TEST REPORT

IEC 62619: 2017

Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for secondary lithium cells and batteries, for use in industrial applications

Report Number	TCT230810B011
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Testing laboratory	Shenzhen TCT Testing Technology Co., Ltd.
Address	2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Testing location	As above

Applicant's name	SHENZHEN TAICO TECHNOLOGY CO.,LTD
Address	Room 1035, 1036, 1038, Dongming Building, Minkang Road, Zhangkeng Community, Minzhi Street, Longhua District, Shenzhen.
Manufacturer's name	Huizhou TPOWER Energy Technology Co., Ltd.
Address	3rd Floor, Building B, Shenli Economic Association Airport (local name),Yuanzhou town, Boluo County, Huizhou

Test specification :	
Standard	IEC 62619: 2017
Test procedure	Type approved
Test result	Pass
Non-standard test method	N/A

This test report is specially limited to the above client company and product model only, It may not be duplicated without prior written consent of Shenzhen TCT Testing Technology Co., Ltd.

Test item description	$LiFePO_4$ Battery Module
Trade Mark	N/A
Model/type reference	51.2V 210Ah
Ratings	51.2V, 210Ah, 10.752KWh

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List of Attachments (including a total number of pages in each attachment):

Attachment 1: Photo documentation (page 16-18)

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
cl.5.6.2 Design recommendation(Lithium system); cl.7.1 Charging procedure for test purposes (for Cells and Pack); cl. 7.2.1 External short-circuit test (cell or cell block); cl. 7.2.2 Impact test (cell or cell block); cl. 7.2.3 Drop test (cell or cell block, and battery system); cl. 7.2.4 Thermal abuse test (cell or cell block); cl. 7.2.5 Overcharge test (cell or cell block); cl. 7.2.6 Forced discharge test (cell or cell block); cl. 7.3.2 Internal short-circuit test (cell); cl. 8.2.2 Overcharge control of voltage (battery system) cl. 8.2.3 Overcharge control of current (battery system); cl. 8.2.4 Overheating control (battery system);	**Shenzhen TCT Testing Technology Co., Ltd.** 2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China

Summary of compliance with National Differences:

☒**The product fulfils the requirements of EN 62619: 2017**

Copy of marking plate：

The artwork below may be only a draft

- $LiFePO_4$ Battery Module
  Model: 51.2V 210Ah 16IFpP/38/131/201/M/-20+55/N/A-2
  3.2V, 210Ah, 10.752KWh
  Huizhou TPOWER Energy Technology Co., Ltd.
+ Date: YYYYMMDD Made in China

WARNING: Risk of Fire and Burns. Do Not Open, Crush, Heat Above 60°C/140°F or Incinerate. Do not short circuit. If bulges severely, discontinue use. Follow Manufacturer's Instructions.

Remark: YYYYMMDD represents the date of manufacture.
"YYYY" represents the year,
"MM" represents the month,
"DD" represents the day.

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Test item particulars..... :	
Classification of installation and use..... :	To be defined in final product
Supply connection..... :	Alloy electrode column
Recommend charging method declared by the manufacturer..... :	Charging the battery with 40A constant current until 51.2V and then constant voltage until charging current reduces to 10.5A at ambient 20°C±5°C.
Discharge current (0.2 ItA)..... :	42A
Specified final voltage..... :	40.0V
Chemistry ..... :	☐ nickel systems ..... ☒ lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell..... :	3.65V
Maximum charging current ..... :	100A
Charging temperature upper limit ..... :	55°C
Charging temperature lower limit..... :	0°C
Polymer cell electrolyte type ..... :	☐ gel polymer ☐ solid polymer ☒ N/A
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..... :	
Date of receipt of test item ..... :	2023-07-01
Date (s) of performance of tests ..... :	2023-07-03 to 2023-08-11

General remarks:

The test results presented in this report relate only to the object tested,
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"(CXX #)" refers to sample number of cells, "X" is 0~9;
"(BXX #)" refers to sample number of batteries, "X" is 0~9;
"(see below table)" refers to a table appended to the report.

Throughout this report a point is used as the decimal separator.

Name and address of factory (ies) ..... : Same as manufacturer

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General product information:

This battery is constructed with thirty-two Lithium-ion cells (16S2P), and has overcharge, over-discharge, over current and short-circuits proof circuit.

The main features of the cell in the battery pack are shown as below:

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
LF105	105Ah	3.2V	52.5A	52.5A	105A	105A	3.65V	2.5V

The main features of the cell in the battery pack are shown as below:

Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
LF105	3.65V	5.25A	0°C	55°C

The main features of the battery pack are shown as below:

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
51.2V 105Ah	210Ah	51.2V	40A	200A	100A	200A	58.4V	40.0V

Construction:



T: 140mm max W: 560m max L: 840mm max
Battery

4	**Parameter measurement tolerances**		**P**
	Parameter measurement tolerances		P

5	**General safety considerations**		**P**
5.1	General		P
5.2	Insulation and wiring		P
	Wiring and its insulation shall be sufficient to withstand the maximum anticipated voltage, current, temperature, altitude and humidity requirements		P
	The design of wiring shall be such that adequate clearances and creepage distances are maintained between conductors.		P
	The mechanical integrity of the whole battery system (cell/module/BMS) and their connections shall be sufficient to accommodate conditions of reasonably foreseeable misuse		P
5.3	Venting		P
	The casing of a cell, module, battery pack, and battery system shall incorporate a pressure relief function that will preclude rupture or explosion. If encapsulation is used to support cells within an outer case, the type of encapsulant and the method of encapsulation shall neither cause the battery system to overheat during normal operation nor inhibit pressure relief.	Venting mechanism exists on top of the prismatic cell.	P
5.4	Temperature/voltage/current management		P
	The design of batteries shall be such that abnormal temperature-rise conditions are prevented.	Overcharge, over-discharge, over current and short-circuit proof circuit used in this battery..	P
	Battery systems shall be designed within voltage, current, and temperature limits specified by the cell manufacturer.	See above.	P
	Battery systems shall be provided with specifications and charging instructions for equipment manufacturers so that associated chargers are designed to maintain charging within the voltage, current and temperature limits specified.	The charging limits specified in the manufacturer's specifications.	P
5.5	Terminal contacts of the battery pack and/or battery system		P
	Terminals shall have clear polarity marking(s) on the external surface of the battery pack or battery system.		P
	The size and shape of the terminal contacts shall ensure that they can carry the maximum anticipated current.		P
	External terminal contact surfaces shall be formed from conductive materials with good mechanical strength and corrosion resistance.		P

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	Terminal contacts shall be arranged so as to minimize the risk of short-circuits, for example to minimize the risk of shortcircuits by metal tools.		P
5.6	Assembly of cells, modules, or battery packs into battery systems		P
5.6.1	The assembly of cells, modules, or battery packs to constitute the battery system shall respect the following rules in order to support adequate mitigation of risks into the battery system:	Complied.	P
	Each battery system shall have an independent control and protection method(s).		P
	The cell manufacturer shall provide recommendations about current, voltage and temperature limits so that the battery system manufacturer/designer may ensure proper design and assembly.		P
	Batteries that are designed for the selective discharging of a portion of their series connected cells shall incorporate separate circuitry to prevent the cell reversal caused by uneven discharging.		P
	Protective circuit components should be added as appropriate and consideration given to the end-device application.		P
5.6.2	Battery system design		P
	The voltage control function of the battery system design shall ensure that the voltage of each cell or cell block shall not exceed the upper limit of the charging voltage specified by the manufacturer of the cells, except in the case where the stationary application devices or motive application devices provide an equivalent voltage control function.	Complied.	P
	The following should be considered at the battery system level and by the battery manufacturer:		N/A
	For the battery system which has series-connected plural single cells, modules or battery packs, it is recommended that the voltages of any one of the single cells or cell blocks do not exceed the upper limit of the charging voltage, specified by the cell manufacturer, by monitoring the voltage of every single cell or cell block.		N/A
5.7	Operating region of lithium cells and battery systems for safe use		P
	The cell manufacturer shall specify the cell operating region. The battery manufacturer shall design the battery system to comply with the cell operating region. Determination of the cell operating region is explained in Annex A.		P
5.8	Quality plan		

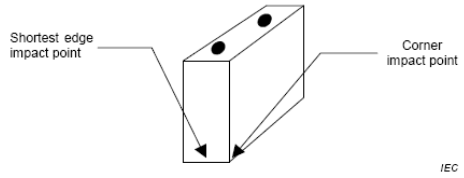
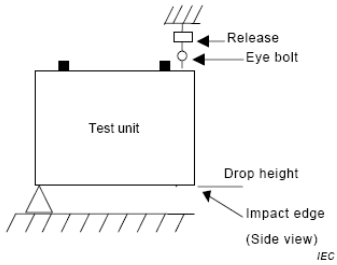
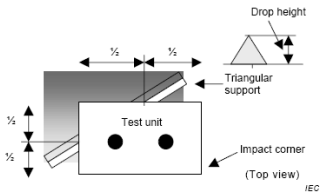
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	The battery system manufacturer shall prepare and implement a quality plan that defines rocedures for the inspection of materials, components, cells, modules, battery packs, and battery systems and which covers the whole process of producing each type of cell, module, battery pack, and battery system (e.g. ISO 9001, etc.). Manufacturers should understand their process capabilities and should institute the necessary process controls as they relate to product safety.	Complied. ISO 9001: 2015 Certificate provided.	P

6	**Type test conditions**		**P**
6.1	**General**		
	A battery system that is used outside of its operating region may exhibit hazards resulting from the cells or batteries. Such risks have to be taken into consideration in order to prepare a safe test plan.	Complied.	P
	The test facility should have a sufficient structural integrity and a fire suppression system to sustain the conditions of overpressure and fire that may occur as a result of testing. The facility should have a ventilation system to remove and capture gas which might be produced during the tests. Consideration should be given to high voltage hazards when applicable.		P
6.2	**Test items**		
	Tests are made with the number of cells or batteries specified in Table 1, using cells or batteries that are not more than six months old. Cells or batteries charged by the method specified in 7.1 shall deliver the rated capacity or more when they are discharged at 25 °C ± 5 °C, at a constant current of 0,2 It A, down to a specified final voltage. This capacity confirmation may be done in the manufacturer shipping inspection. In the case of a battery, the capacity may be calculated on the basis of the cell capacity measurements during the shipping inspection.		
	Unless otherwise specified, tests are carried out in an ambient temperature of 25 °C ± 5 °C.	Tests are carried out at 20°C ± 5°C.	

7	**Specific requirements and tests**		**P**
7.1	Charging procedure for test purposes		P
	Prior to charging, the battery shall be discharged in an ambient temperature of 25 °C ± 5 °C, at a constant current of 0,2 It A, down to a specified final voltage.	Complied.	P
	Unless otherwise stated in this document, cells or batteries shall be charged in an ambient temperature of 25 °C ± 5 °C, in using the method specified by the manufacturer	Tests are carried out at 20°C ± 5°C.	P
7.2	Reasonably foreseeable misuse		P
7.2.1	External short-circuit test (cell or cell block)		P

	Fully charged cells are stored in an ambient temperature of 25 °C ± 5 °C. Each cell is then short-circuited by connecting the positive and negative terminals with a total external resistance of 30 mΩ ± 10 mΩ.		P
	The cells are to remain on test for 6 h or until the case temperature declines by 80 % of the maximum temperature rise, whichever is the sooner.	the case temperature declines by 80 % of the maximum temperature rise	P
	Results: No fire. No explosion	No fire. No explosion.	P
7.2.2	Impact test (cell or cell block)		P
	The cell or cell block shall be discharged at a constant current of 0,2 It A, to 50 % SOC.	Complied.	P
	The cell or cell block is placed on a flat concrete or metal floor. A type 316 stainless steel bar with a diameter of 15,8 mm ± 0,1 mm and at least 60 mm in length or the longest dimension of the cell, whichever is greater, is placed across the centre of the cell or cell block. A 9,1 kg rigid mass is then dropped from a height of 610 mm ± 25 mm onto the bar placed on the sample.		P
	cylindrical or prismatic cell is to be impacted with its longitudinal axis parallel to the flat concrete or metal floor and perpendicular to the 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 subjected to the impact. Each sample is to be subjected to only a single impact with separate samples to be used for each impact .		P
	Results: No fire. No explosion.	(See Table 7.2.2)	P
7.2.3	Drop test (cell or cell block, and battery system)		P
7.2.3.2	Whole drop test (cell or cell block, and battery system)		P
	This test is applied when the mass of the test unit is less than 20 kg.	Cell less than 20 kg.	P
	Each fully charged test unit is dropped three times from a height shown in Table 2 onto a flat concrete or metal floor.		P
	In the case where the mass of the test unit is less than 7 kg, the test unit is dropped so as to obtain impacts in random orientations. In the case where the mass of the test unit is 7 kg or more but less than 20 kg, the test shall be performed with the test unit dropped in the bottom down direction. The bottom surface of the test unit is specified by the manufacturer.		P
	After the test, the test units shall be put on rest for a minimum of 1 h, and then a visual inspection shall be performed.		P
	Results: No fire. No explosion.	No fire. No explosion.	P
7.2.3.3	Edge and corner drop test (cell or cell block, and battery system)	Battery system more than 20 kg.	P
	This test is applied when the mass of the test unit is 20 kg or more.		P

	Each fully charged test unit is dropped two times from a height shown in Table 2 onto a flat concrete or metal floor. The drop test conditions shall assure, with test arrangements as shown in Figure 2, Figure 3 and Figure 4, reproducible impact points for the shortest edge drop impact and the corner impacted. The two impacts, per impact type, shall be on the same corner and on the same shortest edge. For the corner and edge drops, the test unit shall be oriented in such a way that a straight line drawn through the corner/edge to be struck and the test unit geometric centre is approximately perpendicular to the impact surface.		P
	 **Figure 2 – Impact location**  **Figure 3 – Configuration for the shortest edge drop test**  Smaller units can be dropped from a hand-held position. If a lifting-release device is used, it should not, on release, impart rotational or sideward forces to the unit. **Figure 4 – Configuration for the corner drop test**		P
	Results: No fire. No explosion.	No fire. No explosion.	P
7.2.4	Thermal abuse test (cell or cell block)		P
	Each fully charged cell, stabilized in an ambient temperature of 25 °C ± 5 °C, is placed in a gravity or circulating air-convection oven.		P
	The oven temperature is raised at a rate of 5 °C / min ± 2 °C /min to a temperature of 85 °C ± 5 °C.		
	Results: No fire. No explosion. No leakage.	No fire. No explosion. No leakage	P
7.2.5	Overcharge test (cell or cell block)		P

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	This test shall be performed for those battery systems that are provided with only a single control or protection for the charging voltage control. For those battery systems provided with two or more independent protection(s) or control(s) for the charging voltage control, this test may be waived.		P
	The test shall be carried out in an ambient temperature of 25 °C ± 5 °C. Each test cell shall be discharged at a constant current of 0,2 It A to a final voltage specified by the manufacturer. Sample cells shall then be charged with a constant current equal to the maximum specified charging current of the battery system until the voltage reaches the maximum voltage value that is possible under the condition where the original charging control does not work. Then, the charging is terminated. The voltage and temperature should be monitored during the test.		P
	The test shall be continued until the temperature of the cell surface reaches steady state conditions (less than 10 °C change in a 30-minute period) or returns to ambient temperature.		P
	Results: No fire. No explosion.	No fire. No explosion	P
7.2.6	Forced discharge test (cell or cell block)		P
	A discharged cell is subjected to a forced discharge at a constant current of 1,0 It A for a test period of 90 min. At the end of the test period, a visual inspection shall be performed.		P
	If the voltage in discharge reaches the target voltage shown below within the test period, the voltage shall be kept at the target voltage by reducing the current for the remaining test period. The target voltage is determined as follows:		P
	i) If the battery system is provided with two or more independent protection(s) or control(s) for discharging voltage control or the battery system has only a single cell or cell block: Target voltage = – (upper limit charging voltage of the cell) ii) If the battery system is provided with only a single or no protection for the discharging voltage control: Target voltage = – [upper limit charging voltage of the cell × (n-1)]. where n is the number of cells connected in series in the battery system.		P

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	If the maximum discharging current of the cell is less than 1,0 It A, perform a reverse charging at the current for the test period shown below: $t = \frac{1I_t}{I_m} \times 90$ where t is the test period (min.); Im is the maximum discharging current of the cell (A).		P
	Results: No fire. No explosion.	No fire. No explosion	P
7.3	Considerations for internal short-circuit – Design evaluation		P
7.3.2	Internal short-circuit test (cell)		P
	Refer to 8.3.9 of IEC 62133:2012 for the test method except for the test temperature. All the tests are carried out in an ambient temperature of 25 °C ± 5 °C.		P
	The sample preparation procedure may be changed from the procedure outlined in IEC 62133 prior to performing the final pressing process with the corresponding charging procedure according to 8.3.9 of IEC 62133:2012. For example: – the nickel particle may be inserted into a discharged electrode element and then charged, or – the nickel particle may be inserted into the electrode element before electrolyte filling and then it may be assembled, filled with electrolyte and charged. In these assemblies, a polyethylene bag and/or an aluminium-laminated bag can be used instead of the metal case for the actual cell.		P
	In the case of a prismatic cell with either a stacking type or folding type electrode element, the nickel particle should be inserted at the centre of the end positive and negative electrode pair, and the maximum pressing pressure is 400 N.		N/A
	To judge that an internal short between the positive and negative electrodes or substrate has occurred, it is acceptable to use a voltage drop less than 50 mV if a high accuracy voltage meter with enough accuracy to detect the voltage drop is used, and the actual short-circuit location can be confirmed with an inspection of the internal short-circuit location on the sample after the test.		P
	The applied pressure and the voltage behaviour shall be recorded, and the appearance of the short-circuit location shall be recorded by photograph or other means.		P
	Results: No fire. No explosion.	No fire. No explosion	P
8	Battery system safety (considering functional safety)		P
8.2	Battery management system (or battery management unit)		P

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	The BMS evaluates the condition of cells and batteries, and it maintains cells and batteries within the specified cell operating region. The BMS shall be designed according to the safety integrity level (SIL) target defined in 8.1 c). Key factors of the cell operating region are voltage, temperature and current. (See Figure A.1)		P
	To evaluate the charge control that affects safety, the battery system manufacturers shall perform the tests mentioned in 8.2.2 to 8.2.4.		P
	For these tests, the battery system includes the BMS function in the application side as well, if applicable to the design.		P
8.2.2	Overcharge control of voltage (battery system)		P
	The test shall be carried out in an ambient temperature of 25 °C ± 5 °C and under normal operating conditions with the cooling system (if any) operating (main contactors are closed with the battery system controlled by the BMS). Each test battery system shall be discharged at a constant current of 0,2 It A, to a final voltage specified by the manufacturer. Sample batteries shall then be charged at the maximum current of the recommended charger with set voltage exceeding the upper limit charging voltage by 10 % for each cell in the battery.		P
	The exceeded voltage can be applied by an additional charger if it is difficult to do it by the original charger. Also the exceeded voltage can be applied to only a part of the system such as the cell(s) in the battery system, if it is difficult to do it in using the whole battery system. See Figure 6.		P
	The test shall be carried out until the BMS terminates the charging, which should occur before reaching 110 % of the upper limit charging voltage. Data acquisition/monitoring shall be continued for 1 h after charging is stopped. All functions of the battery system shall be fully operational as designed during the test.		P
	Results: No fire. No explosion.	No fire. No explosion	P
8.2.3	Overcharge control of current (battery system)		P
	The test shall be carried out in an ambient temperature of 25 °C ± 5 °C and under normal operating conditions with the cooling system (if any) operating (main contactors closed with the battery system being controlled by the BMS). Each test battery system shall be discharged at a constant current of 0,2 It A, to a final voltage specified by the manufacturer. Sample batteries shall then be charged at a current exceeding the maximum chargingcurrent by 20 %. Data acquisition/monitoring shall be continued for 1 h after charging is stopped. All functions of the battery system shall be fully operational as designed during the test		P
	Results: No fire. No explosion.	No fire. No explosion	P
8.2.4	Overheating control (battery system)		P

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	The test shall be carried out in an initial ambient temperature of 25 °C ± 5 °C and under normal operating conditions (main contactors are closed with battery system being controlled by the BMS) with the exception that the cooling system, if provided, shall be disconnected. Each test battery system shall be discharged at a constant current of 0,2 It A, to a final voltage specified by the manufacturer. Sample batteries shall then be charged at the recommended current to a 50 % state of charge. The temperature of the battery system shall be increased to 5 °C above the maximum operating temperature. The charging is continued at the elevated temperature until the BMS terminates the charging. Data acquisition/monitoring shall be continued for one hour after the sequence is stopped (e.g. the BMS has terminated charging).		P
	The BMS shall detect the overheat temperature and shall terminate charging in order to protect the battery system against further related severe effects. All functions of the battery system shall be fully operational as designed during the test.		P
	Results: No fire. No explosion.	No fire. No explosion	P

9	**Information for safety**		**P**
`	The use, and particularly abuse, of secondary lithium cells and batteries may result in the creation of hazards and may cause harm.	Information for safety mentioned in manufacturer's specifications.	P
	The cell manufacturer shall provide information about current, voltage and temperature limits of their products.		P
	The battery system manufacturer shall provide information regarding how to mitigate hazards to equipment manufacturers and, in the case of direct sales, to end-users.	Information for safety mentioned in manufacturer's specifications.	P
	It is the equipment manufacturer's responsibility to inform end-users of the potential hazards arising from the use of equipment containing secondary lithium cells and batteries		P

10	**Marking**		**P**
10.1	Cell marking		N/A
	Cells marked as specified in the applicable cell standards: IEC 62620.	The final product is battery.	N/A
10.2	Battery marking		P
	Batteries marked in accordance with the requirements for the cells from which they are assembled.	The battery is marked in accordance with IEC 62620, also see page 2.	P
	Batteries marked with an appropriate caution statement.		P

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7.2.1	TABLE: External short circuit (cells)				P
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (mΩ)**	**Maximum case temperature ~~rise ΔT,~~ (°C)**	**Results**
Samples charged at charging temperature upper limit (60°C)					
C1#	23.2	3.42	33	45.3	P
C2#	23.2	3.41	32	43.9	P
C3#	23.2	3.43	34	46.5	P
Supplementary information: - No fire - No explosion					

7.2.2	TABLE: Impact test (cells)			P
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Maximum case temperature ~~rise ΔT,~~ (°C)**	**Results**
C1#	23.8	3.25	26.8	P
C2#	23.8	3.24	25.4	P
C3#	23.8	3.26	26.2	P
Supplementary information: - No fire - No explosion				

7.2.5	TABLE: Over-charging of Cell			P
Constant charging current (A) .....:		**105**		—
Supply voltage (Vdc) .....:		**3.65**		—
Model	**OCV before test, (Vdc)**	**OCV after test, (Vdc)**	**Maximum outer casing temperature, (°C)**	**Results**
C1#	2.86	3.49	49.7	P
C2#	2.86	3.48	51.1	P
C3#	2.85	3.50	48.0	P
Supplementary information: - No fire - No explosion				

7.2.6	TABLE: Forced discharge (cells)			P

Model	OCV before application of reverse charge, (Vdc)	Measured Reverse charge I_t, (A)	Time for reversed charge, (minutes)	Results
C1#	2.85	105	90	P
C2#	2.86	105	90	P
C3#	2.86	105	90	P

Supplementary information:

- No fire

- No explosion

7.3.2	TABLE: Forced internal short circuit (cells)	P

Model	Chamber ambient, (°C)	OCV at start of test, (Vdc)	Particle location [1)]	Maximum applied pressure, (N)	Voltage drop, (mV)	Results
C1#	60	3.42	1	400	2	P
C2#	60	3.41	1	400	1	P
C3#	60	3.42	1	400	3	P
C4#	60	3.40	1	400	1	P
C5#	60	3.41	1	400	2	P
C6#	-5	3.35	1	400	3	P
C7#	-5	3.34	1	400	1	P
C8#	-5	3.33	1	400	2	P
C9#	-5	3.35	1	400	3	P
C10#	-5	3.35	1	400	2	P

Supplementary information:

[1)] Identify one of the following**:**

1: Nickel particle inserted between positive and negative (active material) coated area.

2: Nickel particle inserted between positive aluminium foil and negative active material coated area.

- No fire

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Attachment 1

Photo Documentation

Product: $LiFePO_4$ Battery Module
Type Designation: 51.2V 210Ah



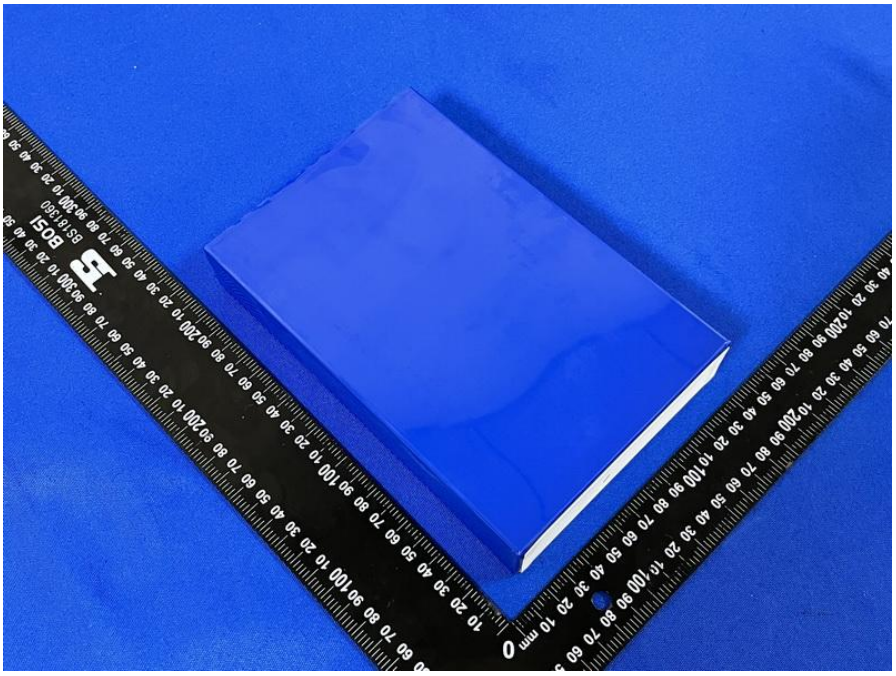
Picture 1. Battery view-1



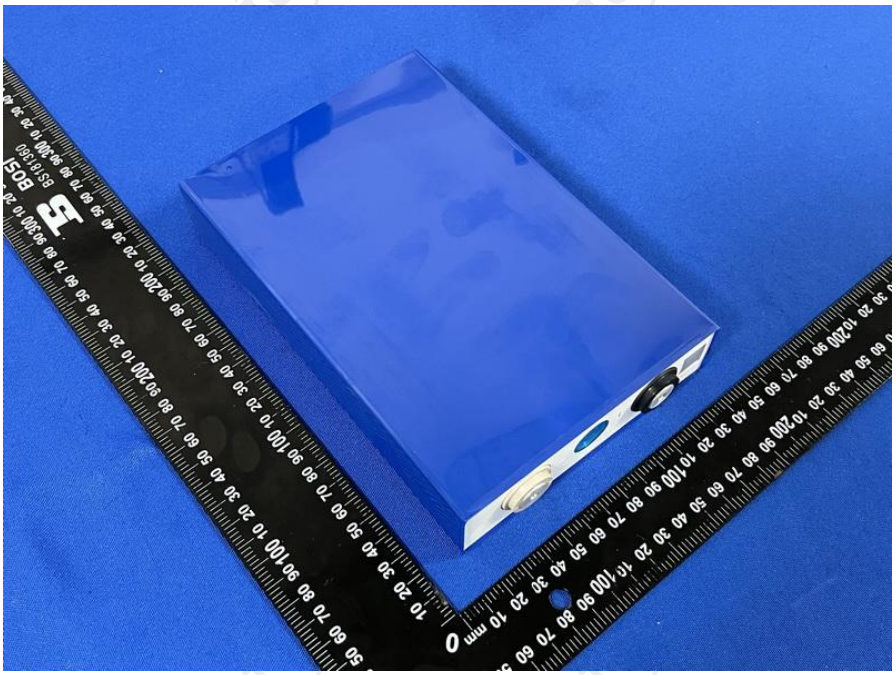
Picture 2. Battery view-2

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Photo Documentation



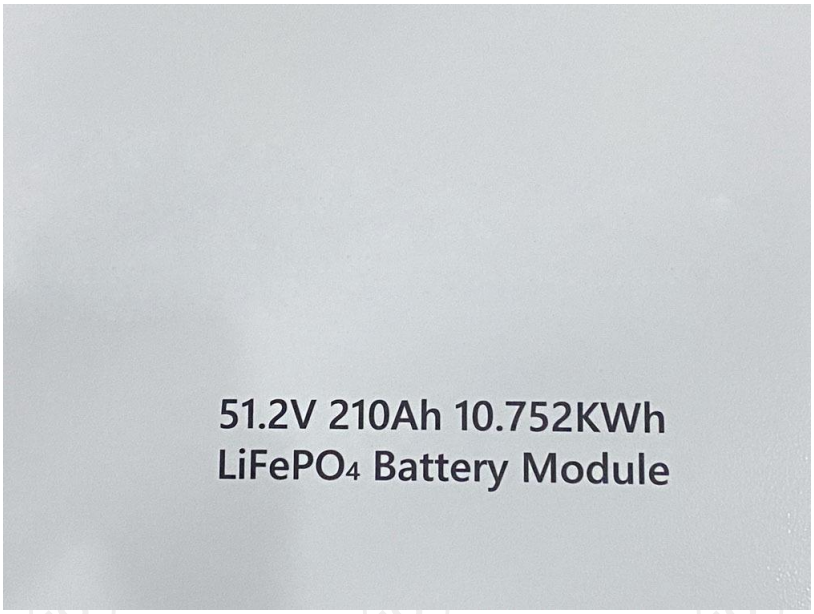
Picture 3. Cell view-1



Picture 4. Cell view-1

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Photo Documentation



Picture 5. Physical label

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