Ref. Certif. No.

SG PSB-BT-00400

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE)METHODE OC

CB TEST CERTIFICATE
CERTIFICAT D'ESSAI OC

Product	Batteries (Cylindrical Li-ion Cell)
Name and address of the applicant	DLG POWER BATTERY (SHANGHAI) CO., LTD. No. 3492, Jinqian Road, Fengxian District 201406 Shanghai, PEOPLE'S REPUBLIC OF CHINA
Name and address of the manufacturer	DLG Power Battery (Ningbo Fenghua) Co., Ltd. No.3, Xinghai Road, Binhai New Area, Fenghua District, 315500 Ningbo, PEOPLE'S REPUBLIC OF CHINA
Name and address of the factory	DLG Power Battery (Ningbo Fenghua) Co., Ltd. No.3, Xinghai Road, Binhai New Area, Fenghua District, 315500 Ningbo, PEOPLE'S REPUBLIC OF CHINA For further information please see attachment
Ratings and principal characteristics	Nominal voltage: 3.6Vd.c. Rated capacity: 3200mAh
Model/type Ref.	INR18650-320
Additional information (if necessary)	--
A sample of the product was tested and found to be in conformity with	IEC 62133:2012
as shown in the Test Report Ref. No. which forms part of this certificate	TÜV SÜD PSB Pte Ltd 211-2817320-000

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme **National de Certification**

Date, 2017-08-04
CBS 17 07 89274 003

(Kenneth Lau)

TÜV SÜD PSB Pte Ltd · 1 Science Park Drive · Singapore 118221

PSB Singapore

	Test Report issued under the responsibility of: **NCB TÜV SÜD PSB Pte Ltd** **1 Science Park Drive,** **Singapore 118221**	

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. .....:	211-2817320-000
Date of issue .....:	2017-07-31
Total number of pages.....	25 pages
Applicant's name.....:	DLG POWER BATTERY (SHANGHAI) CO., LTD.
Address .....:	No. 3492, Jinqian Road, Fengxian District, 201406 Shanghai, PEOPLE'S REPUBLIC OF 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

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

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 .....:	Cylindrical Li-ion Cell
Trade Mark .....:	N/A
Manufacturer.....:	DLG Power Battery (Ningbo Fenghua) Co., Ltd. No.3, Xinghai Road, Binhai New Area, Fenghua District, 315500 Ningbo, PEOPLE'S REPUBLIC OF CHINA
Model/Type reference .....:	INR18650-320
Ratings .....:	3.6Vd.c., 3200mAh

Testing procedure and testing location:			
☒	**CB Testing Laboratory:**	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch	
Testing location/ address .....:		No.11, Jukeng Rd., Juling Village, Jutang District, Guanlan, Longhua New District, 518110 Shenzhen, CHINA	
☐	**Associated CB Testing Laboratory:**		
Testing location/ address .....:			
Tested by (name + signature) .....:		Panda Xiong	Panda
Approved by (name + signature) .....:		Ryan Jin	Ryan
☐	**Testing procedure: TMP**		
Testing location/ address .....:			
Tested by (name + signature) .....:			
Approved by (name + signature) .....:			
☐	**Testing procedure: WMT**		
Testing location/ address .....:			
Tested by (name + signature) .....:			
Witnessed by (name + signature) ....:			
Approved by (name + signature) .....:			
☐	**Testing procedure: SMT**		
Testing location/ address .....:			
Tested by (name + signature) .....:			
Approved by (name + signature) .....:			
Supervised by (name + signature) ..:			

List of Attachments (including a total number of pages in each attachment):
Attachment No.1: 2 pages of Photo Documentation

Summary of testing:

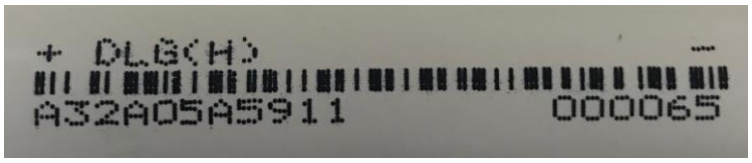
Tests performed (name of test and test clause):	**Testing location:**
Tests are made with the number of samples specified in Table 2 of IEC 62133: 2012 (Second Edition). cl. 8.2.1 Continuous charging at constant voltage (cell) cl. 8.3.1 External short circuit (cell) cl. 8.3.3 Free fall cl. 8.3.4 Thermal abuse (cells) cl. 8.3.5 Crush (cells) cl. 8.3.7 Forced discharge (cells) cl. 8.3.9 Forced internal short circuit (cells) The samples comply with the requirement of IEC 62133: 2012 (Second Edition).	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Address: No.11, Jukeng Rd., Juling Village, Jutang District, Guanlan, Longhua New District, 518110 Shenzhen, CHINA

Summary of compliance with National Differences：

Remark: EN Group differences are considered. National differences are not considered.

List of countries addressed: N/A

Copy of marking plate



Remark:
By agreement between the manufacturer and user, the cell used in the manufacturer of a battery need not be marked.

Test item particulars.....:	
Classification of installation and use.....:	Build-in and use in portable applications
Supply connection.....:	Supply by positive and negative contact area
Recommend charging method declared by the manufacturer ..... :	Charge at constant current 1600mA until voltage reaches 4.2V, then charge at constant voltage 4.2V till charge current is 32mA.
Discharge current (0,2 I_t A) ..... :	640mA
Specified final voltage ..... :	2.5V
Chemistry ..... :	☐ nickel systems ..... ☒ lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell.....:	4.2V
Maximum charging current.....:	3200mA
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
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2017-07-03
Date (s) of performance of tests.....:	2017-07-04 to 2017-07-14

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.

The samples also comply with the requirement of EN 62133:2013. There is no difference between IEC 62133:2012 and EN 62133:2013.

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)	1. DLG Power Battery (Ningbo Fenghua) Co., Ltd. No.3, Xinghai Road, Binhai New Area, Fenghua District, 315500 Ningbo, PEOPLE'S REPUBLIC OF CHINA 2. DLG (Zhangjiagang) Power Battery Co., Ltd. Jinfeng Science&Technology Park, Jinnan Road, Jinfeng Town, 215624 Zhangjiagang City, Jiangsu Province, PEOPLE'S REPUBLIC OF CHINA

General product information:

The cell, model: INR18650-320 is used for portable applications. Additionally, details information of the cell, as following:

Product name	Cylindrical Li-ion Cell
Model	INR18650-320
Nominal voltage	3.6Vd.c.
Rated capacity	3200mAh
Recommended maximum charging voltage by manufacturer	4.2V
Upper limited charging voltage	4.2V
Charging current declared by manufacturer	1600mA
Maximum charging current	3200mA
Charging temp. upper limit	45°C
Charging temp. lower limit	0°C
First charging procedure at 20°C ± 5°C	Charge at constant current 1600mA until voltage reaches 4.2V, then charge at constant voltage 4.2V till charge current reduced to 0.01 *I*t A (32mA).
Second charging procedure at -5°C or 45°C	Store at -5°C or 45°C for 1 to 4 hours, then charge at constant current 3200mA until voltage reaches 4.2V, then charge at constant voltage 4.2V till charge current reduced to 0.05 *I*t A (160mA).
Final voltage	2.5V
Dimensions	Φ×H：Max.(18.30±0.20)mmx(64.90±0.25)mm
Weight	Approx. 47g

The final evaluation of the cell must be conducted in the end product for which the cell will be used.

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		P
	The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ	No externally exposed metal surfaces	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		P
5.3	Venting		P
	Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition		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		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 samples are not more than 6 months old.	P
	Unless noted otherwise in the test methods, testing was 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		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) .....:		—

IEC 62133			
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)..... :		—

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Results: No fire. No explosion. No leakage.		N/A
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		P
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1) ..... :		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) ..... :		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)		N/A
	Oven temperature (°C) ..... :	70°C ± 2°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

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	- The case temperature declined by 20% of the maximum temperature rise		P
	Results: No fire. No explosion..... :	(See Table 8.3.1)	P
8.3.2	External short circuit (battery)		N/A
	The 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
	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..... :	(See Table 8.3.2)	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) ..... :	Measured: Max. 45.239g	—
	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		N/A
	- 10% of deformation has occurred compared to the initial dimension		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..... :	(See Table 8.3.6)	N/A

IEC 62133			
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		P
	Manufacturer's documentation provided to show compliance with UN Recommendations on Transport of Dangerous Goods	UN38.3 test report provided	P
8.3.9	Design evaluation – Forced internal short circuit (cells)		P
	The cells complied with national requirement for .....:		—
	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	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.		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		N/A
	As appropriate, information relating to hazard avoidance resulting from a system analysis is provided to the end user ..... :		N/A
10	**Marking**		N/A
10.1	Cell marking		N/A
	Cells marked as specified in the applicable cell standards: IEC 61951-1, IEC 61951-2 or IEC 61960.	By agreement between the manufacturer and user, the cell used in the manufacturer of a battery need not be marked	N/A
10.2	Battery marking		N/A
	Batteries marked in accordance with the requirements for the cells from which they are assembled.		N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Batteries marked with an appropriate caution statement.		N/A
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.		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		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		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		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
A.4.3.4	Safety consideration when specifying new upper limit in high temperature range		N/A
A.4.4	Low temperature range		N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
A.4.4.1	General		N/A
A.4.4.2	Explanation of safety viewpoint		N/A
A.4.4.3	Safety considerations, when specifying charging conditions in low temperature range		N/A
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range		N/A
A.4.5	Scope of the application of charging current		P
A.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		N/A

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)**
1.Electrolyte	-	-	$LiPF_6$, DMC, EC, etc.	-	-
2.Separator	-	-	Coating separator based on PE	-	-
3.Positive electrode	-	-	$Li(NiCoMn)O_2$, etc.	-	-
4.Negative electrode	-	-	Si and C composite material, etc.	-	-
5.Positive electrode tab	-	-	Aluminum belt, T×W: 0.1mm×3.5mm	-	-
6.Negative electrode tab	-	-	Nickel belt, T×W: 0.1mm×4.0mm	-	-
7.Can	-	-	Steel, 18.2mm(Φ)×68.65mm(H)	-	-
8.CID	-	-	Vent pressure: (1.0 to 1.4)Mpa	-	-

Supplementary information: N/A

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

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
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

7.2.2	TABLE: Vibration	N/A

Model	OCV at start of test, (Vdc)	Results

Supplementary information:

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.1	TABLE: Incorrect installation (cells)		N/A
Model		**OCV of reversed cell, (Vdc)**	**Results**

Supplementary information:

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

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
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

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
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

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
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

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
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

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**
INR18650-320	4.2	1.6	4.173	A, B
INR18650-320	4.2	1.6	4.178	A, B
INR18650-320	4.2	1.6	4.178	A, B
INR18650-320	4.2	1.6	4.172	A, B
INR18650-320	4.2	1.6	4.175	A, B

Supplementary information:

A - No fire or explosion
B - No leakage
C - Leakage
D - Fire
E - Explosion
F - Bulge
G - Others (please explain)

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

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, (K)**	**Results**	
Samples charged at charging temperature upper limit						
INR18650-320	23.7	4.165	0.074	106.8	A	
INR18650-320	23.7	4.171	0.076	103.9	A	
INR18650-320	23.7	4.160	0.074	103.4	A	
INR18650-320	23.7	4.165	0.087	101.9	A	
INR18650-320	23.7	4.166	0.083	106.1	A	
Samples charged at charging temperature lower limit						
INR18650-320	22.4	4.149	0.088	85.3	A	
INR18650-320	22.4	4.149	0.081	105.7	A	
INR18650-320	22.4	4.147	0.075	111.3	A	
INR18650-320	22.4	4.142	0.080	108.2	A	
INR18650-320	22.4	4.142	0.085	103.9	A	

Supplementary information:

A - No fire or explosion
B - No leakage
C - Leakage
D - Fire
E - Explosion
F - Bulge
G - Others (please explain)

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

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, (K)	Results
Samples charged at charging temperature upper limit					
Samples charged at charging temperature lower limit					

Supplementary information:

A - No fire or explosion
B - No leakage
C - Leakage
D - Fire
E - Explosion
F - Bulge
G - Others (please explain)

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

8.3.5	TABLE: Crush(cells)				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					
INR18650-320	4.165	4.160	-	-	A
INR18650-320	4.166	4.161	-	-	A
INR18650-320	4.162	4.159	-	-	A
INR18650-320	4.162	4.159	-	-	A
INR18650-320	4.170	4.167	-	-	A
Samples charged at charging temperature lower limit					
INR18650-320	4.147	4.123	-	-	A
INR18650-320	4.148	4.123	-	-	A
INR18650-320	4.146	4.122	-	-	A
INR18650-320	4.146	4.122	-	-	A
INR18650-320	4.144	4.120	-	-	A

Supplementary information:

A - No fire or explosion
B - No leakage
C - Leakage
D - Fire
E - Explosion
F - Bulge
G - Others (please explain)

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

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

Supplementary information:

A - No fire or explosion
B - No leakage
C - Leakage
D - Fire
E - Explosion
F - Bulge
G - Others (please explain)

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**	
INR18650-320	2.703	3.2	90.0	A	
INR18650-320	2.689	3.2	90.0	A	
INR18650-320	2.690	3.2	90.0	A	
INR18650-320	2.683	3.2	90.0	A	
INR18650-320	2.694	3.2	90.0	A	

Supplementary information:

A - No fire or explosion
B - No leakage
C - Leakage
D - Fire
E - Explosion
F - Bulge
G - Others (please explain)

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

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
INR18650-320	45.0	4.162	1	800.0	A
INR18650-320	45.0	4.163	1	800.0	A
INR18650-320	45.0	4.160	1	800.0	A
INR18650-320	45.0	4.163	2	800.0	A
INR18650-320	45.0	4.162	2	800.0	A
INR18650-320	-5.0	4.109	1	800.0	A
INR18650-320	-5.0	4.105	1	800.0	A
INR18650-320	-5.0	4.104	1	800.0	A
INR18650-320	-5.0	4.104	2	800.0	A
INR18650-320	-5.0	4.106	2	800.0	A

Supplementary information:

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

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

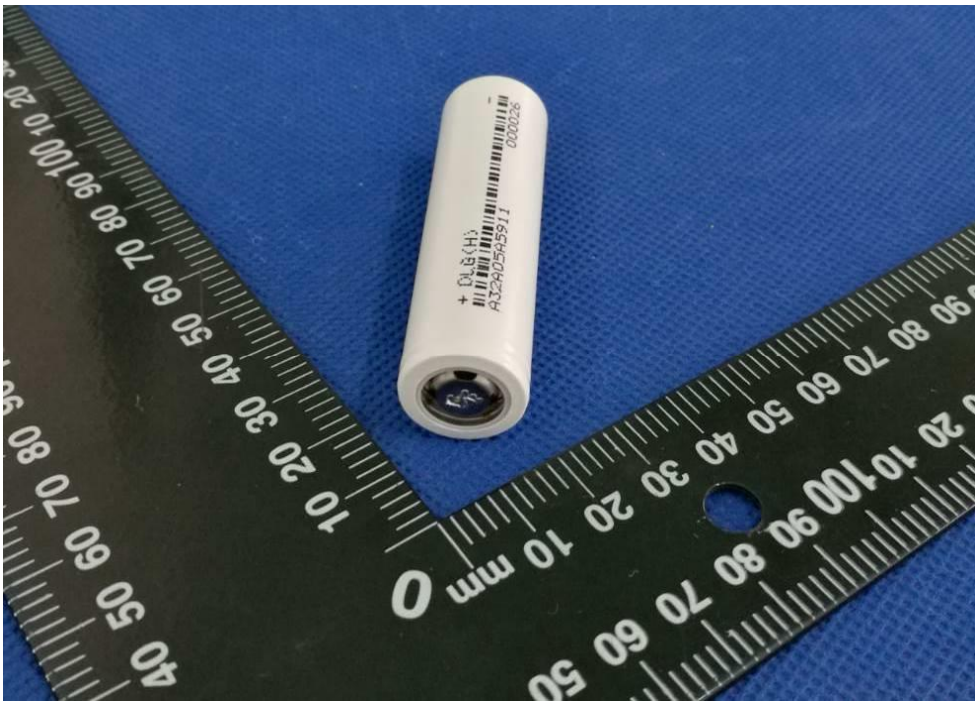
2: Nickel particle inserted between positive aluminium foil and negative active material coated area.

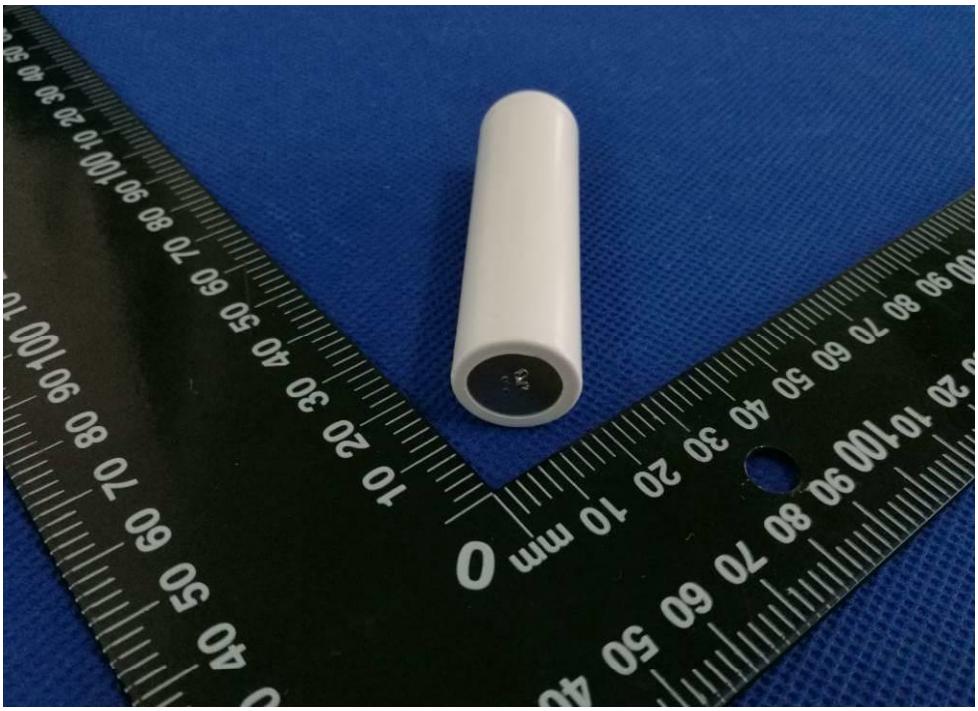
A - No fire or explosion
B - No leakage
C - Leakage
D - Fire
E - Explosion
F - Bulge
G - Others (please explain)

--End of Test Report--

Attachment No. 1
Photo Documentation

Report No.: 211-2817320-000

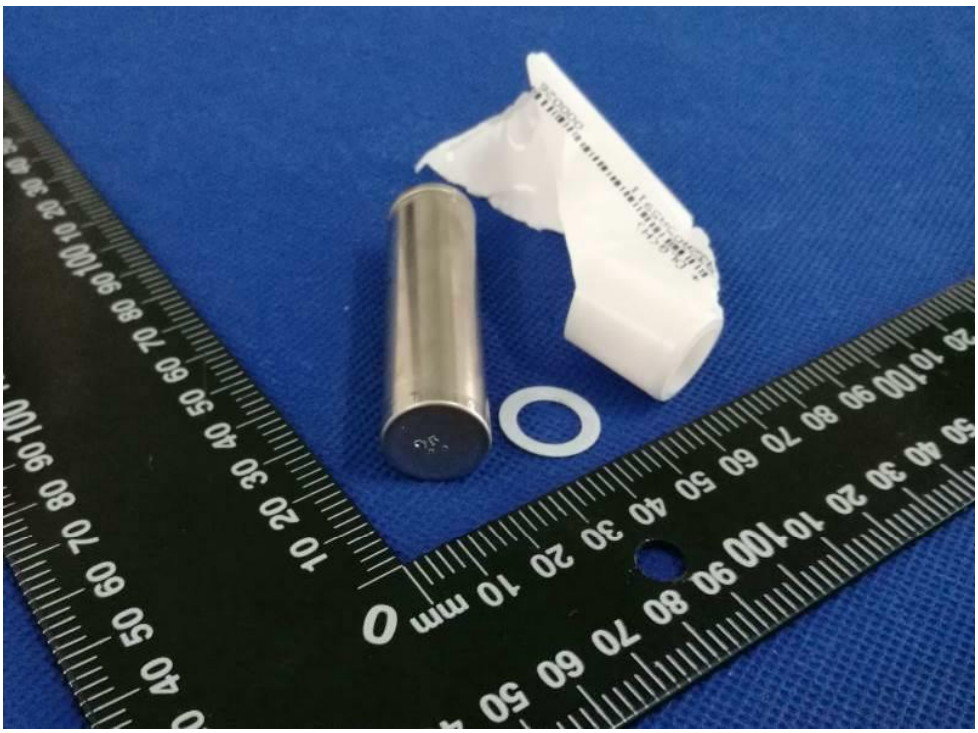
Details of:	Picture 1: View 1 of the cell, model: INR18650-320
	 Remark: By agreement between the manufacturer and user, the cell used in the manufacturer of a battery need not be marked.

Details of:	Picture 2: View 2 of the cell, model: INR18650-320
	

Attachment No. 1
Photo Documentation

Report No.: 211-2817320-000

Details of:	Picture 3: Top view of the cell without insulation film
	

Details of:	Picture 4: Bottom view of the cell without insulation film
	

--The End--