



Lithium Ion Battery

Product Specification

Product name: bending- resistant lithium ion battery

Type Number : HB1420138-220mAh



1. Scope of application

This standard describes the external dimensions, characteristics, technical requirements and precautions of lithium-ion flexible batteries. This standard applies to HB1420137-220mAh bending- resistant lithium-ion batteries produced by " Hoppt " .

2. Definition

2.1 Nominal capacity:

Nominal capacity $Cap = 220\text{mAh}$, refers to the capacity when discharged at a rate of $0.2C$ to a termination voltage of $3.0V$ at $25\pm 2.5^{\circ}\text{C}$.

2.2 Standard charging method:

It means that the battery is charged at a constant current and constant voltage of $0.5C$ under the environment of $25\pm 2.5^{\circ}\text{C}$ until the battery voltage is $4.35V$, and the charging is stopped when the charging current is less than $0.02C$.

2.3 Standard discharge method:

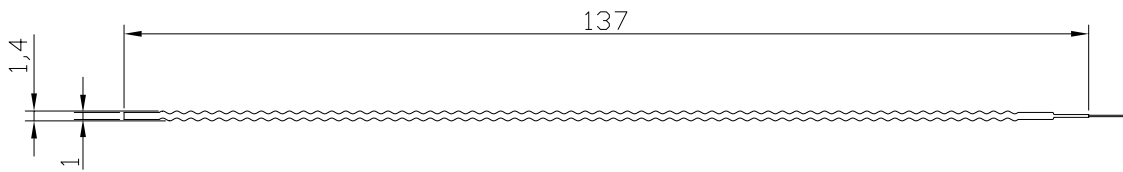
Refers to the discharge of a constant current of $0.5C$ to a single cell voltage of $3.0V$ at $25\pm 2.5^{\circ}\text{C}$.

3, cell type and shape dimensions

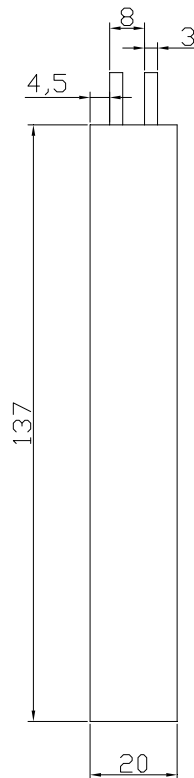
3.1 Cell model:

HB 1420138-220mAh

3.2 batteries Shape Size:



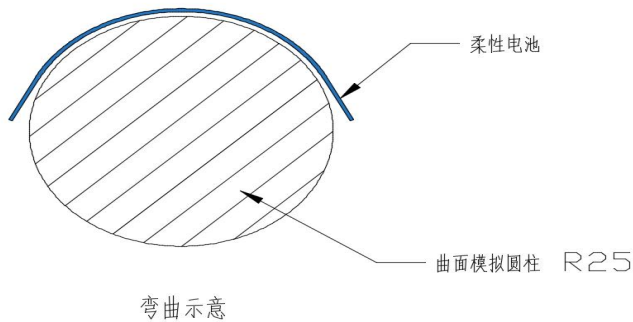
Picture 1



Picture 2

Serial number	project	characteristic
1	Battery length	137 mm±1mm
2	Battery width	20 mm±1mm
3	Battery thickness	1.4 ±0.1mm
4	Pole ear width	3mm
5	Polar ear center distance	8 mm±1mm
6	Edge width	2.5mm±0.5mm
7	weight	4.6 ± 0.3 g

3.3 Bending test conditions and bending performance



Serial number	project	characteristic
1	Test surface radius	25mm
2	Bending test times	1000 times
3	Capacity retention (1 000)	> 95.0 %



4. Product basic characteristics

Serial number	project	characteristic
1	Nominal capacity	2 20mAh
2	Operating Voltage	3.8V
3	Charging cut-off voltage	4.35V
4	Discharge cut-off voltage	3.0V
5	Maximum charging current	1C
6	Maximum discharge current	1C
7	range of working temperature	Charging: 10°C – 45°C Discharge: 10°C – 45°C
8	Operating humidity range	Less than 85%RH
9	Storage temperature range	0°C -30°C, not higher than 45°C
10	Storage humidity range	Less than 85%RH
11	weight	4.6 ± 0. . 3 G



5. Features

5.1 electrical properties

Serial number	project	standard	Test Methods
1	Open circuit voltage	$3.9\text{ V} \pm 0.50\text{V}$	The voltmeter measures that the battery is 40%-50% charged .
2	AC internal resistance	$\leq 1.40\text{ m}\Omega$	Measured with an AC internal resistance tester with a frequency of 1KHz under 40%-50% charge .
3	0.1C discharge	$\geq 225\text{ mAh}$	At an ambient temperature of $25^\circ\text{C} \pm 5^\circ\text{C}$, let the standard stand for 10 minutes after charging, and then discharge to the end voltage at 0.1C. Cycle 3 times. When one discharge reaches the standard, it can be terminated .
4	0.5C discharge	$\geq 220\text{mAh}$	Under the ambient temperature of $25^\circ\text{C} \pm 5^\circ\text{C}$, let the standard stand for 10min after charging, and discharge to the termination voltage at 0.5C, cycle 3 times. When one discharge reaches the standard, it can be terminated.
5	Cycle life	$\geq 500\text{ times}$	Under the ambient temperature of $25^\circ\text{C} \pm 5^\circ\text{C}$, discharge with 0.5C current constant current to the end voltage, then charge with 0.5C current constant current and constant voltage to the cut-off current, let it stand for 10min, and then perform the next charge and discharge cycle until 0.5C The constant current discharge capacity is less than 176 mAh.



6	High temperature discharge	≥ 220 mAh	After standard charging, the battery is placed in a high-temperature box at $45^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 2h, and then discharged at 0.5C to the end voltage.
7	Low temperature discharge	≥ 198 mAh	After standard charging, the cell was placed in $-10^{\circ}\text{C} \pm 2^{\circ}\text{C}$ a cold box thermostat 4h, then of 0. The 2 discharged to a final voltage C.
8	Charge retention	The remaining capacity ≥ 205 mAh Recovery capacity ≥ 110 mAh	After standard charging , the battery is left open for 28 days at an ambient temperature of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, and then discharged at 0.5°C to an end-of-discharge voltage at an ambient temperature of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$. Then perform standard charging, and then discharge at 0.5C to the end-of-discharge voltage at an ambient temperature of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ (can be cycled for 3 weeks).
9	Storage	≥ 205 mAh	At an ambient temperature of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, the battery is charged with a capacity of 40% to 45% using 0.5C, and then stored at $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and a relative humidity of 45% to 85% for 12 months. Charge the battery as standard, and then discharge it at 0.2C to an end voltage at an ambient temperature of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ (the above charge and discharge test can be cycled 5 times).



5.2 safety performance

Serial number	project	standard	Test Methods
1	Normal temperature short circuit performance	No explosion, no fire Maximum surface temperature $\leq 150^{\circ}\text{C}$	Under the ambient temperature of $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$, short-circuit the positive and negative electrodes of the standard charged battery connected with a thermocouple, the total resistance of the line is not more than $100\text{m}\Omega$, short the connection for 24 hours or the surface temperature returns to not higher than the ambient temperature of 10°C To end the experiment.
2	High temperature short circuit performance	No explosion, no fire Maximum surface temperature $\leq 150^{\circ}\text{C}$	Under the ambient temperature of $55^{\circ}\text{C} \pm 2^{\circ}\text{C}$, short-circuit the positive and negative electrodes of the standard charged battery connected with a thermocouple, the total resistance of the line is not more than $100\text{m}\Omega$, short the connection for 24 hours or the surface temperature returns to not higher than the ambient temperature of 10°C To end the experiment.
3	Overcharge performance	No explosion, no fire	At an ambient temperature of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, the battery is discharged to the end voltage at 0.5C, then charged to 4.60V at the current of 0.5C, and then transferred to constant voltage charging to the cut-off current or charge for 8 hours, and the failure mode and failure occurrence are recorded time.
4	Forced discharge performance	No explosion, no fire	At an ambient temperature of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ order of 0. The . 5 C constant current discharge to the termination voltage, and reverse current charging at 0.5C 90min ..



5.3 environmental adaptability

Serial number	project	standard	Test Methods
1	Temperature cycling	No fire No explosion No leakage	After the battery is fully charged according to the experimental standard charging system, place the battery in a temperature-controlled cabinet at $20\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$, and perform the following steps. a: Place the sample in a test chamber with a temperature of $75\pm 2^{\circ}\text{C}$ to maintain 6H. b: After that, reduce the temperature of the test chamber to $-40\pm 2^{\circ}\text{C}$ and keep it for 6H, and the temperature conversion time is not more than 30min. c: The temperature of the test chamber is raised to $75\pm 2^{\circ}\text{C}$ again, and the temperature conversion time is not more than 30min. d: Repeat steps a)-c) for a total of 10 times .
2	Vibration experiment	No leakage Not broken No fire No explosion Voltage $\geq 4.2\text{V}$	After standard charging, install it directly or install it on the vibrating table through a jig, adjust the test equipment according to the following vibration frequency and corresponding amplitude, X, Y, Z three directions from 10Hz-55Hz cycle sweep frequency vibration 30min, sweep Frequency rate is 1oct/min; Vibration frequency: 10Hz-30Hz Displacement amplitude (single amplitude): 0.38mm Vibration frequency: 30Hz-55Hz Displacement amplitude (single amplitude): 0.19mm
3	fall	No fire No explosion	After standard charge, according to the drop in free fall height of 1m concrete plate, each face of the battery for each drop, a total of 6 experiments performed



4	Extrusion performance	No explosion No fire	The two faces of the battery after charging is placed between the standard pressing table, the battery is pressurized to a pressure of $13.0 \text{ N} \pm 0.78 \text{ k N}$, pressing pressure can be stopped upon reaching a maximum value
5	Hot abuse	Within 30 minutes , No explosion No fire	The standard charged battery is heated in a strong convection oven. The temperature of the oven rises from room temperature to $130^{\circ} \text{ C} \pm 2^{\circ} \text{ C}$ at a rate of $(5 \pm 2)^{\circ} \text{ C/min}$, and the temperature is kept constant at this temperature for 0.5 hours. Record Failure mode and failure occurrence time.
6	Heavy impact performance	No explosion No fire	Place the standard recharged battery on a flat surface, and place a $\Phi 3.0 \text{ mm}$ steel column in the center of the battery (the longitudinal axis of the steel column is parallel to the plane, so that a heavy 9.1 kg weight falls freely from the height of 610 mm above the center of the battery On the steel column.
7	Combustion injection	After the experiment, the battery part shall not be penetrated by the aluminum mesh (except for dusty products) or the entire battery shall not penetrate the aluminum mesh .	<p>After the battery is fully charged according to the specified standard charging method, the battery is placed on the steel wire mesh of the experimental tooling, and the battery is heated with flame. The following three conditions occur to stop heating.</p> <ol style="list-style-type: none"> 1 , battery to explode. 2 , the battery complete combustion . 3 , heating was continued for 30 minutes, but the battery is a fire, unexploded .



8	Low air pressure	No leakage Not broken No fire No explosion	After charging the batteries with the standards, is placed in the vacuum tank 20 ± 5 °C, the vacuum tank to reduce the pressure to 11.6kP A , and 6H kept .
9	Acceleration shock	No fire No explosion No leakage	After the battery is fully charged according to the specified method, it is fixed on the impact table and the semi-sinusoidal pulse impact test is carried out. Within the first 3ms, the minimum average acceleration is 75gn, the peak acceleration is $150gn \pm 25gn$, and the pulse duration is $6ms \pm 1ms$ The battery is subjected to three acceleration experiments in each direction, and the soft pack battery is sequentially subjected to impact experiments in three mutually perpendicular directions .

6. Standard test environment

Temperature: 25 ± 2 °C , relative humidity: $45 \pm 20\%$ (unless otherwise required)

7. Storage and transportation requirements

Battery or battery pack should be stored at ambient temperature of 0 deg.] C. 3 ~ 0 deg.] C, relative humidity less than 75% of the clean, dry, ventilated room, to avoid contact with corrosive substances, away from fire and heat.

Batteries or battery packs should be packed and transported in boxes . During transportation, they should be protected from severe vibration, shock or squeezing to prevent sun and rain.



8. Warning and attention

1) It is forbidden to put the battery in water, and it should be placed in a cool and dry environment during storage.

2) It is forbidden to use in moxibustion hot sunlight, otherwise it may cause battery overheating, fire or function failure.

3) It is forbidden to disassemble, open, shred or pierce the battery or battery pack with metal.

4) It is forbidden to expose the battery or battery pack to a heat source or flame, and it is forbidden to put the battery into the fire to avoid storage under direct sunlight.

5) It is forbidden to short-circuit batteries or battery packs. Do not leave multiple batteries in boxes or drawers at will to avoid short-circuiting each other or being short-circuited by other metal objects.

6) Do not subject the battery or battery pack to mechanical shock.

7) Once leakage occurs, do not directly contact the skin or eyes with the leaked liquid. If contact occurs, flush the contact area with plenty of water.

8) Do not use non-dedicated charging, please follow the manufacturer's instructions when charging.



9) "+ positive tab" Note that the battery pack and " - negative electrode ear" mark to ensure correct operation.

10) Keep the battery pack clean and dry.

11) If the battery pack becomes extremely dirty, wipe it with a clean and dry cloth.

12) Do not charge the battery pack for a long time.

13) The best use effect and service life can be obtained by charging or discharging the battery or battery pack at 15°C~25°C.

14) Save the original instructions of the product for future reference.

15) Dispose of used batteries or battery packs in accordance with national environmental protection laws.

9. Other matters:

1) If the customer needs to use the battery in a device that exceeds the requirements of the document, or uses the battery under the conditions of use other than those specified in the document, he should contact " Haobo " in advance , because specific experimental tests are required to verify that the battery is under the conditions of use Performance and safety.



2) " Flexible Power " is not responsible for any accidents caused by using the battery under conditions other than those specified in the document .

3) If necessary, " Haobo " will inform the customer in writing about the improvement measures for the correct operation and use of the battery. Any matters not mentioned in this manual must be determined through consultation between the two parties.

4) The information contained in this document (including changes made without prior notice) is for reference only and cannot be used as a warranty or statement of quality . For unfinished matters, please consult the nearest " Haobo " marketing office or distributor.

5) The supplier reserves the right to revise and improve the design, model and specifications without prior notice.

10. Version control

version	date	Modify description	Modified by
V1.0	20190702	First edition	Li Bei