



# TEST REPORT

**REPORT NO.....: HST201108-3467**

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

**MODEL NAME .....: See Table 1**

**APPLICANT NAME.....: SHENZHEN CENTER POWER TECH CO.,LTD**

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

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



REPORT No. HST201108-3467

# TEST REPORT

IEC 60896.22-2004 IEC 60896.21-2004

Report Reference No. ....: HST201108-3467  
 Tested by (+ signature) .....: *Jeff* Tested by : Jeff  
 Reviewed by (+ signature) .....: *Louis* Inspected by: Louis  
 Approved by (+ signature) .....: *Henly* Approved by: Henly  
 Date of issue .....: March 22, 2013



## Client

Applicant .....: SHENZHEN CENTER POWER TECH CO.,LTD  
 Address .....: CENTER POWER INDUSTRIAL PARK, TONFU INDUSTRIAL DISTRICT, DAPENG TOWN, PC.518120, SHENZHEN, CHINA  
 Manufacturer .....: SHENZHEN CENTER POWER TECH CO.,LTD  
 Address .....: CENTER POWER INDUSTRIAL PARK, TONFU INDUSTRIAL DISTRICT, DAPENG TOWN, PC.518120, SHENZHEN, CHINA

## 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 .....: August 02, 2011  
 Test Duration .....: August 02, 2011~March 22, 2013  
 Conformity .....:  Yes  No

## Test item

Description .....: Valve Regulated Lead Acid Battery  
 Trademark .....: VISION  
 Model and/or type reference .....: See Table 1

Remark: There are one hundred and ninety four models (see Table 1) for application, shown in this report, with the difference being the outer sizes and capacity. All of the tests were performed on 6FM200-X (12V200Ah) and CL500 (2V500Ah), and the result complied the requirement of above standards. Test Items and Description 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)

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Test items		
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	To provide data for the sizing of fuses in the
6.4	Protection against internal ignition from external spark sources	To provide data for the sizing of fuses in the
6.5	Protection against ground short propensity	To evaluate the adequacy of design features
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
6.10	Intercell connector performance	To verify the maximum surface temperatures of the connectors during high rate discharges
6.11	Discharge capacity	To verify the available capacities at selected discharge rates or discharge durations.
6.12	Charge retention during storage	To provide storage duration data
6.13	Float service with daily discharge	To determine cyclic performance under float charge conditions
6.14	Recharge behaviour	To determine the recovery of capacity or autonomy time after a power outage
6.15	Service life at an operating temperature of 40 °C	To determine the operational life at elevated temperatures
6.16	Impact of a stress temperature of 55 °C or 60 °C	To determine the influence of high stress temperatures on cell or monobloc battery life
6.17	Abusive over-discharge	To determine the expected behaviour when excessive capacity is discharged
6.18	Thermal runaway sensitivity	To determine the expected times to establish a condition of escalating current and temperature
6.19	Low temperature sensitivity	To determine the sensitivity toward damage induced by electrolyte freezing
6.20	Dimensional stability at elevated internal pressure and temperature	To provide data for the sizing of fuses in the
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.



**Table 1 – Model for applicant**

No.	Model	No.	Model	No.	Model	No.	Model	No.	Model
1	CP6100	40	6FM90T-X	79	HF12-380W-X	118	CL600	157	CG12-90X
2	CP1208-T	41	6FM100D-X	80	HF12-420W-X	119	CL800	158	CG12-120X
3	CP1229	42	6FM100-X	81	HF12-470WB-X	120	CL800D	159	CG12-150X
4	CP1232	43	6FM100RE-X	82	HF12-470W-X	121	CL1000	160	CG12-200-T
5	CP1245H	44	6FM100RH-X	83	HF12-560W-X	122	CL1000D	161	CG12-200X
6	CP1245	45	6FM100RY-X	84	HF12-600W-X	123	CL1000E	162	CGT12-100X
7	CP1250	46	6FM120D-X	85	HF12-605W-X	124	CL1500	163	CGT12-120X
8	CP1265AE	47	6FM120-X	86	HF12-640WS-X	125	CL2000	164	CGT12-125X
9	CP1270A	48	6FM134D-X	87	HF12-650W-X	126	CL3000	165	CGT12-160X
10	CP1270	49	6FM150D-X	88	HF12-725W-X	127	CLS300	166	CG2-200
11	CP1270M	50	6FM175-X	89	HF12-810WB-X	128	CLS400	167	CG2-300
12	CP1270SA	51	6FM180H-X	90	HF12-890WS-X	129	CLS500	168	CG2-400
13	CP1272	52	6FM200-X	91	HF12-890W-X	130	CLS600	169	CG2-500
14	CP1275	53	6FM200D-X	92	HF12-1010W-X	131	CLS800	170	CG2-600
15	CP1280E	54	6FM200SE-X	93	PHF12-360W-X	132	PCL1000	171	CG2-800
16	CP1280HD	55	6FM230D-X	94	PHF12-380W-X	133	CT12-80EX	172	CG2-1000
17	CP1280H	56	6FM230-X	95	PHF12-420W-X	134	CT12-80X	173	CG2-1500
18	CP1290	57	CG12-65Z-TA	96	PHF12-470W-X	135	CT12-100EX	174	CG12-42PEX
19	CP1290A	58	CG12-80Z-TA	97	PHF12-520W-X	136	CT12-100X	175	CG12-55PEX
20	CP1290D	59	CG12-100Z-TA	98	PHF12-670WS-X	137	CT12-105X	176	CG12-80PEX
21	CP12100D	60	CG12-120Z-TA	99	PHF12-710WS-X	138	CT12-125X	177	CG12-90PEX
22	CP12120	61	CG12-150Z-TA	100	PHF12-890WS-X	139	CT12-140X	178	CG12-120PEX
23	CP12170E-X	62	CG12-200Z-TA	101	HFS12-280WL-X	140	CT12-150X	179	CG12-120PE-T
24	CP12170HD-X	63	CG12-230Z-TA	102	HFS12-340WL-X	141	CT12-150ZEX	180	CG12-150PEX
25	CP12400FX	64	CG12-250Z-TA	103	HFS12- 400W-X	142	CT12-155X	181	CG12-160PEX
26	6FM24-X	65	HP12-105W-X	104	HFS12-400WL-X	143	CT12-160X	182	CG12-160PE-T
27	6FM40E-X	66	HP12-116W-X	105	HFS12-450W-X	144	CT12-180X	183	CG12-200PE-T
28	6FM40SX	67	HF12-135W	106	HFS12-450WL-X	145	CT12-180EX	184	CG12-200PEX
29	6FM45-X	68	HF12-135WB-X	107	HFS12-550W-X	146	CTA12-50X	185	CG12-210PE-T
30	6FM55-X	69	HF12-135W-X	108	HFS12-550WL-X	147	CTA12-75X	186	CGT12-120PEX
31	6FM55SGX	70	HF12-155WB-X	109	HFS12-800WS-X	148	CTA12-80X	187	CGT12-160PEX
32	6FM60-X	71	HF12-155W-X	110	CL100	149	CTA12-85X	188	CG6-180PEX
33	6FM65E-X	72	HF12-165WB-X	111	CL150	150	CTA12-100X	189	CG2-200PE
34	6FM65-X	73	HF12-165W-X	112	CL200	151	CTA12-125X	190	CG2-300PE
35	6FM70-X	74	HF12-260W-X	113	CL300	152	CTA12-155X	191	CG2-400PE
36	6FM75D-X	75	HF12-320WB-X	114	CL400	153	CG12-42X	192	CG2-500PE
37	6FM75-X	76	HF12-320W-X	115	CL400E	154	CG12-55X	193	CG2-800PE
38	6FM80D-T	77	HF12-370W-X	116	CL500	155	CG12-72TX	194	CG2-1000PE
39	6FM80-X	78	HF12-380W	117	CL500E	156	CG12-80X	-	-



No.	Requirement – Test	Result - Remark	Verdict
<b>1</b>	<b>6 Requirements and characteristics</b>		
<b>1.1</b>	<b>6.1 Requirements for gas emission information</b>		
	The test methods are according to clause 6.1.1 to 6.1.14 which are stated in the standard IEC 60896-21	6FM200-X: Float charge: $G_e=0,027$ ml per cell, hour and Ah Over charge: $G_e=0,062$ ml per cell, hour and Ah	State the value
	Requirement and application: see table 4 in the standard IEC 60896-22	CL500: Float charge: $G_e=0,030$ ml per cell, hour and Ah Over charge: $G_e=0,046$ ml per cell, hour and Ah	
<b>1.2</b>	<b>6.2 Requirement for high current tolerance</b>		
	The test methods are according to clause 6.2.1 to 6.2.6 which are stated in the standard IEC 60896-21	6FM200-X: $U=2,15$ Vpc It has no any damage	P
	Requirement and application: see table 5 in the standard IEC 60896-22	CL500: $U=2,13$ Vpc It has no any damage	
<b>1.3</b>	<b>6.3 Requirement for short-circuit current and d. c. internal resistance information</b>		
	The test methods are according to clause 6.3.1 to 6.3.6 which are stated in the standard IEC 60896-21	6FM200-X: $I_{sc}=2559$ A $R_i=5,08$ m $\Omega$	State the value
	Requirement and application: see table 6 in the standard IEC 60896-22	CL500: $I_{sc}=5751$ A $R =0,38$ m $\Omega$	
<b>1.4</b>	<b>6.4 Protection against internal ignition from external spark sources</b>		
	The test methods are according to clause 6.4.1 to 6.4.6 which are stated in the standard IEC 60896-21	No evidence of ground short and leakage phenomena	P
<b>1.5</b>	<b>6.5 Requirement for protection against ground short propensity</b>		
	The test methods are according to clause 6.5.1 to 6.5.9 which are stated in the standard IEC 60896-21	No evidence of ground short and leakage phenomena	P
	Requirement and application: see table 8 in the standard IEC 60896-22		
<b>1.6</b>	<b>6.6 Requirement for content and durability of required markings</b>		
	The durability of the marking shall be tested according to clause 1.7.13 of IEC 60950-1 and the content of marking shall meet the requirement of IEC 60896-22	Information remain readable after test and content meet requirement	P
	Requirement and application: see table 9 and table 10 in the standard IEC 60896-22		



No.	Requirement – Test	Result - Remark	Verdict
<b>1.7</b>	<b>6.7 Requirement for material identification</b>		
	The test methods are according to clause 6.7.1 to 6.7.4 which are stated in the standard IEC 60896-21 Requirement and application: see table 11 in the standard IEC 60896-22	All the symbol remain readable	P
<b>1.8</b>	<b>6.8 Requirement for the operation of the valve</b>		
	The test methods are according to clause 6.8.1 to 6.8.3 which are stated in the standard IEC 60896-21 Requirement and application: see table 12 in the standard IEC 60896-22	The valve adequate opening Gas release detected before and after stress temperature impact test	P
<b>1.9</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 are stated in the standard IEC 60896-21 Requirement and application: see table 13 in the standard IEC 60896-22	6FM200-X(12V200Ah): HB 75, V-0 CL500(2V500Ah): HB 75,V-0	State the level
<b>1.10</b>	<b>6.10 Requirement for performance of the intercell connector</b>		
	The test methods are according to clause 6.9.1 to 6.9.4 which are stated in the standard IEC 60896-21 Requirement and application: see table 14 in the standard IEC 60896-22	6FM200-X (12V200Ah): the maximum temperature:50°C CL500(2V500Ah) the maximum temperature:53°C	State the value
<b>1.11</b>	<b>6.11 Requirement for discharge capacity performance</b>		
	The test methods are according to clause 6.11.1 to 6.11.12 which are stated in the standard IEC 60896-21 Requirement and application: see table 15 in the standard IEC 60896-22	6FM200-X (12V200Ah): C <sub>10</sub> =212,1 Ah(C <sub>rt</sub> =200Ah) C <sub>8</sub> =211,8Ah(C <sub>rt</sub> = 194,4Ah) C <sub>3</sub> =184,3Ah(C <sub>rt</sub> =165 Ah) C=131.3Ah(C <sub>rt</sub> =128Ah) C <sub>0.25</sub> =95,1Ah(C <sub>rt</sub> =90Ah)  CL500(2V500Ah): C <sub>10</sub> =521,4 Ah(C <sub>rt</sub> =500Ah) C <sub>8</sub> =514,7Ah(C <sub>rt</sub> = 495Ah) C <sub>3</sub> =391,8Ah(C <sub>rt</sub> =387 Ah) C=306,2Ah(C <sub>rt</sub> = 300Ah) C <sub>0.25</sub> =179,6Ah(C <sub>rt</sub> =177,75Ah)	P
<b>1.12</b>	<b>6.12 Charge retention during storage</b>		
	The test methods are according to clause 6.12.1 to 6.12.7 which are stated in the standard IEC 60896-21	6FM200-X (12V200Ah): C <sub>rf</sub> =81.6%	P



No.	Requirement – Test	Result - Remark	Verdict
	Requirement and application: see table 16 in the standard IEC 60896-22	CL500 (2V500Ah): Crf=86.3%	
<b>1.13</b>	<b>6.13 Requirement for float service with daily discharges</b>		
	The test methods are according to clause 6.13.1 to 6.13.5 which are stated in the standard IEC 60896-21	6FM200-X (12V200Ah): Cycle number=152	P
	Requirement and application: see table 17 in the standard IEC 60896-22	CL500 (2V500Ah): Cycle number=179	
<b>1.14</b>	<b>6.14 Requirement for recharge behaviour</b>		
	The test methods are according to clause 6.14.1 to 6.14.12 which are stated in the standard IEC 60896-21	6FM200-X (12V200Ah): Rbf <sub>24h</sub> =93.14%Ca Rbf <sub>168h</sub> =97.76%Ca	P
	Requirement and application: see table 18 in the standard IEC 60896-22	CL500 (2V500Ah): Rbf <sub>24h</sub> =94.38%Ca Rbf <sub>168h</sub> =96.02%Ca	
<b>1.15</b>	<b>6.15 Requirement for service life at an operating temperature of 40 °C</b>		
	The test methods are according to clause 6.15.1 to 6.15.5 which are stated in the standard IEC 60896-21	6FM200-X (12V200Ah):T =590 day	P
	Requirement and application: see table 19 in the standard IEC 60896-22	CL500 (2V500Ah):T =590 day	
<b>1.16</b>	<b>6.16 Requirement for the impact of a stress temperature of 55 °C or 60 °C</b>		
	The test methods are according to clause 6.16.1 to 6.16.8 which are stated in the standard IEC 60896-21	At 55 °C: 6FM200-X (12V200Ah): Duration=126 days	P
	Requirement and application: see table 20 in the standard IEC 60896-22	CL500 (2V500Ah): Duration=126 days	
<b>1.16</b>	<b>6.17 Requirement for the impact of abusive over-discharges</b>		
	The test methods are according to clause 6.17.1 to 6.17.15 which are stated in the standard IEC 60896-21	6FM200-X (12V200Ah): a)Unbalanced string over-discharge capacity C <sub>aod</sub> : =0.87C <sub>rt(3h rate)</sub> b)Cyclic over-discharge capacity C <sub>aoc</sub> : =0.94 C <sub>rt(3h rate)</sub>	P
	Requirement and application: see table 21 in the standard IEC 60896-22	CL500 (2V500Ah): a)Unbalanced string over-discharge capacity C <sub>aod</sub> : =0.85C <sub>rt(3h rate)</sub> b)Cyclic over-discharge capacity C <sub>aoc</sub> : =0.91 C <sub>rt(3h rate)</sub>	





No.	Requirement – Test	Result - Remark	Verdict
<b>1.18</b>	<b>6.18 Requirements for information on thermal runaway sensitivity</b>		
	The test methods are according to clause 6.18.1 to 6.18.14 which are stated in the standard IEC 60896-21	6FM200-X (12V200Ah): Ultimate temperature after 168 h at 2,45 Vpc: $T_a=32\text{ }^\circ\text{C}$ Ultimate temperature after 168 h at 2,60 Vpc: $T_b=45\text{ }^\circ\text{C}$	P
	Requirement and application: see table 22 in the standard IEC 60896-22	CL500 (2V500Ah): Ultimate temperature after 168 h at 2,45 Vpc: $T_a=33\text{ }^\circ\text{C}$ Ultimate temperature after 168 h at 2,60 Vpc: $T_b=47\text{ }^\circ\text{C}$	
<b>1.19</b>	<b>6.19 Requirement for the impact of low temperature service on capacity</b>		
	The test methods are according to clause 6.19.1 to 6.19.13 which are stated in the standard IEC 60896-21	6FM200-X (12V200Ah): Cals =0.96 $C_{rt(3h\ rate)}$ No mechanical damages	P
	Requirement and application: see table 23 in the standard IEC 60896-22	CL500 (2V500Ah): Cals =0.95 $C_{rt(3h\ rate)}$ No mechanical damages	
<b>1.20</b>	<b>6.20 Dimensional stability at elevated internal pressure and temperature</b>		
	The test methods are according to clause 6.20.1 to 6.20.6 which are stated in the standard IEC 60896-21	No leakage	P
	Requirement and application: Show dimensional change in percentage and in mm.		
<b>1.21</b>	<b>6.21 Requirements for stability against mechanical abuse of units during installation</b>		
	The test methods are according to clause 6.21.1 to 6.21.6 which are stated in the standard IEC 60896-21	No leakage	P
	Requirement and application: see table 25 in the standard IEC 60896-22		

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

6FM200-X(12V200Ah)



6FM200-X(12V200Ah)



## 2. Photo(s) of the tested samples

CL500(2V500Ah)



CL500(2V500Ah)



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