



Ref. Certif. No.

FR 646427/A1

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

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

CB TEST CERTIFICATE / CERTIFICAT D'ESSAI OC

Product / Produit

Rechargeable lithium-Ion Battery Cell

Name and address of the applicant / Nom et adresse du demandeur

E-ONE MOLI ENERGY CORP. No.10, Dali 2nd Rd., Shanhua Dist., Tainan City 74144, Taiwan

Name and address of the manufacturer / Nom et adresse du fabricant

E-ONE MOLI ENERGY CORP. No.10, Dali 2nd Rd., Shanhua Dist., Tainan City 74144, Taiwan

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

E-ONE MOLI ENERGY CORP. No.10, Dali 2nd Rd., Shanhua Dist., Tainan City 74144, 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

3.7V, 1.96Ah

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

Molicel or

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

-

Model / Type Ref. / Ref. De type

ICP103450CA (ICP11/34/50)

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

Supersedes the certificate FR 646427 (Correction of rated voltage and report description)

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°CB130717C27 002

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: 2015-08-05

Signature:

Rémi HANOTS Certification Officer



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. ....: CB130717C27 002  
Date of issue .....: 2015-08-04  
Total number of pages..... 30

Applicant's name.....: E-ONE MOLLI ENERGY CORP.  
Address .....: No.10, Dali 2nd Rd., Shanhua Dist.,Tainan City 74144,Taiwan

**Test specification:**

Standard .....: IEC 62133: 2012 (Second Edition)  
Test procedure .....: CB / CCA (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 .....: Rechargeable lithium-Ion Battery Cell  
Trade Mark .....: Molicel or   
Manufacturer.....: E-ONE MOLLI ENERGY CORP.  
Model/Type reference .....: ICP103450CA (ICP11/34/50)  
Ratings .....: 3.7V, 1.96Ah

<b>Testing procedure and testing location:</b>		
<input checked="" type="checkbox"/>	<b>CB Testing Laboratory:</b>	Bureau Veritas Consumer Product Services Limited, Taoyuan Branch
<b>Testing location/ address .....</b>		No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Chinese Taipei
<input type="checkbox"/>	<b>Associated CB Testing Laboratory:</b>	N/A
<b>Testing location/ address .....</b>		N/A
<b>Tested by (name + signature) .....</b>		Bob Tsai 
<b>Approved by (name + signature) .....</b>		Danny Lin 
<input type="checkbox"/>	<b>Testing procedure: TMP</b>	N/A
<b>Testing location/ address .....</b>		-
<b>Tested by (name + signature) .....</b>		-
<b>Approved by (name + signature) .....</b>		-
<input type="checkbox"/>	<b>Testing procedure: WMT</b>	N/A
<b>Testing location/ address .....</b>		-
<b>Tested by (name + signature) .....</b>		-
<b>Witnessed by (name + signature) .....</b>		-
<b>Approved by (name + signature) .....</b>		-
<input type="checkbox"/>	<b>Testing procedure: SMT</b>	N/A
<b>Testing location/ address .....</b>		-
<b>Tested by (name + signature) .....</b>		-
<b>Approved by (name + signature) .....</b>		-
<b>Supervised by (name + signature) .....</b>		-

<b>List of Attachments (including a total number of pages in each attachment): -</b>	
<b>Summary of testing:</b>	
<p><b>Tests performed (name of test and test clause):</b></p> <p>5.2 Insulation and wiring</p> <p>5.3 Venting</p> <p>5.4 Temperature/voltage/current management</p> <p>5.5 Terminal contacts</p> <p>5.6 Assembly of cells into batteries</p> <p>5.7 Quality plan</p> <p>8.2.1 Continuous charge</p> <p>8.3.1 External short circuit</p> <p>8.3.3 Free fall</p> <p>8.3.4 Thermal abuse</p> <p>8.3.5 Crushing of cells</p> <p>8.3.7 Forced discharge</p> <p>8.3.9 Forced internal short</p> <p>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.</p> <p>Note:</p> <p>(1) Unless otherwise stated, the charging procedure for test purposes is carried out in an ambient temperature of <math>20\pm 5^{\circ}\text{C}</math>, using the method declared by the manufacturer.</p> <p>(2) Prior to charging, the battery cell shall have been discharged at <math>20\pm 5^{\circ}\text{C}</math> at a constant current of 0.2 It A down to a specified final voltage.</p>	<p><b>Testing location:</b></p> <p><b>Bureau Veritas Consumer Product Services Limited, Taoyuan Branch</b></p> <p><b>No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Chinese Taipei</b></p>
<b>Summary of compliance with National Differences</b>	
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:**

Cell Date Code: YMDDSS

Y: indicates calendar year, 9=2009, A=2010, B=2011, C=2012, D=2013, E=2014, etc.

M: indicates calendar month, 1~9, 10=A, 11=B, 12=C.

DD: indicates calendar date of a month, 01~31.

SS: indicates the sequence number in a day, 01, 02, etc..

<b>Test item particulars.....:</b>	
<b>Classification of installation and use.....:</b>	Built-in
<b>Supply connection.....:</b>	Terminals
<b>Recommend charging method declared by the manufacturer .....</b>	Limiting 1.33A and constant 4.2V charge for 3hours at 23 °C
<b>Discharge current (0,2 I<sub>t</sub> A) .....</b>	0.36A
<b>Specified final voltage.....:</b>	End of charge 4.2±0.05V; End of discharge 3.0V
<b>Chemistry .....</b>	<input type="checkbox"/> nickel systems ..... <input checked="" type="checkbox"/> lithium systems
<b>Recommend of charging limit for lithium system</b>	
<b>Upper limit charging voltage per cell.....:</b>	4.25 V
<b>Maximum charging current.....:</b>	1.9A
<b>Charging temperature upper limit.....:</b>	45°C
<b>Charging temperature lower limit.....:</b>	0°C
<b>Polymer cell electrolyte type .....</b>	<input type="checkbox"/> gel polymer ..... <input type="checkbox"/> solid polymer
<b>Possible test case verdicts:</b>	
- 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)
<b>Testing.....:</b>	
<b>Date of receipt of test item .....</b>	July 17, 2013
<b>Date (s) of performance of tests.....:</b>	July 25, 2013 – August 09, 2013
<b>General remarks:</b>	
<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><b>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</b></p>	
<p>Remark 1: This report is to replace the earlier Test Report Ref. No. CB130717C27 001, dated 2013-09-09 (CB Ref. Certificate No. FR 646427).</p>	
<p>Remark 2: The modifications applied on this report are:</p> <ul style="list-style-type: none"> <li>-To correct rated voltage from 3.6V to 3.7V.</li> <li>- To add/revise report description.</li> </ul>	
<p>Remark 3: For the described change in the "Remark 2", no tests were considered necessary.</p>	

**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) .....** : E-ONE MOLI ENERGY CORP.  
No.10, Dali 2nd Rd., Shanhua Dist.,Tainan  
City 74144,Taiwan

**General product information:**

- (1) The equipment under test (EUT) model ICP103450CA (ICP/11/34/50) is a Rechargeable lithium-Ion 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) 10.8 mm by (W) 34.0 mm by (L) 50.0 mm max.
- (4) Weight: 41.5 g max.

**Test condition:**

Temperature: 20±5°C  
Relative humidity: 60%  
Air pressure: 950 mbar

The test samples were pre-production samples without serial number.



<b>IEC 62133</b>			
Clause	Requirement + Test	Result - Remark	Verdict
<b>4</b>	<b>Parameter measurement tolerances</b>		P
	Parameter measurement tolerances	Both normal and foreseeable misuses are evaluated in the report. All control and measure values were within the tolerances.	P
<b>5</b>	<b>General safety considerations</b>		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 30.	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 cell only “-“polarity marked on the cell body.	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 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
5.6.2	Design recommendation for lithium systems only	Not a battery pack.	N/A

<b>IEC 62133</b>			
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
<b>6</b>	<b>Type test conditions</b>		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 3 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 15.0°C - 25°C.	P
<b>7</b>	<b>Specific requirements and tests (nickel systems)</b>		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 ± 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

<b>8</b>	<b>Specific requirements and tests (lithium systems)</b>		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 ± 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 is 0 degree 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 4.25V.	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 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 Free fall sample ID: ICP103450CA/16; ICP103450CA/17; ICP103450CA/18	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

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.4	Thermal abuse (cells)	See below Thermal abuse sample ID: 45 degree C; ICP103450CA/19; ICP103450CA/20; ICP103450CA/21 ICP103450CA/22 ICP103450CA/23  -5 degree C ICP103450CA/24 ICP103450CA/25 ICP103450CA/26 ICP103450CA/27 ICP103450CA/28	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 (°C).....: 130°C		—
	Gross mass of cell (g) .....: 41.5 g		—
	Results: 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		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	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

<b>IEC 62133</b>			
Clause	Requirement + Test	Result - Remark	Verdict
	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 ICP103450CA meets UN Manual of Tests and Criteria.	P
8.3.9	Design evaluation – Forced internal short circuit (cells)	See below.	P
	The cells complied with national requirement for ..... :	France, Japan, Korea, Switzerland.	—
	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	The pressing force 400 N has been reached.	P
	Results: No fire ..... :	(See Table 8.3.9)	P
<b>9</b>	<b>Information for safety</b>		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
<b>10</b>	<b>Marking</b>		P
10.1	Cell marking	See below	N/A
	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.	N/A
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



IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	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

<b>11</b>	<b>Packaging</b>		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 pass IATA 1.2m packing drop test which can prevent cell for short circuit, mechanical damage and possible ingress.	P

<b>Annex A</b>	<b>Charging range of secondary lithium ion cells for safe use</b>		P
A.1	General	--	P
A.2	Safety of lithium-ion secondary battery	--	P
A.3	Consideration on charging voltage	4.25Vdc	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	The cell lower charging temperature is 0 degree 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 lower limit of test temperature (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	--	N/A
A.4.3.1	General	--	N/A
A.4.3.2	Explanation of safety viewpoint	--	N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
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	--	P
A.4.4.1	General	--	
A.4.4.2	Explanation of safety viewpoint	--	N/A
A.4.4.3	Safety considerations, when specifying charging conditions in low temperature range	--	N/A
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range	--	N/A
A.4.5	Scope of the application of charging current	--	N/A
A.5	Sample preparation		P
A.5.1	General		P
A.5.2	Insertion procedure for nickel particle to generate internal short		P
	The insertion procedure carried out at 20°C±5°C and under -25 °C of dew point		P
A.5.3	Disassembly of charged cell		P
A.5.4	Shape of nickel particle		P
A.5.5	Insertion of nickel particle to cylindrical cell	--	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		P

IEC 62133					
Clause	Requirement + Test			Result - Remark	Verdict
<b>TABLE: Critical components information</b>					N/A
Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity <sup>1)</sup>
Thermal fuse	Panasonic Corporation	P092A	32Vdc, 2A, 92° C	IEC 60691 ed.3 :A1 DIN EN 60691:2007-09 EN 60691:2003+A 1:2007	VDE
<b>Supplementary information: -</b>					

7.2.1	<b>TABLE: Continuous low rate charge (cells)</b>					N/A
Model	Recommended charging method, (CC, CV, or CC/CV)	Recommended charging voltage V <sub>c</sub> , (Vdc)	Recommended charging current I <sub>rec</sub> , (A)	OCV at start of test, (Vdc)	Results	
-	-	-	-	-	-	
-	-	-	-	-	-	
<b>Supplementary information: The EUT is a lithium ion cell</b>						

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

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

7.3.2	<b>TABLE: External short circuit</b>					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	
-	-	-	-	-	-	
-	-	-	-	-	-	
<b>Supplementary information: The EUT is a lithium ion cell</b>						

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
7.3.6	TABLE: Crush		N/A
Model	OCV at start of test, (Vdc)	OCV at removal of crushing force, (Vdc)	Results
-	-	-	-
Supplementary information: The EUT is a lithium ion cell			

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 $V_{c3}$ , (Vdc)	Recommended charging current $I_{rec3}$ , (A)	OCV at start of test, (Vdc)	Results
ICP103450CA / 001	4.25	1.9	4.25	No fire or explosion, No leakage
ICP103450CA / 002	4.25	1.9	4.25	No fire or explosion, No leakage
ICP103450CA / 003	4.25	1.9	4.25	No fire or explosion, No leakage
ICP103450CA / 004	4.25	1.9	4.25	No fire or explosion, No leakage
ICP103450CA / 005	4.25	1.9	4.25	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, ( $\Omega$ )	Maximum case temperature rise $\Delta T$ , (°C)	Results	
<b>Samples charged at charging temperature upper limit</b>						
ICP103450CA / 006	25.3	4.25	0.08	0.4	No fire, No explosion	
ICP103450CA / 007	25.3	4.25	0.07	0.4	No fire, No explosion	
ICP103450CA / 008	25.3	4.25	0.07	0.6	No fire, No explosion	
ICP103450CA / 009	25.3	4.25	0.07	0.7	No fire, No explosion	
ICP103450CA / 010	25.3	4.25	0.07	0.4	No fire, No explosion	
<b>Samples charged at charging temperature lower limit</b>						
ICP103450CA / 011	24.7	4.25	0.08	0.6	No fire, No explosion	
ICP103450CA / 012	24.7	4.25	0.07	0.5	No fire, No explosion	
ICP103450CA / 013	24.7	4.25	0.08	1.5	No fire, No explosion	
ICP103450CA / 014	24.7	4.25	0.07	0.9	No fire, No explosion	
ICP103450CA / 015	24.7	4.25	0.08	0.5	No fire, No explosion	
<b>Supplementary information:</b>						
- 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, ( $\Omega$ )	Maximum case temperature rise $\Delta T$ , (°C)	Results	
<b>Samples charged at charging temperature upper limit</b>						
-	-	-	-	-	-	
<b>Samples charged at charging temperature lower limit</b>						
-	-	-	-	-	-	
-	-	-	-	-	-	
<b>Supplementary information: -</b>						

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

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	
<b>Samples charged at charging temperature upper limit</b>						
ICP103450CA 029 /	4.25	4.13	10.94	9.85	No fire, No explosion	
ICP103450CA 030 /	4.25	4.15	10.96	9.86	No fire, No explosion	
ICP103450CA 031 /	4.25	4.16	10.99	9.89	No fire, No explosion	
ICP103450CA 032 /	4.25	4.15	10.89	9.80	No fire, No explosion	
ICP103450CA 033 /	4.25	4.13	10.90	9.81	No fire, No explosion	
<b>Samples charged at charging temperature lower limit</b>						
ICP103450CA 034 /	4.25	4.17	10.95	9.86	No fire, No explosion	
ICP103450CA 035 /	4.25	4.16	10.96	9.86	No fire, No explosion	
ICP103450CA 036 /	4.25	4.16	10.96	9.86	No fire, No explosion	
ICP103450CA 037 /	4.25	4.15	10.98	9.88	No fire, No explosion	
ICP103450CA 038 /	4.25	4.16	10.93	9.84	No fire, No explosion	
<b>Supplementary information:</b>						
- No fire or explosion						

8.3.6	TABLE: Over-charging of battery				N/A
Model	OCV before charging, (Vdc)	Resistance of circuit, ( $\Omega$ )	Maximum outer casing temperature, ( $^{\circ}\text{C}$ )	Results	
<b>Constant charging current (A) .....</b>					
-					
<b>Supply voltage (Vdc).....</b>					
-					
-	-	-	-	-	
-	-	-	-	-	
<b>Supplementary information: -</b>					

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 $I_r$ , (A)	Time for reversed charge, (minutes)	Results	
ICP103450CA / 039	3.0	1.96	90	No fire, No explosion	
ICP103450CA / 040	3.0	1.96	90	No fire, No explosion	
ICP103450CA / 041	3.0	1.96	90	No fire, No explosion	
ICP103450CA / 042	3.0	1.96	90	No fire, No explosion	
ICP103450CA / 043	3.0	1.96	90	No fire, No explosion	
<b>Supplementary information:</b>					
- No fire or explosion					

8.3.9	TABLE: Forced internal short circuit (cells)					P
Model	Chamber ambient, (°C)	OCV at start of test, (Vdc)	Particle location <sup>1)</sup>	Maximum applied pressure, (N)	Results	
ICP103450CA / 044	45.7	4.25	1	400	No fire	
ICP103450CA / 045	46.1	4.25	1	400	No fire	
ICP103450CA / 046	46.8	4.25	1	400	No fire	
ICP103450CA / 047	45.3	4.26	1	400	No fire	
ICP103450CA / 048	46.5	4.26	1	400	No fire	
ICP103450CA / 049	-7.3	4.24	1	400	No fire	
ICP103450CA / 050	-8.1	4.24	1	400	No fire	
ICP103450CA / 051	-7.5	4.23	1	400	No fire	
ICP103450CA / 052	-6.9	4.23	1	400	No fire	
ICP103450CA / 053	-6.5	4.23	1	400	No fire	
<b>Supplementary information:</b>						
<sup>1)</sup> 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						







香港高士德國際商標有限公司集團分公司  
Bureau Veritas Consumer Products Services (HK) Ltd., Tinian Branch, [Bureau Veritas AIDT]

Page 1 of 3  
Issued Date: 05-27-08  
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INSTRUMENTATION RECORD DATA SHEET  
TEST INSTRUMENTS

File No:  
Project No:

Test	Used	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
		2. 0K97		Shock Tester	VISOURCE	SHOCK-2	Jun-25-2013	Jun-24-2014
Crushing of cells	V	3. 9701		Hydraulic Ram Apparatus	Asia Qtech	AT-1	May-20-2013	May-19-2014
		4. 0801		Vacuum Chamber	Asia Qtech	A-1	Oct-12-2012	Oct-11-2013
Low pressure		11. 41VA0567	-40°C-400°C, 30CH	Hybrid Recorder	Yokokawa	HR 2500E	Apr-18-2013	Apr-17-2014
		13. 43VH0086	-40°C-400°C, 30CH	Hybrid Recorder	Yokogawa	HR 1300	Dec-24-2012	Dec-23-2013
Heating	V	14. 46JE0043	-40°C-400°C, 30CH	Hybrid Recorder	Yokogawa	DR130	Jun-10-2013	Jun-09-2014
		22. 805020222	250V/10A, 300W *1	Electric Load	Prodigit 3302	3302	Sep-07-2012	Sep-06-2013
Input / Leakage / Heating / Abnormal		23. 805020223	250V/10A, 300W *1	Electric Load	Prodigit 3302	3302	Nov-16-2012	Nov-15-2013
		24. 805020220	150V/8A, 300W *1	Electric Load	Prodigit 3302	3251	Dec-19-2012	Dec-18-2013
Enclosure Push		31. 080353	0 - 30 Kg.	Push - Pull Meter	Alkoh	AE-30	Nov-12-2012	Nov-11-2013
		39. 70360742	R, V, A, Full Range	Digital Multimeter	Fluke	87-III	Jul-05-2013	Jul-04-2014
General	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-12-2012	Nov-11-2013
Insulation		46-1. 8330R	Real Time	Timer (Clock)	ORIENT	QUARTZ	Jun-25-2013	Jun-24-2014
		53. 1420073	30-1000V, 0.1-50GΩ	Insulation Tester	Extech	8205	Sep-12-2012	Sep-11-2013
Heating		57. 12WB22613	0-200°C, 60CH	Recorder	Yokokawa	DR230	Apr-18-2013	Apr-17-2014
		66. DU200-32	-40°C-400°C, 30CH	Recorder	Yokokawa	DR230	Nov-30-2012	Nov-29-2013
Input / Leakage / Heating		71. 204020068	500V/5A, 200W*1	Electric Load	Prodigit 3324	3302	Mar-15-2013	Mar-14-2014
		73. 204020077	250V/10A, 300W*1	Electric Load	Prodigit 3312C	3302	Nov-16-2012	Nov-15-2013
Vibration		77. 12A933583	-40°C-400°C, 30CH	Hybrid Recorder	Yokogawa	DR130	Mar-13-2013	Mar-12-2014
		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	
	87. 4292	10Hz-100Hz, 0.2-1.5mm	Vibration Test	VISOURCE	VS-5080L		Dec-03-2012	Dec-02-2013



香港獨立德國國際商品試驗有限公司集團分公司  
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Page 2 of 3

Issued Date: 05-27-08

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## INSTRUMENTATION RECORD DATA SHEET

## TEST INSTRUMENTS

File No:

Project No:

Test	Used	Instr No. S/N.	Range Used	* Instruments, Type	Maker	Model	Calibration Date	Calibration Due
		101. 27CA14591	-40°C -400°C, 30CH	Hybrid Recorder	Yokogawa	DR-230	Jan-24-2013	Jan-23-2014
		102. 27CA14592	-40°C -400°C, 30CH	Hybrid Recorder	Yokogawa	DR-230	Aug-29-2013	Aug-28-2014
		103. 27CA14593	-40°C -1000°C, 30 CH	Hybrid Recorder	Yokogawa	DR-230	May-09-2013	May-08-2014
		104. 27CA14594	-40°C -400°C, 30CH	Hybrid Recorder	Yokogawa	DR-230	Oct-02-2012	Oct-01-2013
		105. 27CA14595	-40°C -400°C, 30CH	Hybrid Recorder	Yokogawa	DR-230	Oct-11-2012	Oct-10-2013
Input / Leakage /		106. 30801A016	60V/60A	Electronic Load	Prodigit	3301A	May-16-2013	May-15-2014
Heating / Abnormal		107. 30801A017	60V/60A	Electronic Load	Prodigit	3301A	Jan-03-2011	stop use
		108. 30801A019	60V/60A	Electronic Load	Prodigit	3301A	May-16-2013	May-15-2014
		109. 30801A020	60V/60A	Electronic Load	Prodigit	3301A	Dec-19-2012	Dec-18-2013
		110. 30901A021	60V/60A	Electronic Load	Prodigit	3301A	Jul-23-2013	Jul-22-2014
General	V	113. 033290010	R, V, A full range	DC+AC 100kHz TRMS DMM	BRYMEN	BM659CF	Sep-11-2012	Sep-10-2013
		114. 033290030	R, V, A full range	DC+AC 100kHz TRMS DMM	BRYMEN	BM659CF	Nov-05-2012	Nov-04-2013
Temperature cycling	V	116.920904	-70°C~100°C, 20%~98% RH	THERMO-HYGROMETER	TAICHY	MHU-480SU	Nov-23-2012	Nov-22-2013
Moulded case stress at high ambient temperature		117.920905	0-200°C	TEMPERATURE OVEN	TAICHY	CK-500	Nov-23-2012	Nov-22-2013
General	V	121.03362462	0-200 mm	Digimatic Caliper	Mitutoyo	500-197 CD-8°CS	Nov-14-2012	Nov-13-2013
		122.680594	0-500V, 20A	Digital Power Meter	Idrc	CP-320A	Oct-09-2012	Oct-08-2013
		123.680595	0-500V, 20A	Digital Power Meter	Idrc	CP-320A	Dec-20-2012	Dec-19-2013
	V	124.357156	0-600V, 50A	Digital Power Meter	Idrc	CP-350	Jul-02-2013	Jul-01-2014
Free fall	V	128. —	0-5m	tape measure	KDS	5.5mm	Jun-25-2013	Jun-24-2014
Heating		135. 27E214538 504	-40°C -400°C, 30CH	Data Acquisition Unit	Yokogawa	MX100-E-1D	Jan-16-2013	Jan-15-2014
General	V	137. 40905090004	0.03µH-96698H, 0.003pF-80.00mF, 0Ω-500MΩ	LCR Meter	Matech	MT40901-S1	Jan-28-2013	Jan-27-2014
Incorrect installation of a cell		154. —	—	1ohm Resistor	Yen Sheng	—	—	—
		160. 9100201	—	Crush Tester Equipment	Asia Otech	IB-5	Oct-08-2012	Oct-07-2013

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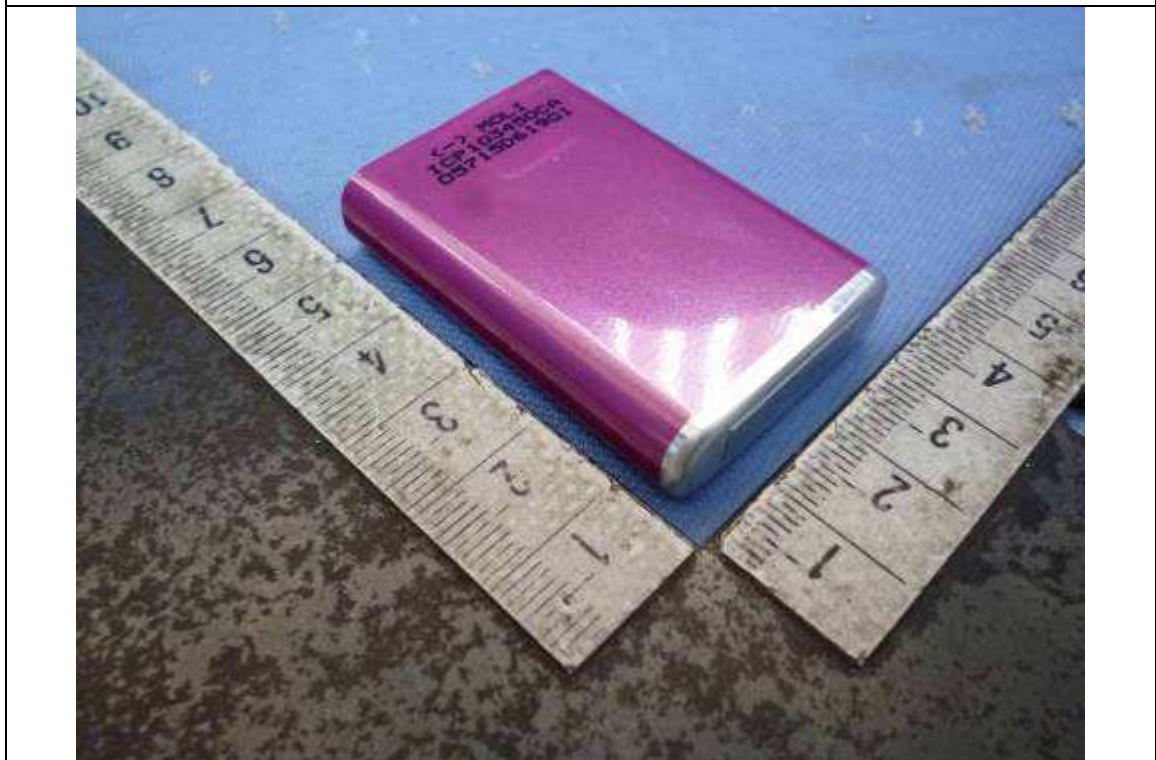




Photo:



The view for the cell



Top view for the cell

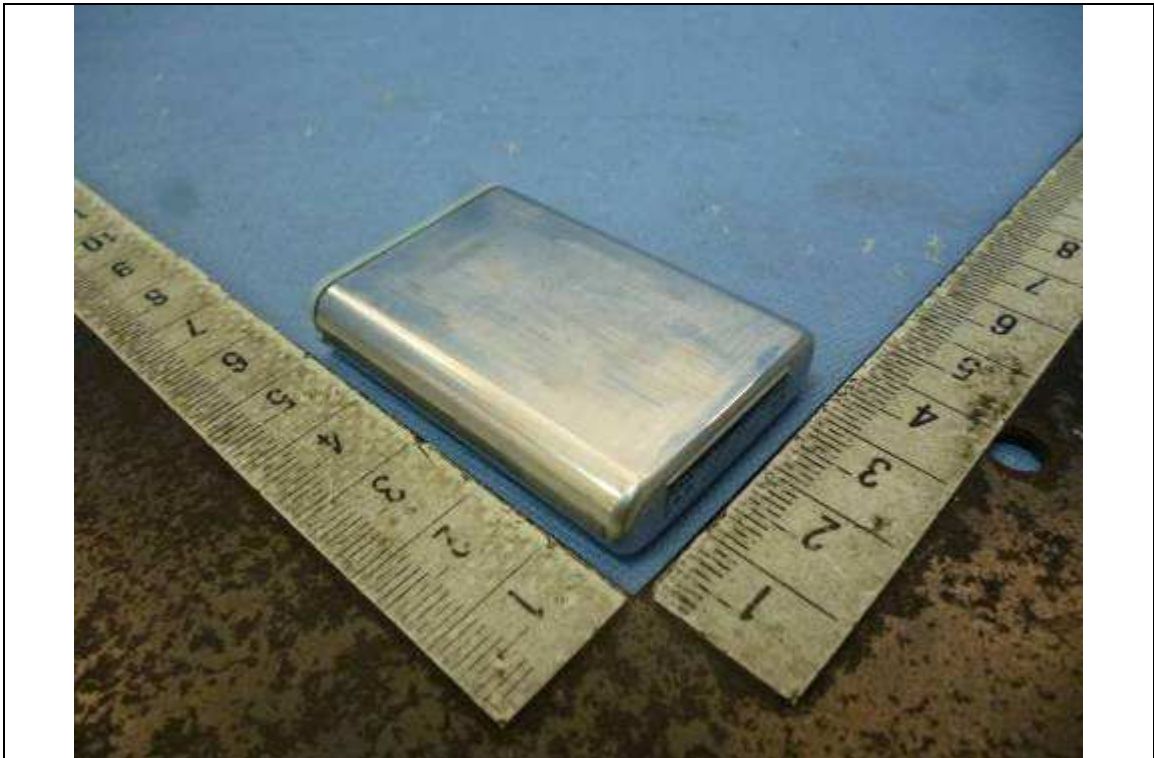


Bottom view for the cell

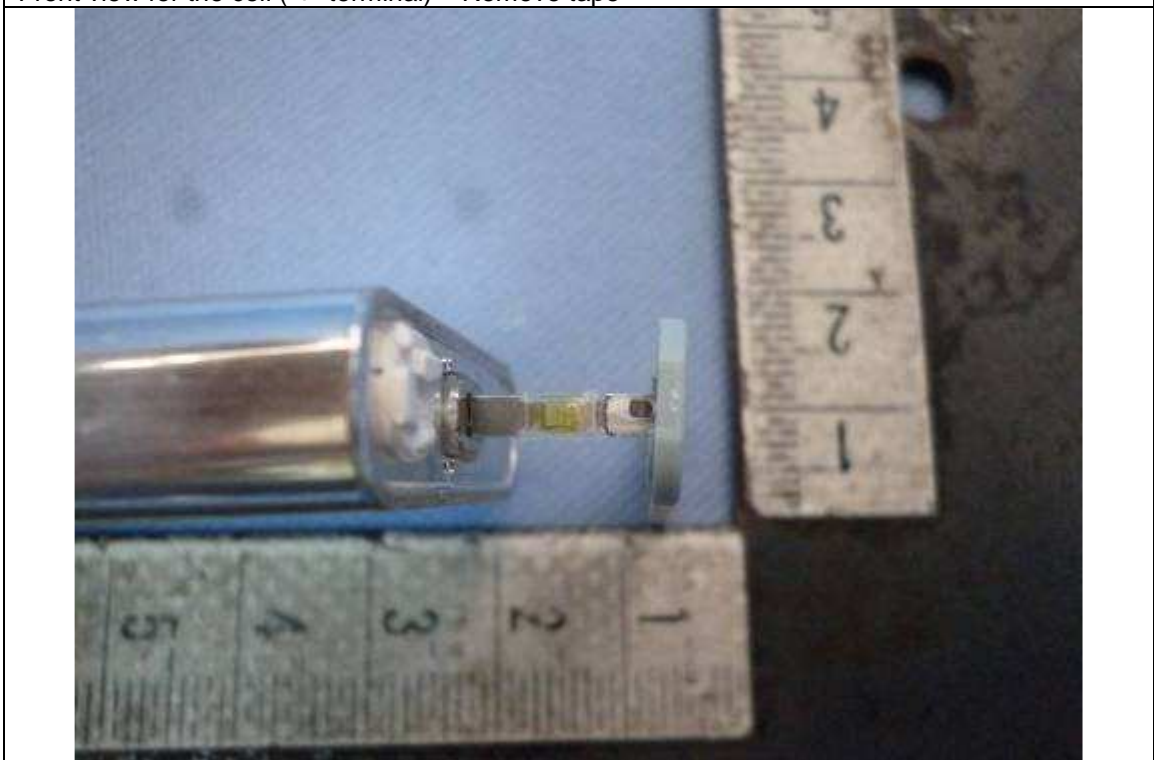


Front view for the cell ("-" terminal) – Remove tape

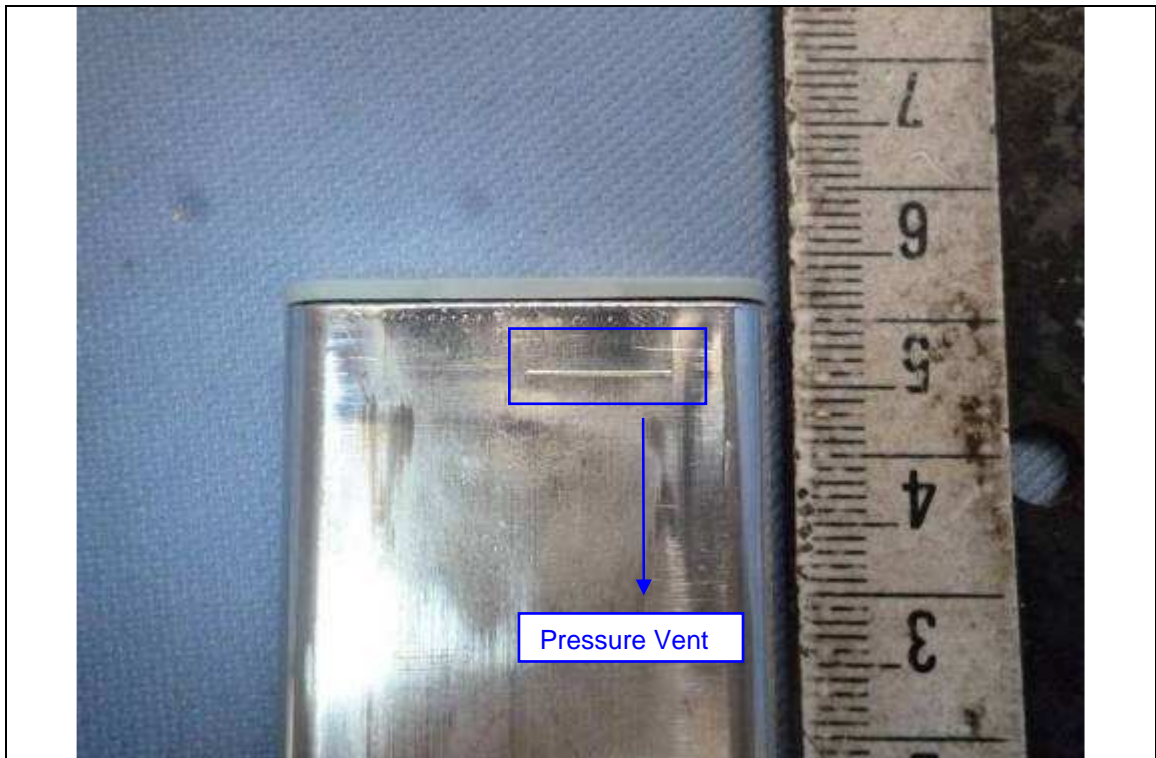




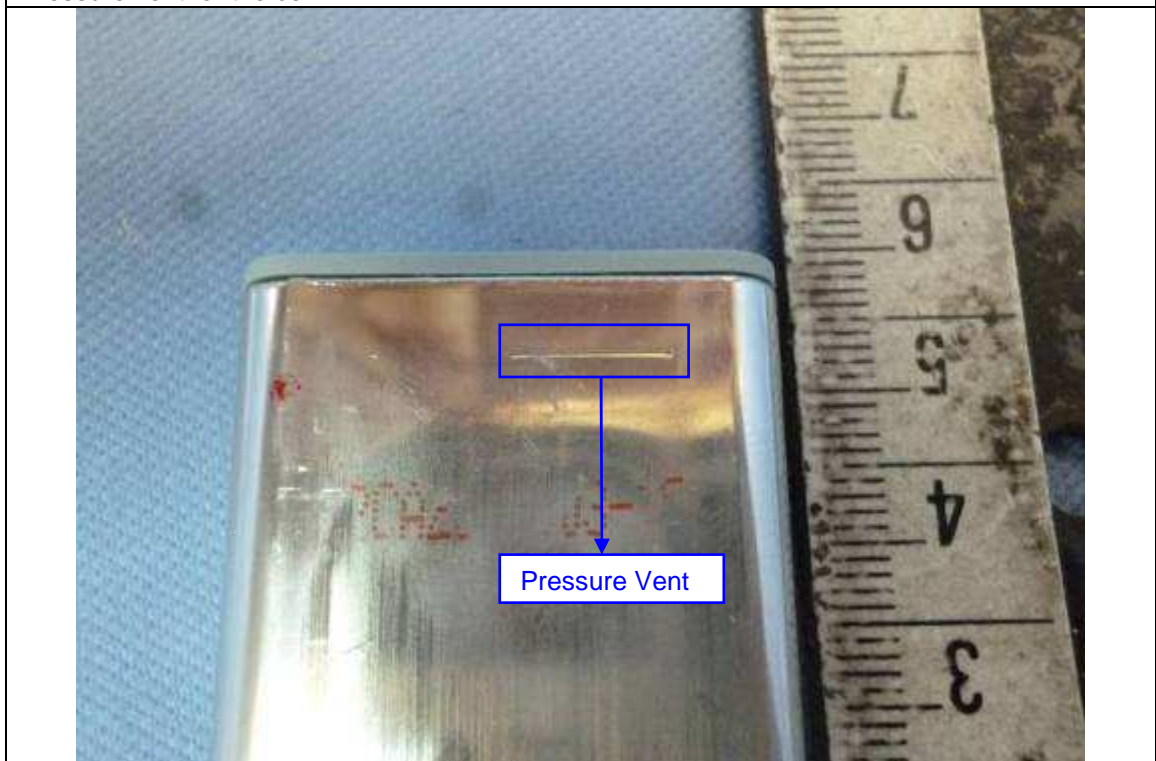
Front view for the cell ("+" terminal) – Remove tape



Front view for the cell ("- terminal) – Thermal fuse connection



Pressure vent for the cell



Pressure vent for the cell