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Test Report No.:	UNT190308C31	
Client		
Name :	E-ONE MOLI ENERGY CORPORAT	ION
Address :	Southern Taiwan Science Park, No Dist. Tainan	o.10, D <u>a</u> li 2nd Rd. Shanhua
Test Item :	Rechargeable Lithium-ion Battery	Cell
Identification :	INR-18650-M35A (INR19/66)	
Testing laboratory		
Name :	Bureau Veritas Consumer Products S	ervices (H.K.) Ltd., Taoyuan
Address :	Branch No. 47-2, 14th Ling, Chia Pau Vil., Lin Taiwan	Kou Dist.,New Taipei City,
Test specification		
Standard :	United Nations, Recommendations or Goods, Manual of Test and Criteria (R 38.3	
Test Result :	The test item passed.	
Prepared By :	MAT UT	2019-09-10
	Signature	Date
	Matt Lin	
	Senior Engineer	
Approved By:	Edwell Atom	2019-04-10
	Signature	Date/
	Edward Chiueh	
	Technical Manager	
This report should not be us approval, or endorsement agencies.	ed by the client to claim product certification, by TAF, NVLAP, NIST or any government	Taff Testing Laboratory 2021
trademark, is permitted only with or identified herein. The results set for which a test sample was taken or a tests requested by you and the resu issuance of this report to notify us of shall be in writing and shall specific shall constitute your unqualified acc	e. Any copying or replication of this report to or for any ot ur prior written permission. This report sets forth our findi rth in this report are not indicative or representative of the iny similar or identical product unless specifically and exp ults thereof based upon the information that you provided of any material error or omission caused by our negligend cally address the issue you wish to raise. A failure to raise ceptance of the completeness of this report, the tests con the uncertainty of measurement has been explicitly taker ion.	ngs solely with respect to the test samples e quality or characteristics of the lot from pressly noted. Our report includes all of the I to us. You have 60 days from date of ce, provided, however, that such notice e such issue within the prescribed time inducted and the correctness of the report



VERITAS	
	TEST SUMMARY
	mmendations on the Transport of Dangerous Goods, and Criteria (Rev. 6 th +Amend.1), Section 38.3
Report Reference No	UNT190308C31
Compiled by	See cover sheet
Title:	See cover sheet
Phone number:	+886-3-3183232 Ext. 1622
E-Mail address:	Matt.Lin@tw.bureauveritas.com
Approved by	See cover sheet
Title:	See cover sheet
Phone number:	+886-3-3183232 Ext. 1817
E-Mail address:	Edward.Chiueh@tw.bureauveritas.com
Date of issue:	2019-04-10
Total number of pages	26
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 CORPORATION
Address :	Southern Taiwan Science Park, No.10, Dali 2nd Rd. Shanhua Dist. Tainan
Contact information	
Name:	Yu Feng Hsu
Phone number:	+886-6-505-0666
E-Mail address	<u>yfhsu@molicel.com</u>
Website:	http://www.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:	
Model number:	INR-18650-M35A (INR19/66)
Ratings	3.6V, 3.45Ah
Mass	48 g (Max)
Physical description:	Cylindrical battery cell
Reference to assembled battery testing requirement:	N/A

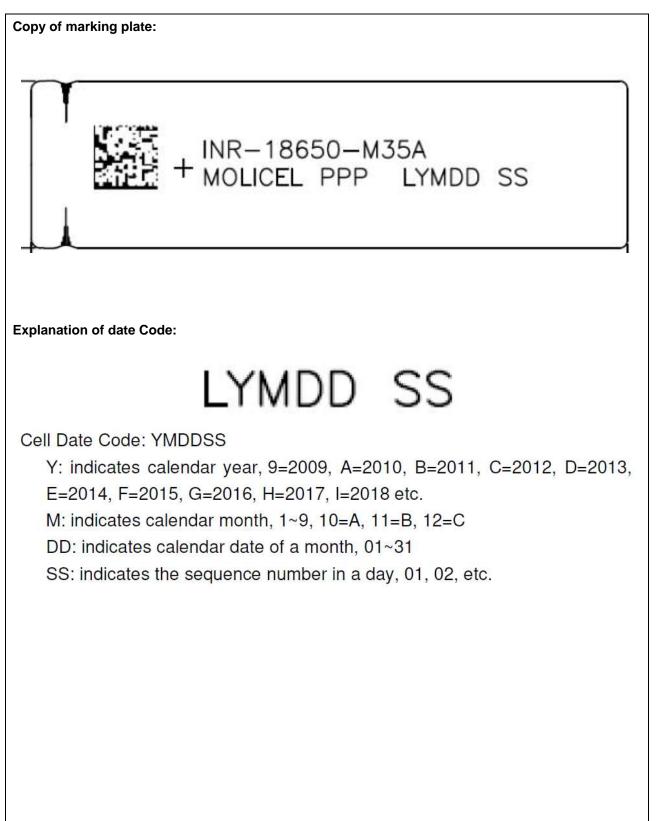


Summary of testing:		
Lis	t of tests conducted	
Clause	Name of test item	Result
38.3.4.1	Altitude simulation	Р
38.3.4.2	Thermal test	Р
38.3.4.3	Vibration	Р
38.3.4.4	Shock	Р
38.3.4.5	External short circuit	Р
38.3.4.6	Impact	Р
38.3.4.7	Overcharge	N/A
38.3.4.8	Forced discharge	Р

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

Nominal capacity (Ah):	3.45
Nominal voltage (Vdc):	3.6
Minimum end voltage of discharge (Vdc)	2.5
Max. charge voltage (Vdc):	4.25
Max. charge current (A):	3.4
Max. continue discharge current (A)	10







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:	2019-03-08
Date (s) of performance of tests:	2019-03-11 to 2019-03-29
General remarks:	
The test results presented in this report relate only to the This report shall not be reproduced, except in full, withou "(see Enclosure #)" refers to additional information app "(see appended table)" refers to a table appended to the	ut the written approval of the Issuing testing laboratory. Dended to the report.

Throughout this report a point is used as the decimal separator.



General product information:

- (1) The equipment under test (EUT) model INR-18650-M35A (INR19/66) is a Rechargeable lithium-Ion Battery Cell.
- (2) The maximum ambient temperature is specified as 60°C for Charging and 60°C for Discharging.
- (3) The 1.2 m drop test has been tested according to UN Recommendations on the Transport of Dangerous Goods - Model Regulations Twentieth revised edition, details test result see "Attachment 1".
- (4) Dimension of the battery cell: (D) 18.6 mm Max by (H) 65.2 mm. Max.
- (5) Weight: 48.0 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.



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United Nations, Recommendations on the Transport of Dangerous Goods,

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Clause Requirement + Test

Result - Remark

Verdict

Ρ

38.3 Lithium batteries

38.3.1	Purpose					
38.3.2	Scope					
38.3.2.1	Lithium cells or batteries which differ from a tested type by:	This a new product (new application)	N/A			
	 (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.					
38.3.2.2	Classification	The EUT is a Rechargeable Lithium-ion Battery Cell.	Р			
38.3.3	The number and condition of cells and batter	ies	Р			
	Cells (Primary/Rechargeable) The EUT is a Rechargeable Lithium-ion Battery Cell.		Р			
	Batteries (Primary/Rechargeable)	The EUT is a Rechargeable Lithium-ion Battery Cell.	Р			
38.3.4	Procedure					
	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	The sequence Test 1 to Test 5 tests were conducted on the same samples.				
	and 8 should be conducted using not otherwise tested cells or batteries. Test 7 may be conducted using undamaged batteries	Test 6 was conducted on the new component cell samples.	Ρ			
	previously used in Tests 1 to 5 for purposes of testing on cycled batteries.	Test 8 was conducted on the new component cell samples.				
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.	Ρ			
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.	Ρ			



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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.	Ρ
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.	Ρ
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.	Ρ
38.3.4.6	Impact	The cells were no disassembly, no fire and no rupture, and the external temperature did not exceed 170 °C.	Ρ
	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.	Р



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Clause Requirement + Test

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38.3.2.2	TAE	BLE: List of critic	al Components				Р
Object/part No. Manufacturer trademark			Type/Model	Technical Data	Standard	-	Marks of onformity
Positive Electrode		Interchangeable	Interchangeable	Material:NCA			
Negative Electrode		Interchangeable	Interchangeable	Material:Si-C Composite			
Separator		Cangzhou Mingzhu Plastic Co., Ltd.	CW141238	PE+Cearmic,14+/- 1.5um			
Electrolyte		Interchangeable	Interchangeable	LiPF6+Organic Solvent			
Cell Case		Interchangeable	Interchangeable	Steel			
Positive Tab		Interchangeable	Interchangeable	Material: AL			
Negative Tab)	Interchangeable	Interchangeable	Material: Cu/Ni			
supplementa	ry inf	ormation:				•	



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Result - Remark

38.3.4.1	Altitude sin	nulation							Р
Model / Sample No.		Sample Status	Befor Weight (g)	e test OCV (V)	After Weight (g)	test OCV (V)	Mass loss ¹⁾ (%)	Residual OCV (%)	Other Event
		After 1 cycle	(<u>9</u>) 45.40	4.24	(<u>9</u>) 45.40	4.23	0.00	99.7	ОК
INR-18650-	M35A / 002	After 1 cycle	45.39	4.24	45.39	4.24	0.00	100	OK
INR-18650-	M35A / 003	After 1 cycle	45.38	4.24	45.37	4.23	0.02	99.7	OK
INR-18650-	M35A / 004	After 1 cycle	45.70	4.24	45.69	4.24	0.02	100	OK
INR-18650-	M35A / 005	After 1 cycle	45.56	4.24	45.55	4.24	0.02	100	OK
INR-18650-	M35A / 006	After 25 cycle	45.38	4.23	45.38	4.22	0.00	99.7	OK
INR-18650-	M35A / 007	After 25 cycle	46.64	4.23	46.64	4.23	0.00	100	OK
INR-18650-	M35A / 008	After 25 cycle	45.58	4.24	45.57	4.24	0.02	99.7	OK
INR-18650-	M35A / 009	After 25 cycle	45.67	4.23	45.66	4.22	0.02	99.7	OK
INR-18650-	M35A / 010	After 25 cycle	45.48	4.23	45.48	4.22	0.00	99.7	OK
1) Mass lo	kage, No Ven ss limit: cell or batter	ting, No Disassen y Mass loss 0.5% 0.2% 0.1%		Rupture, I	<u>No Fire</u>				



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Clause Requirement + Test

Result - Remark

38.3.4.2	Thermal te	st							Р
Model / S	Sample No.	Sample Status	Befor Weight	e test OCV	After Weight	test OCV	Mass loss ¹⁾	Residual OCV (%)	Other Event
			(g)	(V)	(g)	(V)	(%)	000 (78)	Eveni
INR-18650	-M35A / 001	After 1 cycle	45.40	4.23	45.37	4.13	0.06	97.6	OK
INR-18650	-M35A / 002	After 1 cycle	45.39	4.24	45.35	4.13	0.08	97.4	OK
INR-18650	-M35A / 003	After 1 cycle	45.37	4.23	45.33	4.12	0.08	97.3	ОК
INR-18650	-M35A / 004	After 1 cycle	45.69	4.24	45.65	4.13	0.08	97.4	ОК
INR-18650	-M35A / 005	After 1 cycle	45.55	4.24	45.52	4.12	0.06	97.1	ОК
INR-18650	-M35A / 006	After 25 cycle	45.38	4.22	45.34	4.11	0.08	97.3	ОК
INR-18650	-M35A / 007	After 25 cycle	46.64	4.23	46.64	4.12	0.06	97.3	ОК
INR-18650	-M35A / 008	After 25 cycle	45.57	4.24	45.57	4.11	0.08	97.1	OK
INR-18650	-M35A / 009	After 25 cycle	45.66	4.22	45.66	4.11	0.08	97.3	OK
INR-18650	-M35A / 010	After 25 cycle	45.48	4.22	45.48	4.11	0.08	97.3	OK
Note(s): L-Leakage V-Venting D-Disasser R-Rupture F-Fire OK-No Lea	-	iting, No Disassen	nbly, No F	Rupture, 1	No Fire				
	oss limit:	<u>.</u>							
	f cell or batter		limit						
M<1g		0.5%							
1g <m<75< td=""><td>g</td><td>0.2%</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></m<75<>	g	0.2%							
M>75g		0.1%							



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Result - Remark

38.3.4.3	Vibration								Р
Model /	Sample No.	Sample Status	Befor Weight (g)	e test OCV (V)	After Weight (g)	test OCV (V)	Mass loss (%)	Residual OCV (%)	Other Event
INR-18650	-M35A / 001	After 1 cycle	45.37	4.13	45.36	4.12	0.02	99.7	OK
INR-18650	-M35A / 002	After 1 cycle	45.35	4.13	45.35	4.12	0.00	99.7	OK
INR-18650	-M35A / 003	After 1 cycle	45.33	4.12	45.32	4.12	0.02	100	OK
INR-18650	-M35A / 004	After 1 cycle	45.65	4.13	45.64	4.13	0.02	100	OK
INR-18650	-M35A / 005	After 1 cycle	45.52	4.12	45.52	4.12	0.00	100	OK
INR-18650	-M35A / 006	After 25 cycle	45.34	4.11	45.34	4.10	0.00	99.7	OK
INR-18650	-M35A / 007	After 25 cycle	46.64	4.12	46.60	4.11	0.02	99.7	OK
INR-18650	-M35A / 008	After 25 cycle	45.57	4.11	45.53	4.11	0.00	100	OK
INR-18650	-M35A / 009	After 25 cycle	45.66	4.11	45.61	4.10	0.02	99.7	OK
INR-18650	-M35A / 010	After 25 cycle	45.48	4.11	45.44	4.11	0.00	100	OK
M<1g. 1g <m<75g. M>75g. L-Leakage V-Venting D-Disasser R-Rupture F-Fire OK-No Lea</m<75g. 	mbly ikage, No Venti	Mass loss lir 0.5%+2 0.2%+2 0.1%+2	ہ ہ ہ	Rupture, N	No Fire				
Vibration cl	harts table as fo	ollowing :	Y					7	
1	X axis		Y :			1	ni - i normi, sea inservizione - i bossi più inservizione ra	<u>axis</u>	
1.001-0010 60012010740			0 0 1 1 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	и М	100 [Pile 6	A Constraints of the second se		N N N	Enter of the second sec



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38.3.4.4	Shock									Р
Model / S	ample No.	Sample	Status	Befor Weight (g)	e test OCV (V)	After Weight (g)	OCV (V)	Mass loss (%)	Residual OCV (%)	Other Event
INR-18650-	M35A / 001	After 1	cycle	45.36	4.12	45.36	4.12	0.00	100	OK
INR-18650-	M35A / 002	After 1	cycle	45.35	4.12	45.34	4.11	0.02	99.7	ОК
INR-18650-	M35A / 003	After 1	cycle	45.32	4.12	45.32	4.12	0.00	100	ОК
INR-18650-	M35A / 004	After 1	cycle	45.64	4.13	45.63	4.12	0.02	99.7	ОК
INR-18650-	M35A / 005	After 1	cycle	45.52	4.12	45.51	4.11	0.02	99.7	OK
INR-18650-	M35A / 006	After 25	cycle	45.34	4.10	45.34	4.09	0.00	99.7	OK
INR-18650-	M35A / 007	After 25	cycle	46.60	4.11	46.60	4.10	0.00	99.7	OK
INR-18650-	M35A / 008	After 25	cycle	45.53	4.11	45.52	4.10	0.02	99.7	OK
INR-18650-	M35A / 009	After 25	cycle	45.61	4.10	45.61	4.10	0.00	100	OK
INR-18650-	M35A / 010	After 25	cycle	45.44	4.11	45.43	4.11	0.02	100	ОК
M<1g. 1g <m<75g. M>75g. L-Leakage V-Venting D-Disassen R-Rupture</m<75g. 		0.59 0.29 0.19	6 4⊃	م م م						
F-Fire	kage, No Ven	ting, No D	isassen	nbly, No F	Rupture, I	No Fire				
F-Fire OK-No Lea	ts table as fol		isassen		•	No Fire				
F-Fire OK-No Lea			isassen		axis	No Fire		Z Shock Text	Z axis	



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Clause Requirement + Test

Result - Remark

Verdict

38.3.4.5	8.3.4.5 External short circuit			
Model /	Sample No.	Sample Status	Max. External temperature of EUT surface(°C)	Other Event
INR-1865	0-M35A / 001	After 1 cycle	98.2	ОК
INR-1865	0-M35A / 002	After 1 cycle	96.8	OK
INR-1865	0-M35A / 003	After 1 cycle	99.9	ОК
INR-1865	0-M35A / 004	After 1 cycle	86.1	OK
INR-1865	0-M35A / 005	After 1 cycle	96.4	ОК
INR-1865	0-M35A / 006	After 25 cycle	94.3	ОК
INR-1865	0-M35A / 007	After 25 cycle	94.3	OK
INR-1865	0-M35A / 008	After 25 cycle	95.8	ОК
INR-1865	0-M35A / 009	After 25 cycle	95.8	ОК
	0-M35A / 010	After 25 cycle	102.7	OK

R-Rupture

F-Fire

OK- No Disassembly, No Fire, The external temperature of cell not exceeds 170°C.



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Clause Requirement + Test

Result - Remark

Verdict

38.3.4.6 I	Impact				Р
Model / Sample No.		Sample Status	Max. External temperature of EUT surface(°C)	Other Event	
INR-18650-I	M35A / 011	At first cycle at 50 % of the designed capacity	43.5	Ok	,
INR-18650-I	M35A / 012	At first cycle at 50 % of the designed capacity	42.4	Ok	,
INR-18650-I	M35A / 013	At first cycle at 50 % of the designed capacity	47.6	Ok	
INR-18650-I	M35A / 014	At first cycle at 50 % of the designed capacity	45.2	Ok	
INR-18650-I	M35A / 015	At first cycle at 50 % of the designed capacity	41.3	Ok	
INR-18650-I	M35A / 016	At 25 cycle at 50 % of the designed capacity	43.6	Ok	
INR-18650-I	M35A / 017	At 25 cycle at 50 % of the designed capacity	47.4	Ok	,
INR-18650-M35A / 018		At 25 cycle at 50 % of the designed capacity	38.9	9 ОК	
INR-18650-M35A / 019		At 25 cycle at 50 % of the designed capacity	41.6	ОК	
INR-18650-M35A / 020		At 25 cycle at 50 % of the designed capacity	42.7	Ok	,
Note(s):					
D-Disassemb	bly				
F-Fire					

OK- No Disassembly, No Fire, The external temperature of cell not exceeds 170°C.



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Manual of Test and Criteria (Rev. 6th +Amend.1), Section 38.3 Clause Requirement + Test Result - Remark Verdict

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



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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				



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20 2 4 0			Р
38.3.4.8	Forced discharge	Somulo Status	
	lel / Sample No.	Sample Status	Other Event
	8650-M35A / 021	After 1 cycle	OK
INR-1	8650-M35A / 022	After 1 cycle	OK
INR-1	8650-M35A / 023	After 1 cycle	ОК
INR-1	8650-M35A / 024	After 1 cycle	OK
INR-1	8650-M35A / 025	After 1 cycle	OK
INR-1	8650-M35A / 026	After 1 cycle	ОК
INR-1	8650-M35A / 027	After 1 cycle	OK
INR-1	8650-M35A / 028	After 1 cycle	OK
INR-1	8650-M35A / 029	After 1 cycle	OK
INR-1	8650-M35A / 030	After 1 cycle	OK
INR-1	8650-M35A / 031	After 25 cycle	OK
INR-1	8650-M35A / 032	After 25 cycle	OK
INR-1	8650-M35A / 033	After 25 cycle	OK
INR-1	8650-M35A / 034	After 25 cycle	OK
INR-1	8650-M35A / 035	After 25 cycle	OK
INR-1	8650-M35A / 036	After 25 cycle	OK
INR-1	8650-M35A / 037	After 25 cycle	OK
INR-1	8650-M35A / 038	After 25 cycle	OK
INR-1	8650-M35A / 039	After 25 cycle	OK
INR-1	8650-M35A / 040	After 25 cycle	OK
Note(s):			
D-Disasser	nbly		
F-Fire			
OK- No Dis	assembly, No Fire		



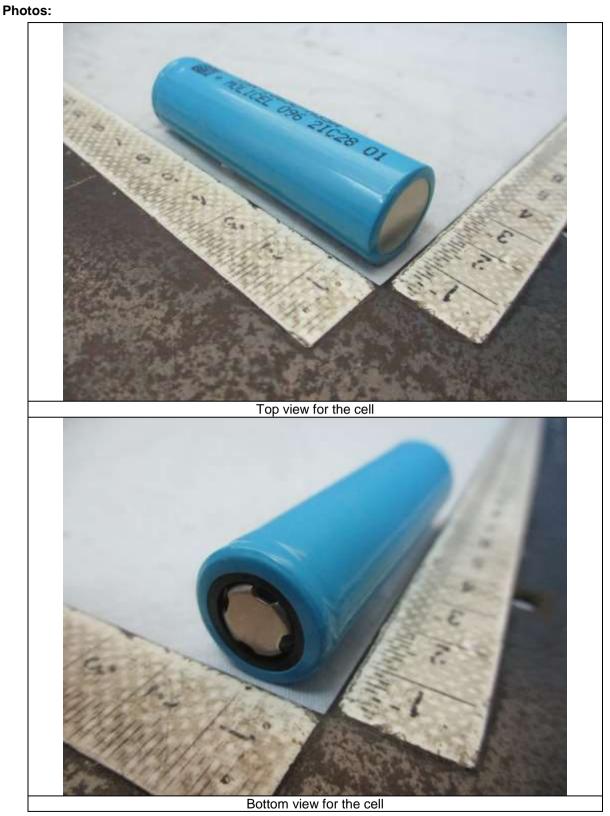
List of test equipment used:

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

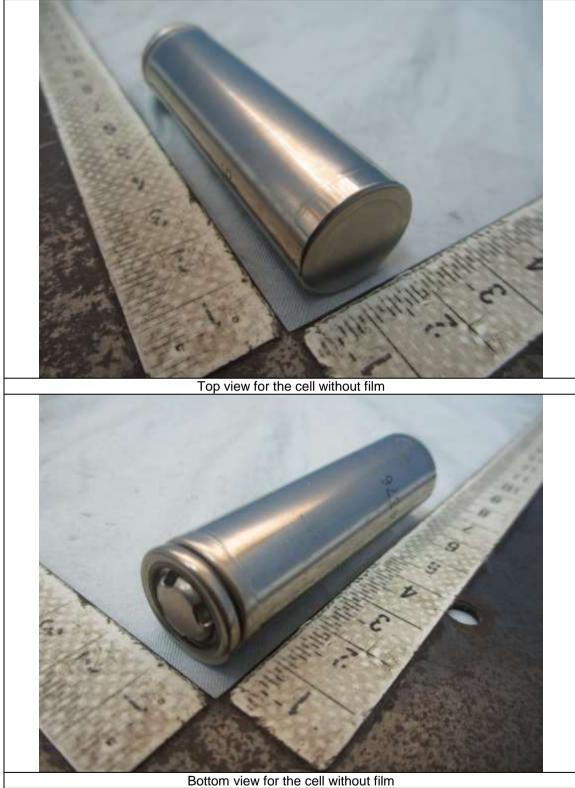
Clause	Measurement / testing	Testing / measuring equipment / material used	Range used	Calibration date
			/	
			¢	
	/			



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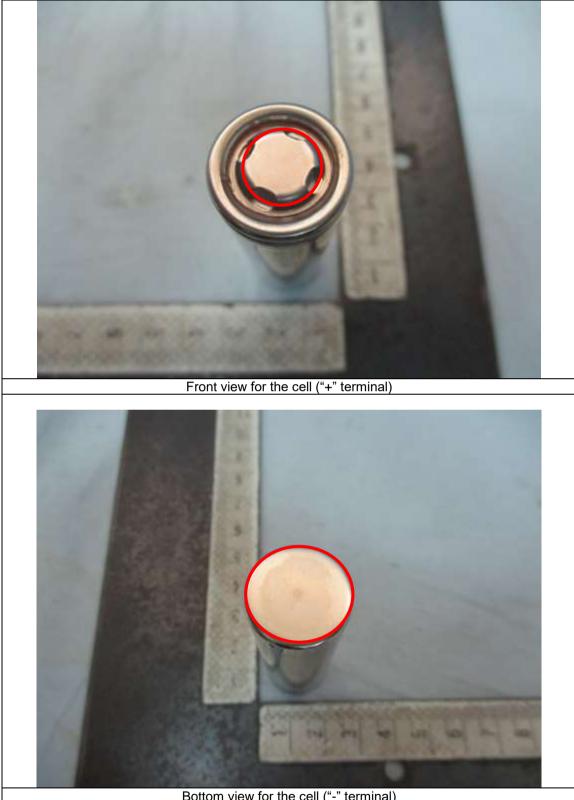






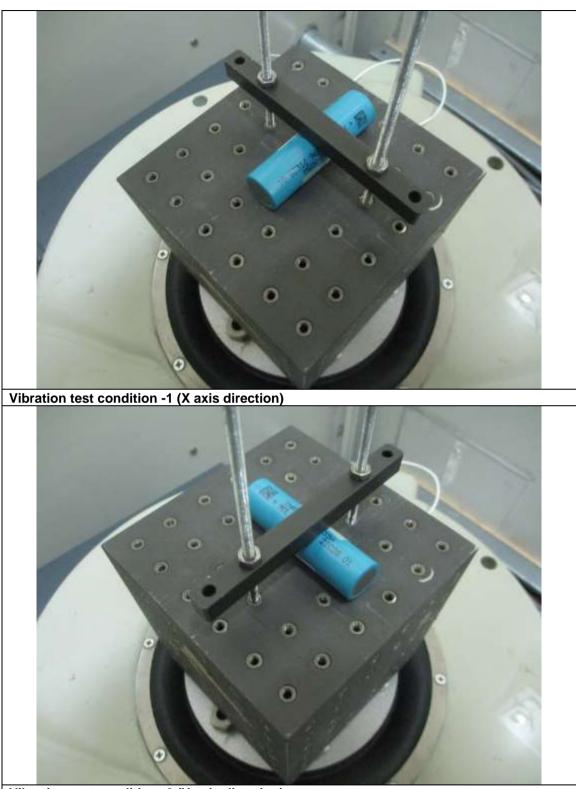
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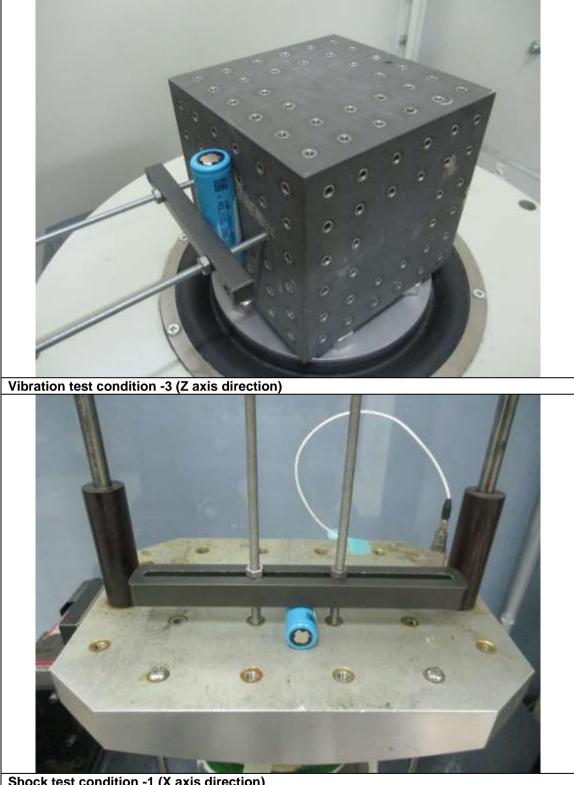
Bottom view for the cell ("-" terminal)





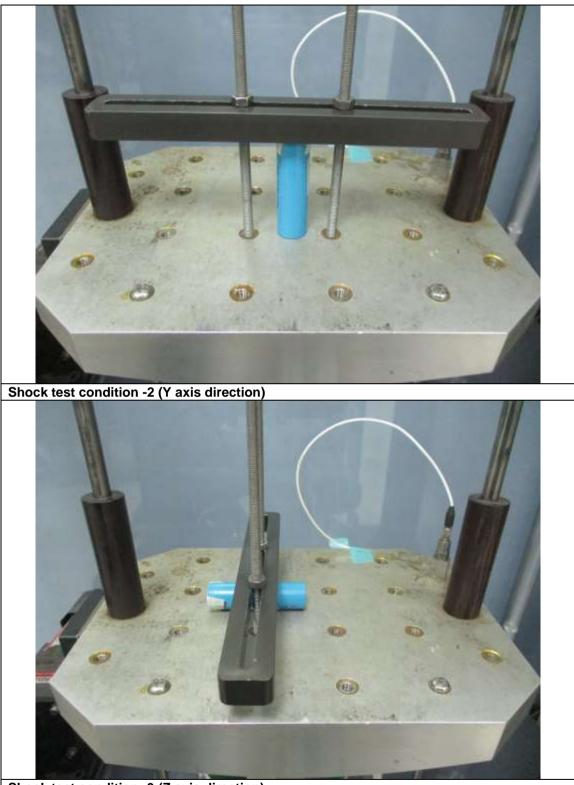
Vibration test condition -2 (Y axis direction)





Shock test condition -1 (X axis direction)





Shock test condition -3 (Z axis direction)



Attachment 1

INR-18650-M35A 1.2m Drop test

(Pass, without damage and shifting of contents)

