
Lithium Battery UN38.3 Test Report

Report No. : AGC11314200907UA01

PRODUCT DESIGNATION : Lithium iron phosphate cell

BRAND NAME : N/A

MODEL NAME : IFP27175200A

APPLICANT : Shenzhen Kweight technology co., LTD

DATE OF ISSUE : 2020-11-10

STANDARD(S) : (ST/SG/AC.10/11/Rev.6/Amend.1)

REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd.

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1. Sample Description			
Sample Name	Lithium iron phosphate cell	Model Name	IFP27175200A
Testing laboratory	Attestation of Global Compliance (Shenzhen) Co., Ltd.		
Testing Address	1, 2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China.		
Applicant	Shenzhen Kweight technology co., LTD		
Applicant Address	Room 1001,Phase 2 ,Tian'anyungu industrial zone, gangtou community, bantian street, longgang district ShenZhen		
Manufacturer	Shenzhen Kweight technology co., LTD		
Manufacturer Address	Room 1001,Phase 2 ,Tian'anyungu industrial zone, gangtou community, bantian street, longgang district ShenZhen		
Manufacturer Of Cell	Shenzhen Kweight technology co., LTD		
Use	---		
Battery Type	Rechargeable Li Cell	Composing Mode	Single Cell
Nominal Voltage	3.2V	Rated Capacity	100Ah
Watt-hour	320Wh	Form	Almost Cuboid
Limited Charge Voltage	3.9V	Cut-off Voltage	1.8V
Charge Current	50A	Max. Continuous Charge Current	50A
Max. Continuous Discharge Current	100Ah	End Charge Current	5A
Cell Model	IFP27175200A	Cell Rated Capacity	100Ah
Client Date	2020-10-20	Completing Date	2020-11-10

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2、 Standard		
<United Nations Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria> (Sixth revised edition Amendment 1)		
3、 Test Item And Conclusion		
Item	测试样品编号 Samples Number	结论 Conclusion
Altitude simulation	Z1~Z5 X1~X5	Pass
Thermal test		Pass
Vibration		Pass
Shock		Pass
External Short Circuit		Pass
Crush	Z6~Z10 X6~X10	Pass
Overcharge	---	N/A (Not applicable)
Forced discharge	Z11~Z20 X11~X20	Pass
The submitted samples were complied with <United Nations Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria>(Sixth revised edition Amend 1), sub-section 38.3.		

Report Revise Record:				
Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2020-11-10	Valid	Initial release

Tested by	Wang Ming	Reviewed by	Xuejiajia	Approved by	Mette He
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Description of the sample

Z1~Z5	Battery in full charge state during the first charge-discharge cycle;
X1-X5	Battery in full charge state during the 25th charge-discharge cycle;
Z6~Z10	The first charge and discharge cycle 50% of the battery cell with rated capacity state;
X6-X10	The 25th cycle of charging and discharging 50% of the battery cell in rated capacity state;
Z11~Z20	Cells at first cycle in fully discharged states;
X11~X20	Cells after 25 cycles ending in fully discharge states.

Test case verdicts:

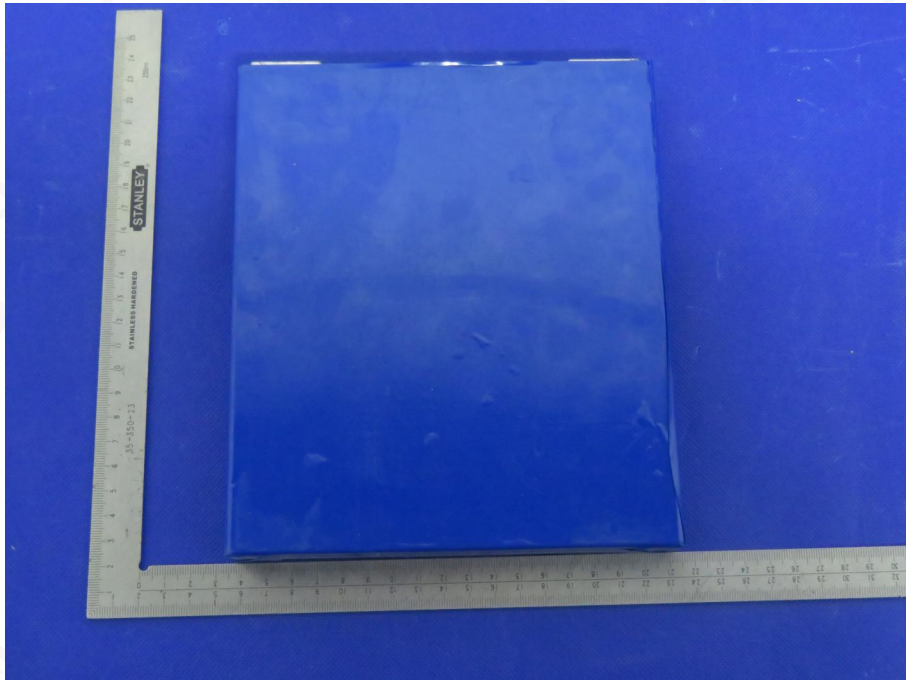
Test case does not apply to the test object	N/A(Not applicable)
Test item does meet the requirement	P(ass)
Test item does not meet the requirement	F(ail)

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4、Sample Photos



Authenticate the photo on original report only

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5、 Test Method And Verdict

Clause	Requirements	Result	Verdict
38.3.4.1	Test 1: Altitude simulation	See Table 1	P
	<p>Test cells and batteries shall be stored at a pressure of 11.6kPa or less for at least six hour at ambient temperature (20±5℃)</p> <p>Cells and batteries meet this requirement if there is no leakage, no venting, no disassemble, 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. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.</p>	No leakage, no venting, no disassemble, no rupture and no fire.	P
38.3.4.2	Test 2: Thermal test	See Table 2	P
	<p>Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72±2℃, followed by storage for at least six hours at a test temperature equal to -40±2℃. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20 ± 5℃). For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.</p> <p>Cells and batteries meet this requirement if there is no leakage, no venting, no disassemble, 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. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.</p>	No leakage, no venting, no disassemble, no rupture and no fire.	P
38.3.4.3	Test 3: Vibration	See Table 3	P
	<p>Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.</p> <p>The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12 kg (cells and small batteries), and for batteries with a gross mass of more than 12 kg (large batteries).</p> <p>For cells and small batteries: from 7 Hz a peak acceleration of 1g_n is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 8g_n occurs (approximately 50 Hz). A peak acceleration of 8g_n is then maintained until the frequency is increased to 200 Hz.</p> <p>For large batteries: from 7 Hz to a peak acceleration of 1g_n is maintained until 18 Hz is reached. The amplitude is then maintained</p>	No leakage, no venting, no disassemble, no rupture and no fire.	P

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Clause	Requirements	Result	Verdict									
	at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 2g _n occurs (approximately 25 Hz). A peak acceleration of 2g _n is then maintained until the frequency is increased to 200 Hz.											
	Cells and batteries meet this requirement if there is no leakage, no venting, no disassemble, 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. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.											
38.3.4.4	Test 4: Shock	See Table 4	P									
	<p>Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery.</p> <p>Each cell shall be subjected to a half-sine shock of peak acceleration of 150g_n and pulse duration of 6 milliseconds. Alternatively, large cells may be subjected to a half-sine shock of peak acceleration of 50g_n and pulse duration of 11 milliseconds.</p> <table border="1" data-bbox="315 958 1105 1480"> <thead> <tr> <th>Battery</th> <th>Minimum peak acceleration</th> <th>Pulse duration</th> </tr> </thead> <tbody> <tr> <td>小型电池 Small batteries</td> <td>1 150g_n or result of formula Acceleration (g_n)= $\sqrt{\left(\frac{100850}{\text{mass}^*}\right)}$ whichever is smaller</td> <td>6ms</td> </tr> <tr> <td>Large batteries</td> <td>50g_n or result of formula Acceleration (g_n)= $\sqrt{\left(\frac{3000}{\text{mass}^*}\right)}$ whichever is smaller</td> <td>11ms</td> </tr> </tbody> </table> <p>* Mass is expressed in kilograms.</p> <p>Each battery shall be subjected to a half-sine shock of peak acceleration depending on the mass of the battery. The pulse duration shall be 6 milliseconds for small batteries and 11 milliseconds for large batteries. The formulas below are provided to calculate the appropriate minimum peak accelerations.</p> <p>Each cell or battery is subjected to three shocks in the positive direction followed by three shocks in the negative direction of each of three mutually perpendicular mounting positions of the cell for a total of 18 shocks.</p> <p>Cells and batteries meet this requirement if there is no leakage, no venting, no disassemble, 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. The requirement relating to voltage is not applicable to test cells and</p>	Battery	Minimum peak acceleration	Pulse duration	小型电池 Small batteries	1 150g _n or result of formula Acceleration (g _n)= $\sqrt{\left(\frac{100850}{\text{mass}^*}\right)}$ whichever is smaller	6ms	Large batteries	50g _n or result of formula Acceleration (g _n)= $\sqrt{\left(\frac{3000}{\text{mass}^*}\right)}$ whichever is smaller	11ms	No leakage, no venting, no disassemble, no rupture and no fire.	P
Battery	Minimum peak acceleration	Pulse duration										
小型电池 Small batteries	1 150g _n or result of formula Acceleration (g _n)= $\sqrt{\left(\frac{100850}{\text{mass}^*}\right)}$ whichever is smaller	6ms										
Large batteries	50g _n or result of formula Acceleration (g _n)= $\sqrt{\left(\frac{3000}{\text{mass}^*}\right)}$ whichever is smaller	11ms										

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Clause	Requirements	Result	Verdict
	batteries at fully discharged states.		
38.3.4.5	Test 5: External Short Circuit	See Table 5	P
	<p>The cell or battery to be tested shall be shall be heated for a period of time necessary to reach a homogeneous stabilized temperature of $57\pm 4^{\circ}\text{C}$, measured on the external case. This period of time depends on the size and design of the cell or battery and should be assessed and documented. If this assessment is not feasible, the exposure time shall be at least 6 hours for small cells and small batteries, and 12 hours for large cells and large batteries. Then the cell or battery at $57\pm 4^{\circ}\text{C}$ shall be subjected to one short circuit condition with a total external resistance of less than 0.1 ohm.</p> <p>This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to $57 \pm 4^{\circ}\text{C}$, or in the case of the large batteries, has decreased by half of the maximum temperature increase observed during the test and remains below that value. The short circuit and cooling down phases shall be conducted at least at ambient temperature.</p> <p>Cells and batteries meet this requirement if their external temperature does not exceed 170°C and there is no disassemble, no rupture and no fire within six hours of this test.</p>	No disassemble, no rupture and no fire.	P
38.3.4.6	Test 6: Impact / Crush	See Table 6	P
	<p>Impact (applicable to cylindrical cells not less than 18mm in diameter)</p> <p>The test sample cell or component cell is to be placed on a flat smooth surface. A $15.8\text{mm}\pm 0.1\text{mm}$ diameter, at least 6cm long, or the longest dimension of the cell, whichever is greater, Type 316 stainless steel bar is to be placed across the centre of the sample. A $9.1\text{kg} \pm 0.1\text{kg}$ mass is to be dropped from a height of $61 \pm 2.5\text{cm}$ at the intersection of the bar and sample in a controlled manner using a near friction less, vertical sliding track or channel with minimal drag on the falling mass. The vertical track or channel used to guide the falling mass shall be oriented 90 degrees from the horizontal supporting surface.</p> <p>The test samples is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the $15.8\text{mm}\pm 0.1\text{mm}$ diameter curved surface lying across the centre of the test samples. Each sample is to be subjected to only a single impact.</p> <p>Cells and component cells meet this requirement if their external temperature does not exceed 170°C and there is no disassemble and no fire during the test and within six hours after this test.</p>	N/A	N/A
	<p>Crush (applicable to prismatic, pouch, coin/button cells and cylindrical cells less than 18mm in diameter)</p> <p>A cell or component cell is to be crushed between two flat surfaces. The crushing is to be gradual with a speed of approximately</p>	No disassemble, no rupture and no fire.	P

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	<p>1.5cm/s at the first point of contact. The crushing is to be continued until the first of the three options below is reached.</p> <p>(a) The applied force reaches 13kN±0.78kN; (b) The voltage of the cell drops by at least 100mV; or (c) The cell is deformed by 50% or more of its original thickness.</p> <p>Once the maximum pressure has been obtained, the voltage drops by 100mV or more, or the cell is deformed by at least 50% of its original thickness, the pressure shall be released.</p> <p>A prismatic or pouch cell shall be crushed by applying the force to the widest side. A button/coin cell shall be crushed by applying the force on its flat surfaces. For cylindrical cells, the crush force shall be applied perpendicular to the longitudinal axis.</p> <p>Each test cell or component cell is to be subjected to one crush only. The test Samples shall be observed for a further 6 h. The test shall be conducted using test cells or component cells that have not previously been subjected to other tests.</p> <p>Cells and component cells meet this requirement if their external temperature does not exceed 170°C and there is no disassemble and no fire during the test and within six hours after this test.</p>		
38.3.4.7	Test 7: Overcharge	N/A	N/A
	<p>The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows:</p> <p>(a) When the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall be the lesser of two times the maximum charge voltage of the battery or 22V.</p> <p>(b) When the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage.</p> <p>Tests are to be conducted at ambient temperature; the duration of the test shall be 24 hours.</p> <p>Rechargeable batteries meet this requirement if there is no disassemble and no fire during the test and within seven days after the test.</p>		
38.3.4.8	Test 8: Forced discharge	See Table 8	P
	<p>Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer.</p> <p>The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in ampere).</p> <p>Primary or rechargeable cells meet this requirement if there is no disassemble and no fire during the test and within seven days after the test.</p>	No disassemble and no fire.	P

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6、 Test Data

Table 1	Altitude simulation						P
Sample No.	Mass (g)		Mass loss (%)	Voltage (V)		Voltage loss (%)	Whether leakage, venting, disassemble, rupture, fire (Y/N)
	Pre-test	After test		Pre-test	After test		
Z1	2063.7	2063.7	0.000	3.56	3.55	0.28	N
Z2	2044.5	2044.5	0.000	3.55	3.55	0.00	N
Z3	2058.8	2058.7	0.005	3.55	3.55	0.00	N
Z4	2060.2	2060.2	0.000	3.56	3.56	0.00	N
Z5	2056.7	2056.7	0.000	3.55	3.55	0.00	N
X1	2062.6	2062.6	0.000	3.56	3.56	0.00	N
X2	2059.4	2059.4	0.000	3.56	3.56	0.00	N
X3	2048.6	2048.6	0.000	3.55	3.55	0.00	N
X4	2052.7	2052.7	0.000	3.56	3.56	0.00	N
X5	2057.8	2057.8	0.000	3.55	3.55	0.00	N

Table 2	Thermal test						P
Sample No.	Mass (g)		Mass loss (%)	Voltage (V)		Voltage loss (%)	Whether leakage, venting, disassemble, rupture, fire (Y/N)
	Pre-test	After test		Pre-test	After test		
Z1	2063.7	2063.5	0.010	3.55	3.52	0.85	N
Z2	2044.5	2044.5	0.000	3.55	3.51	1.13	N
Z3	2058.7	2058.6	0.005	3.55	3.52	0.85	N
Z4	2060.2	2060.1	0.005	3.56	3.52	1.12	N
Z5	2056.7	2056.7	0.000	3.55	3.51	1.13	N
X1	2062.6	2062.5	0.005	3.56	3.52	1.12	N
X2	2059.4	2059.3	0.005	3.56	3.53	0.84	N
X3	2048.6	2048.5	0.005	3.55	3.52	0.85	N
X4	2052.7	2052.7	0.000	3.56	3.52	1.12	N
X5	2057.8	2057.7	0.005	3.55	3.52	0.85	N

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Table 3		Vibration					P
Sample No.	Mass (g)		Mass loss (%)	Voltage (V)		Voltage loss (%)	Whether leakage, venting, disassemble, rupture, fire (Y/N)
	Pre-test	After test		Pre-test	After test		
Z1	2063.5	2063.5	0.000	3.52	3.52	0.00	N
Z2	2044.5	2044.5	0.000	3.51	3.51	0.00	N
Z3	2058.6	2058.6	0.000	3.52	3.52	0.00	N
Z4	2060.1	2060.1	0.000	3.52	3.52	0.00	N
Z5	2056.7	2056.6	0.005	3.51	3.51	0.00	N
X1	2062.5	2062.5	0.000	3.52	3.52	0.00	N
X2	2059.3	2059.3	0.000	3.53	3.52	0.28	N
X3	2048.5	2048.5	0.000	3.52	3.52	0.00	N
X4	2052.7	2052.6	0.005	3.52	3.51	0.28	N
X5	2057.7	2057.7	0.000	3.52	3.52	0.00	N

Table 4		Shock					P
Sample No.	Mass (g)		Mass loss (%)	Voltage (V)		Voltage loss (%)	Whether leakage, venting, disassemble, rupture, fire (Y/N)
	Pre-test	After test		Pre-test	After test		
Z1	2063.5	2063.5	0.000	3.52	3.52	0.00	N
Z2	2044.5	2044.5	0.000	3.51	3.51	0.00	N
Z3	2058.6	2058.5	0.005	3.52	3.52	0.00	N
Z4	2060.1	2060.1	0.000	3.52	3.52	0.00	N
Z5	2056.6	2056.6	0.000	3.51	3.51	0.00	N
X1	2062.5	2062.5	0.000	3.52	3.52	0.00	N
X2	2059.3	2059.3	0.000	3.52	3.52	0.00	N
X3	2048.5	2048.5	0.000	3.52	3.51	0.28	N
X4	2052.6	2052.6	0.000	3.51	3.51	0.00	N
X5	2057.7	2057.7	0.000	3.52	3.52	0.00	N

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Table 5	External short circuit		P
Sample No.	Peak temperature (°C)	Whether disassemble, rupture, fire (Y/N)	
Z1	107.2	N	
Z2	108.6	N	
Z3	109.7	N	
Z4	108.2	N	
Z5	109.7	N	
X1	106.4	N	
X2	108.5	N	
X3	110.3	N	
X4	110.1	N	
X5	108.5	N	

Table 6	Crush		P
Sample No.	Peak temperature (°C)	Whether disassemble, fire (Y/N)	
Z6	23.6	N	
Z7	23.8	N	
Z8	23.9	N	
Z9	24.1	N	
Z10	23.7	N	
X6	23.9	N	
X7	23.8	N	
X8	24.1	N	
X9	23.9	N	
X10	23.6	N	

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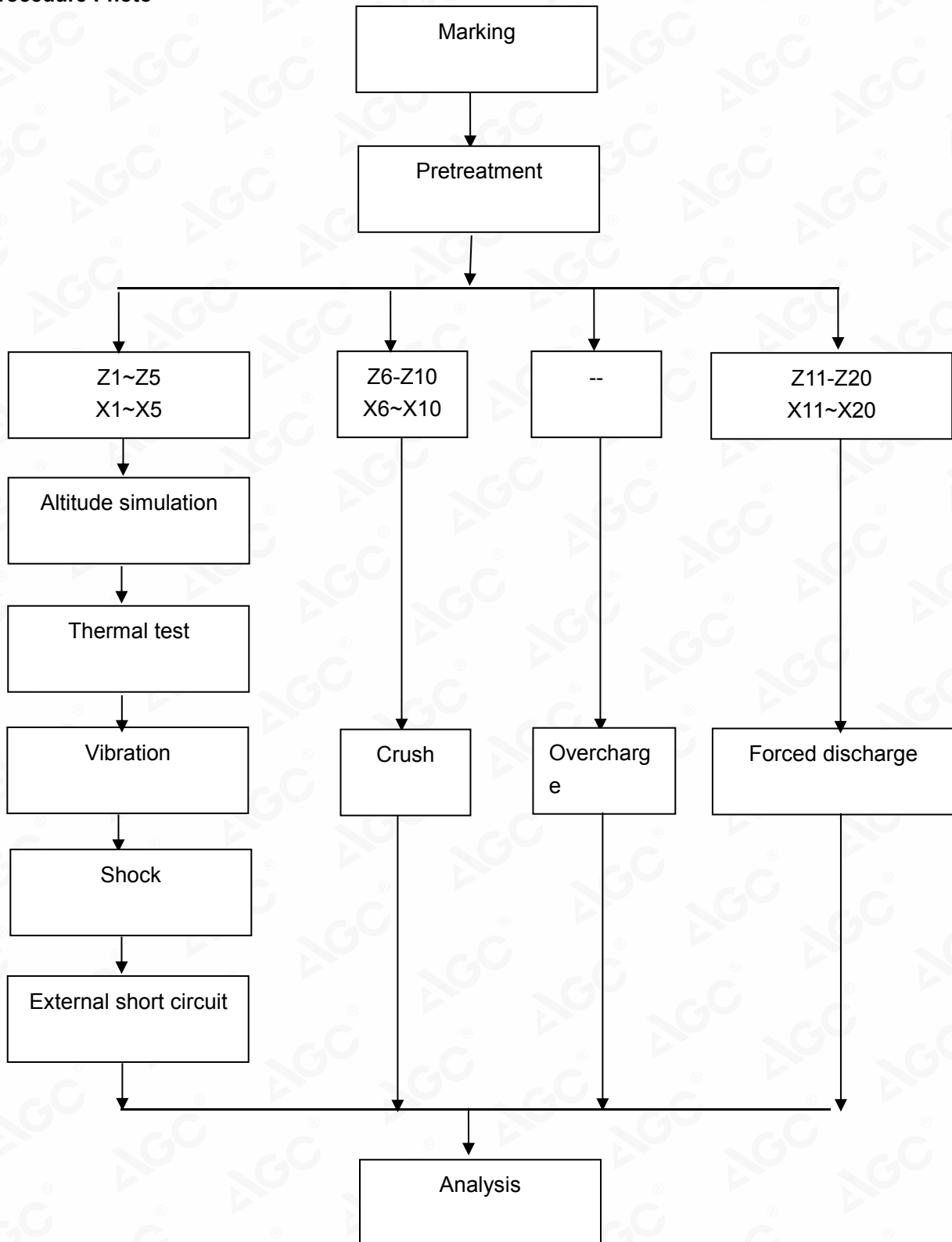
表 7 Table 7	Overcharge	N/A
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Table 8	Forced discharge	P
Sample No.	Whether disassemble, fire (Y/N)	
Z11	N	
Z12	N	
Z13	N	
Z14	N	
Z15	N	
Z16	N	
Z17	N	
Z18	N	
Z19	N	
Z20	N	
X11	N	
X12	N	
X13	N	
X14	N	
X15	N	
X16	N	
X17	N	
X18	N	
X19	N	
X20	N	

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the "Dedicated Testing/Inspection Stamp" is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.



7、Procedure Photo



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8、 Test equipment

AGC-BT-E161	Electronic Weighing Scale
AGC-BT-E154	Digital multimeter
AGC-BT-E062~E082	Battery Testing System
AGC-BT-E133	Vacuum Tester
AGC-BT-E123	Rapid Temperature Change Tester
AGC-BT-E070	Vibration test instrument
AGC-RE-E062	Mechanical shock test instrument
AGC-BT-E139	Battery Short-circuit Tester
AGC-BT-E126	Battery Crush Tester
AGC-BT-E144	Data Acquisition Instrument
AGC-BT-E054~E056	DC power supply

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Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the “Company”) solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the “Clients”).
2. Any report issued by Company as a result of this application for testing services (the “Report”) shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.
3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.
4. The non-CMA report issued by AGC is only permitted to be used by the client as internal reference use and shall not be used for public demonstration purpose.
5. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.
6. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.
7. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.
8. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.
9. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.
10. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of **warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.**

Any report having not been signed by authorized approver, or having been altered without authorization, or having not been stamped by the AGC Dedicated Testing/Inspection Stamp” is deemed to be invalid. Copying or excerpting portion of, or altering the content of the report is not permitted without the written authorization of AGC. The test results presented in the report apply only to the tested sample. Any objections to report issued by AGC should be submitted to AGC within 15days after the issuance of the test report. Further enquiry of validity or verification of the test report should be addressed to AGC by agc@agc-cert.com.

