IEC / IECEE CB SCHEME	Ref. Certif. No.
	FR 684289

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 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*	**GMET Mfg Processes Co., Ltd.** No.50, Guangfu S. Rd., Hukou Township, Hsinchu County 303, Taiwan
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	3.2Vdc, 40Ah
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	-
Model / Type Ref. Ref. De type	G35145158 (IFP35/145/158)
Additional information (if necessary may also be reported on page 2) Informations complémentaires (si nécessaire, peuvent être indiquées sur la 2ème page)	See test report
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° CB160122C38 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: 2016-03-18

Signature:

LABORATOIRE CENTRAL DES INDUSTRIES ELECTRIQUES
S.A.S
au capital de 15.745.984 €
RCS Nanterre B 408 363 174
33, Av. du Gal Leclerc
FONTENAY-aux-ROSES
F-92260

Didier BOURGES
Certification Officer

Issued 2012-04 (LCIE)

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. .....:	CB160122C38 001
Date of issue .....:	2016-03-17
Total number of pages.....	29
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

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 or GMET
Manufacturer.....:	GMET Mfg Processes Co., Ltd.
Model/Type reference .....:	G35145158 (IFP35/145/158)
Ratings .....:	3.2Vdc, 40Ah

Testing procedure and testing location:		
☒ 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	
☐ Associated CB Testing Laboratory:	N/A	
Testing location/ address .....:	N/A	
Tested by (name + signature) .....:	Bob Tsai / Supervisor	
Approved by (name + signature) .....:	Edward Chiueh / Technical Manager	
☐ Testing procedure: TMP	N/A	
Testing location/ address .....:	-	
Tested by (name + signature) .....:	-	-
Approved by (name + signature) .....:	-	-
☐ Testing procedure: WMT	N/A	
Testing location/ address .....:	-	
Tested by (name + signature) .....:	-	-
Witnessed by (name + signature) ....:	-	-
Approved by (name + signature) .....:	-	-
☐ Testing procedure: SMT	N/A	
Testing location/ address .....:	-	
Tested by (name + signature) .....:	-	-
Approved by (name + signature) .....:	-	-
Supervised by (name + signature)...:	-	-

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

N/A

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
5.2 Insulation and wiring 5.3 Venting 5.4 Temperature/voltage/current management 5.5 Terminal contacts 5.6 Assembly of cells into batteries 5.7 Quality plan 8.1.2 Charging procedure for test purposes (Procedure 2) 8.2.1 Continuous charge at constant voltage (cells) 8.3.1 External short circuit (cells) 8.3.3 Free fall 8.3.4 Thermal abuse (cells) 8.3.5 Crush (cells) 8.3.7 Forced discharge (cells) 8.3.8 Transport test 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±5°C, using the method declared by the manufacturer. (2) Prior to charging, the battery cell shall have been discharged at 20±5°C at a constant current of 0.2 It A down to a specified final voltage.	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

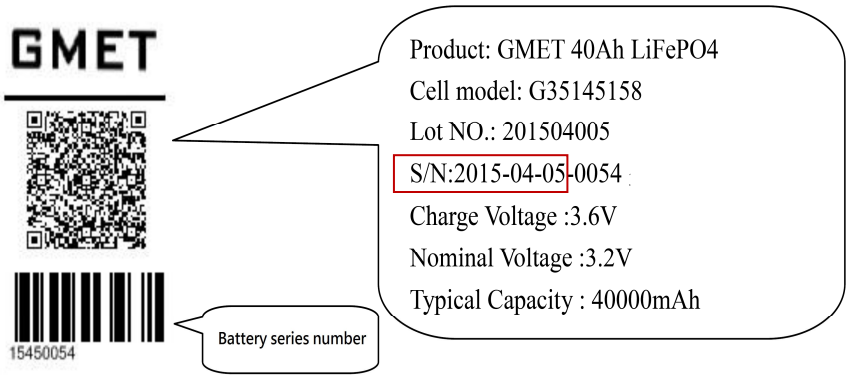
Summary of compliance with National Differences

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:



S/N:2015-04-05

2015: Indicate calendar year
04: Indicate calendar month
05: indicate calendar date of month

Test item particulars.....:	
Classification of installation and use.....:	Built-in
Supply connection.....:	Terminals
Recommend charging method declared by the manufacturer ..... :	Limiting 8000mA and constant 3.6V charge at 20°C±5°C
Discharge current (0,2 I_t A) ..... :	8000mA
Specified final voltage ..... :	End of charge 3.6V; End of discharge 2.0V
Chemistry ..... :	☐ nickel systems ..... ☒ lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell.....:	3.6 V
Maximum charging current.....:	120A
Charging temperature upper limit.....:	45°C
Charging temperature lower limit.....:	0°C
Polymer cell electrolyte type ..... :	☐ gel polymer ..... ☐ solid polymer
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2016-01-22
Date (s) of performance of tests.....:	2016-01-22 to 2016-03-08

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) ..... :	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 G35145158 (IFP35/145/158) 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) 35.0 mm by (W) 145.0 mm by (L) 158.0 mm.

(4) Weight: approx. 1460g.

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	Not a battery pack and it shall be evaluated in the final assembly of battery pack.	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 seams on both side of metal case as the pressure vent, up to release pressure. See pressure vent localization picture on page 29.	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 and it shall be evaluated in the final assembly of 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

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	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 cell is a built-in product; it should be evaluated in the final battery pack.	N/A
	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 cell is build-in product; it should be evaluated in the final battery pack.	N/A
	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
5.6.2	Design recommendation for lithium systems only	Not a battery pack.	N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	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

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

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
	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 15.0°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	The cell is lithium system.	N/A
7.2.2	Vibration	The cell is lithium system.	N/A
	Results: No fire. No explosion. No leakage	The cell is lithium system.	N/A
7.2.3	Moulded case stress at high ambient temperature	The cell is lithium system.	N/A
	Oven temperature (℃) ....:		—
	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 ..... :	The cell is lithium system.	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 ..... :	The cell is lithium system.	N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
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 (℃) ....:		—
	Results: No fire. No explosion.	The cell is lithium system.	N/A
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 ± 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 ..... :	The cell is lithium system.	N/A
7.3.7	Low pressure	The cell is lithium system.	N/A
	Chamber pressure (kPa) .....:		—
	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 ..... :	The cell is lithium system.	N/A
7.3.9	Forced discharge	The cell is lithium system.	N/A
	Results: No fire. No explosion ..... :	The cell is lithium system.	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℃ ± 5℃) 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

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	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 ℃ for the upper limit and minus 5 ℃ for the lower limit	Test results which verify that the cells, charged at the new lower limit of test temperature (lower: 0℃ - 5℃, higher: 45℃ + 5℃) when tested by the methods specified in 8.2 to 8.3 meet the requirements.	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 lower limit of test temperature (lower: 0℃ - 5℃, higher: 45℃ + 5℃) 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
	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 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 iron phosphate cell.	N/A
	Oven temperature (℃) ....:	--	—
	Results: No physical distortion of the battery casing resulting in exposure if internal components	The EUT is a Lithium iron phosphate 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

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	The cells were tested until one of the following occurred: - 24 hours elapsed; or	The EUT is a Lithium iron phosphate cell.	N/A
	- The case temperature declined by 20% of the maximum temperature rise	The EUT is a Lithium iron phosphate 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 iron phosphate cell.	N/A
	Results: No fire. No explosion ..... :	(See Table 8.3.2)	N/A
8.3.3	Free fall	See below Free fall sample ID: G35145158 / 016; G35145158 / 017; G35145158 / 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. Thermal abuse sample ID: 50℃: G35145158 / 019 G35145158 / 020 G35145158 / 021 G35145158 / 022 G35145158 / 023 -5℃: G35145158 / 024 G35145158 / 025 G35145158 / 026 G35145158 / 027 G35145158 / 028	P
	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 (℃) ....:	130℃	—
	Gross mass of cell (g).....:	1460 g	—

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	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 iron phosphate cell.	N/A
	Test was continued until the temperature of the outer casing: - Reached steady state conditions (less than 10℃ change in 30-minute period); or	The EUT is a Lithium iron phosphate cell.	N/A
	- Returned to ambient	The EUT is a Lithium iron phosphate 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 meets UN Manual of Tests and Criteria.	P
8.3.9	Design evaluation – Forced internal short circuit (cells)	The EUT has no considered 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 considered 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 considered forced internal short circuit test.	N/A
	Results: No fire ..... :	(See Table 8.3.9)	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.	Provided in the cell specification, which is given to the equipment manufacturer.	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	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.	By agreement between the manufacturer and battery pack manufacture, cells used in the manufacture of a battery need not be marked.	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 EUT is cell it should be considered during the end product investigation.	N/A
	Batteries marked with an appropriate caution statement.	The EUT is cell it should 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 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	See below.	P
A.2	Safety of lithium-ion secondary battery	Cell charge voltage is 3.6 Vdc.	P
A.3	Consideration on charging voltage	See below.	P
A.3.1	General	Considered.	P
A.3.2	Upper limit charging voltage	See below.	N/A
A.3.2.1	General	Cell charge voltage is 3.6 Vdc.	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	Cell charge voltage 3.6 Vdc is to be applied for testing of Lithium iron phosphate cell and charge voltage has no over upper limit charge voltage.	N/A
A.4	Consideration of temperature and charging current	--	N/A
A.4.1	General	--	N/A
A.4.2	Recommended temperature range	See below.	P
A.4.2.1	General	The cell lower charging temperature is 0℃.	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 lower limit of test temperature (lower: 0℃ - 5℃, higher: 45℃ + 5℃) when tested by the methods specified in 8.2 to 8.3 meet the requirements.	P
A.4.3	High temperature range	See blow.	P
A.4.3.1	General	The cell high charging temperature was declared by client is 45℃.	P
A.4.3.2	Explanation of safety viewpoint	Upper temperature: 50℃ and by using the upper limit of charging voltage are tested by the test methods, specified in 8.2 to 8.3.	P

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Clause	Requirement + Test	Result - Remark	Verdict
A.4.3.3	Safety considerations when specifying charging conditions in high temperature range	Test results which verify that the cells and batteries, charged at the new upper limit of test temperature 50℃ and tested by the test methods, specified in 8.2 to 8.3.	P
A.4.3.4	Safety consideration when specifying new upper limit in high temperature range	Test results which verify that the cells charged at the new upper limit of the high temperature range +5℃ when tested by the methods specified in 8.2 to 8.3 meet the requirements.	P
A.4.4	Low temperature range	See below.	P
A.4.4.1	General	The cell lower charging temperature was declared by client is 0℃.	P
A.4.4.2	Explanation of safety viewpoint	Lower temperature: -5℃ and by using the upper limit of charging voltage are tested by the test methods, specified in 8.2 to 8.3.	P
A.4.4.3	Safety considerations, when specifying charging conditions in low temperature range	Test results which verify that the cells and batteries, charged at the new lower limit of test temperature -5℃ and tested by the test methods, specified in 8.2 to 8.3.	P
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range	Lower temperature: -5℃ and by using the upper limit of charging voltage are tested by the test methods, specified in 8.2 to 8.3.	P
A.4.5	Scope of the application of charging current	--	N/A
A.5	Sample preparation	The EUT has no considered 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℃±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

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Clause	Requirement + Test	Result - Remark	Verdict
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_t, (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**	
G35145158 / 001	3.6	8.0	3.6	No fire or explosion, No leakage	
G35145158 / 002	3.6	8.0	3.6	No fire or explosion, No leakage	
G35145158 / 003	3.6	8.0	3.6	No fire or explosion, No leakage	
G35145158 / 004	3.6	8.0	3.6	No fire or explosion, No leakage	
G35145158 / 005	3.6	8.0	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 (cells)					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						
G35145158 / 006	22.8	3.6	0.07	63.1	No fire, No explosion	
G35145158 / 007	22.8	3.6	0.08	65.8	No fire, No explosion	
G35145158 / 008	22.8	3.6	0.08	62.1	No fire, No explosion	
G35145158 / 009	22.8	3.6	0.07	67.9	No fire, No explosion	
G35145158 / 010	22.8	3.6	0.07	49.9	No fire, No explosion	
Samples charged at charging temperature lower limit						
G35145158 / 011	22.9	3.6	0.07	80.4	No fire, No explosion	
G35145158 / 012	22.9	3.6	0.07	82.5	No fire, No explosion	
G35145158 / 013	22.9	3.6	0.07	78.8	No fire, No explosion	
G35145158 / 014	22.9	3.6	0.08	71.7	No fire, No explosion	
G35145158 / 015	22.9	3.6	0.08	95.1	No fire, No explosion	
Supplementary information: - No fire or explosion						

8.3.2	TABLE: External short circuit (battery)					N/A
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (Ω)**	**Maximum case temperature rise ΔT, (°C)**	**Results**	
Samples charged at charging temperature upper limit						
-	-	-	-	-	-	
Samples charged at charging temperature lower limit						
-	-	-	-	-	-	
Supplementary information: -						

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

8.3.5	TABLE: Crush (cells)					P
Model	**OCV at start of test, (Vdc)**	**OCV at removal of crushing force, (Vdc)**	**Width/ diameter of cell before crush, (mm)**	**Required deformation for crush, (mm)**	**Results**	
Samples charged at charging temperature upper limit						
G35145158 / 029	3.6	3.59	34.69	34.66	No fire, No explosion	
G35145158 / 030	3.6	3.58	34.61	34.56	No fire, No explosion	
G35145158 / 031	3.6	3.57	34.65	34.64	No fire, No explosion	
G35145158 / 032	3.6	3.59	34.63	34.58	No fire, No explosion	
G35145158 / 033	3.6	3.58	34.59	34.57	No fire, No explosion	
Samples charged at charging temperature lower limit						
G35145158 / 034	3.6	3.57	34.66	34.63	No fire, No explosion	
G35145158 / 035	3.6	3.58	34.68	34.65	No fire, No explosion	
G35145158 / 036	3.6	3.57	34.67	34.65	No fire, No explosion	
G35145158 / 037	3.6	3.57	34.65	34.64	No fire, No explosion	
G35145158 / 038	3.6	3.59	34.66	34.65	No fire, No explosion	
Supplementary information: - No fire or explosion						

8.3.6	TABLE: Over-charging of battery				N/A
Constant charging current (A) .....:		-			—
Supply voltage (Vdc).....:		-			—
Model	**OCV before charging, (Vdc)**	**Resistance of circuit, (Ω)**	**Maximum outer casing temperature, (°C)**	**Results**	
-	-	-	-	-	
-	-	-	-	-	
Supplementary information: -					

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

8.3.7	TABLE: Forced discharge (cells)				P
Model	**OCV before application of reverse charge, (Vdc)**	**Measured Reverse charge I_t, (A)**	**Time for reversed charge, (minutes)**	**Results**	
G35145158 / 039	2.0	40	90	No fire, No explosion	
G35145158 / 040	2.0	40	90	No fire, No explosion	
G35145158 / 041	2.0	40	90	No fire, No explosion	
G35145158 / 042	2.0	40	90	No fire, No explosion	
G35145158 / 043	2.0	40	90	No fire, No explosion	
Supplementary information: - No fire or explosion					

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					

List of test equipment used

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

Clause	Measurement/ testing	Testing/measuring equipment/material used, (equipment ID)	Range used	Last calibration date	Calibration due date

File No:
Project No:

INSTRUMENTATION RECORD DATA SHEET
TEST INSTRUMENTS

Issued Date: 05-27-08
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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-08-2015	Jun-07-2016
Mechanical shock		2. 0K97		Shock Tester	VISOURCE	SHOCK-2	Jun-16-2015	Jun-15-2016
Crushing of cells	V	3. 9701		Hydraulic Ram Apparatus	Asia Qtech	AT-1	May-16-2015	May-15-2016
Low pressure		4. 0801		Vacuum Chamber	Asia Qtech	A-1	Oct-23-2015	Oct-22-2016
Heating		11. 41VA0567	-40-400℃, 30CH	Hybrid Recorder	Yokokawa	HR 2500E	Apr-15-2015	Apr-14-2016
		13. 43VH0086	-40-400℃, 20CH	Hybrid Recorder	Yokogawa	HR 1300	Dec-11-2015	Dec-10-2016
	V	14. 48JE0043	-40-400℃, 20CH	Hybrid Recorder	Yokogawa	DR130	Jun-10-2015	Jun-09-2016
		15. 42VF0429	-40-400℃, 30CH	Hybrid Recorder	Yokogawa	HR 2300	Mar-09-2015	under calibration
Input / Leakage /		22. 805020222	250V/10A, 300W *1	Electric Load	Prodigit 3302	3302	Sep-02-2015	Sep-01-2016
Heating / Abnormal		23. 805020223	250V/10A, 300W *1	Electric Load	Prodigit 3302	3302	Oct-28-2015	Oct-27-2016
		24. 805020220	150V/8A, 300W *1	Electric Load	Prodigit 3302	3251	Jan-21-2016	Jan-20-2017
Enclosure Push		31. 080353	0 - 30 Kg.	Push - Pull Meter	Aikoh	AE-30	Nov-06-2015	Nov-05-2016
General	V	39. 70360742	R, V, A. Full Range	Digital Multimeter	Fluke	87-III	Jul-03-2015	Jul-02-2016
		40. 70360755	R, V, A. Full Range	Digital Multimeter	Fluke	87-III	Jul-17-2015	Jul-16-2016
	V	45. W981030	-42 ~150 Degree C	STANDARD TEMPERATURE &HUMIDITY CHAMBER	WIT	TH-4S-C	Jun-09-2014	Jun-08-2015
	V	46. —	Real Time	Timer (Clock)	Chyau Jye	Chyau Jye	Nov-10-2015	Nov-09-2016
		46-1. 8330R	Real Time	Timer (Clock)	ORIENT	QUARTZ	Jun-23-2015	Jun-22-2016
Insulation		53. 1420073	30-1000V, 0.1-50GΩ	Insulation Tester	Extech	8205	Sep-08-2015	Sep-07-2016
		57.12WB22613	-40-400℃, 60CH	Recorder	Yokokawa	DR230	Jun-25-2015	Jun-24-2016
Heating		66. DU200-32	-40-400℃, 30CH	Recorder	Yokokawa	DR230	Nov-30-2015	Nov-29-2016
Input / Leakage /		71. 204020068	500V/5A, 200W*1	Electric Load	Prodigit 3324	3302	Mar-12-2015	under calibration
		73. 204020077	250V/10A, 300W*1	Electric Load	Prodigit 3312C	3302	Oct-28-2015	Oct-27-2016
Heating		77. 12A933583	-40-400℃, 20CH (T	Hybrid Recorder	Yokogawa	DR130	Mar-09-2015	under calibration
		78. 12B615473	-40-400℃, 40CH	Recorder	Yokokawa	DR230	Aug-17-2015	Aug-16-2016
		86. 12B419024	-40-400℃, 20CH	Recorder	Yokokawa	DR130-00-24-1	Jun-25-2015	Jun-24-2016
Vibration		87. 4292	10Hz-100Hz, 0.2-1.5mm	Vibration Test	VISOURCE	VS-5060L	Dec-10-2015	Dec-09-2016

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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-21-2016	Jan-20-2017
		102. 27CA14592	-40-400℃, 30CH	Hybrid Recorder	Yokogawa	DR-230	Aug-25-2015	Aug-24-2016
		103. 27CA14593	-40-400℃, 30CH (T	Hybrid Recorder	Yokogawa	DR-230	May-06-2015	May-05-2016
		104. 27CA14594	-40-400℃, 30CH	Hybrid Recorder	Yokogawa	DR-230	Sep-11-2015	Sep-10-2016
		105. 27CA14595	-40-400℃, 30CH	Hybrid Recorder	Yokogawa	DR-230	Sep-22-2015	Sep-21-2016
Input / Leakage / Heating / Abnormal		106. 30801A016	60V/60A	Electronic Load	Prodigit	3301A	May-12-2015	May-11-2016
		107. 30801A017	60V/60A	Electronic Load	Prodigit	3301A	Jan-03-2011	stop use
		108. 30801A019	60V/60A	Electronic Load	Prodigit	3301A	May-12-2015	May-11-2016
		109. 30801A020	60V/60A	Electronic Load	Prodigit	3301A	Dec-18-2015	Dec-17-2016
		110. 30901A021	60V/60A	Electronic Load	Prodigit	3301A	Jul-17-2015	Jul-16-2016
General		113. 033290010	R, V, A full range	DC+AC 100kHz TRMS DMM	BRYMEN	BM859CF	Sep-02-2015	Sep-01-2016
		114. 033290030	R, V, A full range	DC+AC 100kHz TRMS DMM	BRYMEN	BM859CF	Nov-11-2015	Nov-10-2016
Temperature cycling		116. 920904	-70℃~100℃, 20%~98% RH	THERMO-HYGROMETER	TAICHY	MHU-480SU	Nov-16-2015	Nov-15-2016
Moulded case stress at high ambient temperature		117. 920905	0-200℃	TEMPERATUER OVEN	TAICHY	CK-500	Nov-16-2015	Nov-15-2016
General		122. 680594	0-500V, 20A	Digital Power Meter	Idrc	CP-320A	Dec-14-2015	Dec-13-2016
		123. 680595	0-500V, 20A	Digital Power Meter	Idrc	CP-320A	Sep-25-2015	Sep-24-2016
Free fall	V	128. —	0-5m	tape measure	KDS	5.5mm	Jun-24-2015	Jun-23-2016
Heating		135. 27E214538 504	-40-400℃, 30CH	Data Acquisition Unit	Yokogawa	MX100-E-1D	Jan-21-2016	Jan-20-2017
General		137. 40905090004	0.03μH~9999H, 0.003pF~80.00mF, 0Ω~500MΩ	LCR Meter	Motech	MT4090/-S1	Jan-22-2016	Jan-21-2017
Incorrect installation of a cell		154. —	—	1ohm Resistor	Yen Sheng	—	—	—
		160. 9100201	—	Crush Tester Equipment	Asia Qtech	IB-5	Sep-24-2015	Sep-23-2017
		161. 9100202	—	Projectile Tester Equipment	冲击	PROJ-8	Sep-24-2015	Sep-23-2017
	V	162. 064AB12043	0-600g	Electronic Scale	HENGX	HXB-600	Dec-15-2015	Dec-14-2016

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TEST INSTRUMENTS

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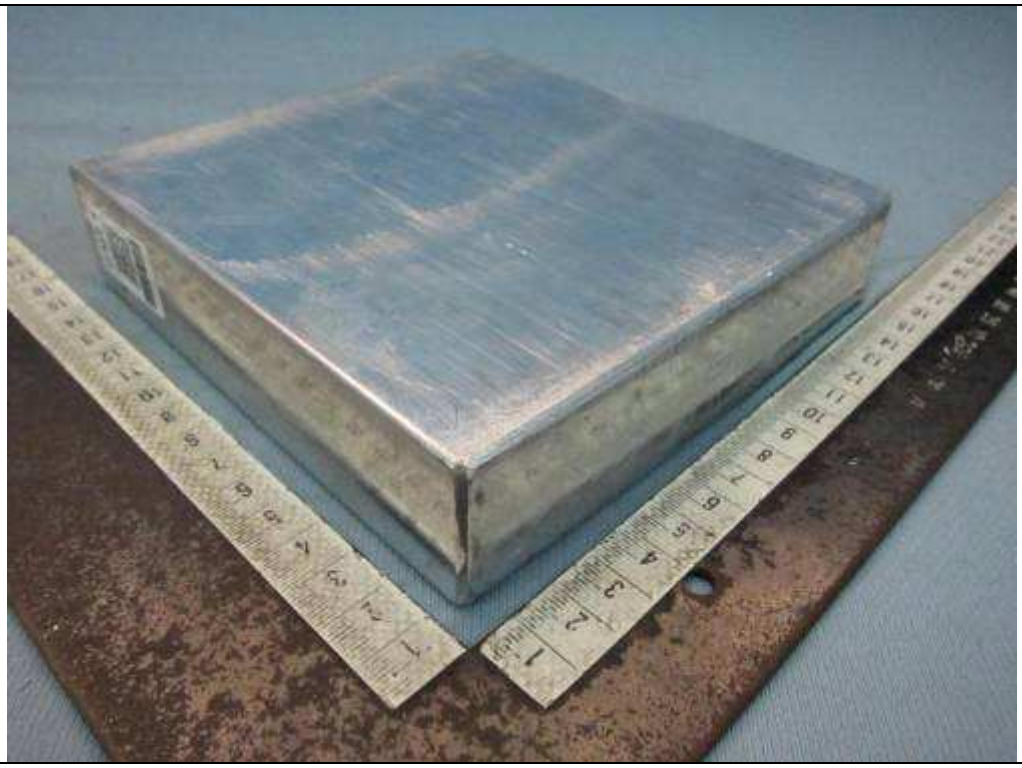
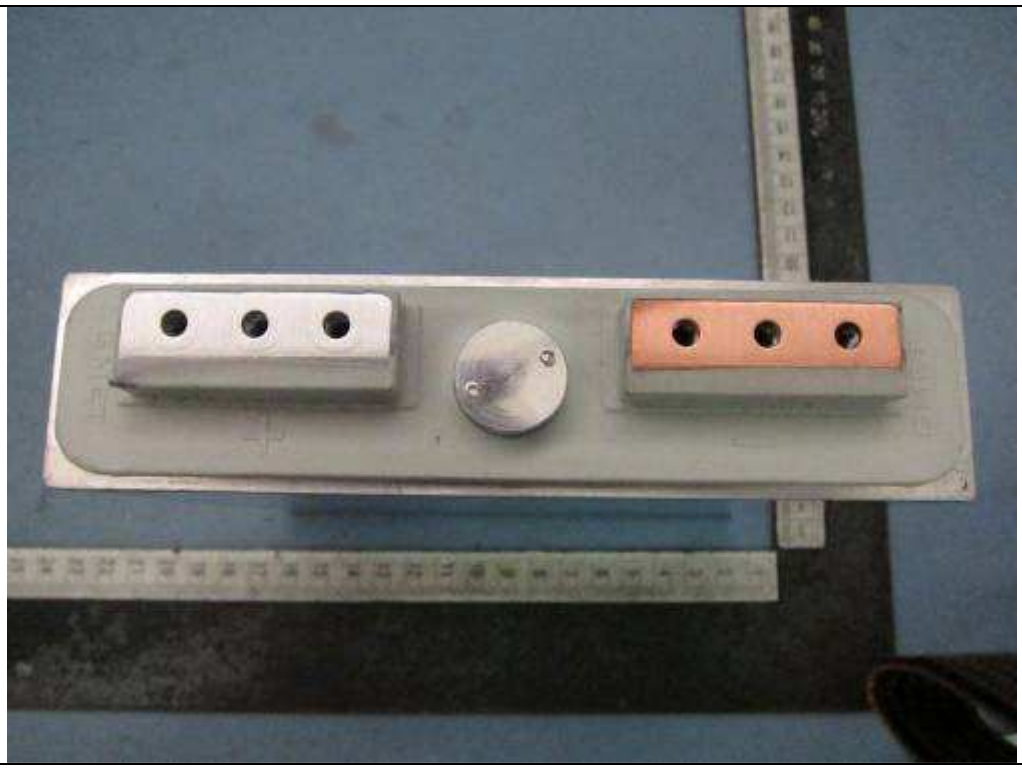
Test	Function Check	Instr No. S/N.	Range Used	* Instruments, Type	Maker	Model	Calibration Date	Calibration Due
	V	166. 3302F-01-00602FD0434	60V/60A/300W	Electronic Load	Prodigit	3302F-01-11F	Jul-03-2015	Jul-02-2016
	V	167. 3302F-01-00602FD0441	60V/60A/300W	Electronic Load	Prodigit	3302F-01-11F	Jul-17-2015	Jul-16-2016
	V	168. 3302F-01-00602FD0436	60V/60A/300W	Electronic Load	Prodigit	3302F-01-11F	Jul-03-2015	Jul-02-2016
	V	169. 3302F-01-00602FD0435	60V/60A/300W	Electronic Load	Prodigit	3302F-01-11F	Jul-03-2015	Jul-02-2016
	V	170. 500156	30V,25A	Programable DC Source	IDRC	DSP-030-025HD	Jul-17-2015	Jul-16-2016
	V	171. 500157	30V,25A	Programable DC Source	IDRC	DSP-030-026HD	Jul-17-2015	Jul-16-2016
	V	172. 500155	30V,25A	Programable DC Source	IDRC	DSP-030-027HD	Jul-17-2015	Jul-16-2016
	V	173. 500158	30V,25A	Programable DC Source	IDRC	DSP-030-028HD	Jul-17-2015	Jul-16-2016
Vibration	V	214. 6293	1Hz-200Hz, 0.2-1mm	Vibration Test	振璃科技	VS-100	Jan-26-2016	Jan-25-2017
		222. 131113325	0-1MΩ, 0-60V	Internal resistance meter	HIOKI	BT3562	Feb-02-2016	Feb-01-2017
		223. Q829392	Temp. : 0~50℃ Humi.: 0~100%	Thermo-Hygro Graph	CAESAR	CEHT-3000	Feb-02-2016	Feb-01-2017
		224. C2PK22022V	0-600V, 0-20A	DIGITAL POWER METER	Yokogawa	WT310	Dec-18-2015	Dec-17-2016
		225. 130612	30V,25A	Programable DC Source	IDRC	DSP-030-025HR	Dec-18-2015	Dec-17-2016
		226. 39108378	300~1200 hPa	atmospheric pressure gauge	testo	testo 511	Jun-11-2015	Jun-10-2016

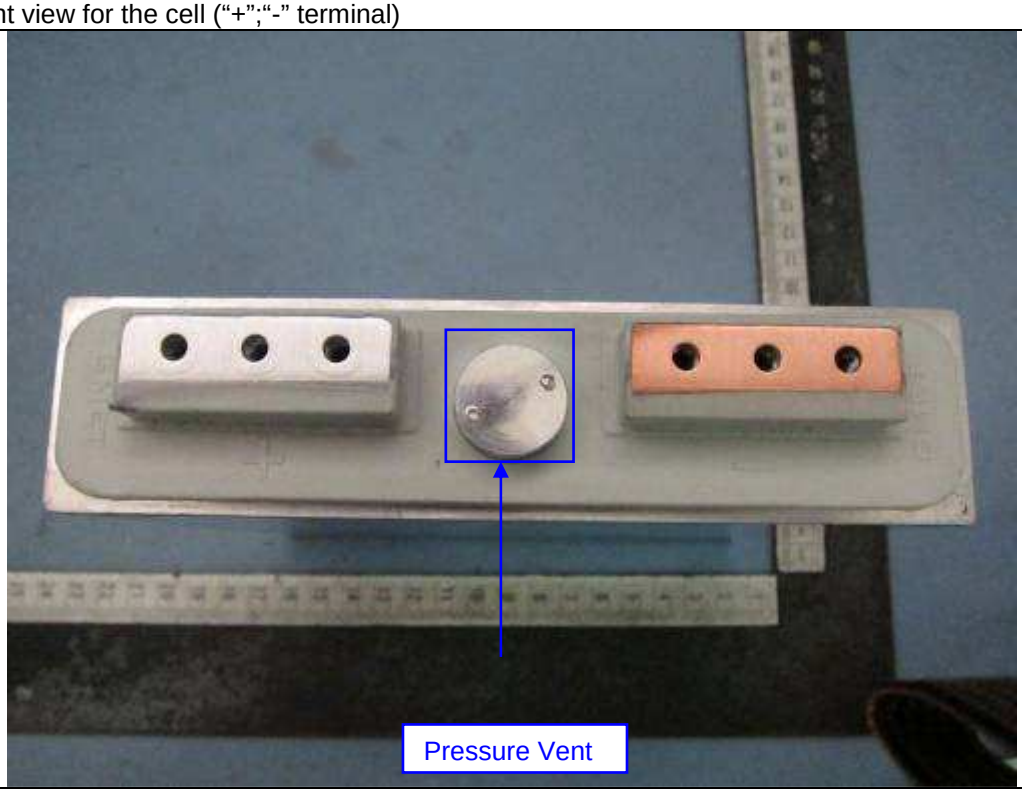


Top view for the cell

Bottom view for the cell



Front view for the cell (“+”;“-” terminal)



Pressure vent for the cell