



中国认可
国际互认
检测
TESTING
CNAS L2885



TEST REPORT

Report No.:

HST 201601-0450-WT

Sample Description.....:

LEAD-ACID BATTERY

Model.....:

See the Table 1

Assessment Category.:

Entrusted

Applicant.....:

SHENZHEN CENTER POWER

TECH.CO.,LTD.

Guangdong Huesent Testing & Inspection Technology Co., Ltd.

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TEST REPORT


Sample Description	LEAD-ACID BATTERY	Trademark	VISION、Invermexa
Model	SeetheTable1	Specification	See theTable1
Assessment Category	Entrusted	SampleQuantity	6 Pieces
Applicant	SHENZHEN CENTER POWERTECH.CO.,LTD.	SampleStatus	The samples are sound, intact and fit for test.
Sample Received Date	2024.01.04	TestDate	2024.01.04~2027.07.11
Manufacturer	SHENZHEN CENTER POWER TECH.CO.,LTD.		
Address	NO.1,Binhai 2nd Road,Tongfu Industrial Park,Dapeng New District,Shenzhen		
Factory	SHENZHEN CENTER POWER TECH.CO.,LTD.		
Address	NO.1,Binhai 2nd Road,Tongfu Industrial Park,Dapeng New District,Shenzhen		
Test address	No.163, Dongguan Zhuang Road, Guangzhou, Guangdong, China		
Test Items	See the Table 1		
Test standard	IEC 60896-21:2004 Stationary lead-acid batteries –Part 21:Valve regulated types – Methods of test IEC 60896-22:2004 Stationary lead-acid batteries –Part 22:Valve regulated types – Requirements		
Test Conclusion	The results conform to the requirements of standards with respect to the test items.  (Stamp of Test Unit)		
Remarks	There are eighty-nine (See the Table 1) for application, shown in this report, with the difference being the outer sizes and capacity. All of the tests were performed on CL500 (2V 500Ah) and INVL12-100 (12V 100Ah)		
Tested by : Ben	Sign: <i>Ben</i>		
Reviewed by : John	Sign: <i>John</i>		
Approved by : Louis	Sign: <i>Louis</i>		

Table 1:Models for application		
No.	Models	Specification
1	CL3000	2V 3000Ah
2	CL3000Y	2V 3000Ah
3	CL3000YE	2V 3000Ah
4	CL2000	2V 2000Ah
5	CL2000Y	2V 2000Ah
6	CL2000YE	2V 2000Ah
7	CL2000E	2V 2000Ah
8	CL1500	2V 1500Ah
9	CL1500Y	2V 1500Ah
10	CL1500YE	2V 1500Ah
11	CL1500E	2V 1500Ah
12	CLS1500	2V 1500Ah
13	CL1200	2V 1200Ah
14	CL1200Y	2V 1200Ah
15	CL1200E	2V 1200Ah
16	CL1000	2V 1000Ah
17	CL1000Y	2V 1000Ah
18	CL1000YE	2V 1000Ah
19	CL1000E	2V 1000Ah
20	CLS1000	2V 1000Ah
21	CL800	2V 800Ah
22	CL800Y	2V 800Ah
23	CL800YE	2V 800Ah
24	CL800E	2V 800Ah
25	CLS800	2V 600Ah
26	CL600Y	2V 600Ah
27	CL600YE	2V 600Ah
28	CL600E	2V 600Ah
29	CL600S	2V 600Ah
30	CLS600	2V 600Ah
31	CL600-HTBS	2V 600Ah
32	CL600-HTB	2V 500Ah
33	CL500	2V 500Ah
34	CL500Y	2V 500Ah
35	CL500YE	2V 500Ah
36	CL500E	2V 500Ah

37	CLS500	2V 500Ah
38	CL400	2V 400Ah
39	CL400Y	2V 400Ah
40	CL400YE	2V 400Ah
41	CL400E	2V 400Ah
42	CLS400	2V 400Ah
43	CL300	2V 300Ah
44	CL300Y	2V 300Ah
45	CL300YE	2V 300Ah
46	CL300E	2V 300Ah
47	CL300S	2V 300Ah
48	CLS300	2V 300Ah
49	CL300-HT	2V 300Ah
50	CL265	2V 265Ah
51	CL200	2V 200Ah
52	CL200Y	2V 200Ah
53	INV12-4.5	12V 4.5Ah
54	INV12-5	12V 5.0Ah
55	INV12-7S	2V 7.0Ah
56	INV12-7.2	12V 7.2Ah
57	INV12-9	12V 9.0Ah
58	INV12-12	12V 12Ah
59	INV12-17	12V 17Ah
60	INV12-18	12V18Ah
61	INV12-20	12V 20Ah
62	INV12-24	12V24Ah
63	INV12-26	12V26Ah
64	INVL12-33	12V 33Ah
65	INVL12-35	12V 35Ah
66	INVL12-38	12V 38Ah
67	INVL12-40	12V 40Ah
68	INVL12-55	12V 55Ah
69	INVL12-65	12V 65Ah
70	INVL12-75	12V 75Ah
71	INVL12-100	12V100Ah
72	INVL12-110	12V 110Ah
73	INVHR12-540W	12V150Ah
74	INVL12-150	12V 150Ah
75	INVL12-200	12V 200Ah

76	UPS350	2V 350Ah
77	UPS260	2V 260Ah
78	UPS180	2V 180Ah
79	CG2-3000A	2V 3000Ah
80	CG2-2000A	2V 2000Ah
81	CG2-1500A	2V 1500Ah
82	CG2-1000A	2V 1000Ah
83	CG2-800A	2V 800Ah
84	CG2-600A	2V 600Ah
85	CG2-500A	2V 500Ah
86	CG2-400A	2V 400Ah
87	CG2-300A	2V 300Ah
88	CG2-200A	2V 200Ah
89	CG2-100A	2V 100Ah

Table 2:Test item		
TestClause	Measures	Purpose
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 off uses in the exterior circuit
6.4	Protection against internal ignition from external spark sources	To evaluate the adequacy of protective features
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	Chargeretentionduringstorage	To provide storage duration data
6.13	Float service with dailydischarge	To determine cyclic performance under floatcharge conditions
6.14	Recharge behaviour	To determine the recovery of capacity or autonomy time after a power outage
6.15	Service life atan 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 stresstemperatures 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 acondition of escalating current and temperature
6.19	Low temperature sensitivity	To determine the sensitivity toward damageinduced by electrolyte freezing
6.20	Dimensional stability at elevated internalpressure and temperature	To determine the propensity of the cell ormonobloc battery to be deformed by internalpressure and at elevated temperature
6.21	Stability against mechanical abuse of unitsduring installation	Determine the propensity of the cell or monobloc battery to fracture or leak when dropped.

TEST RESULT

IEC60896-21:2004, IEC 60896-22:2004			
Items	Requirement-Test	Result-Remark	Verdict
6.1	<p>Gas emission:</p> <p>The test methods are according to clause 6.1.1 to 6.1.14 which are stated in the standard IEC 60896-21</p> <p>Requirement and application: Measure gas volumes (At the rated float charge voltage; At 2,40Vpc overcharge voltage conditions). State data for all applications: ml gas per cell, h and Ah at 20° or 25 °C; ml gas per cell, h and Ah at 20° or 25°C.</p>	<p>At the rated float charge voltage Uflo=2.25V/(Ah•h•cell) at 25°C:</p> <p>1#: Ge=0,0015ml/(hour•Ah) 2#: Ge=0,0014ml/(hour•Ah) 3#: Ge=0,0014ml/(hour•Ah)</p> <p>At 2,40Vpc overcharge voltage conditions at 25°C:</p> <p>1#: Ge=0,0018ml/(hour•Ah) 2#: Ge=0,0017ml/(hour•Ah) 3#: Ge=0,0018ml/(hour•Ah)</p>	State the value
6.2	<p>High current tolerance:</p> <p>The test methods are according to clause 6.2.1 to 6.2.6 which are stated in the standard IEC 60896-21</p> <p>Requirement and application: Measure unit voltage, inspect and document the status of the top-lead and terminals of each unit after 30 s current flow. Pass for all applications: Voltage of unit >2,0 Vpc; 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>It has no any damage after 30 s of high current flow.</p> <p>Voltage after open circuit for 5m in:</p> <p>1#: U=2.10V 2#: U=2.11V 3#: U=2.09V</p>	P
6.3	<p>Short circuit current and d.c. internal resistance:</p> <p>The test methods are according to clause 6.3.1 to 6.3.6 which are stated in the standard IEC 60896-21</p> <p>Requirement and application: Define prospective short-circuit value Isc and internal resistance Ri of all units of a type range. State data for all applications: Short-circuit current (Isc) in A; Internal resistance (Ri) in ohms.</p>	<p>1#: Isc=5128A Ri =0.39mΩ</p> <p>2#: Isc=5011A Ri =0.40mΩ</p> <p>3#: Isc=4878A Ri =0.41mΩ</p>	State the value

IEC60896-21:2004, IEC 60896-22:2004			
Items	Requirement-Test	Result-Remark	Verdict
6.4	Requirement for protection against internal ignition from external spark sources	No rapid combustion, No explosion Conformity	P
	The test methods are according to clause 6.4.1 to 6.4.6 which are stated in the standard IEC 60896-21		
	Requirement and application: see table 7 in the standard IEC 60896-22		
6.5	Requirement for protection against internal ignition from external spark sources	No ground short, No leakage Conformity	P
	Requirement and application: see table 8 in the standard IEC 60896-22		
	The test methods are according to clause 6.5.1 to 6.5.9 which are stated in the standard IEC 60896-21		
6.6	Content and durability of required markings:	Information remain readable after test and content meet requirement	P
	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		
	Requirement and application: Expose information to chemicals. Pass all substances for all applications: Information shall remain readable after exposure to chemicals and remain in place		
	Requested information to be present for all applications.	See the ANNEX A	
6.7	Material identification:	All the symbol remain readable; ABS plastic	P
	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: Inspect case and/or cover for ISO 1043-1 materials symbol. Expose to chemicals. 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. (NOTE If the material of the case differs from the material of the cover, then a material identification symbol should also be present on the case. Otherwise one symbol on the cover is sufficient.)		

IEC60896-21:2004, IEC 60896-22:2004			
Items	Requirement-Test	Result-Remark	Verdict
6.8	Valve operation:	The valve adequate opening Gas release detected before and after stress temperature impact test Valve pressure: 22kpa~26kpa	P
	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: Overcharge units and detect gas flow from the valve. Pass for all applications: Gas release detected before and after stress temperature impact test		
6.9	Flammability rating of materials:	The flammability rating level for samples of thickness equivalent to that of case and cover: HB 40, V-0	State the level
	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: Determine flammability rating of case and cover material. State data for all applications: State the flammability rating level for samples of thickness equivalent to that of case and cover		
6.10	Intercell connector performance:	The maximum temperature reached: 58°C	State the value
	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: Measure and report maximum intercell connector temperature reached. State data for all applications: State maximum temperature reached.		
6.11	Discharge capacity:	See the ANNEX B	P
	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: Determine actual capacity C_a . C_a to be at least X % of C_{rt} with all units at all rates shown below: 10 h 1,80 Vpc; 8 h 1,75 Vpc; 3 h 1,70 Vpc; 1 h 1,60 Vpc; 0.25 h 1,60 Vpc. Comply for all applications: $C_a \geq 95 \% C_{rt}$ (NOTE The requirement of $C_a \geq 95 \% C_{rt}$ applies not to the average but to each individual capacity of each of the 6 units tested with a particular discharge rate.)		

IEC60896-21:2004, IEC 60896-22:2004			
Items	Requirement-Test	Result-Remark	Verdict
6.12	Charge retention during storage	$C_{rf}=86.9\%$	P
	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 16 in the standard IEC 60896-22		
6.13	Float service with daily discharges	Cycle number=312 Float charge: $C_{af}=79.9\% C_{rt(3h \text{ rate})}$ Boost charge: $C_{ab}=79.2\% C_{rt(3h \text{ rate})}$	P
	The test methods are according to clause 6.13.1 to 6.13.5 which are stated in the standard IEC 60896-21		
	Requirement and application: see table 17 in the standard IEC 60896-22		
6.14	Recharge behavior:	1#: $Rbf_{24h}=99.5\%$ $Rbf_{168h}=101.2\%$ 2#: $Rbf_{24h}=99.4\%$ $Rbf_{168h}=101.1\%$ 3#: $Rbf_{24h}=99.6\%$ $Rbf_{168h}=101.3\%$	P
	The test methods are according to clause 6.14.1 to 6.14.12 which are stated in the standard IEC 60896-21		
	Requirement and application: Determine capacity after recharge; Rbf_{24h} (24 h Recharge behaviour factor), Rbf_{168h} (168 h Recharge behaviour factor). Comply for all applications: $\geq 90\%$, $\geq 98\%$ (NOTE The requirement applies not to the average but to each of the individual tested units.) service life at an operating temperature of 40 °C		
6.15		T =515days	P
	The test methods are according to clause 6.15.1 to 6.15.5 which are stated in the standard IEC 60896-21		
	Requirement and application: see table 19 in the standard IEC 60896-22		
6.16	Impact of a stress temperature of 55°C or 60 °C	At 55 °C: Duration=302 days $C_{0.25h \text{ rate}}=0.79C_{rt}$	P
	The test methods are according to clause 6.16.1 to 6.16.8 which are stated in the standard IEC 60896-21		
	Requirement and application: see table 20 in the standard IEC 60896-22		
6.17	Abusive over-discharge:	Unbalanced string over-discharge capacity $C_{aod}:C_{aod}=0.95 C_{rt(3h \text{ rate})}$	P
	The test methods are according to clause 6.17.1 to 6.17.15 which are stated in the standard IEC 60896-21		
	Requirement and application: see table 21 in the standard IEC 60896-22	Cyclic over-discharge capacity $C_{aoc}:C_{aoc}=0.97 C_{rt(3h \text{ rate})}$	

IEC60896-21:2004, IEC 60896-22:2004			
Items	Requirement-Test	Result-Remark	Verdict
6.18	Information on thermal runaway sensitivity	Ultimate temperature after 168h at 2,45 Vpc: $T_a=38.8\text{ }^\circ\text{C}$ Ultimate temperature after 24h at 2,60 Vpc: $T_b=41.2\text{ }^\circ\text{C}$	P
	The test methods are according to clause 6.18.1 to 6.18.14 which are stated in the standard IEC 60896-21		
	Requirement and application: see table 22 in the standard IEC 60896-22		
6.19	Impact of low temperature service on capacity	$C_{als} = 0.96C_{r(3h\text{ rate})}$ No mechanical damages	P
	The test methods are according to clause 6.19.1 to 6.19.13 which are stated in the standard IEC 60896-21		
	Requirement and application: see table 23 in the standard IEC 60896-22		
6.20	Dimensional stability at elevated internal pressures and temperatures	Change in: Length:0,63% +1mm Width:0,63% +1mm Height:0,64% +2mm	P
	The test methods are according to clause 6.20.1 to 6.20.6 which are stated in the standard IEC 60896-21		
	Requirement and application: see table 24 in the standard IEC 60896-22		
6.21	Stability against mechanical abuse of units during installation	No leakage, No broken	P
	The test methods are according to clause 6.21.1 to 6.21.6 which are stated in the standard IEC 60896-21		
	Requirement and application: see table 25 in the standard IEC 60896-22		

TEST RESULT

ANNEX A: 6.6-Requested markings information to be present	
Technical information to be present	
Polarity sign at the positive terminal(s) with a + symbol radius of at least 6 mm	14mm
Manufacturer and/or vendor name	SHENZHEN CENTER POWER TECH.CO.,LTD.
Country of origin of unit	Made in Vietnam
Type designation of unit	CL500, INVL12-100
At least one rated capacity and its final voltage in Vpc or V per unit at a rate listed in 6.11 of IEC 60896-2-1	500Ah(1.8Vpc 25°C), 100Ah (1.8Vpc 25°C)
Rated temperature (20 °C or 25 °C) for the capacity value	25°C
Float voltage in Vpc or V per unit at a rated temperature of 20 °C and/or 25 °C	2.25/Cell25°C)
Date of manufacture (see Note 1 below) in clear unequivocal mm.yyyy format	01.2024
ISO warning symbols to be present with 11 mm diameter minimum size and in two contrasting colours (See Note 2 and 3 below)	
Warning	P
Electrical danger	P
No open fires and sparks	P
Wear eye protection	P
Read instructions	P
Environmental protection and recycling symbols to be present	
Recyclingsymbol	P
Crossedoutwastebin	P
<p>NOTE 1 For the purpose of this standard the “date of manufacture” is defined as the date of final inspection of the units in the factory of origin.</p> <p>NOITE 2 When the physical dimensions of the units do not allow to apply the symbols on the unit itself then a separate label to be affixed near the battery or on the battery operating instructions is acceptable.</p> <p>NOTE 3 The background colour is considered to be one colour.</p>	

TEST RESULT

ANNEX B: 6.11-Discharge capacity(CL500)											
Capacity Sample No.	C _{rt} =500.0Ah		C _{rt} = 47 5A h		C _{rt} =375Ah		C _{rt} =275Ah		C _{rt} =210Ah		Remark
	C10 %of (Ah) C _{rt}	99.6	C8 %of (Ah) C _{rt}	99.8	C3 (Ah)	%of C _{rt}	C1 (Ah)	%of C _{rt}	C0.25 (Ah)	%of C _{rt}	
1#	498.0	99.6	474.1	99.8	433.5	115.6	328.7	119.5	235.8	112.3	25°C Ca≥95%C _{rt}
2#	498.5	99.7	475.5	100.1	437.7	116.7	329.4	119.8	237.5	113.1	
3#	497.5	99.5	474.5	99.9	435.8	116.2	331.7	120.6	237.3	113	

Photo(s) of the tested samples

CL500 (2V 500Ah)



INVL12-100 (12V 100Ah)



--End of Report--

Report Statement

1. This test report is invalid if altered, additions and deletions.
2. This test report is responsible for tested samples only .
3. Objections to the test report must be submitted to Guangdong Huesent Testing & Inspection Technology Co., Ltd. within 15 days.
4. The test report is invalid without the signatures of tester, reviewer ,approver ,and official stamp of test unit.
5. Without permission of Guangdong Huesent Testing & Inspection Technology Co., Ltd., This report is not permitted to be duplicated in extracts.
6. "P"=Pass=Test item conform to the requirement
"F"= Fail=Test item not conform to the requirement
"N"= Not Applicable =Test item Not Applicable to the test object