Test Report issued under the responsibility of:

SGS

TEST REPORT
IEC 62133
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

Report Number. ..... :	SZES140800210501
Date of issue..... :	2014-08-15
Total number of pages..... :	29 Pages
Applicant's name..... :	Xinxiang Sunshine Battery Manufacturing Co., Ltd.
Address ..... :	Dakuai Electronic Industrial Park, Fengquan, Xinxiang, Henan, China
Test specification:	
Standard..... :	IEC 62133: 2012 (Second Edition)
Test procedure ..... :	CB Scheme
Non-standard test method..... :	N/A
Test Report Form No. ..... :	IEC62133B
Test Report Form(s) Originator ... :	UL(Demko)
Master TRF ..... :	Dated 2013-03

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description..... :	Lithium-ion cell
Trade Mark ..... :	YG, YANGGUANG, KINGBIRD, PARKSIDE
Manufacturer ..... :	Same as applicant
Model/Type reference..... :	INR18650E 1100mAh, INR18650E 1200mAh, INR18650E 1300mAh, INR18650E 1400mAh, INR18650E 1500mAh, INR18650E 1600mAh, INR18650E 1700mAh, INR18650E 1800mAh, INR18650E 1900mAh, INR18650E 2000mAh, INR18650E 2100mAh, INR18650E 2200mAh, INR18650E 2300mAh, INR18650E 2400mAh
Ratings ..... :	See page 6 for details.

Testing procedure and testing location:			
☒	**Testing Laboratory:**	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab	
Testing location/ address .....:		No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China 518057	
☐	**Associated Testing Laboratory:**	N/A	
Testing location/ address .....:			
	Tested by (name + signature) .....:	Burning Lin	
	Approved by (name + signature).....:	Simon Chen	
☐	**Testing procedure: TMP**	N/A	
Testing location/ address .....:			
	Tested by (name + signature) .....:		
	Approved by (name + signature).....:		
☐	**Testing procedure: WMT**	N/A	
Testing location/ address .....:			
	Tested by (name + signature) .....:		
	Witnessed by (name + signature) ...:		
	Approved by (name + signature).....:		
☐	**Testing procedure: SMT**	N/A	
Testing location/ address .....:			
	Tested by (name + signature) .....:		
	Approved by (name + signature).....:		
	Supervised by (name + signature) ..:		

List of Attachments:

Attachment 1: Photos;

Attachment 2: Information for safety;

Attachment 3: Product specification.

Summary of testing:

The sample(s) tested complies with the requirements of IEC 62133: 2012.

These tests fulfil the requirements of standard ISO/IEC 17025.

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

All test data in this report are copied from original test report SZES140100004901, dated 2014-04-28, with following change/additional:

- **Add the trade mark: PARKSIDE**

After compare, no additional test was considered necessary.

Remark:

1. Model INR18650E 1100mAh and INR18650E 2400mAh were subjected to full tests as far as applicable. Model INR18650E 1500mAh and INR18650H 2000mAh were tested with Clause 8.3.1, 8.3.4 and 8.3.5.

Clause 8.3.1 External short circuit (cell)

Clause 8.3.4 Thermal abuse (cells)

Clause 8.3.5 Crush (cells)

2. Cells will not be transported without the end product, clause 8.3.8 Transport tests were not considered in this report.

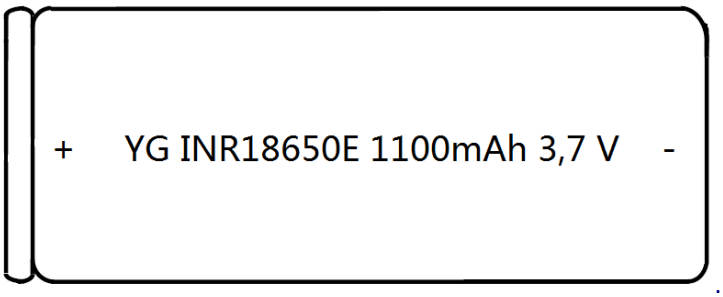
Tests performed (name of test and test clause):	**Testing location:**
Specific requirements and tests (lithium systems)	--
☐5.2 Insulation resistance	
☒8.2.1 Continuous charging at constant voltage (cells)	
☐8.2.2 Moulded case stress at high ambient temperature (battery)	
☒8.3.1 External short circuit (cell)	
☐8.3.2 External short circuit (battery)	
☒8.3.3 Free fall	
☒8.3.4 Thermal abuse (cells)	
☒8.3.5 Crush (cells)	
☐8.3.6 Over-charging of battery	
☒8.3.7 Forced discharge (cells)	
☐8.3.8 Transport tests	
☒8.3.9 Design evaluation – Forced internal short circuit (cells)	

Summary of compliance with National Differences

List of countries addressed:

☒ The product fulfils the requirements of EN 62133:2013.

Copy of marking plate (Not checked this marking plate)



Remark: The marking for other models are of the same pattern.

Test item particulars..... :	--
Classification of installation and use..... :	--
Supply connection ..... :	--
Recommend charging method declaired by the manufacturer ..... :	CC/CV
Discharge current (0,2 I_t A) ..... :	See page 6 for details
Specified final voltage ..... :	2,75 V
Chemistry ..... :	☐ nickel systems .....☒ lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell..... :	4,2 V
Maximum charging current..... :	See page 6 for details
Charging temperature upper limit..... :	45°C
Charging temperature lower limit ..... :	0°C
Polymer cell electrolyte type..... :	☐ gel polymer..... ☐ solid polymer
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A (Not applicable)
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing..... :	
Date of receipt of test item..... :	2014-01-10
Date (s) of performance of tests ..... :	2014-01-10 to 2014-02-24

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.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :

☐ **Yes**
☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... : Same as applicant

General product information:

Model No.	IEC61960 designation	Rated Voltage	Rated Capacity	Discharge current (0,2 It A)	Maximum charging current	Maximum discharging current
INR18650E 1100mAh	INR 18/65	3,7 V	1100mAh	0,22 A	1,1 A	3,3 A
INR18650E 1200mAh	INR 18/65	3,7 V	1200mAh	0,24 A	1,2 A	3,6 A
INR18650E 1300mAh	INR 18/65	3,7 V	1300mAh	0,26 A	1,3 A	3,9 A
INR18650E 1400mAh	INR 18/65	3,7 V	1400mAh	0,28 A	1,4 A	4,2 A
INR18650E 1500mAh	INR 18/65	3,7 V	1500mAh	0,30 A	1,5 A	4,5 A
INR18650E 1600mAh	INR 18/65	3,7 V	1600mAh	0,32 A	1,6 A	4,8 A
INR18650E 1700mAh	INR 18/65	3,7 V	1700mAh	0,34 A	1,7 A	5,1 A
INR18650E 1800mAh	INR 18/65	3,7 V	1800mAh	0,36 A	1,8 A	5,4 A
INR18650E 1900mAh	INR 18/65	3,7 V	1900mAh	0,38 A	1,9 A	5,7 A
INR18650E 2000mAh	INR 18/65	3,7 V	2000mAh	0,40 A	2,0 A	6,0 A
INR18650E 2100mAh	INR 18/65	3,7 V	2100mAh	0,42 A	2,1 A	6,3 A
INR18650E 2200mAh	INR 18/65	3,7 V	2200mAh	0,44 A	2,2 A	6,6 A
INR18650E 2300mAh	INR 18/65	3,7 V	2300mAh	0,46 A	2,3 A	6,9 A
INR18650E 2400mAh	INR 18/65	3,7 V	2400mAh	0,48 A	2,4 A	7,2 A

Remark: All models have same dimensions, construction, techniques and composition, except for model No. and rated capacity.
Please see Attachment 4 for more detailed product specification.

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
4	**Parameter measurement tolerances**		P
	Parameter measurement tolerances		P
5	**General safety considerations**		P
5.1	General		P
5.2	Insulation and wiring		N/A
	The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ	Lithium-ion cell	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		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	A pressure relief mechanism used to relieve excessive internal pressure	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/current management		N/A
	Batteries are designed such that abnormal temperature rise conditions are prevented		N/A
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer		N/A
	Batteries are provided with specifications and charging instructions for equipment manufacturers so that associated chargers are designed to maintain charging within the temperature, voltage and current limits specified		N/A
5.5	Terminal contacts		N/A
	Terminals have a clear polarity marking on the external surface of the battery		N/A
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current		N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		N/A
	Terminal contacts are arranged to minimize the risk of short circuits		N/A
5.6	Assembly of cells into batteries		N/A
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		N/A
	Each battery has an independent control and protection		N/A
	Manufacturers of cells make recommendations about 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 separate circuitry to prevent the cell reversal caused by uneven discharges		N/A
	Protective circuit components are added as appropriate and consideration given to the end-device application		N/A
	When testing a battery, the manufacturer of the battery provides a test report confirming the compliance according to this standard		N/A
5.6.2	Design recommendation for lithium systems only		N/A
	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		N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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		N/A
	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		N/A
	- 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		N/A
5.7	Quality plan	Self declaration was submitted	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		P
6	**Type test conditions**		P
	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 The cell samples are not more than 6 months old (all of them were produced at 2013-12). See marking plate.	P
	Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C.	The tests are conducted in an ambient of 20°C ± 5°C.	P
7	**Specific requirements and tests (nickel systems)**		N/A
7.1	Charging procedure for test purposes	Lithium-ion cell	N/A
7.2	Intended use		N/A
7.2.1	Continuous low-rate charging (cells)		N/A
	Results: No fire. No explosion		N/A
7.2.2	Vibration		N/A
	Results: No fire. No explosion. No leakage		N/A
7.2.3	Moulded case stress at high ambient temperature		N/A
	Oven temperature (°C)..... :	--	—

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Clause	Requirement + Test	Result - Remark	Verdict
	Results: No physical distortion of the battery casing resulting in exposure if internal components		N/A
7.2.4	Temperature cycling		N/A
	Results: No fire. No explosion. No leakage.		N/A
7.3	Reasonably foreseeable misuse		N/A
7.3.1	Incorrect installation cell		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		N/A
	- A stabilized dc power supply.		N/A
	Results: No fire. No explosion ..... :		N/A
7.3.2	External short circuit		N/A
	The cells or batteries were tested until one of the following occurred: - 24 hours elapsed; or		N/A
	- The case temperature declined by 20% of the maximum temperature rise		N/A
	Results: No fire. No explosion ..... :		N/A
7.3.3	Free fall		N/A
	Results: No fire. No explosion.		N/A
7.3.4	Mechanical shock (crash hazard)		N/A
	Results: No fire. No explosion. No leakage.		N/A
7.3.5	Thermal abuse		N/A
	Oven temperature (°C)..... :	--	—
	Results: No fire. No explosion.		N/A
7.3.6	Crushing of cells		N/A
	The crushing force was released upon: - The maximum force of 13 kN ± 1 kN has been applied; or		N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained		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		N/A
	Results: No fire. No explosion ..... :		N/A
7.3.7	Low pressure		N/A
	Chamber pressure (kPa)..... :	--	—
	Results: No fire. No explosion. No leakage.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.3.8	Overcharge		N/A
	Results: No fire. No explosion ..... :		N/A
7.3.9	Forced discharge		N/A
	Results: No fire. No explosion ..... :		N/A
8	**Specific requirements and tests (lithium systems)**		P
8.1	Charging procedures for test purposes		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		P
	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	The upper charging temperature is 45 °C and the lower charging temperature is 0 °C in specification.	P
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1)..... :	See the test result.	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	The upper limit charging voltage is 4,2 V in specification.	P
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1)..... :	See the test result.	P
8.2	Intended use		P
8.2.1	Continuous charging at constant voltage (cells)		P
	Results: No fire. No explosion ..... :	See Table 8.2.1	P
8.2.2	Moulded case stress at high ambient temperature (battery)	Lithium-ion cell	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		P
8.3.1	External short circuit (cell)		P
	The cells were tested until one of the following occurred: - 24 hours elapsed; or		N/A
	- The case temperature declined by 20% of the maximum temperature rise	PTC was used	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Results: No fire. No explosion ..... :	See Table 8.3.1	P
8.3.2	External short circuit (battery)		N/A
	The cells were tested until one of the following occurred: - 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
	Results: No fire. No explosion ..... :		N/A
8.3.3	Free fall		P
	Results: No fire. No explosion.		P
8.3.4	Thermal abuse (cells)		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)		N/A
	Oven temperature (°C)..... :	130°C	—
	Gross mass of cell (g) ..... :	INR18650E 1100mAh: 40,0 g INR18650E 1500mAh: 42,0 g INR18650E 2000mAh: 43,0 g INR18650E 2400mAh: 46,0 g	—
	Results: No fire. No explosion.		P
8.3.5	Crush (cells)		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	No voltage drop was noticed	N/A
	- 10% of deformation has occurred compared to the initial dimension	No deformation was noticed	N/A
	Results: No fire. No explosion ..... :	See Table 8.3.5	P
8.3.6	Over-charging of battery		N/A
	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		N/A
	Results: No fire. No explosion ..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.7	Forced discharge (cells)		P
	Results: No fire. No explosion ..... :	See Table 8.3.7	P
8.3.8	Transport tests	Self declaration was submitted	Not checked
	Manufacturer's documentation provided to show compliance with UN Recommendations on Transport of Dangerous Goods		Not checked
8.3.9	Design evaluation – Forced internal short circuit (cells)		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		P
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached	Cylindrical cells, 800N	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.	See Attachment 2 for detail.	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.		N/A
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product		P
	As appropriate, information relating to hazard avoidance resulting from a system analysis is provided to the end user..... :	--	N/A
10	**Marking**		Not checked
10.1	Cell marking		Not checked
	Cells marked as specified in the applicable cell standards: IEC 61951-1, IEC 61951-2 or IEC 61960.		Not checked
10.2	Battery marking		NA
	Batteries marked in accordance with the requirements for the cells from which they are assembled.		NA

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Clause	Requirement + Test	Result - Remark	Verdict
	Batteries marked with an appropriate caution statement.		NA
10.3	Other information		N/A
	Storage and disposal instructions marked on or supplied with the battery.		N/A
	Recommended charging instructions marked on or supplied with the battery.		N/A
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.	See Attachment 3 for detail.	P
Annex	**Charging range of secondary lithium ion cells for safe use**		P
A.1	General		P
A.2	Safety of lithium-ion secondary battery		P
A.3	Consideration on charging voltage		P
A.3.1	General		P
A.3.2	Upper limit charging voltage		P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		P
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied	The upper limit charging voltage is 4,2 V in specification.	P
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	The recommended temperature range: 0 °C to 45 °C.	P
A.4.3	High temperature range	The upper charging temperature is 45 °C	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	The lower charging temperature 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		N/A
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range	The cells charged at -5 °C by the methods specified in 8.2 to 8.3.	P
A.4.5	Scope of the application of charging current		P
A.5	Sample preparation		N/A
A.5.1	General		N/A
A.5.2	Insertion procedure for nickel particle to generate internal short		N/A
	The insertion procedure carried out at 20°C±5°C and under -25 °C of dew point		N/A
A.5.3	Disassembly of charged cell		N/A
A.5.4	Shape of nickel particle		N/A
A.5.5	Insertion of nickel particle to cylindrical cell		N/A
A.5.5.1	Insertion of nickel particle to winding core		N/A
A.5.5.2	Mark the position of nickel particle on the both end of winding core of the separator		N/A
A.5.6	Insertion of nickel particle to prismatic cell		N/A

	TABLE: Critical components information				P
Object/part no.	**Manufacturer/ trademark**	**Type/model**	**Technical data**	**Standard**	**Mark(s) of conformity [1)]**
Cell	Xinxiang Sunlight Power Supply Manufacture	See page 6 for details	See page 6 for details	IEC 62133: 2012 EN 62133: 2013	Tested with appliance
- Electrolyte	Xinxiang Huarui Fine Chemical Co., Ltd.	HR5215	Conductivity: 11,0 ±0,5 ms/cm; Density: 1,24 ± 0,03 g/cm^3	--	--
- Separator	Tianjian KYD Technology Development Co., Ltd.	--	20 μm × 60 mm	--	--
- Anode	Xinxiang Sairixin New Energy Technology Co., Ltd.	SR168-3	D10: 9 -11μm; D50: 18 – 21μm; D90: ≤ 36,0 μm	--	--
- Cathode	Xinxiang Tianli Energy Technology Co., Ltd.	TLM510	D10: ≥ 5μm; D50: 9 -12μm; D90: ≤ 20μm	--	--
-PTC	Shanghai keter Polymer Co., Ltd.	18#	4R1max: R1≤0,034Ω; Max. time to trip: ≤20 s @10A	--	--

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.

7.2.1	TABLE: Continuous low rate charge (cells)	N/A
7.2.2	TABLE: Vibration	N/A
7.3.1	TABLE: Incorrect installation (cells)	N/A
7.3.2	TABLE: External short circuit	N/A
7.3.6	TABLE: Crush	N/A
7.3.8	TABLE: Overcharge	N/A
7.3.9	TABLE: Forced discharge (cells)	N/A

8.2.1	TABLE: Continuous charging at constant voltage (cells)			P
Model	**Recommended charging voltage V_c, (Vdc)**	**Recommended charging current I_{rec}, (A)**	**OCV at start of test, (Vdc)**	**Results**
INR18650E 1100mAh (#1)	4,2	1,1	4,195	Pass
INR18650E 1100mAh (#2)	4,2	1,1	4,195	Pass
INR18650E 1100mAh (#3)	4,2	1,1	4,198	Pass
INR18650E 1100mAh (#4)	4,2	1,1	4,193	Pass
INR18650E 1100mAh (#5)	4,2	1,1	4,197	Pass
INR18650E 2400mAh (#51)	4,2	2,4	4,197	Pass
INR18650E 2400mAh (#52)	4,2	2,4	4,195	Pass
INR18650E 2400mAh (#53)	4,2	2,4	4,196	Pass
INR18650E 2400mAh (#54)	4,2	2,4	4,196	Pass
INR18650E 2400mAh (#55)	4,2	2,4	4,196	Pass
Supplementary information: - No fire or explosion - No leakage				

8.3.1	TABLE: External short circuit (cell)				P
Model	**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					
INR18650E 1100mAh (#6)	21,3	4,211	0,070	45,2	Pass
INR18650E 1100mAh (#7)	21,5	4,212	0,070	44,9	Pass
INR18650E 1100mAh (#8)	21,4	4,211	0,070	45,7	Pass
INR18650E 1100mAh (#9)	20,9	4,210	0,070	46,0	Pass
INR18650E 1100mAh (#10)	21,2	4,217	0,070	44,3	Pass
INR18650E 1500mAh (#101)	21,6	4,215	0,070	46,9	Pass
INR18650E 1500mAh (#102)	21,2	4,220	0,070	51,1	Pass
INR18650E 1500mAh (#103)	21,5	4,219	0,070	49,9	Pass
INR18650E 1500mAh (#104)	22,4	4,212	0,070	46,8	Pass
INR18650E 1500mAh (#105)	21,9	4,217	0,070	50,3	Pass
INR18650E 2000mAh (#136)	22,2	4,220	0,070	50,2	Pass
INR18650E 2000mAh (#137)	21,3	4,221	0,070	51,8	Pass
INR18650E 2000mAh (#138)	22,5	4,221	0,070	50,3	Pass
INR18650E 2000mAh (#139)	22,1	4,221	0,070	50,6	Pass
INR18650E 2000mAh (#140)	22,5	4,222	0,070	51,1	Pass

INR18650E 2400mAh (#56)	21,4	4,221	0,070	55,6	Pass
INR18650E 2400mAh (#57)	22,1	4,217	0,070	52,3	Pass
INR18650E 2400mAh (#58)	21,4	4,220	0,070	52,3	Pass
INR18650E 2400mAh (#59)	21,7	4,220	0,070	51,2	Pass
INR18650E 2400mAh (#60)	20,9	4,222	0,070	52,1	Pass
Samples charged at charging temperature lower limit					
INR18650E 1100mAh (#16)	23,4	4,189	0,070	40,6	Pass
INR18650E 1100mAh (#17)	23,6	4,195	0,070	45,4	Pass
INR18650E 1100mAh (#18)	22,6	4,186	0,070	40,8	Pass
INR18650E 1100mAh (#19)	23,0	4,186	0,070	39,7	Pass
INR18650E 1100mAh (#20)	24,1	4,191	0,070	38,8	Pass
INR18650E 1500mAh (#106)	22,2	4,192	0,070	40,5	Pass
INR18650E 1500mAh (#107)	21,8	4,191	0,070	47,4	Pass
INR18650E 1500mAh (#108)	21,5	4,201	0,070	48,5	Pass
INR18650E 1500mAh (#109)	21,5	4,195	0,070	46,3	Pass
INR18650E 1500mAh (#110)	22,4	4,195	0,070	37,2	Pass
INR18650E 2000mAh (#141)	22,6	4,201	0,070	40,3	Pass
INR18650E 2000mAh (#142)	23,0	4,198	0,070	40,8	Pass
INR18650E 2000mAh (#143)	24,1	4,185	0,070	43,1	Pass
INR18650E 2000mAh (#144)	23,8	4,187	0,070	41,2	Pass
INR18650E 2000mAh (#145)	23,9	4,185	0,070	41,2	Pass
INR18650E 2400mAh (#76)	21,9	4,195	0,070	40,3	Pass
INR18650E 2400mAh (#77)	22,3	4,187	0,070	42,2	Pass
INR18650E 2400mAh (#78)	21,9	4,185	0,070	41,7	Pass
INR18650E 2400mAh (#79)	21,8	4,188	0,070	41,2	Pass
INR18650E 2400mAh (#80)	22,1	4,187	0,070	42,3	Pass

Supplementary information:

- No fire or explosion

8.3.2	TABLE: External short circuit (battery)				N/A
Model	**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					
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Samples charged at charging temperature lower limit					
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Supplementary information:

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8.3.5	TABLE: Crush				P
Model	**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					
INR18650E 1100mAh (#26)	4,217	3,065	--	--	Pass
INR18650E 1100mAh (#27)	4,210	2,175	--	--	Pass
INR18650E 1100mAh (#28)	4,211	4,013	--	--	Pass
INR18650E 1100mAh (#29)	4,212	4,127	--	--	Pass
INR18650E 1100mAh (#30)	4,215	3,736	--	--	Pass
INR18650E 1500mAh (#116)	4,211	4,001	--	--	Pass
INR18650E 1500mAh (#117)	4,225	4,117	--	--	Pass
INR18650E 1500mAh (#118)	4,207	3,864	--	--	Pass
INR18650E 1500mAh (#119)	4,214	4,018	--	--	Pass
INR18650E 1500mAh (#120)	4,211	4,173	--	--	Pass
INR18650E 2000mAh (#151)	4,225	3,771	--	--	Pass
INR18650E 2000mAh (#152)	4,217	3,695	--	--	Pass
INR18650E 2000mAh (#153)	4,218	4,018	--	--	Pass
INR18650E 2000mAh (#151)	4,221	4,124	--	--	Pass
INR18650E 2000mAh (#155)	4,226	4,009	--	--	Pass
INR18650E 2400mAh (#66)	4,225	3,872	--	--	Pass
INR18650E 2400mAh (#67)	4,215	3,934	--	--	Pass
INR18650E 2400mAh (#68)	4,211	3,278	--	--	Pass
INR18650E 2400mAh (#69)	4,221	4,071	--	--	Pass
INR18650E 2400mAh (#70)	4,210	3,892	--	--	Pass
Samples charged at charging temperature lower limit					
INR18650E 1100mAh (#31)	4,205	3,765	--	--	Pass
INR18650E 1100mAh (#32)	4,197	4,152	--	--	Pass
INR18650E 1100mAh (#33)	4,195	4,028	--	--	Pass
INR18650E 1100mAh (#34)	4,201	4,137	--	--	Pass
INR18650E 1100mAh (#35)	4,198	4,100	--	--	Pass
INR18650E 1500mAh (#126)	4,185	4,180	--	--	Pass
INR18650E 1500mAh (#127)	4,193	4,137	--	--	Pass
INR18650E 1500mAh (#128)	4,187	4,125	--	--	Pass
INR18650E 1500mAh (#129)	4,195	4,120	--	--	Pass
INR18650E 1500mAh (#130)	4,186	4,121	--	--	Pass

INR18650E 2000mAh (#156)	4,197	4,001	--	--	Pass
INR18650E 2000mAh (#157)	4,201	4,123	--	--	Pass
INR18650E 2000mAh (#158)	4,195	3,857	--	--	Pass
INR18650E 2000mAh (#159)	4,190	4,037	--	--	Pass
INR18650E 2000mAh (#160)	4,192	4,028	--	--	Pass
INR18650E 2400mAh (#81)	4,199	4,007	--	--	Pass
INR18650E 2400mAh (#82)	4,205	4,012	--	--	Pass
INR18650E 2400mAh (#83)	4,201	9,321	--	--	Pass
INR18650E 2400mAh (#84)	4,185	4,028	--	--	Pass
INR18650E 2400mAh (#85)	4,190	3,636	--	--	Pass

Supplementary information:

- No fire or explosion

Remark: - Once the maximum force (13KN±1KN) occurs, the force will be released.

8.3.6	TABLE: Over-charging of battery			N/A
Constant charging current (A).....:	--			—
Supply voltage (Vdc).....:	--			—

Model	OCV before charging, (Vdc)	Resistance of circuit, (Ω)	Maximum outer casing temperature, (°C)	Results
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Supplementary information:

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8.3.7	TABLE: Forced discharge (cells)			P

Model	OCV before application of reverse charge, (Vdc)	Measured Reverse charge I_t, (A)	Time for reversed charge, (minutes)	Results
INR18650E 1100mAh (#36)	3,105	1,1	90	Pass
INR18650E 1100mAh (#37)	3,019	1,1	90	Pass
INR18650E 1100mAh (#38)	3,078	1,1	90	Pass
INR18650E 1100mAh (#39)	3,103	1,1	90	Pass
INR18650E 1100mAh (#40)	3,064	1,1	90	Pass
INR18650E 2400mAh (#86)	3,123	2,4	90	Pass
INR18650E 2400mAh (#87)	3,109	2,4	90	Pass
INR18650E 2400mAh (#88)	3,097	2,4	90	Pass
INR18650E 2400mAh (#89)	3,054	2,4	90	Pass
INR18650E 2400mAh (#90)	3,110	2,4	90	Pass

Supplementary information:

- No fire or explosion

8.3.9	TABLE: Forced internal short circuit (cells)				P
Model	**Chamber ambient, (°C)**	**OCV at start of test, (Vdc)**	**Particle location [1)]**	**Maximum applied pressure, (N)**	**Results**
INR18650E 1100mAh (#41)	10	4,198	1	800	P
INR18650E 1100mAh (#42)	10	4,195	1	800	P
INR18650E 1100mAh (#43)	10	4,195	1	800	P
INR18650E 1100mAh (#44)	10	4,192	1	800	P
INR18650E 1100mAh (#45)	10	4,195	1	800	P
INR18650E 1100mAh (#46)	45	4,195	1	800	P
INR18650E 1100mAh (#47)	45	4,190	1	800	P
INR18650E 1100mAh (#48)	45	4,192	1	800	P
INR18650E 1100mAh (#49)	45	4,193	1	800	P
INR18650E 1100mAh (#50)	45	4,190	1	800	P
INR18650E 2400mAh (#91)	10	4,191	1	800	P
INR18650E 2400mAh (#92)	10	4,191	1	800	P
INR18650E 2400mAh (#93)	10	4,196	1	800	P
INR18650E 2400mAh (#94)	10	4,198	1	800	P
INR18650E 2400mAh (#95)	10	4,192	1	800	P
INR18650E 2400mAh (#96)	45	4,187	1	800	P
INR18650E 2400mAh (#97)	45	4,185	1	800	P
INR18650E 2400mAh (#98)	45	4,192	1	800	P
INR18650E 2400mAh (#99)	45	4,195	1	800	P
INR18650E 2400mAh (#100)	45	4,195	1	800	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

Attachment 1: Photos


1 2 3 4 5 6 7 8 9 10
0.5 mm


1 2 3 4 5 6 7 8 9
0.5 mm

Attachment 2: Information for safety

⚠ 注意/Notice

If liquid leaks onto your skin or clothes, wash well with fresh water immediately.

If liquid leaking from the battery gets into your eyes, do not rub your eyes. Wash them well with clean water and go to see a doctor immediately.

如果电池发生泄露, 电解液接触皮肤或衣物，应立即用清水冲洗干净；

如果电解液进入眼睛, 请不要揉擦, 应立即用清水冲洗眼睛, 并及时送医院治疗。

While using, testing or reserving batteries, if you find the battery become hot , distribute smell , change color, deform or any other abnormality, please stop using or testing immediately, and attempt to isolate and keep away from the battery.

如果电池发出异味、发热、变色、变形或在使用、贮存、充电过程中出现任何异常,
应在有安全防护的条件下，立即将电池从装置或充电器中移至安全的地方并停止用。

Store batteries out of reach of children so that they are not accidentally swallowed.

把电池放到儿童接触不到的地方，避免发生意外。

When the battery is thrown away, be sure it is non-conducting by applying insulating tape to the (+) and (-) terminals.

废弃电池应用绝缘纸包住电极, 以防起火、爆炸。

⚠ 提醒/Caution

Batteries have been examined before shipment. If you find the battery become hot , distribute smell, deform or any other abnormality, please contact with us immediately.

电池出货前已经严格检查，如发现所购电池有变形、发热、异味等现象，请与我司联系；

Keep the batteries at the half-fully charged state in room temperature. During long term storage, batteries should be charged once every half a year to avoid over-discharged.

电池应当在室温下存放，应充到50%左右的电量存放。长时间储存时，建议每半年充电一次，防止电池过放电。

Do not use unqualified charger or equipment. Please referrance to the using recommendation.

充放电时请勿用不合格设备，并遵循正确的使用说明。

Do not use battery with dry cells and other primary batteries, or batteries of a different package, type or brand.

Attachment 3: Product specification.

Specification for cell (INR18650E 1100mAh)

2、Specification/基本特性

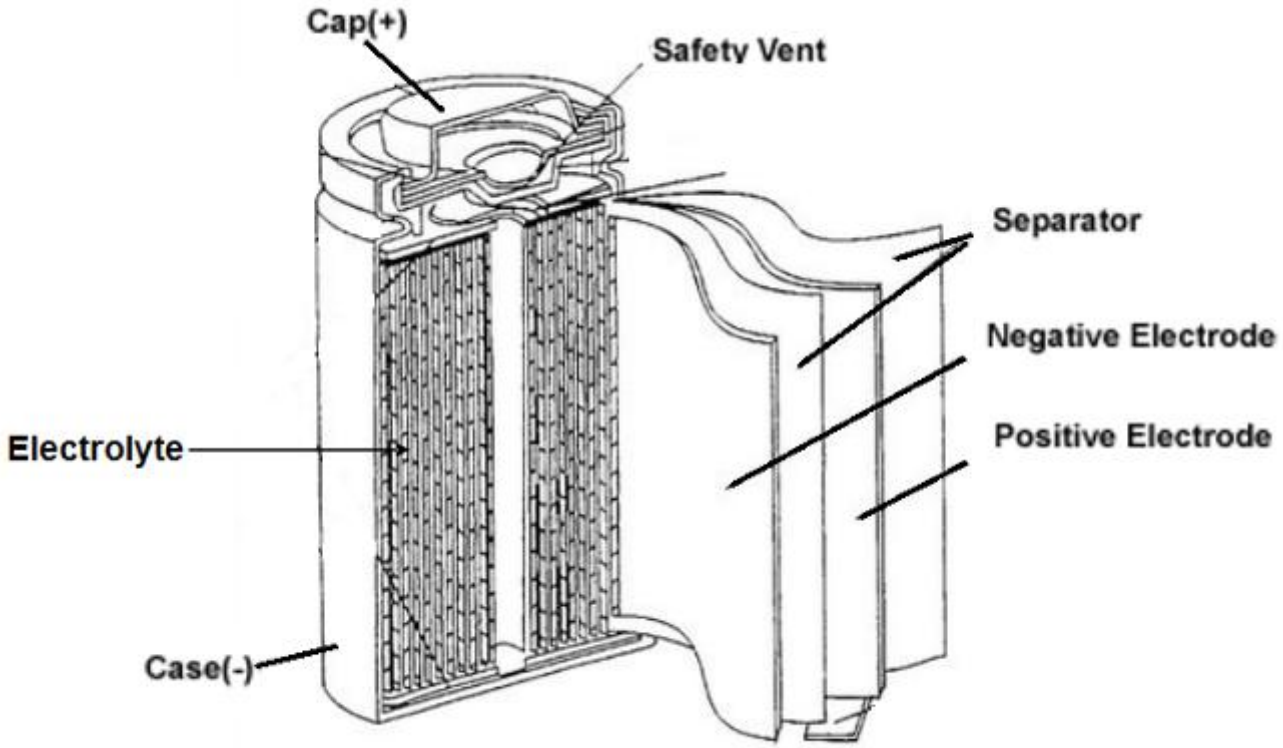
No. 序号	Item 项目	General parameter 常规参数	Remark 备注
1	Can Material 壳体材质	Ni-plate Steel 镀镍钢壳	
2	Nominal capacity 标称容量	1100mAh	0.5C_5A
3	Minimum capacity 最小容量	1080mAh	0.5C_5A
4	Nominal voltage 标称电压	3.7V	
5	Maximum charge voltage充电最高电压	4.20V	
6	Discharge cut-off voltage放电截止电压	2.75V	
7	Maximum continuous charge current 最大持续充电电流	1 C_5A	
8	Maximum continuous discharge current 最大持续放电电流	3C_5A	
9	Internal impedance 内阻	＜60mΩ	Measured at AC1KHz of 50%DOD 半电态下交流1KHz测量
10	Battery weight 电池重量	Approx.40g 约40g	
11	Battery diameter (d) 电池直径	18.1±0.2mm	
12	Battery height (h) 电池高度	65.0±0.5 mm	
13	Standard charge 标准充电	Constant Current 0.5C_5A,Constant Voltage 4.2V,Cut-off Current 0.01C_5A 持续电流0.5C_5A，持续电压4.2V，截止电流0.01C_5A	CC/CV
14	Rapid charge 快速充电	Constant Current 1C_5A,Constant Voltage 4.2V,Cut-off Current 0.01C_5A 持续电流1C_5A，持续电压4.2V，截	CC/CV
		止电流0.01 C_5A	
15	Standard discharge 标准放电	Constant Current 0.5C_5A, Cut-off Voltage 2.75V 持续电流0.5C_5A，截止电压2.75V	CC
16	Operation temperature 工作温度	Charge/充电：0℃～45℃ Discharge/放电：-20℃～55℃	At 60±25%RH
17	Storage temperature 储存温度	Less than 3 months：-20～45℃ Less than 1 year：-20～25℃ 小于3个月：-20～45℃ 小于1年：-20～25℃	At 60±25%RH
18	Protect Performance 保护功能	Contain PTC heat-fuse 内置PTC热保险丝	

Specification for cell (INR18650E 2400mAh)

2、Specification/基本特性

No. 序号	Item 项目	General parameter 常规参数	Remark 备注
1	Can Material 壳体材质	Ni-plate Steel 镀镍钢壳	
2	Nominal capacity 标称容量	2400mAh	0.5C_5A
3	Minimum capacity 最小容量	2380mAh	0.5C_5A
4	Nominal voltage 标称电压	3.6V	
5	Maximum charge voltage充电最高电压	4.20V	
6	Discharge cut-off voltage放电截止电压	2.75V	
7	Maximum continuous charge current 最大持续充电电流	1 C_5A	
8	Maximum continuous discharge current 最大持续放电电流	3C_5A	
9	Internal impedance 内阻	＜60mΩ	Measured at AC1KHz of 50%DOD 半电态下交流1KHz测量
10	Battery weight 电池重量	Approx.46g 约46g	
11	Battery diameter (d) 电池直径	18.1±0.2mm	
12	Battery height (h) 电池高度	65.0±0.5 mm	
13	Standard charge 标准充电	Constant Current 0.5C_5A,Constant Voltage 4.2V,Cut-off Current 0.01C_5A 持续电流0.5C_5A，持续电压4.2V，截止电流0.01C_5A	CC/CV
14	Rapid charge 快速充电	Constant Current 1C_5A,Constant Voltage 4.2V,Cut-off Current 0.01C_5A 持续电流1C_5A，持续电压4.2V，截止电流0.01 C_5A	CC/CV
15	Standard discharge 标准放电	Constant Current 0.5C_5A, Cut-off Voltage 2.75V 持续电流0.5C_5A，截止电压2.75V	CC
16	Operation temperature 工作温度	Charge/充电：0℃～45℃ Discharge/放电：-20℃～55℃	At 60±25%RH
17	Storage temperature 储存温度	Less than 3 months：-20～45℃ Less than 1 year：-20～25℃ 小于3个月：-20～45℃ 小于1年：-20～25℃	At 60±25%RH
18	Protect Performance 保护功能	Contain PTC heat-fuse 内置PTC热保险丝	

Construction for all models



---End report ---