

深圳市雄韬电源科技有限公司

SHENZHEN CENTER POWER CO., LTD

Center Power Industrial Park, Tongfu Industrial District Dapeng Town, 518120

Shenzhen, China Tel: +86-755-8431 8088 Fax: +86-755-8431 8038

RESEARCH & DEVELOPMENT DEPARTMENT

SHENZHEN CENTER POWER CO., LTD

UN38.3 Test Report

User:

Produce Name: Iron Phosphate Lithium-ion Battery

Submittal unit: Research & Development Department

Test by: FX Liao , Jun, 20, 2010

Checked by: GJ Hu , Jun, 21, 2010

Reviewed by: JJ Tu , Jun, 21, 2010

深圳市雄韬电源科技有限公司

SHENZHEN CENTER POWER CO., LTD

Test Report

Page 1/10

Sample name	Iron Phosphate Lithium-ion Battery V-LFP12V10Ah		
Submittal unit	Shenzhen Center Power CO., LTD		
Test method	United nations recommendations on the transport of dangerous Goods		
Judgment criteria	United nations recommendations on the transport of dangerous Goods		
Sample appearance	Blue square ABS container		
Date of test	2010/6/11-2010/6/20	Sample NO.	2010012
Test items	Altitude simulation, thermal test, vibration test, shock test, external short circuit, impact test, overcharge test, forced discharge test		
Test conclusion	Sample have passed the items of UN38.3 test		

深圳市雄韬电源科技有限公司

SHENZHEN CENTER POWER CO., LTD

Test Report

Page 2/10

No	Test items	Criteria requirement or criteria article No.	Test result	Conclusion	Remark
1	Altitude Simulation Test	United Nations Recommendations on the Transport of dangerous Goods(4 th) thereafter call “Manual of Tests and Criteria UN38.3(4 th)”for short, Test T.1	See attached table 1	pass	/
2	Thermal Test	Manual of Tests and Criteria UN38.3(4 th)”for short, Test T.2	See attached table 2	pass	/
3	Vibration Test	Manual of Tests and Criteria UN38.3(4 th)”for short, Test T.3	See attached table 3	pass	/
4	Shock Test	Manual of Tests and Criteria UN38.3(4 th)”for short, Test T.4	See attached table 4	pass	/
5	External Short Circuit	Manual of Tests and Criteria UN38.3(4 th)”for short, Test T.5	See attached table 5	pass	/
6	Impact test	Manual of Tests and Criteria UN38.3(4 th)”for short, Test T.6	See attached table 6	pass	/
7	Overcharge Test	Manual of Tests and Criteria UN38.3(4 th)”for short, Test T.7	See attached table 7	pass	/
8	Forced Discharge Test	Manual of Tests and Criteria UN38.3(4 th)”for short, Test T.8	See attached table 8	pass	/
Test environment condition	Ambience Temperature: $20 \pm 5^{\circ}\text{C}$				

深圳市雄韬电源科技有限公司

SHENZHEN CENTER POWER CO., LTD

Test Report-attached table 1

Page3/10

No.	1	Name of Test item		Altitude Simulation				
		Before test		After test		Mass loss/%	Residual voltage/%	Other phenom-en-on
Sample No.	Sample state	Mass/g	Open-circuit voltage/V	Mass/g	Open-circuit voltage/V			
1	First fully charged	1536.21	13.389	1536.12	13.381	0.01	99.94	O
2	First fully charged	1536.15	13.392	1536.10	13.387	0.01	99.96	O
3	First fully charged	1536.22	13.387	1536.20	13.389	0.00	100.00	O
4	First fully charged	1535.89	13.384	1535.84	13.387	0.01	100.00	O
5	First discharged	1536.14		3122.80		0.01		O
6	First discharged	1535.93		3123.40		0.00		O
7	First discharged	1534.95		3125.50		0.01		O
8	First discharged	1535.69		3127.30		0.01		O
9	fully charged 50cycles	1536.26	13.383	1536.21	13.379	0.01	99.97	O
10	fully charged 50cycles	1536.89	13.379	1536.84	13.375	0.00	99.97	O
11	fully charged 50cycles	1537.25	13.389	1537.23	13.388	0.00	99.99	O
12	fully charged 50cycles	1538.12	13.391	1537.15	13.384	0.01	99.95	O
13	discharged 50cycles	1536.86		3119.60		0.01		O
14	discharged 50cycles	1537.21		3200.20		0.01		O
15	charged 50cycles	1537.12		3111.30		0.00		O
16	discharged 50cycles	1536.59		3113.65		0.01		O

Remark: L-leakage; V-venting; D-disassembly; R-rupture ;F-fire ; O-no venting, no disassembly, no rupture and no fire

深圳市雄韬电源科技有限公司

SHENZHEN CENTER POWER CO., LTD

Test Report-attached table 2

Page4/10

No.	2	Name of Test item		Thermal Test				
Sample No.	Sample state	Before test		After test		Mass loss/%	Residual voltage/%	Other phenomenon
		Mass/g	Open-circuit voltage/V	Mass/g	Open-circuit voltage/V			
1	First fully charged	1536.89	13.386	1536.88	13.379	0.00	99.95	O
2	First fully charged	1536.82	13.379	1536.75	13.372	0.01	99.95	O
3	First fully charged	1536.89	13.378	1536.84	13.372	0.01	99.96	O
4	First fully charged	1537.21	13.385	1537.19	13.380	0.00	99.96	O
5	First fully charged	1536.91		1536.86		0.01		O
6	First fully charged	1535.62		1535.54		0.01		O
7	First fully charged	1536.25		1536.20		0.00		O
8	First fully charged	1537.25		1537.22		0.00		O
9	fully charged 50cycles	1536.84	13.387	1536.84	13.384	0.00	99.98	O
10	fully charged 50cycles	1536.24	13.390	1536.25	13.383	0.00	99.95	O
11	fully charged 50cycles	1536.82	13.382	1536.82	13.371	0.00	99.99	O
12	fully charged 50cycles	1538.20	13.385	1538.10	13.372	0.01	99.99	O
13	discharged 50cycles	1537.62		1537.62		0.00		O
14	discharged 50cycles	1536.21		1536.21		0.00		O
15	charged 50cycles	1537.35		1537.30		0.01		O
16	discharged 50cycles	1536.29		1536.28		0.00		O

Remark: L-leakage; V-venting; D-disassembly; R-rupture ;F-fire ; O-no venting, no disassembly, no rupture and no fire

深圳市雄韬电源科技有限公司

SHENZHEN CENTER POWER CO., LTD

Test Report-attached table 3

Page5/10

No.	3	Name of Test item		Vibration Test				
Sample No.	Sample state	Before test		After test		Mass loss/%	Residual voltage/%	Other phenomenon
		Mass/g	Open-circuit voltage/V	Mass/g	Open-circuit voltage/V			
1	First fully charged	1536.28	13.390	1536.20	13.384	0.01	99.96	O
2	First fully charged	1536.92	13.385	1536.91	13.371	0.00	99.99	O
3	First fully charged	1537.12	13.385	1537.11	13.374	0.00	99.99	O
4	First fully charged	1536.46	13.378	1536.44	13.374	0.00	99.98	O
5	First fully charged	1536.82		1536.76		0.01		O
6	First discharged	1536.42		1536.39		0.01		O
7	First discharged	1536.26		1536.16		0.01		O
8	First discharged	1536.49		1536.48		0.00		O
9	fully charged 50cycles	1537.24	13.383	1537.25	13.372	0.00	99.99	O
10	fully charged 50cycles	1536.96	13.377	1536.92	13.375	0.00	99.99	O
11	fully charged 50cycles	1536.28	13.381	1536.29	13.371	0.00	99.92	O
12	fully charged 50cycles	1537.24	13.388	1537.25	13.372	0.00	99.88	O
13	discharged 50cycles	1536.95		1536.90		0.01		O
14	discharged 50cycles	1536.26		1536.25		0.00		O
15	charged 50cycles	1537.40		1537.42		0.00		O
16	discharged 50cycles	1536.24		1536.20		0.01		O

Remark: L-leakage; V-venting; D-disassembly; R-rupture ;F-fire ; O-no venting, no disassembly, no rupture and no fire

深圳市雄韬电源科技有限公司

SHENZHEN CENTER POWER CO., LTD

Test Report-attached table 4

Page6/10

No.	4	Name of Test item		Shock Test				
Sample No.	Sample state	Before test		After test		Mass loss/%	Residual voltage/%	Other phenom-en-on
		Mass/g	Open-circuit voltage/V	Mass/g	Open-circuit voltage/V			
1	First fully charged	1536.47	13.385	1536.46	13.382	0.00	99.93	O
2	First fully charged	1536.25	13.381	1536.19	13.382	0.01	100.00	O
3	First fully charged	1536.48	13.382	1536.44	13.376	0.01	99.92	O
4	First fully charged	1536.36	13.382	1536.35	13.372	0.00	99.96	O
5	First discharged	1536.67		1536.65		0.00		O
6	First discharged	1536.72		1536.68		0.01		O
7	First discharged	1536.42		1536.39		0.01		O
8	First discharged	1537.48		1537.44		0.01		O
9	fully charged 50cycles	1537.12	13.380	1537.10	13.376	0.00	99.97	O
10	fully charged 50cycles	1537.04	13.382	1537.00	13.366	0.01	99.88	O
11	fully charged 50cycles	1536.29	13.389	1536.16	13.382	0.01	99.95	O
12	fully charged 50cycles	1536.89	13.391	1536.78	13.386	0.01	99.96	O
13	discharged 50cycles	1538.09		1538.00		0.01		O
14	discharged 50cycles	1536.49		1536.42		0.01		O
15	charged 50cycles	1536.24		1536.22		0.00		O
16	discharged 50cycles	1536.19		1536.16		0.01		O

Remark: L-leakage; V-venting; D-disassembly; R-rupture ;F-fire ; O-no venting, no disassembly, no rupture and no fire

深圳市雄韬电源科技有限公司

SHENZHEN CENTER POWER CO., LTD

Test Report-attached table 5

Page7/10

No.	5	Name of Test item	External short circuit
Sample No.	Sample state	External highest temperature/°C	Other phenomenon
1	First fully charged	98.7	O
2	First fully charged	96.5	O
3	First fully charged	98.3	O
4	First fully charged	97.4	O
5	First discharged	66.5	O
6	First discharged	69.2	O
7	First discharged	69.3	O
8	First discharged	68.6	O
9	fully charged 50cycles	102.3	O
10	fully charged 50cycles	98.3	O
11	fully charged 50cycles	105.0	O
12	fully charged 50cycles	98.4	O
13	discharged 50cycles	67.6	O
14	discharged 50cycles	68.9	O
15	discharged 50cycles	72.1	O
16	discharged 50cycles	68.3	O
Remark: D-disassembly; R-rupture ;F-fire ; no disassembly, no rupture and no fire			

深圳市雄韬电源科技有限公司

SHENZHEN CENTER POWER CO., LTD

Test Report-attached table 6

Page8/10

No.	6	Name of Test item	Impact Test
Sample No.	Sample state	External highest temperature/°C	Other phenomenon
1	First 50% capacity	56.7	O
2	First 50% capacity	52.3	O
3	First 50% capacity	49.5	O
4	First 50% capacity	54.5	O
5	First 50% capacity	51.4	O
6	50 cycles discharged	54.3	O
7	50 cycles discharged	51.7	O
8	50 cycles discharged	48.6	O
9	50 cycles discharged	50.2	O
10	50 cycles discharged	49.7	O
Remark: D-disassembly; F-fire ; no disassembly, and no fire			

深圳市雄韬电源科技有限公司

SHENZHEN CENTER POWER CO., LTD

Test Report-attached table 7

Page9/

10

No.	7	Name of Test item	Overcharge Test
Sample No.	Sample state	Test phenomenon	
1	First fully charged		O
2	First fully charged		O
3	First fully charged		O
4	First fully charged		O
5	First discharged		O
6	First discharged		O
7	First discharged		O
8	First discharged		O
9	fully charged 50 cycles		O
10	fully charged 50 cycles		O
11	fully charged 50 cycles		O
12	fully charged 50 cycles		O
13	discharged 50 cycles		O
14	discharged 50 cycles		O
15	discharged 50 cycles		O
16	discharged 50 cycles		O
Remark: D-disassembly; F-fire ; O-no disassembly, and no fire			

深圳市雄韬电源科技有限公司

SHENZHEN CENTER POWER CO., LTD

Test Report-attached table 8

Page1

0/10

No.	8	Name of Test item	Forced Discharge Test
Sample No.	Sample state	Test phenomenon	
1	First fully charged	O	
2	First fully charged	O	
3	First fully charged	O	
4	First fully charged	O	
5	First discharged	O	
6	First discharged	O	
7	First discharged	O	
8	First discharged	O	
9	fully charged 50 cycles	O	
10	fully charged 50 cycles	O	
11	fully charged 50 cycles	O	
12	fully charged 50 cycles	O	
13	discharged 50 cycles	O	
14	discharged 50 cycles	O	
15	discharged 50 cycles	O	
16	discharged 50 cycles	O	
Remark: D-disassembly; F-fire ; O-no disassembly, and no fire			