TRANSPORTATION INFORMATION

LITHIUM BATTERY PACK TEST SUMMARY AND SUPPLIER INQUIRY

IN ACCORDANCE WITH SUB-SECTION 38.3 OF (UN3171、UN3481、UN3480)

(Manual of tests and criteria Rev. 6, Part 111, sub-section
UN38.3 & drop test 2023 IATA DGR 64nd Edition)

1. Name of cell / battery

BF-HP2-36150SS BATTERY PACK

2. Manufacturer of cell / battery

Name	BOOFA ELECTRIC CO.,LTD
Address	5F., No. 1490, Chunri Rd., Taoyuan Dist., Taoyuan City 330022 , Taiwan (R.O.C.)
Phone	+886-3-333-2298
Email	Info.boofa@gmail.com
Website	www.boofa.com.tw

3. Test laboratory of cell / battery

Name	BOOFA ELECTRIC CO., LTD
Address	5F., No. 1490, Chunri Rd., Taoyuan Dist., Taoyuan City 330022 , Taiwan (R.O.C.)
Phone	+886-3-3332298
Email	Info.boofa@gmail.com
Website	www.boofa.com.tw

4. Report number and date

Unique test report identificat	UN230535110BF
Date of test report	2023/05/28

5. Description of Cell / Battery

Parameters	
Cell / Battery Type	Lithium-ion Battery Pack
Cell or Battery	BATTERY
Cell Brand	SAMSUNG-21700-50E
Product Model	BF-HP2-36150SS
Nominal Voltage	36V
Nominal Capacity	15.0Ah
Watt per hour	540Wh
Battery weight	3.2Kg
Description of battery	E-BIKE Battery

6. Tests and Results

Each cell and battery type must be subject to Tests 1 to 8. Tests 1 to 5 must be conducted in sequence on the same cell or battery. Tests 6 and 8 should be conducted using not otherwise tested cells or batteries. Test 7 may be conducted using undamaged batteries previously used in Tests 1 to 5 for purposes of testing.

TRANSPORTATION INFORMATION

Test Items		Test Procedures	Criteria	Results
T1	Altitude	Test cells and batteries shall be stored at a pressure of 11.6kPa or less for℃at least six hours at ambient temperature (20±5). ℃	No mass loss (not exceeding 0.5%), no leakage, no venting, no disassembly, no rupture and no fire and if the Open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.	Pass
	Cycling	Test cells and batteries are to be stored for at least six hours at a test temperature equal to 75±2 , followed by storage for at least six hours at a test temperature ℃ equal to -40±2 . The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated 10 times, after which all test cells and batteries are to be stored for 24 hours at ℃ ambient temperature (20±5). For large cells and batteries, the duration of exposure to the test temperature extremes should be at least 12 hours.	No mass loss (not exceeding 0.5%), no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.	
T3	Vibration	Cells and batteries are firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cells. One of the directions of vibration must be perpendicular to the terminal face. The logarithmic frequency sweep is as follows: From 7 Hz at peak acceleration of 1 gn is maintained until 18 Hz is reached, the amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency increased until a peak acceleration of 8 gn occurs (approximately 50Hz), and then maintained until the frequency is increased to 200 Hz.	No mass loss (not exceeding 0.5%), no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.	Pass

TRANSPORTATION INFORMATION

T4	Shock	Test cells and batteries shall be secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery. Each cell or battery shall be subject to a half-sine shock of peak acceleration of 150 gn and pulse duration of 6 milliseconds; and three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the cells or batteries for a total of 18 shocks. However, each large cell and battery shall be subject to a half-sine or peak acceleration of 50 gn and pulse duration of 11 milliseconds; and three shocks in the positive direction followed by three shocks in the negative direction of each of three mutually perpendicular mounting positions of the cells for a total of 18 shocks.	No mass loss (not exceeding 0.5%), no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90% of its voltage immediately prior to this procedure.	Pass
T5	External Short Circuit	The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches ℃ 55±2 and then the cell or battery shall be subject to a short circuit condition with a total external resistance ℃ of less than 0.1 ohm at 55±2 . This short circuit condition is continued for at least one hour after the external case temperature of the cell or battery has ℃ returned to 55±2 . The cell or battery must be observed for a further six hours for the test to be concluded.	Ext rnal temperature does not exceed 170 ; and there is no disassembly, no rupture and no fire within six hours of this test.	Pass
T6	Impact	The test sample cell or component cell is to be placed on a flat surface. A 15.8 mm diameter bar is to be placed across the centre of the sample. A 9.1kg mass is to be dropped from a height of 61±2.5 cm onto the sample. A cylindrical or prismatic cell is to be impacted with its longitudinal axis of the 15.8.mm diameter curved surface lying across the centre of the test sample. A prismatic cell is also to be rotated 90 degrees around its longitudinal axis so that both the wide and narrow sides will be subject to the impact. Each sample is to be subject to only a single impact. Separate samples are to be used for each impact. A coin or button cell is to be impacted with the flat surface and the 15.8 mm diameter curved surface lying across its centre.	Ext rnal temperature does not exceed 170 ; and there is no disassembly, no rupture and no fire within six hours of this test.	Pass

TRANSPORTATION INFORMATION

	T7	Overcharge	The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows: (a) When the manufacturer's recommended charge voltage is not more than 18V, the Minimum voltage of the test shall be the lesser of two times the maximum charge Voltage of the battery or 22V. (b) When the manufacturer's recommended charge voltage is more than 18V, the Minimum voltage of the test shall be 1.2 times the maximum charge voltage. Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours.	no disassembly and no fire within seven days of the test.	Pass
	T8	Forced Discharge	Each cell shall be forced discharged at ambient temperature by connecting it in series with a 12 V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer. The specified discharge current is to be obtained by connecting a resistive load of the appropriate size and rating in series with the test cell. Each cell shall be forced discharged for a time interval (in hours) equal to its rated capacity divided by the initial test current (in Ampere).	No disassembly and no fire within seven days of the test.	Pass

Sample size: T1 to T5: 10 pcs; T6: 5 pcs; & T8: 10 pcs

(B) Drop Test

Test Items	Conditions	Criteria	Results
Package Drop Test	The package shall be dropped from 1.2 meters high onto a concrete surface (flat and horizontal) with five orientations (drop once a sample).	No deformation.	Pass

We declare that the above-mentioned tests are the results of being checked according to UN3480 UN3481 Test (Manual of tests and criteria ST/SG/AC.10/11/ Rev.6, Part III, sub-section 38.3)

Signed for and on behalf of BOOFA ELECTRIC CO., LTD.

Ricky Lee
Engineering
Manager

寶華電子公司有限印

Important! The above signatory / signatories affirm that this document is a true and correct summary of the original individual tests and test data. The original test data is confidential information available to competent State Authorities with valid identification and only upon their formal request.
Disclosure of the original test data to any other entity upon its request will be considered by BooFa and, should BooFa consider this request is with merit, may be subject to the prior execution of a nondisclosure agreement.