

深圳市雄韬电源科技有限公司

SHENZHEN CENTER POWER CO., LTD

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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 , Aug, 10, 2010

Checked by: GJ Hu , Aug, 11, 2010

Reviewed by: JJ Tu , Aug, 11, 2010

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Sample name	Iron Phosphate Lithium-ion Battery V-LFP12V30Ah		
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	2010/8/1-2010/5/10	Sample NO.	2010017
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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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	5237.60	13.390	5237.55	13.381	0.01	99.93	O
2	First fully charged	5233.10	13.391	5233.05	13.388	0.01	99.98	O
3	First fully charged	5300.85	13.386	5300.85	13.386	0.00	100.00	O
4	First fully charged	5289.00	13.390	5289.95	13.386	0.01	99.97	O
5	First discharged	5231.85		5231.80		0.01		O
6	First discharged	5222.40		5222.40		0.00		O
7	First discharged	5244.55		5244.50		0.01		O
8	First discharged	5256.35		5253.30		0.01		O
9	fully charged 50cycles	5277.45	13.384	5277.40	13.370	0.01	99.90	O
10	fully charged 50cycles	5286.00	13.380	5286.00	13.376	0.00	99.97	O
11	fully charged 50cycles	5287.10	13.384	5287.10	13.378	0.00	99.96	O
12	fully charged 50cycles	5280.55	13.392	5282.50	13.379	0.01	99.90	O
13	discharged 50cycles	5287.65		5287.60		0.01		O
14	discharged 50cycles	5266.25		5266.20		0.01		O
15	charged 50cycles	5273.30		5273.30		0.00		O
16	discharged 50cycles	5271.70		5271.65		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				
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	5255.85	13.384	5255.85	13.380	0.00	99.97	O
2	First fully charged	5257.30	13.378	5257.25	13.368	0.01	99.93	O
3	First fully charged	5266.45	13.380	5266.40	13.371	0.01	99.93	O
4	First fully charged	5274.90	13.390	5274.90	13.381	0.00	99.93	O
5	First fully charged	5235.20		5235.15		0.01		O
6	First fully charged	5222.45		5222.40		0.01		O
7	First fully charged	5217.45		5217.45		0.00		O
8	First fully charged	5233.80		5233.80		0.00		O
9	fully charged 50cycles	5224.90	13.390	5424.90	13.380	0.00	99.93	O
10	fully charged 50cycles	5225.40	13.391	5225.40	13.382	0.00	99.93	O
11	fully charged 50cycles	5233.10	13.390	5233.10	13.375	0.00	99.89	O
12	fully charged 50cycles	5240.15	13.389	5240.10	13.380	0.01	99.93	O
13	discharged 50cycles	5280.20		5280.20		0.00		O
14	discharged 50cycles	5244.00		5244.00		0.00		O
15	charged 50cycles	5253.60		5253.55		0.01		O
16	discharged 50cycles	5239.80		5239.80		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	5217.60	13.388	5217.55	13.382	0.01	99.96	O
2	First fully charged	522340	13.383	5223.40	13.376	0.00	99.95	O
3	First fully charged	524790	13.387	5247.90	13.372	0.00	99.89	O
4	First fully charged	5236.05	13.390	5236.05	13.370	0.00	99.85	O
5	First fully charged	5255.35		5255.30		0.01		O
6	First discharged	5278.30		5278.25		0.01		O
7	First discharged	5299.85		5299.80		0.01		O
8	First discharged	5266.80		5266.80		0.00		O
9	fully charged 50cycles	518945	13.385	5189.45	13.377	0.00	99.94	O
10	fully charged 50cycles	5199.65	13.377	5199.65	13.372	0.00	99.96	O
11	fully charged 50cycles	5237.50	13.381	5237.50	13.370	0.00	99.92	O
12	fully charged 50cycles	5226.35	13.389	5226.35	13.378	0.00	99.92	O
13	discharged 50cycles	5256.75		5256.70		0.01		O
14	discharged 50cycles	5253.40		5253.40		0.00		O
15	charged 50cycles	5244.80		5244.80		0.00		O
16	discharged 50cycles	5237.75		5237.70		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	5275.40	13.378	5275.40	13.376	0.00	99.98	O
2	First fully charged	5236.90	13.386	5236.85	13.382	0.01	99.97	O
3	First fully charged	5266.35	13.388	5266.30	13.376	0.01	99.91	O
4	First fully charged	5256.70	13.382	5256.70	13.374	0.00	99.94	O
5	First discharged	5163.65		5163.65		0.00		O
6	First discharged	5247.70		5247.65		0.01		O
7	First discharged	5139.20		5139.15		0.01		O
8	First discharged	5146.85		5146.80		0.01		O
9	fully charged 50cycles	5200.30	13.392	5200.0	13.376	0.00	99.88	O
10	fully charged 50cycles	5189.30	13.379	5189.25	13.366	0.01	99.90	O
11	fully charged 50cycles	5188.75	13.387	5188.70	13.382	0.01	99.96	O
12	fully charged 50cycles	5276.55	13.391	5276.50	13.382	0.01	99.93	O
13	discharged 50cycles	5201.15		5201.10		0.01		O
14	discharged 50cycles	5144.50		5144.45		0.01		O
15	charged 50cycles	5166.65		5166.65		0.00		O
16	discharged 50cycles	5266.80		5266.75		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	98.7	O
2	First fully charged	98.5	O
3	First fully charged	99.4	O
4	First fully charged	99.7	O
5	First discharged	68.5	O
6	First discharged	69.2	O
7	First discharged	70.8	O
8	First discharged	69.8	O
9	fully charged 50cycles	102.5	O
10	fully charged 50cycles	99.3	O
11	fully charged 50cycles	103.5	O
12	fully charged 50cycles	99.4	O
13	discharged 50cycles	68.6	O
14	discharged 50cycles	68.3	O
15	discharged 50cycles	71.4	O
16	discharged 50cycles	69.9	O
Remark: D-disassembly; R-rupture ;F-fire ; no disassembly, no rupture and no fire			

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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	55.8	O
2	First 50% capacity	53.9	O
3	First 50% capacity	50.5	O
4	First 50% capacity	50.5	O
5	First 50% capacity	52.6	O
6	50 cycles discharged	55.1	O
7	50 cycles discharged	50.7	O
8	50 cycles discharged	49.9	O
9	50 cycles discharged	51.6	O
10	50 cycles discharged	49.8	O
Remark: D-disassembly; F-fire ; no disassembly, and no fire			

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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			