



**UN TEST REPORT**

Report Number.....	SDI-UN-200128-01
Date of issue.....	2020.01.28
Test period.....	2020.01.16~2020.01.28
Testing Laboratory .....	Samsung SDI Co., Ltd
Address.....	467, Beonyeong-ro, Seobuk-gu, Cheonan-si, Chungcheongnam-do, Korea
Contact .....	+82-41-560-3114 / <a href="http://samsungsdi.co.kr/">http://samsungsdi.co.kr/</a>
Manufacturer's name .....	Samsung SDI Co., Ltd
Address.....	467, Beonyeong-ro, Seobuk-gu, Cheonan-si, Chungcheongnam-do, Korea
Contact .....	+82-41-560-3114 / <a href="http://samsungsdi.co.kr/">http://samsungsdi.co.kr/</a>
Test Standard.....	Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria, section 38.3 Sixth revised edition Amendment 1
Description.....	Lithium ion cell
Model Name.....	INR18650-25R
Ratings .....	3.7V 2500mAh (9.00Wh)
Mass .....	Max 45.0 g

**Test Result**

No.	Test item	Result	Remark
T-1	Altitude	PASS	
T-2	Thermal Cycling	PASS	
T-3	Vibration	PASS	
T-4	Shock	PASS	
T-5	External Short Circuit	PASS	
T-6	Impact / Crush	PASS	
T-7	Overcharge	N/A	Battery only
T-8	Forced Discharge	PASS	

	Name	Signature	Date
Reported by	An Jong Ho		2020.01.28
Approved by	Hong Jong Pil		2020.01.28

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T1	ALTITUDE SIMULATION TEST	Results
Requirements	No mass loss, no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.	<input checked="" type="checkbox"/> No leakage, <input checked="" type="checkbox"/> No venting, <input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> No rupture, <input checked="" type="checkbox"/> No fire, <input checked="" type="checkbox"/> No mass loss, (Less than 0.2%) <input checked="" type="checkbox"/> No voltage drop (Residual OCV not less than 90%)  See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Weight Before Test(g)	Voltage After Test(V)	Weight After Test(g)	Residual OCV(%)	Percent of Weight Loss(%)
1	A	4.158	43.059	4.157	43.059	99.98	0.00
2	A	4.160	43.096	4.159	43.096	99.98	0.00
3	A	4.159	43.167	4.157	43.166	99.95	0.00
4	A	4.159	43.130	4.157	43.130	99.95	0.00
5	A	4.159	43.152	4.157	43.152	99.95	0.00
6	B	4.165	43.149	4.165	43.148	100.00	0.00
7	B	4.165	43.040	4.165	43.040	100.00	0.00
8	B	4.165	43.156	4.165	43.156	100.00	0.00
9	B	4.166	43.114	4.165	43.114	99.98	0.00
10	B	4.167	43.113	4.165	43.113	99.95	0.00
<input type="checkbox"/> Supplementary Information: Sample Condition A : at first cycle, in fully charged states(5 pcs) Sample Condition B : after 25th cycles ending in fully charged states(5 pcs)							

T2	THERMAL TEST	Results
Requirements	No mass loss, no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.	<input checked="" type="checkbox"/> No leakage, <input checked="" type="checkbox"/> No venting, <input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> No rupture, <input checked="" type="checkbox"/> No fire, <input checked="" type="checkbox"/> No mass loss, (Less than 0.2%) <input checked="" type="checkbox"/> No voltage drop (Residual OCV not less than 90%)  See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Weight Before Test(g)	Voltage After Test(V)	Weight After Test(g)	Residual OCV(%)	Percent of Weight Loss(%)
1	A	4.157	43.059	4.095	43.059	98.51	0.00
2	A	4.159	43.096	4.095	43.097	98.46	0.00
3	A	4.157	43.166	4.095	43.167	98.51	0.00
4	A	4.157	43.130	4.095	43.130	98.51	0.00
5	A	4.157	43.152	4.095	43.152	98.51	0.00
6	B	4.165	43.148	4.099	43.149	98.42	0.00
7	B	4.165	43.040	4.100	43.040	98.44	0.00
8	B	4.165	43.156	4.100	43.156	98.44	0.00
9	B	4.165	43.114	4.100	43.114	98.44	0.00
10	B	4.165	43.113	4.100	43.114	98.44	0.00
<input type="checkbox"/> Supplementary Information: Sample Condition A : at first cycle, in fully charged states(5 pcs) Sample Condition B : after 25th cycles ending in fully charged states(5 pcs)							

T3	VIBRATION TEST	Results
Requirements	No mass loss, no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.	<input checked="" type="checkbox"/> No leakage, <input checked="" type="checkbox"/> No venting, <input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> No rupture, <input checked="" type="checkbox"/> No mass loss, (Less than 0.2%) <input checked="" type="checkbox"/> No voltage drop (Residual OCV not less than 90%)  See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Weight Before Test(g)	Voltage After Test(V)	Weight After Test(g)	Residual OCV(%)	Percent of Weight Loss(%)
1	A	4.095	43.059	4.095	43.059	100.00	0.00
2	A	4.095	43.097	4.095	43.096	100.00	0.00
3	A	4.095	43.167	4.095	43.166	100.00	0.00
4	A	4.095	43.130	4.095	43.129	100.00	0.00
5	A	4.095	43.152	4.095	43.151	100.00	0.00
6	B	4.099	43.149	4.099	43.148	100.00	0.00
7	B	4.100	43.040	4.100	43.039	100.00	0.00
8	B	4.100	43.156	4.100	43.157	100.00	0.00
9	B	4.100	43.114	4.100	43.113	100.00	0.00
10	B	4.100	43.114	4.100	43.113	100.00	0.00
<input type="checkbox"/> Supplementary Information: Sample Condition A : at first cycle, in fully charged states(5 pcs) Sample Condition B : after 25th cycles ending in fully charged states(5 pcs)							

T4	SHOCK	Results
Requirements	No mass loss, no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.	<input checked="" type="checkbox"/> No leakage, <input checked="" type="checkbox"/> No venting, <input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> No rupture, <input checked="" type="checkbox"/> No fire, <input checked="" type="checkbox"/> No mass loss, (Less than 0.2%) <input checked="" type="checkbox"/> No voltage drop (Residual OCV not less than 90%)  See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Weight Before Test(g)	Voltage After Test(V)	Weight After Test(g)	Residual OCV(%)	Percent of Weight Loss(%)
1	A	4.095	43.059	4.095	43.059	100.00	0.00
2	A	4.095	43.096	4.095	43.096	100.00	0.00
3	A	4.095	43.166	4.095	43.166	100.00	0.00
4	A	4.095	43.129	4.095	43.129	100.00	0.00
5	A	4.095	43.151	4.095	43.151	100.00	0.00
6	B	4.099	43.148	4.099	43.148	100.00	0.00
7	B	4.100	43.039	4.100	43.039	100.00	0.00
8	B	4.100	43.157	4.100	43.157	100.00	0.00
9	B	4.100	43.113	4.100	43.113	100.00	0.00
10	B	4.100	43.113	4.100	43.113	100.00	0.00
<input type="checkbox"/> Supplementary Information: Sample Condition A : at first cycle, in fully charged states(5 pcs) Sample Condition B : after 25th cycles ending in fully charged states(5 pcs)							

T5	EXTERNAL SHORT-CIRCUIT	Results
Requirements	External temperature does not exceed 170 °C and there is no disassembly, no rupture and no fire within six hours of this test.	<input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> No rupture <input checked="" type="checkbox"/> No fire. <input checked="" type="checkbox"/> External Temperature did not exceed 170 °C.  see below table

Sample No.	Sample Condition	Maximum Temperature(°C)	Test result
1	A	104	O
2	A	94	O
3	A	95	O
4	A	111	O
5	A	117	O
6	B	99	O
7	B	114	O
8	B	88	O
9	B	96	O
10	B	114	O
<input type="checkbox"/> Supplementary Information: Sample Condition A : at first cycle, in fully charged states(5 pcs) Sample Condition B : after 25th cycles ending in fully charged states(5 pcs)  Test result : O-No Disassembly, No Rupture, No Fire / D-Disassembly / R-Rupture / F-Fire			

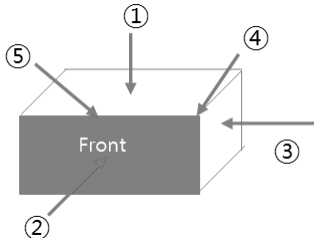
T6	<input checked="" type="checkbox"/> Impact / <input type="checkbox"/> Crush	Results
Requirements	Cells and component cells meet this requirement if their external temperature does not exceed 170℃ and there is no disassembly and no fire during the test and within six hours after this test.	<input checked="" type="checkbox"/> External temperature did not exceed 170℃, <input checked="" type="checkbox"/> no disassembly, <input checked="" type="checkbox"/> no fire during test and within 6 hours after test  See below table

Sample No.	Sample Condition	Voltage Before Test(V)	Maximum Temperature(℃)	Test result
T6-1	C	3.737	23	O
T6-2	C	3.740	23	O
T6-3	C	3.737	26	O
T6-4	C	3.739	24	O
T6-5	C	3.738	23	O
T6-6	D	3.730	24	O
T6-7	D	3.729	24	O
T6-8	D	3.730	24	O
T6-9	D	3.730	25	O
T6-10	D	3.728	25	O
<input type="checkbox"/> Supplementary Information: Sample Condition C : at first cycle, in 50% charged states(5 pcs) Sample Condition D : at 25th cycle, in 50% charged states(5 pcs) Test result : O-No Disassembly, No Fire / D-Disassembly / F-Fire				

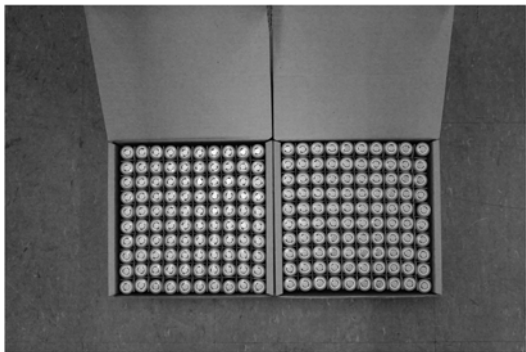
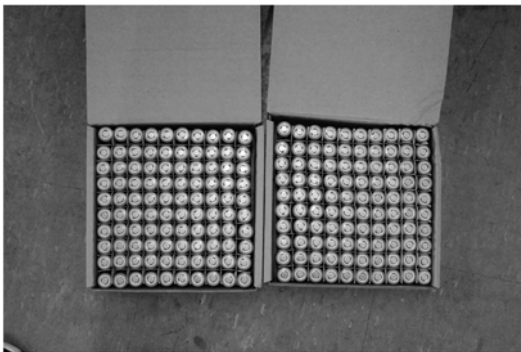
T8	FORCED DISCHARGE	Results
Requirements	Rechargeable cells meet this requirement if there is no disassembly and no fire during the test and within seven days after the test.	<input checked="" type="checkbox"/> No disassembly, <input checked="" type="checkbox"/> no rupture, <input checked="" type="checkbox"/> no fire during the test and within seven days after the test.  See below table

Sample No.	Sample Condition	Test result	Sample No.	Sample Condition	Test result
T8-1	E	O	T8-11	F	O
T8-2	E	O	T8-12	F	O
T8-3	E	O	T8-13	F	O
T8-4	E	O	T8-14	F	O
T8-5	E	O	T8-15	F	O
T8-6	E	O	T8-16	F	O
T8-7	E	O	T8-17	F	O
T8-8	E	O	T8-18	F	O
T8-9	E	O	T8-19	F	O
T8-10	E	O	T8-20	F	O
<input type="checkbox"/> Supplementary Information: Sample Condition E : at first cycle, in fully discharged states (10 pcs) Sample Condition F : after 25th cycles ending in fully discharged states(10 pcs) Test result : O-No Disassembly, No Fire / D-Disassembly / F-Fire <input type="checkbox"/> Test Conditions Initial test current : 20A,      Test duration : 8min					

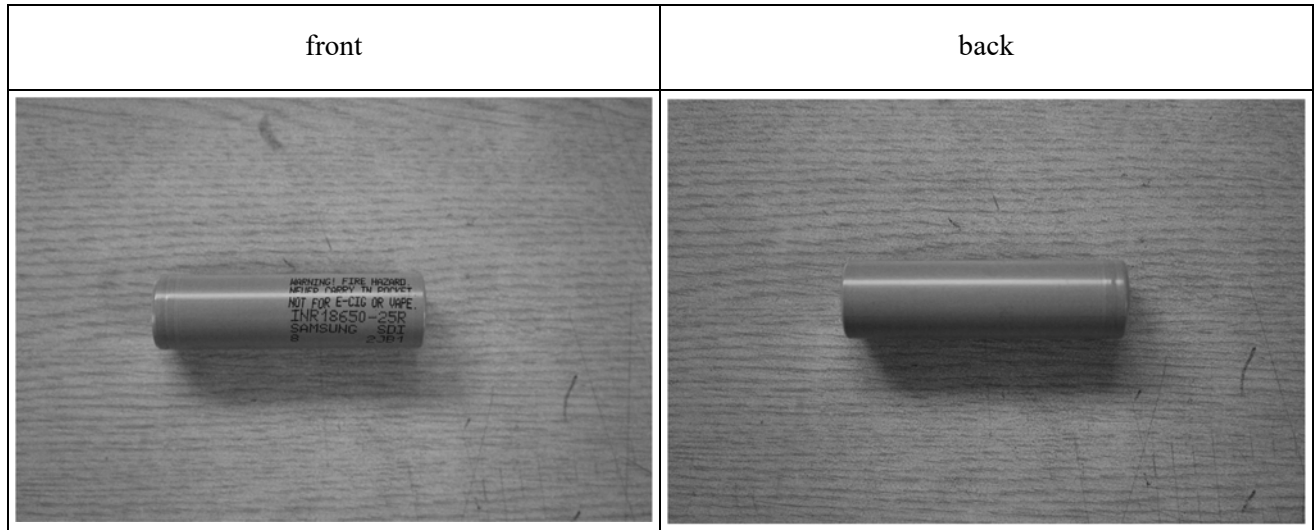


P1	Package Drop Test	Results
Procedure	<p>IATA Dangerous Goods Regulations Each package must be capable of withstanding a 1.2m drop test in any orientation</p> 	<p><input checked="" type="checkbox"/> Without damage to cells or batteries contained therein,  <input checked="" type="checkbox"/> Without shifting of the contents so as to allow battery to battery(or Cell to cell) contact.  <input checked="" type="checkbox"/> Without release of contents</p> <p>See below photo</p>

Cell Qty per box	Cell weight (kg)	Net weight per box (kg)
200	0.043	8.60

	Before Test	After Test
Weight (kg)	9.19	9.19
Test result		

## Sample Photo



- End of Report -