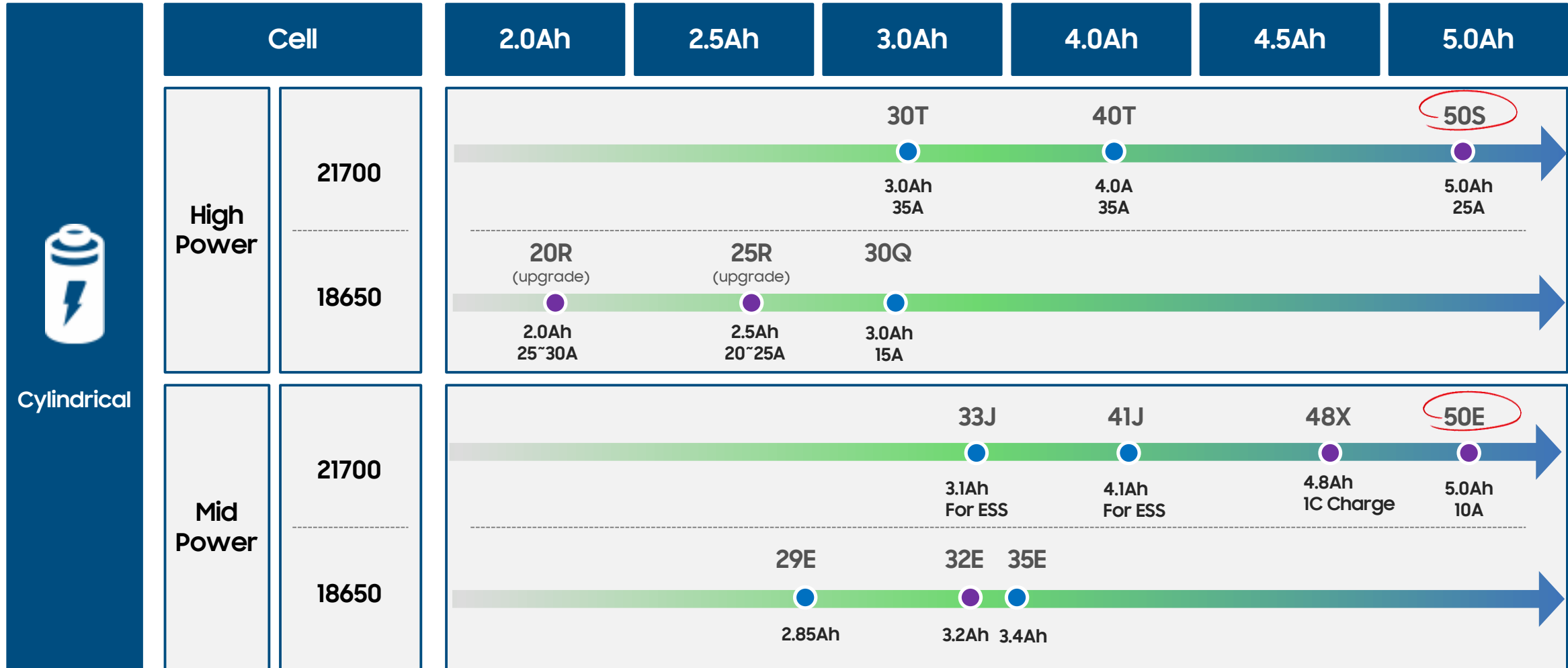


50S Introduction

Contents

- Cell roadmap
- 21700 50S Proposal

Samsung provides total LIB solution based on the latest technology



Cylindrical



High Power

Mid Power

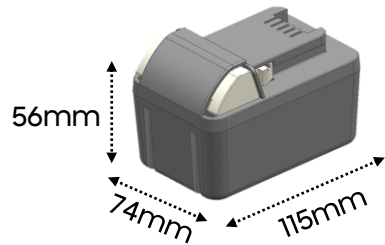
Apply cutting edge technology (Chemistry & Design)

Requirement	New Model (50S)	
Working time	Energy Density : 749Wh/L	New chemistry (Previous model : 594Wh/L)
Compatibility	21700	Pin to Pin Change Standard Form Factor
Mechanical Design	5s1p / 5s2p / 5s3p Pack Structure	5s1p : Cost & Weight 5s2p/3p : usable for heavy duty
Heavy duty tool	Power 25A (w/o 80 °C T-cut) Power 35A (w/ 80 °C T-cut)	Heavy duty
Various Application	P/T, OPE, Vacuum Cleaner	Wide Range Use

The Most Affordable & Wide Usable High Power 21700 Battery

Replace 18650 2p pack with 21700 1p pack

【 18650 5s2p 】



01.
Weight 20% Lighter &
Volume 10% Smaller

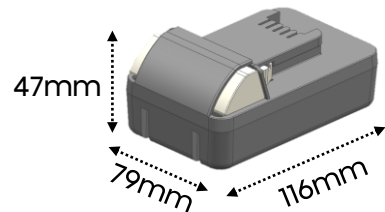


02.
Effective for Heat Release
(※ expectation)
(※ We are experimenting)



03.
Save Pack cost (3% cheaper)
& Logistics cost

【 21700 5s1p 】



Wide use High power cell

OPE (Outdoor Power Equipment)



Make **Walk-behind
Mower to Cordless**

- 18650 25R 10s3p : 40min
- 21700 50S 10s2p : 55min

※ based on 400W

Vacuum Cleaner



Try on 21700 Pack in
Vacuum Cleaner

- 18650 25R 7s1p : 10min
- 21700 50S 6s1p : 16min

※ based on 350W

Type		Tentative Spec.	Typical
Chemistry		NCA / Graphite+Si	NCA / Graphite+Si
Dimension (mm)	Diameter	21.15 ± 0.07	21.15 ± 0.07
	Height	70.15 ± 0.15	70.15 ± 0.15
Weight (g)		Max. 71.0	69.5
Initial IR (mΩ AC 1kHz)		≤ 15	10.87 ± 2
Initial IR (mΩ DC (10A-1A))		≤ 25	18.52 ± 2
Nominal Voltage (V)		3.60	←
Charge Method (100mA cut-off)		CC-CV (4.2±0.05V)	←
Charge Time	Standard (min), 0.5C	160min	133min
	Rapid (min), 6A	100min	80min
Charge Current	Standard current (A)	2.5	2.5
	Max. current (A)	6.0	6.0
Discharge	End voltage (V)	2.5	←
	Max. discharge capability (W/o T-Cut) (A)*	25	←
	Max. discharge capability (W/ T-Cut) (A)*	35	←
Capacity	Standard (mAh) (0.2C)	4,900	5,002
	Rated (mAh) (10A)	4,800	4,976

* TBD

21700 50S provides innovative opportunities for power tool industry with well balanced performance



1

Highest Energy cell in Power Application

18650 3.0Ah → 21700 4.0Ah → **21700 5.0Ah**



2

Robust Cycle Life Performance

20A discharge : 90%@250cycle



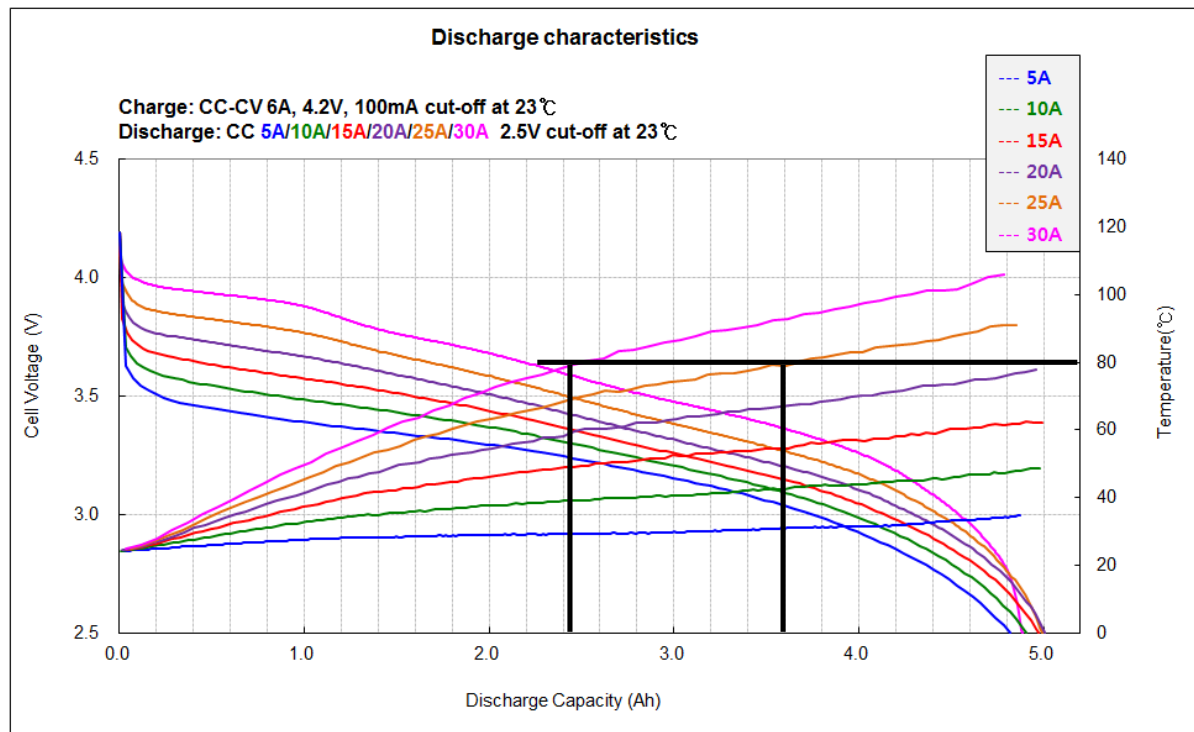
3

Apply to all Power application

Power tool, OPE, Vacuum Cleaner

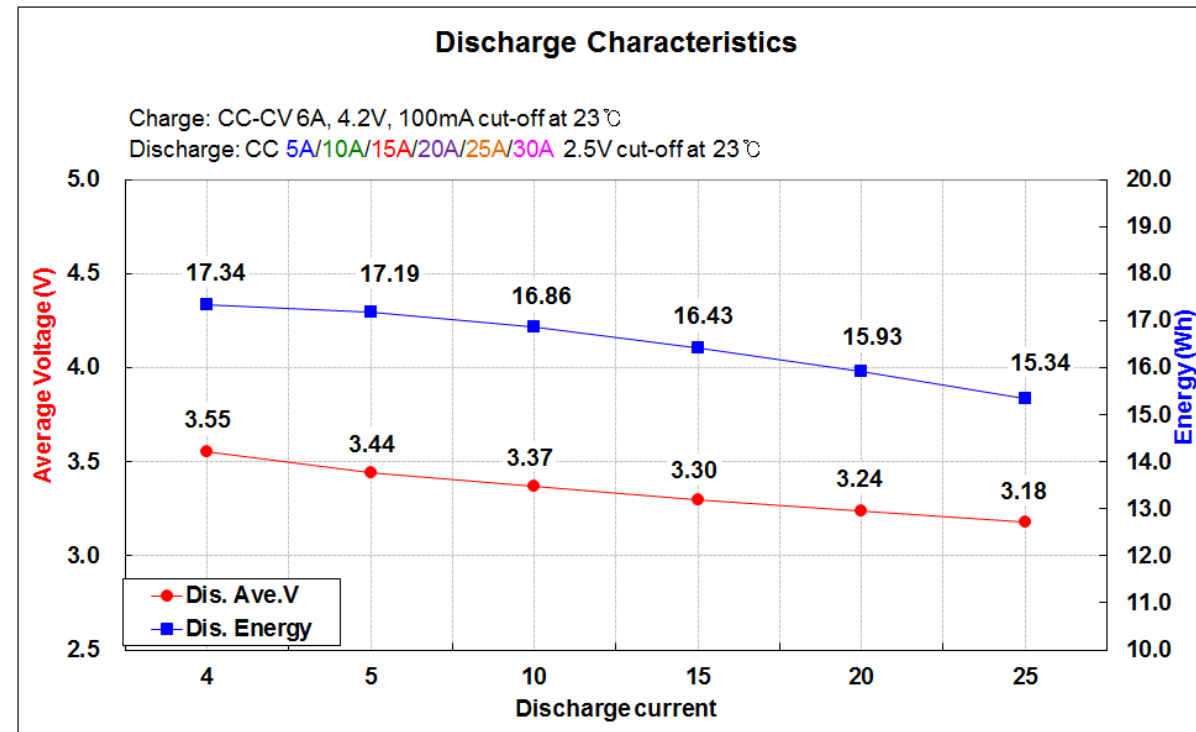


【 Capacity & Temperature 】



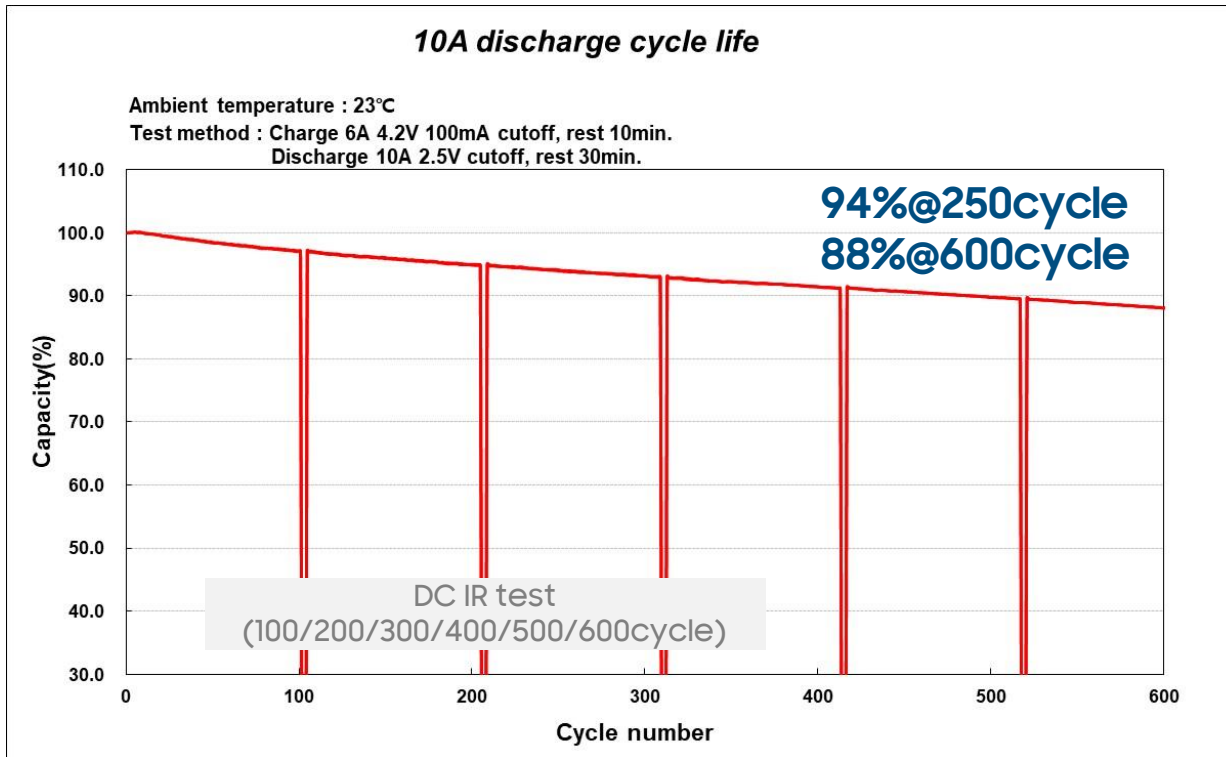
Discharge Current	5A	10A	15A	20A	25A	30A
Capacity (Ah)	4.883	4.992	5.006	4.973	4.908	4.818
Temp.(°C)	34.9	48.6	62.3	78.0	91.2	105.9
Time (min.)	58.6	30.0	20.0	14.9	11.8	9.6

【 Energy & Avg. voltage 】

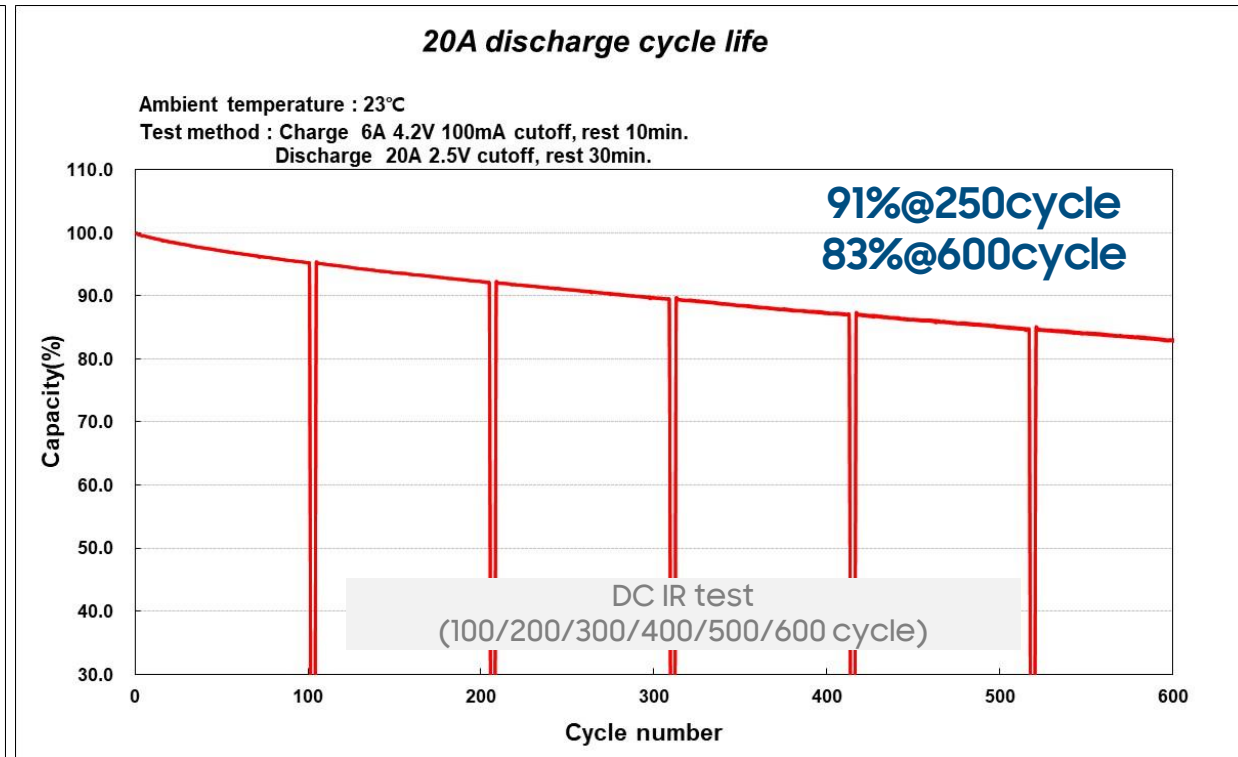


Discharge Current	5A	10A	15A	20A	25A	30A
Energy (Wh)	17.34	17.19	16.86	16.43	15.93	15.34
Avg. voltage (V)	3.55	3.44	3.37	3.30	3.24	3.18

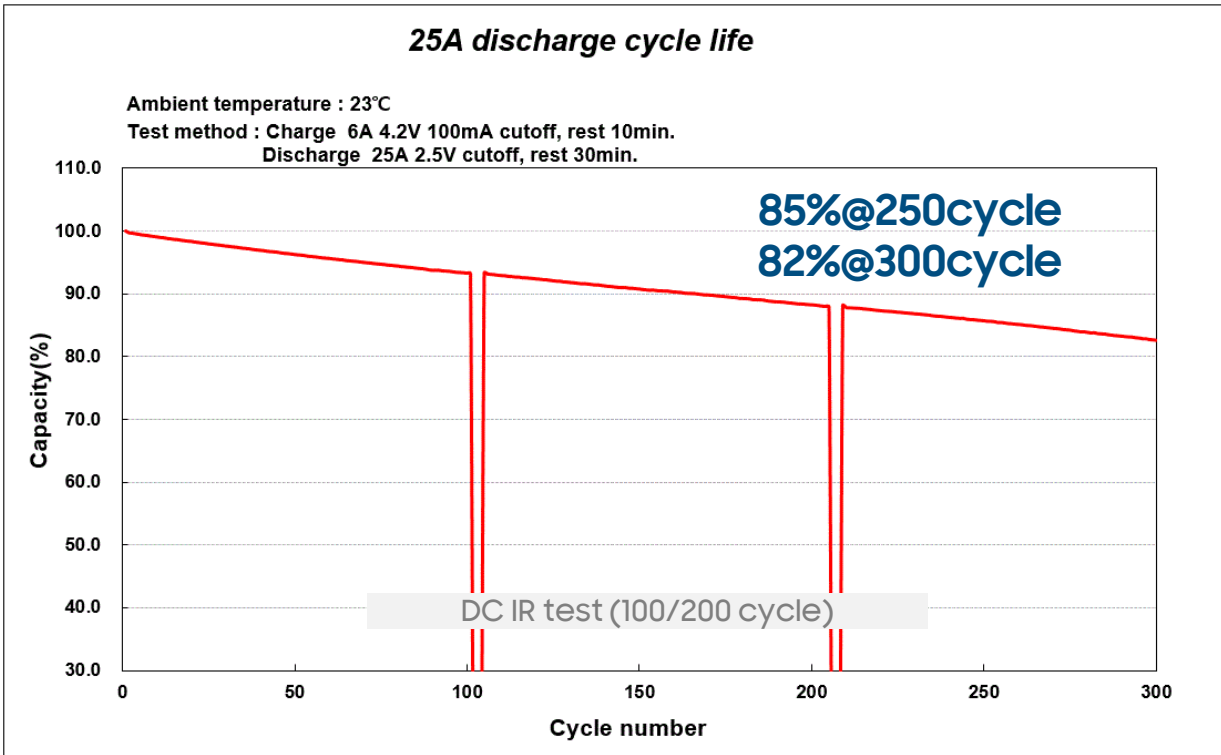
【 10A Cycle Life w/o T-cut】



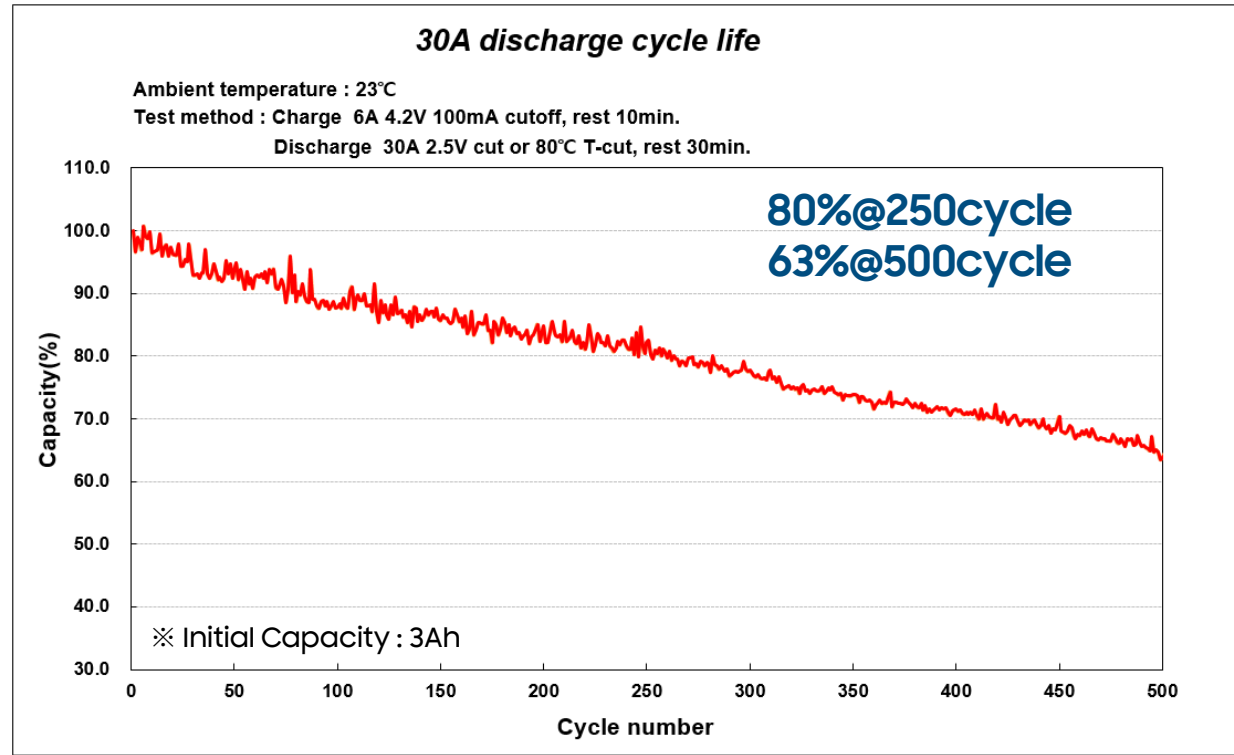
【 20A Cycle Life w/o T-cut】

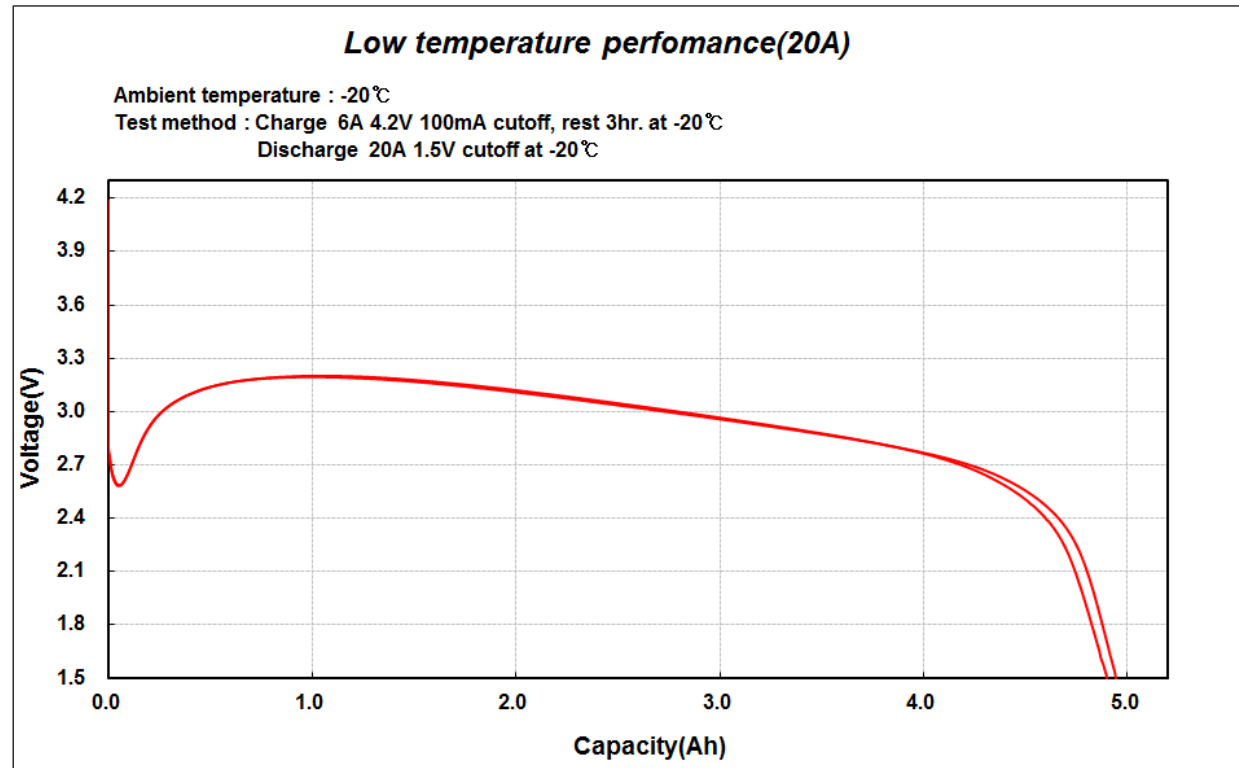


【 25A Cycle Life w/o T-cut 】



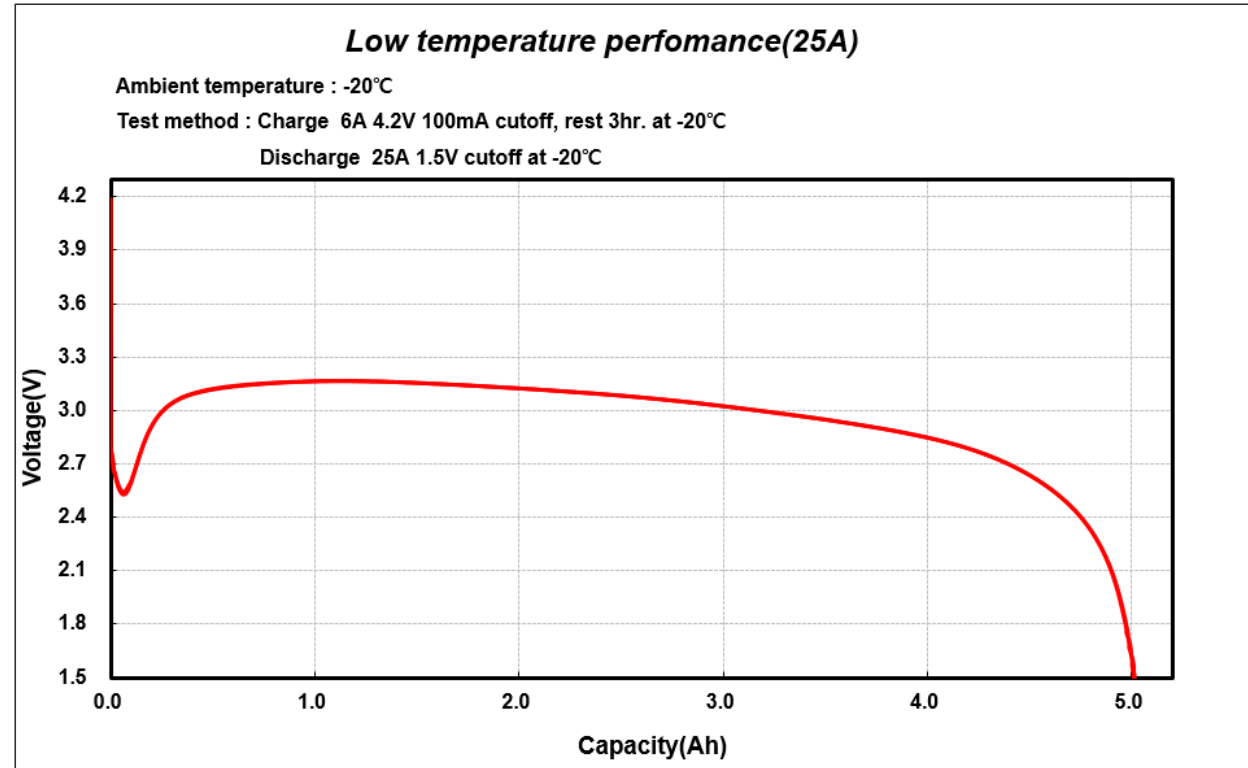
【 30A Cycle Life w/ 80°C T-cut 】





-20 °C Low Temp performance (20A)

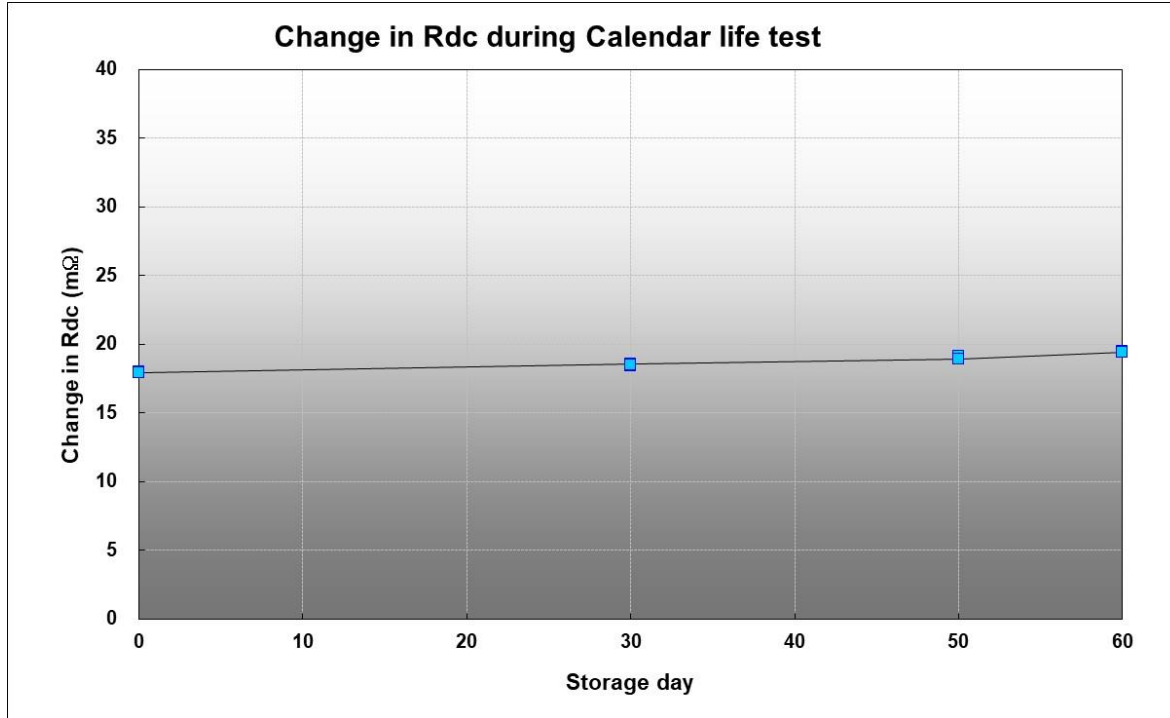
	1.5V Cut off		2.0V Cut off		2.5V Cut off	
	Capa(Ah)	Efficiency(%)	Capa(Ah)	Efficiency(%)	Capa(Ah)	Efficiency(%)
20A	4.898	98.0	4.769	95.4	4.502	90.0
	4.942	98.8	4.827	96.5	4.566	91.3
	4.921	98.4	4.798	96.0	4.534	90.7
Avg.	4.898	98.0	4.769	95.4	4.502	90.0



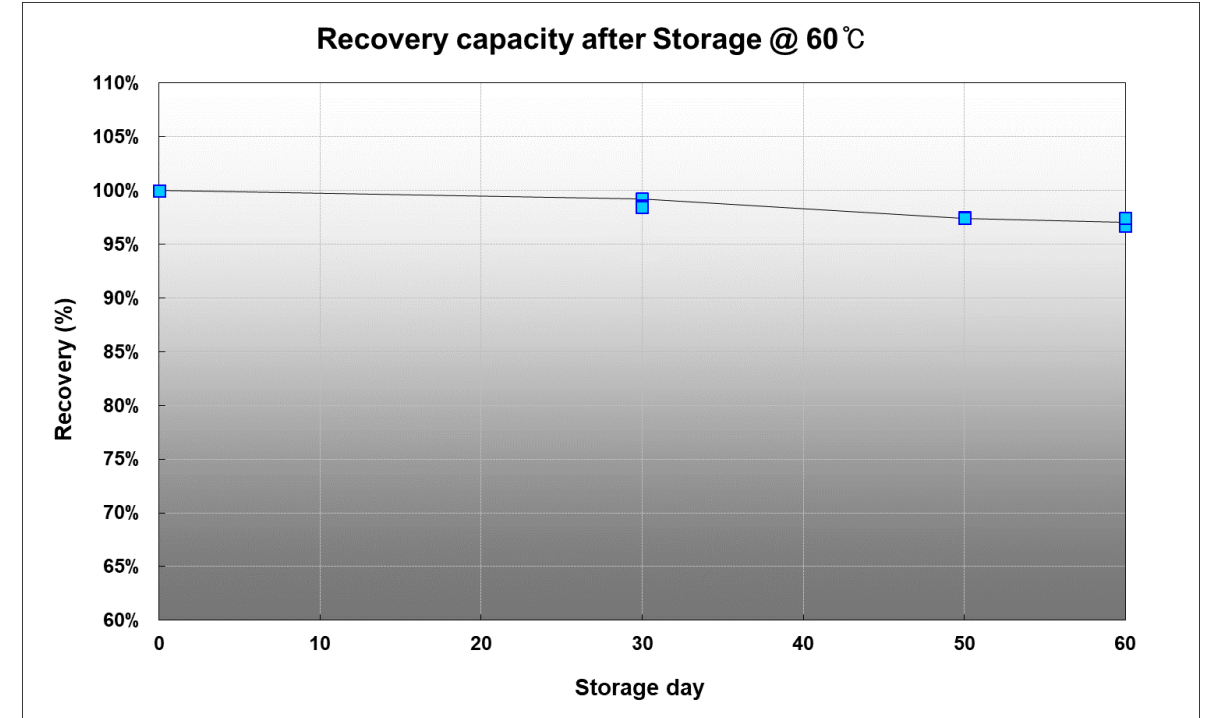
-20 °C Low Temp performance (25A)

	1.5V Cut off		2.0V Cut off		2.5V Cut off	
	Capa(Ah)	Efficiency(%)	Capa(Ah)	Efficiency(%)	Capa(Ah)	Efficiency(%)
25A	5.016	100.3	4.927	98.5	4.664	93.3
	5.010	100.2	4.925	98.5	4.654	93.1
Avg.	5.013	100.3	4.926	98.5	4.659	93.2

【 DC IR 】



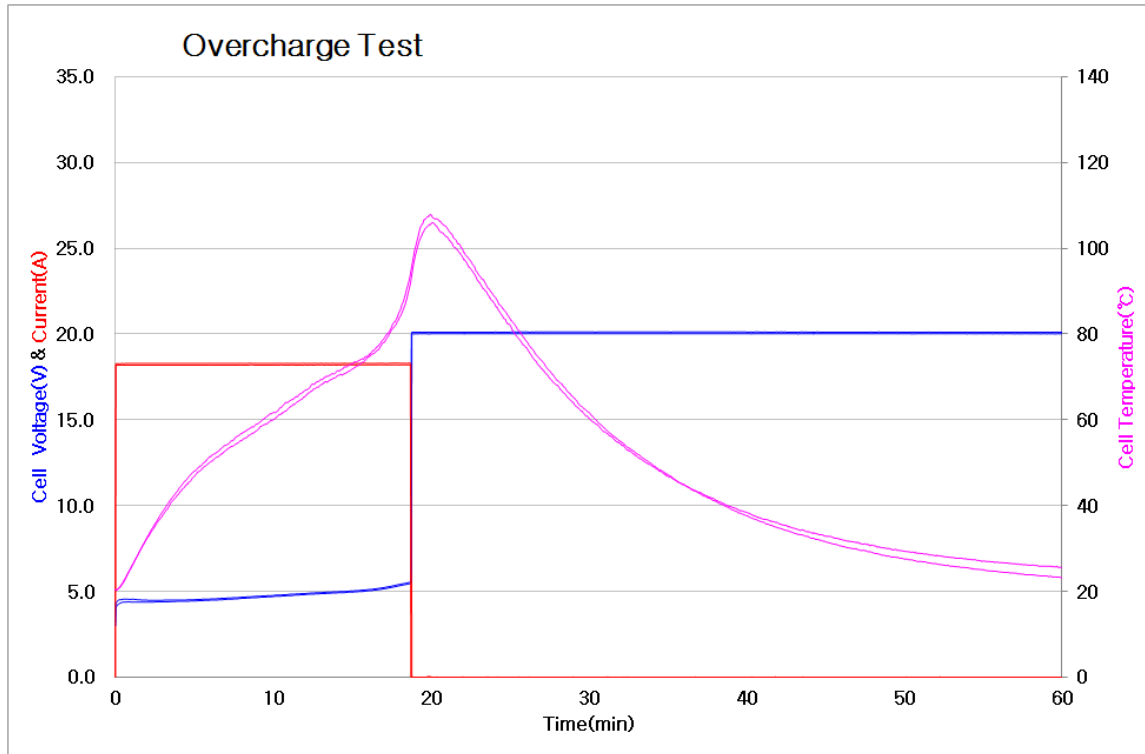
【 Recovery Capacity 】



Storage at 60°C _ 60days

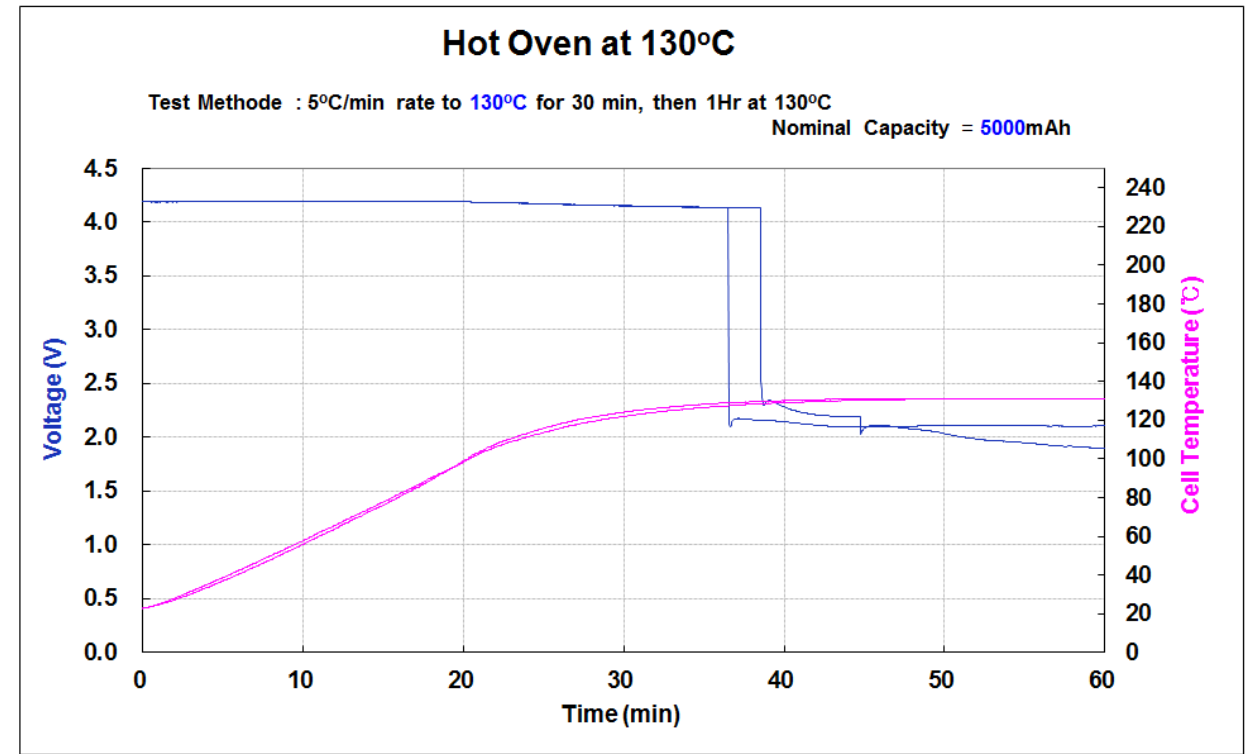
Model	Initial			After storage			Ratio(%)		
	ACIR (mΩ)	DCIR (mΩ)	Capacity (Ah)	ACIR (mΩ)	DCIR (mΩ)	Capacity (Ah)	ACIR	DCIR	Recovery
50S	11.6	17.9	4.96	11.6	19.4	4.76	100%	108%	97.4%

【 Overcharge 】



Cell	Results	CID open time (min.)	Max. temp. (°C)
1	L1 / OK	18.8	106.0
2	L1 / OK	18.7	107.8
Avg.	Pass	18.8	106.9

【 Hot Oven 】



Cell	Results	Max. temp. (°C)
1	L1 / OK	131.2
2	L1 / OK	131.5
Avg.	Pass	131.3

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