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|---|---|
| TEST REPORT IEC 62619 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 | TSZ23080483-P03-R01 |
| Date of issue | 2023-09-27 |
| Total number of pages | 21 Pages |
| Applicant's name | AMPS MIDDLE EAST FZ-LLC |
| Address | B03-314, BUSINESS CENTER 02 RAKEZ BUSINESS ZONE-FZ RAK, UNITED ARAB EMIRATES |
| Test specification: | |
| Standard | IEC 62619:2022 |
| General disclaimer: | |
| The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing laboratory. | |
| Test item description | LiFePO4 Li-ion Battery |
| Trade Mark(s) | Eastman Solar |
| Manufacturer | AMPS MIDDLE EAST FZ-LLC B03-314, BUSINESS CENTER 02 RAKEZ BUSINESS ZONE-FZ RAK, UNITED ARAB EMIRATES |
| Model/Type reference | ES25.6-200LP |
| Ratings | 25.6V, 200Ah, 5120Wh |
| Testing Laboratory: | Shenzhen Tiansu Calibration and Testing Co., Ltd |
| Testing location/ address | No.2, Jinlong Avenue, Longgang District, Shenzhen, Guangdong, China |
| Tested by (name, function, signature) | Joshua mo /Test engineer |
| Reviewed by (name, function, signature) .. | Davis Ding /Reviewer |
| Approved by (name, function, signature) .. | Duan jiangtao /Approved |



| Summary of testing: | |
|---|---|
| Tests performed (name of test and test clause): 7.2.3 Drop test (cell or cell block, and battery system) 8.2.2 Overcharge control of voltage (battery system) 8.2.3 Overcharge control of current (battery system) 8.2.4 Overheating control (battery system) Cell (Model: LF100LA) has been evaluated according to IEC 62619:2022, Certificate No.: SG PSB-BT-03455, Report No.: 085-282260325-000 | Testing location: Shenzhen Tiansu Calibration and Testing Co., Ltd. No.2, Jinlong Avenue, Longgang District, Shenzhen, Guangdong, China |
| The product fulfils the requirements of EN IEC 62619:2022. | |

Copy of marking plate:**The artwork below may be only a draft.**

Product Name: LiFePO4 Li-ion Battery

+ Mode Name: ES25.6-200LP IFpP/51/161/120/[2P8S]E/-20+40/90

25.6V 200Ah 5120Wh

YYYYMMDD0001 Made in China

- Manufacturer: AMPS MIDDLE EAST FZ-LLC

CC/CV 29.2V 40A, CV 29.2V to 10.2A

Caution: Risk of fire and burns, follow manufacturer's instructions, disposal of batteries should follow local regulations.

Remark:

1: The date code "YYYYMMDD0001"

1.1: YYYY stands for year.

1.2: MM stands for month.

1.3: DD stands for date.

1.4: 0001 represents the flow code

| | | |
|---|-----------------------------|-------------------|
| Test item particulars.....: | | |
| Classification of installation and use.....: To be defined in final product | | |
| Supply Connection DC connector | | |
| Recommend charging method declared by the manufacturer.....: Charging the battery with 40A constant current until 29.2V, then constant voltage until charging current reduces to 5.1A. | | |
| 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 2023-08-28 | | |
| Date (s) of performance of tests 2023-08-28 to 2023-09-08 | | |
| General remarks: | | |
| "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. | | |
| Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator. | | |
| Name and address of factory (ies) : GUANGDONG NPP NEW ENERGY CO.,LTD No.3 LiaoBianHongLi Road, Liaobu Town, Dongguan City, Guangdong Province | | |
| General product information and other remarks: | | |
| The battery of model is composed of sixteen lithium-ion cells (8S2P), and equipped with overcharge, overdischarge, overcurrent, and short circuit protection circuits. | | |
| | Cell | Battery |
| Model | LF100LA | ES25.6-200LP |
| Rated capacity(Ah) | 102 | 200 |
| Nominal voltage(V) | 3.2 | 25.6 |
| Recommended Charge Current(A) | 50 | 40 |
| Maximum Charge Current(A) | 100 | 100 |
| Recommended Discharge Current(A) | 50 | 100 |
| Maximum Discharge Current(A) | 250 | 100 |
| Maximum Charge Voltage(V) | 3.9 | 29.6 |
| End-of-discharge Voltage(V) | 1.9 | 22.4 |
| Charge temperature Range(°C) | 0 to 65 | 0 to 45 |
| Discharge temperature Range(°C) | -30 to 65 | -20 to 60 |
| Nominal mass(kg) | 1.98±0.1 | 46.5±2 |
| External dimensions(mm) | 49.9±1.0*160±1.0*118.5± 1.0 | 160±2*370±2*600±2 |

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| IEC 62619 | | | |
|-----------|---|-----------------|---------|
| 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 | | 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 | | P |
| | Voltage, current, and temperature limits of the cells | | P |
| | Specifications and charging instructions for equipment manufacturers | Charging instructions included in the product specification. | 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 |

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| IEC 62619 | | | |
|------------|---|--|------------------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | 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 ¹ | | 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..... : | Upper limit charge voltage: 3.90V; Cut off discharge Voltage: 1.90V | P |
| | Designation of battery system to comply with the cell operating region | | P |
| 5.8 | System lock (or system lock function) | | N/A |
| | Non-resettable function to stop battery operation | | N/A ⁱ |
| | Manual with procedure for resetting of battery operation | | N/A |
| | Emergency battery final discharge | | N/A |
| 5.9 | Quality plan | | P |
| | Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... : | The manufacturer supplies a self-declaration document. | 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 | | P |

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| IEC 62619 | | | |
|-----------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | |
|------------|--|---|-----|
| 7 | SPECIFIC REQUIREMENTS AND TESTS | | P |
| 7.1 | Charging procedure for test purposes | | P |
| | 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) | CB approval cell | 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) | CB approval cell | 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 | CB approval cell | N/A |
| 7.2.3.2 | Whole drop test (cell or cell block, and battery system) | | 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 system | — |
| | Mass of the test unit (kg)..... : | 46.5 | — |
| | Height of drop (m)..... : | 0.1 | — |
| | Results: no fire, no explosion | | P |
| 7.2.4 | Thermal abuse test (cell or cell block) | CB approval cell | N/A |
| | Results: no fire, no explosion | | N/A |
| 7.2.5 | Overcharge test (cell or cell block) | | N/A |

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| IEC 62619 | | | |
|------------|---|------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | 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) | CB approval cell | 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 |
| | Target Voltage | | N/A |
| | Maximum discharge current of the cell, I_m | | N/A |
| | Discharge current for forced discharge, 1.0 I_t | | N/A |
| | Discharging time, $t = (1 I_t / I_m) \times 90$ (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 | CB approval cell | 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 $25 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$. | | 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) | | 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 | | N/A |
| | Functional safety analysis for critical controls | | N/A |

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| IEC 62619 | | | |
|------------|---|------------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Conduct of a process hazard analysis for both the cell manufacturing process and the battery system manufacturing process | | N/A |
| | 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 | | 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 |
| | 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..... : | 50°C | 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..... : | | N/A |
| 10 | INFORMATION FOR SAFETY | | P |

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|-----------|---|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | 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 | | N/A |
|----|-------------------------|--|-----|
| | Refer to Annex D | | N/A |

| ANNEX A | OPERATING REGION OF CELLS FOR SAFE USE | | N/A |
|---------|--|--|-----|
| A.1 | General | | N/A |
| A.2 | Charging conditions for safe use | | N/A |
| A.3 | Consideration on charging voltage | | N/A |
| A.4 | Consideration on temperature | | N/A |
| A.5 | High temperature range | | N/A |
| A.6 | Low temperature range | | N/A |
| A.7 | Discharging conditions for safe use | | N/A |
| A.8 | Example of operating region | | N/A |

| 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..... : | | — |

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| IEC 62619 | | | |
|-----------|---|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | 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 |
| | – 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 | | N/A |
|---------|--|--|-----|
| | 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 | | N/A |
| | Regulations concerning international transport of secondary lithium batteries | | N/A |

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|-----------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| 5.1 | TABLE: Critical components information | | | | | N/A |
|---|--|--------------|----------------|----------------|---|-----|
| Object / part No. | Manufacturer/ trademark | Type / model | Technical data | Standard | Mark(s) of conformity1) | |
| Cell | EVE Power Co., Ltd. | LF100LA | 3.2V, 102Ah | IEC 62619:2022 | Certificate No.: SG PSB-BT-03455, Report No.: 085-282260325-000 | |
| IC | -- | -- | -- | -- | -- | |
| MOSFET | -- | -- | -- | -- | -- | |
| PCB | -- | -- | -- | -- | -- | |
| Supplementary information: Due to customer confidential information not being reflected. | | | | | | |

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|-----------|--------------------|-----------------|---------|
| 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 ΔT (°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): ____

Remark: Maximum charge voltage of the cell is 3.65V. The customer requires to use the maximum charge voltage of 110% for the test as the tightening test condition

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|-----------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| 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 | |
| -- | -- | -- | -- | -- | -- | |
| -- | -- | -- | -- | -- | -- | |
| -- | -- | -- | -- | -- | -- | |

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

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|-----------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| 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:

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 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): ___

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| 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): ___ | | | | | | |

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| IEC 62619 | | | |
|-----------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| 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 | |
| B01# | 23.42 | 100 | 27.09 | 3.701 | A, D, F | |
| | | | Charge Voltage Applied Battery System: 1) | | | |
| | | | Whole | Part | | |
| | | | 34.32V | -- | | |
| Supplementary information: | | | | | | |
| 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: | | | | | | |
| 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 | |
| B01# | 23.45 | 120 | 24.19 | A, D, F | |
| Supplementary information: | | | | | |
| 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): ____ | | | | | |

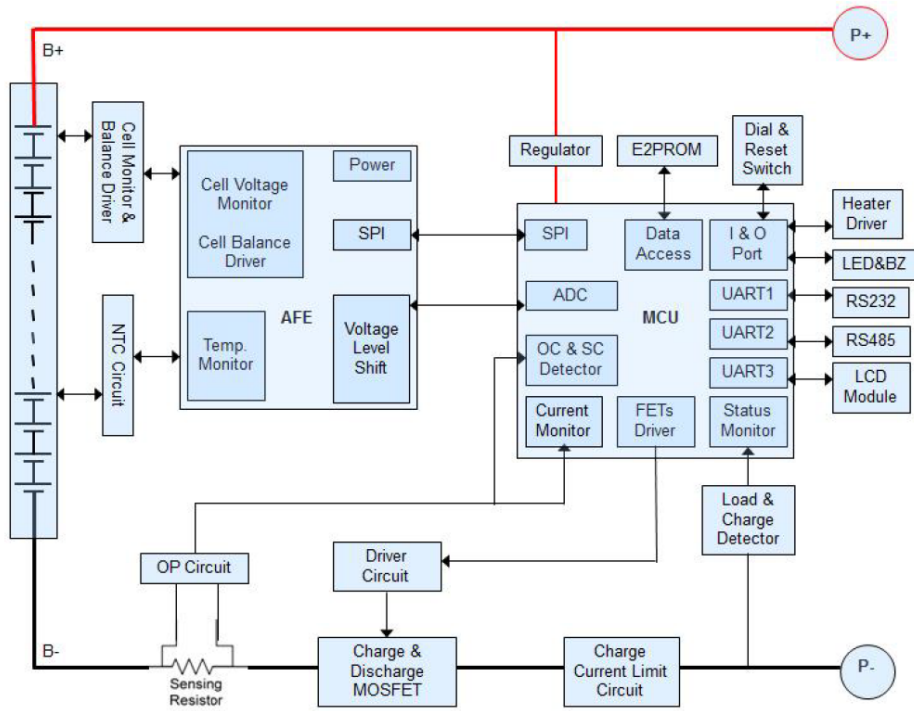
错误!未找到引用源。

| IEC 62619 | | | |
|-----------|--------------------|-----------------|---------|
| Clause | Requirement + Test | Result - Remark | Verdict |

| 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 | |
| B01# | 25.79 | 100 | 27.68 | |
| Maximum Specified Temperature of Battery System, °C | | Maximum Measured Cell Case Temperature, °C | Results | |
| 45 | | 48.7 | A, D, F | |
| Supplementary information: 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): ____ | | | | |

错误!未找到引用源。

Circuit Diagram



错误!未找到引用源。

Product Photo



Figure 1 Front view of battery

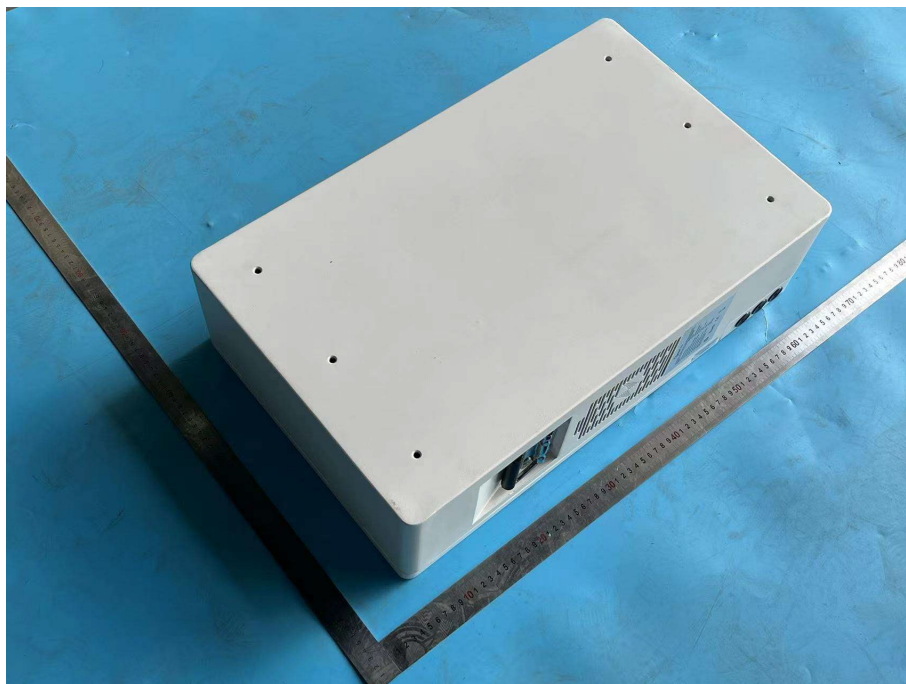


Figure 2 Back view of battery

错误!未找到引用源。

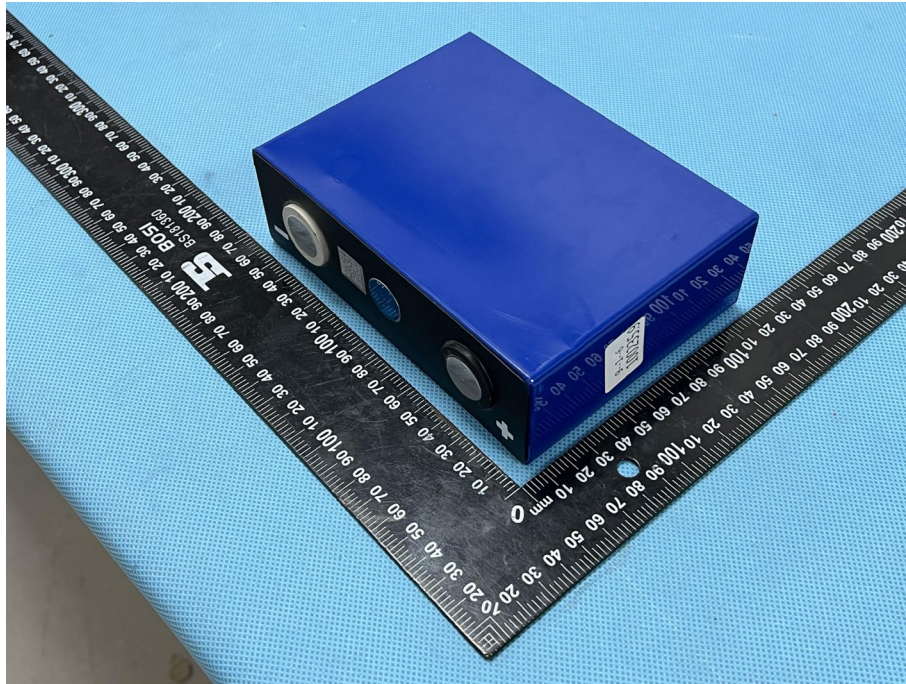


Figure 3 Front view of cell

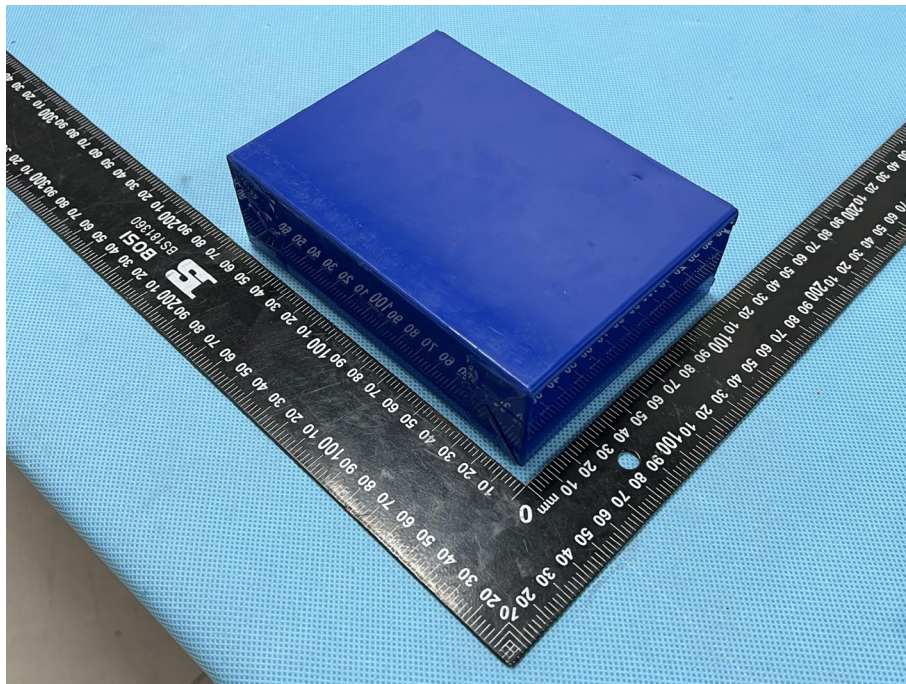


Figure 4 Back view of cell