Test Report

中国认可
国际互认
检测
TESTING
CNAS L6964

Report No.: UNIB23060528FR-02

Applicant	:	SAITE POWER SOURCE (VIETNAM) CO., LTD
Address	:	Road No.6, An Phuoc IP, An Phuoc Ward, Long Thanh District, Dong Nai Province, Vietnam
Name of sample	:	Valve Regulated Sealed Lead Acid Battery
Model No.	:	BT-MSE-2000（2V2000Ah）
Trade Name	:	SAITE
Receiving Date	:	May 27, 2023
Test Date	:	May 27, 20233 ~ Jul. 03, 2023
Test Location	:	No.47-3, Industrial Road, Zhushan, Dalong Street, Panyu District, Guangzhou, Guangdong, China
Test Method	:	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
Testing Item	:	See the test data page
Decision Rule	:	See the test data page
Conclusion	:	The sample meets the standard test requirements

Shenzhen United Testing Technology Co.,Ltd
Signed for and on behalf of

Liu Ze
Approved Signatory

Jul. 06, 2023
Signatory Date

深圳市优耐检测技术有限公司
Shenzhen United Testing Technology Co.,Ltd.

1、Conclusion

The sample(s) was/were detected and according to the results, the conclusion are as follows:

Test Item(s)		Testing Standard(s)	Decision Rule(s)	Conclusion
Article	Name			
6.1	Gas emission	IEC 60896-21:2004	IEC 60896-22:2004	Pass
6.2	High current tolerance			Pass
6.3	Short circuit current and d.c. internal resistance			Pass
6.4	Protection against internal ignition from external spark sources			Pass
6.5	Requirement for protection against ground short propensity			Pass
6.6	Content and durability of required markings			Pass
6.7	Material identification			Pass
6.8	Valve operation			Pass
6.9	Flammability rating of materials			Pass
6.10	Intercell connector performance			Pass
6.11	Discharge capacity			Pass
6.14	Recharge behaviour			Pass
6.17	Abusive over-discharge			Pass
6.18	Thermal runaway sensitivity			Pass
6.19	Low temperature sensitivity			Pass
6.20	Dimensional stability at elevated internal pressure and temperature			Pass
6.21	Stability against mechanical abuse of units during installation			Pass

General remark:

Possible test conditions:	
——The test case does not apply to the test product:	N/A
——The test sample meets the requirements:	P(ass)
——The test sample does not meet the requirements:	F(ail)

2、Sample information(s)

The following information of sample(s) was/were submitted and identified by applicant:

Product name	Valve Regulated Sealed Lead Acid Battery
Test model	BT-MSE-2000（2V2000Ah）
Additional models	BT-MSE-50(2V50Ah), BT-MSE-65 (2V65Ah), BT-MSE-100(2V100Ah), BT-MSE-150(2V150Ah), BT-MSE-200(2V200Ah), BT-MSE-225 (2V225Ah), BT-MSE-250(2V250Ah), BT-MSE-300(2V300Ah), BT-MSE-320 (2V320Ah), BT-MSE-330 (2V330Ah), BT-MSE-350 (2V350Ah), BT-MSE-375 (2V375Ah),BT-MSE-400(2V400Ah), BT-MSE-425 (2V425Ah), BT-MSE-450(2V450Ah), BT-MSE-500(2V500Ah), BT-MSE-520 (2V520Ah), BT-MSE-550(2V550Ah), BT-MSE-575 (2V575AH), BT-MSE-600(2V600Ah), BT-MSE-610(2V610Ah), BT-MSE-625 (2V625AH), BT-MSE-650(2V650Ah), BT-MSE-700 (2V700Ah), BT-MSE-750 (2V750Ah), BT-MSE-800(2V800Ah), BT-MSE-850 (2V850Ah), BT-MSE-900(2V900Ah), BT-MSE-950 (2V950Ah), BT-MSE-1000(2V1000Ah), BT-MSE-1200(2V1200Ah), BT-MSE-1250 (2V1250AH), BT-MSE-1400(2V1400Ah), BT-MSE-1500(2V1500Ah), BT-MSE-1600 (2V1600Ah), BT-MSE-1700 (2V1700Ah), BT-MSE-1800 (2V1800Ah), BT-MSE-1875 (2V1875Ah), BT-MSE-1900 (2V1900Ah), BT-MSE-2500 (2V2500Ah), BT-MSE-3000(2V3000Ah)

Trade Name	SAITE
Nominal voltage	2 V
Rated capacity	2000 Ah(10HR)
Recommended charging current	200A
Limit charging voltage	2.35V
Recommended discharging current	200A
Discharge cut-off voltage	1.8V
Dimensions	490mm*350mm*345mm*383mm (Length*Width*Height*Total Height)
Weight	122.5kg ±3%
Manufacturer	SAITE POWER SOURCE (VIETNAM) CO., LTD
Address	Road No.6, An Phuoc IP, An Phuoc Ward, Long Thanh District, Dong Nai Province, Vietnam

General remark:

This test report shall not be reproduced except in full without the written approved of the testing laboratory.

The test result presented in this report relate only to the item tested.

"(See remark#)" refers to a remark appended to the report.

"(See appended table)" refer to a table appended to the report.

3、Detection of clause

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6	Test methods		P
6.1	**Gas emission**		**P**
6.1.1	The test shall be carried out with six cells or three monobloc batteries.		P
6.1.2	The test units shall be selected and prepared according to 5.2.		P
6.1.3	The test units shall be tested connected in series and maintained during the test between 20°Cand 25°C (temperature of test unit). The units shall be fitted with an individual or common gas collection device so that the emitted gas can be collected from all cells over several days and its volume determined with the required accuracy.		P
6.1.4	The gas collection shall be carried out, for example, with a volumetric measurement or gas collection device similar to that shown in Figure 1. Careful attention shall be paid to ensure leak-free gas transport from the test units to the collection device during long unattended operation. The maximum hydrostatic head (as given by the difference in collection vessel immersion depth and water level) shall be not more than 20 mm.		P
6.1.5	The test units shall have, before starting the test, an actual capacity Ca of at least Crt (3 h rate – Ufinal 1.7Vpc at the selected reference temperature),be fully charged and then float charged, in a series string, for (72±0.1) h with the		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	manufacturer's specified float voltage of $n*U_{n0} \pm$ 0.01 Vpc. This voltage shall be recorded and reported. All units shall be checked for absence of leaks before commencing the test.		
6.1.6	After (72±0.1) h of float charge, the gas collection shall commence and the collection of gas be continued for four periods each of (168±0.1) h duration.		P
6.1.7	The cumulative total gas volume (Va in ml) collected over each of the four periods of (168±0.1) h shall be recorded together with the ambient temperature Ta (in K} and the ambient pressure Pa (in kPa) at which each determination of the gas volumes was made.		P
6.1.8	The corrected volume of gas Vn emitted at the reference temperature of 293 K (20°C) or 298 K (25°C) and the reference pressure of 101.3 kPa, shall be calculated by the formula (ignoring correction for water vapour pressure)		P
	$V_n = \frac{V_a \times T_r}{T_a} \times \frac{p_a}{P_r}$ in ml where Va is the cumulative total gas collected of all cells in ml; Tr is the reference temperature in K (at 293 K or 298 K); Ta is the ambient temperature (in K) = 273 + Ta (in °C); Pa is the ambient atmospheric pressure in kPa; Pr is the reference pressure of 101.3 kPa.		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6.1.9	The normalized gas emission Ge per cell at float charge voltage conditions shall be calculated for each of the four (168±0.1) h periods with the formula below:		P
	$G_e = \frac{V_n}{n \times 168 \times C_{rt}}$ in ml per cell, hour and Ah (rated C3) where Vn is the total corrected gas volume emitted per test unit in ml n is the number of cells from which the gas was collected in the collection vessel 168 is the number of hours during which the gas was collected Crt is the rated C3 capacity in Ah of the test units from which the gas was collected.		P
	The normalized gas emission Ge per cell at float charge voltage conditions during each of the four periods of (168±0.1) h of the test shall be reported.		P
6.1.10	The charge voltage of the same test unit string shall then be increased to n × 2.40 Vpc±0.01 Vpc		P
6.1.11	After 24 h±0.1 h of charge at n × 2.40 Vpc ± 0.01 Vpc the gas collection shall commence and the collection of gas be continued for one period of 48 h±0.1 h duration or until 1 000 ml have been collected. In this case the time t_c (in hours) to collect 1 000 ml shall also be reported.		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6.1.12	The cumulative total gas volume (Va in ml) collected over one period of 48 h±0.1 h shall be recorded together with the ambient temperature Ta (in K) and the ambient pressure Pa (in kPa) at which the determination of the gas volumes was made. If the collection has been stopped at time t_c after accumulation of 1 000 ml, the volume after 48 h shall be determined by a simple calculation Va = (1 000 ml/ t_c) ×48 in ml.		P
6.1.13	The corrected volume of gas Vn emitted at the reference temperature of 293 K (20°C) or 298 K (25°C) and the reference pressure of 101.3 kPa shall be calculated by the formula (ignoring correction for water vapour pressure)		P
	$V_n = \frac{V_a \times T_r}{T_a} \times \frac{P_a}{P_r}$ in ml Where Va: is the cumulative total gas collected of all cells in ml; Tr: is the reference temperature in K (at 293 K or 298 K); Ta: is the ambient temperature (in K) = 273 + Ta (in °C); Pa: is the ambient atmospheric pressure in kPa; Pr: is the reference pressure of 101,3 kPa.		P
6.1.14	The normalized gas emission Ge per cell at elevated charge voltage (2.40Vpc) conditions shall be calculated for the 48 h±0.1 h period using the formula below:		P
	Ge=Vn/(n×48×Cr1) in ml per cell, hour and Ah		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	(rated C3)		
	Where Vn: is the corrected gas volume emitted per test unit in ml n: is the number of cells from which the gas was collected in the collection vessel 48: is the number of hours during which the gas was collected Crt: is the rated C3 capacity in Ah of the test units from which the gas was collected. The normalized gas emission Ge at elevated charge voltage (2.40 Vpc) conditions during the 48 h±0.1h of the test shall be reported.	Ge=0.0012ml/h/Ah	P
6.2	**High current tolerance**		**P**
6.2.1	The test shall be carried out with three cells or three monobloc batteries.		P
6.2.2	The test units shall be selected and prepared according to 5.2.		P
6.2.3	The test units shall have, before starting the test, an actual capacity Ca of at least $C_{rl.}$ (3 h rate - U_{final} 1.70 Vpc at the selected reference temperature), be fully charged and have unit temperature between 20℃ and 25℃		P
6.2.4	The test units shall be discharged for 30 s with a current equal to 3 times the 5 min rate current (to U_{final} 1.80 Vpc at 20℃or 25℃) or with a current equal to the maximum allowable discharge current, both as specified by the manufacturer in the relevant technical		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	documentation of the product range.		
6.2.5	After the completion of the specified discharge duration, the test units shall stand for 5 min in open circuit and their voltage measured and reported.		P
6.2.6	The test units shall be examined, after the discharge, internally and externally for effects of high current flow and signs of melting. The conditions of all three units shall be reported and documented photographically.	It has no any damage after 30 s of high current flow. Voltage after open circuit for 5min: U=2.29V	P
6.3	**Short-circuit current and d.c. internal resistance**		**P**
6.3.1	The test shall be carried out with three cells or three monobloc batteries.		P
6.3.2	The test units shall be selected and prepared according to 5.2.		P
6.3.3	The test units shall have, before starting the test, an actual capacity Ca of at least $C_{rt.}$ (3 h rate – U_{final} 1.70 Vpc at the selected reference temperature), be fully charged and have unit temperature between 20°C and 25°C.		P
6.3.4	The voltage of the test units shall be measured at the terminals of each test unit in order to make sure that no external voltage drop interferes with the test result. A suitable circuit is given in Figure 2.		P
6.3.5	The short circuit current shall be defined by determining two data pairs in the following way:		P
	a) First data pair (Ua, Ia)		P
	After 20 s of discharge at the current Ia = 4 * I_{10},		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	the voltage and current shall be recorded to give the first data pair. The current shall be interrupted after 25 s maximum and, without recharge and after an open circuit stand of 5 min, the second data pair shall be determined.		
	b) Second data pairs (Ub, Ib)		P
	After 5 s of discharge at the current Ib = 20 $\times I_{10}$, the voltage and current shall be recorded to give the second data pair.		P
6.3.6	The characteristics U = f(I) shall be linearly extrapolated from the two data pairs to U = 0. The intercept indicates the short-circuit current I_{sc}. The internal resistance R_i can be also determined by interpolation from these two data pairs. The appropriate formulas for this interpolation are:		P
	Short circuit current I_{sc} = $[(U_a*I_b)-(U_b*I_a)]/(U_a-U_b)$ in amperes		P
	Internal resistance $R_i=(U_a-U_b)/(I_b-I_a)$ in ohms		P
	The individual value of I_{sc} and R_i of all cells and monobloc batteries of the product range shall be reported.	Isc=8189A Ri =0.023Ω	P
6.4	**Protection against internal ignition from external spark sources**		**P**
6.4.1	The test (see Table 7) shall be carried out with three fully functional valve assemblies of the concerned cells or monobloc batteries of the product range.		P
	This valve assembly may be a single valve system (screw-in type) or a valve system integrated in the cell or monobloc battery cover.		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	In both cases all design relevant features (flame barriers, seal lines and similar) shall be present in the valve assembly to be tested.		P
6.4.2	The test shall be carried out under the guidance of the safety procedures described in IEC 61430 (1997).		P
6.4.3	The test shall be carried out according to IEC 61430 Clause 4.2 using a test fixture as shown in Figure 3 and placed in an explosion test chamber shown in Figure 2 of IEC 61430. The test shall be carried out at an ambient temperature between 15°C and 30°C.		P
6.4.4	The three functional valve assemblies shall be mounted together onto the test fixture as shown below and be documented photographically in the test report.		P
6.4.5	The test shall be carried out according to the following procedures and subclauses of IEC 61430.		P
6.4.6	The outcome of the test shall be reported and, for the purposes of IEC 60896-21 IEC 60896-22, the valve assembly is deemed to have passed the test when no explosion rapid combustion event occurred within the test fixture.	No rapid combustion, No explosion Conformity	P
6.5	**Protection against ground short propensity**		**P**
6.5.1	The test shall be carried out with one cell or monobloc battery.		P
6.5.2	The test unit shall be selected and prepared according to 5.2.		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6.5.3	The test unit shall have, before starting the test, an actual capacity Ca of at least 0,95 C_{rt} (3 h rate - U_{final} 1.70 Vpc at the selected reference temperature), be fully charged and have unit temperature between 20℃ and 25℃.		P
6.5.4	The case to cover seal line of the unit shall be placed in contact with a metallic surface. This contact can be achieved, for example, by taping a conducting aluminium foil strip onto the seal line. The injection moulding points at the cell or monobloc battery case bottom can be additional site of ground short propensity and shall be investigated if needed.		P
6.5.5	The unit shall be placed horizontally (see Figure 4) and sequentially on all four possible faces according to the time schedule in 6.5.8 and 6.5.9 and float charged, with U_{flo} as specified by the manufacturer, at a room temperature between 20℃ and 25℃.		P
6.5.6	The units shall be connected, to a circuit which applies a d.c. voltage of at least 500 V±5 V between one terminal and the metallic surface (aluminium foil strip) in contact with the seal line. A suggested test circuit is shown in Figure 5 below.		P
6.5.7	The negative terminal of the d.c. voltage source shall be connected to the terminal of the unit(s) and the positive terminal to the aluminium foil strip.		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6.5.8	The unit shall be placed horizontally first on face 1 for 30 days or until either electrolyte leakage (with PH paper, d.c ohmmeters or similar or significant ground short current flow (few mA of current) is detected.		P
6.5.9	After 30 days of test, the unit shall be placed horizontally for 7 days on face 2, followed by 7 days on face 3 followed by 7 days on face 4 or until either electrolyte leakage (with pH paper, d.c. ohmmeters or similar) or significant ground short current flow (few mA of current) is detected.		P
6.5.10	The presence or absence of ground short/leakage phenomena shall be reported.	No ground short, No leakage Conformity	P
6.6	**Content and durability of required markings**		**P**
6.6.1	The test shall be carried out on three of the required markings in their definitive size, form, material and execution. Required markings may be printed, painted or moulded on the case or cover or included in a label affixed to the case or cover.		**P**
6.6.2	The test shall consist of visual verification of a) the presence and b) the legibility of all the required markings before and after exposure to selected chemicals.		**P**
6.6.3	The durability of the marking shall be tested, consistent with 1.7.13 of IEC 60950-1, as follows:		**P**
	Test with water and aliphatic solvent.		**P**

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	The procedure is as follows: a) A label or marking shall be rubbed for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked with petroleum spirit, dried in air and then inspected visually. b) The petroleum spirit used for this test shall be n-hexane (C6H14- alkane C6) with an initial boiling point of 65 °C, a dry point of approximately 69 °C, a density of 0,7 kg/l and a maximum aromatic hydrocarbon content of 0,1 % per volume.		
	Test with neutralizing solutions. The procedure is as follows: A new label or marking shall be rubbed for 15 s with a piece of cloth soaked with a saturated solution of sodium carbonate (Na2CO3) or bicarbonate (NaHCO3) in water, dried in air and then inspected visually.		P
	Test with electrolyte. The procedure is as follows: A new label or marking shall be rubbed for 15 s with a piece of cloth soaked with a solution of 40 % in weight of H2SO4 in water, washed with water, dried in air and then inspected visually.		P
6.6.4	Each required label or marking shall be visually inspected, fully described and depicted photographically before and after the application of the test chemical.		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	IMPORTANT: Solvents shall not be used to clean cells and monobloc batteries as otherwise damage to the plastic components may result. Approved cleaning fluids are only those expressly specified by the manufacturer.	Information remain readable after test and content meet requirement	**P**
6.7	**Material identification**		**P**
6.7.1	The inspection shall be carried out with one cell or monobloc battery cover or case having all the specified information applied in its definitive size, form, material and execution.		P
	If the case material differs from the cover material so as to justify another symbol, the inspection shall be carried out on both the case and the cover.		P
6.7.2	The specified information for material identification shall be selected from the list of abbreviation published in ISO 1043-1		P
6.7.3	The cover and case shall be visually inspected for a marking showing an ISO 1043-1 defined abbreviation of the name of the polymer(s) forming the bulk of the case and/or cover.		P
6.7.4	The stability of the marking shall be tested, if needed, with the test outlined in 6.6.	All the symbol remain readable	P
6.8	**Valve operation**		**P**
6.8.1	The test shall be carried out with the units destined for the test 6.16 (impact of a stress temperature of 55℃ or 60℃).		P
6.8.2	The units shall be tested for valve opening before and at the end of the stress temperature impact		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	test at 55℃ or 60℃ as follows.		
	a) The units shall be fully charged and at a temperature between 18℃ to 27℃. b) The units shall be overcharged with a constant voltage between 2.60 Vpc to 2.70 Vpc for at least 1 h. c) A gas collection cover shall be placed sequentially onto each valve opening in such a way that all gas released from that valve is captured. d) If the valve openings are hidden by, or integrated in a gas collection cover or manifold, gas flowing from the outlet of this cover or manifold shall be collected. e) A tubing shall carry the gas from this collection cover to the bubble detection device such as for example an U-shaped glass tubing of about 15 mm diameter and with the bottom of the U filled with water. See also Figure 6. f) The opening of each valve, at a test temperature of 18℃ to 27℃ shall be verified visually by detecting the released gas bubbling through the liquid at the bottom of the U-shaped glass tubing.		P
6.8.3	The observed valve opening (adequate opening or otherwise) before and after the test of 6.16 shall be reported.	The valve adequate opening Gas release detected before and after stress temperature impact test	P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6.9	**Flammability rating of materials**		**P**
6.9.1	The test shall be carried out with appropriately sized samples of the material used for the manufacture of the cell or monobloc battery case and, if different, also of the cell or monobloc battery cover.		P
6.9.2	The test shall be carried out by an appropriate test laboratory.		P
6.9.3	The test method used shall be in accordance with IEC 60707 and IEC 60695-11-10 or equivalent test methods for all of the above.		P
6.9.4	The test result and the resulting flammability classification of the material shall appear on a dated and signed test certificate.	The flammability rating level for samples of thickness equivalent to that of case and cover: HB 75, V-0	P
6.10	**Intercell connector performance**		**P**
6.10.1	The test shall be carried out with the cells and monobloc batteries destined for the test of 6.11 (discharge capacity at the $C_{0.25}$ or 0.25 h rate with a current $I_{0.25}$ to U_{final} =1,60 Vpc) or alternatively with the highest discharge current for a particular unit and intercell connector size as specified/allowed by the manufacturer in the relevant technical documentation of the product range The temperature of the units at the start of the test shall be between 20°C and 25°C.		P
6.10.2	The shape, size and construction details and the maximum temperature reached of the intercell connectors during this discharge test shall be	The maximum temperature reached: 54°C	P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	reported.		
6.11	**Discharge capacity**		**P**
6.11.1	The test shall be carried out with five times six cells or five times six monobloc batteries.		P
6.11.2	The test units shall be selected and prepared according to 5.2.		P
6.11.3	The test for the actual capacity Ca, at the moment of dispatch, shall be carried out at each of the following discharge rates each time with six fully charged units. These units shall not have been previously submitted to any discharge.		P
	The capacities shall be determined with the following rates to the following end-of-discharge voltages: C_{10} 10 h rate with current I_{10} to Ufinal = 1,80 Vpc (λ = 0,006) C_8 8 h rate with current lato Ufinal = 1,75 Vpc (λ = 0,006)C_3 3 h rate with current l3 to Ufinal = 1,70 Vpc (λ = 0,006) 1 h rate with current I to Ufinal = 1,60 Vpc (λ = 0,01) Co.25 0,25 h rate with current lo,25 to Ufinal = 1,60 Vpc (λ = 0,01)		P
6.11.4	The test shall be carried out with the units fully charged and with each unit temperature between 18°C and 27°C measured immediately prior the discharge.		P
	This initial temperature θ of the unit shall be used		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	for the correction of its capacity in function of temperature.		
6.11.5	The discharge shall be started within 1 h to 24 h after termination of charge and with the discharge current /dis held constant within 1% throughout the whole discharge duration.		P
6.11.6	The voltage measured at the terminals, including one intercell connector length, of all the units shall be either recorded automatically against time or by taking the readings manually with a voltmeter. In the latter case readings shall be made at least at 25 %, 50% and 80 % of the calculated discharge time with:		P
	$t=C_{rt}/I_{rt}$ (h)		P
	and then at suitable time intervals, which permits the detection of the transition to the final discharge voltage U_{final}.		P
6.11.7	In a type test for the determination of the actual capacity Ca at the moment of dispatch with five discharge rates (this subclause), the discharge shall be terminated when the following value has been recorded from each unit:		P
	disch= elapsed time of discharge of each unit, with n cells, to a final voltage of Ufinal = n x Ufinal (V).		P
6.11.8	The six individual capacity data, normalized to 20°C and 25°C for each of the five discharge rates shall be reported.		P
6.11.9	In the type test for determination of the actual		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	capacity Ca preceding or following a particular test routine, the discharge shall be terminated, if not specified otherwise, when the elapsed time of discharge t_{disch} of each unit with n cells to a final voltage of U_{final} = n x U_{final}(V) has been recorded.		
6.11.10	In an acceptance or commissioning test the discharge, at one rate only, shall be terminated when one of the following values t_{disch}, whichever comes first, has been recorded: t_{disch}= elapsed time of discharge of each unit, with n cells, to a final voltage of Ufinal = n x U_{final} (V). t_{disch} = the elapsed time when the first of the unit in the string reached a voltage of U = (U_{final} - √ n x 0,2) in volts with the value of (√ n x 0,2) as shown below, or as agreed between the battery manufacturer and the battery user. Individual unit voltages can be used to assess variability within the lot.		P
6.11.11	The measured capacity Ca (Ah) at the initial temperature θ shall be calculated as the product of the discharge current (A) and t_{disch} i.e. the discharge time (h).		P
6.11.12	If the initial temperature θ is different from the reference temperature of either 20°C or 25°C, the measured capacity shall be corrected by means of the following equation to obtain the actual capacity Ca at the selected reference temperature:	C_{10}:2050.3Ah C_8:1992.8Ah C_3:1480.3Ah C_1:1111.6 Ah $C_{0.25}$:220.2Ah	P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	Ca20 °c = C/[1+λ (0 - 20)] in Ah or Ca25 °C = C/[1+λ (0 - 25)] in AhThe coefficient shall be taken always as shown in 6.11.3 and according to the relative discharge rate.		
6.14	**Recharge behaviour**		**P**
6.14.1	The test shall be carried out with three cells or three monobloc batteries in a single string.		P
6.14.2	The test units shall be selected and prepared according to 5.2.		P
6.14.3	The test units shall have, before starting the test, an actual capacity C_a of at least C_{rt} (10 h - U_{final} 1.80 Vpc at the selected reference temperature) and be fully charged.		P
6.14.4	The string shall be discharged, with unit temperature between 18℃ to 27℃, and a constant current of I= I_{10} to a string voltage U_{final} n x 1.80 Vpc. This capacity C_3 value shall be corrected to 20℃ or 25℃.		P
6.14.5	After the discharge and a 1 h±0.1 h stand in the discharged state, the units shall be recharged, with unit temperature between 18℃ to 27℃, with a current limited to I= 2.0I_{10} and a voltage limited to the float voltage specified by the manufacturer for either 20℃ or 25 ℃		P
6.14.6	After 24 h ± 0.1 h of charge the units shall be immediately discharged again with a current of I_{10} to a string voltage U_{final}, n× 1.80 Vpc. This capacity value C_{a24} shall be corrected to 20℃ or 25℃.		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6.14.7	The capacity found after 24 h of charge C_{a24} shall be expressed as percentage of the initial actual capacity (recharge behaviour factor R_{bf}) as follows:		P
	The units shall be fully recharged and then again discharged, with unit temperature between 18℃ to 27℃and a constant current of I = I_{10} to a string voltage of n × 1.80 Vpc. This capacity C_a value shall be corrected to 20℃ or 25℃.		P
6.14.9	After the discharge and a 1 h±0.1 h stand in the discharged state, the units shall be recharged with a current limited to I = 2.0 I_{10} and a voltage limited to the float voltage specified by the manufacturer for either 20℃or 25℃.		P
6.14.10	After 168 h±0.1 h of charge the units shall be discharged again with a current of I_{10} to a string voltage of U_{final} n×1.80 Vpc. This capacity value C_{a168} shall be corrected to 20℃or 25℃.		P
6.14.11	The capacity found after 168 h C_{a168} shall be expressed as percentage of the initial actual capacity charge (recharge behaviour factor R_{bt}) as follows:		P
6.14.12	The value of $R_{bt24\ h}$ and $R_{bt120\ h}$ of the string shall be reported.	$R_{bf24\ h}$ =96.2% $R_{bf168\ h}$ =100.2%	P
6.17	**Abusive over-discharge**		**P**
6.17.1	The test shall be carried out with the number of units shown below.		P
6.17.2	The test units shall be selected and prepared according to 5.2.		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6.17.3	The test units shall have, before starting the test, an actual capacity C_a of at least C_{rt}, (3 h - U_{final} 1.70 Vpc at the selected reference temperature) and be fully charged.		P
6.17.4	The unbalanced string over-discharge test shall be carried out with four fully charged cells or monobloc batteries.		P
6.17.5	One of the 4 units shall be discharged, at a unit temperature of 18°C to 27°C, with a current of I_{10} for 3 h and then connected to the remaining 3 fully charged units in series and with the intercell connectors giving, between each units, an air gap of 10 mm or as specified in the appropriate technical documentation of the product range.		P
6.17.6	This four unit string shall then be discharged, with all unit temperatures between 18°C to 27°C, with a current I = /10 (U_{final} 1.80 Vpc) until the voltage of the three, initially fully charged (i.e. not predischarged) units reach a total voltage of U_{final} of 3 × n × 1.70 Vpc where n is the number of cells in this substring.		P
6.17.7	After the discharge and a 24 h±0.1 h stand in the discharged state, the four unit string shall be recharged in series for 168 h±0.1 h with a current limited to I= 2,0 I_{10} and a voltage limited to the float voltage specified by the manufacturer for either 20°C or 25°C.		P
6.17.8	At the end of the 168 h±0.1 h of charge, the units shall be subjected, as a four unit string, to a		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	capacity test with a constant current of I = 13 to a U_{final} of 4 × n × 1.70 Vpc and the capacity Ca corrected to 20°C or 25°C.		
6.17.9	The capacity C_a of the string shall be referenced to the rated capacity C_{rt} (3 h - U_{final} 1.70 Vpc at the selected reference temperature) as shown below and gives the unbalanced over-discharge C_{aod} capacity ratio. This value shall be reported.		P
6.17.10	The cvclic over-discharge test shall be carried out with three fully charged units.		P
6.17.11	The units shall be discharged individually or as a string, with all unit temperatures between 18°Cto 27°C and with a constant current of I = I_{10} to a voltage U_{final} of n x 1,25 Vpc where n is the number of cells per unit or string.		P
6.17.12	After the discharge and a 1 h ± 0.1 h stand in the discharged state, the units shall be recharged for 168 h ± 0.1h with a current limited to I= 2,0 I_{10} and a voltage limited to the float voltage specified by the manufacturer for either 20°C or 25°C.		P
6.17.13	The sequence outlined above shall be repeated 5 times.		P
6.17.14	At the end of the fifth 168 h ± 0.1 h of charge, the units or the string shall be subjected to a capacity test with a constant current of I = 13 to U_{final} of n×1.70 Vpc and the capacity C_a corrected to20°C or 25°C.		P
6.17.15	The capacity Ca of each unit or of the string shall be referenced to the rated capacity Crt (3 h -	C_{aod}=0.87; Greater than 0.8 required by the standard.	P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	Ufinal 1.70 Vpc at the selected reference temperature) as shown below and gives the cyclic over-discharge C_{aoc} capacity ratio. This value(s) shall be reported	C_{aoc}=0.96 Greater than 0.9 required by the standard.	
6.18	**Thermal runaway sensitivity**		**P**
6.18.1	The test shall be carried out with six cells or six monobloc batteries.		P
6.18.2	The test units shall be selected and prepared according to 5.2.		P
6.18.3	The test units shall have, before starting the test, an actual capacity C_a of at least C_{rt} (3 h - U_{final} 1.70 Vpc at the selected reference temperature) and be fully charged.		P
6.18.4	The units shall be assembled with the intercell connectors as specified in the appropriate technical documentation of the product range and the test configuration photographed and associated distances reported.		P
6.18.5	The ambient temperature shall be between 20°C to 25°C during the test and any natural airflow across the units shall be slower than 0.5 $m \cdot s^{-1}$		P
6.18.6	Temperature probes, with a resolution of 1K and allowing a continuous registration of the temperature (interval between temperature measurements ≤0.25 h), shall be installed as follows		P
6.18.7	The string shall be charged with a source of d.c. current and with a voltage as specified below. The current flowing through the string shall be		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	monitored with an appropriate resolution and at an interval, between measurements, of ≤0.25 h.		
6.18.8	The constant charge voltage, measured at the terminals of the string, shall be set to n x 2.45 Vpc ± 0,01 Vpc throughout the test, where n is the number of cells in the string.		P
6.18.9	The elapsed time of charge to a unit temperature of 60°C±1 K, measured with the probe a) at the surface or the temperature reached after 168 h continuous charge, shall be recorded and the test stopped whichever comes first.		P
6.18.10	The string shall then be cooled down to room temperature in open circuit condition and then utilized for the test in 6.18.11.		P
6.18.11	The previously utilized string shall be charged with a source of d.c. current and with a voltage as specified below. The current flowing through the string shall be monitored with an appropriate resolution at an interval between measurements of ≤0.25 h.		P
6.18.12	The constant charge voltage, measured at the terminals of the string, shall be set to n x 2,60 Vpc ± 0,01 Vpc throughout the test, where n is the number of cells in the string.		P
6.18.13	The elapsed time of charge to a temperature of unit 60°C±1 K, measured with the probe a) at the surface or the temperature reached after 168 h continuous charge, shall be recorded and the test stopped whichever comes first.		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6.18.14	At the conclusion of both tests the test data shall be assembled and presented as follows:	$T_{2.45V}$=24.6℃ $T_{2.65V}$=24.8℃	P
	a) Duration of charge until a unit temperature of 60 °C + 1 K (probe a) is reached or the effective temperature (probe a) after 168 h of charge with 2,45 Vpc b) Duration of charge until a unit temperature of 60 °C t 1 K (probe a) is reached or the effective temperature (probe a) after 168 h of charge with 2,60 Vpc c) Graphic or trace of the temperatures recorded by probes a), b) and c) during both test d) Graphic or trace of string current during both test		P
6.19	**Low temperature sensitivity**		**P**
6.19.1	The test shall be carried out with three cells or three monobloc batteries.		P
6.19.2	The test units shall be selected and prepared according to 5.2.		P
6.19.3	The test units shall have, before starting the test, an actual capacity C_a of at least C_{rt}, (3 h - U_{final} 1.70 Vpc at the selected reference temperature) and be fully charged.		P
6.19.4	The units shall be individually discharged with a current of I =I_{10} to an Ufinal of n×1.80Vpc at a unit temperature between 18℃ and 27℃.		P
6.19.5	The discharged units shall then be placed in a test chamber with a forced flow of air having a temperature of -18℃±2 K.		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6.19.6	After 72 h ± 1 h of residence in the test chamber the units shall be withdrawn from the test chamber and, after 24 h ± 1 h of stand at open circuit, charged in a room with an ambient temperature between +18 to +27°C for 168 h±0.1 h with a current limited to I =2,0 I_{10} and a voltage limited to the float voltage specified by the manufacturer for either 20°Cor 25°C.		P
6.19.7	The units shall then be individually discharged with a current of I =I_3 to an U_{final} of n x 1.70 Vpc and the actual capacity Ca corrected to 20°Cor 25°C shall be recorded.		P
6.19.8	The capacity C_a of each unit shall be referenced to the rated capacity C_{rt}· (3 h - U_{final} 1.70 Vpc at the selected reference temperature) as shown below and gives the Cals capacity ratio.		P
6.19.9	The units shall be inspected for fractures, excessive bulging or other freezing induced damages.		P
6.19.10	The three individual values of Gals as also freezing damage shall be reported.		P
6.19.11	The sequence 6.19.1 to 6.19.10 shall be repeated with a new set of units only if the previous freeze cycle resulted in a significant capacity loss or freezing damages and be modified as shown in 6.19.12.		P
6.19.12	These units shall be individually discharged in this second test, before low temperature exposure, with a current of I = I_3 to an U_{final} of n x 1.70 Vpc		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	at a unit temperature between 18°C and 27°C		
6.19.13	The test data shall be reported as follows	No damages 18°C:C_{als}=0.974 27°C:C_{als}=0.986	P
6.20	**Dimensional stability at elevated internal pressures and temperatures**		**P**
6.20.1	The test shall be carried out with one cell or one monobloc battery.		P
6.20.2	The test unit, inclusive eventual standard structural stabilizing features, shall be adapted with a pressure regulator to maintain a pressure in all interior cavities of the test unit equal to the maximum valve opening pressure present in units and as specified by the manufacturer. This value shall be measured and reported. This specified pressure shall be maintained throughout the test.		P
6.20.3	The maximum outside dimension (width and length of the cell case shall be measured before pressurization and recorded.		P
6.20.4	The pressurized unit shall be placed into a chamber with recirculating air at a temperature of 50°C±2 K.		P
6.20.5	After 24 h±0.1 h of residence in the test chamber and under pressure, the maximum outside dimension (width and length) of the cell case shall be measured and recorded at temperature as close as possible to 50°C±2 K.		P
6.20.6	The increase in the cell case dimensions after 24 h±0.1 h at 50°C±2 K shall be reported both as percentage deviation from the value before the test and as measured change in mm.		P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6.21	**Stability against mechanical abuse of units during installation**		**P**
6.21.1	The test shall be carried out with two cells or two monobloc batteries.		P
6.21.2	The test unit shall be selected and prepared according to 5.2 and not have any protective packing.		P
6.21.3	The units shall be dropped according to the height prescriptions of IEC 60068-2-32 and amendment. Two “Free Fall”, for resistance against leakages caused by two drops each onto a smooth, level concrete floor from drop heights as specified below:		P
6.21.4	The drop test conditions shall assure, with test arrangements as shown in Figures 9, 10 and 11 below, reproducible impact points for the shortest edge drop impact and the corner impact. The two impacts, per impact type, shall be on the same corner and on the same shortest edge.		P
6.21.5	For the corner and edge drops, the unit shall be oriented in such a fashion that a straight line drawn through the struck corner/edge and the unit geometric centre is approximately perpendicular to the impact surface.		P
6.21.6	Each of the units shall be inspected, after the two consecutive drops, for gas and liquid leaks with adequate and sensitive means such as a high voltage (2 kV to 5 kV) dielectric breakdown test, helium leak detectors, hydrogen detector, PH indicator paper and the like and the findings	No leakage detectable after two times two drops	P

IEC 60896-21:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	documented and reported.		

IEC 60896-22:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6	Requirements and characteristics		P
6.1	**Requirement for gas emission information**		**P**
6.1.1	The purpose of this requirement is the determination of gas emission volumes under normal float and overcharge voltage conditions.		P
6.1.2	The result of this test documents the amount of gas, reported as hydrogen, released during the float- and overcharge conditions.		P
	This value can be used by designers of equipment and facilities to validate if adequate air exchange exists in accordance with national or international standards for battery room ventilation.		P
6.2	**Requirement for high current tolerance**		**P**
6.2.1	The purpose of this requirement is the verification that the design of the internal current conducting components is robust enough so to withstand short periods of abnormally high discharge current which may occur before current limiting devices in the exterior circuit activate (fuses etc.).		P
6.2.2	The result of this test documents the condition of the top-lead and of the terminals after 30 s of high current flow at a level below the maximum short circuit current of the tested unit.		P
6.3	**Requirement for short-circuit current and d.c. internal resistance information**		**P**
6.3.1	The purpose of this requirement is to provide data about the possible short circuit current flowing from the unit into an exterior circuit of negligible		P

IEC 60896-22:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	resistance.compared to that of the unit itself.		
6.3.2	The result of this test documents the current delivery capability of the units and can be used to determine the size and suitable type of safety devices such as fuses or circuit breakers. The values have an accuracy of t10 %. The test also yields, at the same time and using the same method, the internal d.c. resistance of the units.		
6.4	**Requirement for protection against internal ignition from external spark sources**		**P**
6.4.1	The purpose of this requirement is to evaluate the adequacy of protective features such as the valve/flame barrier assembly as a safeguard against the ignition of gases, within the volume enclosed by the valve, from an external ignition source. The external ignition source shall be in the form of sparks generated between two auxiliary electrodes.		P
6.4.2	The results of this test documents the protection afforded by the flame barrier at the valve/flame barrier assembly when a defined hydrogen gas volume emission occurs and sparks are generated near the gas-venting opening.		P
6.5	**Requirement for protection against ground short propensity**		**P**
6.5.1	The purpose of this requirement is to confirm the satisfactory resistance of the units toward phenomena enhancing ground shorts such as the occurrence of an electrolyte break-through at seals, joints or at terminals. An electrolyte break-through can be enhanced by gravity (horizontal position operation mode) and d.c.		P

IEC 60896-22:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	voltage gradients (electrocapillarity phenomena).		
6.5.2	The result of this test documents if a particular operating orientation results in conductive paths of electrolyte causing ground short current flow conditions and associated fire risks.		P
6.6	**Requirement for content and durability of required markings**		**P**
6.6.1	The purpose of this requirement is to ensure the presence of essential product and safety information on each unit and their legibility after exposure to a set of chemicals.		P
6.6.2	The result of this test documents the presence of a minimum of information content and stability against chemicals.		P
6.7	**Requirement for material identification**		**P**
6.7.1	The purpose of this requirement is to enhance the recycling of material for environmental protection by ensuring that the plastic materials used for the units are clearly identified with the ISO 1043-1 material symbol and legible throughout the service life.		P
6.7.2	The result of this test documents the presence of correct and legible material identification.		P
6.8	**Requirement for the operation of the valve**		**P**
6.8.1	The purpose of this requirement is to ensure that each valve on the unit is opening and releasing gas before and after the high temperature (55°Cor 60°C) stress test.		P
6.8.2	The result of this test documents that the valve of the cell will function properly as a one-way vent over the service life of the unit.		P
6.9	**Requirement for definition of the flammability rating of the materials**		**P**

IEC 60896-22:2004			
Clause	Requirement + Test	Result - Remark	Verdict
6.9.1	The purpose of this requirement is to ensure that the burning properties of the non-metallic materials of the case/cover have been defined in accordance with international standards by completing an appropriate laboratory test.		P
6.9.2	The result of this test documents the burning and self-extinguishing property levels resulting from the plastic material of the units so to plan adequate fire safety measures.		P
6.10	**Requirement for performance of the intercell connector**		**P**
6.10.1	The purpose of this requirement is to show the maximum temperature reached by the specified intercell connector (the external conductor that connects individual units or monoblocs to form a battery) under the high current conditions.		P
6.10.2	The result of this test documents if a high temperature (T > 70°C) hazard exists on the connector during a high rate discharge.		P
6.11	**Requirement for discharge capacity performance**		**P**
6.11.1	The purpose of this requirement is to confirm the capacity to a specific end-voltage at the selected discharge rate or rates, at the moment of unit dispatch.		P
6.11.2	The result of this test documents the level of compliance of the actual capacity with the rated capacity at the moment of dispatch of a sample of six units at five separate discharge rates.		P
6.14	**Requirement for recharge behaviour**		**P**
6.14.1	The purpose of this requirement is to define the capacity once more available following a long duration		P

IEC 60896-22:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	discharge with both short (24 h) and long (168h) periods of recharge under float voltage settings.		
6.14.2	The result of this test documents the effective available capacity, as a percent of the original capacity after a recharge for 24 h or 168 h using only the recommended float voltage setting.		P
6.17	**Requirement for the impact of abusive over-discharges**		**P**
6.17.1	The purpose of the requirement is to abusive over-discharges during the service life, show a minimum specified conditions.		P
6.17.2	The results of these tests documents the available capacity		P
	a) after a severely capacity-unbalanced string has been discharged and recharged, and b) after repetitive discharges with large active mass utilization factors to a low end of discharge voltage.		P
	Such conditions may arise when units with irregular charge levels are used as replacements of failed units in a string or where low voltage disconnects are not available or have failed.		P
6.18	**Requirements for information on thermal runaway sensitivity**		**P**
6.18.1	The purpose of the requirement is to elicit standardized information about how soon units may enter thermal runaway conditions when exposed to higher than normal voltages under specified conditions.		P
6.18.2	The result of this test documents the elapsed time and the current associated before reaching elevated temperatures with standardized battery layouts. This facilitates the evaluation if a particular unit design		P

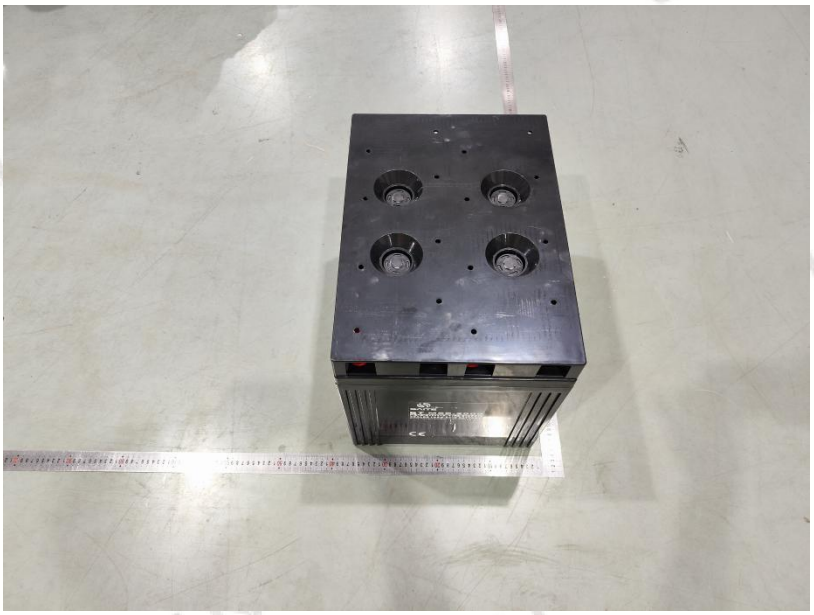
IEC 60896-22:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	shows increased sensitivity toward escalating temperature and current conditions.		
6.19	**Requirement for the impact of low temperature service on capacity**		**P**
6.19.1	The purpose of this requirement is to ensure that units experiencing abusive low temperature conditions during service life show a minimum of mechanical stability against freezing induced forces and adequate capacity recovery under specified conditions.		P
6.19.2	The result of this test documents how a particular unit design is capable of withstanding electrolyte freezing which may be encountered in installations without adequate thermal protection and mains supply stability.		P
6.20	**Requirement for dimensional stability at elevated internal pressures and temperatures**		**P**
6.20.1	The purpose of this requirement is to provide an indication of the susceptibility of the unit to “balloon out” or expand under certain conditions and may be of interest where cells/monoblocs are to be installed in areas of restricted space.		P
6.20.2	The result of the test documents for the designer of battery installations the potential deformations of the units to be expected and related clearances needed.		P
6.21	**Requirements for stability against mechanical abuse of units during installation**		**P**
6.21.1	The purpose of this requirement is to ensure that the unit design is mechanically robust enough to withstand standardized mechanical stresses during unpacked transport and installation.		P
6.21.2	The result of the test documents if impact forces on unit		P

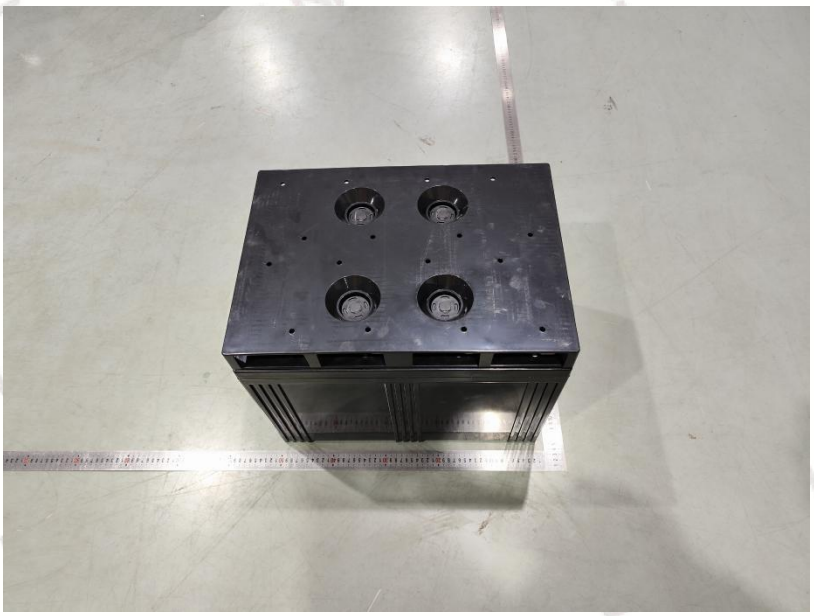
IEC 60896-22:2004			
Clause	Requirement + Test	Result - Remark	Verdict
	edges and corners will lead to electrolyte leakages. This test does not replace seismic or other specific vibration tests.		

4、Test data

1) General product type information					
product manufacture	SAITE POWER SOURCE (VIETNAM) CO., LIMITED				
Manufacturing site of tested product	Road No.6,An Phuoc IP,An Phuoc Ward,Long Thanh District, Dong Nai Province,Vietnam				
product name	Valve Regulated Sealed Lead Acid Battery				
Product tested	BT-MSE-2000（2V2000Ah）				
2) Product specification information					
Product safe operation in service	IEC 60896-21 test clause result				
6.2 High current tolerance	2.29V				
6.3 Short circuit current and d.c. internal resistance	Isc=8189A Ri =0.023Ω				
6.4 internal ignition from external spark sources	No rapid combustion, No explosion Conformity				
6.5 Protection against ground short propensity	No ground short, No leakage Conformity				
6.6 Content and durability of required markings	Information remain readable after test and content meet requirement				
6.7 Material identification	Case: ABS		Cover: ABS		
6.8 Valve operation	Before: a little		After: a little		
6.9 Flammability rating of materials	Case: HB75, V-0		Cover: HB75, V-0		
6.10 Intercell connector performance	54℃				
Product performance in service	IEC 60896-21 test clause result				
6.11 Discharge capacity (Ah)	C_{10}:2050.3	C_8:1992.8	C_3:1480.3	C:1111.6	$C_{0.25}$:220.2
6.14 Recharge behaviour	24h :96.2%		168h :100.2%		
Product durability in service	IEC 60896-21 test clause result				
6.17 Abusive over-discharge	87%		96%		
6.18 Thermal runaway sensitivity	24.6℃		24.8℃		
6.19 Low temperature sensitivity	0.974		0.986		
6.20 Dimensional stability at elevated internal pressure and temperature	The size did not change after the test compared to before the test				
6.21 Stability against mechanical abuse of units during installation	No leakage detectable		No leakage detectable		
Company name: Shenzhen United Testing Technology Co., Ltd. Company officer: Hoffer Lau Address/phone/fax/e-mail: No.47-3, Industrial Road, Zhushan, Dalong Street, Panyu District, Guangzhou, Guangdong, China Document established as reply for RFI: --					

5、Sample Photo

Details of:	Fig. 1 – Front view of Battery
	

Details of:	Fig. 2 – Side view of Battery
	

The sample picture is only used to inform the customer that the sample received by the laboratory is shown in the picture, which does not prove the appearance and quality of the customer's products.

This report replaces the test report numbered UNIB23060528FR-01 and the test report numbered UNIB23060528FR-01 is invalid.

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

声明/ Statement

1、本报告必须有授权签字人签名和报告专用章，否则视为报告无效。若 PDF 格式的报告中若无本实验室的防伪电子章或显示为“×”，报告无效。

This report must have the signature of the authorized signatory and the special seal of the report, otherwise it will be considered invalid. If there is no anti-counterfeiting electronic seal of the laboratory in the report in PDF format or it is displayed as "×", the report is invalid.

2、本报告不得擅自修改、增加和删除。

This report shall not be modified, added or deleted without authorization.

3、本报告的结果只对委托方提供给本实验室检验检测的样品（即本实验室收到的样品。无特殊说明，指报告“Sample Photo(s)”中所呈现的样品）有效。

The results of this report are only valid for the samples provided by Applicant to our laboratory for inspection (That is, samples received by our laboratory.Without special explanation, it refers to the samples presented in the report "Sample Photo(s)").

4、若对本报告的测试数据和结论有异议，请在报告签发日期后 10 个工作日内以书面形式提出，逾期不予受理。

If there is any objection to the test data and conclusions of this report, please submit it in writing within 10 working days after the date of issuance of the report.

5、未经本实验室书面同意，不得复制本报告（全文复制除外），亦不可作为宣传品或者广告使用。

Without the written consent of the laboratory, this report shall not be copied (except for full copy), nor shall it be used as publicity materials or advertising.

6、报告封面仅作装饰用，不在报告正文内。

The cover of the report is for decoration only, not included in the body of the report.

7、本实验室出具的纸质报告与电子版报告具备相同的效力，当两者内容有差异时，以电子版报告为准。

The paper report issued by our laboratory has the same effect as the electronic report. In case of any difference between the two, the electronic report shall prevail.

8、本实验室出具的中文和英文的报告具备相同的效力，当理解出现差异时，以中文为准。

The Chinese and English reports issued by our laboratory have the same effect. In case of any difference in understanding, the Chinese version shall prevail.

9、查询报告时请提供本实验室出具的完整的报告文档。

Please provide the complete report documents issued by our laboratory when inquiring the report.

10、对于需要根据测试值做符合性判定的情况，相关的规范、标准、文件和客户无相关要求且无特殊说明时，本实验室出具的检验检测报告采用全数值进行且采用ILAC-G8:09/2019中“Simple Acceptance Rule（简单接受规则）”进行判定。

For cases where compliance is determined based on test values, when relevant specifications, standards, documents, and customers have no relevant requirements and no other special instructions, the test report issued by this laboratory is carried out in full value and adopts ILAC-G8:09 /2019 "Simple Acceptance Rule" for judgment.

11、在中华人民共和国境内，本报告无CMA认可状态标识时，报告仅供科研、教学或内部质量控制等活动使用。

In the People's Republic of China, when there is no CMA Accredited Symbol in this report, the report is only for scientific research, teaching or internal quality control activities.