

检测
CNAS L0095



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INSPECTION
CNAS IB 0011

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No.: GJW2016-0224-3

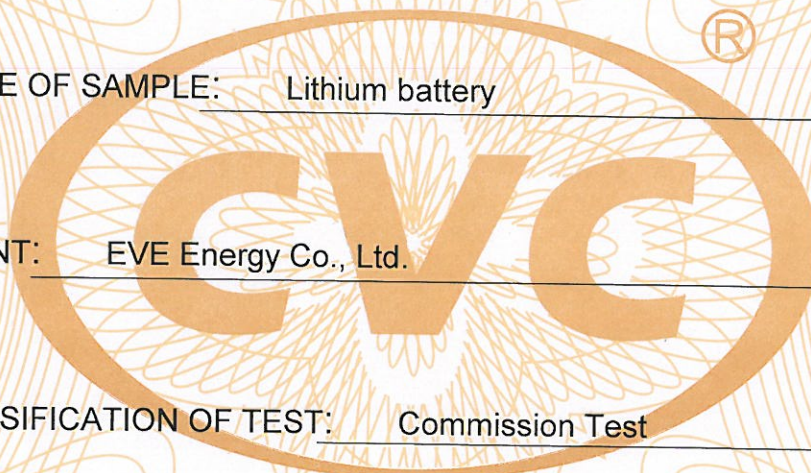
检验报告

TEST REPORT

NAME OF SAMPLE: Lithium battery

CLIENT: EVE Energy Co., Ltd.

CLASSIFICATION OF TEST: Commission Test




Vkan Certification & Testing Co., Ltd.

检验报告

TEST REPORT

No.: GJW2016-0224-3

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Name of product: Lithium battery	Trade mark: EVE
Type/Model: CR17450 3,0V 1500mAh	Sample status: Good
Manufacturer: EVE Energy Co., Ltd.	Commissioned by: EVE Energy Co., Ltd.
Manufacturer address: No.36 Seven road Huifeng, Zhongkai Hi-tech District, Huizhou, Guangdong, P. R. China	Commissioner address: No.36 Seven road Huifeng, Zhongkai Hi-tech District, Huizhou, Guangdong, P. R. China
Quantity of sample: 100 Pieces	Sampled by: by CCS
Sample identification: 1#-100#	Sampling at (place): Huizhou Guangdong
Means of receiving: Received by CVC	Means of sampling: Submitted by commissioner
Classification of test: Commission Test	Sampling date: April 26 th 2016
Receiving date: April 26 th 2016	Completing date: May 19 th 2016
Tested according to: IEC 60086-4:2014 Primary batteries-part 4: safety of lithium batteries and CR17450 Specification of EVE	Test item: 14 items
<p>Test conclusion:</p> <p>The Lithium Batteries submitted by EVE Energy Co., Ltd. are tested according to IEC 60086-4:2014 Primary batteries-part 4: safety of lithium batteries and CR17450 Specification of EVE.</p> <p>The test results of the items comply with the requirements of IEC 60086-4:2014 Primary batteries-part 4: safety of lithium batteries and CR17450 Specification of EVE.</p> <p style="text-align: center;">Seal of CVC: Date of issue: 2016.5.20</p> <div style="text-align: center;">  </div>	

Approved by:

Lin Guoming

Reviewed

Zhang Siyao

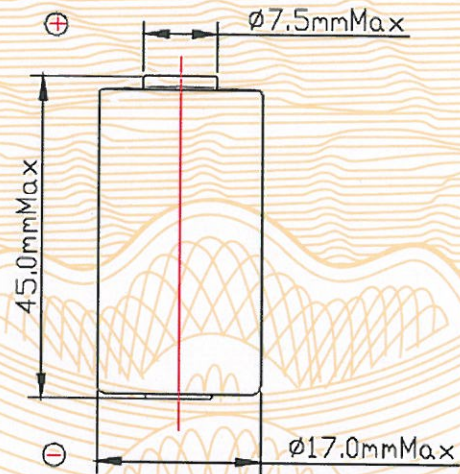
by:

Tested by:

Wei Guohua

Description and illustration of the sample:

The samples' status is good.
The lithium content of the CR17450 is 0.45g.
The design characteristics of CR17450 is as follows,



Description of the sampling procedure:

Description of the deviation from the standard, if any:

Remarks:

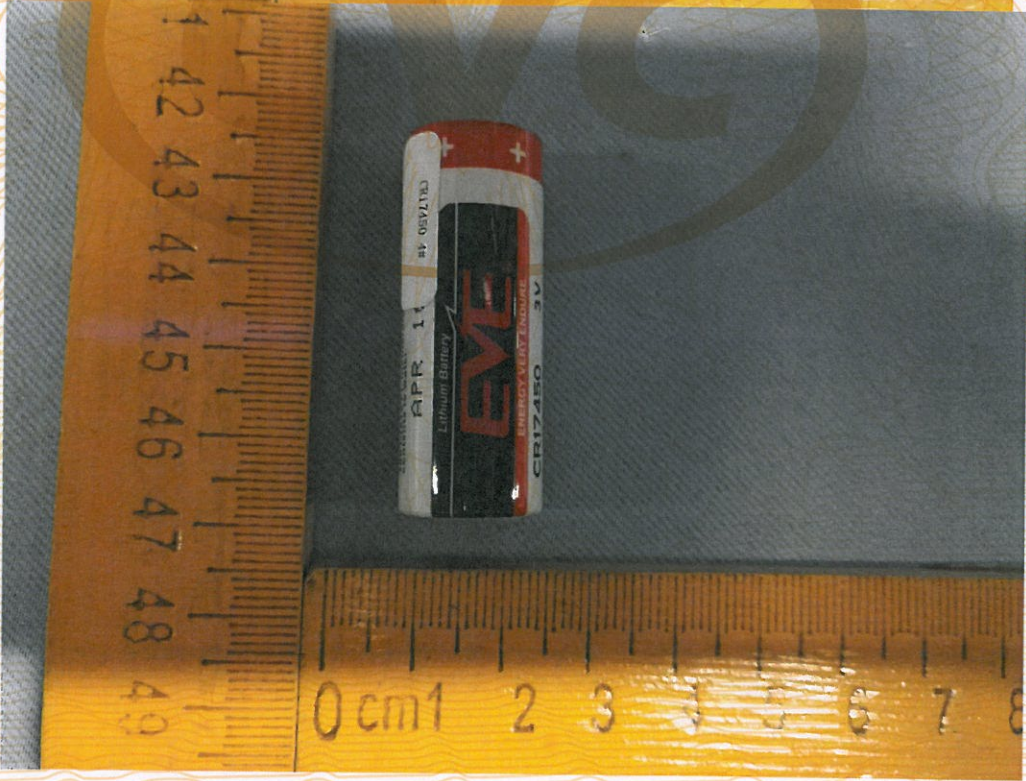
Throughout this report a comma is used as the decimal separator.

Photos and markings
CR17450 3,0V 1500mAh



Photos and markings

CR17450 3,0V 1500mAh



IEC 60086-4:2014 and Specification of EVE			
Clause	Requirement – Test	Result	Verdict
	Testing and requirements		P
1	Capacity		P
1.1	Normal capacity		
	The batteries are discharged as the CR17450 specification of EVE . The room temperature is $20 \pm 3^{\circ}\text{C}$,The battery connect to constant current of 5mA (CC) discharge and the end-point voltage is 2,0 V.	1#:2480mAh 2#:2476mAh 3#:2450mAh 4#:2460mAh	P
	Acceptance criteria: $\geq 2400\text{mAh}$	5#:2474mAh	
1.2	Typical capacity		
	The batteries are discharged as the CR17450 specification of EVE .The room temperature is $20 \pm 3^{\circ}\text{C}$,The battery connect to the of 560Ω load constant resistance(CR) discharge and the end-point voltage is 2,0 V.	6#:457h 7#:452h 8#:462h 9#:459h	P
	Acceptance criteria: $\geq 450\text{h}$	10#:460h	
2	Fast discharge		
	The batteries are discharged as the CR17450 specification of EVE . The room temperature is $20 \pm 3^{\circ}\text{C}$,The battery connect to the 50Ω load constant resistance(CR) and the end-point voltage is 2,0 V.	11#:35h 12#:34h 13#:33h 14#:34h 15#:33h	P
	Acceptance criteria: $\geq 32\text{h}$		
6.4.1	Altitude simulation		
	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.	31#-50#	P
	There shall be no mass loss, no leakage, no venting, no short-circuit no rupture, no explosion, and no fire during this test.	No mass loss, no leakage, no venting, no short-circuit no rupture, no explosion,	P
6.4.2	Thermal test		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.	31#-50#	
	There shall be no mass loss, no leakage, no venting, no short-circuit no rupture, no explosion, and no fire during this test.	No mass loss, no leakage, no venting, no short-circuit no rupture, no explosion,	P
6.4.3	Vibration		

IEC 60086-4:2014 and Specification of EVE			
Clause	Requirement – Test	Result	Verdict
	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	31#-50#	P
	There shall be no mass loss, no leakage, no venting, no short-circuit no rupture, no explosion, and no fire during this test.	No mass loss, no leakage, no venting, no short-circuit no rupture, no explosion,	P
6.4.4	Shock		
	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, Each cell or battery shall be subjected to a half-sine shock of peak acceleration of 150 gn and pulse duration of 6 milliseconds, Each cell or battery shall be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks	31#-50#	P
	There shall be no mass loss, no leakage, no venting, no short-circuit no rupture, no explosion, and no fire during this test.	No leakage, no venting, no short-circuit no rupture, no explosion,	P
6.5	tests for reasonably foreseeable misuse		
6.5.1	External Short Circuit		
	The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches 5°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°C, This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 55°C, the cell or battery must be observed for a further six hour for the test to be concluded,	31#-50#	P
	There shall be no excessive temperature rise, no rupture, no explosion, and no fire during this test.	No excessive temperature rise, no explosion, and no fire	P
6.5.2	Impact		

IEC 60086-4:2014 and Specification of EVE			
Clause	Requirement – Test	Result	Verdict
	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	51#-60#	P
	There shall be no excessive temperature rise, no rupture, no explosion, and no fire during this test and within the 6h of observation	No excessive temperature rise, no explosion, and no fire	P
6.5.4	Forced discharge		
	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	61#-70# No explosion and no fire	P
6.5.5	abnormal charging		
	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_{rec} , recommended by the manufacture, for $2.5 C_5 / 3I_{\text{rec}} \text{ h}$.	71#-75#	P
	There shall be no explosion and no fire during this test.	No explosion and no fire.	
6.5.6	Free fall		
	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	76#-80# No venting, no explosion and no fire	P
6.5.7	Thermal abuse		
	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.	81#-85#	P
	There shall be no explosion and no fire during this test.	No explosion and no fire.	

IEC 60086-4:2014 and Specification of EVE			
Clause	Requirement – Test	Result	Verdict
6.5.8	incorrect installation		
	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	86#-90#	P
	There shall be no explosion and no fire during this test.	No explosion and no fire.	
6.5.9	Overdischarge		
	5 pcs test battery shall be predischarged to 50% depth of discharge and 5 pcs predischarged to 75% depth of discharge respectively. It shall then be connected in series with three undischarged additional batteries of the same type , a 8Ω load resistance should be connected to the circuit for 24h or until the surface temperature of the test battery down to the room temperature.	91#-100#	P
	There shall be no explosion and no fire during this test.	No explosion and no fire.	P



Table1: T1~T5 / 表 1. 试验 1~试验 5

Sample No. 样品号	Mass prior to test / 试验前质量(g)	OCV prior to test / 试验前电压(V)	Altitude simulation/ 高度模拟		Thermal test/ 热冲击		Vibration/ 振动		Shock/ 冲击		External Short Circuit/ 外接短路
			Mass loss(%) 质量损(%)	Change ratio 试验前后开路 电压比(%)	Mass loss(%) 质量损(%)	Change ratio 试验前后开路 电压比(%)	Mass loss(%) 质量损(%)	Change ratio 试验前后开路 电压比(%)	Mass loss(%) 质量损(%)	Change ratio 试验前后开路 电压比(%)	
31#	22,278	3,240	0,000	100,00	0,018	99,98	0,000	100,00	0,000	99,97	89,0
32#	22,450	3,357	0,000	100,00	0,016	97,49	0,000	99,98	0,000	100,00	93,0
33#	22,208	3,256	0,000	100,00	0,012	100,57	0,000	100,00	0,000	100,00	93,7
34#	22,540	3,256	0,000	100,00	0,018	100,01	0,000	100,00	0,000	100,00	97,0
35#	22,908	3,255	0,000	100,00	0,018	100,10	0,006	100,00	0,000	99,98	88,0
36#	22,850	3,243	0,000	100,00	0,018	100,07	0,006	99,98	0,000	100,00	99,0
37#	22,780	3,271	0,000	100,00	0,012	100,20	0,000	99,98	0,000	100,00	97,0
38#	22,540	3,264	0,000	100,00	0,018	99,99	0,000	100,00	0,000	99,96	95,0
39#	22,470	3,260	0,000	100,00	0,018	99,98	0,006	99,97	0,000	99,97	97,0
40#	22,325	3,250	0,000	100,00	0,012	99,98	0,000	99,97	0,000	99,97	98,10
41#	22,230	-	0,000	-	0,012	-	0,000	-	0,000	-	83,0
42#	22,500	-	0,000	-	0,018	-	0,000	-	0,000	-	86,10
43#	22,366	-	0,000	-	0,015	-	0,000	-	0,000	-	87,2
44#	22,820	-	0,000	-	0,012	-	0,000	-	0,000	-	89,3
45#	22,298	-	0,000	-	0,09	-	0,000	-	0,000	-	99,0

46#	22,807	-	0,000	-	0,012	-	0,000	-	0,000	-	0,000	-	88,1
47#	22,450	-	0,000	-	0,012	-	0,000	-	0,000	-	0,000	-	88,9
48#	22,274	-	0,000	-	0,006	-	0,006	-	0,006	-	0,000	-	97,0
49#	22,640	-	0,000	-	0,006	-	0,006	-	0,006	-	0,000	-	93,0
50#	22,470	-	0,000	-	0,012	-	0,006	-	0,006	-	0,000	-	87,0

Table2: impact / 表 2 重物撞击

Test 6: Impact/测试 6: 撞击	Sample No. 样品号	51#	52#	53#	54#	55#	56#	57#	58#	59#	60#
	OCV prior to test / 试验前电压 (V)	3,254	3,260	3,260	3,254	3,260	2,570	2,712	2,722	2,721	2,690
Temp. (°C) 温度 (°C)	56,3	76,0	44,9	67,0	49,6	26,3	22,3	23,5	23,7	23,5	

Table3: Forced discharge / 表 3. 强制放电

Test 8: Overcharge/测试 8: 过充电	Sample No. 样品号	61#	62#	63#	64#	65#	66#	67#	68#	69#	70#
	OCV prior to test / 试验前电压(V)	3,254	3,277	3,269	3,265	3,274	3,276	3,264	3,265	3,265	3,268

注 意 事 项

Important

1. 本报告无检验单位公章、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. 对检验报告若有异议，应于收到报告之日起十五天内向检验单位提出。
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”表示“不适用”。
As for the Verdict,“-” means “no need for judgement”, “P” means “pass”, “F” means “fail” and “N” means “not applicable”.

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