IEC IECEE CB SCHEME

Ref. Certif. No.

JPTUV-098728

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 Produit	Rechargeable lithium ion cell
Name and address of the applicant Nom et adresse du demandeur	JIANGXI GANFENG BATTERY TECHNOLOGY CO., LTD. No.2551, Sunshine Avenue, High-tech Development Zone, Xinyu, City, Jiangxi Province 338000, P. R. China
Name and address of the manufacturer Nom et adresse du fabricant	JIANGXI GANFENG BATTERY TECHNOLOGY CO., LTD. No.2551, Sunshine Avenue, High-tech Development Zone, Xinyu, City, Jiangxi Province 338000, P. R. China
Name and address of the factory Nom et adresse de l'usine	JIANGXI GANFENG BATTERY TECHNOLOGY CO., LTD. No.2551, Sunshine Avenue, High-tech Development Zone, Xinyu, City, Jiangxi Province 338000, P. R. China
Ratings and principal characteristics Valeurs nominales et charactéristiques principales	3.2V, 100Ah, 320Wh
Trademark (if any) Marque de fabrique (si elle existe)	see test report
Type of Manufacturer's Testing Laboratories used Type de programme du laboratoire d'essais constructeur	N/A
Model / Type Ref. Ref. de type	48173125-100Ah
Additional information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaire, peuvent être indiqués sur la 2ème page)	
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 62619:2017 See Test Report for National Differences
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat	50253438 001

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

TÜVRheinland®

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Date: 22.07.2019

Signature: Dipl.-Ing. Univ. S. O. Steinke

10/061 CB 05.12

TÜV Rheinland (China) Ltd.
Member of TÜV Rheinland Group

TÜVRheinland®
Precisely Right.

JIANGXI GANFENG BATTERY TECHNOLOGY CO., LTD.

Date : 22.07.2019
Our ref. : lujac SZ
Your ref.: 168115902

No.2551, Sunshine Avenue,
High-tech Development Zone, Xinyu City, Jiangxi Province 338000
P. R. China

Ref : CB Certificate Japan

Type of Equipment : Rechargeable lithium ion cell
Model Designation : See Certificate
Certificate No. : JPTUV-098728
Report No. : 50253438 001

Dear Ladies and Gentlemen,

Thank you very much for your interest in our services.

Please find enclosed your certification documents.

We appreciate your support and would like to offer our assistance in the approval of your future products through our extensive range of technical services.

Please feel free to contact us whatever your requirements may be.

With kind regards,

Certification Body

Dipl.-Ing. Univ. S. O. Steinke

Enclosure

TÜV Rheinland (China) Ltd.
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Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 62619
Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications

Report Number. ..... :	50253438 001
Date of issue ..... :	2019-07-22
Total number of pages ..... :	18 pages
Name of Testing Laboratory preparing the Report ..... :	TÜV Rheinland (Shenzhen) Co., Ltd.
Applicant's name ..... :	JIANGXI GANFENG BATTERY TECHNOLOGY CO., LTD.
Address ..... :	No.2551, Sunshine Avenue, High-tech Development Zone, Xinyu City, Jiangxi Province 338000, P. R. China
Test specification:	
Standard ..... :	IEC 62619: 2017
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC62619A
Test Report Form(s) Originator .... :	UL(Demko)
Master TRF ..... :	Dated 2018-06-07

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.

General disclaimer:

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 CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description ..... :	Rechargeable lithium ion cell
Trade Mark ..... :	鹏辉电池
Manufacturer ..... :	Same as applicant
Model/Type reference ..... :	48173125-100Ah
Ratings ..... :	3.2V, 100Ah, 320Wh

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	**TÜV Rheinland (Shenzhen) Co., Ltd.**	
Testing location/ address ..... :		East of F/1, F/2~F/4, Building 1, Cybio Technology Building No. 6 Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA	
Tested by (name, function, signature) ..... :		Jacob Lu	Jacob Lu
Approved by (name, function, signature) ... :		Daniel Dai	Daniel Dai
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature) ... :			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature) ..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) ... :			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) ... :			
Supervised by (name, function, signature) :			

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

Attachment 1: Photo documentation (2 pages)

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
cl.7.2.1 External short circuit test (cell); cl.7.2.2 Impact test (cell); cl.7.2.3.2 Whole drop test (cell); cl.7.2.3.3 Edge and corner drop test (battery system); cl.7.2.4 Thermal abuse (cell); cl.7.2.5 Overcharging (cell); cl.7.2.6 Forced discharge (cell); cl.7.3.2 Internal short-circuit test (cell); The samples comply with the requirement of IEC 62619: 2017.	**TÜV Rheinland (Shenzhen) Co., Ltd.** East of F/1, F/2~F/4, Building 1, Cybio Technology Building No. 6 Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA

Summary of compliance with National Differences (List of countries addressed):

N/A

☒**The product fulfils the requirement of EN 62619:2017**

Copy of marking plate

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

\+ -

Rechargeable lithium ion cell

48173125-100Ah

3.2V, 100Ah, 320Wh

IFpP/49/175/133/M/-10+30/95

赣锋电池

5.6.11.1 对于量产的动力和储能单体蓄电池，按照国标规定编码规则如下：

0AL X4 X5 X6X7X8 X9X10X11X12X13 X14 YMD X18X19X20X21X22X23X24

0AL:产商代码（江西赣锋电池科技有限公司）

X4：产品类型（代码见 5.4.2.3，单体蓄电池 C）

X5：电池类型（代码见 5.4.2.4， LFP 电池为 B）

X6X7X8：电池规格段，江西赣锋电池公司使用 QCP 文件编号： 如 A02/A04/A08/A10/A11 代表 86Ah 电芯，A09 代表 100Ah 电芯

X9X10X11X12X13：企业自行定义的追溯信息段，X9 为拉线代号，X10X11X12X13 为预留追溯信息，

江西赣锋电池公司目前决定使用 10000 替代， 从 48 型号电芯拉线开始编号 1,2,3 ……，拉线编码分别为 10000,2000,3000……)

X14：生产厂址，江西赣锋电池公司新余(阳光大道 2551 号)工厂使用 D 代替

Y: 年份（代码见 5.4.2.8 年份代码）

M: 月份（代码见 5.4.2.8 月份代码）

D: 当天日期（代码见 5.4.2.8 日期代码）

X18X19X20X21X22X23X24：电芯序列号段（流水号）

Test item particulars.....:	
Classification of installation and use.....:	To be defined in final product
Supply Connection.....:	Not directly connected to mains
.....:	
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 .....:	2019-06-12
Date (s) of performance of tests.....:	2019-06-12 to 2019-07-02

General remarks:

"(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 and other remarks:

The main features of the cell are shown as below:

Product name	Rechargeable lithium ion cell
Model	48173125-100Ah
Capacity	100Ah
Nominal voltage	3.2V
Nominal charge current	50A
Maximum continuous charge current	100A
Nominal discharge current	50A
Maximum continuous discharge current	100A
Maximum Charge Voltage	3.65V
Upper charge temperature	55°C
Lower charge temperature	0°C
Upper discharge temperature	55°C
Lower discharge temperature	-20°C
Storage temperature range	-20°C ~ +55°C
Recommend charging method declared by the manufacturer	At constant current 50A till cell voltage reaches 3.65V, then switch to constant voltage 3.65V till charge current drops to 5.0±0.5A
Charging procedure for internal short-circuit test	At constant current 100A till cell voltage reaches 3.65V, then switch to constant voltage 3.65V till charge current drops to 5A
Recommend discharging method declared by the manufacturer	Discharging the cell with 50A constant current to discharge cut-off voltage 2.5V
Nominal mass (g)	≤2.25Kg
External dimensions (mm)	173.9mm × 132.2m × 48.0mm

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
4	**PARAMETER MEASUREMENT TOLERANCES**		**P**
	Parameter measurement tolerances		P
5	**GENERAL SAFETY CONSIDERATIONS**		**P**
5.1	**General**		**P**
	Cells and batteries are safe under conditions of both intended use and reasonably foreseeable misuse.. :	See also table 5.1 for Critical components information	P
5.2	**Insulation and wiring**		**N/A**
	Voltage, current, altitude, and humidity requirements		N/A
	Adequate clearances and creepage distances between connectors		N/A
	The mechanical integrity of internal connections		N/A
5.3	**Venting**		**P**
	Pressure relief function	Vent design in cell.	P
	Encapsulation used to support cells within an outer casing		N/A
5.4	**Temperature/voltage/current management**		**N/A**
	The design prevents abnormal temperature-rise	Cell only	N/A
	Voltage, current, and temperature limits of the cells		N/A
	Specifications and charging instructions for equipment manufacturers		N/A
5.5	**Terminal contacts of the battery pack and/or battery system**		**N/A**
	Polarity marking(s)	Cell only	N/A
	Capability to carry the maximum anticipated current		N/A
	External terminal contact surfaces		N/A
	Terminal contacts are arranged to minimize the risk of short circuits		N/A
5.6	**Assembly of cells, modules, or battery packs into battery systems**		**N/A**
5.6.1	General	Cell only	N/A
	Independent control and protection method(s)		N/A
	Recommendations of cell operating limits by the cell manufacturer		N/A
	Batteries designed for the selective discharge of a portion of their series connected cells		N/A
	Protective circuit component(s) and consideration to the end-device application		N/A
5.6.2	Battery system design	Cell only	N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	The voltage control function		N/A
	The voltage control for series-connected batteries		N/A
5.7	**Operating region of lithium cells and battery systems for safe use**		**P**
	The cell operating region..... :		P
	Designation of battery system to comply with the cell operating region	Information mentioned in manufacturer's specifications.	P
5.8	**Quality plan**		**P**
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... :	Reference: IATF 16949: 2016 certificate provided.	P
	The process capabilities and the process controls		P
6	**TYPE TEST CONDITIONS**		**P**
6.1	**General**		**P**
6.2	**Test items**		**P**
	Cells or batteries that are not more than six months old (See Table 1 of IEC62619)		P
	Capacity confirmation of the cells or batteries		P
	Default ambient temperature of test, 25 °C ± 5 °C	Tests were carried out in an ambient temperature of 25±5°C.	P
7	**SPECIFIC REQUIREMENTS AND TESTS**		**P**
7.1	**Charging procedure for test purposes**		**P**
	The battery discharged to a specified final voltage prior to charging		P
	The cells or batteries charged using the method specified by the manufacturer..... :	The method mentioned in manufacturer's specifications.	P
7.2	**Reasonably foreseeable misuse**		**P**
7.2.1	External short-circuit test (cell or cell block)		P
	Short circuit with total resistance of 30 mΩ ± 10 mΩ at 25 °C ± 5 °C	Tested complied.	P
	Results: no fire, no explosion	See Table 7.2.1.	P
7.2.2	Impact test (cell or cell block)		P
	Cylindrical cell, longitudinal axis impact		N/A
	Prismatic cell, longitudinal axis and lateral axis impact	Prismatic cell	P
	Results: no fire, no explosion.		P
7.2.3	Drop test (cell or cell block, and battery system)		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
7.2.3.1	General		P
7.2.3.2	Whole drop test (cell or cell block, and battery system)		P
	Description of the Test Unit..... :	LiFePO4 Cell	—
	Mass of the test unit (kg)..... :	≤2.25kg	—
	Height of drop (m)..... :	1.0m	—
	Results: no fire, no explosion		P
7.2.3.3	Edge and corner drop test (cell or cell block, and battery system)	The mass of cell is less than 20 kg	N/A
	Description of the Test Unit..... :		—
	Mass of the test unit (kg)..... :		—
	Height of drop (m)..... :		—
	Results: no fire, no explosion		N/A
7.2.4	Thermal abuse test (cell or cell block)		P
	Results: no fire, no explosion		P
7.2.5	Overcharge test (cell or cell block)		P
	For those battery systems that are provided with only a single protection for the charging voltage control		—
	Results: no fire, no explosion..... :	See Table 7.2.5.	P
7.2.6	Forced discharge test (cell or cell block)		P
	Upper limit charge voltage of the cell..... :	3.65V	P
	Cells connected in series in the battery system ..... :		N/A
	Redundant or single protection for discharge voltage control provided in battery system ..... :		N/A
	Target Voltage ..... :	-3.65V applied.	P
	Maximum discharge current of the cell, I_m..... :	1I_t A	P
	Discharge current for forced discharge, 1.0 It ..... :	1I_t A	P
	Discharging time, t = (1 It / I_m) x 90 (min.) ..... :	90min	P
	Results: no fire, no explosion..... :	See Table 7.2.6.	P
7.3	**Considerations for internal short-circuit – Design evaluation**		**P**
7.3.1	General		P
7.3.2	Internal short-circuit test (cell)		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Samples preparation procedure: a), in accordance with 8.3.9 of IEC62133:2012; or b), the nickel particle inserted before charging, or c), the nickel particle was inserted before electrolyte filling ..... :	a)	P
	Tested according to Cl. 8.3.9 of IEC 62133:2012 test method, except all tests were carried out in an ambient temperature of 25 °C ± 5 °C.		P
	The appearance of the short-circuit location recorded by photograph or other means ..... :	See Attachment 1: Photo documentation	—
	The pressing was stopped - When a voltage drop of 50 mV was detected; or		N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) was reached	400N	P
	Results: no fire, no explosion ..... :	See Table 7.3.2.	P
7.3.3	**Propagation test (battery system)**	7.3.2 was selected.	N/A
	Method to create a thermal runaway in one cell ... :	See Annex B	N/A
	Results: No external fire from the battery system or no battery case rupture ..... :	See results in Table 7.3.3	N/A
8	**BATTERY SYSTEM SAFETY (CONSIDERING FUNCTIONAL SAFETY)**		**N/A**
8.1	**General requirements**	**Cell only**	**N/A**
	Functional safety analysis for critical controls		N/A
	Conduct of a process hazard, risk assessment and mitigation of the battery system		N/A
8.2	**Battery management system (or battery management unit)**		N/A
8.2.1	Requirements for the BMS		N/A
	The safety integrity level (SIL) target of the BMS		N/A
	The charge control evaluated by tests in clauses 8.2.2 to 8.2.4		N/A
8.2.2	Overcharge control of voltage (battery system)		N/A
	The exceeded charging voltage applied to the whole battery system		N/A
	The exceeded charging voltage applied to only a part of the battery system, such as the cell(s) ..... :		N/A
	Results: no fire, no explosion ..... :	See Table 8.2.2.	N/A
	The BMS interrupted the overcharging before reaching 110% of the upper limit charging voltage		N/A
8.2.3	Overcharge control of current (battery system)		N/A
	Results: no fire, no explosion ..... :	See Table 8.2.3	N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	The BMS detected the overcharging current and controlled the charging to a level below the maximum charging current		N/A
8.2.4	Overheating control (battery system)		N/A
	The cooling system, if provided, was disconnected		N/A
	Elevated temperature for charging, 5 °C above maximum operating temperature ..... :		N/A
	Results: no fire, no explosion ..... :	See Table 9.2.5	N/A
	The BMS detected the overheat temperature and terminated charging		N/A
	The battery system operated as designed during test		N/A

9	**INFORMATION FOR SAFETY**		**P**
	The cell manufacturer provides information about current, voltage and temperature limits of their products		P
	The battery system manufacturer provides information regarding how to mitigate hazards to equipment manufacturers or end-users.		N/A

10	**MARKING AND DESIGNATION (REFER TO CLAUSE 5 OF IEC 62620)**		**P**
	The marking items shown in Table 1 in IEC 62620 indicated on the cell, battery system or instruction manual.	See page 4	P
	Cell or battery system has clear and durable markings		P
	Cell designation	IFpP/49/175/133/M/-10+30/95	P
	Battery designation		N/A
	Battery structure formulation		N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX A	**OPERATING REGION OF CELLS FOR SAFE USE**		**P**
A.1	General		P
A.2	Charging conditions for safe use		P
A.3	Consideration on charging voltage		P
A.4	Consideration on temperature		P
A.5	High temperature range		P
A.6	Low temperature range		P
A.7	Discharging conditions for safe use		P
A.8	Example of operating region		P

ANNEX B	**PROCEDURE OF 7.3.3 PROPAGATION TEST**		**N/A**
B.1	General		N/A
B.2	Test conditions:		N/A
	– The battery fully charged according to the manufacturer recommended conditions ..... :		—
	– Target cell forced into thermal runaway ..... :		—
	– A specially prepared sample (e.g. a heater or a hole for nail penetration provided) used for ease of testing..... :		—
B.3	Method used for initiating the thermal runaway. 1) Heater (Heater, Burner, Laser, Inductive heating 2) Overcharge 3) Nail penetration of the cell 4) Combination of above methods 5) Other methods..... :		—

ANNEX C	**PACKAGING**		**P**
	The materials and pack design chosen in such a way as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

5.1	TABLE: Critical components information				
Object/part no.	**Manufacturer/ trademark**	**Type/model**	**Technical data**	**Standard**	**Mark(s) of conformity [1)]**
Cell	Jiangxi Ganfeng Battery Technology Co., Ltd	48173125-100Ah	3.2V, 100Ah	IEC 62619: 2017	Tested in appliance
-Positive electrode	Taifeng Advance Lithium Energy Technology Co., Ltd	P700	LFP, Carbon black, NMP, PVDF, Conductive Additive	--	--
-Negative electrode	Jiangxi Zichen Technology Co.,Ltd	FT-1	Graphite, CMC, OA133, Distilled Water, Conductive Additive	--	--
-Electrolyte	Guangdong Jinguang Gaoke Co., Ltd.	A3072	LiPF6+EMC+EC+ DMC+PC	--	--
-Separator	Newmi	DWG-124 PE9+3	Shutdown temperature: 130°C	--	--
-Case	--	--	Aluminum	--	--
Supplementary information: **[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.**					

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.1	TABLE: External short-circuit test (cell or cell block)				P
Sample No.	**Ambient (at 25°C ± 5°C)**	**OCV at start of test (V dc)**	**Resistance of Circuit (mΩ)**	**Maximum Case Temperature ~~Rise ΔT~~ (°C)**	**Results**
C1#	24.5	3.340	26.35	42.9	A, E
C2#	25.1	3.341	24.17	44.1	A, E
C3#	25.2	3.342	25.68	43.9	A, E

Supplementary information:

A - No fire or Explosion
B - Fire
C - Explosion
D - The test was completed after 6 h
E - The test was completed after the cell casing cooled to 20% of the maximum temperature rise
F - Other (Please explain):___

7.2.5	TABLE: Overcharge test (cell or cell block)					P
Sample No.	**OCV at start of test (V dc)**	**OCV at end of test (V dc)**	**Measured Maximum Charging Current (A)**	**Measured Maximum Charging Voltage (V dc)**	**Max. Cell Case Temperature, (°C)**	**Results**
C16#	2.829	3.345	100	4.015	35.7	A, E
C17#	2.813	3.351	100	4.015	35.7	A, E
C18#	2.806	3.352	100	4.015	37.0	A, E

Supplementary information:

Results:
A - No fire or Explosion
B - Fire
C - Explosion
D - Test concluded when temperature reached a steady state condition
E - Test concluded when temperature returned to ambient
F - Other (Please explain): _____

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.6	TABLE: Forced discharge test (cell or cell block)				P
Sample No.	**OCV before applying reverse charge, (V dc)**	**Target Voltage (V dc)**	**Measured Reverse Charge Current It, (A)**	**Total Time for Reversed Charge Application (min)**	**Results**
C19#	2.785	-3.65	100	90	P
C20#	2.781	-3.65	100	90	P
C21#	2.790	-3.65	100	90	P

Supplementary information:

Results:
A - No fire or Explosion
B - Fire
C - Explosion
D - Other (Please explain): ___

7.3.2	TABLE: Internal short-circuit test (cell)			P
Sample No.	**OCV at start of test, (V dc)**	**Particle location 1)**	**Maximum applied pressure, (N)**	**Results**
C22#	3.332	1	400	A, E
C23#	3.332	1	400	A, E
C24#	3.331	1	400	A, E
C25#	3.332	1	400	A, E
C26#	3.334	1	400	A, E

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.

Results:

A - No fire or explosion
B – Fire
C - Explosion
D – Test concluded when 50 mV voltage drop occurred prior to reaching force limit
E – Test concluded when 800/400 N pressure was reached and 50 mV voltage drop was not achieved
F – Test was concluded when fire or explosion occurred
G - Other (Please explain): __

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.3	TABLE: Propagation test (battery system)				N/A
Sample No.	**OCV of Battery System Before Test, (V dc)**	**OCV of Target Cell Before Test, (V dc)**	**Maximum Cell Case Temperature, (°C)**	**Maximum DUT Enclosure Temperature, (°C)**	**Results**

Method of cell failure [1)]	Location of target cell	Area for fire protection (m^2)

Supplementary information:

1) Cell can be failed through applied heat, overcharge, nail penetration or combinations of these failures or other acceptable methods. See supporting documentation for details on cell failure method

2) If the battery system has no outer covering, the manufacturer is required to specify the area for fire protection.

Results:
A – No fire external to DUT enclosure or area for fire protection or no battery case rupture
B – Fire external to DUT enclosure or area for fire protection
C – Explosion
D – Battery case rupture
E - Other (Please explain): __

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

8.2.2	TABLE: Overcharge control of voltage (battery system)				N/A
Sample No.	**OCV at start of test for Cell/Cell Blocks, (V dc)**	**Maximum Charging Current, (A)**	**Max. Charging Voltage, (V dc)**	**Max. Voltage of Cell/Cell Blocks, (V dc)**	**Results**

	Charge Voltage Applied Battery System: 1)	
	Whole	**Part**

Supplementary information:

1. The exceeded voltage can be applied to only a part of the system such as the cell(s) in the battery system per Figure 6 of IEC 62619, if it is difficult to do it in using the whole battery system.

Results:
A - No Fire or Explosion
B – Fire
C - Explosion
D - The voltage of the measured cells or cell blocks did not exceed the upper limit charging voltage
E - The voltage of the measured cells or cell blocks did exceed the upper limit charging voltage
F - All function of battery system did operate as intended during the test.
G - All function of battery system did not operate as intended during the test.
H - Other (Please explain): ___

8.2.3	TABLE: Overcharge control of current (battery system)				N/A
Sample No.	**OCV at start of test, (V dc)**	**Max. Charging Current, (A)**	**Max. Charging Voltage, (V dc)**	**Results**	

Supplementary information:

Results:
A – No fire or Explosion
B – Fire
C – Explosion
D - Overcurrent sensing function of BMU did operate and then charging stopped
E - Overcurrent sensing function of BMU did not operate and then charging stopped
F - All function of battery system did operate as intended during the test.
G - All function of battery system did not operate as intended during the test.
H - Other (Please explain): ____

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

8.2.4	TABLE: Overheating control (battery system)		N/A
Model No.	**OCV at start(SOC 50%) of test, V dc**	**Maximum Charging Current, A**	**Maximum Charging Voltage, V dc**
Maximum Specified Temperature of Battery System, °C		**Maximum Measured Cell Case Temperature, °C**	**Results**

Supplementary information:

Results:
A – No fire or Explosion
B – Fire
C – Explosion
D - Temperature sensing function of BMU did operate and then charging stopped
E - Temperature sensing function of BMU did not operate and then charging stopped
F - All function of battery system did operate as intended during the test.
G - All function of battery system did not operate as intended during the test.
H - Other (Please explain): ____

Product: Rechargeable lithium ion cell

Type Designation: 48173125-100Ah

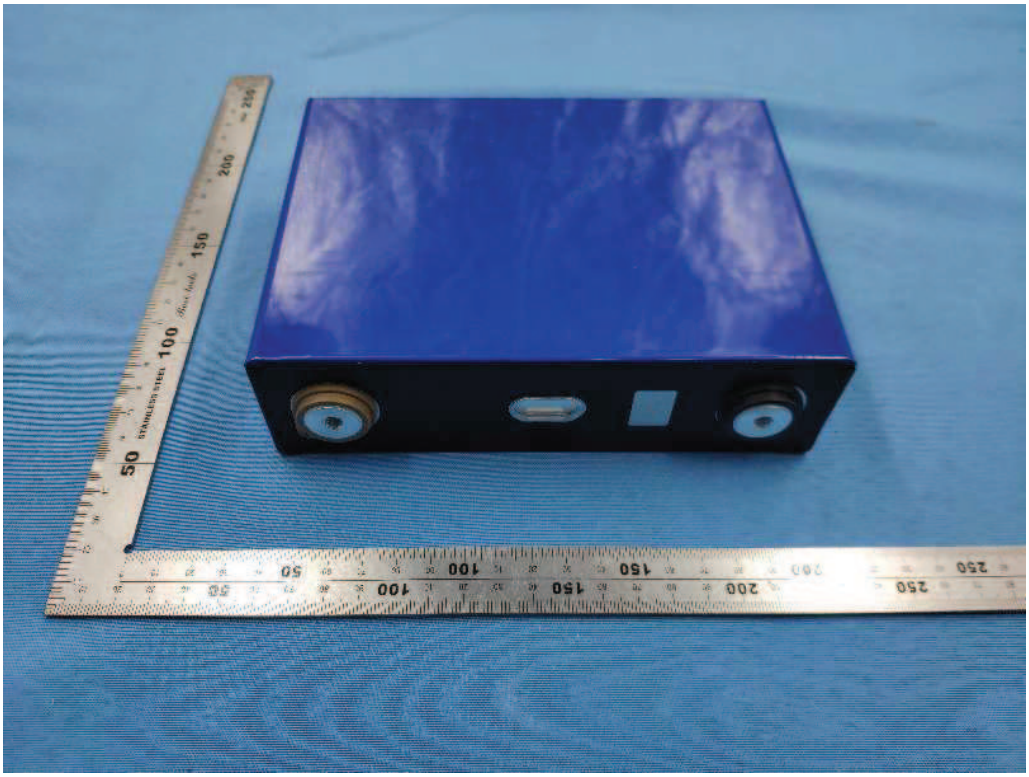

Figure 1 Top view of cell

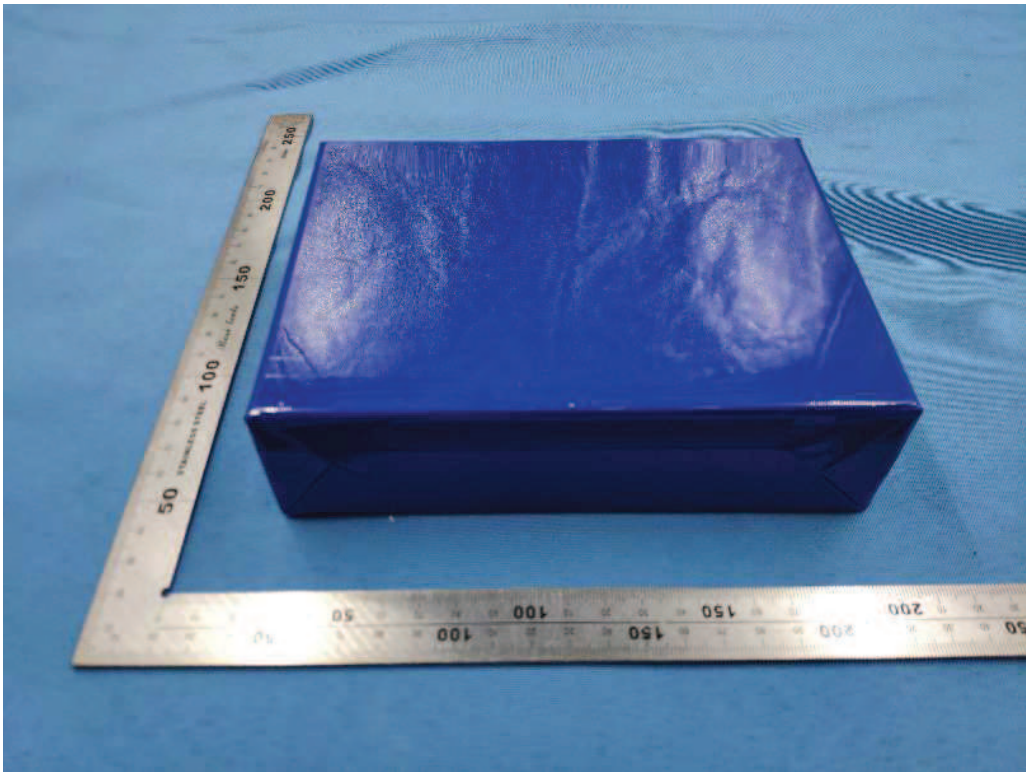

Figure 2 Bottom view of cell

Product: Rechargeable lithium ion cell

Type Designation: 48173125-100Ah

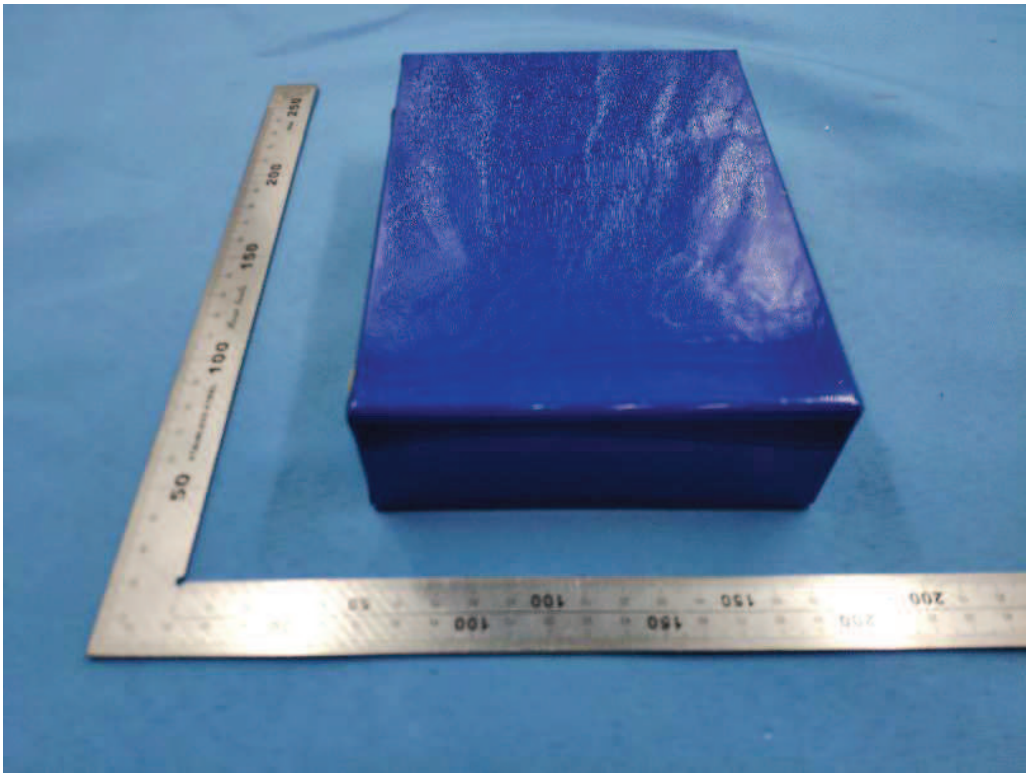

Figure 3 Side view of cell

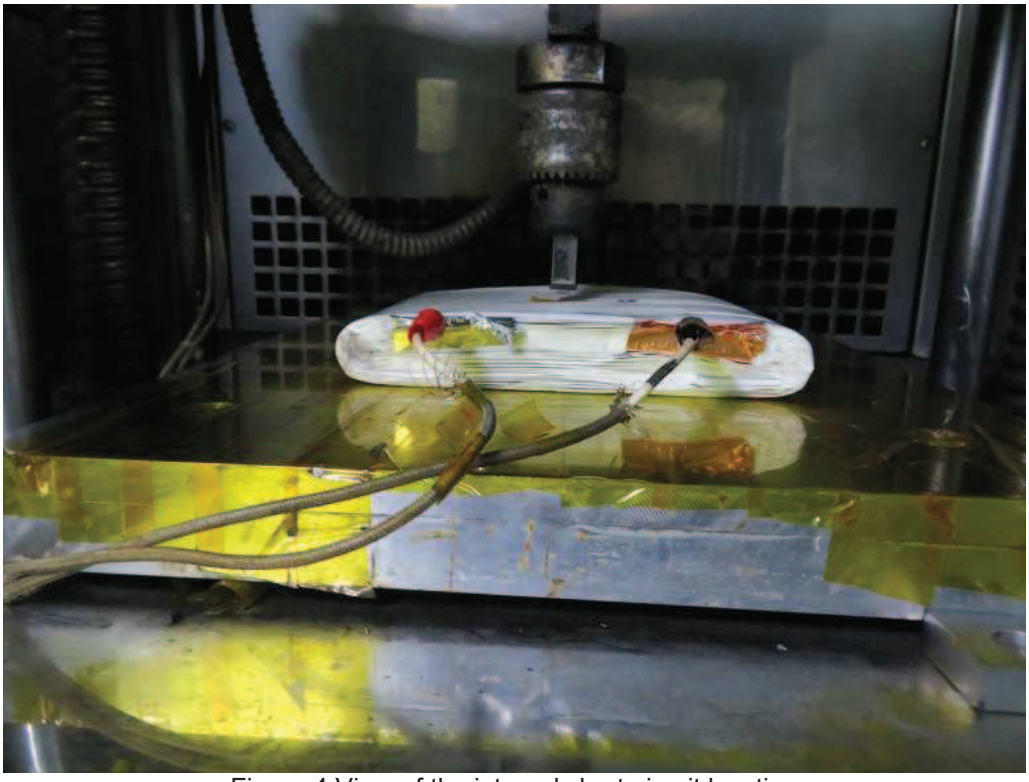

Figure 4 View of the internal short-circuit location