



新普科技股份有限公司
新世電子(常熟)有限公司
新普科技(重慶)有限公司
華普電子(常熟)有限公司

Control Number: SLEU-1908002

Lithium-ion Battery UN38.3 Test Report

Recommendations on the TRANSPORT OF DANGEROUS GOODS

(Manual of Tests and Criteria, Sixth revised edition, Amend 1)

Customer: Lenovo

Model: L17M3PG1

Rating/ Mass: 11.25V, TYP 4670mAh / 52.5Wh

MIN 4535mAh / 51Wh/ 220 (g)

Issue date: 2019/08/07

Approved By	Checked By	Prepared By
Assistant Manager	Authorized Signatory	Test Engineer

SIMPLO TECHNOLOGY CO., LTD.

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Website : <http://www.simplo.com.tw/>



Form No. : W11-002-B05

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Control Number: SLEU-1908002

1. Purpose of the Test :

To test each cell/battery is of the type proved to meet the requirements in United Nations Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Sixth revised edition, Amend 1, Section 38.3.

2. Test Result :

Test results of the UN Recommendations on the Transport of Dangerous Goods

No.	Test Item	Test results
T.1	Altitude simulation	PASS
T.2	Thermal test	PASS
T.3	Vibration test	PASS
T.4	Shock test	PASS
T.5	External short circuit	PASS
T.6	Impact, Crush test	PASS
T.7	Overcharge	PASS
T.8	Forced discharge	PASS

3. Test Lab: Email : Test_Lab@simplo.com.tw Website : <http://www.simplo.com.tw/>

●	SIMPLO (Taiwan) Laboratory ADD : No. 471 Pa Teh Rd, Sec 2 Hu Kou, Hsinchu Hsien, 303 Taiwan TEL: +886-3-5695920 FAX: +886-3-5695931
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Control Number: SLEU-1908002

4. Product manufacturer : Email : Test_Lab@simplo.com.tw Website : <http://www.simplo.com.tw/>

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5. Test Quantity :

- 5.1 Four batteries, at first cycle, in fully charged states. (For T.1~T.5)
- 5.2 Four batteries, after 25 cycles ending in fully charged states. (For T.1~T.5)
- 5.3 Five component cells, at first cycle at 50% of the design rated capacity. (For T.6)
- 5.4 Five component cells, after 25 cycles at 50% of the design rated capacity. (For T.6)
- 5.5 Four batteries, at first cycle, in fully charged states. (For T.7)
- 5.6 Four batteries, after 25 cycles ending in fully charged states. (For T.7)
- 5.7 Ten component cells, at first cycle in fully discharge states. (For T.8)
- 5.8 Ten component cells, after 25 cycles ending in fully discharged states. (For T.8)

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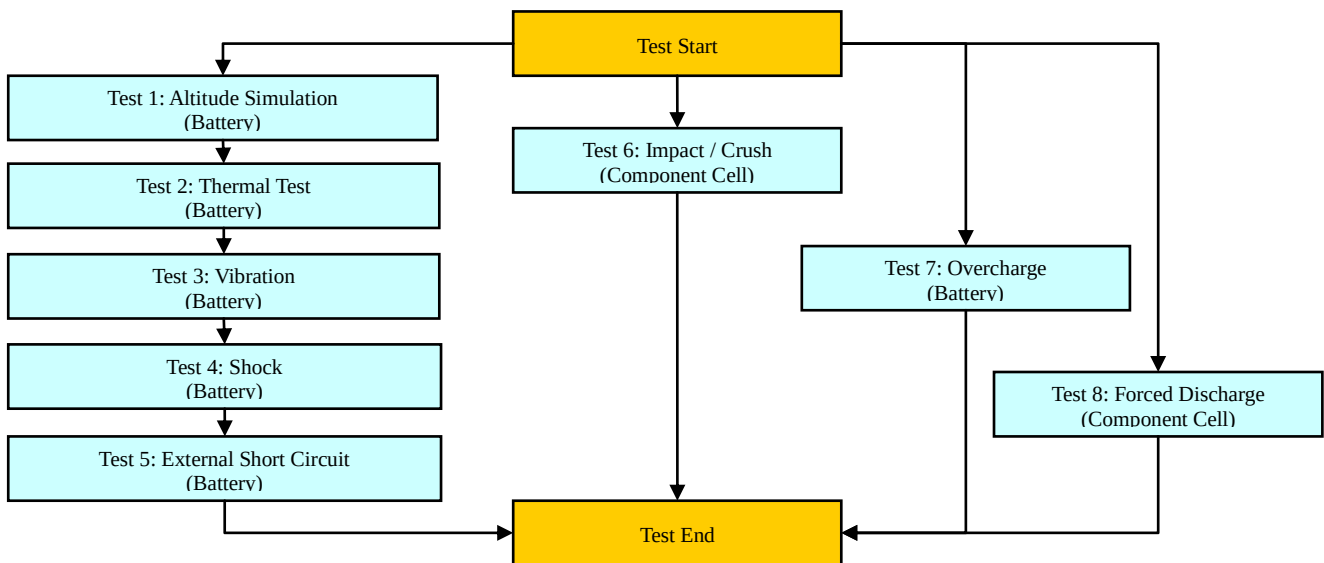
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6. Test Procedure :

6.1 All detailed test procedures must be based on United Nations Recommendations on the TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Sixth revised edition, Amend 1, Section 38.3.

6.2 Test flow shall be followed as below.



Conclusion: The samples had passed the test items of UN38.3.

7. Comment :

Follow the requirement of “TRANSPORT OF DANGEROUS GOODS, Manual of Tests and Criteria, Sixth revised edition, Amend 1, Section 38.3”, this report was updated. (The control number of old report: SLEU-1711007)



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8. Test Equipment :

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Revised Date: 2017-11-28

Test Instruments Reference List								
Used	Instrument ID	Instrument Name	Type	Range of use	Manufacturer	Calibration Date_Last	Calibration Date_Next	Remarks
	Pretest							
V	ML-761	Learning	715C	0~18V 0~8A	SMP	2017/3/1	2018/3/1	
V	ML-762	Learning	715C	0~18V 0~8A	SMP	2017/1/4	2018/1/4	
V	ML-763	Learning	715C	0~18V 0~8A	SMP	2017/3/1	2018/3/1	
V	ML-764	Learning	715C	0~18V 0~8A	SMP	2017/1/4	2018/1/4	
	ML-514	Learning	750R	0~60V 0~60A	SMP	2017/2/6	2018/2/6	
	T.1 Altitude Simulation							
V	ML-522	Altitude	SVT-120	Kpa:30~90	HSIN JIANG	2017/7/19	2018/7/19	
V	ML-257	Multimeter	HP 34401A	Note 1	Agilent	2017/3/2	2018/3/2	
	ML-494	Electronic Balance	XS1220M-SCS	1-1200 gf	CHUANHUA	2017/7/19	2018/7/19	
V	TD-166	Electronic Balance	PG603-S	1-610 gf	METTLER TOLEDO	2017/9/13	2018/9/13	
	ML-523	Electronic Balance	MTW-30K	30*0.005Kg		2017/9/13	2018/9/13	
V	ML-550	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	T.2 Thermal Test							
V	ML-789	Thermal Shock	GTST-080-65-AW	T:-40 to 120°C	GF	2017/1/4	2018/1/4	
V	ML-257	Multimeter	HP 34401A	note 1	Agilent	2017/3/2	2018/3/2	
	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2017/7/19	2018/7/19	
V	TD-166	Electronic Balance	PG603-S	1-610 gf	METTLER TOLEDO	2017/9/13	2018/9/13	
	ML-523	Electronic Balance	MTW-30K	30*0.005Kg		2017/9/13	2018/9/13	
V	ML-551	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	T.3 Vibration							
V	ML-233	Vibration	KD-9636-EM-300F2K-30N80	F:5~2000Hz G:0.2~20G	King Design	2017/8/29	2018/8/29	
V	ML-257	Multimeter	HP 34401A	note 1	Agilent	2017/3/2	2018/3/2	
	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2017/7/19	2018/7/19	
V	TD-166	Electronic Balance	PG603-S	1-610 gf	METTLER TOLEDO	2017/9/13	2018/9/13	
	ML-523	Electronic Balance	MTW-30K	30*0.005Kg		2017/9/13	2018/9/13	
V	ML-552	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	T.4 Shock							
V	ML-056	Shock	DP-1200-25	G:10~600G	King Design	2017/8/29	2018/8/29	
V	ML-257	Multimeter	HP 34401A	note 1	Agilent	2017/3/2	2018/3/2	
	ML-494	Electronic Balance	XS1220M-SCS	1-1000 gf	CHUANHUA	2017/7/19	2018/7/19	
V	TD-166	Electronic Balance	PG603-S	1-610 gf	METTLER TOLEDO	2017/9/13	2018/9/13	
	ML-523	Electronic Balance	MTW-30K	30*0.005Kg		2017/9/13	2018/9/13	
V	ML-551	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	T.5 External Short Circuit							
V	ML-534	mΩ Hitester	3540	1mΩ ~ 30kΩ	HIOKI	2017/9/18	2018/9/18	
V	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2017/9/13	2018/9/13	
V	ML-460	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2017/9/13	2018/9/13	
V	ML-521	Oven	9031	30~80 °C	YEOU LONG	2017/9/13	2018/9/13	
V	ML-549	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	T.6 Impact / Crush							
V	ML-339	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2017/5/17	2018/5/17	
	ML-076	Impact Tester			JYI SHENG	2017/1/3	2018/1/3	
	ML-553	Crush Tester	BCT-01		Simplo	2017/5/18	2018/5/18	
V	ML-866	Crush Tester	M0654		JYI SHENG	2017/4/13	2018/4/13	
	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2017/9/13	2018/9/13	

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Revised Date: 2017-11-28

Test Instruments Reference List								
Used	Instrument ID	Instrument Name	Type	Range of use	Manufacturer	Calibration Date_Last	Calibration Date_Next	Remarks
	T.7 Overcharge							
	ML-482	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2017/5/17	2018/5/17	
	ML-483	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2017/5/17	2018/5/17	
	ML-484	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2017/5/17	2018/5/17	
	ML-486	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2017/5/17	2018/5/17	
	ML-487	Programmable DC Source	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2017/5/17	2018/5/17	
	ML-488	Programmable DC Source	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2017/5/17	2018/5/17	
V	ML-549	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2017/9/13	2018/9/13	
	ML-460	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2017/9/13	2018/9/13	
V	ML-918	Overcharge & Forced discharge tester	T901	3~30 Vdc, Charge: 0.05~20A Discharge: 0.02~10A	SMP	2017/5/17	2018/5/17	
	T.8 Forced Discharge							
	ML-132	Electronic Load	3311C	60V,55A, 300W	Prodigit	2017/3/2	2018/3/2	
	ML-133	Electronic Load	3311C	60V,55A, 300W	Prodigit	2017/3/2	2018/3/2	
	ML-136	Electronic Load	3311C	60V,55A, 300W	Prodigit	2017/3/2	2018/3/2	
	ML-192	Electronic Load	3311C	60V,55A, 300W	Prodigit	2017/3/2	2018/3/2	
	ML-269	Electronic Load	3311C	60V,55A, 300W	Prodigit	2017/3/2	2018/3/2	
	ML-532	DC Electronic Load	33511-01	120V, 240A, 3600W	Prodigit	2017/7/19	2018/7/19	
	ML-482	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2017/5/17	2018/5/17	
	ML-483	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2017/5/17	2018/5/17	
	ML-484	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2017/5/17	2018/5/17	
	ML-486	Programmable DC Source	DS10014	1-100Vdc, 0.3-14.4A	MOTECH	2017/5/17	2018/5/17	
	ML-487	Programmable DC Source	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2017/5/17	2018/5/17	
	ML-488	Programmable DC Source	DS6024	1-60 Vdc, 0.3-24A	MOTECH	2017/5/17	2018/5/17	
V	ML-549	Data Logger	313	15~35 °C; 30~80 %RH	CENTER	2017/9/18	2018/9/18	
	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2017/9/13	2018/9/13	
	ML-460	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2017/9/13	2018/9/13	
V	ML-918	Overcharge & Forced discharge tester	T901	3~30 Vdc, Charge: 0.05~20A Discharge: 0.02~10A	SMP	2017/5/17	2018/5/17	
Note 1: DC Voltage: 0.1-1000V; AC Voltage: 0.5-700V at 60Hz, 1kHz; Resistance: 10Ω-10MΩ; DC Current: 0.1mA-3A; AC Current: 0.01-3A at 60Hz, 0.01-1A, at 1kHz.								

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	Pretest							
V	ML-761	Learning	715C	0~18V 0~8A	SMP	2019/2/26	2020/2/26	
V	ML-762	Learning	715C	0~18V 0~8A	SMP	2019/1/3	2020/1/3	
V	ML-763	Learning	715C	0~18V 0~8A	SMP	2019/2/26	2020/2/26	
V	ML-764	Learning	715C	0~18V 0~8A	SMP	2019/1/3	2020/1/3	
	ML-925	Learning	750C8	0~60V 0~30A	SMP	2019/1/3	2020/1/3	
	T.6 Impact / Crush							
V	ML-339	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2019/5/10	2020/5/10	
	ML-076	Impact Tester			JYI SHENG	2019/1/3	2020/1/3	
	ML-553	Crush Tester	BCT-01		Simplo	2019/5/10	2020/5/10	
V	ML-866	Crush Tester	M0654		JYI SHENG	2019/4/8	2020/4/8	
	ML-459	Data Acquisition	MX100-E-1D	1-100 Vdc, -50 to 150°C	Yokogawa	2018/9/12	2019/9/12	

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Control Number: SLEU-1908002

9. T.1~T.8 Detail Reports:

UN 38.3 Test Datasheet UN38.3/ST/SG/AC.10/11/Rev.6/Amend.1

Control Number: SLEU-1908002	Customer: Lenovo	Model Name: L17M3PG1	SMP Project Name: Y530-15
Pack P/N: 928QA223H (A)(B)	Configuration: 3S1P	Test Duration: 2017/10/27~2017/11/27 2019/07/31~2019/08/07	Reviewer: Esmond

Test Sample Identification: ☐ Large Battery ☒ Small Battery ☐ Single-cell Battery

Battery Pack						Component Cell		
Used	Sample No.	Sample State	Used	Sample No.	Sample State	Used	Sample No.	Sample State
V	01~04	1 Cycle, Fully charged	V	05~08	25 Cycles, Fully charged	V	01C~05C	1 Cycle, 50% SOC
V	09~12	1 Cycle, Fully charged	V	13~16	25 Cycles, Fully charged	V	06C~10C	25 Cycles, 50% SOC
						V	11C~20C	1 Cycle, Fully discharged (0% SOC)
						V	21C~30C	25 Cycles, Fully discharged (0% SOC)

T.1 Altitude Simulation

Start time: 2017/11/13 08:50		Ambient temp.: 23.1 °C Operator: Stephy							
Finish time: 2017/11/13 15:10		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	12.918	12.914	12.916	12.913	12.913	12.917	12.912	12.914
	After	12.908	12.904	12.907	12.903	12.904	12.908	12.902	12.905
	Residual OCV %	99.92%	99.92%	99.93%	99.92%	99.93%	99.93%	99.92%	99.93%
Mass (g)	Before	219.264	219.569	219.387	219.674	219.568	219.924	219.729	219.583
	After	219.256	219.563	219.382	219.672	219.566	219.920	219.729	219.580
	Mass loss %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Results		P	P	P	P	P	P	P	P

T.2 Thermal Test

Start time: 2017/11/13 15:30		Ambient temp.: 24.2 °C					Operator: Stephy		
Finish time: 2017/11/20 09:00		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	12.908	12.904	12.907	12.903	12.904	12.908	12.902	12.905
	After	12.687	12.690	12.692	12.682	12.688	12.696	12.684	12.680
	Residual OCV %	98.29%	98.34%	98.33%	98.29%	98.33%	98.36%	98.31%	98.26%
Mass (g)	Before	219.256	219.563	219.382	219.672	219.566	219.920	219.729	219.580
	After	219.234	219.544	219.361	219.649	219.542	219.895	219.710	219.556
	Mass loss %	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Results		P	P	P	P	P	P	P	P

T.3 Vibration

Start time: 2017/11/20 09:20		Ambient temp.: 22.9 °C						Operator: Stephy	
Finish time: 2017/11/21 08:50		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08
OCV (V)	Before	12.687	12.690	12.692	12.682	12.688	12.696	12.684	12.680
	After	12.659	12.664	12.666	12.655	12.660	12.668	12.658	12.654
	Residual OCV %	99.78%	99.80%	99.80%	99.79%	99.78%	99.78%	99.80%	99.79%
Mass (g)	Before	219.234	219.544	219.361	219.649	219.542	219.895	219.710	219.556
	After	219.231	219.540	219.359	219.643	219.538	219.887	219.705	219.550
	Mass loss %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Results		P	P	P	P	P	P	P	P

T.4 Shock

Start time: 2017/11/21 09:10		Ambient temp.: 23.5 °C								Operator: Stephy	
Finish time: 2017/11/21 11:10		Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08		
OCV (V)	Before	12.659	12.664	12.666	12.655	12.660	12.668	12.658	12.654		
	After	12.658	12.663	12.665	12.653	12.659	12.666	12.657	12.653		
	Residual OCV %	99.99%	99.99%	99.99%	99.98%	99.99%	99.98%	99.99%	99.99%		
Mass (g)	Before	219.231	219.540	219.359	219.643	219.538	219.887	219.705	219.550		
	After	219.226	219.539	219.359	219.641	219.534	219.887	219.705	219.545		
	Mass loss %	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%		
Results		P	P	P	P	P	P	P	P		

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Control Number: SLEU-1908002

T.5 External Short Circuit

Start time: 2017/11/21 11:30	Ambient temp.: 23.0 °C				Operator: Stephy				
Finish time: 2017/11/22 09:00	Sample 01	Sample 02	Sample 03	Sample 04	Sample 05	Sample 06	Sample 07	Sample 08	
OCV (V)	Before	12.658	12.663	12.665	12.653	12.659	12.666	12.657	12.653
	After	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Resistance (<100mΩ)		57.6	61.2	59.2	60.5	58.6	59.3	61.7	56.0
Max Temp. (< 170°C)		57.6	57.8	57.8	57.6	57.7	57.6	57.6	57.8
Results		P	P	P	P	P	P	P	P

T.6 Impact / Crush (Component Cell)

UN38.3/ST/SG/AC.10/11/Rev.6/Amend.1

☐ Impact - Cylindrical cells not less than 18.0 mm in diameter

☒ Crush - Prismatic, pouch, coin/button cells and cylindrical cells less than 18.0 mm in diameter

Start time: 2019/08/07 08:40	Ambient temp.: 24.0 °C				Operator: Mia				
Finish time: 2019/08/07 12:00	Sample 01C	Sample 02C	Sample 03C	Sample 04C	Sample 05C				
Initial OCV (V)	3.717	3.708	3.702	3.711	3.715				
Max Temp. (< 170°C)	24.2	23.8	24.2	23.6	24.7				
Results	P	P	P	P	P				
Sample No.	Sample 06C	Sample 07C	Sample 08C	Sample 09C	Sample 10C				
Initial OCV (V)	3.707	3.704	3.719	3.705	3.713				
Max Temp. (< 170°C)	23.7	23.4	24.5	24.1	23.9				
Results	P	P	P	P	P				

T.7 Overcharge

Start time: 2017/11/17 09:50	Ambient temp.: 23.1 °C				Operator: Stephy				
Finish time: 2017/11/27 09:30	Sample 09	Sample 10	Sample 11	Sample 12	Sample 13	Sample 14	Sample 15	Sample 16	
Initial OCV (V)	12.917	12.912	12.915	12.916	12.911	12.918	12.911	12.916	
Results	P	P	P	P	P	P	P	P	

T.8 Forced Discharge (Component Cell)

Start time: 2017/11/15 09:30	Ambient temp.: 23.0 °C				Operator: Stephy				
Finish time: 2017/11/22 16:50	Sample 11C	Sample 12C	Sample 13C	Sample 14C	Sample 15C	Sample 16C	Sample 17C	Sample 18C	
Initial OCV (V)	3.406	3.411	3.403	3.415	3.410	3.417	3.411	3.407	
Results	P	P	P	P	P	P	P	P	
Sample No.	Sample 19C	Sample 20C	Sample 21C	Sample 22C	Sample 23C	Sample 24C	Sample 25C	Sample 26C	
Initial OCV (V)	3.409	3.413	3.411	3.403	3.406	3.398	3.396	3.401	
Results	P	P	P	P	P	P	P	P	
Sample No.	Sample 27C	Sample 28C	Sample 29C	Sample 30C					
Initial OCV (V)	3.405	3.400	3.396	3.402					
Results	P	P	P	P					

9. Test Sample:



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