



中国认可  
国际互认  
检测  
TESTING  
CNAS L0095

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No.: GJW2017-0490

# 检测报告

## TEST REPORT

NAME OF SAMPLE: Li/SOCl<sub>2</sub> Battery

CLIENT: EVE Energy Co., Ltd.

CLASSIFICATION OF TEST: Commission Test

**Vkan Certification & Testing Co., Ltd.**



# TEST REPORT

No.: GJW2017-0490

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Name of product: Li/SOCl <sub>2</sub> Battery	Trade mark: EVE
Type/Model: ER18505 3.6V 3.8Ah	Sample status: The sample's status is good.
Manufacturer: EVE Energy Co., Ltd.	Commissioned by: EVE Energy Co., Ltd.
Manufacturer address: NO.36,HuiFeng7thRoad,ZhongkaiHi-TechZone,HuiZhou,Guangdong,China	Commissioner address: NO.36,HuiFeng7thRoad,ZhongkaiHi-TechZone,HuiZhou,Guangdong,China
Quantity of sample: 65 cells	Sampled by: -
Sample identification: c1# ~ c65#	Sampling at (place): -
Means of receiving: Submitted by commissioner	Means of sampling: -
Classification of test: Commission Test	Sampling date: -
Receiving date: 2017-06-20	Completing date: 2017-07-13
Tested according to: IEC 60086-4:2014	Test item: All items

**Test conclusion:**

The Li/SOCl<sub>2</sub> Batteries submitted by EVE Energy Co., Ltd. are tested according to IEC 60086-4:2014 Primary batteries –Part 4: Safety of lithium batteries.

Test item: All items

Test result: The test results comply with the relevant requirements of the standard.



Seal of CVC

Date of issue: 2017-07-13

Approved by:

Lin Guorong

Reviewed by:

Zhang Siguo

Tested by:

Liu Zhen

Description and illustration of the sample:

-

Description of the sampling procedure:

-

Description of the deviation from the standard, if any:

-

Remarks:

-

### Photos and markings

Battery (ER18505 3.6V 3.8Ah)



IEC 60086-4:2014			
Clause	Requirement – Test	Result	Verdict
<b>6</b>	<b>Testing and requirements</b>		-
<b>6.4</b>	<b>Intended use</b>		-
<b>6.4.1</b>	<b>Altitude simulation</b>		P
	Test cells and batteries shall be stored at a pressure of 11,6kPa or less for at least six hour at ambient temperature until the battery is fully discharged.		P
	There shall be no mass loss, no leakage, no venting, no short-circuit no rupture, no explosion, and no fire during this test.	The test data see table 1.	P
<b>6.4.2</b>	<b>Thermal test</b>		P
	Test cells and batteries are to be stored for at least six hours at a test temperature equal to $75 \pm 2^{\circ}\text{C}$ , followed by storage for at least six hours at a test temperature equal to $-40 \pm 2^{\circ}\text{C}$ , The maximum time interval between test temperature extremes is 30 minutes, This procedure is to be repeated 10 times, after which all test cells and batteries are to be stored for 24 hours at ambient temperature, For large cells and batteries the duration of exposure to the test temperature extremes should be at least 12 hours.		P
	There shall be no mass loss, no leakage, no venting, no short-circuit no rupture, no explosion, and no fire during this test.	The test data see table 1.	P
<b>6.4.3</b>	<b>Vibration</b>		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 position of the cell, One of the directions of vibration must be perpendicular to the terminal face, The logarithmic frequency sweep is as follows: from 7 Hz a peak acceleration of 1 gn 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 8 gn occurs (approximately 50Hz), A peak acceleration of 8 gn is then maintained until the frequency is increased to 200 Hz		P
	There shall be no mass loss, no leakage, no venting, no short-circuit no rupture, no explosion, and no fire during this test.	The test data see table 1.	P
<b>6.4.4</b>	<b>Shock</b>		P

IEC 60086-4:2014			
Clause	Requirement – Test	Result	Verdict
	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 cell or battery. Each test cell or battery shall be subjected to 3 shocks in each direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks. For each shock, the test battery shall be accelerated in such a manner that during the first 3 milliseconds the minimum average acceleration is $75 g_n$ . The peak acceleration shall be between $125 g_n$ and $175 g_n$ . The test shall be conducted with undischarged batteries. The test shall be conducted using the batteries previously subjected to vibration test.		P
	There shall be no mass loss, no leakage, no venting, no short-circuit no rupture, no explosion, and no fire during this test.	The test data see table 1.	P
<b>6.5</b>	<b>tests for reasonably foreseeable misuse</b>		P
<b>6.5.1</b>	<b>External Short Circuit</b>		P
	The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches $5^{\circ}\text{C}$ and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0,1 ohm at $55^{\circ}\text{C}$ , This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to $55^{\circ}\text{C}$ , the cell or battery must be observed for a further six hour for the test to be concluded,		P
	There shall be no excessive temperature rise, no rupture, no explosion, and no fire during this test.	The test data see table 1.	P
<b>6.5.2</b>	<b>Impact</b>		N/A
	This test sample cell or component cell is to be placed on a flat surface, A 15,8 mm diameter bar is to be placed across the center of the sample, A 9,1kg mass is to be dropped from a height of $61 \pm 2,5\text{cm}$ onto the sample, A cylindrical or prismatic cell is to be impacted with its longitudinal axis of the 15,8 mm diameter curved surface lying across the center of the wide and narrow sides will subjected to the impact, Each sample is to be subjected to only a single impact, Separate samples are to be used for each impact	The cells less than 20 mm in diameter.	N/A
	There shall be no excessive temperature rise, no rupture, no explosion, and no fire during this test and within the 6h of observation		N/A
<b>6.5.3</b>	<b>Crush</b>		P

IEC 60086-4:2014			
Clause	Requirement – Test	Result	Verdict
	Each fully charged cell is crushed between two surfaces. The force for the crushing is applied by a hydraulic ram exerting a force of $13\text{kN} \pm 1\text{kN}$ . The crushing is performed in a manner that will cause the most adverse result. Once the maximum force has been applied, or an abrupt voltage drop of one-third of the original voltage has been obtained, the force is released.		P
	There shall be no excessive temperature rise, no explosion, and no fire during this test and within the 6h of observation	The test data see table 2.	P
<b>6.5.4</b>	<b>Forced discharge</b>		P
	Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12 V D,C, power supply at an initial current equal to the maximum discharge current specified by the manufacturer,		P
	There shall be no explosion and no fire during this test and the 7 days of observation	The samples c31#~c40#: no explosion and no fire.	P
<b>6.5.5</b>	<b>abnormal charging</b>		P
	The cell is discharged as described in IEC 61960, then charged from a power supply of $\geq 10\text{V}$ , at the charging current $I_{\text{rec}}$ , recommended by the manufacture, for $2.5 C_5 / 3I_{\text{rec}}$ h.		P
	There shall be no explosion and no fire during this test.	The samples c41#~c45#: no explosion and no fire.	P
<b>6.5.6</b>	<b>Free fall</b>		P
	Each fully charged cell or battery is dropped three times from a height of 1.0 m onto a concrete floor. The cells or batteries are dropped so as to obtain impacts in random orientations.		P
	There shall be no venting, no explosion and no fire during this test and within the 1h of observation	The samples c46#~c50#: no venting, no explosion and no fire.	P
<b>6.5.7</b>	<b>Thermal abuse</b>		P
	Each fully charged cell, stabilized at room temperature, is placed in a gravity or circulating air-convection oven. The oven temperature is raise 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 remains at this temperature for 10 min before the test is discontinued.		P
	There shall be no explosion and no fire during this test.	The samples c51#~c55#: no explosion and no fire.	P
<b>6.5.8</b>	<b>incorrect installation</b>		P
	the test battery shall then be connected in series with three undercharged additional batteries of the same type in reverse ,The circuit shall be completed for 24h or unit the battery case temperature has returned to ambient	The cell is spiral construction.	P

IEC 60086-4:2014			
Clause	Requirement – Test	Result	Verdict
	There shall be no explosion and no fire during this test.	The samples c56#~c60#: no explosion and no fire.	P
<b>6.5.9</b>	<b>Overdischarge</b>		P
	Each test battery shall be pre-discharged to 50% depth of discharge. It shall then be connected in series with three undischarged additional batteries of the same type	The cell is spiral construction.	P
	There shall be no explosion and no fire during this test.	The samples c61#~c65#: no explosion and no fire.	P

Table 1

Sample No.	Mass prior to test (g)	OCV prior to test (V)	Test 6.4.1: Altitude		Test 6.4.2: Thermal cycling		Test 6.4.3: Vibration		Test 6.4.4: Shock		Test 6.5.1: External Short Circuit
			Mass loss(%)	Change ratio	Mass loss(%)	Change ratio	Mass loss(%)	Change ratio	Mass loss(%)	Change ratio	Temp. (°C)
c1#	28,190	3,673	0,000	100,00	0,017	99,92	0,003	100,00	0,000	100,00	90,6
c2#	28,283	3,672	0,003	100,00	0,014	99,95	0,000	100,00	0,003	100,00	87,2
c3#	28,144	3,673	0,000	99,97	0,014	99,92	0,000	99,97	0,000	100,00	93,4
c4#	28,201	3,672	0,000	100,00	0,014	99,95	0,000	100,00	0,000	99,97	91,5
c5#	28,200	3,671	0,003	99,97	0,017	99,92	0,003	100,00	0,000	99,95	86,5
c6#	28,125	3,672	0,000	100,00	0,014	99,95	0,000	100,00	0,003	100,00	92,4
c7#	28,184	3,673	0,000	100,00	0,007	99,92	0,003	100,00	0,000	99,95	89,3
c8#	28,273	3,673	0,000	99,97	0,010	99,92	0,000	99,97	0,000	100,00	90,2
c9#	28,153	3,672	0,007	99,95	0,010	99,95	0,000	99,95	0,003	99,97	87,5
c10#	28,145	3,671	0,000	100,00	0,014	99,95	0,003	100,00	0,000	99,95	89,4
c11#	28,276	–	0,003	–	0,017	–	0,000	–	0,000	–	82,6
c12#	28,215	–	0,003	–	0,014	–	0,000	–	0,000	–	76,8
c13#	28,312	–	0,000	–	0,010	–	0,003	–	0,003	–	75,4
c14#	28,264	–	0,000	–	0,010	–	0,003	–	0,000	–	80,2
c15#	28,183	–	0,000	–	0,010	–	0,000	–	0,000	–	78,3
c16#	28,169	–	0,003	–	0,010	–	0,000	–	0,003	–	69,4
c17#	28,304	–	0,000	–	0,010	–	0,000	–	0,000	–	80,1
c18#	28,452	–	0,000	–	0,007	–	0,000	–	0,000	–	79,4

c19#	28,136	–	0,000	–	0,010	–	0,007	–	0,000	–	83,5
c20#	28,207	–	0,007	–	0,010	–	0,000	–	0,003	–	82,3

Table 2: Crush

Sample No.	c21#	c22#	c23#	c24#	c25#	c26#	c27#	c28#	c29#	c30#
OCV prior to test (V)	3,672	3,672	3,671	3,672	3,672	3,671	3,654	3,668	3,650	3,654
Temp. (°C)	49,6	52,3	29,6	48,4	36,8	50,4	47,2	45,3	41,5	38,4

## 注 意 事 项

### Important

1. 本报告无检测单位印章、骑封章无效。  
The test report is invalid without the official stamp of CVC and Paging seal of CVC.
2. 未经本试验室书面同意，不得部分地复制本报告。  
Nobody is allowed to photocopy or partly photocopy this test report without written permission of CVC.
3. 本报告无批准人、审核人及鉴定人签名无效。  
The test report is invalid without the signatures of Ratifier, Reviewer and Testing engineer.
4. 本报告涂改无效。  
The test report is invalid if altered,
5. 对检测报告若有异议，应于收到报告之日起十五天内向检测单位提出。  
Objections to the test report must be submitted to CVC within 15 days,
6. 本报告仅对送检样品负责。  
The test report is valid for the tested samples only.
7. 判定栏中“-”表示“不需要判定”，“P”表示“通过”，“F”表示“不通过”，“N/A”表示“不适用”。  
As for the Verdict, “-” means “no need for judgement”, “P” means “pass”, “F” means “fail” and “N/A” means “not applicable”.

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