±20 mΩ.	5	0	දුපි	ES a	Р
		eclined by 20	ed for 24 h or until the % of the maximum	e case	2			Ρ
Le L	battery pack s one hour after state condition where the per	hould remain the current re n. This typicall cell voltage (s w 0,8 V and is	hort circuit current, th on test for an additio eaches a low end ste y refers to a conditio series cells only) of t s decreasing by less	onal ady n he	3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	100 163 163	5 5 7 5 7 5 7 5 7 5 7 5	N/A
2	Results: no fire	e, no explosic	n. <u>(</u> 3		al	\$	183	Р
30	After the test	BE	P LC	5	See	below	1CS	Р
Sample No.	Ambient temperature (At 55°C ± 5°C)	OCV at start of test (Vdc)	Maximum case temperature rise ΔT, (°C)	Resis of Ci (m	rcuit	Charging temp. Upper limit (°C)	Results	Р
B04#	56.3	4.18	0.2	8	0	45	NF, NE	Р
B05#	56.6	4.18	0.1	8	0	45	S NF, NE	Р
B06#	56.6	4.17	0.3	8	0	45	NF, NE	Р
B07#	56.9	4.18	0.1	8	0	45	NF, NE	Р
B08#	56.2	4.18	0.1	8	0	45	NF, NE	Р
Sample No.	Ambient temperature (At 55°C ± 5°C)	OCV at start of test (Vdc)	Maximum case temperature rise ΔT, (°C)	Resis of Ci (m	rcuit	Charging temp. Lower limit (°C)	Results	Р
B09#	56.6	4.15	0.2	8	0	10	NF, NE	2S P
B10#	56.3	4.15	0.3	8	0	10	NF, NE	P
B11#	56.2	4.15	0.1	8	0	10	NF, NE	Р
B12#	56.3	4.16	0.2	8	0	10	NF, NE	Р
B13#	56.5	4.15	0.1	8	0 300	10	NF, NE	Р

supplementary information

- NF: No Fire

- NE: No Explosion

Fire: the emission of flames from a cell or battery.Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.

8.3.3 Free fall

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Ρ

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		IEC 62133: 2012				
Requirement	equirement – Test			Result – Remark		
Ambient tem	perature of 20±5℃	CS CS	Р			
		Three time	s	Р		
a minimum o	f one hour and then a v	200	3			
Results: no f	ire, no explosion	28	Read	Р		
Sample No. C16#		C17#	23	C18#	Beeg	
atus	NF, NE	NF, NE	1.CS	NF, NE		
Sample No. B14		B15#	B16#		al	
atus	NF, NE	NF, NE	133	NF, NE	0	
	Ambient tem Fully charged from a heigh After the test a minimum o shall be perfo Results: no f De No.	from a height of 1.0 m onto a concreAfter the test, the cell or battery sha a minimum of one hour and then a v shall be performed.Results: no fire, no explosionole No.C16#atusNF, NEole No.B14#	Ambient temperature of 20±5°C         Fully charged cells or batteries were dropped 3 times from a height of 1.0 m onto a concrete floor.         After the test, the cell or battery shall be put on rest for a minimum of one hour and then a visual inspection shall be performed.         Results: no fire, no explosion         De No.       C16#         NF, NE       NF, NE         De No.       B14#	Ambient temperature of 20±5°C       Three time         Fully charged cells or batteries were dropped 3 times from a height of 1.0 m onto a concrete floor.       Three time         After the test, the cell or battery shall be put on rest for a minimum of one hour and then a visual inspection shall be performed.       Results: no fire, no explosion         New No.       C16#       C17#         Attack       NF, NE       NF, NE         De No.       B14#       B15#	Ambient temperature of 20±5°C         Fully charged cells or batteries were dropped 3 times from a height of 1.0 m onto a concrete floor.       Three times         After the test, the cell or battery shall be put on rest for a minimum of one hour and then a visual inspection shall be performed.       Results: no fire, no explosion         Ne No.       C16#       C17#       C18#         Atus       NF, NE       NF, NE       NF, NE         Ne No.       B14#       B15#       B16#	

supplementary information:

## - NF: No Fire

- NE: No Explosion

- Fire: the emission of flames from a cell or battery.

- Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.

8.3.4	Thermal abuse (cells)	as sas	Р
59 565 565 565	Fully charged cells were placed in a gravity or circulating air-convention oven. The oven temperature was raised at a rate of 5°C/min $\pm$ 2°C/min to a temperature of 130°C $\pm$ 2°C. The cell remained at that temperature for 10 minutes before the test was terminated.	163 163 163 163 163 163	P
n.C	Results: no fire, no explosion	23 5	B P

After the test (Charging temp. Upper limit 45°C)

	C23#	C22#	C21#	C20#	C19#	Sample No.
Status NF, NE NF, NE NF, NE NF, NE	Status					

After the test (Charging temp. Lower limit -5°C)

Sample No.	C24#	C25#	C26#	C27#	C28#
Status	NF, NE				

supplementary information:

- NF: No Fire

- NE: No Explosion

- Fire: the emission of flames from a cell or battery.

- Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.

3		IEC 62133: 2012		
Clause	Requirement – Test	Beeg	Result – Remark	Verdict

aB.	Bos Bos Bos	Car	1.60	
8.3.5	Crush (cells)	LC3	LCS)	Р
P.GE	Each fully charged cell, charged according to the second procedure at the upper limit charging temperature in 8.1.2, is immediately transferred and crushed between two flat surfaces in an ambient temperature.	160 163 163		P
	Fully charged cells were crushed between two flat surfaces with a hydraulic ram exerting a force of 13 kN $\pm$ 1 kN.	3 10	3	P
3	The crushing is performed in a manner that will cause the most adverse result.	See below	33 23	Р
es.	- Once the maximum force has been applied,	ES.	S.CS	Р
Les.	- or an abrupt voltage drop of one-third of the original voltage has been obtained,	133 123	163	N/A
39.90	- or 10 % of deformation has occurred compared to the initial dimension, the force is released (whichever condition occurs first should be the indication that the force should be released).	163 163 163	Ne e	N/A
5	A cylindrical or prismatic cell was crushed with its longitudinal axis parallel to the flat surfaces of the crushing apparatus.		5 35 (65)	LCS P
50	Test only the wide side of prismatic cells.	CS.	3 CS	5
	Results: no fire, no explosion.	2 CS	28	Р

Sample No.	C29#	C30#	C31#	C32#	C33#
Status	NF, NE				

supplementary information:

NF: No Fire
NE: No Explosion
Fire: the emission of flames from a cell or battery.
Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.

8.3.6	Over-charging of battery	Base B	Р
2	The test shall be carried out in an ambient temperature of +20 °C±5°C.	LGS I	Р
3	Each test battery shall be discharged at a constant current of 0,2 <i>I</i> t A, to a final discharge voltage specified by the	Les Les	Р

Clause	Requirement -	Test		Re	esult – Remark		Verdict
3	manufacturer.	LCE LCE	3 30	es .	CES .	See.	B
160	A discharged ba 5.0V per cell or supplied by the current of 2.0 <i>k</i> Total Time of C the temperature conditions (less returns to ambie	not to exceed recommende A. harging: The t of the outer of than 10 °C cl	I the maximum d charger, at a test shall be co casing reaches	voltage charging ntinued until steady state	163 163 163		5 P (5 <sup>5</sup>
3	Results: no fire,	no explosion	Rea	3 B	S	RED	Р
S	After the test	S.CS	Bo	S	No fire, no e	explosion.	Р
Sample no.	Model	OCV at start of test (Vdc)	Maximum Charging Current (2.0 <i>I</i> t A)	Maximum Charging Voltage (Vdc	Total Time of Charging (h)	temperature of the outer casing (°C)	Results
B17#	ZN-103450	3.32	3.6	5	≤0.1	25.3	NF, NE
B18#	ZN-103450	3.30	3.6	5	≤0.1	25.2	NF, NE
B19#	ZN-103450	3.32	3.6	5	≤0.1	25.3	NF, NE
B20#	ZN-103450	3.33	3.6	5 5	≤0.1	25.2	NF, NE
		IL COM			G ()	A 1000	100

supplementary information:

- NF: No Fire

- NE: No Explosion

Fire: the emission of flames from a cell or battery.
Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.

Remark: Total time of charging ≤0.1h means the PCB protection in a flash.

8.3.7	Forced discha	rge (cells)	NG2		GP
	A discharged It A for 90 min	cell is subjected to a revers	se charge at 1	165	Р
P.C.	Results: no fire	e, no explosion	is is	\$ 63	P
Sample no.	Model	OCV before application of reverse charge (Vdc)	Measured Reverse Charge It (A)	Total Time for Reversed Charge Application (Min)	Results
C34#	103450	3.15	1.8	90	NF, NE
C35#	103450	3.15	1.8	90	NF, NE
C36#	103450	3.16	1.8	90	NF, NE
C37#	103450	3.15	1.8	90	NF, NE
C38#	103450	3.19	1.8	90	NF, NE

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3	Bag Bag	IEC 62133: 2012	NGO.
Clause	Requirement – Test	Result – Remark	Verdict

- NF: No Fire

NE: No ExplosionFire: the emission of flames from a cell or battery.

- Explosion: failure that occurs when a cell container or battery case opens violently and major components are forcibly expelled.

8.3.8	Transport test	3 63	N/A
3 53	Regulations concerning international transport of lithium ion batteries are based on the UN Recommendations on the Transport of Dangerous Goods. Testing requirements are defined in the UN Manual of Tests & Criteria.		N/A
C(S)	Testing laboratory	33 33	N/A

8.3.9	Design evaluation – F	orced internal short circu	it (cells)			N/A
n.C	The cells complied wi	th nation requirement for	303	Prism	atic cells	is -
B	The pressing was sto -A voltage drop of 50	pped upon: mV has been detected; c	or Se	3 23	163	N/A
3	-The pressing force of (prismatic cells) has b	f 800N (cylindrical cells) o been reached	or 400N	133	3 3 CS	N/A
25	Results: No fire.	ies ies	3	200	3 63	N/A
Model	Chamber ambient, (°C)	OCV at start of test, (Vdc)	Particle location	1)	Maximum applied pressure, (N)	Results
C39	CB.	-CS-	3-		103 - Ber	NE, NF
C40	23	LC3	CB-		- ES -	NE, NF
C41		120	"LC	5	133	NE, NF
C42	So -Neo	S LOO	H	50	JES .	NE, NF
C43	- LO	3 -53	2	300	190	NE, NF
S C44	~ - ES	B - 28		Bee	3 323	NE, NF
C45	133 -	133 - 13	5	2	23 - 23	NE, NF
C46	Les-	BES - N	55	1	183 - 183	NE, NF
C47	Bass	Leson 1	500-		ISS - ISS	NE, NF
C48	3 Boo	Read	Res		Res - Re	NE, NF

supplementary information:

<sup>1)</sup>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

- No Leakage

3	5-28 5	28	IEC 62133: 2012	Bene B	2	Ree
Clause	Requirement – Test	1900	Bass	Result – Remark	les.	Verdict
1	1.9-	1192	0.00	0.62	- (C.E.)	1.0

- Leakage Fire Explosion Bulge

C2D

- Other (Please Explain)

9	Information for safety	\$ 63	P
કે ટુકે	Information is provided to equipment manufacturers in the form of instructions to minimize and mitigate hazards associated with the cells or batteries in accordance with guidelines outlined in informative Annex B.		Р
763 763	Information is provided to end-users in the form of instructions to minimize and mitigate hazards associated with the batteries in accordance with guidelines outlined in informative Annex C.		Р

10	Marking	a been b	Р
10.1	Cell marking	3 33	Р
	Rechargeable Li or Li-ion	13 . AS	N/A
3	Battery designation	1,63 (63	N/A
ŝ	Polarity of terminal	Les Les	N/A
as.	Date of manufacture	Read Read	Р
LCS	Name or identification of the manufacturer or supplier	Les Les	Р
Por Con	Nominal voltage(V)	3.7V	P
2 6	Rated Capacity (mAh)	1800mAh	Р
10.2	Battery marking	See below	P
3	Rechargeable Li or Li-ion	Li-ion	N/A
S	Battery designation	Res Res	N/A
(BS	Polarity of terminal	On the battery	N/A
133	Date of manufacture	On the battery	N/A
Pes.	Name or identification of the manufacturer or supplier	Les Le	Р
all all	Nominal voltage(V)	3.7V	SP
5	Rated Capacity (mAh)	1800mAh	P
	Caution statement	For details please see the picture	P

	IEC 62133: 2012		
Clause	Requirement – Test	Result – Remark	Verdict
10.3	Other information	63 63	Р
1GS	Disposal instructions are marked on the battery or supplied in the information packaged with the battery.	See Specification book	Р
Pa	Recommended charging instruction are marked on the battery or supplied in the information packaged with the battery.	See Specification book	P B

11	Packaging	23 23	P
5 55 165	Cells or batteries were provided with packaging that was adequate to avoid mechanical damage during transport, handling and stacking. The materials and pack design was chosen to prevent the development of unintentional electrical conduction, corrosion of the terminal and ingress of moisture.		P

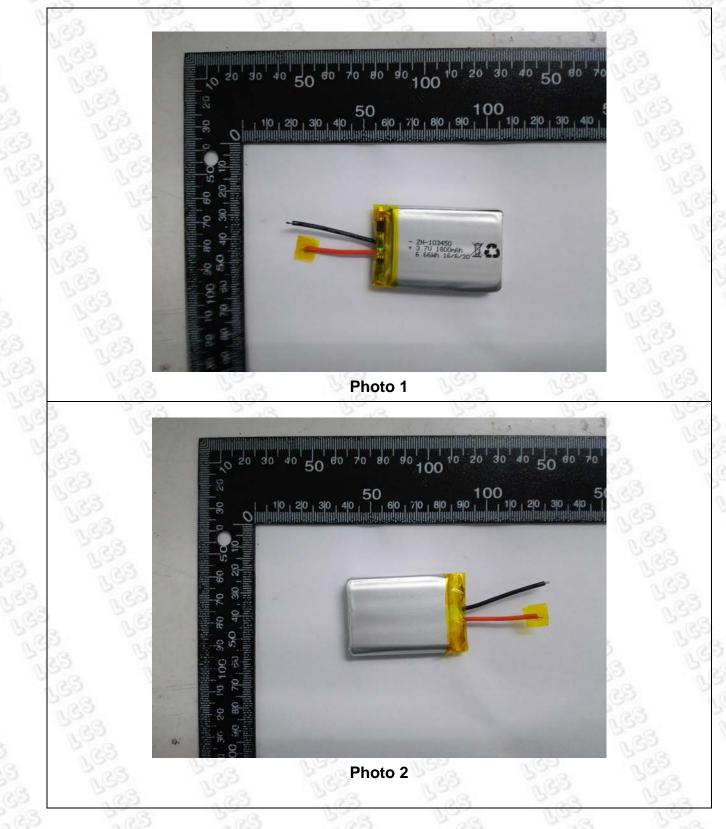
Annex A	Charging range of secondary lithium io	n cells for safe use	P
A.1	General	e (2)	P
A.2	Safety of lithium-ion secondary battery	Complied	Р
A.3	Consideration on charging voltage	Complied	Р
A.3.1	General	23 5 AS	Р
A.3.2	Upper limit charging voltage	4.2V	Р
A.3.2.1	General	Bog Bog	Р
A.3.2.2	Explanation of safety viewpoint	Bar Bar	Р
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied	4.2V	Р
A.4	Consideration of temperature and charging current	65	SP
A.4.1	General	1 3.23 B	P
A.4.2	Recommended temperature range	See A.4.2.2.	Р
A.4.2.1	General	as bas	Р
A.4.2.2	Safety consideration when a different recommended temperature range is applied	Charging temperature for cell declared by client is: 0-45°C	Р
A.4.3	High temperature range	Not higher than the temperature range specific in this standard.	N/A
A.4.3.1	General	621 C21	N/A
A.4.3.2	Explanation of safety viewpoint	(C) (C)	N/A
A.4.3.3	Safety considerations when specifying charging conditions in high temperature range	Les Le	N/A
A.4.3.4	Safety consideration when specifying new upper limit in high temperature range	Les y	N/A
A.4.4	Low temperature range	Charging low temperature declared by client is: 0°C	Р
A.4.4.1	General	as bas	Р

3	IEC 62133: 2012	Para Rev	Rec
Clause	Requirement – Test	Result – Remark	Verdie
A.4.4.2	Explanation of safety viewpoint	13 V 28	Р
A.4.4.3	Safety considerations, when specifying charging conditions in low temperature range	163 163	Р
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range	-5℃	Р
A.4.5	Scope of the application of charging current	and start	P
A.5	Sample preparation	S GRS U	Р
A.5.1	General	B Bas	Р
A.5.2	Insertion procedure for nickel particle to generate internal short	3 163	P
3	The insertion procedure carried out at 20°C±5°C and under -25 °C of dew point	160 160 163 163	P.C
A.5.3	Disassembly of charged cell	323 323	Р
A.5.4	Shape of nickel particle	H:0.2mm T:0.1mm L shape(Angle:90±10°): 1.0mm	Р
A.5.5	Insertion of nickel particle to cylindrical cell	623	N/A
A.5.5.1	Insertion of nickel particle to winding core	C CES	N/A
A.5.5.2	Mark the position of nickel particle on the both end of winding core of the separator	B Les	N/A
A.5.6	Insertion of nickel particle to prismatic cell	See Bee	N/A

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# Photo Documentation



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