BATTERY TEST REPORT

IEC 60896-21 : 2004

IEC 60896-22 : 2004

Report Reference No.....	**: TQ2212011**
Tested by (printed name and signature)	**: Le Tan Phong**
Approved by (printed name and signature)	**: Adam Chen**
Date of issue.....	**: 2022-12-14**
Testing laboratory.....	: Laboratory Le Long Viet Nam Limited Company
Address.....	: Cum Cong Nghiep Duc My, Xa Duc Hoa Dong, Huyen Duc Hoa, Tinh Long An, 81999 Viet Nam . Tell:+84-72-3779666
Applicants Name.....	: KUNG LONG BATTERIES INDUSTRIAL CO., LTD
Address.....	: No., 6 Tzu-Li 3 Road,Nantou City 54067, Nantou Hsien, Taiwan
Test Specification:	
Standard.....	**: IEC 60896-21:2004 and IEC 60896-22:2004**
Non-standard test method.....	**: N/A**
Test Report Form No.....	**: IEC 60896-21:2004 and IEC 60896-22:2004**
Test item description.....	**: Valve Regulated Lead-Acid Battery**
Trade Mark.....	**: LONG**
Model/Type reference.....	**: WPL5-12**
Series model.....	**: N/A**
Rating(s)	**: 12V 5Ah**
Battery dimension.....	**: 90mm x 70mm x 107mm (LxWxH)**

Possible Test Case Verdicts:

Test case does not apply to the test object.....*N/A*

Test object does meet the requirement.....*P(Pass)*

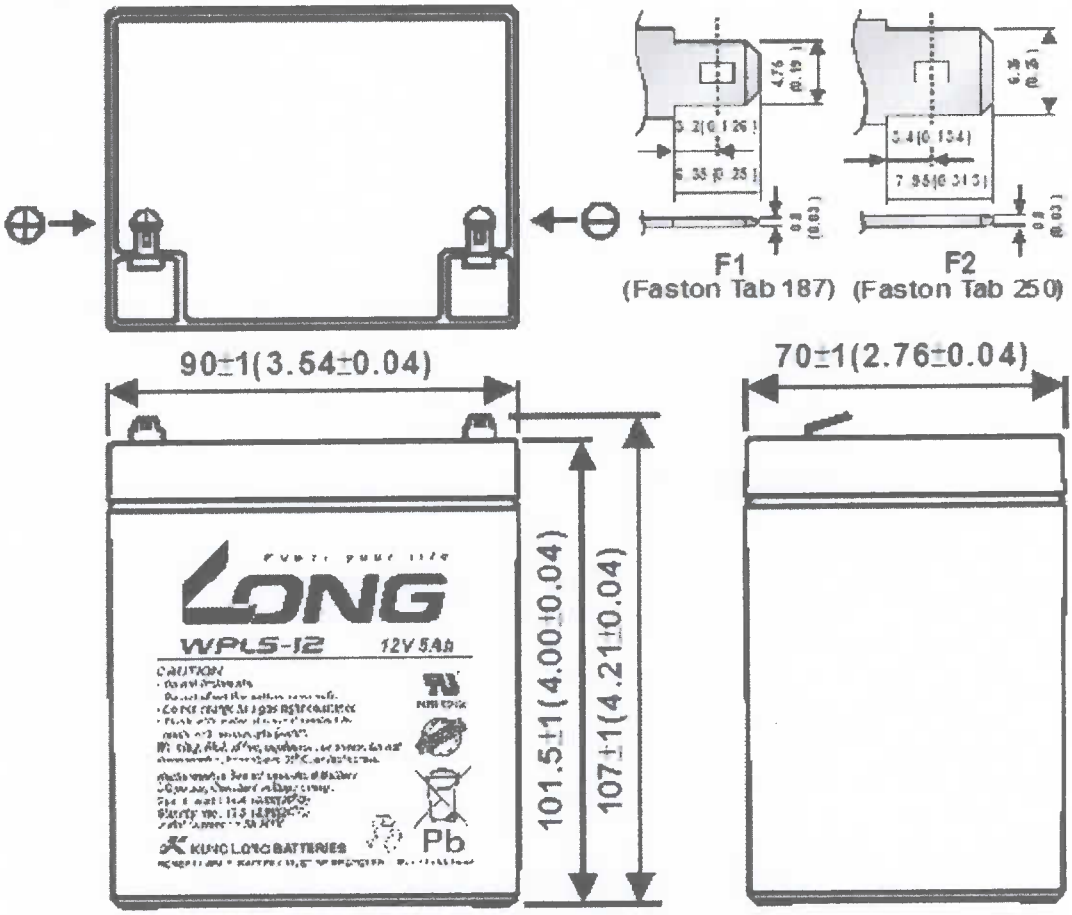
Test object does not meet the requirement.....*F(Fail)*

Testing Laboratory information:

Laboratory Le Long Viet Nam Limited Company

Cum Cong Nghiep Duc My, Xa Duc Hoa Dong, Huyen Duc Hoa, Tinh Long An, 81999 Viet Nam . Tell: +84-72-3779666

Trade Mark And Dimension:



1. Test Item:

No	Test Item	Clauses.	Verdict
1	Gas Emission	6.1	p
2	High current tolerance (High current discharge capacity)	6.2	P
3	Short circuit current and DC internal resistance	6.3	P
4	Protection against internal ignition from external spark sources	6.4	P
5	Protection against ground short propensity	6.5	P
6	content and durability of required markings	6.6	P
7	Material Identification	6.7	P
8	Valve operation	6.8	P
9	Flammability rating of materials	6.9	P
10	Intercell connector performance	6.10	P
11	Discharge Capacity	6.11	P
12	Charge retention during storage	6.12	P
13	Float service with daily discharges 25℃,80%	6.13	P
14	Recharge behavior	6.14	P
15	Service life at an operating temperature of 40℃ all units to 0.8 C_{rt}	6.15	P
16	Impact of a stress temperature of 60℃,80%	6.16	P
17	Abusive over- discharge	6.17	P
18	Thermal run away sensitivity	6.18	P
19	Low temperature sensitivity	6.19	P
20	Dimensional stability at elevated internal pressure and temperatures	6.20	P
21	Stability against mechanical abuse of units during installation	6.21	P

2. Test Result:

No.	Test Item	Clauses.	Technical Specification	Test data
1	Gas Emission (V=Voltage per cell)	6.1	U_{flo}≤0.05ml/cell • h • Ah（25℃）	0.0057
			2.40Vpc≤1.70ml/cell • h • Ah（25℃）	0.0085
2	High current tolerance (High current discharge capacity)	6.2	Discharge with 3 times of 15min rate current, or with a current equal to the maximum allowable discharge current. there is no melting or continuous power loss. V_{5min} >2. 0Vpc	Discharge with 3 times of 15min large current, there is no melting or continuous power loss. V_{5min}=12.96Voltage
3	Short circuit current and DC internal resistance	6.3	I_{sc}	- I_{sc} (Short Circuit Current (A)): 216A
			Internal Resistance	- 19.0 mΩ（measured by HIOKI 3554 Battery Hitester）
4	Protection against internal ignition from external spark sources	6.4	There is no fast burn or explosive apart from valve	There is no fast burn or explosive apart from valve
5	Protection against ground short propensity	6.5	No earthing short or leakage	No earthing short or leakage
6	content and durability of required markings	6.6	Marks are easy for long-lasting	Marks are easy for long-lasting
7	Material Identification	6.7	ISO symbol is visible, and the symbol is remain after put in chemical reagent place	ISO symbol is visible, and the symbol is remain after put in chemical reagent place
8	Valve operation	6.8	Check the gas outlet before and after high-temp.	Open/close valve pressure (Kpa)is: Bef. high-temp.: 22.4/20.6 After high-temp.: 23.3/21.2
9	Flammability rating of materials	6.9	Indicate sample's value with same thickness of containers and lids	ABS UL94 HB
10	Intercell connector performance	6.10	Indicate highest temp. reached	35.8℃
11	Discharge Capacity	6.11	C_{10}≥4.75Ah	112.4 % @0.475A
			C_8≥ 4.60Ah	114.5% @0.575A
			C_3≥3.75Ah	116.8% @1.25A
			C_1≥3.00Ah	118.3% @3.00A
			$C_{0.25}$≥ 1.75Ah	119.6% @7.00A

12	Charge retention during storage	6.12	≥70%	78.2%
13	Float service with daily discharges 25℃,80%	6.13	Total Cycle times≥300	405 times
14	Recharge behavior	6.14	R_{bf24h}≥90%	96.7%
			R_{bf168h}≥98%	100.4%
15	Service life at an operating temperature of 40℃ all units to 0.8 C_{rt}	6.15	- Brief duration exposure time≥500d - Medium duration exposure time≥750d - Long duration exposure time≥1100d - Very long duration exposure time≥1700d	1705d (Very long duration exposure time)
16	Impact of a stress temperature of 60℃,80%	6.16	- Brief duration exposure time≥105d - Medium duration exposure time175d - Long duration exposure time≥250d - Very long duration exposure time≥350d	353d (Very long duration exposure time)
17	Abusive over-discharge	6.17	Unbalanced series over discharge C_{aod}> 0.80	0.87
			Cycle over discharge C_{aoc} > 0.90	0.98
18	Thermal run away sensitivity	6.18	Battery temperature change at 2.40VPC, the temperature after 168h	23.8℃
			Battery temperature change at 2.60VPC, the temperature after 168h	29.7℃
19	Low temperature sensitivity	6.19	C_{als}>95%	96.5%
20	Dimensional stability at elevated internal pressure and temperatures	6.20	percentage deviation over the girth value	ΔL=0.05%
21	Stability against mechanical abuse of units during installation	6.21	No fracture or leak of the battery case	No fracture or leak of the battery case

— — — The End of Test Report — — —