

Report No.: 18270BC30031101

APPLICATION FOR IEC TEST REPORT

Client Name : ZHEJIANG CHISAGE NEW ENERGY
TECHNOLOGY CO., LTD.
Address : NO. 1828, FUQING SOUTH RD., PANHUO ST.,
YINZHOU DISTRICT, NINGBO, ZHEJIANG,
315000 CHINA
Product Name : 5KWh Wall Mounted Battery System
Date : Feb. 27, 2023

Shenzhen Anbotek Compliance Laboratory Limited



Shenzhen Anbotek Compliance Laboratory Limited

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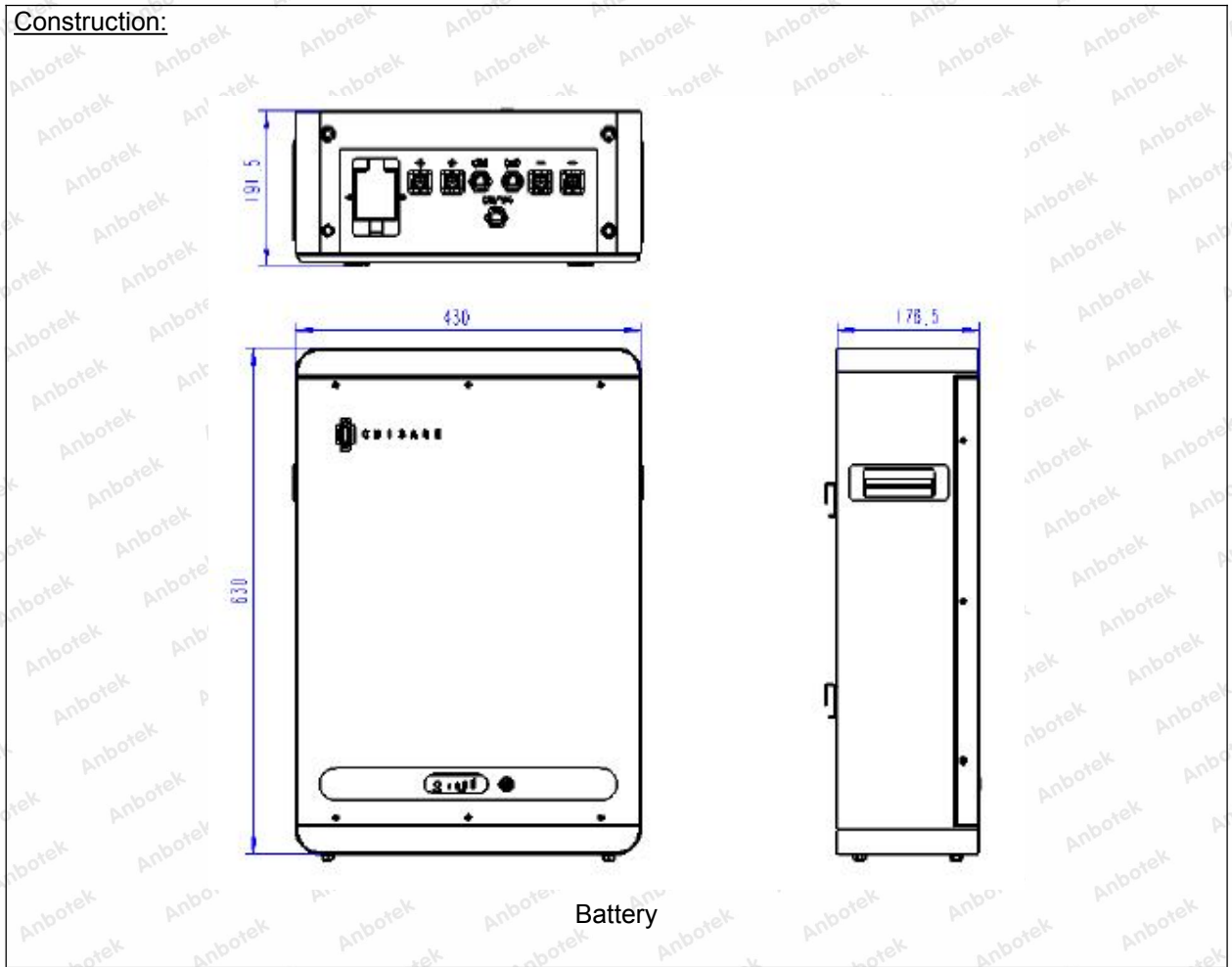
TEST REPORT	
IEC 62619: 2022	
Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for secondary lithium cells and batteries, for use in industrial applications	
Report	
Reference No.....	: 18360BC30031101
Compiled by (+ signature).....	: Lucy Zeng / Project Engineer 
Approved by (+ signature).....	: Dely Yang/ Project Manager 
Date of issue.....	: Feb. 27, 2023
Contents.....	: 18 pages(including 2 pages of photos)
Testing laboratory	
Name.....	: Shenzhen Anbotek Compliance Laboratory Limited
Address.....	: Zone South,1/F.,Building2,Hengchangrong High-Tech Industrial Park,Huangtian Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China
Testing location.....	: Shenzhen Anbotek Compliance Laboratory Limited
Client	
Name.....	: ZHEJIANG CHISAGE NEW ENERGY TECHNOLOGY CO., LTD.
Address.....	: NO. 1828, FUQING SOUTH RD., PANHUO ST., YINZHOU DISTRICT, NINGBO, ZHEJIANG, 315000 CHINA
Test specification	
Standard.....	: IEC 62619: 2022
Test procedure	: Compliance with IEC 62619: 2022 except Clause 8.1
Non-standard test method.....	: N.A.
Test item	
Description.....	: 5KWh Wall Mounted Battery System
Trademark.....	: 
Model and/or type reference.....	: CE48100-W
Manufacturer.....	: Same as client
Address.....	: Same as client
Factory.....	: Same as client
Address.....	: Same as client
Rating(s).....	: 51.2Vdc, 100Ah, 5.12kWh



<p>Particulars: test item vs. test requirements</p> <p>Ambient temperature..... : 25°C ± 5°C.</p>
<p>Test case verdicts</p> <p>Test case does not apply to the test object..... : N (.A.)</p> <p>Test item does meet the requirement..... : P (ass)</p> <p>Test item does not meet the requirement..... : F (ail)</p>
<p>Testing</p> <p>Date of receipt of test item : Feb. 01, 2023</p> <p>Date(s) of performance of test..... : Feb. 01, 2023 to Feb. 25, 2023</p>
<p>Tests performed (name of test and test clause):</p> <p>cl.5.2 Insulation and wiring;</p> <p>cl.7.1 Charging procedures for test purposes;</p> <p>cl.7.2.3.2 Whole drop test (cell or cell block, and battery system);</p> <p>cl.7.3 Considerations for internal short-circuit;</p> <p>cl.8.2.2 Overcharge control of voltage (battery system)</p> <p>cl.8.2.3 Overcharge control of current (battery system)</p> <p>cl.8.2.4 Overheating control(battery system)</p>
<p>General remarks</p> <p>This test report shall not be reproduced except in full without the written approval of the testing laboratory.</p> <p>The test results presented in this report are only relevant to the test sample.</p> <p>"(see remark #)" refers to a remark appended to the report.</p> <p>"(see appended table)" refers to a table appended to the report</p> <p>Throughout this report a dot is used as the decimal separator.</p> <p>The product fulfils the requirements of EN IEC 62619: 2022</p> <p>The cell (Model: LEP-100Ah) inside this power bank had passed the IEC 62619: 2022 test by Shenzhen Anbotek Compliance Laboratory Limited. (IEC Report No.: 18270BC20321701).</p>



Construction:



Battery



Copy of marking plate:

The artwork below may be only a draft.

5KWh Wall Mounted Battery System
CE48100-W IFpP/49/174/151/[16S]E/-20+55/80
51.2V, 100Ah, 5.12kWh
(+), (-)
ZHEJIANG CHISAGE NEW ENERGY TECHNOLOGY
CO.,LTD.
2023.01
CAUTION
-Do not disassemble or modify
-Do not short-circuit
-Do not dispose in fire
-Do not expose to high temperature



General product information and other remarks:

This battery is constructed with sixteen lithium-ion cells (16S1P), and has overcharge, over-discharge, over current and short-circuits proof circuit.

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

Product name	Cell	Battery
Model	LFP-100Ah	CE48100-W
Capacity	100Ah	100Ah
Nominal voltage	3.2V	51.2V
Nominal charge current	50A	50A
Maximum continuous charge current	50A	50A
Nominal discharge current	50A	50A
Maximum continuous discharge current	50A	50A
Maximum Charge Voltage	3.65V	58.4V
Upper limited charging voltage	3.65V	58.4V
Upper charge temperature	50°C	50°C
Lower charge temperature	0°C	0°C
Upper discharge temperature	55°C	55°C
Lower discharge temperature	-20°C	-20°C
Storage temperature range	-30°C ~45°C	-20°C ~50°C
Recommend charging method declared by the manufacturer	At constant current 50A till cell voltage reaches 3.65V, then switch to constant voltage 3.65V till charge current drops to 5.0A	At constant current 50A till cell voltage reaches 58.4V, then switch to constant voltage 58.4V till charge current drops to 5.0A
Charging procedure for internal short-circuit test	At constant current 50A till cell voltage reaches 3.65V, then switch to constant voltage 3.65V till charge current drops to 5A	--
Recommend discharging method declared by the manufacturer	Discharging the cell with 50A constant current to discharge cut-off voltage 2.5V	Discharging the cell with 50A constant current to discharge cut-off voltage 40V
Nominal mass	≤2.5kg	About 58kg
External dimensions	(48.3±0.5)mm × (173.9±0.5)mm × (150±0.6)mm	(176.5)mm × (430)mm × (630)mm



IEC 62619: 2022			
Clause	Requirement + Test	Result - Remark	Verdict
4	PARAMETER MEASUREMENT TOLERANCES		P
	Parameter measurement tolerances		P
5	GENERAL SAFETY CONSIDERATIONS		P
5.1	General		P
	Cells and batteries are safe under conditions of both intended use and reasonably foreseeable misuse	Clause 6, Clause 7, 8.1, and 8.2. See also table 5.1 for Critical components information	P
	Reduce the risk of injuries from moving parts		N/A
5.2	Insulation and wiring		P
	Adequate clearances and creepage distances between connectors and live parts at different voltages or between live parts and non-current-carrying accessible parts		P
	Protect from hazardous live parts, including during installation		P
	The mechanical integrity of internal connections		P
	Adequate clearances and creepage distances between connectors and live parts at different voltages or between live parts and non-current-carrying accessible parts		P
5.3	Venting		P
	Pressure relief function		P
	Encapsulation used to support cells within an outer casing		P
5.4	Temperature/voltage/current management		
	The design prevents abnormal temperature-rise		P
	Voltage, current, and temperature limits of the cells		P
	Specifications and charging instructions for equipment manufacturers		P
5.5	Terminal contacts of the battery pack and/or battery system		P
	Polarity marking(s)		P
	Polarity marking not provided for keyed external connector		N/A
	Capability to carry the maximum anticipated current		P
	External terminal contact surfaces		P
	Terminal contacts are arranged to minimize the risk of short circuits		P



IEC 62619: 2022			
Clause	Requirement + Test	Result - Remark	Verdict
5.6	Assembly of cells, modules, or battery packs into battery systems		P
5.6.1	General		P
	Independent control and protection method(s)		P
	Recommendations of cell operating limits, mounting advice, storage conditions and other design recommendations by the cell manufacturer		P
	Batteries designed for the selective discharge of a portion of their series connected cells		N/A
	Protective circuit component(s) and consideration to the end-device application		P
5.6.2	Battery system design		P
	The voltage control function		P
	Maximum charging/discharging current of the cell are not exceeded		P
5.7	Operating region of lithium cells and battery systems for safe use		
	The cell operating region..... :		P
	Designation of battery system to comply with the cell operating region		P
5.8	System lock (or system lock function)		N
	Non-resettable function to stop battery operation		P
	Manual with procedure for resetting of battery operation		P
	Emergency battery final discharge		P
5.8	Quality plan		
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... :		P
	The process capabilities and the process controls		P
6	TYPE TEST CONDITIONS		P
6.1	General		P
6.2	Test items		P
	Cells or batteries that are not more than six months old (See Table 1 of IEC62619)		P
	Capacity confirmation of the cells or batteries		P
	Default ambient temperature of test, 25 °C ± 5 °C		P
7	SPECIFIC REQUIREMENTS AND TESTS		P
7.1	Charging procedure for test purposes		P



IEC 62619: 2022			
Clause	Requirement + Test	Result - Remark	Verdict
	The battery discharged to a specified final voltage prior to charging		P
	The cells or batteries charged using the method specified by the manufacturer.....:		P
7.2	Reasonably foreseeable misuse		P
7.2.1	External short-circuit test (cell or cell block)	IEC approved cell used.	N
	Short circuit with total resistance of 30 mΩ ± 10 mΩ at 25 °C ± 5 °C		N
	Results: no fire, no explosion		N
7.2.2	Impact test (cell or cell block)	IEC approved cell used.	N
	Cylindrical cell, longitudinal axis impact		N
	Prismatic cell, longitudinal axis and lateral axis impact		N
	Results: no fire, no explosion.		N
7.2.3	Drop test (cell or cell block, and battery system)	Tested complied.	P
7.2.3.1	General		P
7.2.3.2	Whole drop test (cell or cell block, and battery system)	Tested complied.g	N
	Description of the Test Unit.....:	Cell.	—
	Mass of the test unit (kg).....:	Less than 7 kg.	—
	Height of drop (m).....:	1	—
	Results: no fire, no explosion	See Table 7.2.3.2.	P
7.2.3.3	Edge and corner drop test (cell or cell block, and battery system)	Tested complied.	P
	Description of the Test Unit.....:	Battery system.	—
	Mass of the test unit (kg).....:	20 kg or more – less than 50 kg	—
	Height of drop (m).....:	0.1	—
	Results: no fire, no explosion	See Table 7.2.3.3.	P
7.2.4	Thermal abuse test (cell or cell block)	IEC approved cell used.	N
	Results: no fire, no explosion		N
7.2.5	Overcharge test (cell or cell block)	IEC approved cell used.	N
	For those battery systems that are provided with only a single protection for the charging voltage control		—
	Results: no fire, no explosion.....:		N



IEC 62619: 2022			
Clause	Requirement + Test	Result - Remark	Verdict
7.2.6	Forced discharge test (cell or cell block)	IEC approved cell used.	N
	Upper limit charge voltage of the cell..... :		N
	Cells connected in series in the battery system..... :		N
	Redundant or single protection for discharge voltage control provided in battery system..... :		N
	Target Voltage..... :		N
	Maximum discharge current of the cell, I _m :		N
	Discharge current for forced discharge, 1.0 I _t :		N
	Discharging time, t = (1 I _t / I _m) x 90 (min.)..... :		N
	Results: no fire, no explosion..... :		N
7.3	Considerations for internal short-circuit – Design evaluation		
7.3.1	General		N
7.3.2	Internal short-circuit test (cell)	IEC approved cell used.	N
	Samples preparation procedure: In accordance with Clause A.5 and A.6 of IEC 62133-2:2017		N
	Tested per 7.3.2 b) in an ambient temperature of 25 °C ± 5 °C.		N
	The appearance of the short-circuit location recorded by photograph or other means..... :	See Attachment # ___	—
	The pressing was stopped - When a voltage drop of 50 mV was detected; or		N
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) was reached		N
	Results: no fire..... :	See Table 7.3.2.	N
7.3.3	Propagation test (battery system)		N/A
	Method to create a thermal runaway in one cell :	See Annex B and C	N/A
	Results: No external fire from the battery system or no battery case rupture..... :	See results in Table 7.3.3	N/A

8	BATTERY SYSTEM SAFETY (CONSIDERING FUNCTIONAL SAFETY)		P
8.1	General requirements		N/A
	Functional safety analysis for critical controls		N/A
	Conduct of a process hazard analysis for both the cell manufacturing process and the battery system manufacturing process		N/A



IEC 62619: 2022			
Clause	Requirement + Test	Result - Remark	Verdict
	Conduct of risk assessment and mitigation of the battery system		N/A
8.2	Battery management system (or battery management unit)		P
8.2.1	Requirements for the BMS		P
	The safety integrity level (SIL) target of the BMS		P
	The charge control evaluated by tests in clauses 8.2.2 to 8.2.4		P
8.2.2	Overcharge control of voltage (battery system)	Tested complied.	P
	The exceeded charging voltage applied to the whole battery system		P
	The exceeded charging voltage applied to only a part of the battery system, such as the cell(s)..... :		N/A
	Results: no fire, no explosion..... :	See Table 8.2.2.	P
	The BMS terminated the charging before exceeding the upper limit charging voltage		P
8.2.3	Overcharge control of current (battery system)	Tested complied.	P
	Results: no fire, no explosion..... :	See Table 8.2.3	P
	The BMS detected the overcharging current and controlled the charging to a level below the maximum charging current		P
8.2.4	Overheating control (battery system)	Tested complied.	P
	The cooling system, if provided, was disconnected		N/A
	Elevated temperature for charging, 5 °C above maximum operating temperature..... :		P
	Results: no fire, no explosion..... :	See Table 8.2.4	P
	The BMS detected the overheat temperature and terminated charging		P
	The battery system operated as designed during test		P

9	EMC		P
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IEC 62619: 2022			
Clause	Requirement + Test	Result - Remark	Verdict
	Battery system fulfil EMC requirements of the end-device application.....	See Table 9 [] See attachment [XX] for detail EMC report [√] Intended for to be tested in the end use application [include specific application]	P
10	INFORMATION FOR SAFETY		P
	The cell manufacturer provides information about current, voltage and temperature limits of their products		P
	The battery system manufacturer provides information regarding how to mitigate hazards to equipment manufacturers or end-users.		P
11	MARKING AND DESIGNATION (REFER TO CLAUSE 5 OF IEC 62620)		P
	The marking items shown in Table 1 in IEC 62620 indicated on the cell, battery system or instruction manual.		P
	Cell or battery system has clear and durable markings		P
	Cell designation		N/A
	Battery designation		P
	Battery structure formulation		P
12	PACKAGING AND TRANSPORT		P
	Refer to Annex D		P
ANNEX A	OPERATING REGION OF CELLS FOR SAFE USE		P
A.1	General		P
A.2	Charging conditions for safe use		P
A.3	Consideration on charging voltage		P
A.4	Consideration on temperature		P
A.5	High temperature range		P
A.6	Low temperature range		P
A.7	Discharging conditions for safe use		P
A.8	Example of operating region		P
ANNEX B	PROCEDURE OF 7.3.3 PROPAGATION TEST BY LASER IRRADIATION		N/A



IEC 62619: 2022			
Clause	Requirement + Test	Result - Remark	Verdict
B.1	General		N/A
B.2	Test conditions		N/A
B.2.1	Cell test (preliminary test)		N/A
	The cell fully charged according to the manufacturer recommended conditions..... :		—
	Laser irradiation point on the cell..... :		—
	Output power of laser irradiation..... :		—
	Tested in an ambient temperature of 25 °C ± 5 °C		N/A
	Repeat of cell test for 3 times		N/A
B.2.2	Battery system test (main test)		N
	The battery system fully charged according to the manufacturer recommended conditions..... :		—
	Target cell to be laser irradiated..... :		—
	The irradiation point on the target cell same or similar as that on the cell test		
	Output power of laser irradiation..... :		—
	Tested in an ambient temperature of 25 °C ± 5 °C		N
ANNEX C	PROCEDURE OF 7.3.3 PROPAGATION TEST BY METHODS OTHER THAN LASER		N/A
C.1	General		N/A
C.2	Test conditions:		N/A
	– The battery fully charged according to the manufacturer recommended conditions..... :		—
	– Target cell forced into thermal runaway..... :		—
	– A specially prepared sample (e.g. a heater or a hole for nail penetration provided) used for ease of testing..... :		—
C.3	Method used for initiating the thermal runaway. 1) Heater (Heater, Burner, Laser, Inductive heating) 2) Overcharge 3) Nail penetration of the cell 4) Combination of above methods 5) Other methods..... :		—
ANNEX D	PACKAGING AND TRANSPORT		P



IEC 62619: 2022			
Clause	Requirement + Test	Result - Remark	Verdict
	The materials and pack design chosen in a way as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants		P
	Regulations concerning international transport of secondary lithium batteries		P



5.	TABLE: List of critical components				P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity ¹⁾
Cell	JIANGSU Higeer ENERGY CO., LTD.	LFP-100Ah	3.2V, 100Ah	IEC 62619: 2022	IEC Report No: 18270BC203 21701
1) An asterisk indicates a mark which assures the agreed level of surveillance.					

7.2.3.2	TABLE: Edge and corner drop test (cell or cell block, and battery system)				P
Sample No.	OCV at start of test, (Vdc)	Mass, (g)	Height of drop, (m)	Results	
B2	54.57	54.48	0.05	P	
Supplementary information: Results: No fire or Explosion					

7.3.3	TABLE: Propagation test (battery system)					N/A
Sample No.	OCV of Battery System Before Test, (V dc)	OCV of Target Cell Before Test, (V dc)	Maximum Cell Case Temperature, (°C)	Maximum DUT Enclosure Temperature, (°C)	Results	
--	--	--	--	--	--	
Method of cell failure ¹⁾		Location of target cell		Area for fire protection (m ²)		
--		--		--		
Supplementary information: 1) Cell can be failed through applied heat, overcharge, nail penetration or combinations of these failures or other acceptable methods. See supporting documentation for details on cell failure method 2) If the battery system has no outer covering, the manufacturer is required to specify the area for fire protection. Results: No fire external to DUT enclosure or area for fire protection or no battery case rupture						



8.2.2 TABLE: Overcharge control of voltage (battery system)					P
Sample No.	OCV at start of test for Cell/Cell Blocks, (V dc)	Maximum Charging Current, (A)	Max. Charging Voltage, (V dc)	Max. Voltage of Cell/Cell Blocks, (V dc)	Results
B1	46.08	50.0	64.24	3.64	P
Charge Voltage Applied Battery System: 1)					
			Whole	Part	
			P	N/A	
Supplementary information:					
1. The exceeded voltage can be applied to only a part of the system such as the cell(s) in the battery system per Figure 6 of IEC 62619, if it is difficult to do it in using the whole battery system.					
Results: No Fire or Explosion					

8.2.3 TABLE: Overcharge control of current (battery system)					P
Sample No.	OCV at start of test, (V dc)	Max. Charging Current, (A)	Max. Charging Voltage, (V dc)	Results	
B2	45.66	60	58.4	P	
Supplementary information:					
Results: No fire or Explosion					

8.2.4 TABLE: Overheating control (battery system)				P	
Model No.	OCV at start(SOC 50%) of test, V dc	Maximum Charging Current, A	Maximum Charging Voltage, V dc		
B1	51.52	50	58.4		
Maximum Specified Temperature of Battery System, °C		Maximum Measured Cell Case Temperature, °C	Results		
50		52.3	P		
Supplementary information:					
Results: No fire or Explosion					



Photo 1

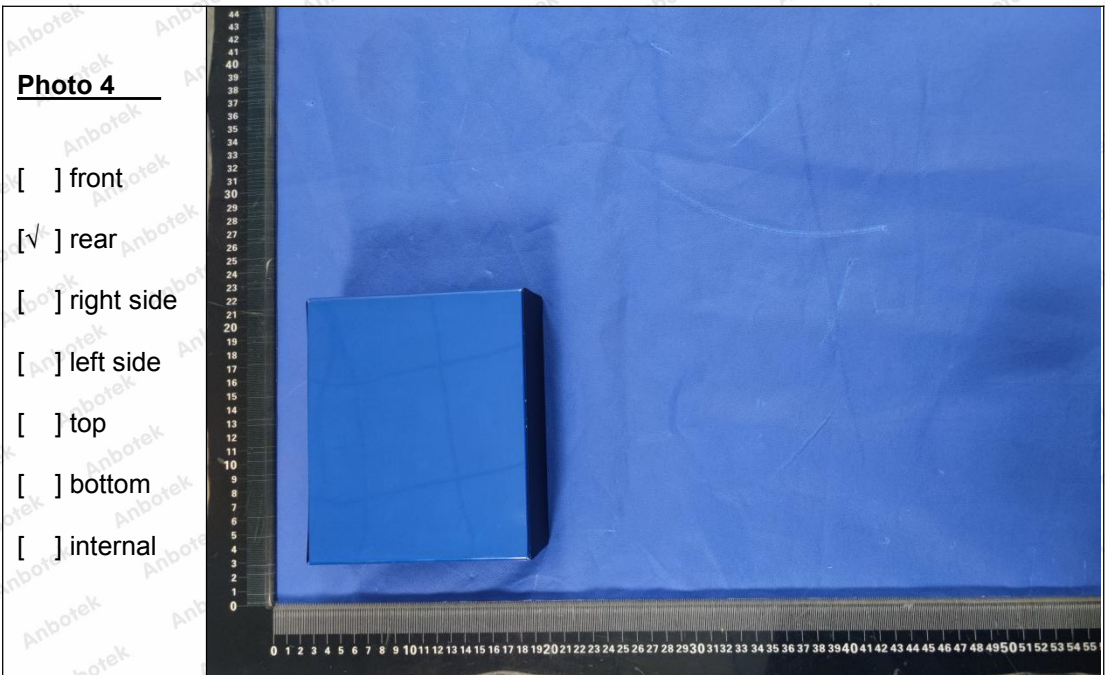
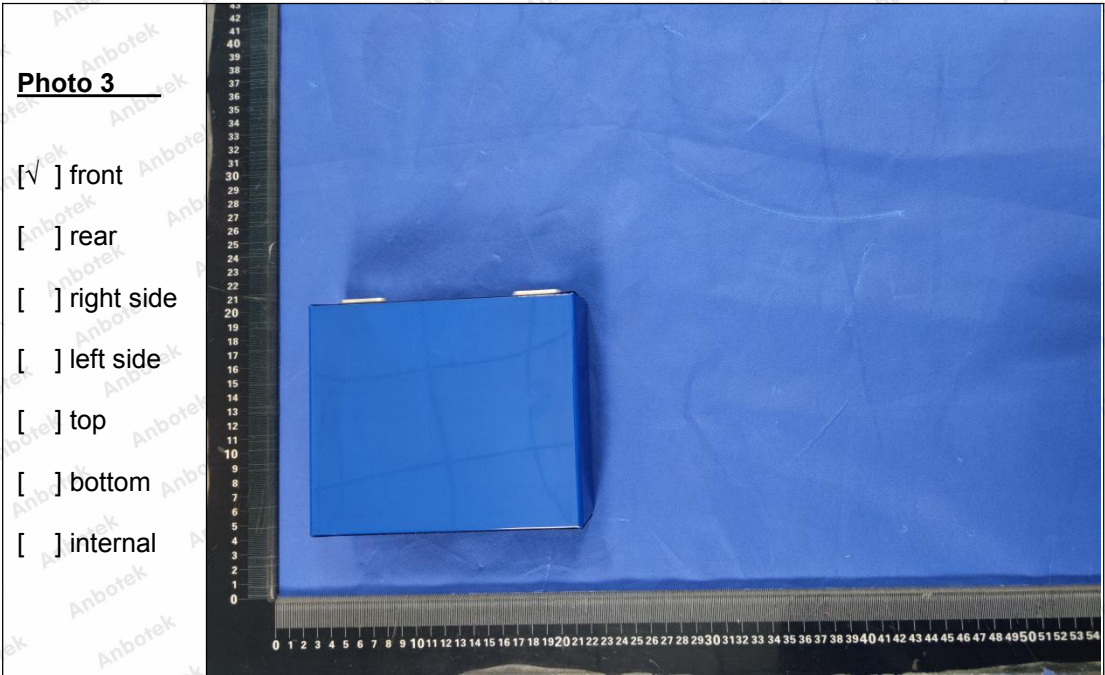
- front
- rear
- right side
- left side
- top
- bottom
- internal



Photo 2

- front
- rear
- right side
- left side
- top
- bottom
- internal





End of the report

