TEST REPORT

On Behalf of

Prepared For :	**Shenzhen Luyuan Technology Co., Ltd.** 229 Tianhui Building,26 Huaxing Road, Longgang, Shenzhen, Guangdong
Trade Mark :	**N/A**
Product Name :	**Rechargeable battery**
Model(s) :	**314Ah**
Prepared By:	**Shenzhen ZTS Testing Service Co., Ltd.** 808, Building 1, 7th Industrial Zone, Yulv Community, Yutang Street, Guangming District, Shenzhen, Guangdong, China Tel: 400-8788-298 Tel:0755-23245950 Web: www.zts-test.com Email: zts@zts-test.com
Test Date:	**Sep. 05, 2025 - Sep. 30, 2025**
Date of Report:	**Sep. 30, 2025**
Report No. :	**ZTS25091526TRS**

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

TEST REPORT

EN IEC 62619:2022

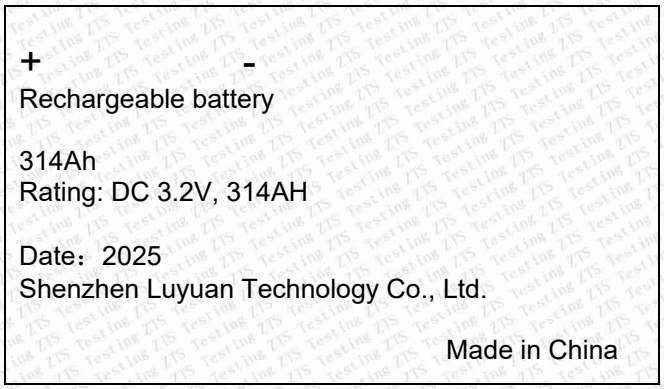
Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications

Administrative Data		
Report Reference No.	:	ZTS25091526TRS
Date of issue	:	Sep. 30, 2025
Testing Laboratory	:	Shenzhen ZTS Testing Service Co., Ltd.
Address	:	808, Building 1, 7th Industrial Zone, Yulv Community, Yutang Street, Guangming District, Shenzhen, Guangdong, China
Applicant's name	:	Shenzhen Luyuan Technology Co., Ltd.
Address	:	229 Tianhui Building,26 Huaxing Road, Longgang, Shenzhen, Guangdong
Test specification:		
Directive/ standard	:	EN IEC 62619:2022
Test procedure	:	Test report
Test item description	:	Rechargeable battery
Manufacturer	:	Shenzhen Luyuan Technology Co., Ltd.
Address	:	229 Tianhui Building,26 Huaxing Road, Longgang, Shenzhen, Guangdong
Trade Mark	:	N/A
Model/Type reference	:	314Ah
Additional models	:	N/A
Rating	:	DC 3.2V, 314AH

Testing procedure and testing location

Laboratory name……	:	Shenzhen ZTS Testing Service Co., Ltd.
Testing location/address:	:	808, Building 1, 7th Industrial Zone, Yulv Community, Yutang Street, Guangming District, Shenzhen, Guangdong, China
Testing lprocedure	:	TL ☒ RMT ☐ SMT ☐ WMT ☐ TMP ☐
Prepared by (Engineer)	:	Wilson Bin
Reviewed By (Supervisor)	:	Tony Mo

Copy of marking plate: Due to the similar of rating label, only above label is listed.



Remark: YYYY means year, MM means month, DD means day.

Test case verdicts	
Test case does not apply to the test object .....:	N(/A)
Test item does meet the requirement ..... :	P(ass)
Test item does not meet the requirement ..... :	F(ail)
Charging temperature upper limit..... :	45°C
Charging temperature lower limit..... :	0°C
Classification of installation and use..... :	N/A
Supply connection..... :	DC connector
Testing	
Date of receipt of test item ..... :	Sep. 05, 2025
Date(s) of performance of test ..... :	Sep. 05, 2025, 2025 - Sep. 20, 2025

General remarks

This report shall not be reproduced except in full without the written approval of the testing laboratory. The test results presented in this report relate only to the item tested.

General product information:

EN IEC 62619			
Clause	Requirement – Test	Result - Remark	Verdict

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 CDF attachment for Critical components information	P
	Reduce the risk of injuries from moving parts		P
5.2	**Insulation and wiring**		P
	Voltage, current, altitude, and humidity requirements		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
5.3	**Venting**		P
	Pressure relief function		P
	Encapsulation used to support cells within an outer casing		P
5.4	**Temperature/voltage/current management**		P
	The design prevents abnormal temperature-rise	Overcharge, over current and overheating proof circuit used in this battery.	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		P
	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
5.6	**Assembly of cells, modules, or battery packs into battery systems**		P
5.6.1	General		P

EN IEC 62619			
Clause	Requirement – Test	Result - Remark	Verdict
	Independent control and protection method(s)	Battery system has independent control and protective functions, and BMS is integrated into battery system.	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**		P
	The cell operating region..... :		P
	Designation of battery system to comply with the cell operating region	Information mentioned in manufacturer's specifications.	P
5.8	**System lock (or system lock function)**		P
	Non-resettable function to stop battery operation		P
	Manual with procedure for resetting of battery operation		P
	Emergency battery final discharge		P
5.9	**Quality plan**		P
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... :	ISO 9001:2015 certification provided.	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 IEC 62619)		P
	Capacity confirmation of the cells or batteries		P
	Default ambient temperature of test, 25 °C ± 5 °C	Tests were carried out in an ambient temperature of 25±5°C.	P
7	**SPECIFIC REQUIREMENTS AND TESTS**		P
7.1	**Charging procedure for test purposes**		P

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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 ..... :	The method mentioned in manufacturer's specifications.	P
7.2	**Reasonably foreseeable misuse**		P
7.2.1	External short-circuit test (cell or cell block)	Approval cell used.	N/A
	Short circuit with total resistance of 30 m ± 10 m at 25 °C ± 5 °C		N/A
	Results: no fire, no explosion		N/A
7.2.2	Impact test (cell or cell block)	Approval cell used.	N/A
	Cylindrical cell, longitudinal axis impact		N/A
	Prismatic cell, longitudinal axis and lateral axis impact		N/A
	Results: no fire, no explosion.		N/A
7.2.3	Drop test (cell or cell block, and battery system)		P
7.2.3.1	General		P
7.2.3.2	Whole drop test (cell or cell block, and battery system)	Approval cell used.	N/A
	Description of the Test Unit ..... :		—
	Mass of the test unit (kg)..... :		—
	Height of drop (m)..... :		—
	Results: no fire, no explosion		N/A
7.2.3.3	Edge and corner drop test (cell or cell block, and battery system)		P
	Description of the Test Unit ..... :	Battery module: TP-HS36	—
	Mass of the test unit (kg)..... :	5.4kg	—
	Height of drop (m)..... :	0.1	—
	Results: no fire, no explosion	No fire, no explosion.	P
7.2.4	Thermal abuse test (cell or cell block)	Approval cell used.	N/A
	Results: no fire, no explosion		N/A
7.2.5	Overcharge test (cell or cell block)	Approval cell used.	N/A
	For those battery systems that are provided with only a single protection for the charging voltage control		—
	Results: no fire, no explosion ..... :		N/A
7.2.6	Forced discharge test (cell or cell block)	Approval cell used.	N/A
	Cells connected in series in the battery system..... :		N/A
	Redundant or single protection for discharge voltage control provided in battery system ..... :		N/A

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Clause	Requirement – Test	Result - Remark	Verdict
	Target Voltage..... :		N/A
	Maximum discharge current of the cell, Im..... :		N/A
	Discharge current for forced discharge, 1.0 It..... :		N/A
	Discharging time, t = (1 It / Im) x 90 (min.)..... :		N/A
	Results: no fire, no explosion ..... :		N/A
7.3	**Considerations for internal short-circuit – Design evaluation**		**N/A**
7.3.1	General	Approval cell used.	N/A
7.3.2	Internal short-circuit test (cell)		N/A
	Samples preparation procedure: In accordance with Clause A.5 and A.6 of IEC 62133-2:2017		N/A
	Tested per 7.3.2 b) in an ambient temperature of 25 °C ± 5 °C.		N/A
	The appearance of the short-circuit location recorded by photograph or other means ..... :		—
	The pressing was stopped - When a voltage drop of 50 mV was detected; or		N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) was reached		N/A
	Results: no fire ..... :		N/A
7.3.3	Propagation test (battery system)	7.3.2 tested for cell	N/A
	Method to create a thermal runaway in one cell ... :		N/A
	Results: No external fire from the battery system, no battery case rupture..... :		N/A
8	**BATTERY SYSTEM SAFETY (CONSIDERING FUNCTIONAL SAFETY)**		P
8.1	**General requirements**		P
	Functional safety analysis for critical controls	Functional safety evaluated acc. to IEC 60730-1 Annex H	P
	Conduct of a process hazard analysis for both the cell manufacturing process and the battery system manufacturing process	See above.	P
	Conduct of risk assessment and mitigation of the battery system	Considered	P
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		N/A
	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)		P

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Clause	Requirement – Test	Result - Remark	Verdict
	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)		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)		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**		N/A
	Battery system fulfil EMC requirements of the end-device application..... :	Considered in end products	N/A
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		P
	Battery designation	See copy of marking plate.	P
	Battery structure formulation	See above.	P

EN IEC 62619			
Clause	Requirement – Test	Result - Remark	Verdict
12	**PACKAGING AND TRANSPORT**		P
	Refer to Annex D	Considered	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**
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/A
	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/A
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

EN IEC 62619			
Clause	Requirement – Test	Result - Remark	Verdict
	– 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
	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

EN IEC 62619			
Clause	Requirement – Test	Result - Remark	Verdict

7.2.1	TABLE: External short-circuit test (cell or cell block)				N/A
Sample No.	Ambient (at 25 ° C ± 5°C)	OCV at start of test (V dc)	Resistance of Circuit (mΩ)	Maximum Case Temperature Rise DT (° C)	Results
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

Supplementary information:

A – No fire or Explosion B – Fire
C – Explosion
D – The test was completed after 6 h
E – The test was completed after the cell casing cooled to 20% of the maximum temperature rise F – Other (Please explain):___

7.2.5	TABLE: Overcharge test (cell or cell block)					N/A
Sample No.	OCV at start of test (V dc)	OCV at end of test (V dc)	Measured Maximum Charging Current (A)	Measured Maximum Charging Voltage (V dc)	Max. Cell Case Temperature, (° C)	Results
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

Supplementary information:

Results:
A – No fire or Explosion B – Fire
C – Explosion
D – Test concluded when temperature reached a steady state condition E – Test concluded when temperature returned to ambient
F – Other (Please explain): _____

7.2.6	TABLE: Forced discharge test (cell or cell block)				N/A
Sample No.	OCV before applying reverse charge, (V dc)	Target Voltage (V dc)	Measured Reverse Charge Current It, (A)	Total Time for Reversed Charge Application (min)	Results
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

EN IEC 62619			
Clause	Requirement – Test	Result - Remark	Verdict

Supplementary information:

Results:
A – No fire or Explosion B – Fire
C – Explosion
D – Other (Please explain): ___

7.3.2	TABLE: Internal short-circuit test (cell)			N/A
Sample No.	**OCV at start of test, (V dc)**	**Particle location 1)**	**Maximum applied pressure, (N)**	**Results**
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-

Supplementary information:

8)..... 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.

Results:

A – No fire or explosion B – Fire
C – Explosion
D – Test concluded when 50 mV voltage drop occurred prior to reaching force limit
E – Test concluded when 800/400 N pressure was reached and 50 mV voltage drop was not achieved F – Test was concluded when fire or explosion occurred
G – Other (Please explain): __

EN IEC 62619			
Clause	Requirement – Test	Result - Remark	Verdict

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 laser exposure, 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:
A – No fire external to DUT enclosure or area for fire protection or no battery case rupture B – Fire external to DUT enclosure or area for fire protection
C – Explosion
D – Battery case rupture
E – Other (Please explain): __

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
314Ah	3.18 to 3.2	5	3.65	3.65	A, D, F
-	-	-	-	-	-
-	-	-	-	-	-

Charge Voltage Applied Battery System: 1)	
Whole	Part
127.6	-

EN IEC 62619			
Clause	Requirement – Test	Result - Remark	Verdict

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.
2. Test was conducted on representative model T-BAT HS7.2 Results:

A – No Fire or Explosion B – Fire
C – Explosion
D – The voltage of the measured cells or cell blocks did not exceed the upper limit charging voltage E – The voltage of the measured cells or cell blocks did exceed the upper limit charging voltage
F – All function of battery system did operate as intended during the test.
G – All function of battery system did not operate as intended during the test. H – Other (Please explain): ___

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**
314Ah	3.2	5	3.65	A, D, F
-	-	-	-	-

Supplementary information: Test was conducted on representative model T-BAT HS7.2.

Results:
A – No fire or Explosion B – Fire
C – Explosion
D – Overcurrent sensing function of BMU did operate and then charging stopped
E – Overcurrent sensing function of BMU did not operate and then charging stopped F – All function of battery system did operate as intended during the test.
G – All function of battery system did not operate as intended during the test. H – Other (Please explain): ____

EN IEC 62619			
Clause	Requirement – Test	Result - Remark	Verdict

8.2.4	TABLE: Overheating control (battery system)		P
Sample No.	**OCV at start(SOC 50%) of test, V dc**	**Maximum Charging Current, A**	**Maximum Charging Voltage, V dc**
314Ah	3.2	5	3.65
-	-	-	-
-	-	-	-
Maximum Specified Temperature of Battery System, ° C		**Maximum Measured Cell Case Temperature, °C**	**Results**
53		53	A, D, F
-		-	-
-		-	-

Supplementary information: Test was conducted on representative model T-BAT HS7.2.

Results:
A – No fire or Explosion B – Fire
C – Explosion
D – Temperature sensing function of BMU did operate and then charging stopped
E – Temperature sensing function of BMU did not operate and then charging stopped F – All function of battery system did operate as intended during the test.
G – All function of battery system did not operate as intended during the test. H – Other (Please explain): ____

ATTACHMENTS: REAL PHOTOS DOCUMENTATION OF EUT

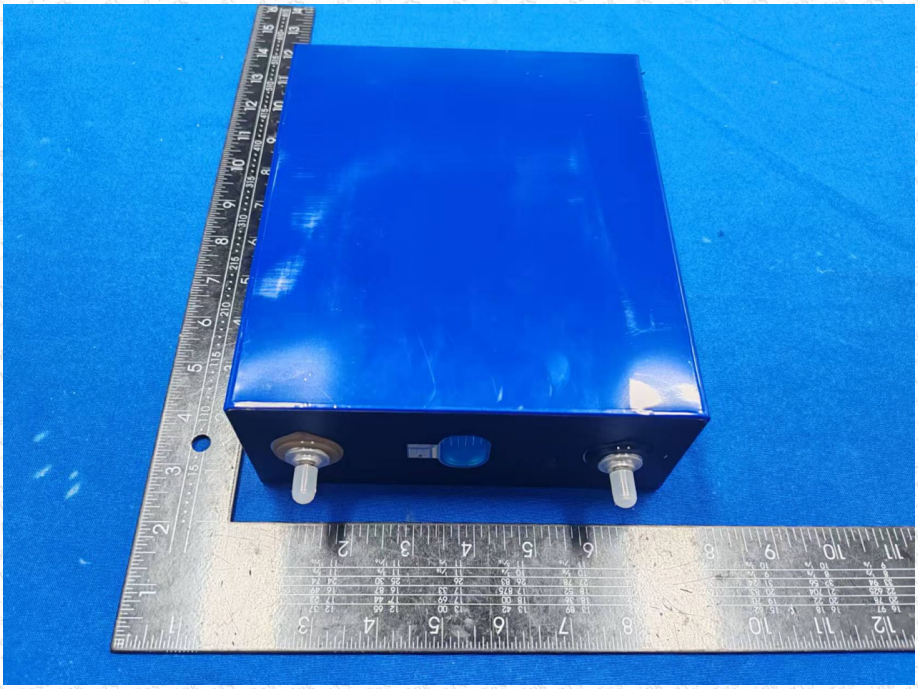

Photo 1

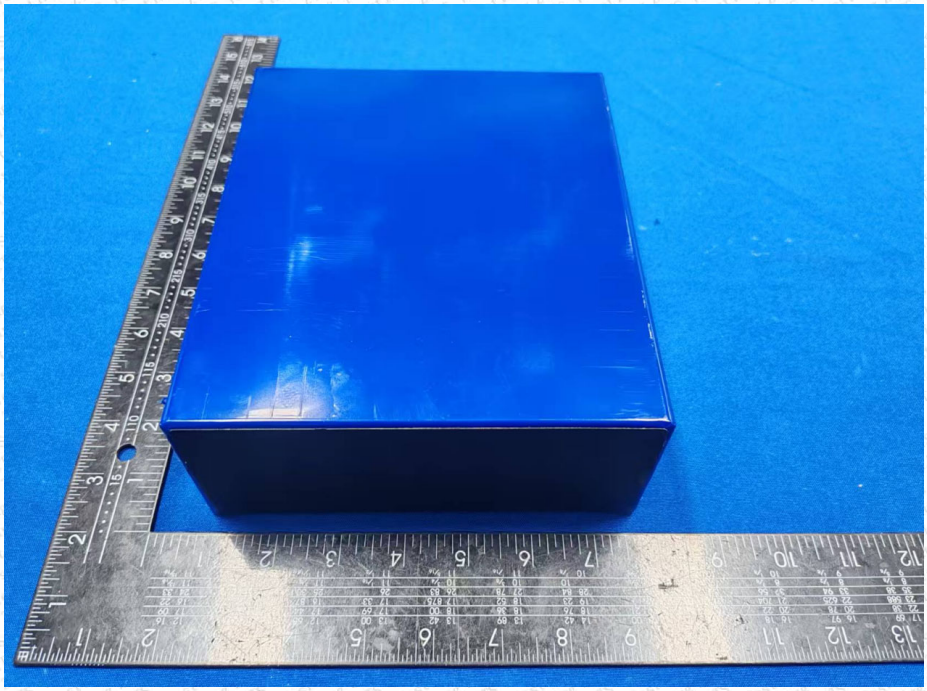

Photo 2

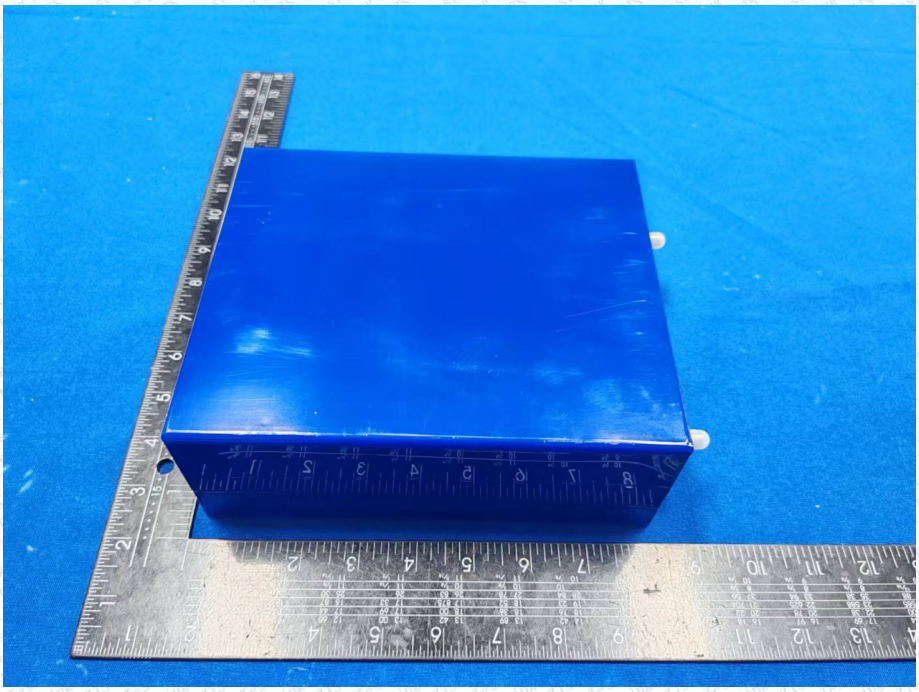

Photo 3

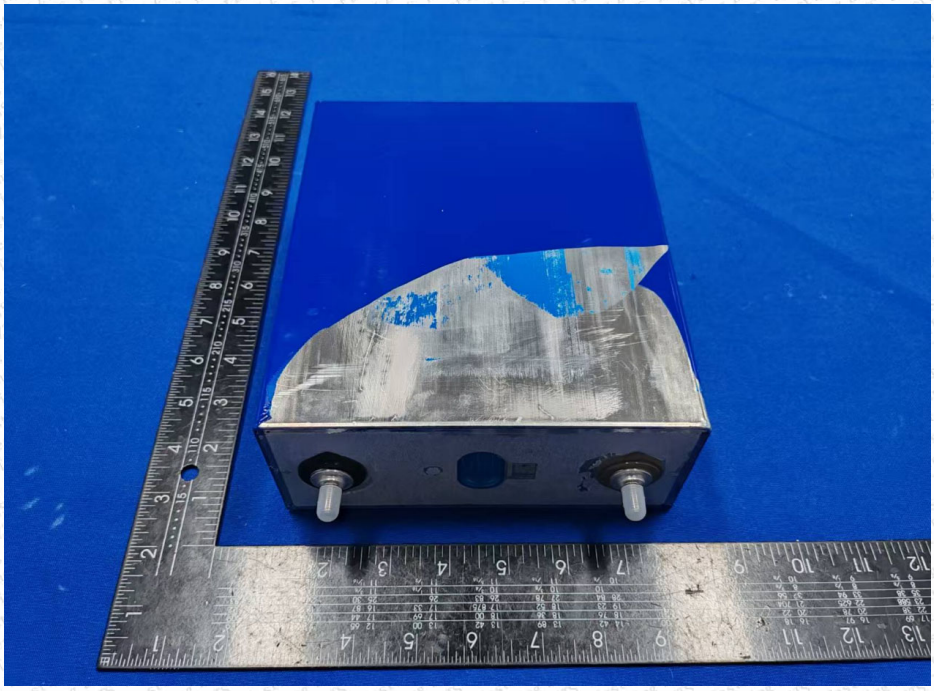

Photo 4

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