



# TEST REPORT

**REPORT NO.....: HST201009-3384**

**NAME OF SAMPLE.....: Valve Regulated Lead Acid Battery**

**MODEL NAME .....: ML12-100 (12V 100AH)**

**APPLICANT NAME.....: SUNSTONE POWER INDUSTRY CO., LTD**

**CLASSIFICATION.....: Entrusted**

**PREPARED BY.....: Guangzhou Huesent Testing Service Co., Ltd.**



# TEST REPORT

IEC 60896.22-2004

Report Reference No.....: HST201009-3384

Tested by (+ signature).....: *Jeff*

Reviewed by (+ signature).....: *Louis*

Approved by (+ signature).....: *[Signature]*

Date of issue .....: November 20,2010



**Client**

Applicant.....: SUNSTONE POWER INDUSTRY CO., LTD

Address.....: ROOMS1318-20,13/F,HOLLYWOOD PLAZA,610 NATHAN ROAD,MONGKOK,KOWLOON,H.K

Manufacturer.....: SUNSTONE POWER INDUSTRY CO., LTD

Address.....: ROOMS1318-20,13/F,HOLLYWOOD PLAZA,610 NATHAN ROAD,MONGKOK,KOWLOON,H.K

**Testing laboratory**

Name.....: Guangzhou Huesent Testing Service Co., Ltd.

Address.....: HST Testing Centre, No.91, Dongguanhuang Road, Tianhe District, Guangzhou, China

Laboratory Qualification.....: Laboratory has been accredited by CNAS (China National Accreditation Service for Conformity Assessment) and CMA (China Metrology Accreditation), The CNAS registration number is L2885.The CMA registration number is 2008191614Z.

**Test specification**

Standard.....: IEC 60896.22-2004 IEC 60896.21-2004

Sample Received Date.....: September 13, 2010

Test Duration.....: September 13, 2010~November 19,2010

Conformity.....:  Yes  No

**Test item**

Description.....: Valve Regulated Lead Acid Battery

Trademark.....: SUNSTONE POWER

Model and/or type reference.....: ML12-100 (12V 100AH)

Remark: The test items please refer to page four



## ITEMS FOR ATTENTION

1. It would be invalid test report without specific stamp for test institute or the authority.
2. It would be invalid duplicated report without specific stamp for test institute or the authority.
3. It would be invalid test report without all the signatures of compilation, reviewer and approver.
4. It would be invalid test report, if there is any scrawl in the test report without official authorization.
5. Any disputes about the report must be submitted for test institute within 15 days from the day when the report is received, otherwise that would be invalid out of expiry.
6. Generally, the responsible is only for the samples in entrusted test.

Remark: Possible test case verdicts:

Test case does not apply to the test object.....:N(.A.)

Test item does meet the requirement.....:P(ass)

Test item does not meet the requirement.....:F(ail)

Address: HST Testing Centre, No. 91, Dongguanhuang Road, Guangzhou,China

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Test Items and Description		
6.1	Gas emission	To determine the emitted gas volume
6.2	High current tolerance	To verify the adequacy of current conduction cross-sections
6.3	Short circuit current and d.c. internal resistance	To provide data for the sizing of fuses in the exterior circuit
6.6	Content and durability of required markings	To evaluate the quality of the markings and the content of the information
6.7	Material identification	To ensure the presence of material identification markings
6.8	Valve operation	To ensure the correct opening of safety valves
6.9	Flammability rating of materials	To verify the fire hazard class of battery materials
6.11	Discharge capacity	To verify the available capacities at selected discharge rates or discharge durations.
6.14	Recharge behaviour	To determine the recovery of capacity or autonomy time after a power outage
6.17	Abusive over-discharge	To determine the expected times to establish a condition of escalating current and temperature
6.21	Stability against mechanical abuse of units during installation	To determine the propensity of the cell or monobloc battery to fracture or leak when dropped.



IEC60896.21-2004 IEC60896.22-2004

No.	Requirement – Test	Result - Remark	Verdict
<b>6Requirements and characteristics</b>			
<b>1</b>	<b>6.1 Requirement for gas emission information</b>		
	<p>The test methods are according to clause 6.1 to 6.1.14 which stated in the standard of IEC 60896.21-2004</p> <p><b>Requirement:</b>            At the rated float charge voltage            State data for all applications: ml gas per cell, h and Ah at 20° or 25 °C.            At 2,40 Vpc overcharge voltage conditions            State data for all applications :ml gas per cell, h and Ah at 20° or 25 °C</p>	<p>At the rated float charge voltage:            ML12-100 (12V100AH) :            G<sub>e</sub>: =0.041ml per cell, hour and Ah            At 2,40 Vpc overcharge voltage conditions:            ML12-100 (12V 100AH):            Ge=0.098 ml per cell, hour and Ah</p>	P
<b>2</b>	<b>6.2 Requirement for high current tolerance</b>		
	<p>The test methods are according to clause 6.2.1 to 6.2.6which stated in the standard of IEC 60896.21-2004</p> <p><b>Requirement :</b>            (a):Voltage of unit &gt;2,0 Vpc            (b)Show evidence of no incipient melting or of no loss of electrical continuity after 30 s of high current flow (value to be stated)</p>	<p>Maximum discharge current is 500 A(Which is specified by the manufacturer, after 30s of high current flow the sample show no incipient melting or of no loss of electrical continuity            ML12-100 :U=12.27V</p>	P
<b>3</b>	<b>6.3 Requirement for short-circuit current and d.c. Internal resistance information</b>		
	<p>The test methods are according to clause 6.3.1 to 6.3.6which stated in the standard of IEC 60896.21-2004</p> <p><b>Requirement:</b>            State data for all applications: Short-circuit current (I<sub>sc</sub>) in A Internal resistance (R<sub>i</sub>) in ohms</p>	<p>ML12-100 :            I<sub>sc</sub>=1.790×10<sup>3</sup> A            R<sub>i</sub>= 7.25mΩ</p>	P
<b>4</b>	<b>6.6 Requirement for content and durability of required markings</b>		
	<p>The test methods are according to clause 6.6.1 to 6.6.4 which stated in the standard of IEC 60896.21-2004</p> <p><b>Requirement:</b> see table 9 and table 10 in standard of IEC 60896.22-2004</p>	<p>The marking and following information are remain readable after 15s water, petroleum solution of Na<sub>2</sub>CO<sub>3</sub>,and 40% weight of H<sub>2</sub>SO<sub>4</sub> in water respectively</p>	P



No.	Requirement – Test	Result - Remark	Verdict		
<b>5</b>	<b>6.7 Requirement for material identification</b>				
	The test methods are according to clause 6.7.1 to 6.7.4 which stated in the standard of IEC 60896.21-2004	All the symbol remain readable	P		
	<b>Requirement:</b>				
	<table border="1"> <tr> <td>Requirement and application</td> <td>Inspect case and/or cover for ISO 1043-1 materials symbol. Expose to chemicals.(6.6 and 6.7 of IEC 60896-21)</td> </tr> <tr> <td>Pass for all applications</td> <td>ISO symbol present on the outside of the cover or/and case Symbol shall remain readable after exposure to chemicals and remain in place</td> </tr> </table>			Requirement and application	Inspect case and/or cover for ISO 1043-1 materials symbol. Expose to chemicals.(6.6 and 6.7 of IEC 60896-21)
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Pass for all applications	ISO symbol present on the outside of the cover or/and case Symbol shall remain readable after exposure to chemicals and remain in place				
<b>6</b>	<b>6.8 Requirement for the operation of the valve</b>				
	The test methods are according to clause 6.8.1 to 6.8.4 which stated in the standard of IEC 60896.21-2004	The valve adequate opening Gas release detected before and after stress temperature impact test	P		
	<b>Requirement:</b> Gas release detected before and after stress temperature impact test				
<b>7</b>	<b>6.9 Requirement for definition of the flammability rating of the materials</b>				
	The test methods are according to clause 6.9.1 to 6.9.4 which stated in the standard of IEC 60896.21-2004	HB 75	-		
	<b>Requirement :</b>				
	<table border="1"> <tr> <td>Requirement and application</td> <td>Determine flammability rating of case and cover material (6.9 of IEC 60896-21)</td> </tr> <tr> <td>State data for all applications</td> <td>State the flammability rating level for samples of thickness equivalent to that of case and cover</td> </tr> </table>			Requirement and application	Determine flammability rating of case and cover material (6.9 of IEC 60896-21)
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<b>8</b>	<b>6.11 Requirement for discharge capacity performance</b>				
	The test methods are according to clause 6.1.1 to 6.11.2 which stated in the standard of IEC 60896.21-2004				

No.	Requirement – Test	Result - Remark	Verdict																												
	<p><b>Requirement for discharge capacity performance</b></p> <table border="1"> <tr> <td rowspan="3">Requirement and application</td> <td colspan="5">Determine actual capacity Ca (6.11 of IEC 60896-21)</td> </tr> <tr> <td colspan="5">Ca to be at least X % of Crt with all units at all rates shown below</td> </tr> <tr> <td>10 h</td> <td>8 h</td> <td>3 h</td> <td>1 h</td> <td>0.25</td> </tr> <tr> <td></td> <td>1,80</td> <td>1,75</td> <td>1,70</td> <td>1,60</td> <td>h1,60</td> </tr> <tr> <td></td> <td>Vpc</td> <td>Vpc</td> <td>Vpc</td> <td>Vpc</td> <td>Vpc</td> </tr> </table> <p>Comply for all applications Ca ≥ 95 % Crt (see note below)</p> <p>NOTE The requirement of Ca ≥95 % Crt applies not to the average but to each individual capacity of each of the 6 units tested with a particular discharge rate.</p>	Requirement and application	Determine actual capacity Ca (6.11 of IEC 60896-21)					Ca to be at least X % of Crt with all units at all rates shown below					10 h	8 h	3 h	1 h	0.25		1,80	1,75	1,70	1,60	h1,60		Vpc	Vpc	Vpc	Vpc	Vpc	VG12-100 (12V 100Ah): C10=111.2Ah(Crt=100Ah) C8=91.3 Ah(Crt= 90Ah) C3=83.2Ah(Crt=75 Ah) C=61.3Ah(Crt= 60Ah)	P
Requirement and application	Determine actual capacity Ca (6.11 of IEC 60896-21)																														
	Ca to be at least X % of Crt with all units at all rates shown below																														
	10 h	8 h	3 h	1 h	0.25																										
	1,80	1,75	1,70	1,60	h1,60																										
	Vpc	Vpc	Vpc	Vpc	Vpc																										
<b>9</b>	<b>6.14 Recharge behaviour</b>																														
	The test methods are according to clause 6.14.1 to 6.14.12 which stated in the standard of IEC 60896.21-2004 <b>Requirement :</b> Rbf24h: 24 h Recharge behaviour factor≥90 % (see note below) Rbf168h: 168 h Recharge behaviour factor≥98 % (see note below)	Rbf24h= 94.1% Rbf168h= 97.7%	P																												
<b>10</b>	<b>6.17 Abusive over-discharge</b>																														
	The test methods are according to clause 6.17.1 to 6.17.15 which stated in the standard of IEC 60896.21-2004 <b>Requirement :</b> Determine capacity ratio Caod : Unbalanced string over-discharge capacity Caod ≥0,80 (for the string) Determine capacity ratio Caoc : Cyclic over-discharge capacity Caoc : Caod ≥0,90 (for the string)	Caod=0.879 Caod=0.942	P																												
<b>11</b>	<b>6.21 Stability against mechanical abuse of units during installation</b>																														
	The test methods are according to clause 6.21.1 to 6.21.6 which stated in the standard of IEC 60896.21-2004 <b>Requirement :</b> Show leakage inspection results: No leakage detectable after two times two drops	No leakage detectable after two times two drops	P																												

**Photo(s) of the tested samples**

ML12-100 (12V 100AH)



ML12-100 (12V 100AH)





**Photo(s) of the tested samples**

ML12-100 (12V 100AH)



\*\*\*End of Report\*\*\*