



Ref. Certif. No.

FR 657544

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 iron phosphate Rechargeable Battery Cell

Name and address of the applicant
Nom et adresse du demandeur

GMET Mfg Processes Co., Ltd.
No.50, Guangfu S. Rd., Hukou Township, Hsinchu County 303, Taiwan

Name and address of the manufacturer
Nom et adresse du fabricant

GMET Mfg Processes Co., Ltd.
No.50, Guangfu S. Rd., Hukou Township, Hsinchu County 303, Taiwan

Name and address of the factory
Nom et adresse de l'usine

GMET Mfg Processes Co., Ltd.
No.50, Guangfu S. Rd., Hukou Township, Hsinchu County 303, Taiwan

Note : When more than one factory, please report on page 2
Note : Lorsqu'il y a plus d'une usine, veuillez utiliser la 2ème page

Ratings and principal characteristics
Valeurs nominales et caractéristiques principales

3.2V, 20Ah

Trademark (if any)
Marque de fabrique (si elle existe)

GMET or **GMET**

Type of Manufacturer's Testing Laboratories used
Type de programme du laboratoire d'essais constructeur

G23103158 (IFP23/103/158)

Model / Type Ref.
Ref. De type

See test report

Additional information (if necessary may also be
reported on page 2)
Informations complémentaires (si nécessaire, peuvent
être indiquées 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

PUBLICATION **EDITION**
IEC 62133:2012 (ed.2)

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

BV CPS Taoyuan Branch N°CB140403C17 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**



Laboratoire Central des Industries Électriques

33, av du Général Leclerc – BP 8
FR 92266 Fontenay-aux-Roses cedex
www.lcie.fr

Date: 2014-05-23

Signature:





Test Report issued under the responsibility of:



**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: CB140403C17 001

Date of issue: May 20, 2014

Total number of pages: 28

Applicant's name: GMET Mfg Processes Co., Ltd.

Address: No.50, Guangfu S. Rd., Hukou Township, Hsinchu County 303, Taiwan

Test specification:

Standard: IEC 62133: 2012 (Second Edition)

Test procedure: CB (National Differences: DK, HU, SE)

Non-standard test method: N/A

Test Report Form No.: IEC62133B

Test Report Form(s) Originator: UL(Demko)

Master TRF: Dated 2013-03

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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 iron phosphate Rechargeable Battery Cell

Trade Mark:

GMET

GMET or

Manufacturer: GMET Mfg Processes Co., Ltd.

Model/Type reference: G23103158 (IFP23/103/158)

Ratings: 3.2V, 20Ah

Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	Bureau Veritas Consumer Product Services Limited, Taoyuan Branch
Testing location/ address		No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Chinese Taipei
<input type="checkbox"/>	Associated CB Testing Laboratory:	N/A
Testing location/ address		N/A
Tested by (name + signature)		Taocheng Wang
Approved by (name + signature)		Danny Lin
		<i>Taocheng Wang</i> <i>[Signature]</i>
<input type="checkbox"/>	Testing procedure: TMP	N/A
Testing location/ address		-
Tested by (name + signature)		-
Approved by (name + signature)		-
<input type="checkbox"/>	Testing procedure: WMT	N/A
Testing location/ address		-
Tested by (name + signature)		-
Witnessed by (name + signature)		-
Approved by (name + signature)		-
<input type="checkbox"/>	Testing procedure: SMT	N/A
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): -	
Summary of testing:	
Tests performed (name of test and test clause): 8.2.1 Continuous charge 8.3.1 External short circuit 8.3.3 Free fall 8.3.4 Thermal abuse 8.3.5 Crushing of cells 8.3.7 Forced discharge The load conditions used during testing: The unit is charging the empty battery cell and discharging the full charged battery cell according to its rating. Note: (1) Unless otherwise stated, the charging procedure for test purposes is carried out in an ambient temperature of $20\pm5^{\circ}\text{C}$, using the method declared by the manufacturer. (2) Prior to charging, the battery cell shall have been discharged at $20\pm5^{\circ}\text{C}$ at a constant current of 0.2 It A down to a specified final voltage.	Testing location: Bureau Veritas Consumer Product Services Limited, Taoyuan Branch No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Chinese Taipei
Summary of compliance with National Differences DK, HU, SE	

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.

**Explanation of date Code:**

A close-up photograph of the date code '2014/03/10' from the marking plate, showing the individual digits and slashes.

2014: calendar year
03: calendar of month
10: sequence number in a day

Test item particulars.....:	
Classification of installation and use.....:	Built-in
Supply connection.....:	Customized terminal
Recommend charging method declared by the manufacturer	Limiting 20A and constant 3.6V charge for 3h at 0-45 °C.
Discharge current (0,2 I_L A)	4A
Specified final voltage	End of charge 3.6V; End of discharge 2.0V
Chemistry	<input type="checkbox"/> nickel systems <input checked="" type="checkbox"/> lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell.....:	3.6V
Maximum charging current	20A
Charging temperature upper limit	45°C
Charging temperature lower limit.....:	0°C
Polymer cell electrolyte type	<input type="checkbox"/> gel polymer <input type="checkbox"/> 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	April 03, 2014
Date (s) of performance of tests	April 08, 2013 – April 30, 2014
General remarks:	
<p>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.</p>	
<p>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</p>	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 62133B:	
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 :	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
<p>When differences exist; they shall be identified in the General product information section.</p>	

Name and address of factory (ies) : GMET Mfg Processes Co., Ltd. No.50, Guangfu S. Rd., Hukou Township, Hsinchu County 303, Taiwan
General product information: (1) The equipment under test (EUT) model G23103158 (IFP23/103/158) is a Lithium iron phosphate Rechargeable Battery Cell (2) The maximum ambient temperature is specified as 45°C for Charging and 60°C for Discharging. (3) Dimension of the battery cell: (T) 23.0 mm by (W) 103.0 mm by (L) 158.0 mm. (4) Weight: 660g max. Test condition: Temperature: 20±5°C Relative humidity: 60% Air pressure: 950 mbar The test samples were pre-production samples without serial number.

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
4	Parameter measurement tolerances		P
	Parameter measurement tolerances	Both normal and foreseeable misuses are evaluated in the report. All control and measure values were within the tolerances.	P
5	General safety considerations		P
5.1	General	The cell is safe and do not present significant hazards under the condition of reasonably foreseeable misuse.	P
5.2	Insulation and wiring	See below.	N/A
	The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ	The metal case is electrical contact ("—").	N/A
	Insulation resistance (MΩ) :	-	—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements	No internal wiring.	N/A
	Orientation of wiring maintains adequate creepage and clearance distances between conductors	No internal wiring.	N/A
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse	No internal wiring.	N/A
5.3	Venting	See below.	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	The device of vent on the top side of cell as the pressure vent, up to release pressure. See pressure vent localization picture on page 28.	P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief	The cell is a built in product, which shall be enclosed in a rigid case, and will be evaluated in the final battery pack.	N/A
5.4	Temperature/voltage/current management	See below.	N/A
	Batteries are designed such that abnormal temperature rise conditions are prevented	The cell is a built in product, its protection will be evaluated in the final battery pack.	N/A
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	The cell is a built in product, its protection will be evaluated in the final battery pack.	N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	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 cell is a built in product, its protection will be evaluated in the final battery pack.	N/A
5.5	Terminal contacts	See below.	P
	Terminals have a clear polarity marking on the external surface of the battery	The polarity mark “+” and “-” were provided on the top side of cell body.	P
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	The cross section area is considered enough to carry the rating current of the cell.	P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance	The dedicated case of the cell described in the spec. can provide the proper mechanical strength and prevent the corrosion.	P
	Terminal contacts are arranged to minimize the risk of short circuits	The distance between the terminals is considered enough to minimize the possibility of short circuits.	P
5.6	Assembly of cells into batteries	See below.	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	Not a battery pack.	N/A
	Each battery has an independent control and protection	Not a battery pack.	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	Not a battery pack.	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	Not a battery pack.	N/A
	Protective circuit components are added as appropriate and consideration given to the end-device application	Not a battery pack.	N/A
	When testing a battery, the manufacturer of the battery provides a test report confirming the compliance according to this standard	Not a battery pack.	N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
5.6.2	Design recommendation for lithium systems only	See below.	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	Not a battery pack.	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.	Not a battery pack.	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	Not a battery pack.	N/A
	- 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	Not a battery pack.	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	Not a battery pack.	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	Not a battery pack.	N/A
5.7	Quality plan	See below	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	The manufacturer's procedures for the inspection of materials, components, cells and batteries and which covers the process of producing each type of cell and battery comply with the requirement.	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	The cells under testing were less than 6 months old.	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C.	The testing was conducted at the ambient range of 15°C - 25°C.	P
7	Specific requirements and tests (nickel systems)		N/A
7.1	Charging procedure for test purposes	The cell is lithium system.	N/A
7.2	Intended use	The cell is lithium system.	N/A
7.2.1	Continuous low-rate charging (cells)	The cell is lithium system.	N/A
	Results: No fire. No explosion	(See Table 7.2.1)	N/A
7.2.2	Vibration	The cell is lithium system.	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	The cell is lithium system.	N/A
	Oven temperature (°C)	The cell is lithium system.	—
	Results: No physical distortion of the battery casing resulting in exposure if internal components	The cell is lithium system.	N/A
7.2.4	Temperature cycling	The cell is lithium system.	N/A
	Results: No fire. No explosion. No leakage.	The cell is lithium system.	N/A
7.3	Reasonably foreseeable misuse	The cell is lithium system.	N/A
7.3.1	Incorrect installation cell	The cell is lithium system.	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	The cell is lithium system.	N/A
	- A stabilized dc power supply.	The cell is lithium system.	N/A
	Results: No fire. No explosion.....	(See Table 7.3.1)	N/A
7.3.2	External short circuit	The cell is lithium system.	N/A
	The cells or batteries were tested until one of the following occurred: - 24 hours elapsed; or	The cell is lithium system.	N/A
	- The case temperature declined by 20% of the maximum temperature rise	The cell is lithium system.	N/A
	Results: No fire. No explosion.....	(See Table 7.3.2)	N/A
7.3.3	Free fall	The cell is lithium system.	N/A
	Results: No fire. No explosion.	The cell is lithium system.	N/A
7.3.4	Mechanical shock (crash hazard)	The cell is lithium system.	N/A
	Results: No fire. No explosion. No leakage.	The cell is lithium system.	N/A
7.3.5	Thermal abuse	The cell is lithium system.	N/A
	Oven temperature (°C)	The cell is lithium system.	—
	Results: No fire. No explosion.	The cell is lithium system.	N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
7.3.6	Crushing of cells	The cell is lithium system.	N/A
	The crushing force was released upon: - The maximum force of 13 kN \pm 1 kN has been applied; or	The cell is lithium system.	N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained	The cell is lithium system.	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	The cell is lithium system.	N/A
	Results: No fire. No explosion..... :	(See Table 7.3.6)	N/A
7.3.7	Low pressure	The cell is lithium system.	N/A
	Chamber pressure (kPa)..... :	The cell is lithium system.	—
	Results: No fire. No explosion. No leakage.	The cell is lithium system.	N/A
7.3.8	Overcharge	The cell is lithium system.	N/A
	Results: No fire. No explosion..... :	(See Table 7.3.8)	N/A
7.3.9	Forced discharge	The cell is lithium system.	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	See below.	P
8.1.1	First procedure: This charging procedure applied to tests other than those specified in 8.1.2	The cells were charged in the ambient temp (20 °C \pm 5 °C,) according to manufacturer's spec.	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	The cells were charged in the ambient temp according to manufacturer's spec.	P
	If a cell's specified upper and/or lower charging temperature exceeds values for the upper and/or lower limit test temperatures of Table 4, the cells were charged at the specified values plus 5 °C for the upper limit and minus 5 °C for the lower limit	The cell lower charging temperature declared by client is 0 °C.	P
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1)	Test results which verify that the cells charged at the new low limit of the temperature range -5 °C when tested by the methods specified in 8.2 to 8.3 meet the requirements.	P
	For a different upper limit charging voltage (i.e. other than for lithium cobalt oxide systems at 4,25 V), the applied upper limit charging voltage and upper limit charging temperatures were adjusted accordingly	The upper limit charging voltage of cell specified by manufacturer was 3.6V.	N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1)	-	N/A
8.2	Intended use	See below.	P
8.2.1	Continuous charging at constant voltage (cells)	Five fully charged cells were submitted to 7 days test.	P
	Results: No fire. No explosion.....	(See Table 8.2.1)	P
8.2.2	Moulded case stress at high ambient temperature (battery)	The EUT is a lithium ion cell.	N/A
	Oven temperature (°C)	The EUT is a lithium ion cell.	—
	Results: No physical distortion of the battery casing resulting in exposure if internal components	The EUT is a lithium ion cell.	N/A
8.3	Reasonably foreseeable misuse	See below.	P
8.3.1	External short circuit (cell)	See below.	P
	The cells were tested until one of the following occurred: - 24 hours elapsed; or	The cells were tested for until the case temperature declined by 20% of the maximum temperature rise.	N/A
	- The case temperature declined by 20% of the maximum temperature rise	The cells were tested for until 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)	See below.	N/A
	The cells were tested until one of the following occurred: - 24 hours elapsed; or	The EUT is a lithium ion cell.	N/A
	- The case temperature declined by 20% of the maximum temperature rise	The EUT is a lithium ion cell.	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	The EUT is a lithium ion cell.	N/A
	Results: No fire. No explosion.....	(See Table 8.3.2)	N/A
8.3.3	Free fall	See below. The used test samples' no.: No. 016 to 018.	P
	Results: No fire. No explosion.	Three cells were fully charged and tested for this condition and no fire, no explosion after the test.	P
8.3.4	Thermal abuse (cells)	See below. The used test samples' no.: No. 019 to 028.	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	The cells were held at 130°C ± 2°C for: - 10 minutes; or	Ten cells were fully charged according to and tested for these conditions.	P
	- 30 minutes for large cells (gross mass of more than 500 g as defined in IEC 62281)	The EUT is not a large cell.	N/A
	Oven temperature (°C)	130°C	—
	Gross mass of cell (g)	660g	—
	Results: No fire. No explosion.	No fire. No explosion.	P
8.3.5	Crush (cells)	See below.	P
	The crushing force was released upon: - The maximum force of 13 kN ± 1 kN has been applied; or	The maximum force of 13 kN ± 1 kN has been applied.	P
	- An abrupt voltage drop of one-third of the original voltage has been obtained; or	The maximum force of 13 kN ± 1 kN has been applied.	N/A
	- 10% of deformation has occurred compared to the initial dimension	The maximum force of 13 kN ± 1 kN has been applied.	N/A
	Results: No fire. No explosion.....	(See Table 8.3.5)	P
8.3.6	Over-charging of battery	The EUT is a lithium ion cell.	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	The EUT is a lithium ion cell.	N/A
	- Returned to ambient	The EUT is a lithium ion cell.	N/A
	Results: No fire. No explosion.....	(See Table 8.3.6)	N/A
8.3.7	Forced discharge (cells)	See below.	P
	Results: No fire. No explosion.....	(See Table 8.3.7)	P
8.3.8	Transport tests	See below	P
	Manufacturer's documentation provided to show compliance with UN Recommendations on Transport of Dangerous Goods	The EUT G23103158 can meet UN Manual of Tests and Criteria.	P
8.3.9	Design evaluation – Forced internal short circuit (cells)	The EUT has no consider forced internal short circuit test.	N/A
	The cells complied with national requirement for	-	—
	The pressing was stopped upon: - A voltage drop of 50 mV has been detected; or	The EUT has no consider forced internal short circuit test.	N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached	The EUT has no consider forced internal short circuit test.	N/A
	Results: No fire	(See Table 8.3.9)	N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
9	Information for safety		P
	The manufacturer of secondary cells ensures that information is provided about current, voltage and temperature limits of their products.	Provided in the cell specification, which is given to the equipment manufacturer.	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.	Provided in the cell specification, which will be considered during the end product investigation.	N/A
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product	Provided in the cell specification, which will be considered during the end product investigation.	N/A
	As appropriate, information relating to hazard avoidance resulting from a system analysis is provided to the end user :	Provided in the cell specification, which will be considered during the end product investigation.	N/A
10	Marking		P
10.1	Cell marking	See below.	P
	Cells marked as specified in the applicable cell standards: IEC 61951-1, IEC 61951-2 or IEC 61960.	The cell will be used in the manufacture of a battery. See copy of the marking plate.	P
10.2	Battery marking	See below.	N/A
	Batteries marked in accordance with the requirements for the cells from which they are assembled.	The cell will be used in the manufacture of a battery. See copy of the marking plate.	N/A
	Batteries marked with an appropriate caution statement.	It will be considered during the end product investigation.	N/A
10.3	Other information	See below.	N/A
	Storage and disposal instructions marked on or supplied with the battery.	Will be provided in the end product specification.	N/A
	Recommended charging instructions marked on or supplied with the battery.	Will be provided in the end product specification.	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.	The material and packing is following DGR packing procedure 4C1 or 4C2 which can prevent cell for short circuit, mechanical damage and possible ingress.	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
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	3.6Vdc.	P
A.3.1	General	-	N/A
A.3.2	Upper limit charging voltage	-	N/A
A.3.2.1	General	-	N/A
A.3.2.2	Explanation of safety viewpoint	-	N/A
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied	-	N/A
A.4	Consideration of temperature and charging current	-	N/A
A.4.1	General	-	P
A.4.2	Recommended temperature range	Charging temperature declared by client is: 0-45 °C.	P
A.4.2.1	General	See below.	P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	Test results which verify that the cells, charged at the new higher and lower limit of test temperature (higher than 45°C +5 °C; lower than 10 °C -5 °C), and by using the upper limit of charging voltage are tested by the test methods, specified in 8.2 to 8.3.	P
A.4.3	High temperature range	The cell higher charging temperature was declared by client is 45 °C.	P
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	The cell lower charging temperature was declared by client is 0 °C.	P
A.4.4.1	General	-	P
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

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
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	-	N/A
A.5	Sample preparation	The EUT has no consider forced internal short circuit test.	N/A
A.5.1	General	-	N/A
A.5.2	Insertion procedure for nickel particle to generate internal short	-	N/A
	The insertion procedure carried out at 20°C±5°C and under -25 °C of dew point	-	N/A
A.5.3	Disassembly of charged cell	-	N/A
A.5.4	Shape of nickel particle	-	N/A
A.5.5	Insertion of nickel particle to cylindrical cell	-	N/A
A.5.5.1	Insertion of nickel particle to winding core	-	N/A
A.5.5.2	Mark the position of nickel particle on the both end of winding core of the separator	-	N/A
A.5.6	Insertion of nickel particle to prismatic cell	-	N/A

IEC 62133					
Clause	Requirement + Test			Result - Remark	Verdict
	TABLE: Critical components information				N/A
Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity ¹⁾
-	-	-	-	-	-
Supplementary information: -					

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: The EUT is a lithium ion cell.						

7.2.2	TABLE: Vibration		N/A
Model	OCV at start of test, (Vdc)	Results	
-	-	-	
Supplementary information: The EUT is a lithium ion cell.			

7.3.1	TABLE: Incorrect installation (cells)		N/A
Model	OCV of reversed cell, (Vdc)	Results	
-	-	-	
Supplementary information: The EUT is a lithium ion cell.			

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: The EUT is a lithium ion cell.						

7.3.6	TABLE: Crush			N/A
Model	OCV at start of test, (Vdc)	OCV at removal of crushing force, (Vdc)	Results	
-	-	-	-	
Supplementary information: The EUT is a lithium ion cell.				

IEC 62133				
Clause	Requirement + Test		Result - Remark	Verdict
7.3.8	TABLE: Overcharge			N/A
Model	OCV prior to charging, (Vdc)	Maximum charge current, (A)	Time for charging, (hours)	Results
-	-	-	-	-
Supplementary information: The EUT is a lithium ion cell.				

7.3.9	TABLE: Forced discharge (cells)			N/A
Model	OCV before application of reverse charge, (Vdc)	Measured reverse charge I_r , (A)	Time for reversed charge, (minutes)	Results
-	-	-	-	-
Supplementary information: The EUT is a lithium ion cell.				

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
G23103158 / 001	3.6	20	3.6	No fire or explosion, No leakage
G23103158 / 002	3.6	20	3.6	No fire or explosion, No leakage
G23103158 / 003	3.6	20	3.6	No fire or explosion, No leakage
G23103158 / 004	3.6	20	3.6	No fire or explosion, No leakage
G23103158 / 005	3.6	20	3.6	No fire or explosion, No leakage
Supplementary information:				
- No fire or explosion				
- No leakage				

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 , (°C)	Results	
Samples charged at charging temperature upper limit (50 °C)						
G23103158 / 006	23.7	3.6	0.06	75.4	No fire, No explosion	
G23103158 / 007	23.7	3.6	0.06	60.5	No fire, No explosion	
G23103158 / 008	23.7	3.6	0.06	69.8	No fire, No explosion	
G23103158 / 009	23.7	3.6	0.07	80.8	No fire, No explosion	
G23103158 / 010	23.7	3.6	0.06	62.6	No fire, No explosion	
Samples charged at charging temperature lower limit (-5°C)						
G23103158 / 011	23.5	3.6	0.07	62.0	No fire, No explosion	
G23103158 / 012	23.5	3.6	0.06	52.6	No fire, No explosion	
G23103158 / 013	23.5	3.6	0.06	50.1	No fire, No explosion	
G23103158 / 014	23.5	3.6	0.06	45.0	No fire, No explosion	
G23103158 / 015	23.5	3.6	0.06	62.6	No fire, No explosion	
Supplementary information:						
- No fire or explosion						

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 , (°C)	Results
Samples charged at charging temperature upper limit					
-	-	-	-	-	-
Samples charged at charging temperature lower limit					
-	-	-	-	-	-
Supplementary information: The EUT is a lithium ion cell					

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 (50 °C)						
G23103158 / 029	3.60	3.60	23.2	22.90	No fire, No explosion	
G23103158 / 030	3.60	3.60	23.1	22.91	No fire, No explosion	
G23103158 / 031	3.60	3.59	23.2	22.93	No fire, No explosion	
G23103158 / 032	3.60	3.60	23.1	22.91	No fire, No explosion	
G23103158 / 033	3.60	3.60	23.1	22.93	No fire, No explosion	
Samples charged at charging temperature lower limit (-5°C)						
G23103158 / 034	3.60	3.59	23.2	22.91	No fire, No explosion	
G23103158 / 035	3.60	3.59	23.2	22.93	No fire, No explosion	
G23103158 / 036	3.60	3.60	23.2	22.91	No fire, No explosion	
G23103158 / 037	3.60	3.60	23.1	22.91	No fire, No explosion	
G23103158 / 038	3.60	3.60	23.2	22.91	No fire, No explosion	
Supplementary information:						
- No fire or explosion						

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, ($^{\circ}\text{C}$)	Results
-	-	-	-	-
Supplementary information: The EUT is a lithium ion cell.				

8.3.7	TABLE: Forced discharge (cells)				P
Model	OCV before application of reverse charge, (Vdc)	Measured Reverse charge I_r , (A)	Time for reversed charge, (minutes)	Results	
G23103158 / 039	2.0	20	90	No fire, No explosion	
G23103158 / 040	2.0	20	90	No fire, No explosion	
G23103158 / 041	2.0	20	90	No fire, No explosion	
G23103158 / 042	2.0	20	90	No fire, No explosion	
G23103158 / 043	2.0	20	90	No fire, No explosion	
Supplementary information:					
- No fire or explosion					

IEC 62133					
Clause	Requirement + Test			Result - Remark	Verdict
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)	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					

(Note: This is an example of the required attachment. Other forms with a different layout but containing similar information are also acceptable.)

[illegible]



香港高立德國際商品試驗有限公司桃園分公司
Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch 【Bureau Veritas ADT】

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INSTRUMENTATION RECORD DATA SHEET
TEST INSTRUMENTS

File No:
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Test	Function Check	Instr No. S/N.	Range Used	* Instruments, Type	Maker	Model	Calibration Date	Calibration Due
Thermal abuse	V	1. 970210		Test Oven	TAICHY	MCKR-200	Jun-10-2013	Jun-09-2014
Mechanical shock		2. 0K97		Shock Tester	VISOURCE	SHOCK-2	Jun-25-2013	Jun-24-2014
Crushing of cells		3. 9701		Hydraulic Ram Apparatus	Asia Qtech	AT-1	May-20-2013	under calibration
Low pressure		4. 0801		Vacuum Chamber	Asia Qtech	A-1	Nov-05-2013	Nov-04-2014
Heating		11. 41VA0567	-40°C-400°C, 30CH	Hybrid Recorder	Yokokawa	HR 2500E	Apr-17-2014	Apr-16-2015
		13. 43VH0086	-40°C-400°C, 30CH	Hybrid Recorder	Yokokawa	HR 1300	Dec-17-2013	Dec-16-2014
		14. 48JE0043	-40°C-400°C, 30CH	Hybrid Recorder	Yokokawa	DR130	Jun-10-2013	Jun-09-2014
Input / Leakage /		22. 805020222	250V/10A, 300W *1	Electric Load	Prodigit 3302	3302	Sep-04-2013	Sep-03-2014
Heating / Abnormal		23. 805020223	250V/10A, 300W *1	Electric Load	Prodigit 3302	3302	Nov-01-2013	Oct-31-2014
		24. 805020220	150V/8A, 300W *1	Electric Load	Prodigit 3302	3251	Dec-17-2013	Dec-16-2014
Enclosure Push		31. 080353	0 - 30 Kg.	Push - Pull Meter	Alkoh	AE-30	Nov-12-2013	Nov-11-2014
General		39. 70360742	R, V, A, Full Range	Digital Multimeter	Fluke	87-III	Jul-05-2013	Jul-04-2014
	V	40. 70360755	R, V, A, Full Range	Digital Multimeter	Fluke	87-III	Jul-23-2013	Jul-22-2014
	V	46. —	Real Time	Timer (Clock)	Chyau Jye	Chyau Jye	Nov-13-2013	Nov-12-2014
		46-1. 8330R	Real Time	Timer (Clock)	ORIENT	QUARTZ	Jun-25-2013	Jun-24-2014
Insulation		53. 1420073	30-1000V, 0.1-50GQ	Insulation Tester	Extch	8205	Sep-11-2013	Sep-10-2014
		57.12WB22613	0-200°C, 60CH	Recorder	Yokokawa	DR230	Apr-17-2014	Apr-16-2015
Heating		66. DU200-32	-40°C-400°C, 30CH	Recorder	Yokokawa	DR230	Nov-29-2013	Nov-28-2014
Input / Leakage /		71. 204020068	500V/5A, 200W*1	Electric Load	Prodigit 3324	3302	Mar-13-2014	Mar-12-2015
		73. 204020077	250V/10A, 300W*1	Electric Load	Prodigit 3312C	3302	Nov-01-2013	Oct-31-2014
Heating	V	77. 12A933583	-40°C-400°C, 30CH	Hybrid Recorder	Yokokawa	DR130	Mar-12-2014	Mar-11-2015
		78. 12B615473	-40°C-400°C, 30CH	Recorder	Yokokawa	DR230	Jun-18-2013	Jun-17-2014
		86. 12B419024	-40°C-400°C, 30CH	Recorder	Yokokawa	DR130-00-24-1	Jun-27-2013	Jun-26-2014
Vibration		87. 4292	10Hz-100Hz, 0.2-1.5mm	Vibration Test	VISOURCE	VS-5060L	Dec-02-2013	Dec-01-2014

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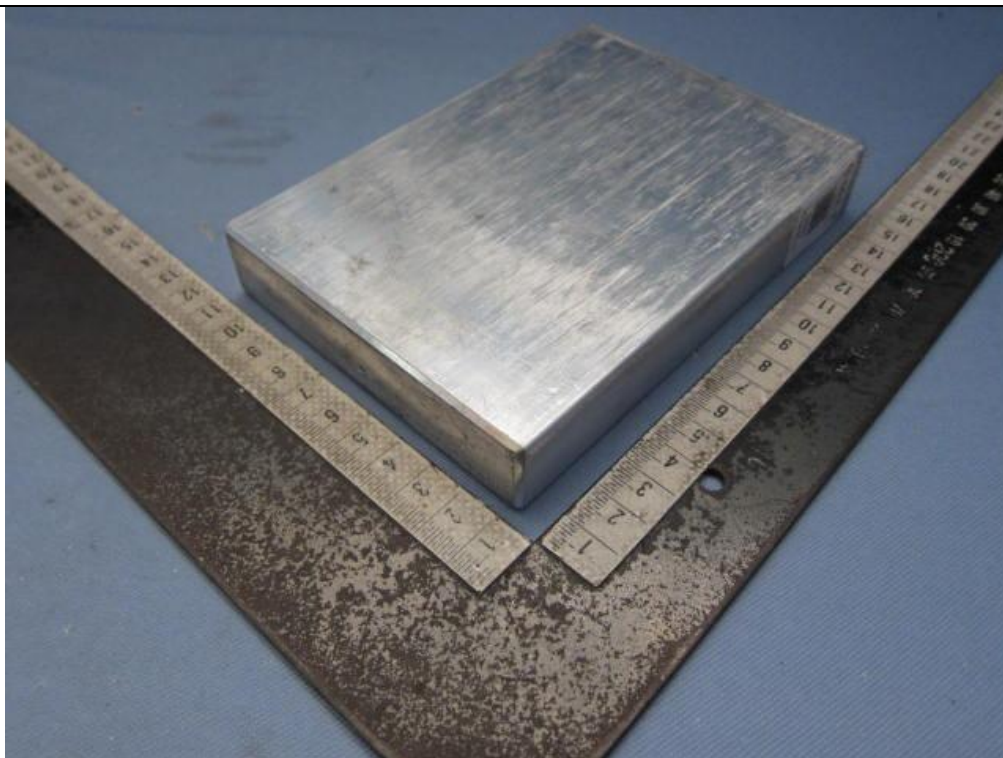
Test	Function Check	Instr No. S/N.	Range Used	* Instruments, Type	Maker	Model	Calibration Date	Calibration Due
		101. 27CA14591	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	DR-230	Jan-21-2014	Jan-20-2015
		102. 27CA14592	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	DR-230	Aug-29-2013	Aug-28-2014
		103. 27CA14593	-40℃-1000℃, 30 CH	Hybrid Recorder	Yokogawa	DR-230	May-08-2014	May-07-2015
		104. 27CA14594	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	DR-230	Sep-24-2013	Sep-23-2014
		105. 27CA14595	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	DR-230	Oct-04-2013	Oct-03-2014
Input / Leakage / Heating / Abnormal		106. 30801A016	60V/60A	Electronic Load	Prodigit	3301A	May-13-2014	May-12-2015
		107. 30801A017	60V/60A	Electronic Load	Prodigit	3301A	Jan-03-2011	stop use
		108. 30801A019	60V/60A	Electronic Load	Prodigit	3301A	May-13-2014	May-12-2015
		109. 30801A020	60V/60A	Electronic Load	Prodigit	3301A	Dec-17-2013	Dec-16-2014
		110. 30901A021	60V/60A	Electronic Load	Prodigit	3301A	Jul-23-2013	Jul-22-2014
General		113. 033290010	R, V, A full range	DC+AC 100kHz TRMS DMM	BRYMEN	BM859CF	Sep-10-2013	Sep-09-2014
		114. 033290030	R, V, A full range	DC+AC 100kHz TRMS DMM	BRYMEN	BM859CF	Nov-01-2013	Oct-31-2014
Temperature cycling		116. 920904	-70℃-100℃, 20%-98% RH	THERMO-HYGROMETER	TAICHY	MHU-480SU	Nov-20-2013	Nov-19-2014
Moulded case stress at high ambient temperature		117. 920905	0-200℃	TEMPERATURE OVEN	TAICHY	CK-500	Nov-20-2013	Nov-19-2014
General		122. 680594	0-500V, 20A	Digital Power Meter	Idrc	CP-320A	Dec-17-2013	Dec-16-2014
		123. 680595	0-500V, 20A	Digital Power Meter	Idrc	CP-320A	Oct-04-2013	Oct-03-2014
Free fall	V	128. —	0-5m	tape measure	KDS	5.5mm	Jun-25-2013	Jun-24-2014
Heating		135. 27E214538 504	-40℃-400℃, 30CH	Data Acquisition Unit	Yokogawa	MX100-E-1D	Jan-27-2014	Jan-26-2015
General	V	137. 40905090004	0.03μH-9999H, 0.003pF-80.00mF, 0Ω-500MΩ	LCR Meter	Motech	MT4090/I-S1	Feb-12-2014	Feb-11-2015
Incorrect installation of a cell		154. —	—	10hm Resistor	Yen Sheng	—	—	—
		160. 9100201	—	Crush Tester Equipment	Asia Qtech	IB-5	Oct-07-2013	Oct-06-2014
		161. 9100202	—	Projectile Tester Equipment	博紳	PROJ-8	Oct-07-2013	Oct-06-2015

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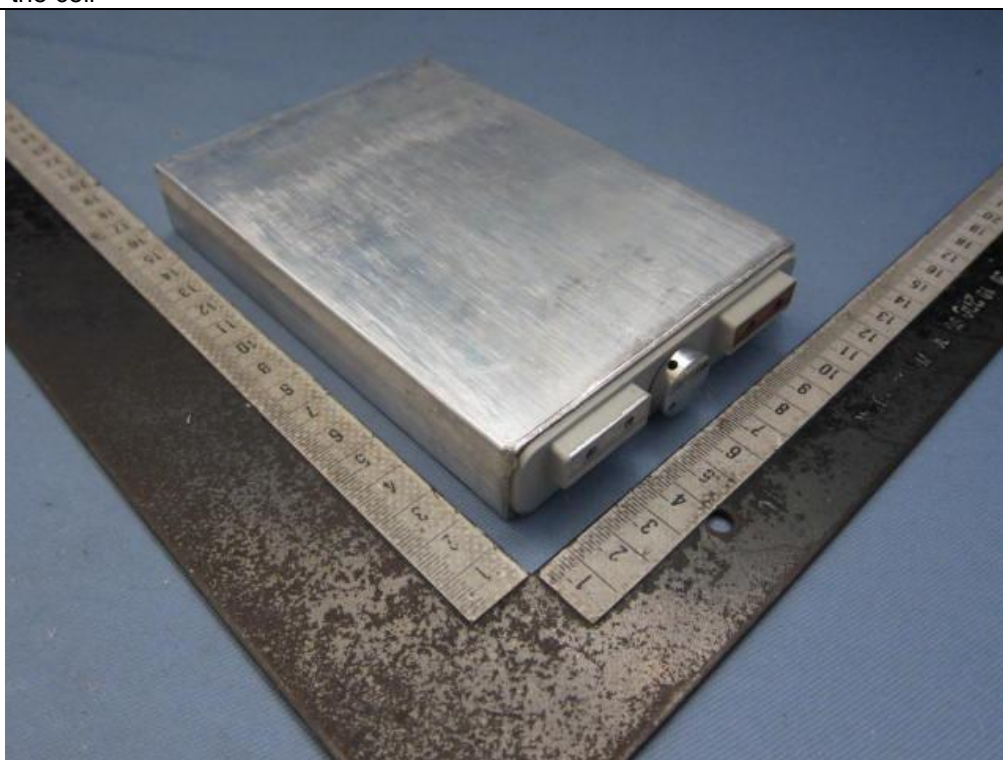
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TEST INSTRUMENTS

Test	Function Check	Instr No. S/N.	Range Used	* Instruments, Type	Maker	Model	Calibration Date	Calibration Due
Vibration		166. 3302F-01-00602FD0434	60V/60A/300W	Electronic Load	Prodigit	3302F-01-11F	Jul-05-2013	Jul-04-2014
		167. 3302F-01-00602FD0441	60V/60A/300W	Electronic Load	Prodigit	3302F-01-11F	Aug-02-2013	Aug-01-2014
		168. 3302F-01-00602FD0436	60V/60A/300W	Electronic Load	Prodigit	3302F-01-11F	Jul-05-2013	Jul-04-2014
		169. 3302F-01-00602FD0435	60V/60A/300W	Electronic Load	Prodigit	3302F-01-11F	Jul-05-2013	Jul-04-2014
		170. 500156	30V, 25A	Programmable DC Source	IDRC	DSP-030-025HD	Jul-26-2013	Jul-25-2014
		171. 500157	30V, 25A	Programmable DC Source	IDRC	DSP-030-028HD	Jul-26-2013	Jul-25-2014
		172. 500155	30V, 25A	Programmable DC Source	IDRC	DSP-030-027HD	Jul-26-2013	Jul-25-2014
		173. 500158	30V, 25A	Programmable DC Source	IDRC	DSP-030-028HD	Jul-26-2013	Jul-25-2014
	V	220-1. 9111050078		Current Transducer	LEM	IT700-S	2013-11-27	2014-11-26
		176. N/A	900~1100mbar	Atmospheric-pressure gauge	永發	VF-72	Nov-13-2013	Nov-12-2014
		214. 6293	1Hz-200Hz, 0.2-1mm	Vibration Test	振儀科技	VS-100	Jan-08-2014	Jan-07-2015
		222. 131113325	0-1MQ, 0-60V	Internal resistance meter	HIOKI	BT3562	Feb-07-2014	Feb-06-2015
		223. Q829392	Temp.: 0~50℃ Humid.: 0~100%	Thermo-Hygro Grap	CAESAR	CEHT-3009	Feb-07-2014	Feb-06-2015
		224. C2PK22022V	0-600V, 0-20A	DIGITAL POWER METER	Yokogawa	WT310	Dec-20-2013	Dec-19-2014
		225. 130612	30V, 25A	Programmable DC Source	IDRC	DSP-030-025HR	Dec-25-2013	Dec-24-2014

Photo:



Top view for the cell



Front view for the cell

