



Model name : INR21700-50E

Revision 10

Executive Div.	Safety Center	Confidential	
	Name / Title	Signature	Date
Reported by	HAM HSYUNG WOO		2018.7.31
Approved by	Minso Jongs Pi		2018.3.31

Test report; UN Manual of Tests and Criteria,
Part III, Subsection 38.3



2015, Rev.6

Document No : SDI-UN-180331-01

SAMSUNG SDI
Energy Business Division



Product Information

- 1. Model name: INR21700-50E**
- 2. Product classification: Lithium ion rechargeable cell**
- 3. Nominal voltage: 3.63V**
- 4. Rated capacity: 4900mAh**
- 5. Wh Capacity: 17.787Wh**
- 6. Weight of product: Max 69.5g**
- 7. Test Date: 2018.02.28 ~ 2018.03.20**
- 8. Test Location: SAMSUNG SDI Safety Center, 467, Beonyeong-ro, Seobuk-gu,
Cheonan-si, Chungcheongnam-do, Korea**

Test summary

Test No.	Test item	Relating Std.	Test begins on (YYYY/MM/DD)	Test Completed on (YYYY/MM/DD)	Judgment (Pass/Fail)
T1	Altitude simulation	UN Manual of Tests and Criteria, Part III , Subsection 38.3.4.1	2018/02/28	2018/02/28	Pass
T2	Thermal test	UN Manual of Tests and Criteria, Part III , Subsection 38.3.4.2	2018/03/01	2018/03/07	Pass
T3	Vibration	UN Manual of Tests and Criteria, Part III , Subsection 38.3.4.3	2018/03/09	2018/03/09	Pass
T4	Shock	UN Manual of Tests and Criteria, Part III , Subsection 38.3.4.4	2018/03/12	2018/03/12	Pass
T5	External short circuit	UN Manual of Tests and Criteria, Part III , Subsection 38.3.4.5	2018/03/13	2018/03/13	Pass
T6	Impact / Crush	UN Manual of Tests and Criteria, Part III , Subsection 38.3.4.6	2018/03/13	2018/03/13	Pass
T7	Overcharge	UN Manual of Tests and Criteria, Part III , Subsection 38.3.4.7	N/A	N/A	N/A
T8	Forced discharge	UN Manual of Tests and Criteria, Part III , Subsection 38.3.4.8	2018/03/13	2018/03/20	Pass
Total Judgment(Pass/Fail)					Pass

- Tests T-1 through T-5 shall be conducted in sequence with the same cell/pack/single cell battery.
- For test 6, test should be conducted for Li-ion cells or component cell contained in a battery.
- T7 shall be performed only for Li-ion rechargeable battery or rechargeable single cell battery not cell.
- T8 should be conducted for Li-ion cells or component cell contained in a battery.

T-1~T-5) Transportation Test (Test Result: Pass)

Fresh cell 100% SOC												
Initial							T1					
No.	Weight(g)	OCV(V)					Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result
1	68.801	4.145					68.801	4.145	0.00	100.0	○	Pass
2	68.737	4.144					68.738	4.144	0.00	100.0	○	Pass
3	68.862	4.145					68.862	4.145	0.00	100.0	○	Pass
4	68.646	4.145					68.646	4.145	0.00	100.0	○	Pass
5	68.755	4.145					68.757	4.145	0.00	100.0	○	Pass
6	68.674	4.145					68.674	4.145	0.00	100.0	○	Pass
7	68.828	4.145					68.829	4.145	0.00	100.0	○	Pass
8	68.807	4.146					68.809	4.145	0.00	100.0	○	Pass
9	68.691	4.145					68.691	4.145	0.00	100.0	○	Pass
10	68.754	4.145					68.754	4.145	0.00	100.0	○	Pass
T2							T3					
No.	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result
1	68.815	4.101	0.00	98.9	○	Pass	68.807	4.101	0.01	100.0	○	Pass
2	68.741	4.100	0.00	98.9	○	Pass	68.731	4.100	0.01	100.0	○	Pass
3	68.871	4.101	0.00	98.9	○	Pass	68.868	4.101	0.00	100.0	○	Pass
4	68.651	4.101	0.00	98.9	○	Pass	68.646	4.101	0.01	100.0	○	Pass
5	68.762	4.101	0.00	98.9	○	Pass	68.753	4.101	0.01	100.0	○	Pass
6	68.686	4.101	0.00	98.9	○	Pass	68.680	4.101	0.01	100.0	○	Pass
7	68.833	4.102	0.00	99.0	○	Pass	68.832	4.102	0.00	100.0	○	Pass
8	68.817	4.101	0.00	98.9	○	Pass	68.811	4.101	0.01	100.0	○	Pass
9	68.689	4.100	0.00	98.9	○	Pass	68.691	4.100	0.00	100.0	○	Pass
10	68.745	4.100	0.01	98.9	○	Pass	68.745	4.100	0.00	100.0	○	Pass
T4							T5					
No.	Weight(g)	OCV(V)	Mass Loss(%)	Residual OCV(%)	Appearance	Result	Max T(°C)	Appearance				Result
1	68.805	4.101	0.00	100.0	○	Pass	95	○				Pass
2	68.731	4.100	0.00	100.0	○	Pass	95	○				Pass
3	68.868	4.101	0.00	100.0	○	Pass	88	○				Pass
4	68.646	4.101	0.00	100.0	○	Pass	91	○				Pass
5	68.754	4.101	0.00	100.0	○	Pass	102	○				Pass
6	68.682	4.101	0.00	100.0	○	Pass	105	○				Pass
7	68.832	4.101	0.00	100.0	○	Pass	93	○				Pass
8	68.813	4.101	0.00	100.0	○	Pass	92	○				Pass
9	68.691	4.100	0.00	100.0	○	Pass	91	○				Pass
10	68.744	4.100	0.00	100.0	○	Pass	98	○				Pass

[Appearance] O-No Leakage, No Venting, No Disassembly, No Rupture, No Fire / L-Leakage / V-Venting / D-Disassembly / R-Rupture / F-Fire

[Criteria] T1~T4: No Leakage / No Venting / No Disassembly / No Rupture / No Fire / Residual OCV not less than 90%

T5: External temperature does not exceed 170°C, no disassembly, no rupture, and no fire within 6 hours of this test

T-6) Impact/Crush Test (Test Result: Pass)

■ Cell type

Cylindrical cells not less than 18.0 mm in diameter

Prismatic, Pouch, Cylindrical cells less than 18.0 mm in diameter

■ Test procedure

Impact

Crush

Fresh Cell 50% SOC				
	Initial	T6		
No.	OCV(V)	Max Temp(°C)	Appearance	Result
T6-1	3.712	25	0	Pass
T6-2	3.712	24	0	Pass
T6-3	3.712	23	0	Pass
T6-4	3.712	25	0	Pass
T6-5	3.712	24	0	Pass
[Appearance] O-No Disassembly, No Fire / D-Disassembly / F-Fire				
[Criteria] External temperature does not exceed 170°C, no disassembly, and no fire within 6 hours of this test.				

T-7) Over charge Test (Test Result: N/A)

■ Test condition: N/A

T-8) Forced discharge Test (Test Result: Pass)

■ Test condition:

- Initial test current: 9.8A

- Time interval: 30min

Fresh cell 0% SOC			50 cycled cell 0% SOC		
No.	Appearance	Result	No.	Appearance	Result
T8-1	0	Pass	T8-11	0	Pass
T8-2	0	Pass	T8-12	0	Pass
T8-3	0	Pass	T8-13	0	Pass
T8-4	0	Pass	T8-14	0	Pass
T8-5	0	Pass	T8-15	0	Pass
T8-6	0	Pass	T8-16	0	Pass
T8-7	0	Pass	T8-17	0	Pass
T8-8	0	Pass	T8-18	0	Pass
T8-9	0	Pass	T8-19	0	Pass
T8-10	0	Pass	T8-20	0	Pass

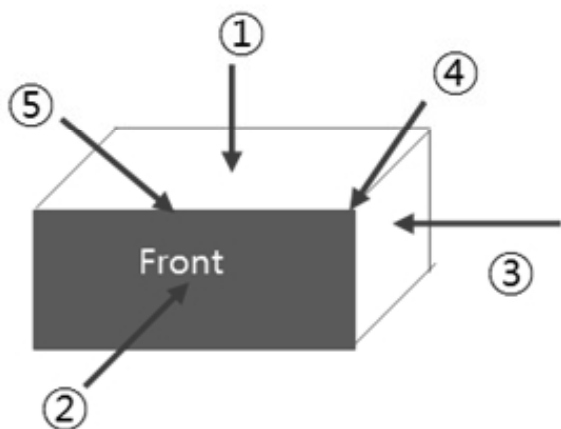
[Appearance] 0-No Disassembly, No Fire / D-Disassembly / F-Fire
[Criteria] No disassembly and no fire within 7 days of the test

Annex 1 - 1.2m Packaging Drop Test

■ Test Summary


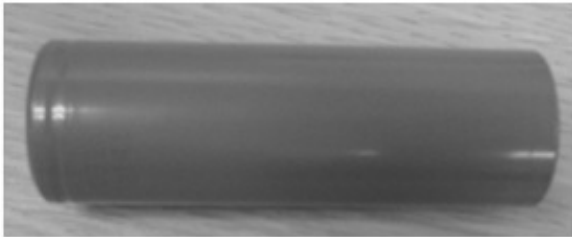
Test No.	Test item	Relating Std.	Test begins on (YYYY/MM/DD)	Test Completed on (YYYY/MM/DD)	Judgment (Pass/Fail)
P1	Packaging Drop	IATA Dangerous Goods Regulations	2018/03/20	2018/03/20	Pass
Total Judgment(Pass/Fail)					Pass

■ Test Method



P-1 1.2m Packaging Drop Test (Test Result: Pass)



■ Sample Information

	Front	Back
Picture		

Cell Qty per box	Cell weight (kg)	Net weight per box (kg)
130	0.068	8.84

P-1 1.2m Packaging Drop Test (Test Result: Pass)

■ Test result

	Before Test	After Test
Weight (Kg)	9.50	9.50
Test Result		
Remark	Outer packaging is damaged but samples inside the package remain intact and no damage, no shifting, no release of contents for samples inside the package.	
Criteria	<ul style="list-style-type: none">- Without damage to cells or batteries contained therein.- Without shifting of the contents so as to allow battery to battery(or Cell to cell) contact.- Without release of contents.	