




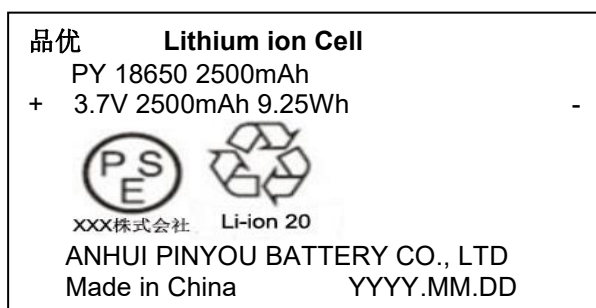
Shenzhen ZRLK Testing Technology Co., Ltd.

試験報告書番号: Test Report No.	ZKS190700481-1	頁: Page 1 of 16
申請者: Applicant:	ANHUI PINYOU BATTERY CO.,LTD Building 10, Innovation Park, Economic Development Area New District, Huaibei City, Anhui Province	
製造者/輸入者: Manufacturer/ Importer:	ANHUI PINYOU BATTERY CO.,LTD Building 10, Innovation Park, Economic Development Area New District, Huaibei City, Anhui Province	
試験品: Test item:	Lithium ion Cell	
識別表示: Identification:	PY 18650 2500mAh	製造番号: Engineering sample Serial No.:
申請受理番号: Receipt No.:	ZKS190700481-1	申請受理日: 2019-07-15 Date of receipt:
試験場所: Testing location:	Shenzhen ZRLK Testing Technology Co., Ltd. 6F, Fuxinfa Industrial Park, Liuxiandong, Xili Street, Nanshan District, Shenzhen, China	
適用した試験基準: Test specification:	電気用品の技術上の基準を定める省令の解釈(H25.07.01) 別表第九リチウムイオン蓄電池 Interpretation for METI Ordinance of Technical Requirements (H25.07.01) Appendix 9 : Lithium ion secondary batteries	
試験所: Testing Laboratory:	Shenzhen ZRLK Testing Technology Co., Ltd. 6F, Fuxinfa Industrial Park, Liuxiandong, Xili Street, Nanshan District, Shenzhen, China	
試験結果: Test result:	上記試験品は、適合した。 The a. m. test item PASSED.	
試験者: tested by:	 2019-08-16 Jacky Sun 	照査者: checked by: 2019-08-16 Bruce Luo 
備考/Other Aspects:	電気用品安全法 – 特定電気用品以外の電気用品 – リチウムイオン蓄電池 Electrical Appliance and Material Safety Law – Other electrical appliances and materials – Li-Ion secondary batteries	
略語: OK, Pass or P F or Fail N/A or N	= 適合 = 不適合 = 該当せず	Abbreviations: OK, Pass or P F or Fail N/A or N = passed = failed = not applicable

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This test report relates to the a. m. test item. Without permission of the test centre this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products.

Test item description.....: Lithium ion Cell
Model/Type reference.....: PY 18650 2500mAh
Manufacturer/Importer Name or Trade Mark.....: ANHUI PINYOU BATTERY CO.,LTD
Factory.....: ANHUI PINYOU BATTERY CO.,LTD
Building 10, Innovation Park, Economic Development Area New District, Huaibei City, Anhui Province
Seller Name of Trade mark.....: 品优
Ratings.....: 3.7V, 2500mAh, 9.25Wh

Copy of marking plate:

Possible test case verdicts:

- test case does not apply to the test object : N/A
- test object does meet the requirement : P (Pass)
- test object does not meet the requirement : F (Fail)

Testing..... :

Date of receipt of test item : 2019.07.15

Date (s) of performance of tests : 2019.07.15 – 2019.08.15

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
Throughout this report a point is used as the decimal separator.

General product information:

The cell consists of the positive electrode plate, negative electrode plate, separator, electrolyte and case.

The positive and negative electrode plates are housed in the case in the state being separated by the separator.

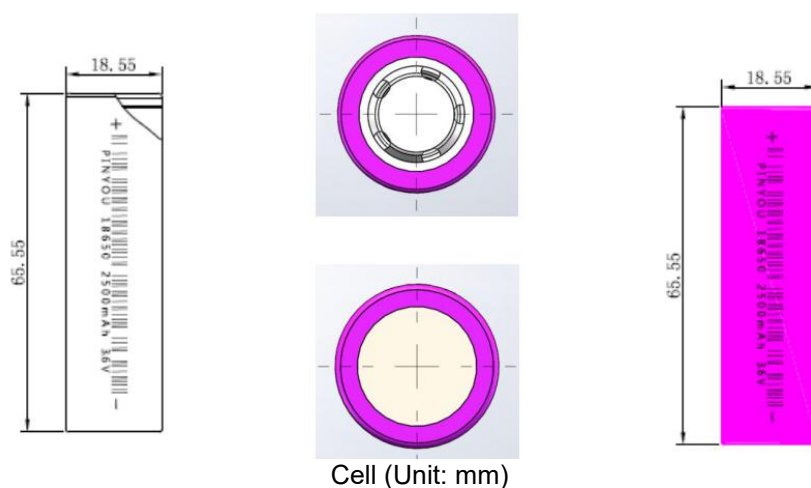
Dimension: 18.55mm Max.(Φ)×65.55mm Max.(H)

Type classification

Factor	Classification
Shape of secondary cell	Cylindrical
Type of electrolyte in secondary cell	Liquid state
Upper-limit charge voltage of secondary cell	>4.25V
Weight of secondary battery	7 kg or less
Number of battery blocks	one
Overcharge protection	/
Uses	For mobile equipment
Type of secondary battery	Those designed to fix to appliances by soldering or other joining methods so that it cannot be easily removed, or those having other special construction

The main features of this cell shown as below:

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
PY 18650 2500mAh	2500mAh	3.7V	1250mA	1250mA	2500mA	2500mA	4.2V	2.75V

Construction: (mm)**Circuit diagram:**

Only cell

Summary of Testing:

The cell is also evaluated and tested in this test report according to DENAN appendix 9.

Clause	Requirement - Test	Result - Remark	Verdict
1.	Basic Design		P
1.(1)	Insulation and Wiring		P
	a) Insulation Resistance between an accessible metal case (excluding electrical contacts) and positive terminals $\geq 5M\Omega$.	No metal on the case.	N/A
	b) Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements	See tests of clause 2 and clause 3.	P
	c) Orientation of wiring maintains adequate creepage and clearance distances between conductors. Mechanical integrity of internal connections are sufficient to accommodate conditions of reasonably foreseeable misuse.	See tests of clause 2 and clause 3.	P
1.(2)	Inner Pressure Reduction Mechanism		P
	a) Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition.	Venting mechanism exists on the top of cell.	P
	b) Encapsulant used to support cells within an outer casing does not cause the battery to overheat during normal operation no inhibit pressure relief.		N/A
1.(3)	Temperature and current management	Only cell	N/A
	The batteries are designed such that abnormal temperature rise conditions are prevented.		N/A
	Means is provided to limit current to safe levels during charge and discharge.		N/A
1.(4)	Terminal contacts		P
	a) Terminals have a clear polarity marking on the external surface of the battery or be designed with no fear of misconnection.	The "+" and "-" polarity explicitly marked on surface of the cell. see page 2	P
	b) The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current.		P
	c) External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance.		P
	Terminal contacts are arranged to minimize the risk of short circuits.		P
1.(5)	Assembly of cells into batteries	Only cell	N/A
	Cells used in the battery assembly have closely matched capacities, are of the same design, and are of the same chemistry and same manufacturer.		N/A
	The battery incorporates separate circuitry to prevent cell reversal from uneven charges as the pack is designed for the selective discharge of a portion of its series connected cells.		N/A

Clause	Requirement - Test	Result - Remark	Verdict
2.	Intended Use		P
2.(1)	Continuous Low Rate Charge		P
	Fully charged cells are subjected for 28 days to a charge as specified by the manufacturer.	Arrange the test as required.	P
	Ambient temperature when testing	45°C	P
	Results: no fire, no explosion, no leakage	No fire, no explosion, no leakage.	P
2.(2)	Vibration		P
	The measured open circuit voltage of the fully charged cells or batteries is within anticipated parameters	See test below.	P
	The cells or batteries are subjected to a vibration sequence with amplitude of 0.76 mm and a total maximum excursion of 1.52 mm. The frequency was varied at the rate of 1 Hz/min between the limits of 10 Hz and 55 Hz. The entire range of frequencies (10 Hz to 55 Hz) and return (55 Hz to 10 Hz) was traversed in 90 min \pm 5 min for each mounting position.	Arrange the test as required.	P
	The vibration was applied in each of three mutually perpendicular directions.	Arrange the test as required.	P
	Results: no fire, no explosion, no leakage	No fire, no explosion, no leakage.	P
2.(3)	Battery enclosure test at high ambient temperature	Only cell	N/A
	Fully charged batteries were placed in an air-circulating oven at a temperature of 70°C \pm 2°C for 7 hours. Afterwards, they are removed and allowed to return to room temperature.		N/A
	Results: no physical distortion of the battery casing resulting in exposure of internal components.		N/A
2.(4)	Temperature cycling		P
	Fully charged cells or batteries were subjected to temperature cycling (+75°C, +20°C, -20°C, +20°C) in forced draught chambers according to the procedure.	Arrange the test as required.	P
	After the fifth cycle, the cells or batteries were stored at 20 \pm 5°C for 7 days prior to examination.	Arrange the test as required.	P
	Results: No fire, no explosion, no leakage	No fire, no explosion, no leakage.	P
3	Reasonably foreseeable misuse		P
3.(1)	External short circuit		P

Clause	Requirement - Test	Result - Remark	Verdict
	a) Fully charged cells were subjected to a short circuit test at $55^{\circ}\text{C} \pm 5^{\circ}\text{C}$.	Arrange the test as required. Each 5pcs cells charged at ambient temperature 45°C and -5°C respectively prepared for the test.	P
	The external resistance did not exceed $80 \pm 20 \text{ m}\Omega$.	Total external resistance: $80\text{m}\Omega$.	P
	The cells were tested for 24 h or until the case temperature declined by 20% of the maximum temperature rise.	Tested until the case temperature declined by 20% of the maximum temperature rise.	P
	b) Fully charged batteries were subjected to a short circuit test at $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$.	Only cell	N/A
	The external resistance did not exceed $80 \pm 20 \text{ m}\Omega$.		N/A
	The batteries were tested for 24 h or until the case temperature declined by 20% of the maximum temperature rise.		N/A
	If battery incorporates protective device or protective circuit and the current has stopped, then for one hour after the current stopped.		N/A
	Results: no fire, no explosion.	No fire, no explosion.	P
3.(2)	Free fall		P
	Fully charged cells or batteries were dropped 3 times from a height of 1.0 m onto a concrete floor.	Arrange the test as required.	P
	Provided that this does not apply to charged batteries weighting more than 7 kg.		P
	Results: no fire, no explosion	No fire, no explosion.	P
3.(3)	Mechanical shock (crash hazard)		P
	a) Fully charged cells or batteries were subjected to a total of three shocks of equal magnitude applied in each of three mutually perpendicular directions.	Arrange the test as required.	P
	b) During the initial 3 milliseconds, the minimum average acceleration was 735 m/s^2 . The peak acceleration was between 1228 m/s^2 and 1716 m/s^2 .	Arrange the test as required.	P
	Results: no fire, no explosion, no leakage	No explosion, no leakage.	P
3.(4)	Thermal abuse		P
	Fully charged cells were placed in a gravity or circulating air-convection oven. The oven temperature was raised at a rate of $5^{\circ}\text{C}/\text{min} \pm 2^{\circ}\text{C}/\text{min}$ to a temperature of $130^{\circ}\text{C} \pm 2^{\circ}\text{C}$. The cell remained at that temperature for 10 minutes before the test was discontinued.	Arrange the test as required. Each 5pcs cells charged at ambient temperature 45°C and -5°C respectively prepared for the test.	P
	Results: no fire, no explosion	No fire, no explosion.	P
3.(5)	Crushing of cells		P

Clause	Requirement - Test	Result - Remark	Verdict
	a) Fully charged cells were crushed between two flat surfaces with a hydraulic ram exerting a force of 13 kN \pm 1 kN.	Arrange the test as required. Each 5pcs cells charged at ambient temperature 45°C and -5°C respectively prepared for the test.	P
	b) The force was released when		P
	(1) the maximum forces applied	The max. force is achieved when the force applied crushing the cell.	P
	(2) an abrupt voltage drop of one-third of the original voltage has been obtained		N/A
	(3) There was 10% deformation of battery height		N/A
	c) A cylindrical or prismatic cell was crushed with its longitudinal axis parallel to the flat surfaces of the crushing apparatus.	Cylindrical cell	P
	A second set of prismatic cells was tested, rotated 90 degrees around their longitudinal axis compared to the first set.		N/A
	Ambient temperature when testing	Ambient temperature 45°C and -5°C respectively.	P
	Results: no fire, no explosion.	No fire, no explosion.	P
3.(6)	Low pressure	Arrange the test as required.	P
	Fully charged cells are placed in a vacuum chamber whose internal pressure was gradually reduced to a pressure equal to or less than 11.6 kPa and held at that value for 6 hours.		P
	Results: no fire, no explosion, no leakage	No fire, no explosion, no leakage.	P
3.(7)	Overcharge		P
	A discharged cell was charged from a power supply of ≥ 10 V, at a charging current I_{rec} recommended by the manufacturer for 2.5 C_5/I_{rec} hours or until it reach the test voltage.	Arrange the test as required.	P
	Ambient temperature when testing	Ambient temperature 45°C and -5°C respectively.	P
	Results: no fire, no explosion.	No fire, no explosion.	P
3.(8)	Forced discharge		P
	Discharged cells intended for use in multi-cell applications, were subjected to a reverse charge at 1.0 I_t (A) for 90 minutes.	Arrange the test as required.	P
	Ambient temperature when testing	Ambient temperature 45°C and -5°C respectively.	P
	Results: no fire, no explosion	No fire, no explosion.	P
3.(9)	Cell protection against a high charging rate		P

Clause	Requirement - Test	Result - Remark	Verdict
	Discharged cells were charged at three times the charging current recommended by the manufacturer until	Arrange the test as required.	P
	the cells was fully charged, or		P
	A protective devices in the equipment or battery cut off the charge current before the cell became fully charged.	No protective device exists on the cell.	N/A
	Ambient temperature when testing	Ambient temperature 45°C and -5°C respectively.	P
	Results: no fire, no explosion	No fire, no explosion.	P
3.(10)	Forced internal short circuit of cells		P
	Pressed the winding core of charged cell (except when electrolyte is not liquid) by pressing jig under condition that nickel peace was inserted.	Arrange the test as required. Each 5pcs cells charged at ambient temperature 45°C and -5°C respectively prepared for the test.	P
	Inserted between the positive active material and negative active material	Arrange the test as required.	P
	Inserted between the uncoated current collector of positive electrode and the active material coated negative active electrode	Arrange the test as required.	P
	Test was stopped when voltage drop of over 50 mV was obtained, or		N/A
	Stopped when the pressure reached 800 N (for prismatic cells, 400N).	The force reached 800N.	P
	Ambient temperature when testing	Ambient temperature 45°C and -5°C respectively.	P
	Number of test sample	Each 5pcs cells charged at ambient temperature 45°C and -5°C respectively prepared for the test.	P
	Results: no fire, no explosion	No fire, no explosion.	P
3.(11)	Function of the overvoltage protection of batteries	Only cell	N/A
	The cell block in the battery shall not exceed the upper limited charging voltage at 20 ± 5°C ambient temperature.		N/A
	a) For batteries made of a one cell block, the voltage applied to the cell block during charging shall be measured.		N/A
	b) For batteries consisting of a series of two pieces or more of cell blocks, it shall be charged while measuring the voltage of each cell block and at the same time, one cell block shall forcibly be discharged and the voltages of the other cell blocks shall gradually be measured.		N/A

Clause	Requirement - Test	Result - Remark	Verdict
	c) For batteries consisting of a series of connection of two pieces or more of cell blocks, a voltage exceeding the upper limited charging voltage specified in Annex Table 1-2 shall be applied to the cell block while measuring the voltage of each cell block. When the charging stops, the voltage shall be measured.		N/A
	The battery provides with protective circuits		N/A
	Appliance in which battery is installed or battery charger provides with protective circuits.		N/A
3.(12)	Free fall of appliance		N/A
	The charged battery shall be installed to be used, and shall be dropped once a concrete floor or iron plate in a direction considered to most likely affect the battery in a negative manner.		N/A
	An equivalent load shall be applied to the battery		N/A
	Kind of equipment		N/A
	Weight of appliance		N/A
	Applicable standard		N/A
	Height in drop testing		N/A
	Results: no short-circuiting		N/A
4	Labeling		P
	Labeling for batteries shall be provided as below on surface where it can easily be seen but not easily faded.	The label of cell meets the requirements.	P
	Rated voltage	See page 2	P
	Rated capacity	See page 2	P

TABLE 1: List of Critical Components					P
Object/part No.	Manufacturer/ trademark	Type/Model	Technical Data	Standard	Marks of Conformity ¹⁾
Cell	ANHUI PINYOU BATTERY CO.,LTD	PY 18650 2500mAh	3.7V, 2500mAh	--	Tested with appliance
-Electrolyte	Xianghe Kunlun Chemicals Co., Ltd	KLE-PU01	DMC/EMC/EC +LiPF ₆ +FEC	--	--
-Separator	LIAOYUAN HONGTU LITHIUM BATTERY SEPARATOR MEMBRANES TECHNOLOGY CO.,LTD	16μm*61mm	16μm(Thickness) × 61mm(Width), Shutdown temperature: 137°C	--	--
-Negative electrode	ZCT JIANGXI ZICHEN TECHNOLOGY CO., LTD	F3-H	Graphite, Particle size D50: 14.45μm Tap density: 1.10g/ml, Specific surface area: 1.48m ² /g	--	--
-Positive electrode	Ningxia Shanshan Energy Technology CO., LTD	NCM811	Li(NiCoMn)O ₂ , Ni: Co: Mn= 5: 2: 3, Specific surface area: 0.176m ² /g, Vibration solid density: 3.528g/dm ³ , Particle size D50: 16.948μm	--	--
Supplementary information:					
1) Provided evidence ensures the agreed level of compliance.					

TABLE: 2.(1) Continuous Low Rate Charge Test (Cell)					P
Model	Recommended Charging Method, CC, CV, or CC/CV	Recommended Charging Voltage Vc, Vdc	Recommended Charging Current Irec, A	OCV at Start of Test, Vdc	Results
#1	CC/CV	4.20	1.25	4.19	P
#2	CC/CV	4.20	1.25	4.19	P
#3	CC/CV	4.20	1.25	4.20	P
#4	CC/CV	4.20	1.25	4.19	P
#5	CC/CV	4.20	1.25	4.20	P
Supplementary information: no fire, explosion or leakage observed					

TABLE: 2.(2) – Vibration Test (Cell)			P
Model	OCV at Start of Test, Vdc	Results	
#1	4.19	P	
#2	4.20	P	
#3	4.19	P	
#4	4.19	P	
#5	4.20	P	
Supplementary information: no fire, explosion or leakage observed			

TABLE: 2.(2) – Vibration Test (Battery Pack)			N/A
Model	OCV at Start of Test, Vdc	Results	
Supplementary information: no fire, explosion or leakage observed			

TABLE: 3.(1) – External Short Circuit Test (Cell)					P
Model	Ambient (At 55°C ± 5°C)	OCV at start of test, Vdc	Resistance of Circuit, Ω	Maximum Case Temperature Rise ΔT, °C	Results
#1	57.2	4.23	0.080	111.2	P
#2	57.2	4.22	0.091	103.7	P
#3	57.2	4.23	0.081	114.2	P
#4	57.2	4.22	0.081	110.6	P
#5	57.2	4.22	0.083	111.1	P

MODEL	Ambient (At 55°C ± 5°C)	OCV at start of test, Vdc	Resistance of Circuit, Ω	Maximum Case Temperature Rise ΔT _r , °C	Results
#1	58.1	4.13	0.085	117.0	P
#2	58.1	4.14	0.083	118.5	P
#3	58.1	4.14	0.080	127.1	P
#4	58.1	4.13	0.085	119.6	P
#5	58.1	4.14	0.087	114.0	P
Supplementary information: no fire or explosion					

TABLE: 3.(1) – External Short Circuit Test (Battery Pack)					N/A
Model	Ambient (At 20°C ± 5°C)	OCV at start of test, Vdc	Resistance of Circuit, Ω	Maximum Case Temperature Rise ΔT _r , °C	Results
Model	Ambient (At 20°C ± 5°C)	OCV at start of test, Vdc	Resistance of Circuit, Ω	Maximum Case Temperature Rise ΔT _r , °C	Results
Supplementary information: no fire or explosion					

TABLE: 3.(7) – Overcharge Tests (Lithium Systems)						P
Model	Ambient (°C)	OCV at start of test, Vdc	Maximum Charging Current, mA	Maximum Charging Voltage, Vdc	Total Time of Charging, h	Results
#1	45	3.41	1250	10	5.0	P
#2	45	3.44	1250	10	5.0	P
#3	45	3.41	1250	10	5.0	P
#4	45	3.40	1250	10	5.0	P
#5	45	3.39	1250	10	5.0	P
#6	-5	3.41	1250	10	5.0	P
#7	-5	3.42	1250	10	5.0	P

#8	-5	3.41	1250	10	5.0	P
#9	-5	3.39	1250	10	5.0	P
#10	-5	3.42	1250	10	5.0	P
Supplementary information: the test voltage reached 10V after the test applied for 5 hours. No fire or explosion.						

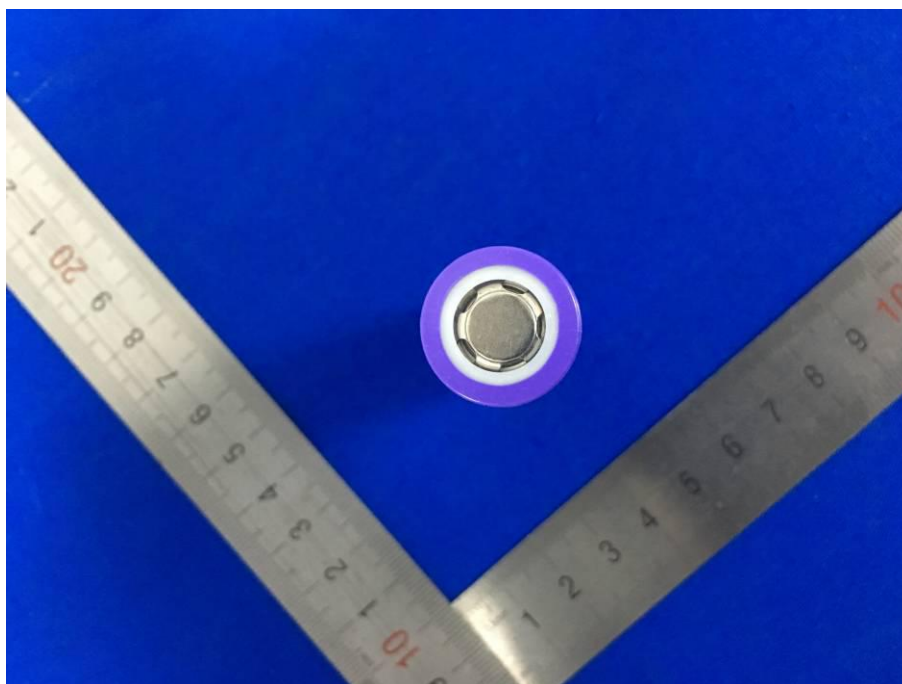
	TABLE: 3.(8) – Forced Discharge Test (Cell)					P
Model	Ambient (°C)	OCV before application of reverse charge, Vdc	Measured Reverse Charge It, A	Total Time for Reversed Charge Application, Min	Results	
#1	45	3.33	2.5	90	P	
#2	45	3.37	2.5	90	P	
#3	45	3.39	2.5	90	P	
#4	45	3.38	2.5	90	P	
#5	45	3.39	2.5	90	P	
#6	-5	3.37	2.5	90	P	
#7	-5	3.35	2.5	90	P	
#8	-5	3.34	2.5	90	P	
#9	-5	3.38	2.5	90	P	
#10	-5	3.39	2.5	90	P	
Supplementary information: no fire or explosion						

		TABLE: 3.(9) – Cell Protection Against a High Charging Rate Test (Lithium Systems)				P
Model	Ambient (°C)	OCV at start of test, Vdc	Maximum Charging Current, A	Maximum Charging Voltage, Vdc	Results	
#1	45	3.37	7.5	4.25	P	
#2	45	3.36	7.5	4.25	P	
#3	45	3.40	7.5	4.25	P	
#4	45	3.37	7.5	4.25	P	
#5	45	3.39	7.5	4.25	P	
#6	-5	3.36	7.5	4.25	P	
#7	-5	3.39	7.5	4.25	P	
#8	-5	3.38	7.5	4.25	P	
#9	-5	3.39	7.5	4.25	P	
#10	-5	3.40	7.5	4.25	P	
Supplementary information: no fire or explosion						

TABLE: 3.(10) – Forced internal short circuit of cells				P
Model	Ambient (°C)	OCV at start of test, Vdc	Test was terminated for a voltage drop of 50mV or a pressure of reaching 800N	Results
#1	45	4.20	Pressure: 800N, voltage drop: 3mV	P
#2	45	4.20	Pressure: 800N, voltage drop: 5mV	P
#3	45	4.19	Pressure: 800N, voltage drop: 7mV	P
#4	45	4.20	Pressure: 800N, voltage drop: 6mV	P
#5	45	4.19	Pressure: 800N, voltage drop: 2mV	P
#6	-5	4.10	Pressure: 800N, voltage drop: 4mV	P
#7	-5	4.11	Pressure: 800N, voltage drop: 8mV	P
#8	-5	4.11	Pressure: 800N, voltage drop: 3mV	P
#9	-5	4.10	Pressure: 800N, voltage drop: 2mV	P
#10	-5	4.11	Pressure: 800N, voltage drop: 9mV	P
Supplementary information: no fire or explosion				

Photos

Model: PY 18650 2500mAh



-- End of Report --