EVE 亿纬锂能

Cylindrical Power Tool Product

ICR18650/15P Report

Prepared by: Jeff Li

Report date: Aug. 28th, 2018

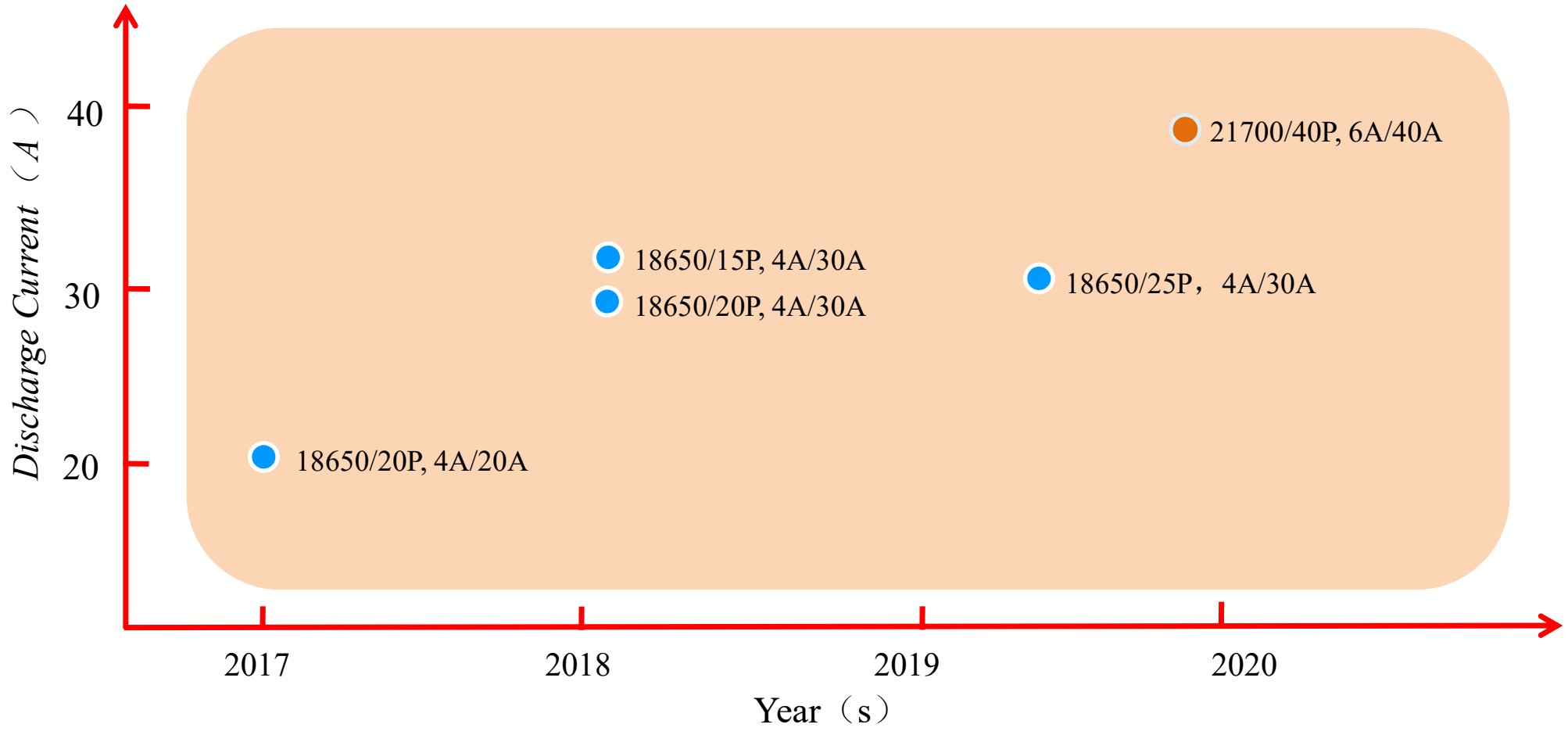
做世界上最好的锂电池，成为行业领先企业

Make the Best Lithium Battery in the world, and Become a Technology Leader

Contents

Product Roadmap

High Power Cylindrical Cell Roadmap



EVE 亿纬锂能

Specifications

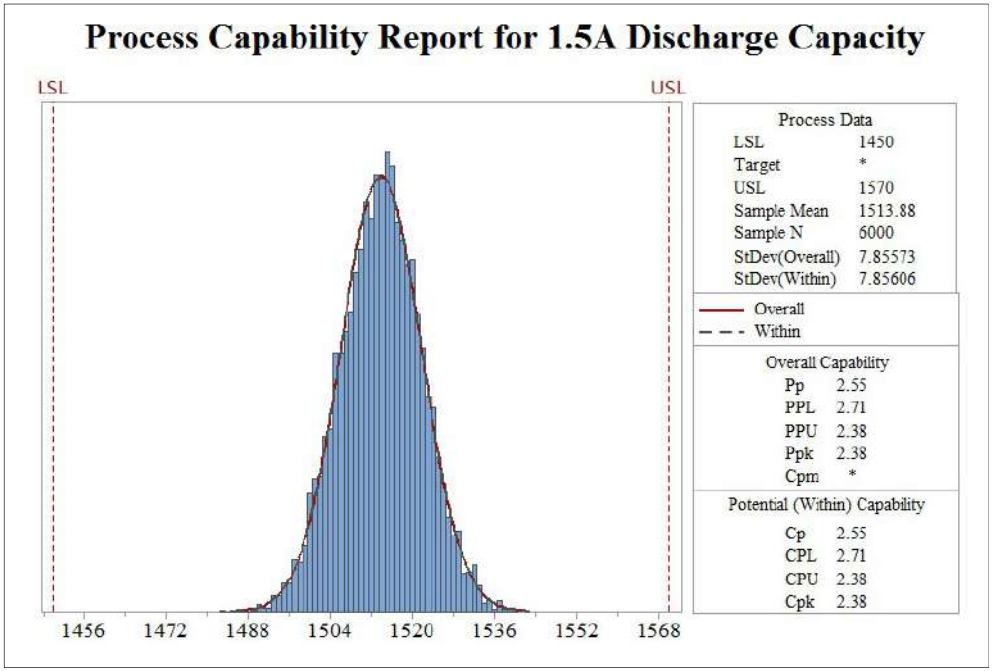
ICR18650/15P

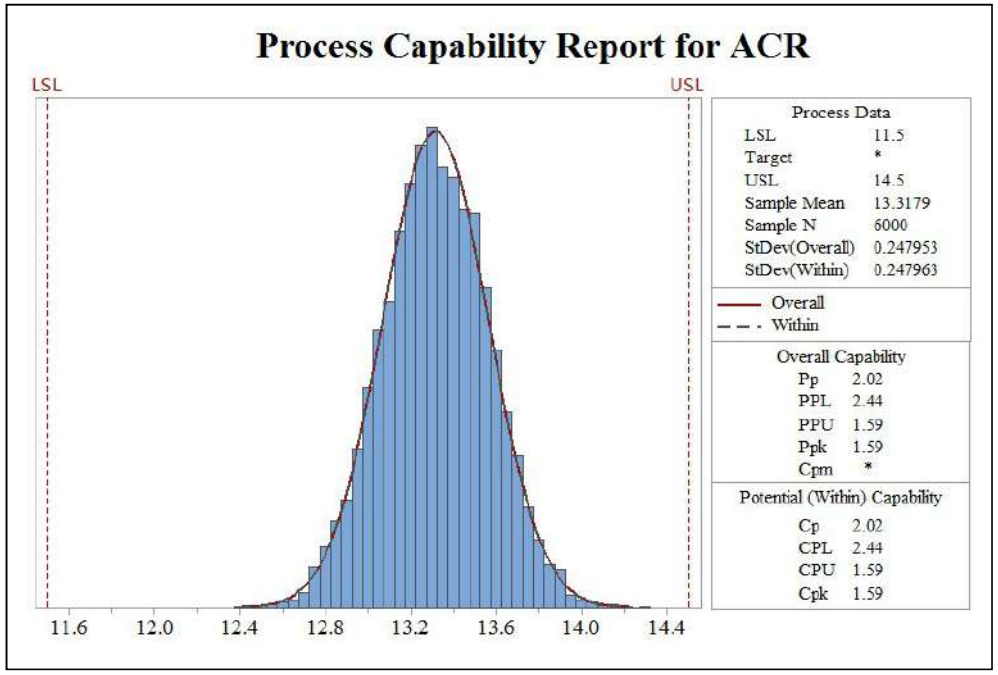
For reference only

NO.	Item		EVE-15P	Ref-1.5Ah
1	Rated Capacity (1C)		1510 mAh	1480 mAh
2	Impedance	ACR	13.3 mΩ	12.8 mΩ
		DCR	24.5 mΩ	24.7 mΩ
3	Charge Current	Standard	0.75A	0.75A
		Max. Continuous	4A	4A
4	Discharge Current	Standard	1.5A	1.5A
		Max. Continuous	30A	23A
5	Operating Temperature Range	Charge	0ºC~50ºC	0ºC~50ºC
		Discharge	-20ºC~75ºC	-20ºC~75ºC
6	Cycle Life	4A/20A	500cycles=80%	500cycles=80%
		4A/30A@75ºC cut-off	200cycles=70%	200cycles=65%
		3A/10A@0ºC	200cycles=93%	200cycles=93%

Performance

BenchMarking	EVE
● Capacity: ±25 mAh	● Capacity: ±25 mAh
● ACR: ±1.0 mΩ	● ACR: ±1.0 mΩ





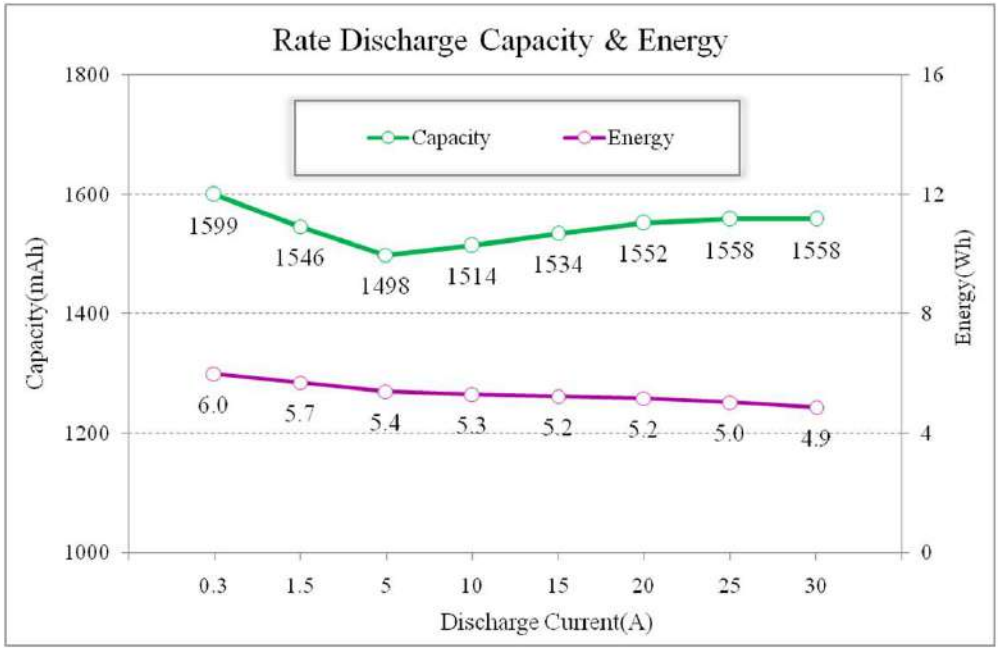
1 Rate Discharge

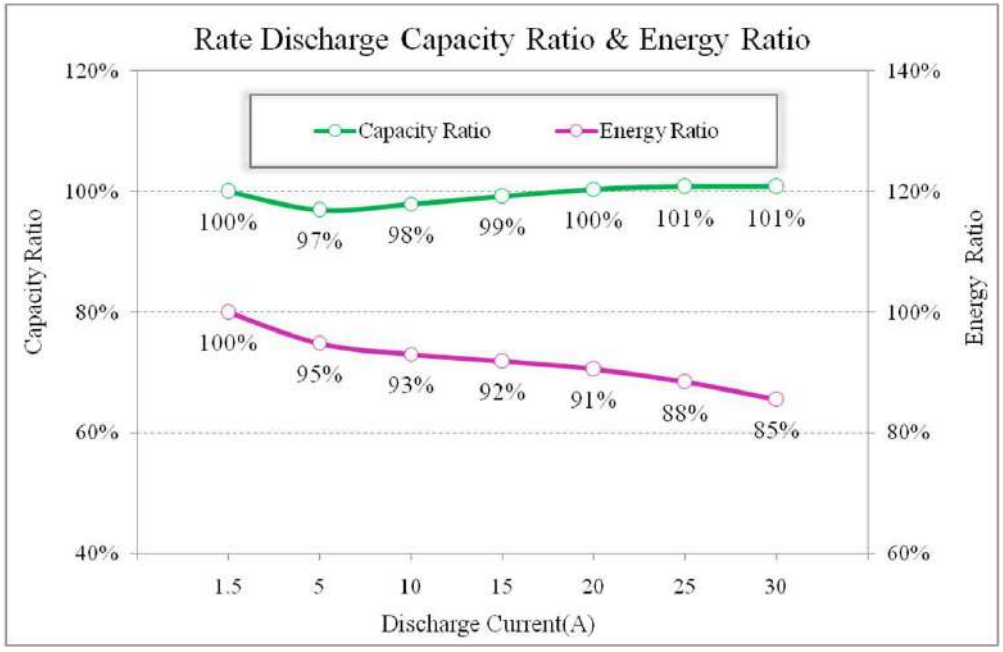
Test Method

Step1: 4A CC-CV to 4.2V with 0.1A cut-off, rest 10min.

Step2: Discharge with 0.3A/1.5A/5A/10A/15A/20A/25A/30A to 2.5V, rest 30min.

Test temperature: 25±2ºC





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Test Method

Step1: 4A CC-CV to 4.2V with 0.1A cut-off, rest 10min.

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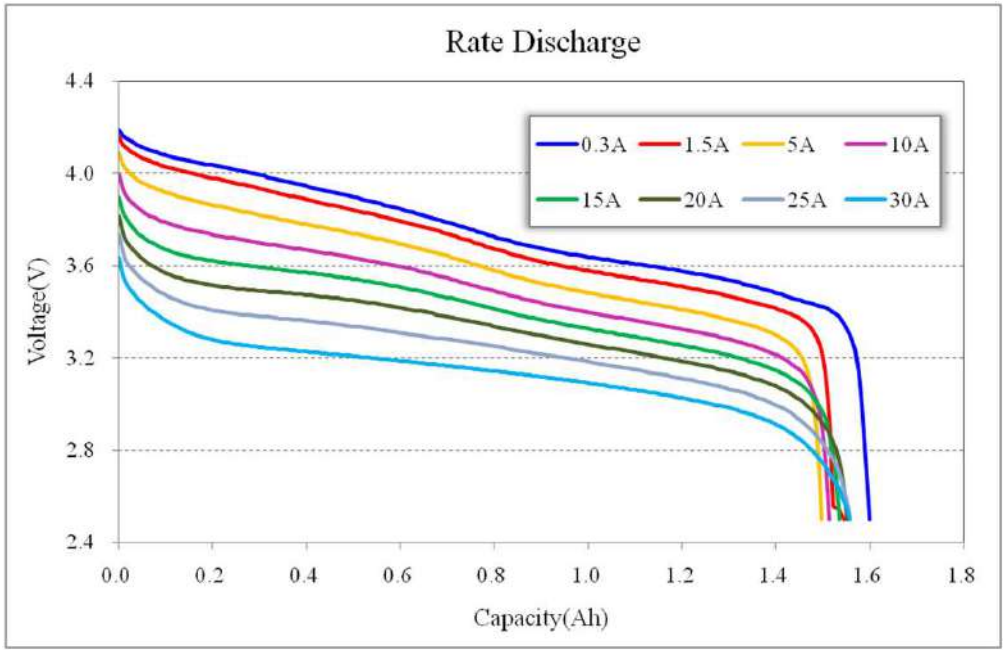
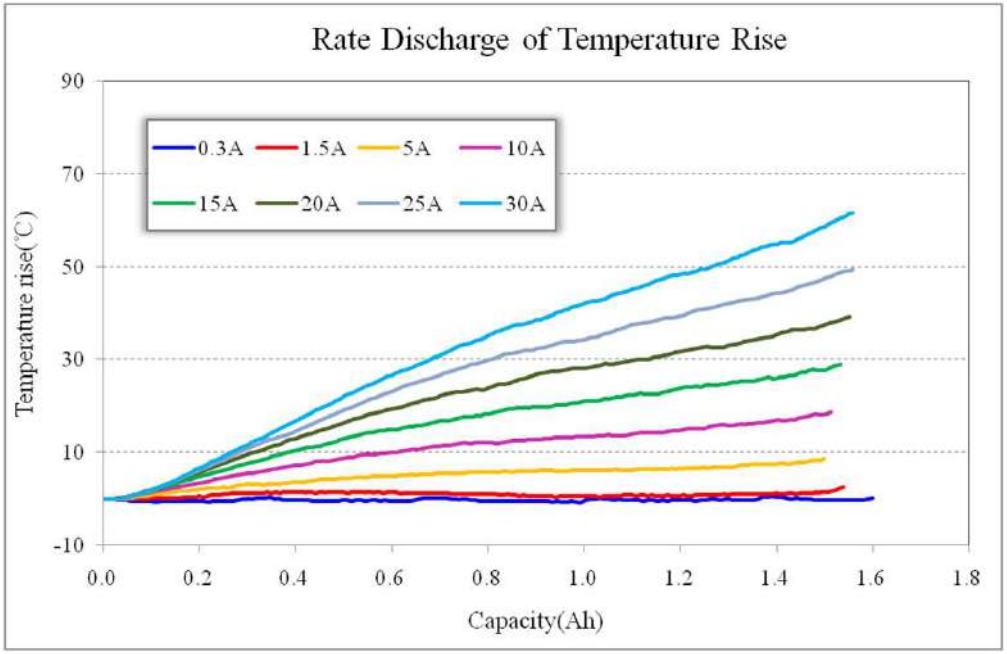
Test temperature: 25±2ºC





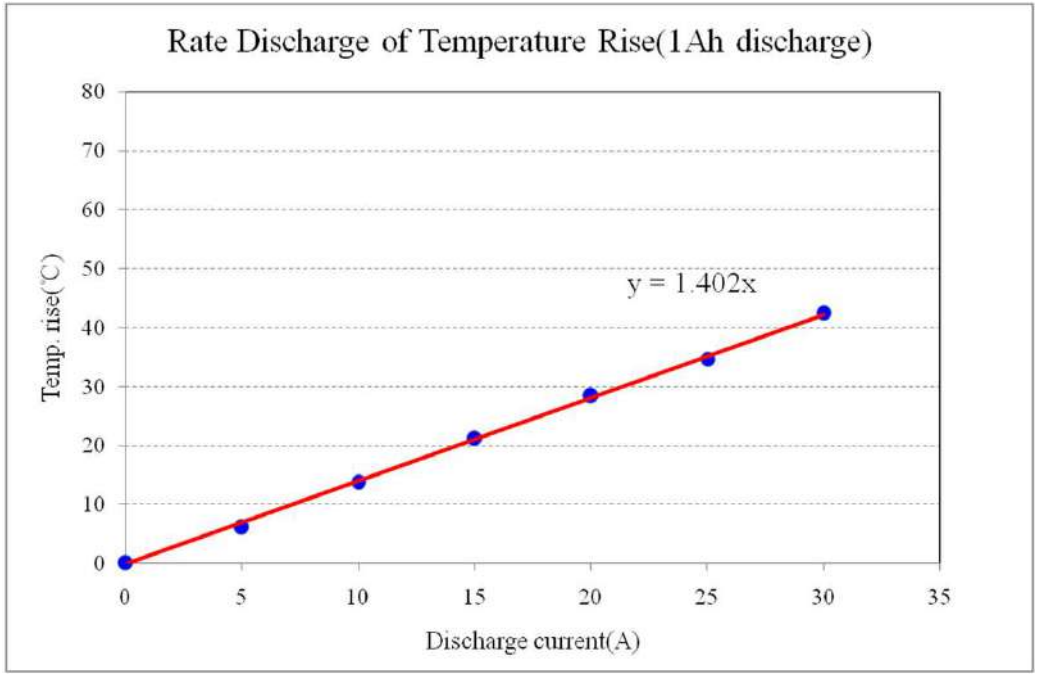
1 Rate Discharge

Test Method

Step1: 4A CC-CV to 4.2V with 0.1A cut-off, rest 10min.

Step2: Discharge with 0.3A/1.5A/5A/10A/15A/20A/25A/30A to 2.5V, rest 30min.

Test temperature: 25±2ºC



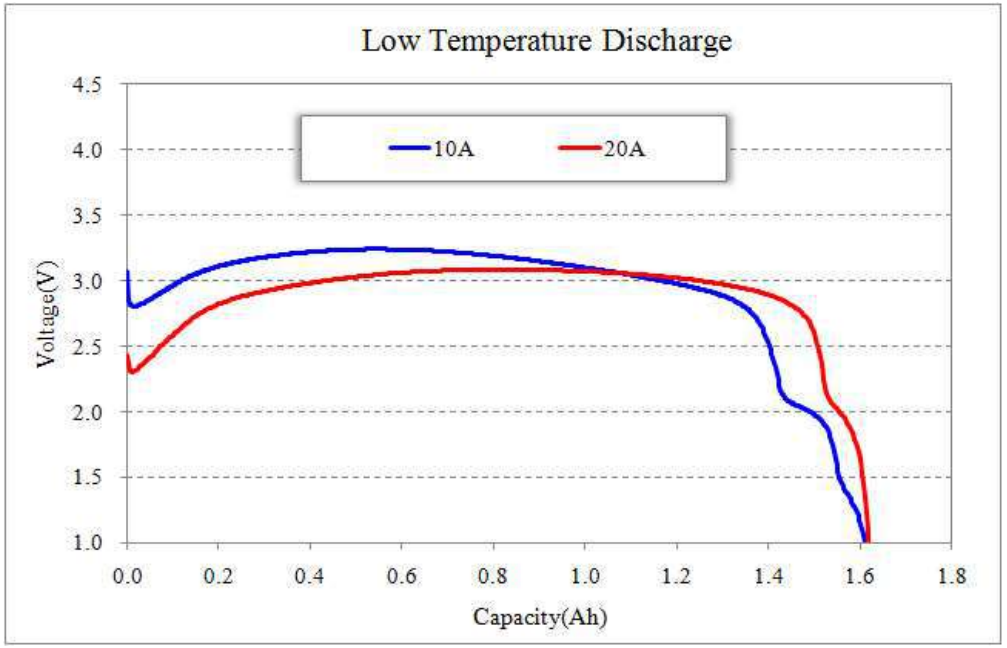
2 Low Temperature Discharge

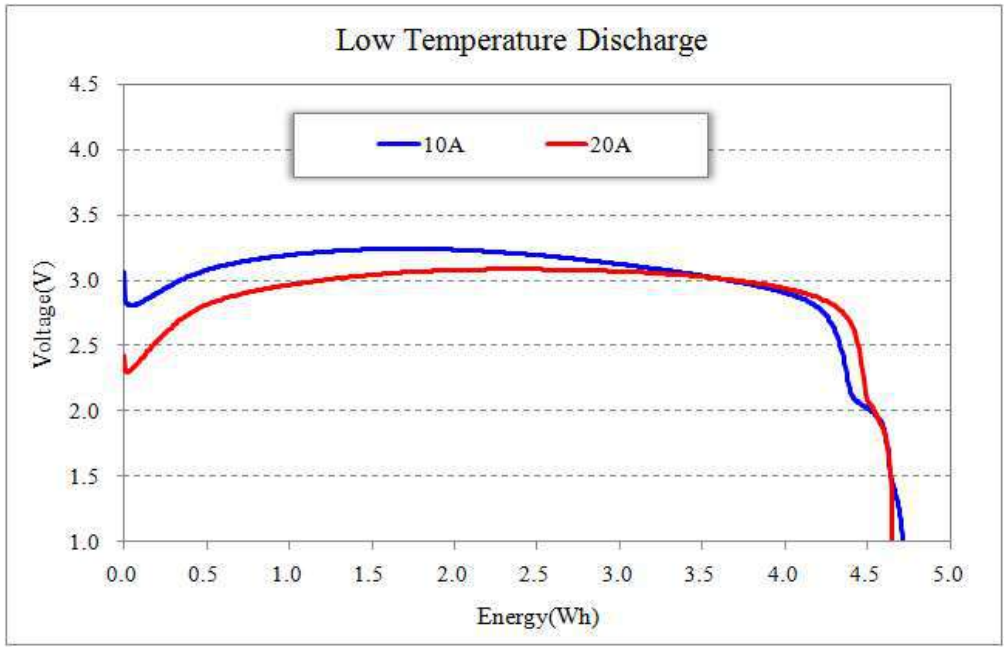
Test Method

Step1: 4A CC-CV to 4.2V with 0.1A cut-off @ 25±2ºC

Step2: -20±2ºC rest 3h, discharge with 10A/20A to 1.0V, rest 30min.

Test temperature: -20±2ºC





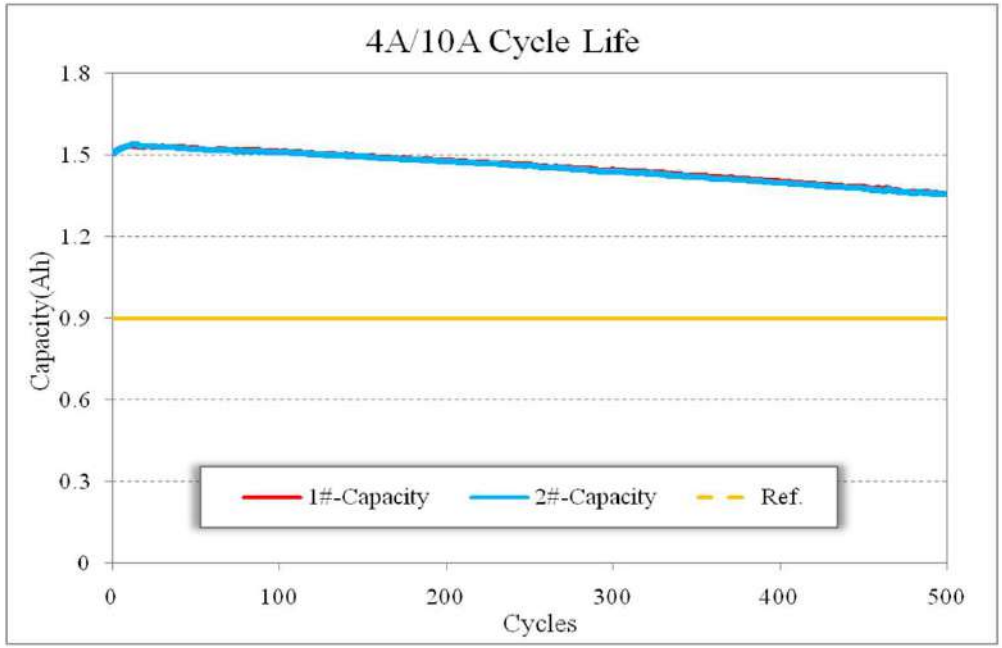
3 RT Cycle Life-4A/10A

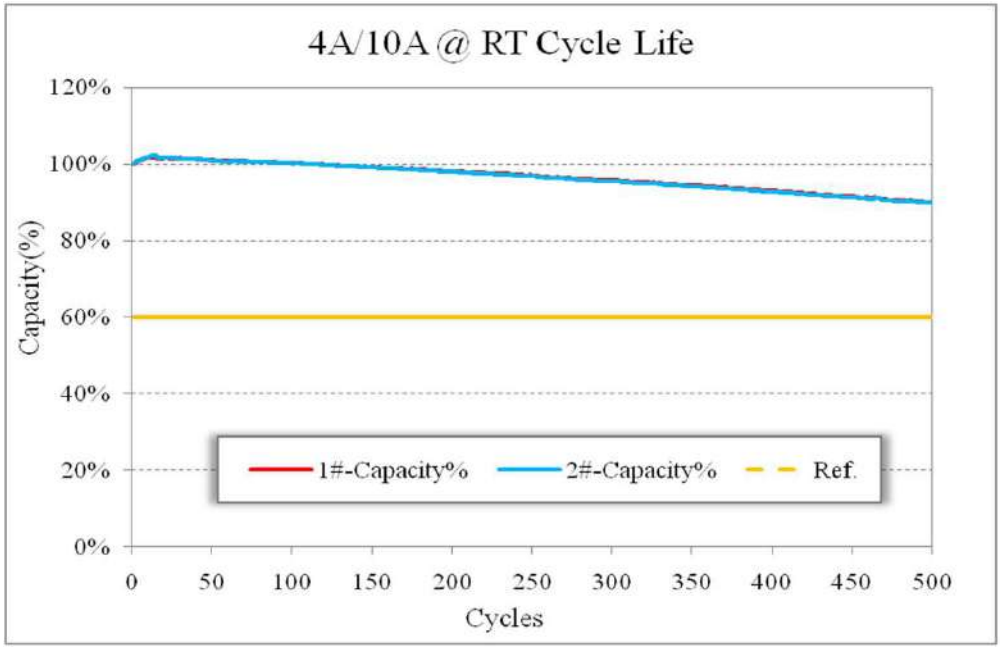
Test Method

Step1: 4A CC-CV to 4.2V with 0.1A cut-off, rest 10min.

Step2: Discharge with 10A to 2.5V, rest 30min.

Test temperature: 25±2ºC





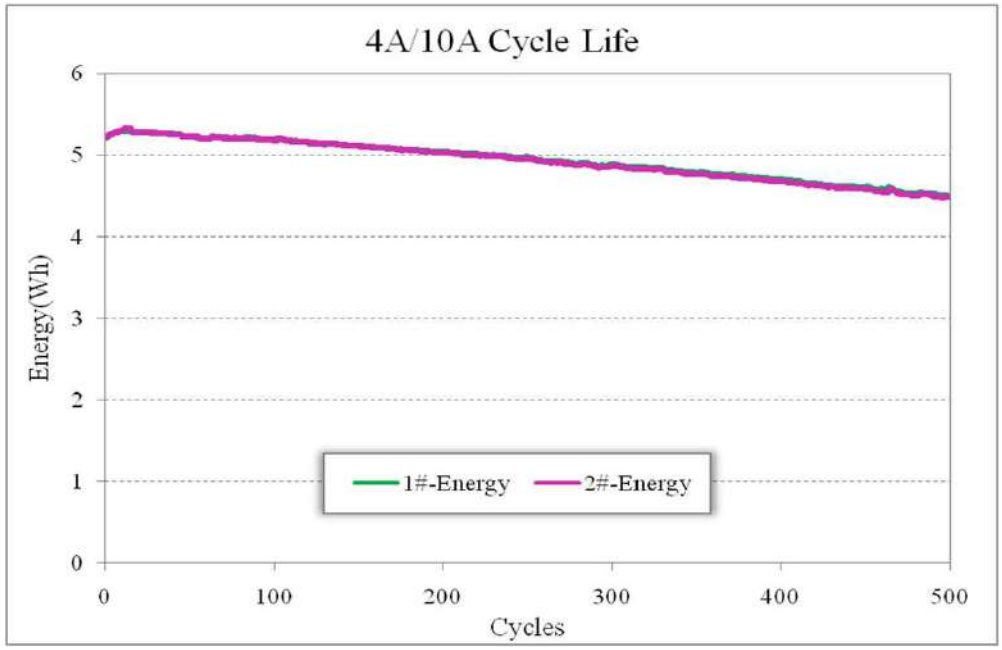
3 RT Cycle Life-4A/10A

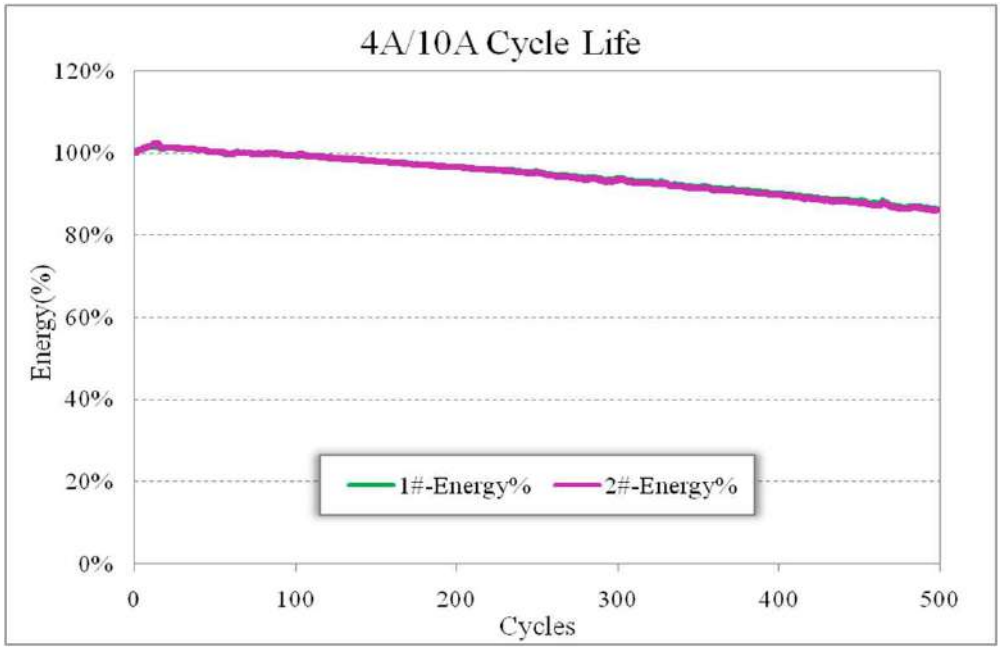
Test Method

Step1: 4A CC-CV to 4.2V with 0.1A cut-off, rest 10min.

Step2: Discharge with 10A to 2.5V, rest 30min.

Test temperature: 25±2ºC





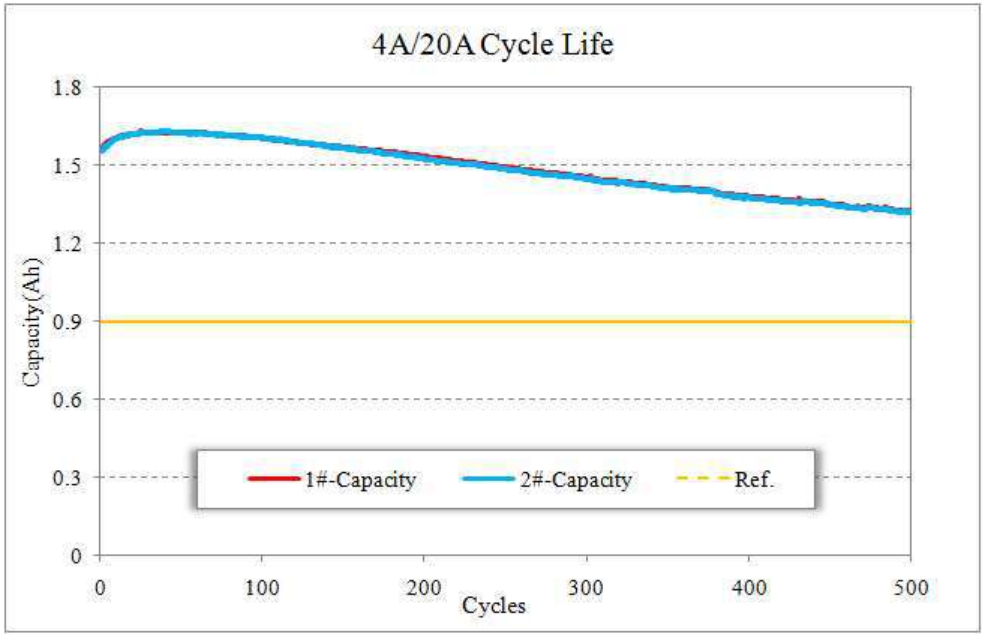
4 RT Cycle Life-4A/20A

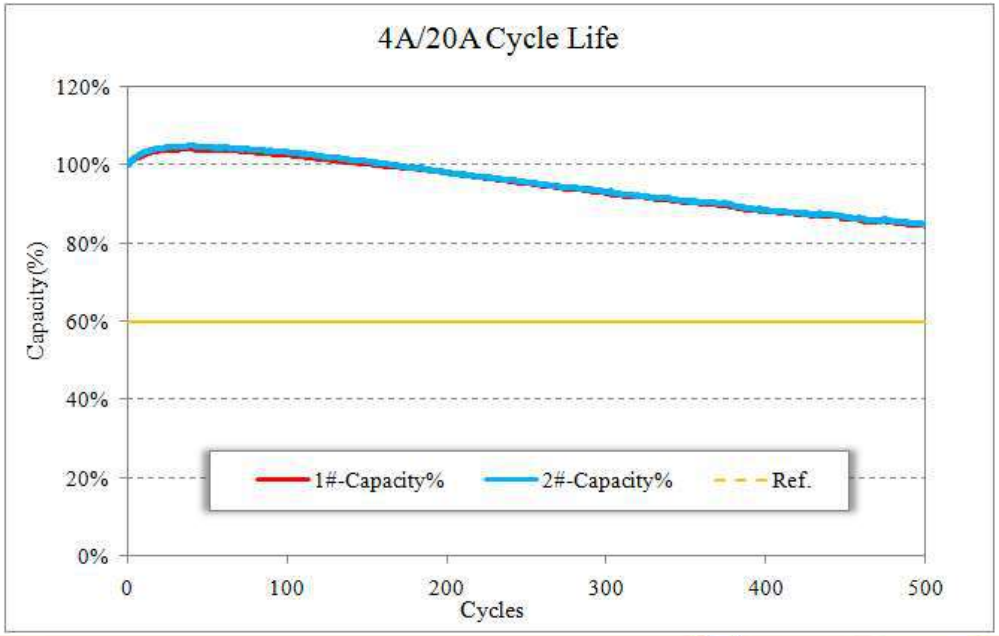
Test Method

Step1: 4A CC-CV to 4.2V with 0.1A cut-off, rest 10min.

Step2: Discharge with 20A to 2.5V, rest 30min.

Test temperature: 25±2ºC





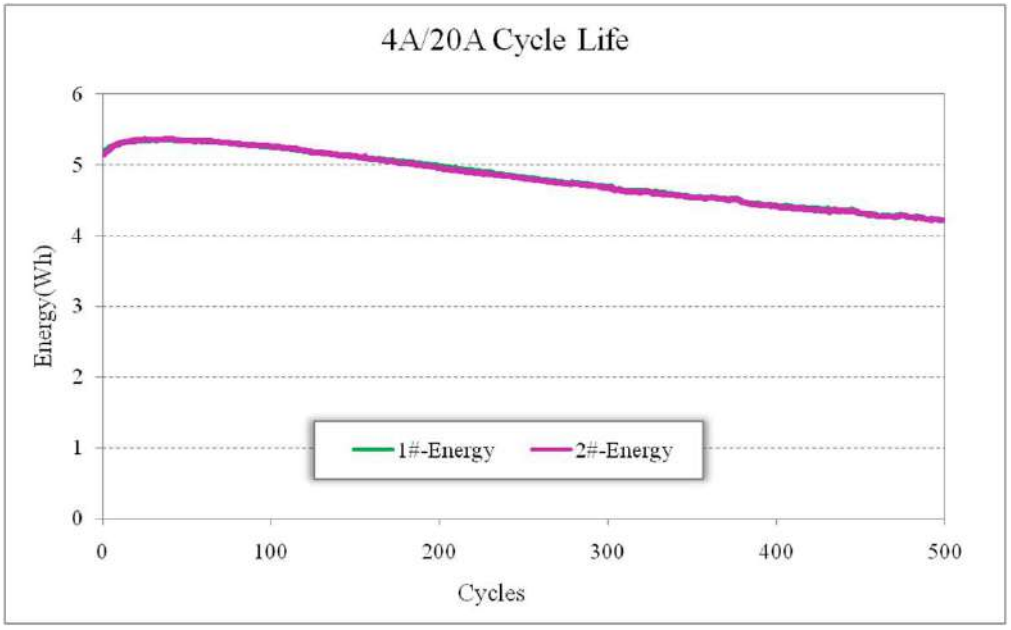
4 RT Cycle Life-4A/20A

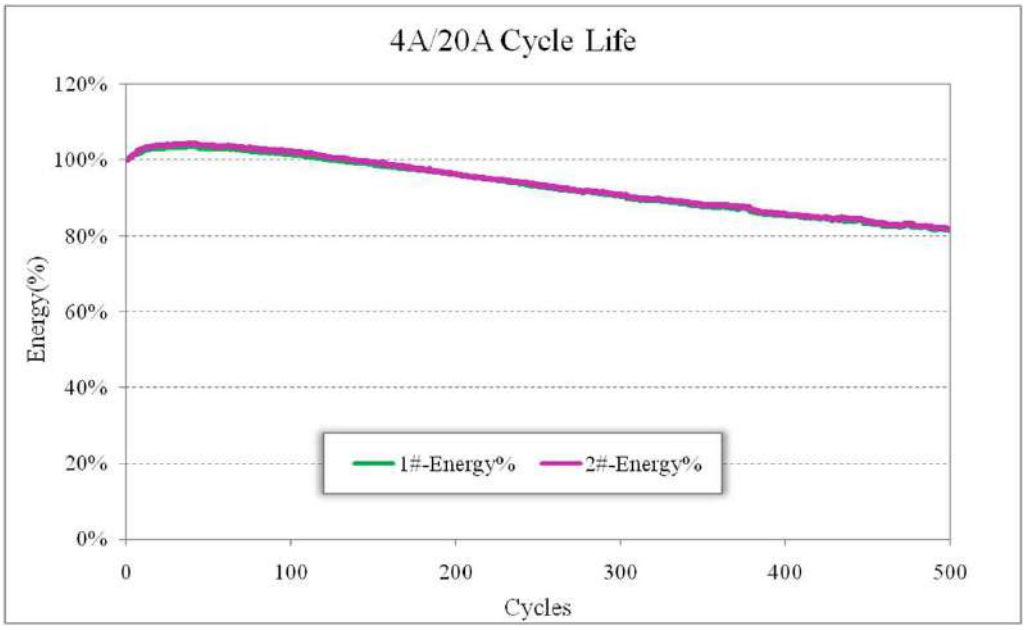
Test Method

Step1: 4A CC-CV to 4.2V with 0.1A cut-off, rest 10min.

Step2: Discharge with 20A to 2.5V, rest 30min.

Test temperature: 25±2ºC





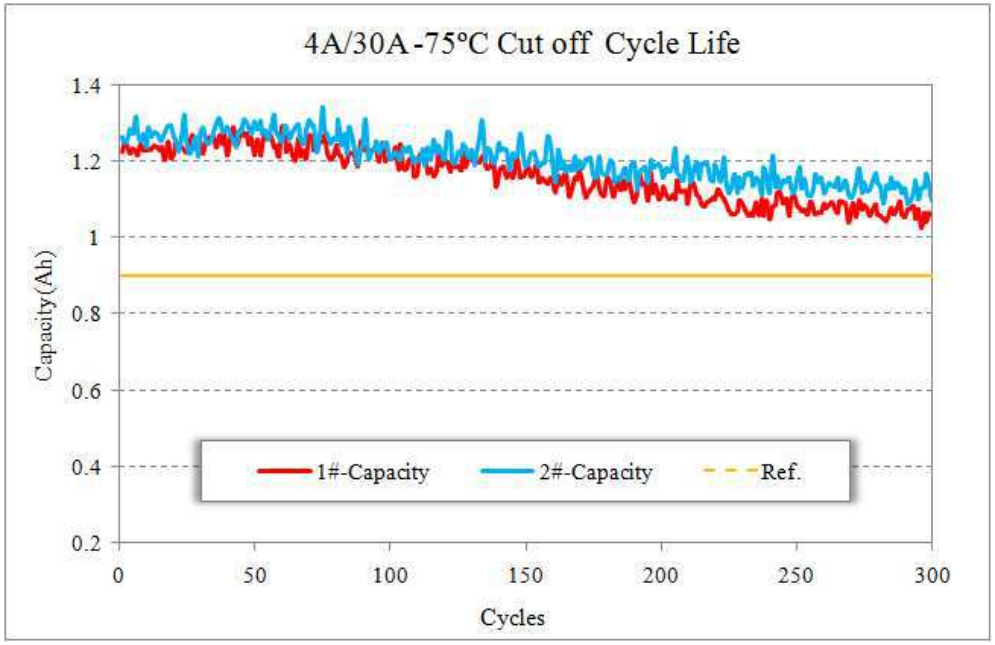
5 RT Cycle Life-4A/30A-75°C Cut off

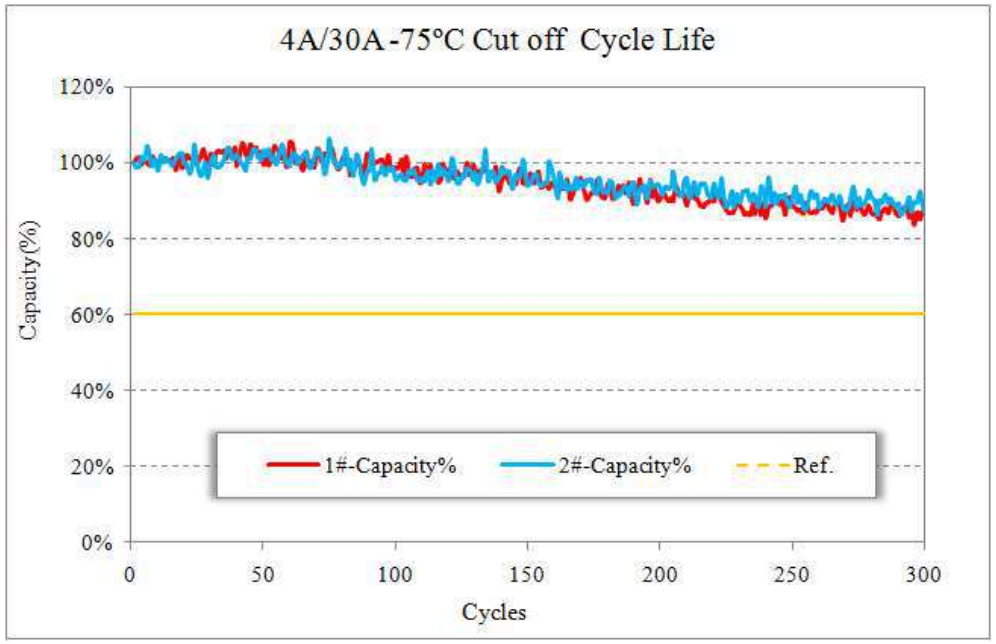
Test Method

Step1: 4A CC-CV to 4.2V with 0.1A cut-off, rest 10min.

Step2: Discharge with 30A to 2.5V, 75°C cut off , rest 30min.

Test temperature: 25±2ºC





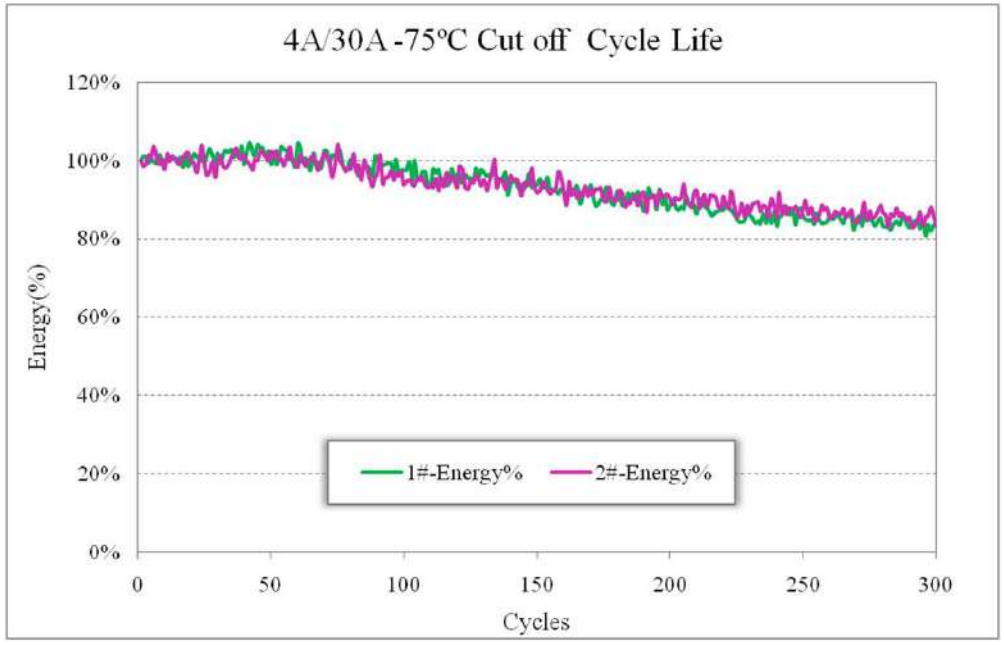
5 RT Cycle Life-4A/30A-75°C Cut off

Test Method

Step1: 4A CC-CV to 4.2V with 0.1A cut-off, rest 10min.

Step2: Discharge with 30A to 2.5V, 75°C cut off , rest 30min.

Test temperature: 25±2ºC



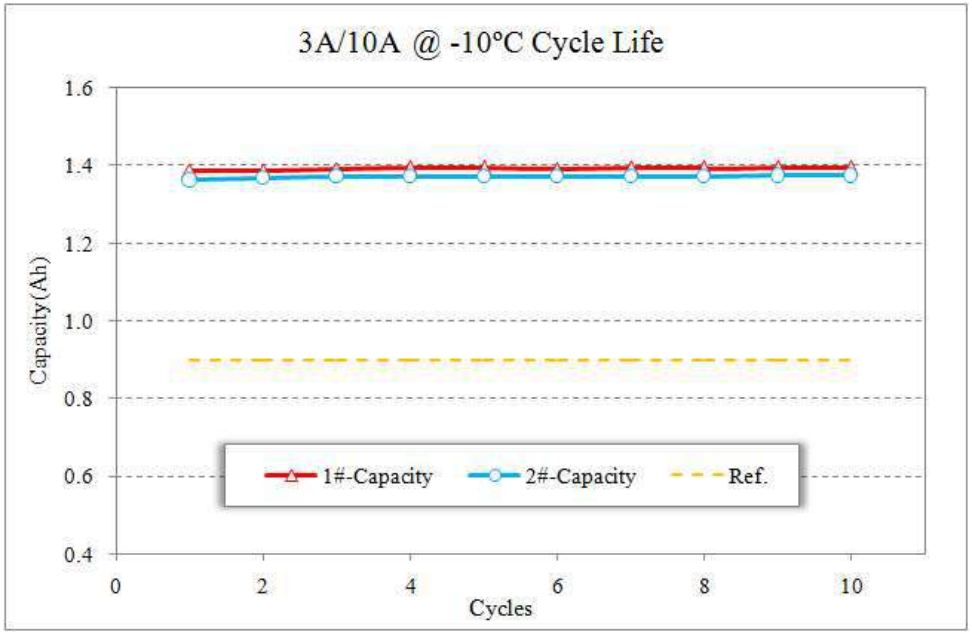
6 -10℃ Cycle Life-3A/10A

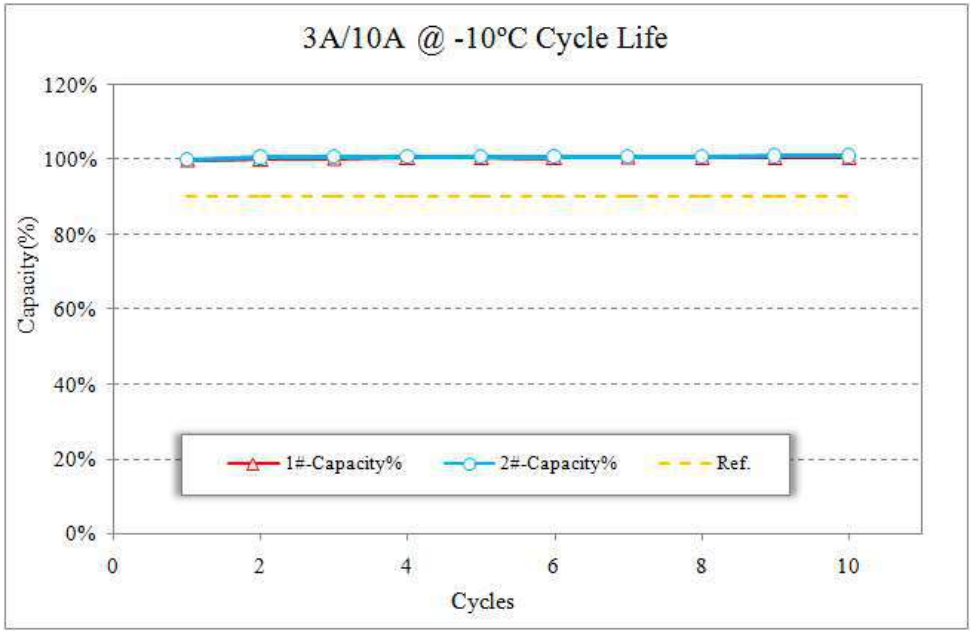
Test Method

Step1: 3A CC-CV to 4.2V with 0.1A cut-off @ -10℃, rest 10min.

Step2: Discharge with 10A to 2.5V, rest 45min.

Test temperature: -10±2ºC





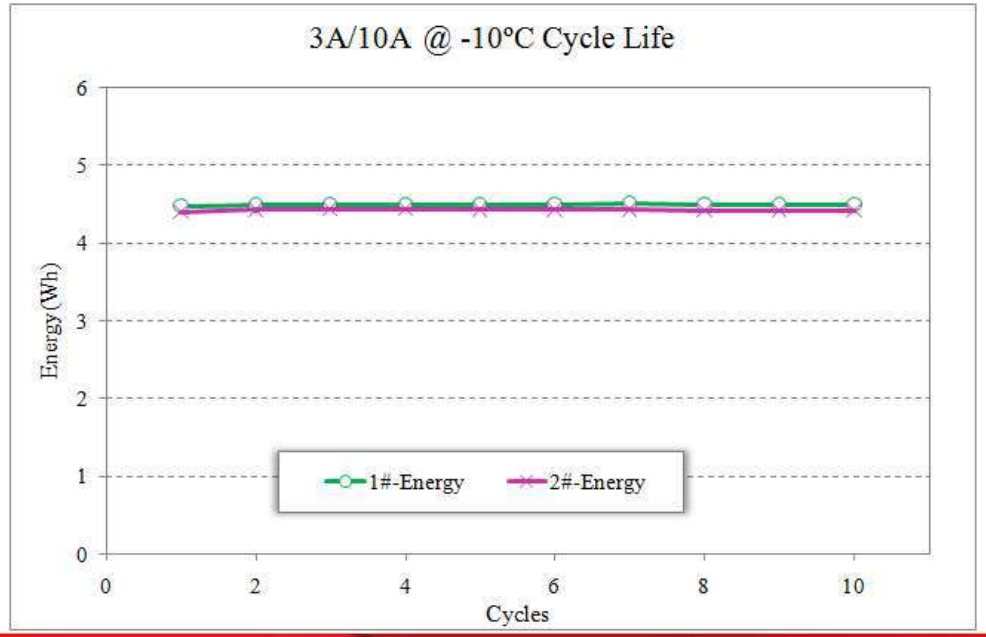
6 -10℃ Cycle Life-3A/10A

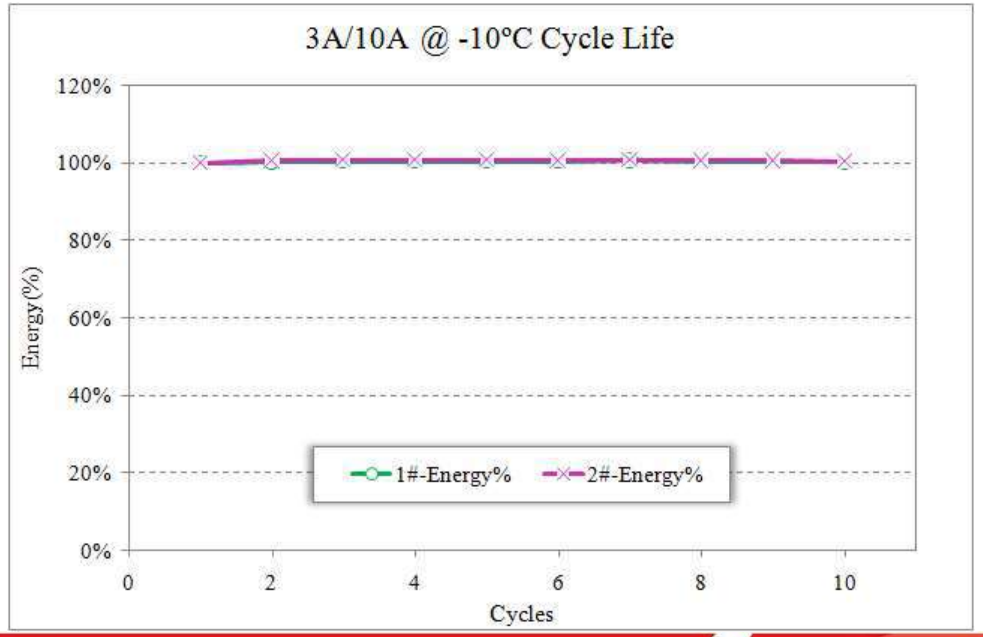
Test Method

Step1: 3A CC-CV to 4.2V with 0.1A cut-off @ -10℃, rest 10min.

Step2: Discharge with 10A to 2.5V, rest 45min.

Test temperature: -10±2ºC





7 60°C 7D/30D Storage

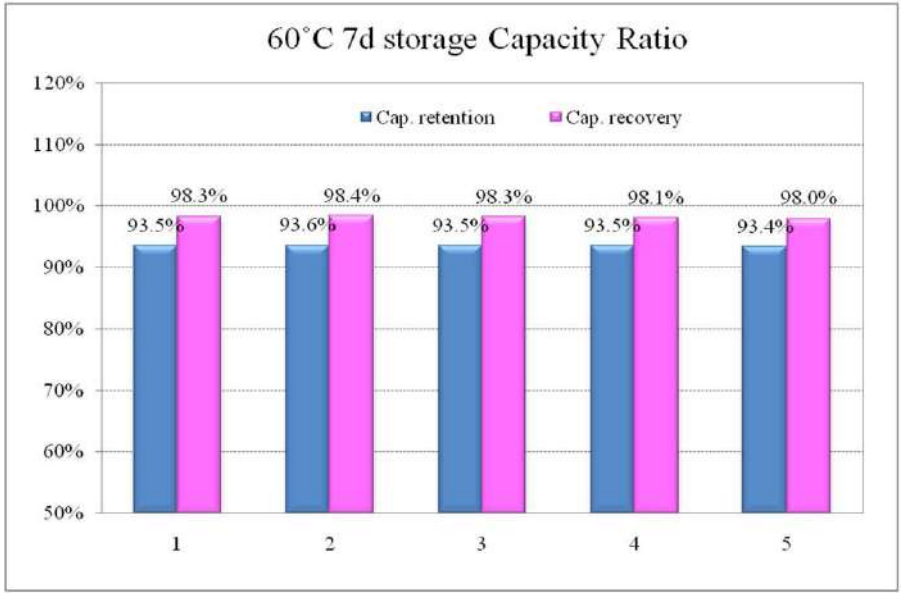
Test Method

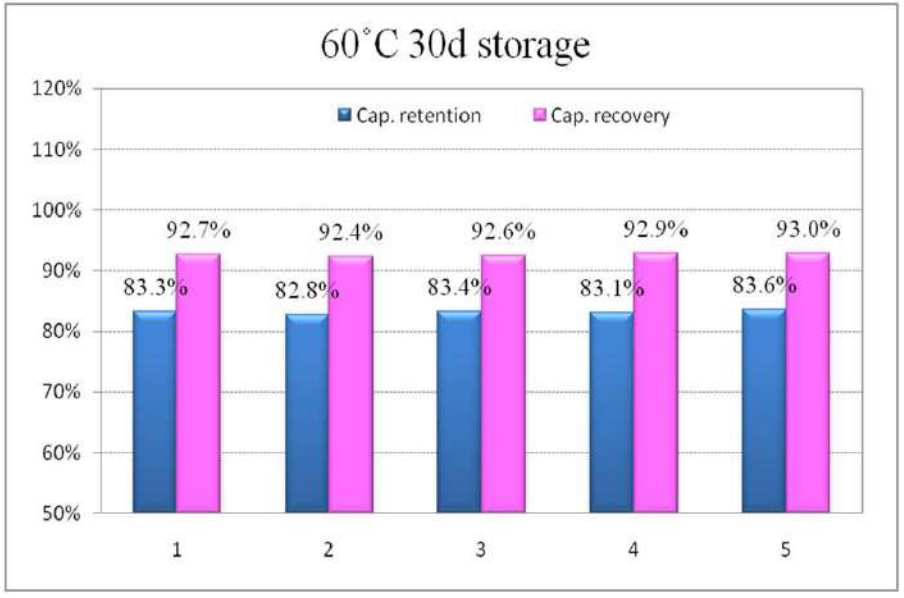
Step1: 4A CC-CV to 4.2V with 0.1A cut-off, rest 10mins.

Step2: Discharge with 1.5A to 2.5V, record initial capacity.

Step3: 4A CC-CV to 4.2V with 0.1A cut-off, 60°C storage 7/30days.

Step4: Discharge with 1.5A to 2.5V, record retention capacity, repeat step1 to step2 for 3 cycles and record recovery capacity.





8 Short Test @ RT

Test method: The fully charged cell is short-circuited by connecting with a circuit of 5mΩ/10mΩ/20mΩ/40mΩ/60mΩ/80mΩ/100mΩ.

Test temperature: 25±5ºC

Standard: No fire, no explosion.

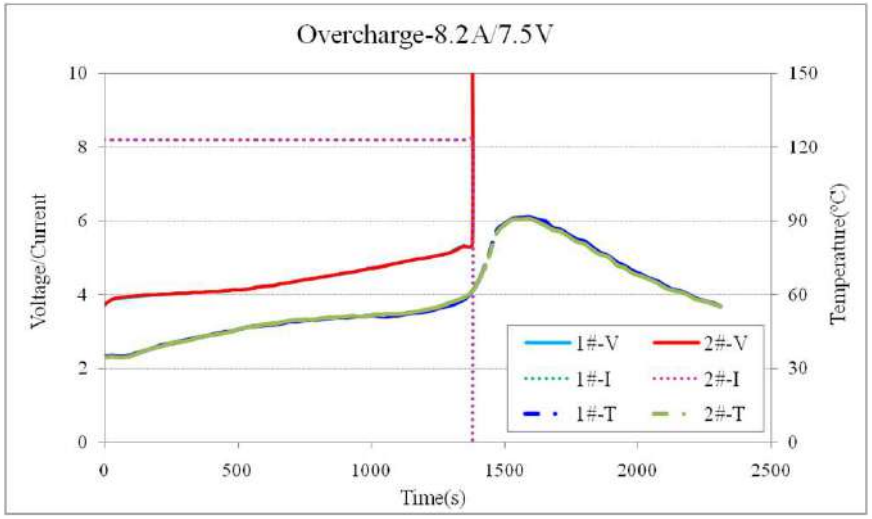
No.	Resistance	Phenomenon								Disassembly		Conclusion
		Max.Current(A)	Continuous Current (A)	Short Time(s)	Max. Temperature(ºC)	Leakage	Smoke	Fire	Explode	CID	VENT	
1	5mΩ	146	100-106	18	127	Y	N	N	N	Y	Y	Pass
2	10mΩ	110	94-96	20	123	Y	N	N	N	Y	Y	Pass
3	20mΩ	80	70-72	28	125	Y	N	N	N	Y	Y	Pass
4	40mΩ	66	58-61	72	124	Y	N	N	N	Y	Y	Pass
5	60mΩ	52	43-47	129	122	N	N	N	N	Y	N	Pass
6	80mΩ	38	38-41	224	112	N	N	N	N	Y	N	Pass
7	100mΩ	31	26-30	261	109	N	N	N	N	Y	N	Pass

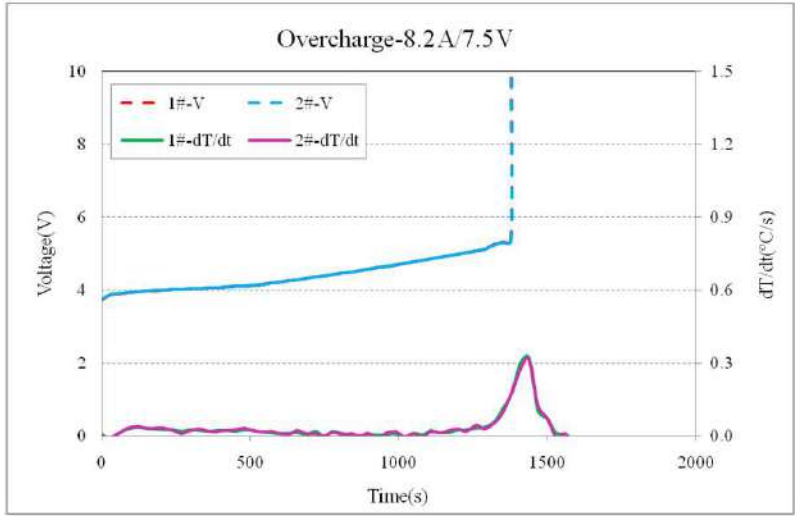
9 Overcharge Test

Test method: The fully discharged cell is charged with 8.2A to 7.5V.

Test temperature: 25±5ºC

Standard: No fire, no explosion.





No.	Phenomenon								Disassembly		Conclusion
	Max. Temperature(ºC)	BreakTime(s)	Charging Capacity(Ah)	Overcharge Capacity	Leakage	Smoke	Fire	Explode	CID	VENT	
1	91.7	1397	3.176	158%	N	N	N	N	Y	N	Pass
2	91.3	1394	3.182	159%	N	N	N	N	Y	N	Pass

10 Other Safety Test

No.	Item	Test Standard	Test Method	Test Number	Standard	Conclusion
1	Forced Discharge	IEC62133-2017	A fully discharged cell is subjected to a reverse charge at 1C for 90 minutes	5pcs	No fire , no explosion	Pass
2	Heating Test	UL 1642-2012	A fully charged cell is heated in a gravity convection and stayed at 130±2 ºC for 10min	5pcs	No fire , no explosion	Pass
3	Impact Test	UN38.3-2017	A 9.1 ±0.46-kg weight is to be dropped from a height of 610 ±25 mm onto the 50% SOC cell.	5pcs	No fire , no explosion	Pass
4	Free fall	IEC 62133-2017	A fully charged cell is dropped 3 times from a height of 1.0m onto a concrete floor .	5pcs	No fire , no explosion	Pass
5	Crush Test	UL 1642-2012	A fully charged cell is to be crushed with its longitudinal axis parallel to the flat surfaces of the crushing apparatus.	5pcs	The samples shall not explode or catch fire	Pass

Certification

UN38.3 by sea

UN38.3 by air

UL1642

IEC62133

ROHS

MSDS

REACH

THANKS

谢 谢

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Make the Best Lithium Battery in the world, and Become a Technology Leader