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. .....:	CB131104C04 002
Date of issue .....:	2017-01-20
Total number of pages.....	30
Applicant's name.....:	E-ONE MOLI 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 Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC62133B
Test Report Form(s) Originator ....:	UL(Demko)
Master TRF.....:	Dated 2013-03

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description .....:	Lithium Ion Rechargeable cell
Trade Mark .....:	Molicel or MOLICEL
Manufacturer.....:	E-ONE MOLI ENERGY CORP.
Model/Type reference .....:	ICR-18650K (ICR19/66)
Ratings .....:	3.7Vdc, 2.6Ah

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, Taiwan	
☐ Associated CB Testing Laboratory:	N/A	
Testing location/ address .....:	N/A	
Tested by (name + signature) .....:	Bob Tsai / Supervisor	Bob Tsai
Approved by (name + signature) .....:	Danny Lin / 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 Charging procedure for test purposes (Cells) 8.2.1 Continuous charging at constant voltage(Cells) 8.3.1 External short circuit (cells) 8.3.3 Free fall (cells) 8.3.4 Thermal abuse (cells) 8.3.5 Crushing of cells (cells) 8.3.7 Forced discharge (cells) 8.3.9 Design evaluation – Forced internal short circuit (cells) 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, Taiwan**

Summary of compliance with National Differences

List of countries addressed:

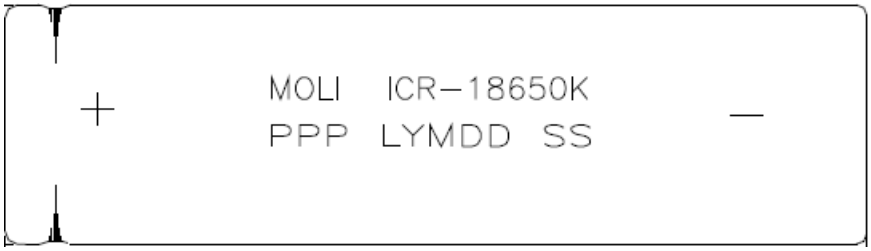
DK, HU, SE

☒ **The product fulfils the requirements of IEC 62133: 2012 (Second Edition) and EN 62133:2013**

Copy of marking plate

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

Explanation of date Code:



Cell Date Code: YMDDSS

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

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.

Test item particulars.....:	
Classification of installation and use.....:	Built-in
Supply connection.....:	Terminals
Recommend charging method declaired by the manufacturer ..... :	Limiting 1.82A and constant 4.2V charge for 3.0h or 100mA at 23 °C.
Discharge current (0,2 I_t A) ..... :	0.52A
Specified final voltage ..... :	End of charge 4.2±0.05V; End of discharge 3.0V
Chemistry ..... :	☐ nickel systems ..... ☒ lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell.....:	4.25V
Maximum charging current.....:	2.6A
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 .....:	November 08, 2013
Date (s) of performance of tests.....:	November 08, 2013 – November 22, 2013

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) ..... :	E-ONE Moli Energy Corporation No.10, Dali 2nd Rd., Shanhua Dist.,Tainan City 74144, Taiwan.

General product information:

(1) The equipment under test (EUT) model ICR-18650K (ICR19/66) is a Lithium Ion Rechargeable cell.

(2) The maximum ambient temperature is specified as 45°C for Charging and 60°C for Discharging.

(3) Dimension of the battery cell: (D) 18.6 mm by (H) 65.2 mm max.

(4) Weight: 50g max.

Report history:	
CB131104C04 002 (Project no.: 170116C14)	
Remark 1:	This report is to replace the earlier Test Report Ref. No. CB131104C04 001 dated 2013-11-27 (CB Ref. Certificate No. FR 650271).
Remark 2:	The modification applied on this report is: - To change applicant, manufacture and factory address from "10, Dali 2nd Rd., Tainan Science-Based Industrial Park, Shanhua Dist., Tainan City, 74144, Taiwan" To "No.10, Dali 2nd Rd., Shanhua Dist.,Tainan City 74144, Taiwan"
Remark 3	For the described change in the "Remark 2", no tests were considered necessary.

Test condition:

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

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

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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 four holes on the top (“+”) side of cell 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

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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 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

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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

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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 (℃)..... .....:	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 (℃)..... .....:	The cell is lithium system	—
	Results: No fire. No explosion.	The cell is lithium system	N/A

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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

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
	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	The cell lower charging temperature declared by client is 0 ^{o}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 ℃ 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

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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 (℃)..... .....:	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: ICR-18650K / 016; ICR-18650K / 017; ICR-18650K / 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

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.4	Thermal abuse (cells)	See below. Thermal abuse sample ID: 45℃: ICR-18650K / 019 ICR-18650K / 020 ICR-18650K / 021 ICR-18650K / 022 ICR-18650K / 023 -5℃: ICR-18650K / 024 ICR-18650K / 025 ICR-18650K / 026 ICR-18650K / 027 ICR-18650K / 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°C	—
	Gross mass of cell (g) .....:	48g	—
	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℃ 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

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Clause	Requirement + Test	Result - Remark	Verdict
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 ICR-18650K can meet 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	The pressing force of 800 N used.	N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached	The pressing force of 800 N used.	P
	Results: No fire ..... :	(See Table 8.3.9)	P

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.	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 pass IATA 1.2 packing drop test 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	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	Charging temperature declared by client is: 0-45 ^{o}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 ℃ -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.4.3	High temperature range	-	N/A
A.4.3.1	General	-	N/A
A.4.3.2	Explanation of safety viewpoint	-	N/A
A.4.3.3	Safety considerations when specifying charging conditions in high temperature range	-	N/A
A.4.3.4	Safety consideration when specifying new upper limit in high temperature range	-	N/A
A.4.4	Low temperature range	The cell lower charging temperature was declared by client is 0 ^{o}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
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

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
A.5	Sample preparation	See below.	P
A.5.1	General	Considered.	P
A.5.2	Insertion procedure for nickel particle to generate internal short	See below.	P
	The insertion procedure carried out at 20℃±5℃ and under -25 ℃ of dew point	Test environment keep 20℃ ± 5℃ and under -25℃ of dew point.	P
A.5.3	Disassembly of charged cell	Considered.	P
A.5.4	Shape of nickel particle	Considered.	P
A.5.5	Insertion of nickel particle to cylindrical cell	The EUT is a cylindrical cell.	P
A.5.5.1	Insertion of nickel particle to winding core	-	P
A.5.5.2	Mark the position of nickel particle on the both end of winding core of the separator	-	P
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				

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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**	
ICR-18650K / 001	4.25	1.82	4.25	No fire or explosion, No leakage	
ICR-18650K / 002	4.25	1.82	4.25	No fire or explosion, No leakage	
ICR-18650K / 003	4.25	1.82	4.25	No fire or explosion, No leakage	
ICR-18650K / 004	4.25	1.82	4.25	No fire or explosion, No leakage	
ICR-18650K / 005	4.25	1.82	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, (Ω)**	**Maximum case temperature rise ΔT, (°C)**	**Results**
Samples charged at charging temperature upper limit (45 °C)					
ICR-18650K / 006	20.4	4.25	0.08	36.2	No fire, No explosion
ICR-18650K / 007	20.4	4.25	0.07	34.1	No fire, No explosion
ICR-18650K / 008	20.4	4.25	0.07	39.5	No fire, No explosion
ICR-18650K / 009	20.4	4.25	0.09	37.7	No fire, No explosion
ICR-18650K / 010	20.4	4.25	0.08	43.6	No fire, No explosion
Samples charged at charging temperature lower limit (-5°C)					
ICR-18650K / 011	20.4	4.25	0.09	35.5	No fire, No explosion
ICR-18650K / 012	20.4	4.25	0.08	33.7	No fire, No explosion
ICR-18650K / 013	20.4	4.25	0.08	38.7	No fire, No explosion
ICR-18650K / 014	20.4	4.25	0.08	37.4	No fire, No explosion
ICR-18650K / 015	20.4	4.25	0.07	43.4	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: -						

8.3.5	TABLE: Crush				P
Model	**OCV at start of test, (Vdc)**	**OCV at removal of crushing force, (Vdc)**	**Width/ diameter of cell before crush, (mm)**	**Required deformation for crush, (mm)**	**Results**
Samples charged at charging temperature upper limit (45 °C)					
ICR-18650K / 029	4.25	4.23	18.21	16.19	No fire, No explosion
ICR-18650K / 030	4.25	0	18.23	16.18	No fire, No explosion
ICR-18650K / 031	4.25	0	18.29	16.20	No fire, No explosion
ICR-18650K / 032	4.25	0	18.28	16.21	No fire, No explosion
ICR-18650K / 033	4.25	4.24	18.20	16.18	No fire, No explosion
Samples charged at charging temperature lower limit (-5°C)					
ICR-18650K / 034	4.25	4.24	18.24	16.19	No fire, No explosion
ICR-18650K / 035	4.25	4.23	18.23	16.20	No fire, No explosion
ICR-18650K / 036	4.25	0	18.25	16.21	No fire, No explosion
ICR-18650K / 037	4.25	4.23	18.26	16.18	No fire, No explosion
ICR-18650K / 038	4.25	4.24	18.21	16.22	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, (°C)	Results
-	-	-	-	-

Supplementary information: -

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**
ICR-18650K / 039	3.0	2.6	90	No fire, No explosion
ICR-18650K / 040	3.0	2.6	90	No fire, No explosion
ICR-18650K / 041	3.0	2.6	90	No fire, No explosion
ICR-18650K / 042	3.0	2.6	90	No fire, No explosion
ICR-18650K / 043	3.0	2.6	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)	P

Model	Chamber ambient, (°C)	OCV at start of test, (Vdc)	Particle location [1)]	Maximum applied pressure, (N)	Results
ICR-18650K / 044	47.3	4.25	1	800	No fire
ICR-18650K / 045	48.2	4.25	1	800	No fire
ICR-18650K / 046	48.5	4.25	1	800	No fire
ICR-18650K / 047	47.9	4.25	1	800	No fire
ICR-18650K / 048	47.5	4.25	1	800	No fire
ICR-18650K / 049	-8.3	4.25	1	800	No fire
ICR-18650K / 050	-8.9	4.25	1	800	No fire
ICR-18650K / 051	-9.1	4.25	1	800	No fire
ICR-18650K / 052	-8.5	4.25	1	800	No fire
ICR-18650K / 053	-9.3	4.25	1	800	No fire

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

香港商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】

File No:
Project No:

INSTRUMENTATION RECORD DATA SHEET
TEST INSTRUMENTS

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
Mechanical shock		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
Low pressure		4. 0801		Vacuum Chamber	Asia Qtech	A-1	Nov-05-2013	Nov-04-2014
Heating		11. 41VA0567	-40℃-400℃, 30CH	Hybrid Recorder	Yokokawa	HR 2500E	Apr-18-2013	Apr-17-2014
		13. 43VH0086	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	HR 1300	Dec-24-2012	Dec-23-2013
	V	14. 48JE0043	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	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-19-2012	Dec-18-2013
Enclosure Push		31. 080353	0 - 30 Kg.	Push - Pull Meter	Aikoh	AE-30	Nov-12-2013	Nov-11-2014
General	V	39. 70360742	R, V, A. Full Range	Digital Multimeter	Fluke	87-III	Jul-05-2013	Jul-04-2014
		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, 0.1-50GΩ	Insulation Tester	Extech	8205	Sep-11-2013	Sep-10-2014
		57.12WB22613	0-200℃, 60CH	Recorder	Yokokawa	DR230	Apr-18-2013	Apr-17-2014
Heating		66. DU200-32	-40℃-400℃, 30CH	Recorder	Yokokawa	DR230	Nov-30-2012	Nov-29-2013
Input / Leakage /		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-01-2013	Oct-31-2014
Heating		77. 12A933583	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	DR130	Mar-13-2013	Mar-12-2014
		78. 12B615473	-40℃-400℃, 30CH	Recorder	Yokokawa	DR230	Jun-18-2013	Jun-17-2014
		86. 12B419024	-40℃-400℃, 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-03-2012	Dec-02-2013

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Test	Used	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-24-2013	Jan-23-2014
		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-09-2013	May-08-2014
		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 /		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	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	V	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℃	TEMPERATUER OVEN	TAICHY	CK-500	Nov-20-2013	Nov-19-2014
General		122.680594	0-500V, 20A	Digital Power Meter	Idrc	CP-320A	Dec-20-2012	Dec-19-2013
		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-16-2013	Jan-15-2014
General	V	137. 40905090004	0.03μH~9999H, 0.003pF~80.00mF, 0Ω~500MΩ	LCR Meter	Motech	MT4090/I-S1	Jan-28-2013	Jan-27-2014
Incorrect installation of a cell		154. —	—	1ohm 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-06-2014

File No:
Project No:

INSTRUMENTATION RECORD DATA SHEET
TEST INSTRUMENTS

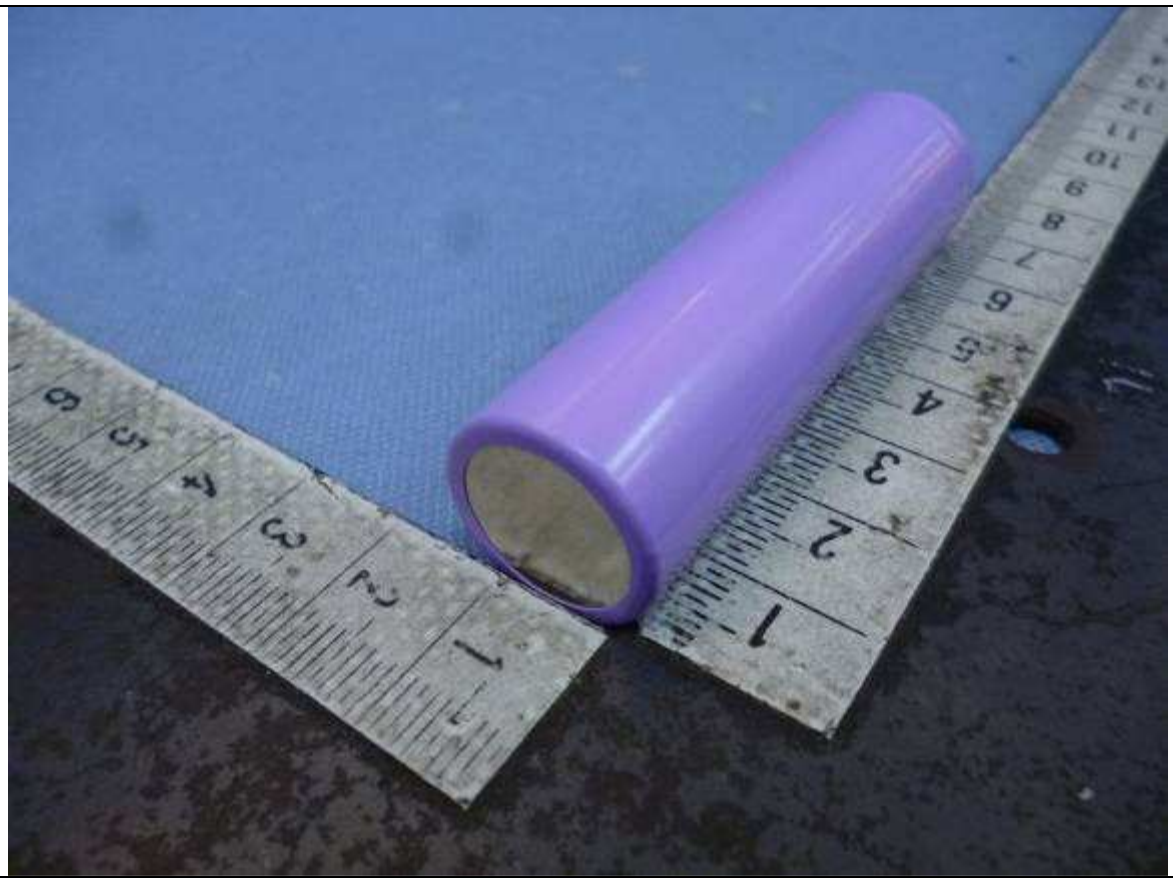
Issued Date: 05-27-08
Revised: 11-20-2013

Test	Used	Instr No. S/N.	Range Used	* Instruments, Type	Maker	Model	Calibration Date	Calibration Due
		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	Programable DC Source	IDRC	DSP-030-025HD	Jul-26-2013	Jul-25-2014
	V	171.500157	30V,25A	Programable DC Source	IDRC	DSP-030-026HD	Jul-26-2013	Jul-25-2014
		172.500155	30V,25A	Programable DC Source	IDRC	DSP-030-027HD	Jul-26-2013	Jul-25-2014
		173.500158	30V,25A	Programable DC Source	IDRC	DSP-030-028HD	Jul-26-2013	Jul-25-2014
	V	180.0336258	0~200mm	Digimatic Caliper	MITUTOYO	500-197	Nov-13-2013	Nov-12-2014
		N/A	900~1100mbar	Atmospheric-pressure gauge	永發	YF-72	Nov-13-2013	Nov-12-2014
Vibration		214.6293	1Hz-200Hz, 0.2-1mm	Vibration Test	振儀科技	VS-100	Jan-14-2013	Jan-13-2014

Photo:

Top view for the cell

Front view for the cell



Rear view for the cell

Side view without film

Front view without spacer

Pressure vent for the cell