Product Specification

of 314Ah Prismatic Cells

Model：SBP-01-3140

Prepared	Checked	Checked	Checked	Checked	Approved
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1 General

1.1 Requirement for Confidentiality

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1.2 Scope of application

The purpose of this document is to specify the size, specification, performance, storage and transportation precautions. This document is only appropriate to SBP-01-3140 batteries manufactured by SEVB.

1.3 Terms and Definition

Terms	Definition
SEVB	SEVB
Product	The SBP-01-3140 prismatic batteries manufactured by SEVB
Client	The customer who buy the product described in this < product specification >
Ambient temperature	25 ± 2℃
cell temperature	Means the temperature of the cell measured by the temperature sensor connected to the large surface of cell

nominal capacity	Means the minimum discharge capacity at 0.5CP, after fully charged by standard charge method in BOL state.
nominal voltage	Means the ratio of the energy to capacity by standard discharge measurement.
Standard Charge	The default charging method set out in paragraph 4.1.1
Standard Discharge	The default discharging method set out in paragraph 4.1.2
SOC	State of Charge
BOL	Beginning of life
EOL	End of life
CC	Constant current
CV	Constant voltage
CP	Constant power
C_0	C_0 is cell real capacity, which is calculated by several times charge/discharge cycling, and CP will change with C_0. For example, when the cell real capacity is 314Ah, C_0 is 314 Ah, and CP is 1004.8W (1004.8W=314A*3.2V); when the cell decay to 251.2Ah, C_0 is 251.2Ah, and CP is 803.8W (803.8W=251.2A*3.2V).
Unit	“V”（Volt）
	“A”（Ampere）
	“Ah”（Ampere-Hour）
	“Wh”（Watt-Hour）
	“mΩ”（MilliOhm）
	“Hz”（Hertz）

2 Battery Dimension

Battery dimension	Thickness	Width	Height	Height (including
	71.53±0.50 mm	174.30±0.50 mm	204.33±0.50 mm	206.90±0.50 mm

3 Specification

No.	Terms	Specification
1	cell type	Theprismatic battery with high
2	（0.5CP）nominal capacity	314 Ah，(within 1 month)
3	（0.5CP）nominal voltage	3.2 V
4	cell weight	5.6±0.1 Kg

5	V Cut-off Voltage		3.65 V
6	End-off Voltage	T＞0℃	2.5 V
		T≤0℃	2.0 V
7	standard charge power		0.5 CP
8	max continuous charge power		0.5 CP
9	standard discharge power		0.5 CP
10	max continuous discharge power		0.5 CP
11	1kHz，50%SOC）Impedance		≤ 0.23 mΩ
12	charge temperature		0℃~ 60℃
13	discharge temperature		-30℃~ 60℃
14	storage temperature		-40℃~ 60℃
15	the optimum working temperature		25℃~ 35℃
16	residual capacity loss (the first 3 month at BOL state)		per month ≤ 2%

4 Product Performance

The cells for test should be the ones manufactured less than one month and cycled less than five times. The test should be processed in the condition of humidity of (65 ± 20) % RH and atmospheric pressure of 86-106 kPa. There is a certain amount of preload force applied on the surface of cells to assemble the cells to a pack. The range of the force is 500~3000N, and the recommended preload force is 3000N with the tolerance of ±200N.

Swelling force will increase with cells operating. Under the test condition that the initial preload force of ≥10mm steel plate test fixture on the surface of cells is (3000±200)N, the swelling force for cells is about 40000N when the cells fade to 70%SOH. Customers should consider the reliability of structural strength of the pack system to design the application scenarios of products. Customers should consult sunwoda about the mechanical properties of the cell and pack system. If customers fail to consult, sunwoda will not be responsible for any quality or safety problems for the products.

4.1 Standard Cycle Method

4.1.1 Standard Charge power

Constant power charge: The charge rate is 0.5CP, corresponding to battery energy 1004.8Wh and charge power of 502.4W.

4.1.2 Standard Discharge power

Constant power discharge: The discharge rate is 0.5CP, corresponding to battery energy is 1004.8Wh and to charge power is 502.4W.

4.2 Different Temperature Performance

No.	Terms	Test Step	Specification
1	Capacity@ room temperature	At room temperature, 0.5CP constant power charge to 3.65V, rest 30min; then 0.5CP constant power discharge to 2.5V. Record the final discharge capacity.	≥314 Ah
2	Capacity@55 ℃	At room temperature, 0.5CP constant power charge to 3.65V, rest 30min; then put the cell under 55±2℃ for 4h; 0.5CP constant power discharge to 2.5V. Record the final discharge capacity.	discharge capacity @ 55℃/ discharge capacity @ room temperature≥90%
3	Capacity@-20℃	。At room temperature, 0.5CP constant power charge to 3.65V, rest 30min; then put the cell under -20±2℃ for 6h; 0.5CP constant power discharge to 2.0V. Record the final discharge capacity.	discharge capacity @ -20℃/ discharge capacity @ room temperature≥80%

4.3 Rate Performance

No.	Terms	Test Step	Specification	
1	Rate energy	。 At room temperature, 0.5CP constant power charge to 3.65V, rest 30min; then discharge the cell to cut-off voltage at different rate. Record the final discharge energy.	Discharge rate	Ah %
			0.25CP	≥100%
			0.5 CP	100%
			1.0 CP	≥98.0%

4.4 Charging Capacity

No.	cell temperature	max continuous charge power
1	T＜0℃	0 CP
2	0℃≤ T＜5℃	0.05 CP
3	5℃≤ T＜10℃	0.1 CP
4	10℃≤ T＜15℃	0.2 CP
5	15℃≤ T ≤ 20℃	0.3 CP
6	20℃≤ T＜25℃	0.5 CP
7	25℃≤ T＜35℃	0.5 CP
8	35℃≤ T ≤ 45℃	0.5 CP
9	45℃≤ T ≤ 50℃	0.5 CP
10	50℃≤ T≤ 60℃	0.5 CP
11	>60℃	0 CP

4.5 Cycle Performance

No.	Terms	Test Step	Specification
1	Storage performance	At 25±2℃, charge the cell to 3.65V at 0.5CP constant power, rest 30min; discharge the cell at 0.5CP to 2.5V. Record the initial discharge capacity. Put the cell under room temperature for 28 days, and then charge the cell at 0.5CP constant power to 3.65V, rest 30min, then discharge the cell at 0.5CP constant power to 2.5V. Record the recovery discharge capacity.	Recovery capacity ratio≥98%
2	(25±2℃) (0.5P /0.5P)	At 25±2℃ and 300kgf clamp force, charge the cell to 3.65V at 0.5CP constant power, rest 30min, then discharge at 0.5CP to 2.5V, rest 30min. Keep cycling to the capacity of battery reach to 80% nominal capacity.	≥6000 times

4.6 Safety Performance

No.	Terms	Test Step	Specification
1	Overdischarge test	At room temperature，discharge the cell to 2.5V at 0.5CP constant power, rest 10min., then discharge the cell at 0.5C for 90 min or until the voltage up to 0V, rest and observe 1h.	No fire, No explosion, No rupture outside vent
2	Overcharge test	At room temperature, charge the cell to 3.65V at 0.5CP constant power, rest 10min, then still charge the cell at 0.5C until the voltage up to 1.5*cut-off voltage or the charging time up to 1h, rest 1h.	No fire, No explosion, No rupture outside vent

3	Short Circuit	At room temperature, charge the cell to 3.65V at 0.5CP constant power, rest 10min, link the cathode and anode electrode with external line (resistance less than 1 mΩ) for 10min, rest 1h.	No fire, No explosion, No rupture outside vent
4	Drop	At room temperature, charge the cell to 3.65V at 0.5CP constant power, rest 10min. Fall down the cell from 1.5m height to cement floor, keeping its cathode and anode terminals pointing downwards. Rest 1h.	No fire, No explosion, No rupture outside vent
5	Adiabatic heating	At room temperature, charge the cell to 3.65V at 0.5CP constant power, rest 10min. Heat the cell in adiabatic apparatus to 40℃, rest 5h, then continue heating the cell by the step of 5℃ (with 1h rest) to 130℃, and keep 20min.	No fire, No explosion, No rupture outside vent
6	Crush	At room temperature, charge the cell to 3.65V at 0.5CP constant power, rest 10min. Crush the cell as following condition: Crush direction: be perpendicular to the main cell plate; Shape: half-cylinder with 75mm radius, and its length should be longer than the width of cell; Crush speed: 5±1 mm/s; Crush level: Stop crushing when the extrusion force is up to 50kN, then keep the cell at such condition for 10min, rest 1h.	No fire, No explosion, No rupture outside vent

7	High rate	At room temperature, discharge the cell to 2.5V at 0.5CP constant power, rest 10min, cell charge at 2CP to 3.65V, rest 10 min, and then discharge at 2CP to 2.5V, rest 1h.	No fire, No explosion, No rupture outside vent
8	Thermal runaway	At room temperature, charge the cell to 3.65V at 0.5CP constant power, rest 10min. Charge the cell at 0.5C while heat the cell by flat or bar shaped heater with the highest power. When the thermal runaway is triggered or the temperature of monitoring point has been higher than 300℃ or heating for 4h, turn off the heating equipment and stop charging, and record test data.	No fire, No explosion, No rupture outside vent

5 Storage and Transportation

5.1 Storage Requirement

At 10%RH~90%RH relative humidity, the ambient temperature for battery storage should be -40℃~60℃, during which -10℃~35℃ is recommended. The battery should avoid corrosive material and magnetic environment. The battery should be storage at clean, dry, and ventilated atmosphere, keeping away from fire source and heat source.

5.2 Transportation Requirement

During transportation, protect the cell from vigorous shaking, impact, sun and rain, and make sure do not invert the cell to avoid short circuit. During loading and unloading, the cell should be lightly move to avoid throw, roll, pressing, and inversion. Keep the cell with 10%~40%SOC during transportation.

6 Operation Specification

6.1 Operation precaution

6.1.1 Overcharging, overdischarging and reverse charging should be strictly prohibited.

6.1.2 Do not short circuit the cathode and anode terminals, otherwise high current and temperature may cause fire hazards and even explosion.

6.1.3 Do not immerse cells into sea or any water. When the cells are not in use, keep them into cool and dry environment

6.1.4 During operating, the cells should avoid to be squeezed, dropped, crashed, and external short-circuit.

6.1.5 Do not operate or storage the cell outside the specific temperature range in this specification, otherwise it may cause the batteries becoming overheating, firing, invalid or life span shorting.

6.2 Operation Cautions

6.2.1 This specification should be particularly read and understand before operating the batteries.

6.2.2 The batteries should storage and use away from static electricity, heat source, fire source.

6.2.3 Keep the cell surface cleaning, and avoid cell function failure due to poor contact.

6.2.4 During operating and storage period, if the cell emits peculiar odor; overheats; discolors; deforms, or any abnormality occurs, it should be immediately stopped using and removed from the devices.

6.2.5 If the electrolyte leaks and enters into eyes, please do not rub the eye. Wash the eyes with clean water and then go to see a doctor immediately, otherwise the eyes will be hurt.

6.2.6 Avoid short circuit due to cathode and anode terminals directly connect during manufacturing and packing process,

7 Others

7.1 If customers need to operate or apply cells in the condition beyond this specification, please consult SWD for details at first. The company is not responsible for any accident if the cells are not operated as the conditions specified in this document.

7.2 The company is not responsible for the event due to mismatch of cell with module or battery systems.

7.3 After delivery, the defective cells during processing and assembly process by customers are not within the scope of quality assurance.

7.4 It should be discharged to 2.0V when the cell reaches the EOL state. The cell should be recovered, disassembled and applied further disposal by a professional organization.