IEC IECEE CB SCHEME

Ref. Certif. No.

JPTUV-072245

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	LITHIUM POLYMER BATTERY
Name and address of the applicant Nom et adresse du demandeur	Shenzhen Vigor Power Battery Co., Ltd 3rd Floor, No. 1 Building Yongfa Industrial Zone, Yanchuanchaoyang Road, Songgang Town, Baoan District, Shenzhen, P.R. China
Name and address of the manufacturer Nom et adresse du fabricant	Shenzhen Vigor Power Battery Co., Ltd 3rd Floor, No. 1 Building Yongfa Industrial Zone, Yanchuanchaoyang Road, Songgang Town, Baoan District, Shenzhen, P.R. China
Name and address of the factory Nom et adresse de l'usine	Shenzhen Vigor Power Battery Co., Ltd 3rd Floor, No. 1 Building Yongfa Industrial Zone, Yanchuanchaoyang Road, Songgang Town, Baoan District, Shenzhen, P.R. China
Ratings and principal characteristics Valeurs nominales et charactéristiques principales	7.4V, 6200mAh, 45.88Wh
Trademark (if any) Marque de fabrique (si elle existe)	
Type of Manufacturer's Testing Laboratories used Type de programme du laboratoire d'essais constructeur	N/A
Model / Type Ref. Ref. de type	6200mAh 7.4V 70C
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 62133:2012 National differences see test report
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	17056292 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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Global Technology Assessment Center
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Mail: info@jpn.tuv.com
Web: www.tuv.com

Date: 25.05.2016

Signature: Dipl.-Ing. (FH) C. Padel

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

TÜVRheinland®
Precisely Right.

Shenzhen Vigor Power Battery Co., Ltd
Mr. Xuan Xianzhu
-
3rd Floor, No. 1 Building
Yongfa Industrial Zone
Yanchuanchaoyang Road, Songgang Town
Baoan District, Shenzhen

Date : 25.05.2016
Our ref. : ZENCHA ZJ
Your ref.: 164054799

Ref : CB Certificate Japan

Type of Equipment : LITHIUM POLYMER BATTERY
Model Designation : See Certificate
Certificate No. : JPTUV-072245
Report No. : 17056292 001

Dear Mr. Xuan Xianzhu,

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. (FH) C. Padel

Enclosure

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

TÜVRheinland®

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. .....:	**17056292 001**
Date of issue .....:	2016-05-25
Total number of pages.....	24 pages
Applicant's name.....:	**Shenzhen Vigor Power Battery Co., Ltd**
Address .....:	3rd Floor, No. 1 Building, Yongfa Industrial Zone, Yanchuanchaoyang Road, Songgang Town, Baoan District, Shenzhen, P.R. 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 .....:	LITHIUM POLYMER BATTERY
Trade Mark .....:	N/A
Manufacturer.....:	Same as applicant
Address .....:	Same as applicant
Model/Type reference .....:	6200mAh 7.4V 70C
Ratings .....:	7.4V, 6200mAh, 45.88Wh

Testing procedure and testing location:			
☒	**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	
☐	**Associated CB Testing Laboratory:**		
Testing location/ address .....:			
	Tested by (name + signature).....:	Charlie Zeng	Charlie Zeng
	Approved by (name + signature) .....:	Daniel Dai	Daniel Dai
☐	**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 1: Photo documentation (3 pages).

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
cl.5.6.2 Design recommendation(Lithium system); cl.8.1 Charging procedure for test purposes (for Cells and Packs); cl.8.2.1 Continuous charging at constant voltage (Cells); cl.8.2.2 Moulded case stress at high ambient temperature (battery); cl.8.3.1 External short circuit (Cells); cl.8.3.2 External short circuit (Battery); cl.8.3.3 Free fall (for Cells and Packs); cl.8.3.4 Thermal abuse (Cells); cl.8.3.5 Crush (Cells); cl.8.3.6 Over-charging of battery; cl.8.3.7 Forced discharge (Cells); cl.8.3.8 Transport tests (Cells). The electrolyte type of this cell doesn't belong to polymer, and the applicant declares that this cell isn't to be sold in France, Japan, Republic of Korea and Switzerland. Tests are made with the number of cells and batteries specified in IEC 62133: 2012 (Second Edition) Table 2.	**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

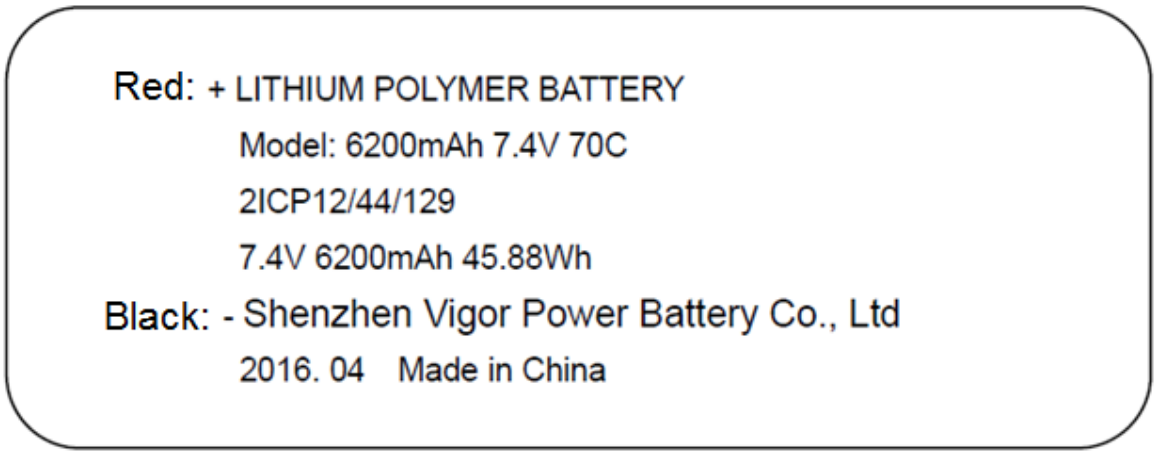
Summary of compliance with National Differences:

BE, BY, CN, DE, DK, FI, GB, HU, NL, NO, SE, SG.
BE=Belgium, BY=Belarus, CN=China, DE=Germany, DK=Denmark, FI=Finland, GB=United Kingdom, HU=Hungary, NL=The Netherlands, NO=Norway, SE=Sweden, SG=Singapore.

☒ The product fulfils the requirements of EN 62133: 2013

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.



Test item particulars.....:	
Classification of installation and use.....:	To be defined in final product
Supply connection.....:	DC connector
Recommend charging method declared by the manufacturer ..... :	Charging the battery with 6200mA constant current until 8.4V and then constant voltage until charging current reduces to 310mA at ambient 20℃±5℃.
Discharge current (0,2 I_t A) ..... :	1240mA
Specified final voltage ..... :	6V
Chemistry ..... :	☐ nickel systems ..... ☒ lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell.....:	4.25V
Maximum charging current .....:	18600mA
Charging temperature upper limit .....:	40℃
Charging temperature lower limit.....:	0℃
Polymer cell electrolyte type ..... :	☐ gel polymer ☐ solid polymer ☒ N/A
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2016-04-05
Date (s) of performance of tests.....:	2016-04-05 to 2016-05-06

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:

This battery is constructed with 2 lithium-ion cells (2S1P), and no any protected proof circuit.

The main features of the component cell in the battery pack are shown as below (clause 8.1.1):

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
1143128	6200mAh	3.7V	6200mA	6200mA	18600mA	186000mA	4.2V	3.0V

The main features of the component cell in the battery pack are shown as below (clause 8.1.2):

Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
1143128	4.25V	310mA	0℃	40℃

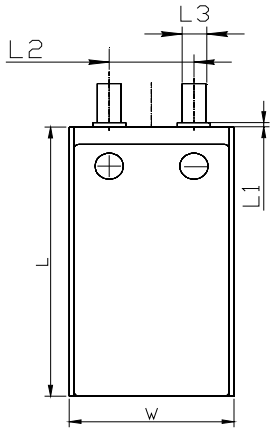
The main features of the battery pack are shown as below (clause 8.1.1):

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
6200mAh 7.4V 70C	6200mAh	7.4V	6200mA	6200mA	18600mA	186000mA	8.4V	6.0V

The main features of the battery pack are shown as below (clause 8.1.2):

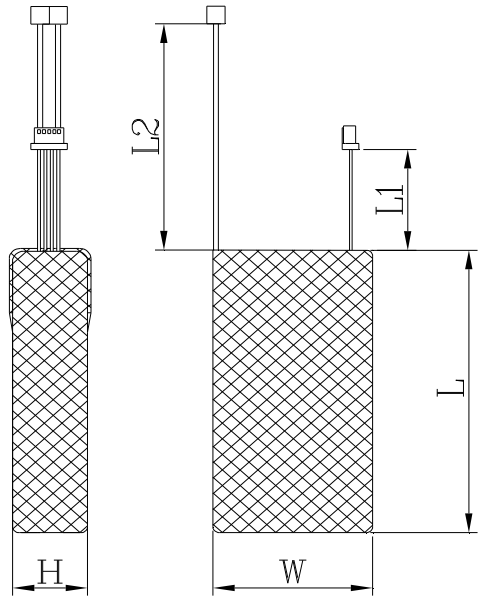
Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
6200mAh 7.4V 70C	8.5V	310mA	0℃	40℃

Construction:



T x W x H (max.): 11.3mm x 43.5mm x 128.5

Cell (Unit: mm)



H x W x L (Max.): 25.2mm x 47.0mm x 139.0mm
Battery

Circuit diagram:

None.

IEC 62133: 2012			
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 metal case exists.	N/A
	Insulation resistance (MΩ)..... :		—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		P
	Orientation of wiring maintains adequate creepage and clearance distances between conductors		P
	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	Venting mechanism exists on narrow side of the pouch cell.	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		P
	Batteries are designed such that abnormal temperature rise conditions are prevented	No proof circuit used.	P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	See above.	P
	Batteries are provided with specifications and charging instructions for equipment manufacturers so that associated chargers are designed to maintain charging within the temperature, voltage and current limits specified	The charging limits specified in the manufacturer's specifications.	P
5.5	Terminal contacts		P
	Terminals have a clear polarity marking on the external surface of the battery	The "Red +" and "Black -" polarity explicitly marked on surface of the battery.	P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	DC connector contacts complied with the requirements.	P

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance	Complied.	P
	Terminal contacts are arranged to minimize the risk of short circuits	Complied.	P
5.6	Assembly of cells into batteries		P
5.6.1	If there is more than one battery housed in a single battery case, cells used in the assembly of each battery have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer	2S1P.	P
	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		P
	Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate separate circuitry to prevent the cell reversal caused by uneven discharges	No proof circuit used.	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		P
	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	Charging voltage of each cell: 4.2V, not exceed 4.25V specified in Clause 8.1.2, Table 4.	P
	- The voltages of any one of the single cells or single cellblocks does not exceed the different upper limit of the charging voltage, determined through Clause 8.1.2, NOTE 1, by monitoring the voltage of every single cell or the single cellblocks		N/A

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
	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	Complied. ISO 9001: 2008 certificate provided.	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	Complied. Lithium system.	P
	Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C.	Tests are carried out at 20°C ± 5°C.	P
7	**Specific requirements and tests (nickel systems)**		**N/A**
7.1	Charging procedure for test purposes	Lithium system.	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	(See Table 7.2.2)	N/A
7.2.3	Moulded case stress at high ambient temperature		N/A
	Oven temperature (°C) .....:		—
	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

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
	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 ..... :	(See Table 7.3.1)	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 ..... :	(See Table 7.3.2)	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 ..... :	(See Table 7.3.6)	N/A
7.3.7	Low pressure		N/A
	Chamber pressure (kPa) ..... :		—
	Results: No fire. No explosion. No leakage.		N/A
7.3.8	Overcharge		N/A
	Results: No fire. No explosion ..... :	(See Table 7.3.8)	N/A
7.3.9	Forced discharge		N/A
	Results: No fire. No explosion ..... :	(See Table 7.3.9)	N/A

8	**Specific requirements and tests (lithium systems)**		**P**
8.1	Charging procedures for test purposes	Complied.	P

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
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	Charge temperature range: 0-40°C declared. -5°C used for lower limit tests. 45°C used for upper limit tests.	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	Lithium cobalt oxide system only.	N/A
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1) .....:	4.25V applied.	N/A
8.2	Intended use		P
8.2.1	Continuous charging at constant voltage (cells)	Tested complied.	P
	Results: No fire. No explosion .....:	(See Table 8.2.1)	P
8.2.2	Moulded case stress at high ambient temperature (battery)		P
	Oven temperature (°C) .....:	70°C	—
	Results: No physical distortion of the battery casing resulting in exposure of internal components	No physical distortion of the battery casing.	P
8.3	Reasonably foreseeable misuse		P
8.3.1	External short circuit (cell)	Tested complied.	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		P
	Results: No fire. No explosion .....:	(See Table 8.3.1)	P
8.3.2	External short circuit (battery)	Tested complied.	P
	The batteries were tested until one of the following occurred: - 24 hours elapsed; or		P
	- The case temperature declined by 20% of the maximum temperature rise		N/A

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
	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)	P
8.3.3	Free fall	Tested complied.	P
	Results: No fire. No explosion.	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	Tested complied.	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).....:	<500g, small cell.	—
	Results: No fire. No explosion.	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	Tested complied.	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	Tested complied.	P
	Test was continued until the temperature of the outer casing: - Reached steady state conditions (less than 10°C change in 30-minute period); or		N/A
	- Returned to ambient		P
	Results: No fire. No explosion.....:	(See Table 8.3.6)	P
8.3.7	Forced discharge (cells)	Tested complied.	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	Tested complied. No leakage, no venting, no short-circuit, no rupture, no explosion and no fire.	P
8.3.9	Design evaluation – Forced internal short circuit (cells)	The applicant declares that this cell isn't to be sold in France, Japan, Republic of Korea and Switzerland	N/A

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
	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		N/A
	Results: No fire .....:		N/A
9	**Information for safety**		**P**
	The manufacturer of secondary cells ensures that information is provided about current, voltage and temperature limits of their products.	Information for safety mentioned in manufacturer's specifications.	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.	Information for safety mentioned in manufacturer's specifications.	P
	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**		**P**
10.1	Cell marking		N/A
	Cells marked as specified in the applicable cell standards: IEC 61951-1, IEC 61951-2 or IEC 61960.	The final product is battery.	N/A
10.2	Battery marking		P
	Batteries marked in accordance with the requirements for the cells from which they are assembled.	The battery is marked in accordance with IEC 61960, also see page 4.	P
	Batteries marked with an appropriate caution statement.		N/A
10.3	Other information		P
	Storage and disposal instructions marked on or supplied with the battery.		P
	Recommended charging instructions marked on or supplied with the battery.	Information for recommended charging instructions mentioned in manufacturer's specifications.	P
11	**Packaging**		**P**

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
	The materials and packaging design are chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants.		P
Annex A	**Charging range of secondary lithium ion cells for safe use**		**P**
A.1	General		P
A.2	Safety of lithium-ion secondary battery	Complied.	P
A.3	Consideration on charging voltage	Complied.	P
A.3.1	General		P
A.3.2	Upper limit charging voltage	4.25V applied.	P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		N/A
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied	4.25V applied.	N/A
A.4	Consideration of temperature and charging current		P
A.4.1	General		P
A.4.2	Recommended temperature range	See A.4.2.2.	P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	Charging temperature range declared by client is: 0-40°C	N/A
A.4.3	High temperature range	Not higher than the temperature specific in this standard.	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	45°C applied.	N/A
A.4.4	Low temperature range	Charging low temperature limit declared by client: 0°C	P
A.4.4.1	General		P
A.4.4.2	Explanation of safety viewpoint		P
A.4.4.3	Safety considerations, when specifying charging conditions in low temperature range		P
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range	-5°C applied.	P
A.4.5	Scope of the application of charging current		P
A.5	Sample preparation		N/A

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
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℃±5℃ and under -25 ℃ 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	Shenzhen Vigor Power Battery Co., Ltd	1143128	3.7V, 6200mAh	IEC 62133: 2012	Tested with appliance
- Positive Electrode	Hunan Shanshan New Material Co., Ltd.	LC108R	$LiCoO_2$, PVDF, NMP, Conductive Additive,	--	--
- Negative Electrode	Shanghai Shanshan Technology Co., Ltd.	CAG-3	Graphite, CMC, SBR, Distilled Water, Conductive	--	--
- Electrolyte	ZHEJIANG LIHUI Electronic Material Co., Ltd.	LBE-505A	$LiPF_6$+EMC+EC+ DMC	--	--
- Separator	DONGGUAN XURAN New Material Technology Co., Ltd.	120*0.02MM	Shutdown temperature: 155℃	--	--
Tape	Interchangeable	Interchangeable	130℃	UL 510	UL approved
Lead Wire For Discharge	Interchangeable	Interchangeable	22AWG, 200ºC	UL 758	UL approved
Connector For Discharge	Interchangeable	Interchangeable	V-0, 90ºC	UL 498	UL approved
Lead Wire For Charging	Interchangeable	Interchangeable	12AWG, 200ºC	UL 758	UL approved
Connector For Charging	Interchangeable	Interchangeable	V-0, 125ºC	UL498	UL approved
Plastic enclosure	SABIC INNOVATIVE PLASTICS B V	RV0079	V-0, 130ºC	UL 94/ UL 746	UL E45329

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance.

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)

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 ± 5ºC 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)

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)

7.3.9	TABLE: Forced discharge (cells)	N/A

Model	OCV before application of reverse charge, (Vdc)	Measured reverse charge I_t, (mA)	Time for reversed charge, (minutes)	Results

Supplementary information:

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

8.2.1	TABLE: Continuous charging at constant voltage (cells)			P
Model	**Recommended charging voltage V_c, (Vdc)**	**Recommended charging current I_{rec}, (mA)**	**OCV at start of test, (Vdc)**	**Results**
c1#	4.20	6200	4.19	P
c2#	4.20	6200	4.18	P
c3#	4.20	6200	4.18	P
c4#	4.20	6200	4.17	P
c5#	4.20	6200	4.19	P

Supplementary information:

- No fire
- No explosion
- No leakage

8.3.1	TABLE: External short circuit (cells)				P
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (mΩ)**	**Maximum case temperature ~~rise ΔT,~~ (°C)**	**Results**
Samples charged at charging temperature upper limit (45°C)					
c6#	25.0	4.23	72	83.0	P
c7#	25.0	4.21	71	86.4	P
c8#	25.0	4.23	72	90.1	P
c9#	25.0	4.22	73	87.0	P
c10#	25.0	4.23	72	85.4	P
Samples charged at charging temperature lower limit (-5°C)					
c11#	25.0	4.17	75	89.2	P
c12#	25.0	4.18	73	89.7	P
c13#	25.0	4.16	72	84.2	P
c14#	25.0	4.17	73	86.3	P
c15#	25.0	4.19	74	85.9	P

Supplementary information:

- No fire
- No explosion

8.3.2	TABLE: External short circuit (battery)				P
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (mΩ)**	**Maximum case temperature ~~rise ΔT,~~ (°C)**	**Results**
Samples charged at charging temperature upper limit (45°C)					
b4#	55.0	4.23	72	88.7	P
b5#	55.0	4.22	73	89.5	P
b6#	55.0	4.22	71	89.9	P
b7#	55.0	4.23	72	89.0	P
b8#	55.0	4.22	74	88.8	P
Samples charged at charging temperature lower limit (-5°C)					
b9#	55.0	4.17	72	85.9	P
b10#	55.0	4.18	73	87.5	P
b11#	55.0	4.18	75	88.9	P
b12#	55.0	4.17	72	85.0	P
b13#	55.0	4.16	71	82.5	P

Supplementary information:

- No fire
- No explosion

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 (45°C)					
c29#	4.23	4.23	--	--	P
c30#	4.22	4.22	--	--	P
c31#	4.23	4.23	--	--	P
c32#	4.21	4.21	--	--	P
c33#	4.22	4.22	--	--	P

Note:

A 13kN force applied at cylindrical cells.

No voltage abrupt drop occurred.

Supplementary information:

- No fire
- No explosion

8.3.6	TABLE: Over-charging of battery	P
Constant charging current (A).....:	12.4	—
Supply voltage (Vdc).....:	10	—

Model	OCV before charging, (Vdc)	Resistance of circuit, (mΩ)	Maximum outer casing temperature, (°C)	Results
b17#	3.33	11.6	100.8	P
b18#	3.32	12.7	96.1	P
b19#	3.33	13.1	94.8	P
b20#	3.28	12.5	95.1	P
b21#	3.33	14.4	101.0	P

Supplementary information:

- No fire
- No explosion

8.3.7	TABLE: Forced discharge (cells)	P

Model	OCV before application of reverse charge, (Vdc)	Measured Reverse charge I_t, (mA)	Time for reversed charge, (minutes)	Results
c39#	3.32	6200	90	P
c40#	3.31	6200	90	P
c41#	3.34	6200	90	P
c42#	3.28	6200	90	P
c43#	3.33	6200	90	P

Supplementary information:

- No fire
- No explosion

8.3.8 T-5	TABLE: External short circuit (cells)				P
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (mΩ)**	**Maximum case temperature ~~rise ΔT,~~ (°C)**	**Results**
c44#	55.0	4.19	72	83.9	P
c45#	54.9	4.18	73	85.8	P
c46#	55.0	4.18	76	84.0	P
c47#	55.0	4.17	71	86.1	P
c48#	54.8	4.18	72	83.3	P
c49#	55.0	4.18	73	88.2	P
c50#	55.0	4.19	75	85.7	P
c51#	54.8	4.18	71	85.9	P
c52#	54.9	4.17	72	84.0	P
c53#	54.8	4.18	74	85.9	P

Supplementary information:

The external short-circuit test of 10 pcs samples performed after the test of Altitude, Thermal cycling, Vibration and Shock in sequence.

- No excessive temperature rise, no rupture, no explosion and no fire

8.3.9	TABLE: Forced internal short circuit (cells)					N/A
Model	**Chamber ambient, (°C)**	**OCV at start of test, (Vdc)**	**Particle location [1)]**	**Maximum applied pressure, (N)**	**Voltage drop, (mV)**	**Results**

Supplementary information:

[1)] Identify one of the following:

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

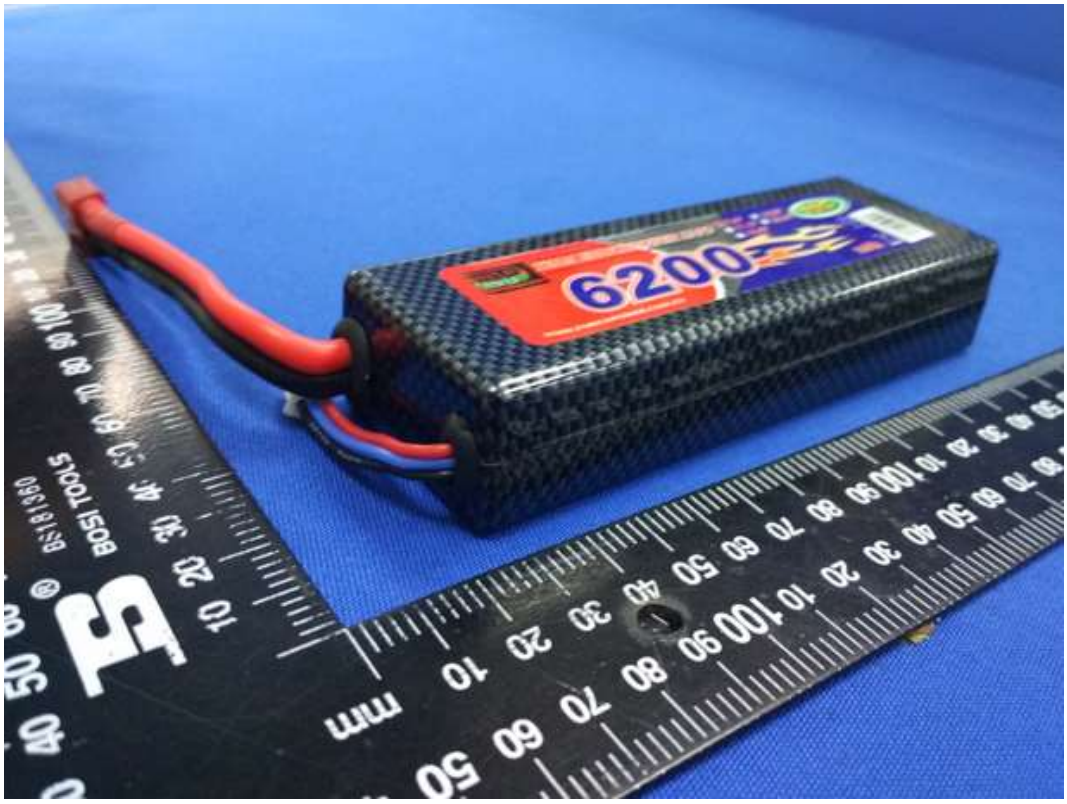
2: Nickel particle inserted between positive aluminium foil and negative active material coated area.

- No fire

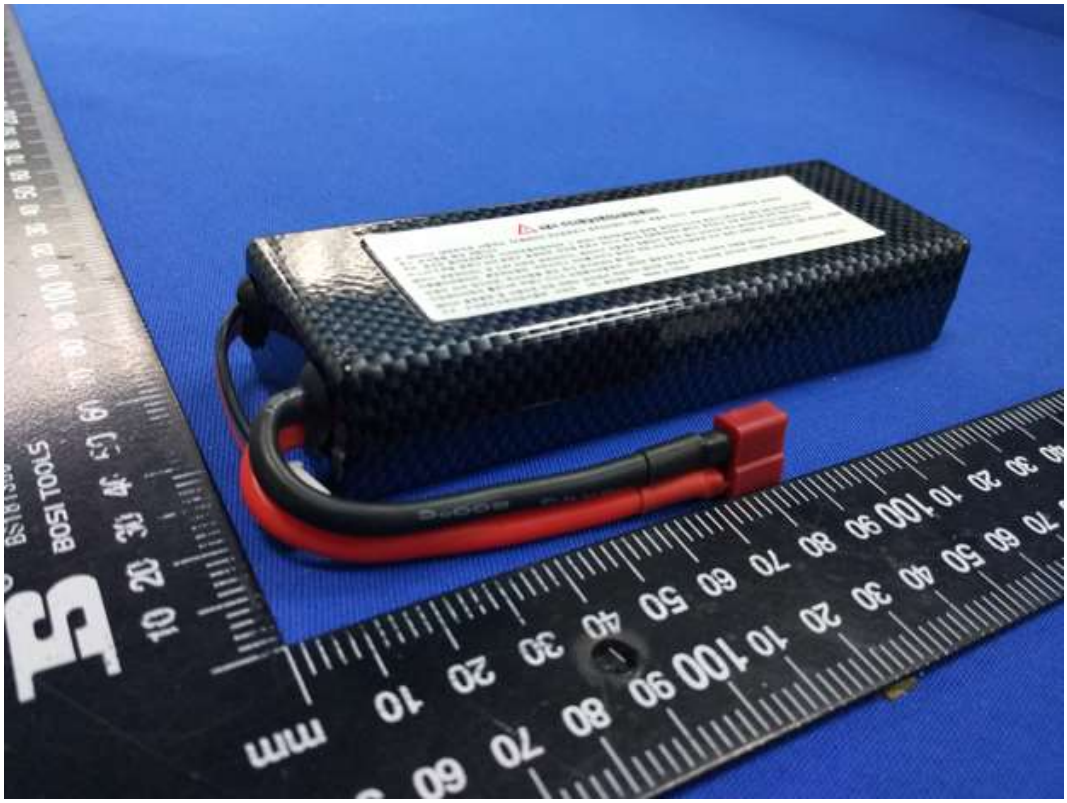
-- End of Report --

Product: LITHIUM POLYMER BATTERY

Type Designation: 6200mAh 7.4V 70C



Picture 1. Battery view-1

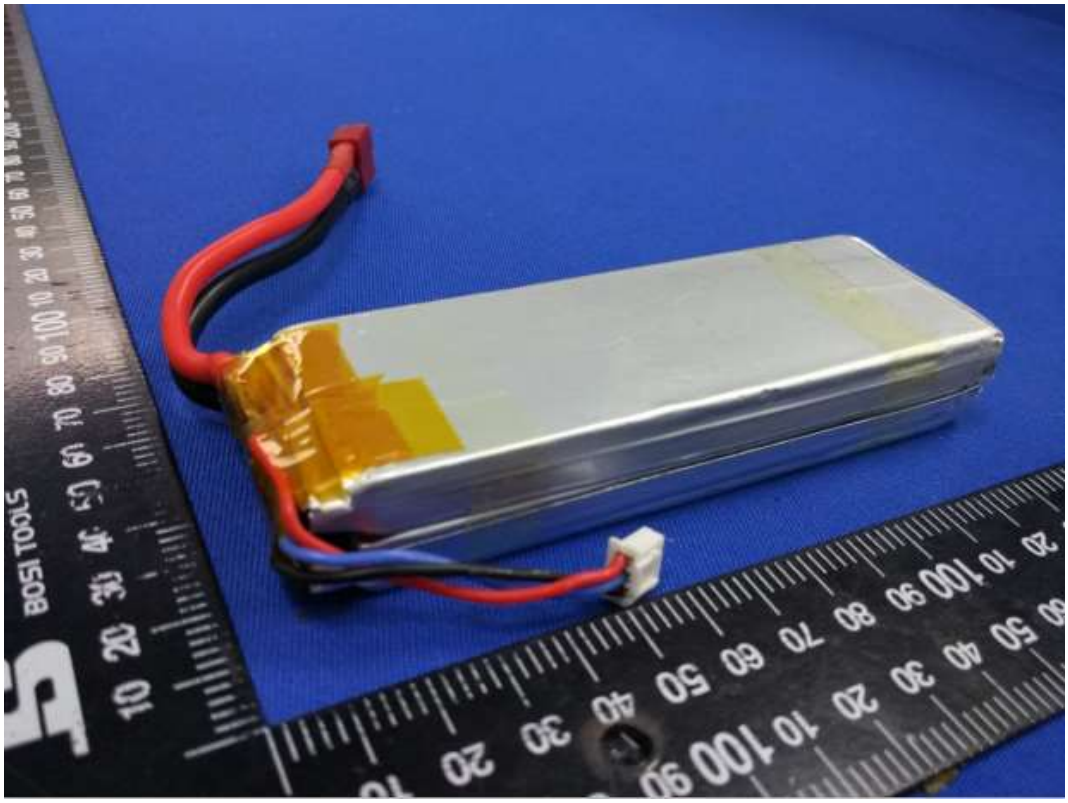


Picture 2. Battery view-2

Product: LITHIUM POLYMER BATTERY

Type Designation: 6200mAh 7.4V 70C

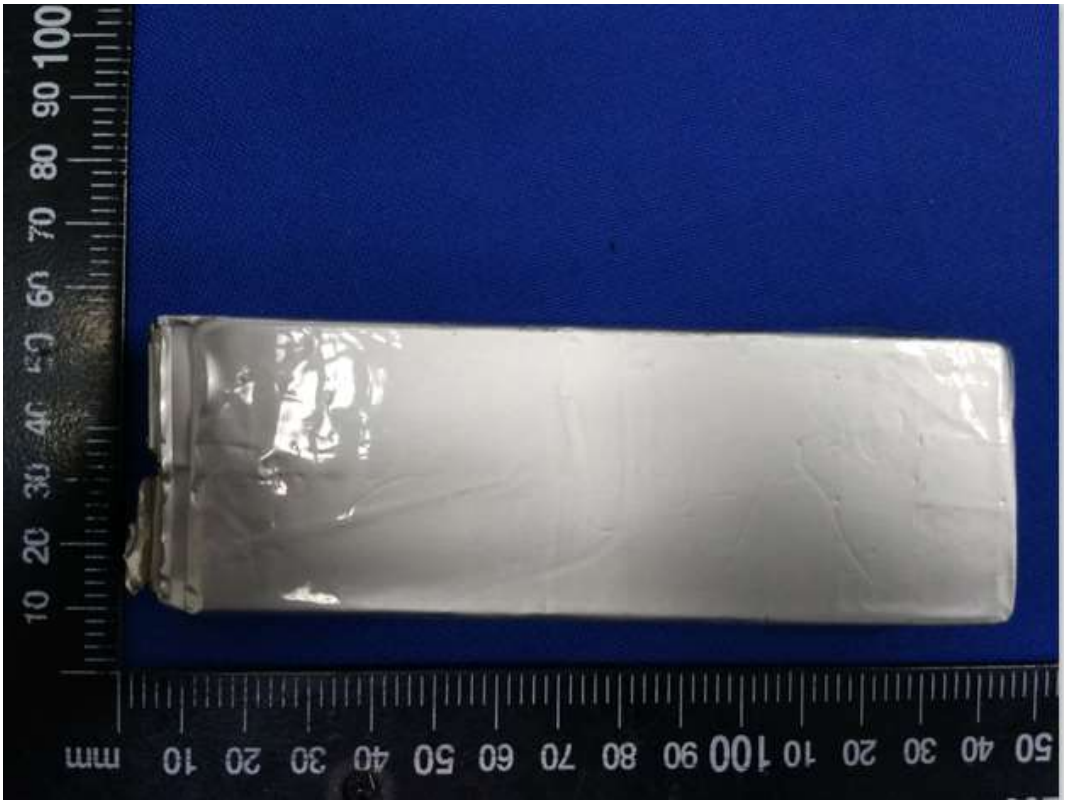
Picture 3. Battery inside view-1



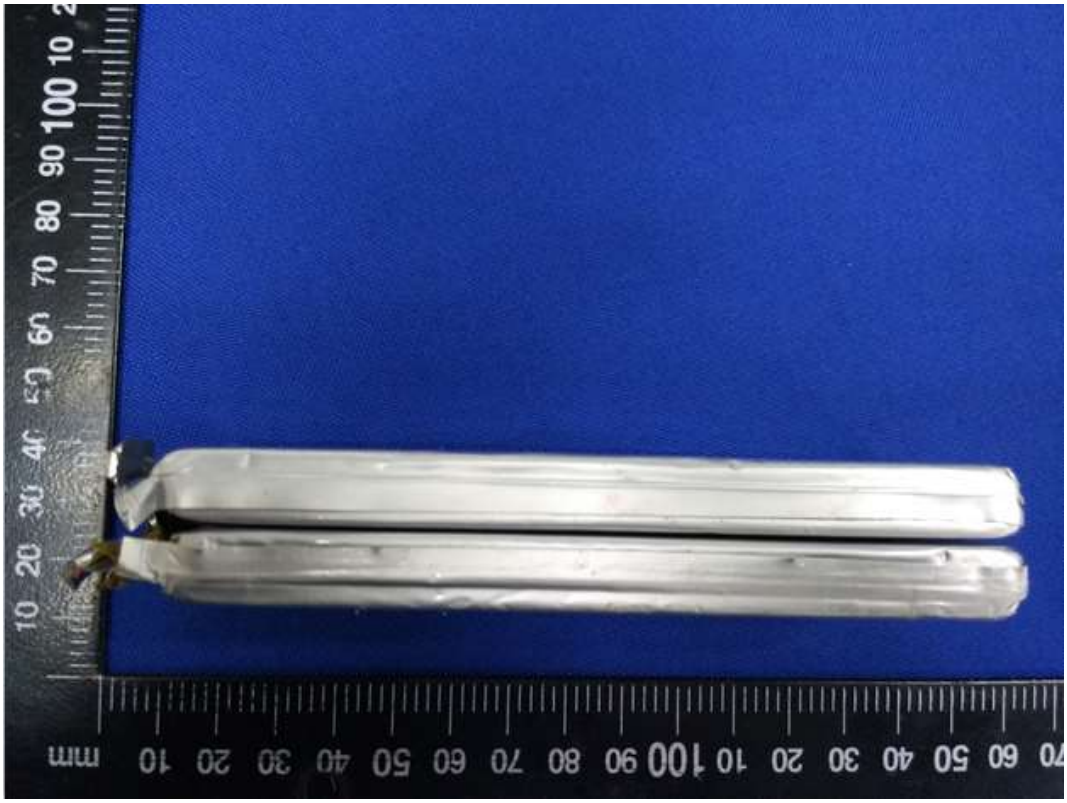
Picture 4. Battery inside view-2

Product: LITHIUM POLYMER BATTERY

Type Designation: 6200mAh 7.4V 70C



Picture 5. Cell view-1



Picture 6. Cell view-2