

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 , Jul, 20,2010

Checked by: GJ Hu , Jul, 30,2010

Reviewed by: JJ Tu , Jul, 30,2010

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## Test Report

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Sample name	Iron Phosphate Lithium-ion Battery V-LFP12V20Ah		
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	2010/7/20-2010/7/30	Sample NO.	2010016
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		

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**Test Report**

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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 ± 5℃			

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**Test Report-attached table 1**

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No.	1	Name of Test item		Altitude Simulation				
				Before test		After test		Mass loss/%
Sample No.	Sample state	Mass/g	Open-circuit voltage/V	Mass/g	Open-circuit voltage/V			
1	First fully charged	3118.60	13.386	3118.55	13.381	0.01	99.96	O
2	First fully charged	3119.10	13.390	3119.05	13.387	0.01	99.98	O
3	First fully charged	3120.85	13.389	3120.85	13.389	0.00	100.00	O
4	First fully charged	3121.00	13.390	3121.95	13.387	0.01	99.98	O
5	First discharged	3122.85		3122.80		0.01		O
6	First discharged	3123.40		3123.40		0.00		O
7	First discharged	3125.55		3125.50		0.01		O
8	First discharged	3127.35		3127.30		0.01		O
9	fully charged 50cycles	3118.45	13.380	3118.40	13.373	0.01	99.94	O
10	fully charged 50cycles	3115.00	13.378	3118.00	13.372	0.00	99.96	O
11	fully charged 50cycles	3116.10	13.384	3116.10	13.375	0.00	99.93	O
12	fully charged 50cycles	3117.55	13.392	3117.50	13.380	0.01	99.91	O
13	discharged 50cycles	3119.65		3119.60		0.01		O
14	discharged 50cycles	3200.25		3200.20		0.01		O
15	charged 50cycles	3111.30		3111.30		0.00		O
16	discharged 50cycles	3113.70		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

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Test Report-attached table 2

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No.	2	Name of Test item		Thermal Test				
		Before test		After test		Mass loss/%	Residual voltage/%	Other phenomenon
Sample No.	Sample state	Mass/g	Open-circuit voltage/V	Mass/g	Open-circuit voltage/V			
1	First fully charged	3120.85	13.384	3120.85	13.380	0.00	99.97	O
2	First fully charged	3118.30	13.378	3118.25	13.369	0.01	99.93	O
3	First fully charged	3112.45	13.376	3112.40	13.372	0.01	99.97	O
4	First fully charged	3122.90	13.390	3122.90	13.381	0.00	99.93	O
5	First fully charged	3114.20		3114.15		0.01		O
6	First fully charged	3115.45		3115.40		0.01		O
7	First fully charged	3113.45		3113.45		0.00		O
8	First fully charged	3122.80		3122.80		0.00		O
9	fully charged 50cycles	3121.90	13.387	3121.90	13.380	0.00	99.95	O
10	fully charged 50cycles	3123.40	13.390	3123.40	13.382	0.00	99.94	O
11	fully charged 50cycles	3123.10	13.382	3123.10	13.375	0.00	99.95	O
12	fully charged 50cycles	3127.15	13.385	3127.10	13.380	0.01	99.96	O
13	discharged 50cycles	3120.20		3120.20		0.00		O
14	discharged 50cycles	3128.00		3128.00		0.00		O
15	charged 50cycles	3119.60		3119.55		0.01		O
16	discharged 50cycles	3114.80		3114.80		0.00		O

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

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**Test Report-attached table 3**

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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	3117.60	13.392	3117.55	13.382	0.01	99.93	O
2	First fully charged	3112.40	13.383	3112.40	13.375	0.00	99.94	O
3	First fully charged	3123.90	13.385	3123.90	13.372	0.00	99.90	O
4	First fully charged	3120.05	13.378	3120.05	13.374	0.00	99.97	O
5	First fully charged	3119.35		3119.30		0.01		O
6	First discharged	3121.30		3121.25		0.01		O
7	First discharged	3114.85		3114.80		0.01		O
8	First discharged	3126.80		3126.80		0.00		O
9	fully charged 50cycles	3122.45	13.383	3122.45	13.372	0.00	99.92	O
10	fully charged 50cycles	3124.65	13.377	3124.65	13.370	0.00	99.95	O
11	fully charged 50cycles	3125.50	13.381	3125.50	13.370	0.00	99.92	O
12	fully charged 50cycles	3120.35	13.388	3120.35	13.371	0.00	99.87	O
13	discharged 50cycles	3125.75		3125.70		0.01		O
14	discharged 50cycles	3127.40		3127.40		0.00		O
15	charged 50cycles	3117.80		3117.80		0.00		O
16	discharged 50cycles	3116.75		3116.70		0.01		O

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

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**Test Report-attached table 4**

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No.	4	Name of Test item		Shock 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	3117.40	13.380	3117.40	13.370	0.00	99.93	O
2	First fully charged	3121.90	13.384	3121.85	13.382	0.01	99.98	O
3	First fully charged	3122.35	13.387	3122.30	13.376	0.01	99.92	O
4	First fully charged	3124.70	13.380	3124.70	13.374	0.00	99.96	O
5	First discharged	3200.65		3200.65		0.00		O
6	First discharged	3115.70		3115.65		0.01		O
7	First discharged	3108.20		3108.15		0.01		O
8	First discharged	3114.85		3114.80		0.01		O
9	fully charged 50cycles	3116.30	13.380	3116.30	13.376	0.00	99.97	O
10	fully charged 50cycles	3109.30	13.382	3109.25	13.366	0.01	99.88	O
11	fully charged 50cycles	3105.75	13.389	3105.70	13.382	0.01	99.95	O
12	fully charged 50cycles	3114.55	13.391	3114.50	13.386	0.01	99.96	O
13	discharged 50cycles	3113.15		3113.10		0.01		O
14	discharged 50cycles	3128.50		3128.45		0.01		O
15	charged 50cycles	3125.65		3125.65		0.00		O
16	discharged 50cycles	3124.80		3124.75		0.01		O

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

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**Test Report-attached table 5**

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No.	5	Name of Test item	External short circuit
Sample No.	Sample state	External highest temperature/°C	Other phenomenon
1	First fully charged	99.7	O
2	First fully charged	97.5	O
3	First fully charged	98.4	O
4	First fully charged	99.4	O
5	First discharged	69.5	O
6	First discharged	69.9	O
7	First discharged	70.3	O
8	First discharged	68.9	O
9	fully charged 50cycles	102.7	O
10	fully charged 50cycles	99.3	O
11	fully charged 50cycles	103.0	O
12	fully charged 50cycles	99.9	O
13	discharged 50cycles	68.6	O
14	discharged 50cycles	68.3	O
15	discharged 50cycles	71.4	O
16	discharged 50cycles	69.6	O
Remark: D-disassembly; R-rupture ;F-fire ; no disassembly, no rupture and no fire			



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**Test Report-attached table 6**

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No.	6	Name of Test item	Impact Test
Sample No.	Sample state	External highest temperature/°C	Other phenomenon
1	First 50% capacity	56.8	O
2	First 50% capacity	52.2	O
3	First 50% capacity	49.9	O
4	First 50% capacity	53.5	O
5	First 50% capacity	52.4	O
6	50 cycles discharged	54.2	O
7	50 cycles discharged	50.7	O
8	50 cycles discharged	49.2	O
9	50 cycles discharged	50.4	O
10	50 cycles discharged	49.8	O
Remark: D-disassembly; F-fire ; no disassembly, and no fire			

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**Test Report-attached table 7**

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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			

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**Test Report-attached table 8**

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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			