

Product Performance Test Report

(Improved safe and reliable high-temperature battery suitable for oil and gas exploration) Product model: ER14250SM-150



Directory

I. Product specification range -----	2
II. Product Information -----	2
III. General electrical performance -----	2
IV. Appearance and structure -----	3
V. Product performance -----	3
VI. Safety performance and environmental testing -----	4-5
VII. Product Identification -----	6
VIII. Shipping inspection -----	6
IX. Product Storage -----	6
X. Product Safety -----	7
XI. Product transportation -----	7
XII. Product size diagram -----	7

I. Specification range

This document specifies the electrical performance, specifications, quality, structure, appearance, testing methods, working performance, and product assurance of ER14250SM-150 high-temperature batteries supplied by POWER STABILITY.

II. Product Information

Electrochemical composition	Model
lithium sulfite chloride battery	ER14250SM-150

III. General electrical performance

NO.	Project	Characteristic	Remarks
1	Model	ER14250SM-150	Half wound battery
2	Nominal voltage	3.6V	36K Ω (0.1mA) load, tested at+20°C
3	Nominal capacity	800mAh	3600 Ω (1mA) discharge,+20°C, cut-off voltage 2.0V. The capacity varies depending on the size of the load, temperature, and cutoff voltage.
4	Recommended maximum continuous current	50mA	Maintain a capacity of over 80%,+20°C, and a cut-off voltage of 2.0V. Allow for higher current,please consult our company.
5	Operating temperature range	-40°C / +150°C	Working temperatures outside of room temperature may lead to a decrease in capacity and operating voltage. Please consult our company.
6	Self discharge rate	<2%	Annual self discharge rate for storage at room temperature+20 ° C
7	Overall dimensions (maximum)	Φ 14.25mm (H)25.25mm	Refer to product dimension drawing
8	Standard weight	10g	-----
9	Battery capacity	4.2cm ³	-----

IV. Product appearance and structure

Exterior	Structure
No scratches, rust, deformation, leakage, or any manufacturing defects.	The internal structure of ER14250SM is semi wound. The sealing adopts glass terminal compression technology. Under standard nitrogen pressure, the leakage rate is $\leq 10^{-7}$ atm.cc/sec

V. Product performance

(standard data for products stored at room temperature not exceeding +30°C for 1 year)

NO.	Project	Test conditions (Temperature)	Battery stored at room temperature for 1 year
1	Open circuit voltage (OCV)	(Room) +20°C ±2°C	3.68V±0.05V
		(High) +100°C ±2°C	3.68V±0.05V
		(High) +145°C ±2°C	3.68V±0.05V
2	Load voltage: 330 Ω load for 3 seconds, +20 ° C	330 Ω load for 3 seconds	≥3.15V
3	Working voltage: 330 Ω load continuous discharge, cut-off voltage 2.0V, placed upright.	(Room) +20°C ±2°C	≥3.30V
		(High) +100°C ±2°C	≥3.30V
		(High) +145°C ±2°C	≥3.30V
4	Working hours, 330 Ω load continuous discharge, cut-off voltage 2.0V, placed upright.	(Room) +20°C ±2°C	≥0.60Ah (60.0h)
		(High) +100°C ±2°C	≥0.65Ah (65.0h)
		(High) +145°C ±2°C	≥0.65Ah (50.0h)
5	Nominal capacity, 3600 Ω load continuous discharge, cut-off voltage 2.0V, placed upright.	330 Ω load for 3 seconds	≥3.15V
6	Electrolyte leakage test	No leakage	

VI. Safety performance and environmental testing

VI.I Environmental testing

VI.I.I Thermal cycling test

Place the battery in the experimental box and perform the following cycle: increase the temperature inside the box to $70\pm 3^{\circ}\text{C}$ within 30 minutes, and maintain it for 4 hours. Then lower the temperature to $20\pm 3^{\circ}\text{C}$ and hold for 2 hours. Reduce the temperature to $-40\pm 3^{\circ}\text{C}$ and hold for 4 hours. Then increase the temperature to $20\pm 3^{\circ}\text{C}$ within 30 minutes. This is a cycle, repeated 10 times.

Qualification criteria: The battery shall not leak, ignite, or burst.

VI.I.II Low voltage (high simulation) test

The test sample is kept at a temperature of $20\pm 3^{\circ}\text{C}$ and an absolute pressure of 11.6 kPa (1.68 psi) for 6 hours.

Qualification criteria: The battery shall not leak, ignite, or burst.

VI.I.III Heating test

Place the test sample in a gravity convection heating furnace or a thermal cycling drying furnace for heating. Heat at a rate of $5\pm 2^{\circ}\text{C}$ per minute to $145\pm 2^{\circ}\text{C}$ and hold for 10 minutes.

Qualification criteria: The battery shall not leak, ignite, or burst.

VI.II Mechanical performance testing

VI.II.I Free fall

According to IEC standards, each side of the battery must drop from a height of 1 meter to the cement floor twice, a total of 6 times.

Qualification criteria: The battery shall not leak, ignite, or burst.

VI.II.II Vibration test

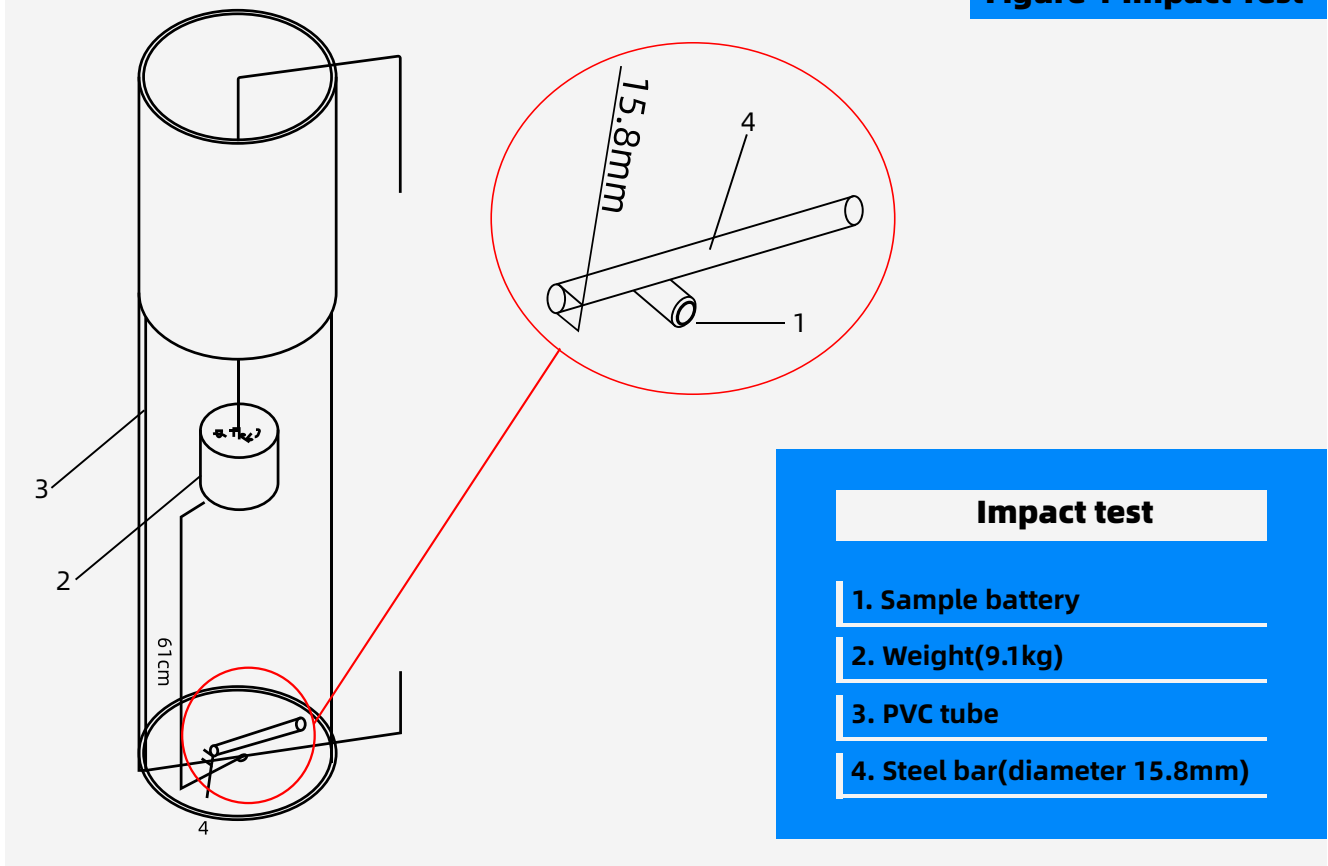
The vibration frequency of the battery varies by 1 Hz per minute between 10 and 55 Hz, with a maximum of 90 minutes, tested on three sides.

Qualification criteria: The battery shall not leak, ignite, or burst.

VI.II.III Impact testing

Place the sample on the platform. A 5/8 inch (15.8 mm) diameter iron rod is placed at the center of the battery. One A weight of 20 pounds (9.1 kilograms) falls freely from a height of 24 ± 1 inch (610 ± 25 mm) onto a round rod.

Qualification criteria: The battery shall not ignite or burst.

Figure 1 Impact Test**VI.II.IV Impact testing**

The sides of the sample battery are fixed on the testing platform, and each sample is subjected to three equally strong impacts. The three vertical sides of the sample are also tested. If there are only two symmetrical axes, only two sides are tested. Each impact directly affects the surface of the battery. Each impact accelerates the battery to a minimum of 75G (G is the gravitational acceleration value) within the first three millionths of a second. The peak acceleration should be between 125G and 175G, and the test temperature should be $20 \pm 5^\circ\text{C}$.

Qualification criteria: The battery shall not leak, ignite, or burst.

VI.II.IV Impact testing

Place the two flat surfaces of the lithium battery in the center of the hydraulic press shaft, with a diameter of 1.25 inches (32mm) for extrusion. Slowly apply force and observe the pressure gauge reading. Apply pressure to 3000 pounds (1300Kg) and hold for 1 minute.

Qualification criteria: No fire or burst.

VI.III Ultra standard usage testing

This type of test is only for demonstration purposes. Any excessive use or abuse of batteries should be strictly prohibited. Due to the consequences of using batteries beyond the standard, our company does not assume any responsibility.

VI.III.I Short circuit test

Connect the positive and negative electrodes of the battery with wires not exceeding 0.1 Ω and discharge until the battery catches fire, explodes, or completely discharges to 0.1V, and the battery temperature returns to +10°C.

Qualification criteria: No fire or burst.

VI.III.II Abnormal charging test

The battery is charged by a DC power source at a temperature of 20°C, with a charging current of 3 times the rated charging current. The charging time for each time is as follows: $(2.5 * \text{rated battery capacity}) / (3 * \text{rated charging current})$ The rated charging current of R14250SM-150 is 0.010A. Each charging time should be at least 7 hours.

Qualification criteria: No fire or burst.

VI.III.III Forced discharge test

Use a completely emptied battery in series with a fully charged single battery to force discharge. The number of fully charged single batteries is less than the number of batteries in the battery pack.

Qualification criteria: No fire or burst.

VII. Product identification**VII.I Environmental testing****I. Model****II. Nominal voltage****III. Positive and negative pole identification****IV. Upper temperature limit****V. Batch number****VI. Producing area****VIII. Shipping inspection**

Before shipment, the factory conducts a 100% inspection of the battery OCV open circuit voltage, 330 Ω load voltage, and product appearance. At the same time, samples are randomly inspected to test the capacitance and size of the product. Currently, the sampling standards implemented by the factory are GE32828.1-2003 and GB2829-2002. Sampling standards proposed by customers can also be followed.

IX. Battery storage

Our company's lithium batteries should be stored in a clean and dry environment, with a temperature not exceeding +30°C and a humidity not exceeding 70%. Avoid contact with conductive materials and corrosive substances, and stay away from heat sources and high temperatures. High or low storage temperatures can affect capacitance and starting voltage.

X. Security

X.I Precautions for using batteries

Before use, keep the battery in its original inner packaging

Isolate and place scattered batteries to avoid short circuits

The working environment temperature of the battery should not exceed 150°C

Unable to charge the battery

Do not directly solder or solder on the battery casing

New batteries cannot be assembled together with used batteries or batteries of different brands

Unable to disassemble battery

Do not burn batteries or immerse them in water

Cannot use positive and negative poles in reverse

X.II Design assistance

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XI. Transport

The ER14250SM-150 high-temperature lithium battery has been tested by a qualified independent agency and meets the UN Manual of Tests and Criteria, Part III, subsection 38.3 (Document No.: ST/SG/AC.10.11/Rev 6th)

The lithium metal content of ER14250SM-150 is less than 1 gram. According to the United Nations Recommendations on the Transport of Dangerous Goods Model Regulations - Document No.: ST/SG/AC.10/1- Rev 16th, there are no transportation restrictions for the ER14250SM-150 battery.

XII. Product size diagram (without any external components or components)

Dimensions in mm

