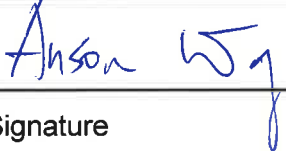







Test Report No.:	UNT181031C20	
Client		
Name :	E-ONE MOLI ENERGY CORP.	
Address :	10, Dali 2nd Rd., Tainan Science-Based Industrial Park, Shanhua Dist., Tainan City, 74144, Taiwan	
Test Item :	Rechargeable Lithium-ion Battery Cell	
Identification :	ICR-18650M	
Testing laboratory		
Name :	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch	
Address :	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan	
Test specification		
Standard :	United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 6th +Amend.1), Section 38.3	
Test Result :	The test item passed.	
Prepared By :	 Signature <u>Anson Wang</u> Assistant Manager	<u>2018-12-06</u> Date
Approved By:	 Signature <u>Ted Wu</u> Senior Manager	<u>2018-12-06</u> Date
This report should not be used by the client to claim product certification, approval, or endorsement by TAF, NVLAP, NIST or any government agencies.		 
This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.		



TEST SUMMARY	
United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 6 th +Amend.1), Section 38.3	
Report Reference No.	UNT181031C20
Compiled by	See cover sheet
Title.....	See cover sheet
Phone number	+886-3-3183232 Ext. 1872
E-Mail address	Anson.Wang@tw.bureauveritas.com
Approved by	See cover sheet
Title.....	See cover sheet
Phone number	+886-3-3183232 Ext. 1828
E-Mail address	Ted.Wu@tw.bureauveritas.com
Date of issue	2018-12-06
Total number of pages	24
Testing Laboratory	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Address	No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City, TAIWAN
Website :	http://ee.bureauveritas.com.tw
Manufacturer's name	E-ONE MOLI ENERGY CORP.
Address	10, Dali 2nd Rd., Tainan Science-Based Industrial Park, Shanhua Dist., Tainan City, 74144, Taiwan
Contact information	
Name	Yu Feng Hsu
Phone number	+886-6-505-0666
E-Mail address	yfhsu@molicel.com
Website	http://molicel.com.tw
Test specification:	
Standard.....	United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 6 th +Amend.1), Section 38.3.
Product description	Rechargeable Lithium-ion Battery Cell
Trade Mark	MOLICEL or 
Model number.....	ICR-18650M
Ratings	3.7V, 2.8Ah
Mass	50.0 g(Max)
Physical description	Cylindrical battery cell
Reference to assembled battery testing requirement.....	N/A

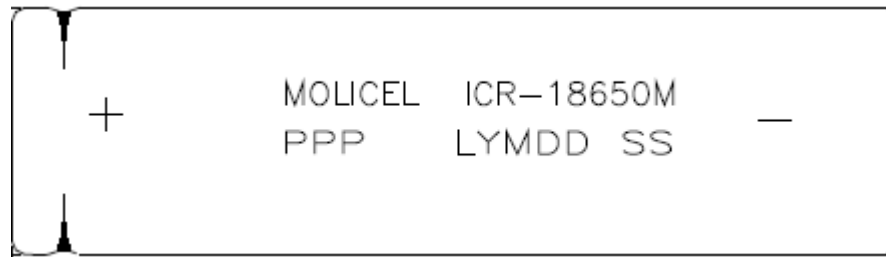
Summary of testing:

List of tests conducted		
Clause	Name of test item	Result
38.3.4.1	Altitude simulation	P
38.3.4.2	Thermal test	P
38.3.4.3	Vibration	P
38.3.4.4	Shock	P
38.3.4.5	External short circuit	P
38.3.4.6	Impact	P
38.3.4.7	Overcharge	N/A
38.3.4.8	Forced discharge	P

The load conditions used during testing: The battery cell is charged and discharged according to its rating.

Nominal capacity (Ah):	2.8
Nominal voltage (Vdc):	3.7
Minimum end voltage of discharge (Vdc)	3.0
Max. charge voltage (Vdc):	4.25
Max. charge current (A):	2.8
Max. continue discharge current (A)	5.0

Copy of marking plate:



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..



Test item particulars	
Classification of installation and use	Built-in
Supply Connection	Customized terminal
.....	:
.....	:
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	2018-10-31
Date (s) of performance of tests	2018-11-07 to 2018-11-21
General remarks:	
<p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a point is used as the decimal separator.</p>	



General product information:

- (1) The equipment under test (EUT) model ICR-18650M (INR19/66) is a Rechargeable Lithium-ion Battery Cell.
- (2) The battery cell maximum ambient temperature is specified as 45°C for Charging and 60°C for Discharging.
- (3) The product was investigated to the following additional 1.2m Drop test, details test result see "Attachment 1".
- (4) Dimension of the battery cell: (D) 18.6 mm by (H) 65.2 mm max.
- (5) Battery Cell Weight: **50.0** 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.



United Nations, Recommendations on the Transport of Dangerous Goods,
Manual of Test and Criteria (Rev. 6th +Amend.1), Section 38.3

Clause	Requirement + Test	Result - Remark	Verdict
38.3	Lithium batteries		P
38.3.1	Purpose		P
38.3.2	Scope		P
38.3.2.1	Lithium cells or batteries which differ from a tested type by: (a) A change of more than 0.1 g or 20% by mass, whichever is greater, to the cathode, to the anode, or to the electrolyte; or (b) A change that would materially affect the test results.	This a new product (new application)	N/A
38.3.2.2	Classification	The EUT is a rechargeable Lithium ion battery cell.	P
38.3.3	The number and condition of cells and batteries		P
	Cells (Primary/Rechargeable)	The EUT is a rechargeable Lithium ion battery cell.	P
	Batteries (Primary/Rechargeable)	The EUT is a rechargeable Lithium ion battery cell.	N/A
38.3.4	Procedure		P
	Each cell and battery type must be subjected to tests 1 to 8. Tests 1 to 5 must be conducted in sequence on the same cell or battery. Tests 6 and 8 should be conducted using not otherwise tested cells or batteries. Test 7 may be conducted using undamaged batteries previously used in Tests 1 to 5 for purposes of testing on cycled batteries.	The sequence Test 1 to Test 5 tests were conducted on the same samples. Test 6 was conducted on the new component cell samples. Test 8 was conducted on the new component cell samples.	P
38.3.4.1	Altitude simulation	The cells were no mass loss, no leakage, no venting, no disassembly, no rupture and no fire and the OCV of batteries after testing was not less than 90% of its voltage before testing.	P
38.3.4.2	Thermal test	The cells were no mass loss, no leakage, no venting, no disassembly, no rupture and no fire and the OCV of batteries after testing was not less than 90% of its voltage before testing.	P



United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 6th +Amend.1), Section 38.3			
Clause	Requirement + Test	Result - Remark	Verdict
38.3.4.3	Vibration	The cells were no mass loss, no leakage, no venting, no disassembly, no rupture and no fire and the OCV of batteries after testing was not less than 90% of its voltage before testing.	P
38.3.4.4	Shock	The cells were no mass loss, no leakage, no venting, no disassembly, no rupture and no fire and the OCV of batteries after testing was not less than 90% of its voltage before testing.	P
38.3.4.5	External short test	The cells were no disassembly, no fire and no rupture, and the external temperature did not exceed 170 °C.	P
38.3.4.6	Impact	The cells were no disassembly, no fire and no rupture, and the external temperature did not exceed 170 °C.	P
	Crush	The cell is a cylindrical type which diameter is 18mm.	N/A
38.3.4.7	Overcharge	The EUT is a rechargeable Lithium ion battery cell.	N/A
38.3.4.8	Forced discharge	The cells were no disassembly and no fire.	P



United Nations, Recommendations on the Transport of Dangerous Goods,
Manual of Test and Criteria (Rev. 6th +Amend.1), Section 38.3

Clause	Requirement + Test	Result - Remark	Verdict
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38.3.2.2 TABLE: List of critical Components					P
Object/part No.	Manufacturer/ trademark	Type/Model	Technical Data	Standard	Marks of Conformity
Cell Case	Interchangeable	Interchangeable	Ni plating mild steel	--	--
Positive Electrode	Interchangeable	Interchangeable	Blend Lithium Cobalt Oxide/Lithium Nickel Cobalt Oxide	--	--
Negative Electrode	Interchangeable	Interchangeable	Carbon	--	--
Separator	Celgard	H1612	PE/PE/PP Thickness:16um	--	--
Electrolyte	Interchangeable	Interchangeable	LiPF6 in organic solvent	--	--
Positive Tab	Interchangeable	Interchangeable	AL	--	--
Negative Tab	Interchangeable	Interchangeable	Ni	--	--
supplementary information: --					



United Nations, Recommendations on the Transport of Dangerous Goods,
Manual of Test and Criteria (Rev. 6th +Amend.1), Section 38.3

Clause	Requirement + Test	Result - Remark	Verdict
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38.3.4.1		Altitude simulation						P	
Model / Sample No.	Sample Status	Before test		After test		Mass loss (%)	Residual OCV (%)	Other Event	
		Weight (g)	OCV (V)	Weight (g)	OCV (V)				
ICR-18650M / 001	After 1 cycle	47.89	4.25	47.89	4.25	0.00	98.8	OK	
ICR-18650M / 002	After 1 cycle	47.93	4.24	47.93	4.24	0.00	98.8	OK	
ICR-18650M / 003	After 1 cycle	47.83	4.24	47.83	4.24	0.00	98.8	OK	
ICR-18650M / 004	After 1 cycle	47.83	4.24	47.83	4.24	0.00	98.8	OK	
ICR-18650M / 005	After 1 cycle	47.77	4.24	47.77	4.24	0.00	98.8	OK	
ICR-18650M / 006	After 25 cycle	47.02	4.25	47.02	4.25	0.00	100	OK	
ICR-18650M / 007	After 25 cycle	47.32	4.24	47.32	4.24	0.00	100	OK	
ICR-18650M / 008	After 25 cycle	47.38	4.25	47.38	4.25	0.00	100	OK	
ICR-18650M / 009	After 25 cycle	47.07	4.25	47.07	4.25	0.00	100	OK	
ICR-18650M / 010	After 25 cycle	47.29	4.25	47.29	4.25	0.00	100	OK	

Note(s):

Mass loss limit:

Mass M of cell or battery	Mass loss limit
M<1g	0.5%
1g<M<75g	0.2%
M>75g	0.1%

L-Leakage

V-Venting

D-Disassembly

R-Rupture

F-Fire

OK-No Leakage, No Venting, No Disassembly, No Rupture, No Fire



United Nations, Recommendations on the Transport of Dangerous Goods,
Manual of Test and Criteria (Rev. 6th +Amend.1), Section 38.3

Clause	Requirement + Test	Result - Remark	Verdict
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38.3.4.2 Thermal test								P
Model / Sample No.	Sample Status	Before test		After test		Mass loss (%)	Residual OCV (%)	Other Event
		Weight (g)	OCV (V)	Weight (g)	OCV (V)			
ICR-18650M / 001	After 1 cycle	47.89	4.25	47.86	4.17	0.06	98.1	OK
ICR-18650M / 002	After 1 cycle	47.93	4.24	47.91	4.18	0.04	98.5	OK
ICR-18650M / 003	After 1 cycle	47.83	4.24	47.80	4.18	0.06	98.5	OK
ICR-18650M / 004	After 1 cycle	47.83	4.24	47.82	4.20	0.02	99.0	OK
ICR-18650M / 005	After 1 cycle	47.77	4.24	47.76	4.20	0.02	99.0	OK
ICR-18650M / 006	After 25 cycle	47.02	4.25	47.00	4.19	0.06	98.6	OK
ICR-18650M / 007	After 25 cycle	47.32	4.24	47.29	4.20	0.04	99.1	OK
ICR-18650M / 008	After 25 cycle	47.38	4.25	47.35	4.20	0.06	98.8	OK
ICR-18650M / 009	After 25 cycle	47.07	4.25	47.05	4.18	0.06	98.4	OK
ICR-18650M / 010	After 25 cycle	47.29	4.25	47.29	4.18	0.00	98.4	OK

Note(s):

Mass loss limit:

Mass M of cell or battery	Mass loss limit
M<1g	0.5%
1g<M<75g	0.2%
M>75g	0.1%

L-Leakage

V-Venting

D-Disassembly

R-Rupture

F-Fire

OK-No Leakage, No Venting, No Disassembly, No Rupture, No Fire



United Nations, Recommendations on the Transport of Dangerous Goods,
Manual of Test and Criteria (Rev. 6th +Amend.1), Section 38.3

Clause	Requirement + Test	Result - Remark	Verdict
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38.3.4.3		Vibration						P
Model / Sample No.	Sample Status	Before test		After test		Mass loss (%)	Residual OCV (%)	Other Event
		Weight (g)	OCV (V)	Weight (g)	OCV (V)			
ICR-18650M / 001	After 1 cycle	47.86	4.17	47.86	4.17	0.00	100	OK
ICR-18650M / 002	After 1 cycle	47.91	4.18	47.91	4.18	0.00	100	OK
ICR-18650M / 003	After 1 cycle	47.80	4.18	47.80	4.18	0.00	100	OK
ICR-18650M / 004	After 1 cycle	47.82	4.20	47.82	4.20	0.00	100	OK
ICR-18650M / 005	After 1 cycle	47.76	4.20	47.76	4.20	0.00	100	OK
ICR-18650M / 006	After 25 cycle	47.00	4.19	47.00	4.19	0.00	100	OK
ICR-18650M / 007	After 25 cycle	47.29	4.20	47.29	4.19	0.00	99.8	OK
ICR-18650M / 008	After 25 cycle	47.35	4.20	47.29	4.19	0.00	99.8	OK
ICR-18650M / 009	After 25 cycle	47.05	4.18	47.05	4.18	0.00	100	OK
ICR-18650M / 010	After 25 cycle	47.29	4.18	47.29	4.18	0.00	100	OK

Note(s):

Mass loss limit:

Mass M of cell or battery	Mass loss limit
M<1g	0.5%
1g<M<75g	0.2%
M>75g	0.1%

L-Leakage

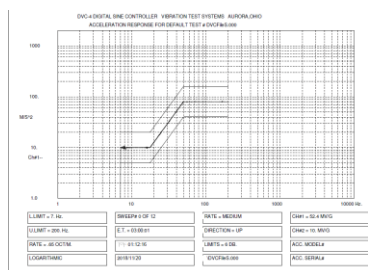
V-Venting

D-Disassembly

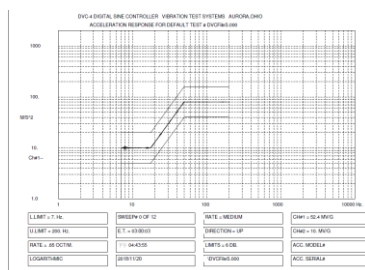
R-Rupture

F-Fire

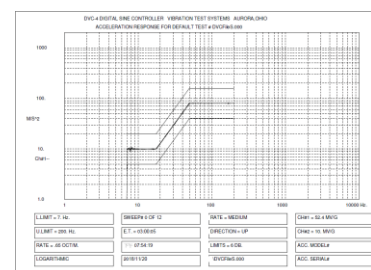
OK-No Leakage, No Venting, No Disassembly, No Rupture, No Fire



X axis



Y axis



Z axis



United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 6th +Amend.1), Section 38.3

Clause	Requirement + Test	Result - Remark	Verdict
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38.3.4.4 Shock							P	
Model / Sample No.	Sample Status	Before test		After test		Mass loss (%)	Residual OCV (%)	Other Event
		Weight (g)	OCV (V)	Weight (g)	OCV (V)			
ICR-18650M / 001	After 1 cycle	47.86	4.17	47.86	4.17	0.00	100	OK
ICR-18650M / 002	After 1 cycle	47.91	4.18	47.91	4.18	0.00	100	OK
ICR-18650M / 003	After 1 cycle	47.80	4.18	47.80	4.18	0.00	100	OK
ICR-18650M / 004	After 1 cycle	47.82	4.20	47.82	4.20	0.00	100	OK
ICR-18650M / 005	After 1 cycle	47.76	4.20	47.76	4.20	0.00	100	OK
ICR-18650M / 006	After 25 cycle	47.00	4.19	47.00	4.19	0.00	100	OK
ICR-18650M / 007	After 25 cycle	47.29	4.19	47.29	4.19	0.00	100	OK
ICR-18650M / 008	After 25 cycle	47.29	4.19	47.29	4.19	0.00	100	OK
ICR-18650M / 009	After 25 cycle	47.05	4.18	47.05	4.18	0.00	100	OK
ICR-18650M / 010	After 25 cycle	47.29	4.18	47.29	4.18	0.00	100	OK

Note(s):

Mass loss limit:

Mass M of cell or battery	Mass loss limit
M<1g	0.5%
1g<M<75g	0.2%
M>75g	0.1%

L-Leakage

V-Venting

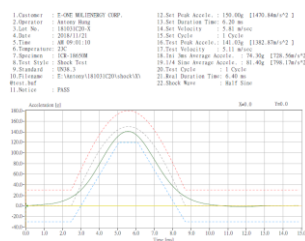
D-Disassembly

R-Rupture

F-Fire

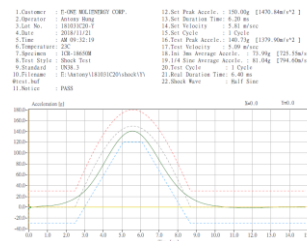
OK-No Leakage, No Venting, No Disassembly, No Rupture, No Fire

Shock Test Report



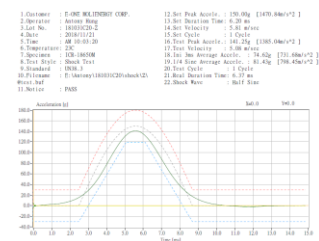
X axis

Shock Test Report



Y axis

Shock Test Report



Z axis



United Nations, Recommendations on the Transport of Dangerous Goods,
Manual of Test and Criteria (Rev. 6th +Amend.1), Section 38.3

Clause	Requirement + Test	Result - Remark	Verdict
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38.3.4.5	External short circuit			P
Model / Sample No.	Sample Status	Max. External temperature of EUT surface(°C)	Other Event	
ICR-18650M / 001	After 1 cycle	85.0	OK	
ICR-18650M / 002	After 1 cycle	84.0	OK	
ICR-18650M / 003	After 1 cycle	86.0	OK	
ICR-18650M / 004	After 1 cycle	86.0	OK	
ICR-18650M / 005	After 1 cycle	85.0	OK	
ICR-18650M / 006	After 25 cycle	78.5	OK	
ICR-18650M / 007	After 25 cycle	78.6	OK	
ICR-18650M / 008	After 25 cycle	77.9	OK	
ICR-18650M / 009	After 25 cycle	77.9	OK	
ICR-18650M / 010	After 25 cycle	80.1	OK	
<p>Note(s): D-Disassembly R-Rupture F-Fire OK- No Disassembly, No Fire, The external temperature of cell not exceeds 170°C.</p>				



United Nations, Recommendations on the Transport of Dangerous Goods,
Manual of Test and Criteria (Rev. 6th +Amend.1), Section 38.3

Clause	Requirement + Test	Result - Remark	Verdict
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38.3.4.6		Impact		P
Model / Sample No.	Sample Status	Max. External temperature of EUT surface(°C)	Other Event	
ICR-18650M / 011	At first cycle at 50 % of the designed capacity	55.0	OK	
ICR-18650M / 012	At first cycle at 50 % of the designed capacity	29.0	OK	
ICR-18650M / 013	At first cycle at 50 % of the designed capacity	44.0	OK	
ICR-18650M / 014	At first cycle at 50 % of the designed capacity	107.0	OK	
ICR-18650M / 015	At first cycle at 50 % of the designed capacity	105.0	OK	
ICR-18650M / 016	At 25 cycle at 50 % of the designed capacity	40.1	OK	
ICR-18650M / 017	At 25 cycle at 50 % of the designed capacity	40.3	OK	
ICR-18650M / 018	At 25 cycle at 50 % of the designed capacity	38.2	OK	
ICR-18650M / 019	At 25 cycle at 50 % of the designed capacity	36.8	OK	
ICR-18650M / 020	At 25 cycle at 50 % of the designed capacity	40.7	OK	
Note(s): D-Disassembly F-Fire OK- No Disassembly, No Fire, The external temperature of cell not exceeds 170°C.				

38.3.4.6		Crush		N/A
Model / Sample No.	Sample Status	Max. External temperature of EUT surface(°C)	Other Event	
--	--	--	--	
Note(s):				



United Nations, Recommendations on the Transport of Dangerous Goods, Manual of Test and Criteria (Rev. 6th +Amend.1), Section 38.3

Clause	Requirement + Test	Result - Remark	Verdict
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38.3.4.7	Overcharge		N/A
Model / Sample No.	Sample Status	Other Event	
--	--	--	
Note(s): EUT is a lithium ion battery cell			

38.3.4.8	Forced discharge		P
Model / Sample No.	Sample Status	Other Event	
ICR-18650M / 021	After 1 cycle	OK	
ICR-18650M / 022	After 1 cycle	OK	
ICR-18650M / 023	After 1 cycle	OK	
ICR-18650M / 024	After 1 cycle	OK	
ICR-18650M / 025	After 1 cycle	OK	
ICR-18650M / 026	After 1 cycle	OK	
ICR-18650M / 027	After 1 cycle	OK	
ICR-18650M / 028	After 1 cycle	OK	
ICR-18650M / 029	After 1 cycle	OK	
ICR-18650M / 030	After 1 cycle	OK	
IHR-18650B / 031	After 25 cycle	OK	
IHR-18650B / 032	After 25 cycle	OK	
IHR-18650B / 033	After 25 cycle	OK	
IHR-18650B / 034	After 25 cycle	OK	
IHR-18650B / 035	After 25 cycle	OK	
IHR-18650B / 036	After 25 cycle	OK	
IHR-18650B / 037	After 25 cycle	OK	
IHR-18650B / 038	After 25 cycle	OK	
IHR-18650B / 039	After 25 cycle	OK	
IHR-18650B / 040	After 25 cycle	OK	
Note(s): D-Disassembly F-Fire OK- No Disassembly, 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	Range used	Calibration date

Photos:



Top view for the cell



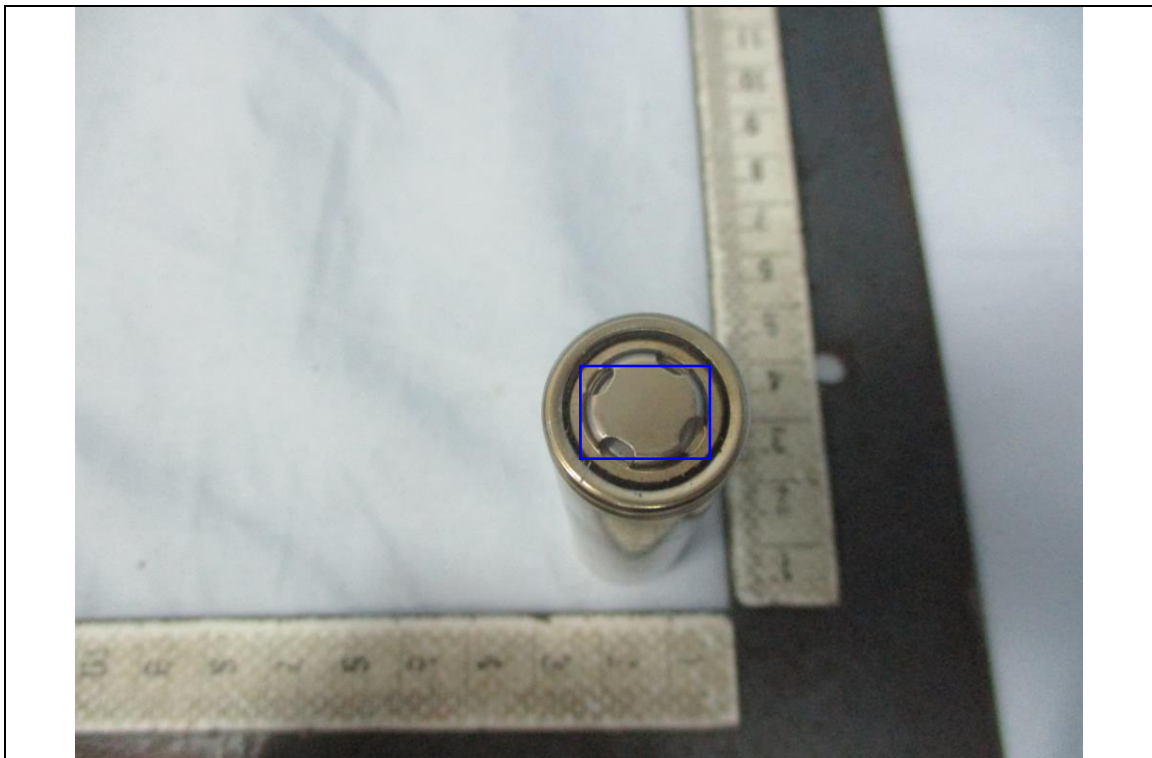
Bottom view for the cell



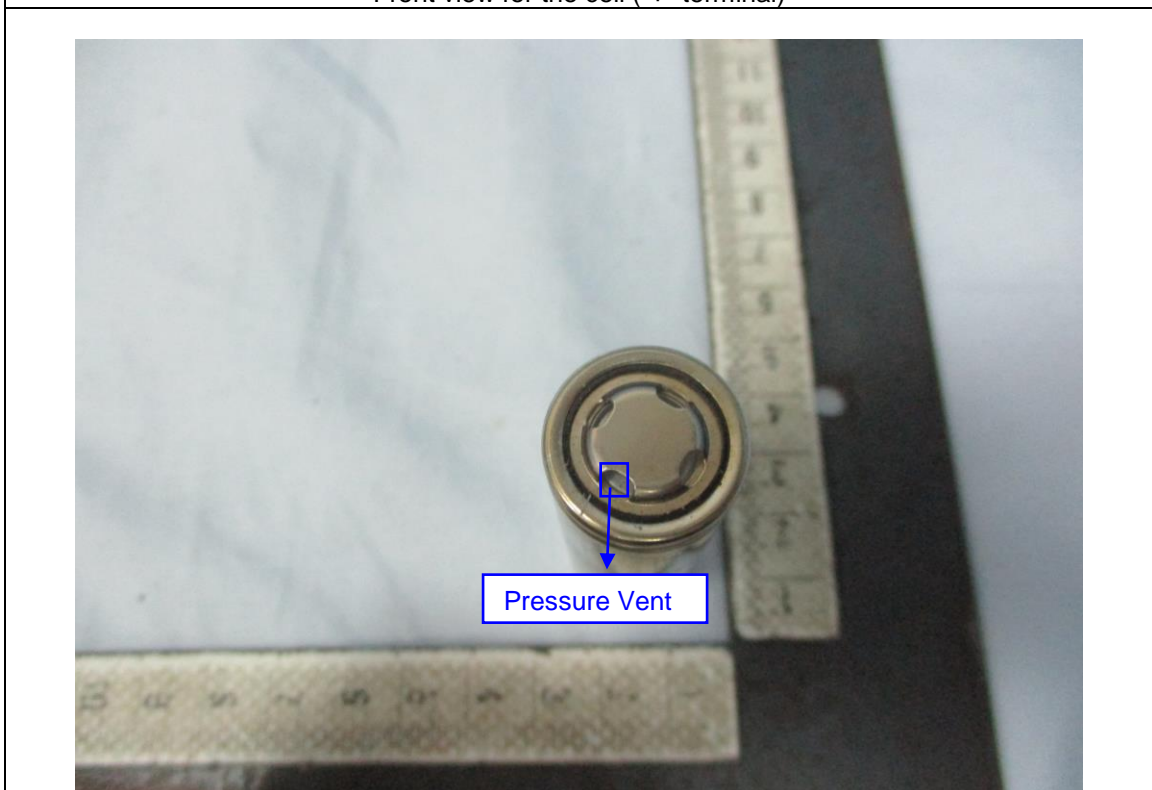
Top view for the cell without film



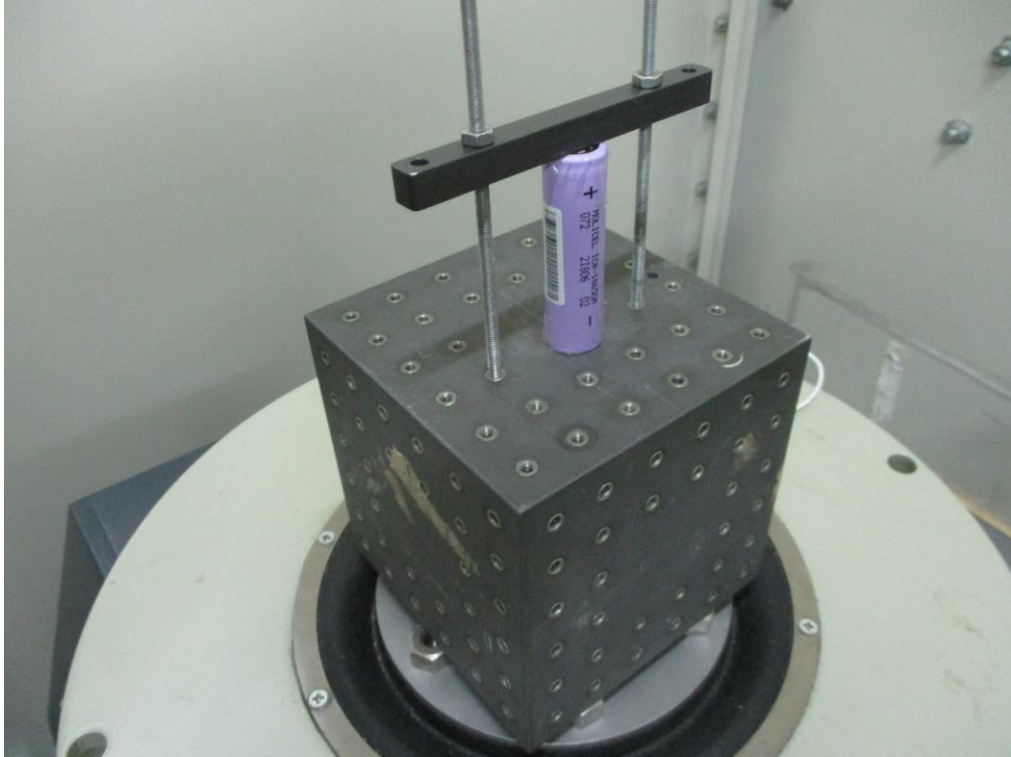
Bottom view for the cell without film



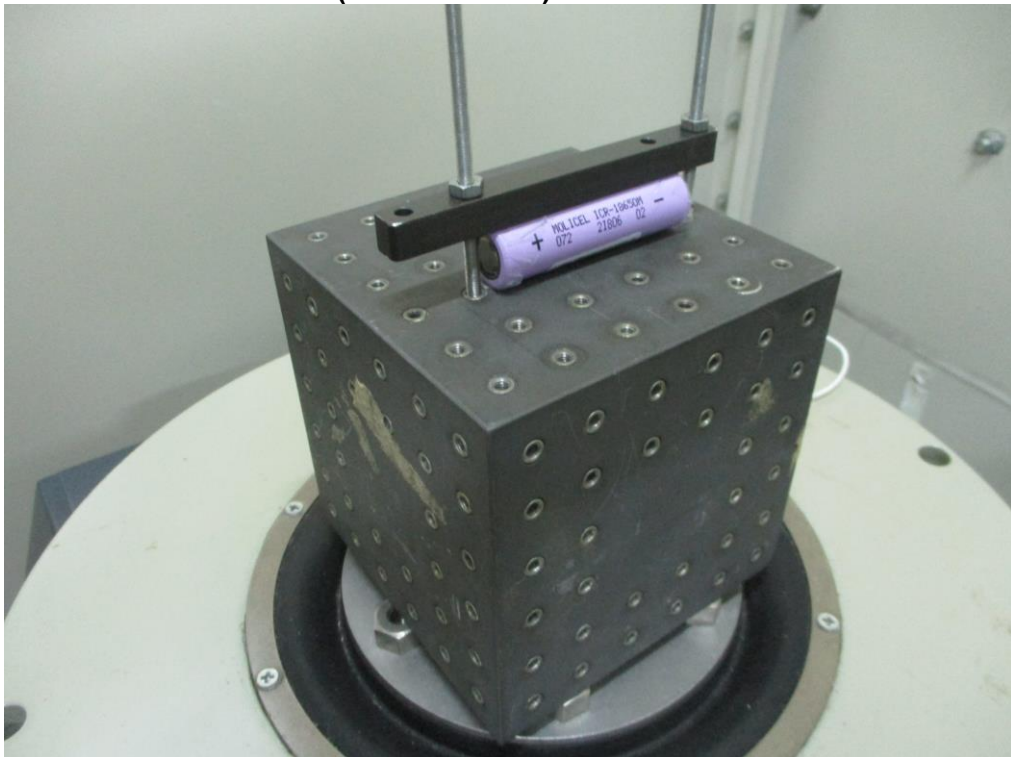
Front view for the cell (“+” terminal)



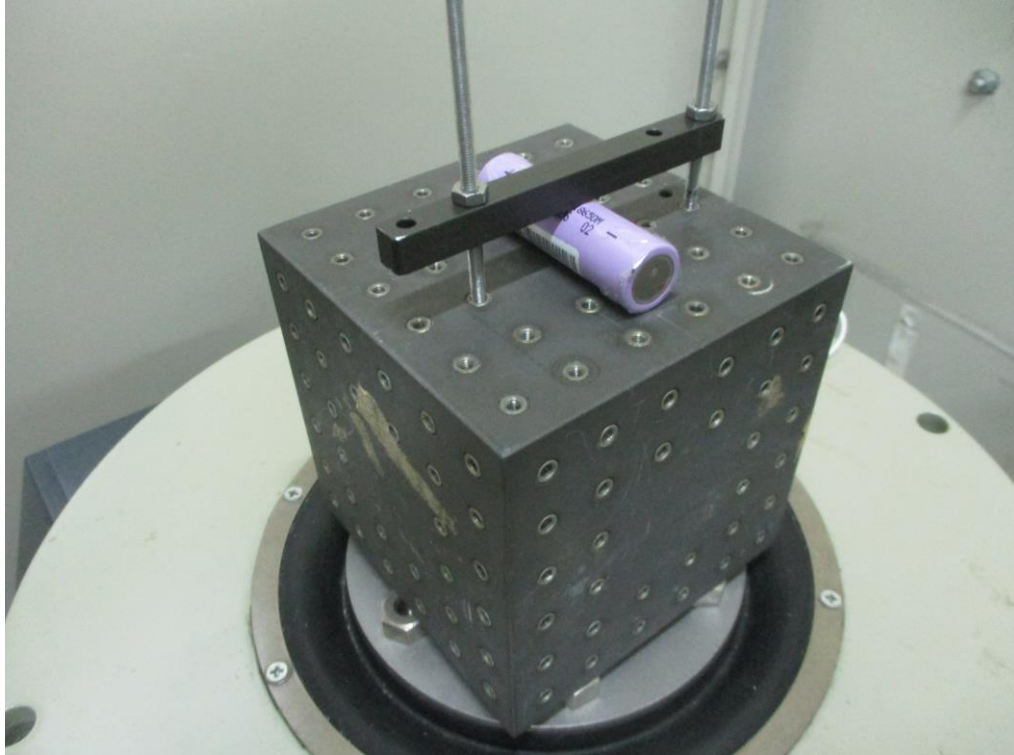
Pressure vent for the cell



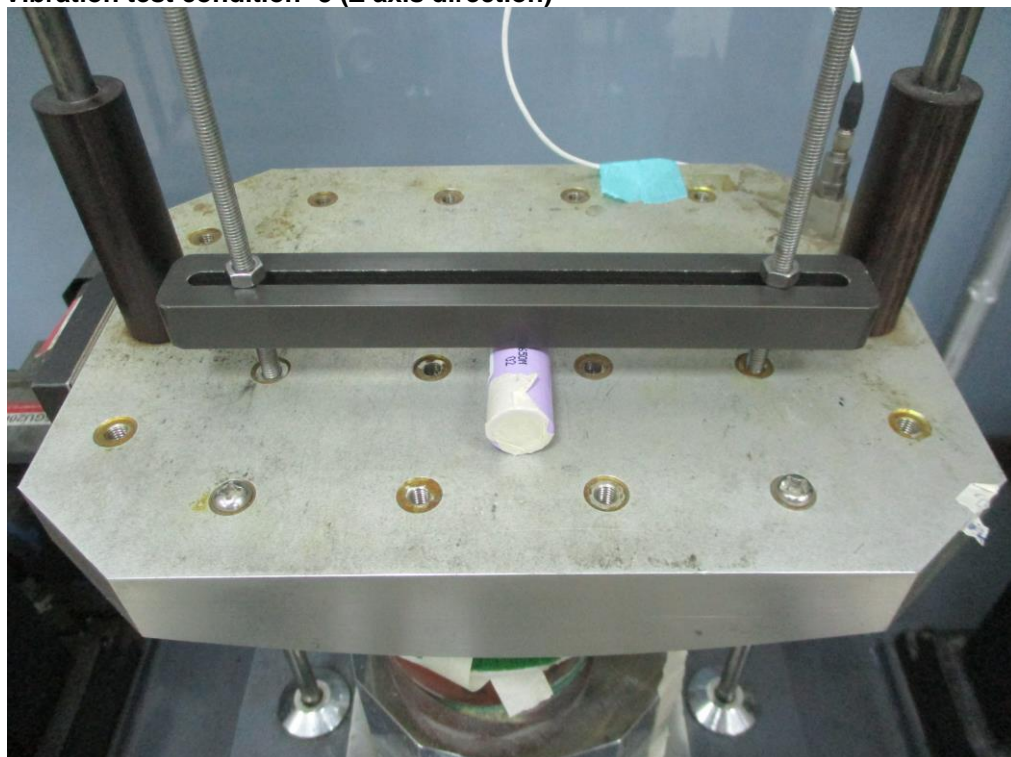
Vibration test condition -1 (X axis direction)



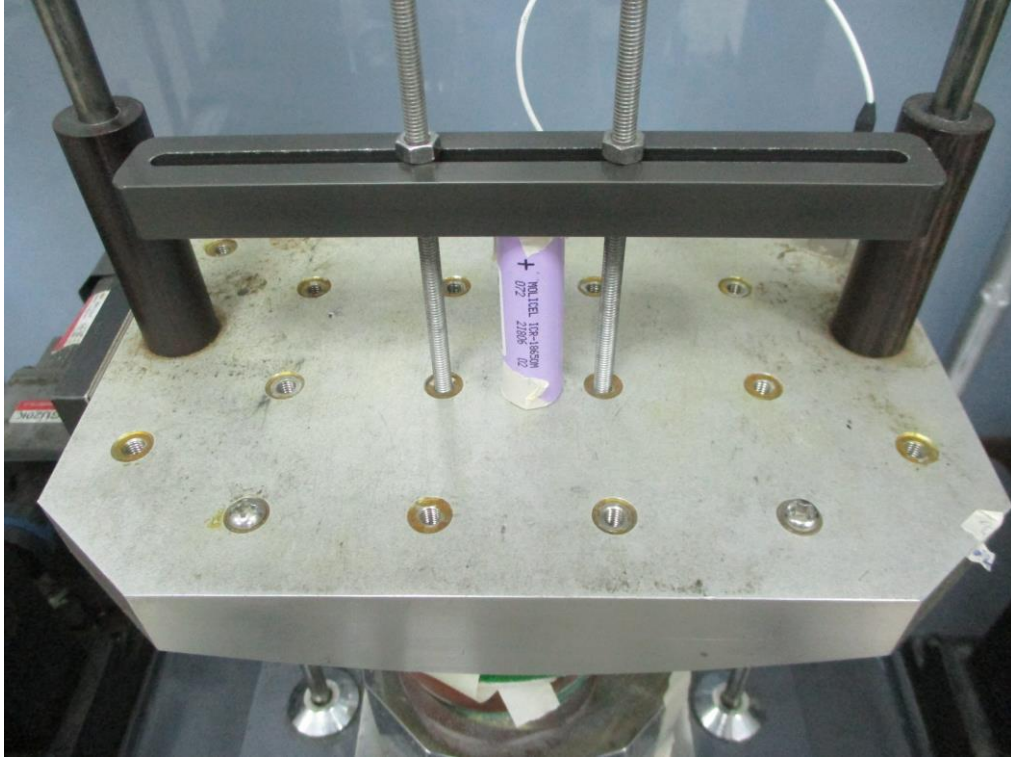
Vibration test condition -2 (Y axis direction)



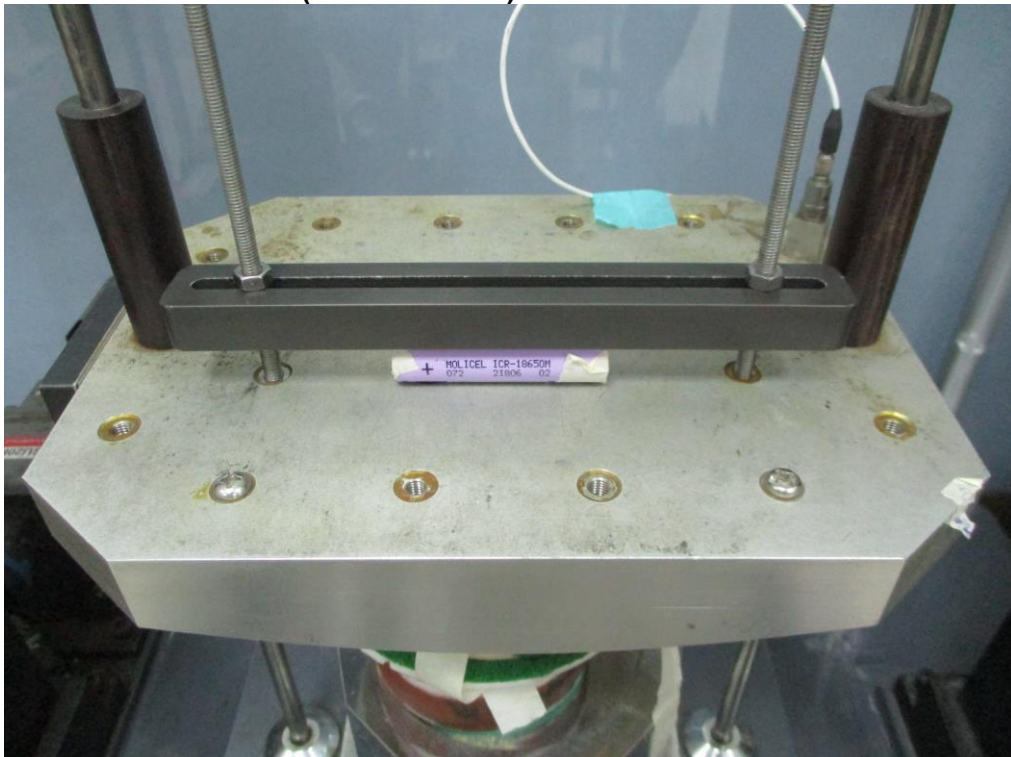
Vibration test condition -3 (Z axis direction)



Shock test condition -1 (X axis direction)



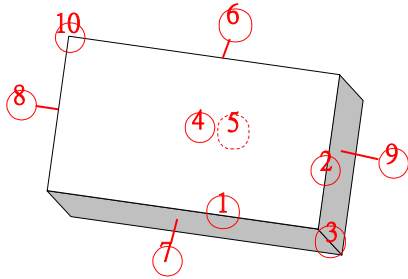
Shock test condition -2 (Y axis direction)



Shock test condition -3 (Z axis direction)

Attachment 1

ICR-18650M 1.2m Drop test
(Pass, without damage and shifting of contents)



After drop

