



Test Report issued under the responsibility of:

**SGS Fimko Ltd.**

|                                                                                                                                                                                                                                                                                                                                                            |                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <b>TEST REPORT</b><br><b>IEC 62133-2</b><br><b>Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications –</b><br><b>Part 2: Lithium systems</b>                                                      |                                                                        |
| <b>Report Number..... :</b>                                                                                                                                                                                                                                                                                                                                | SZES190601362501                                                       |
| <b>Date of issue..... :</b>                                                                                                                                                                                                                                                                                                                                | 2019-07-22                                                             |
| <b>Total number of pages .....</b>                                                                                                                                                                                                                                                                                                                         | 22 Pages                                                               |
| <b>Name of Testing Laboratory preparing the Report .....</b>                                                                                                                                                                                                                                                                                               | <b>SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch</b> |
| <b>Applicant's name .....</b>                                                                                                                                                                                                                                                                                                                              | Haidi Energy Technology Co., Ltd.                                      |
| <b>Address.....</b>                                                                                                                                                                                                                                                                                                                                        | No.6, Yongfu Road, Xuecheng District, Zaozhuang, Shandong, China       |
| <b>Test specification:</b>                                                                                                                                                                                                                                                                                                                                 |                                                                        |
| <b>Standard .....</b>                                                                                                                                                                                                                                                                                                                                      | IEC 62133-2:2017                                                       |
| <b>Test procedure .....</b>                                                                                                                                                                                                                                                                                                                                | CB Scheme                                                              |
| <b>Non-standard test method .....</b>                                                                                                                                                                                                                                                                                                                      | N/A                                                                    |
| <b>Test Report Form No. ....</b>                                                                                                                                                                                                                                                                                                                           | IEC62133_2A                                                            |
| <b>Test Report Form(s) Originator ....</b>                                                                                                                                                                                                                                                                                                                 | DEKRA                                                                  |
| <b>Master TRF .....</b>                                                                                                                                                                                                                                                                                                                                    | Dated 2017-08-10                                                       |
| <b>Copyright © 2017 IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE System). All rights reserved.</b>                                                                                                                                                                                                     |                                                                        |
| This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context. |                                                                        |
| If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.                                                                                                                                                                                                                   |                                                                        |
| <b>This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.</b>                                                                                                                                                                 |                                                                        |
| <b>General disclaimer:</b>                                                                                                                                                                                                                                                                                                                                 |                                                                        |
| The test results presented in this report relate only to the object tested.<br>This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.                      |                                                                        |

|                                                                                                   |                                                  |                                                                                                    |
|---------------------------------------------------------------------------------------------------|--------------------------------------------------|----------------------------------------------------------------------------------------------------|
| <b>Test item description..... :</b>                                                               | Lithium-ion Cell                                 |                                                                                                    |
| <b>Trade Mark..... :</b>                                                                          | HAIDI                                            |                                                                                                    |
| <b>Manufacturer .....</b>                                                                         | Same as applicant                                |                                                                                                    |
| <b>Model/Type reference .....</b>                                                                 | HDCF18650-1800-3.2V                              |                                                                                                    |
| <b>Ratings .....</b>                                                                              | Rated Voltage: 3,2 V<br>Rated Capacity: 1800 mAh |                                                                                                    |
| <b>Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):</b> |                                                  |                                                                                                    |
| <input checked="" type="checkbox"/>                                                               | <b>CB Testing Laboratory:</b>                    | SGS-CSTC Standards Technical Services Co., Ltd.<br>Shenzhen Branch                                 |
| <b>Testing location/ address..... :</b>                                                           |                                                  | No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China 518057 |
| <b>Tested by (name, function, signature)..... :</b>                                               |                                                  | Mino Wu /<br>Project Engineer                                                                      |
| <b>Approved by (name, function, signature)... :</b>                                               |                                                  | Judy Fu /<br>Report Reviewer                                                                       |
| <input type="checkbox"/>                                                                          | <b>Testing procedure: CTF Stage 1:</b>           | N/A                                                                                                |
| <b>Testing location/ address..... :</b>                                                           |                                                  |                                                                                                    |
| <b>Tested by (name, function, signature)..... :</b>                                               |                                                  |                                                                                                    |
| <b>Approved by (name, function, signature)... :</b>                                               |                                                  |                                                                                                    |
| <input type="checkbox"/>                                                                          | <b>Testing procedure: CTF Stage 2:</b>           | N/A                                                                                                |
| <b>Testing location/ address..... :</b>                                                           |                                                  |                                                                                                    |
| <b>Tested by (name + signature) .....</b>                                                         |                                                  |                                                                                                    |
| <b>Witnessed by (name, function, signature) . :</b>                                               |                                                  |                                                                                                    |
| <b>Approved by (name, function, signature)... :</b>                                               |                                                  |                                                                                                    |
| <input type="checkbox"/>                                                                          | <b>Testing procedure: CTF Stage 3:</b>           | N/A                                                                                                |
| <input type="checkbox"/>                                                                          | <b>Testing procedure: CTF Stage 4:</b>           | N/A                                                                                                |
| <b>Testing location/ address..... :</b>                                                           |                                                  |                                                                                                    |
| <b>Tested by (name, function, signature)..... :</b>                                               |                                                  |                                                                                                    |
| <b>Witnessed by (name, function, signature) . :</b>                                               |                                                  |                                                                                                    |
| <b>Approved by (name, function, signature)... :</b>                                               |                                                  |                                                                                                    |
| <b>Supervised by (name, function, signature) :</b>                                                |                                                  |                                                                                                    |

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

Attachment 1: 2 pages of Photos;  
 Attachment 2: 1 page of Information for safety;  
 Attachment 3: 2 pages of Packaging;  
 Attachment 4: 1 page of Product specification;  
 Attachment 5: 1 page of ISO 9001 certificate.

**Summary of testing:**

The sample(s) tested complies with the requirements of IEC 62133-2: 2017.

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

Remark: Only cell was considered and tested according to standard in this report.

**Tests performed (name of test and test clause):**

- ☐ 5.2 Insulation resistance
- ☒ 7.2.1 Continuous charging at constant voltage (cells)
- ☐ 7.2.2 Case stress at high ambient temperature (battery)
- ☒ 7.3.1 External short circuit (cell)
- ☐ 7.3.2 External short circuit (battery)
- ☒ 7.3.3 Free fall
- ☒ 7.3.4 Thermal abuse (cells)
- ☒ 7.3.5 Crush (cells)
- ☐ 7.3.6 Over-charging of battery
- ☒ 7.3.7 Forced discharge (cells)
- ☐ 7.3.8 Mechanical tests (batteries)
- ☒ 7.3.9 Design evaluation – Forced internal short circuit (cells)
- ☐ Annex D Measurement of the internal AC resistance for coin cells

**Testing location:**

SGS-CSTC Standards Technical Services Co., Ltd.  
 Shenzhen Branch

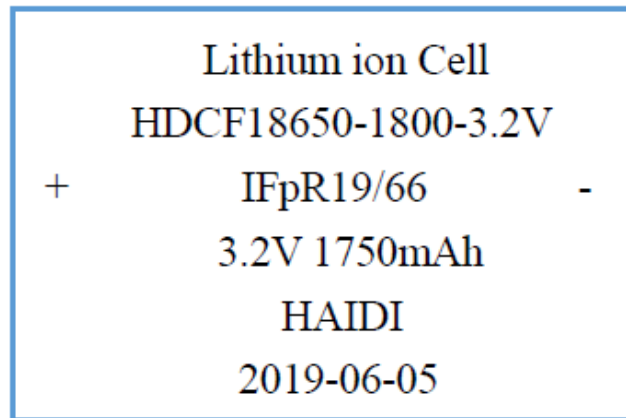
No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China 518057

**Summary of compliance with National Differences (List of countries addressed): none.**

☒ The product fulfils the requirements of EN 62133-2: 2017.

**Copy of marking plate:**

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| Test item particulars.....: --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |
| Classification of installation and use.....: --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |
| Supply Connection .....: --                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |
| Recommend charging method declared by the manufacturer .....                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | CC/CV |
| Discharge current (0,2 It A) .....: 0,36 A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |
| Specified final voltage.....: 2,5 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |
| Upper limit charging voltage per cell.....: 3,6 V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |       |
| Maximum charging current .....: 1800 mA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |
| Charging temperature upper limit.....: 45°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |
| Charging temperature lower limit.....: 0°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |
| Polymer cell electrolyte type.....: <input type="checkbox"/> gel polymer <input type="checkbox"/> solid polymer <input checked="" type="checkbox"/> 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 .....: 2019-06-26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |
| Date (s) of performance of tests .....: 2019-06-27 to 2019-07-09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |
| General remarks:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |
| <p>"(see Enclosure #)" refers to additional information appended to the report.<br/>         "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</p> <p>This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <a href="http://www.sgs.com/en/Terms-and-Conditions.aspx">http://www.sgs.com/en/Terms-and-Conditions.aspx</a> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <a href="http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx">http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx</a>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 3 months only.</p> |       |

|                                                                                                                                                                                                                                                                           |                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <b>Manufacturer's Declaration per sub-clause 4.2.5 of IECCE 02:</b>                                                                                                                                                                                                       |                                                                                    |
| The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> Not applicable |
| <b>When differences exist; they shall be identified in the General product information section.</b>                                                                                                                                                                       |                                                                                    |
| Name and address of factory (ies)..... : Same as applicant                                                                                                                                                                                                                |                                                                                    |
| <b>General product information and other remarks:</b>                                                                                                                                                                                                                     |                                                                                    |
| Product description:                                                                                                                                                                                                                                                      | Lithium-ion Cell                                                                   |
| Model of cell:                                                                                                                                                                                                                                                            | HDCF18650-1800-3.2V                                                                |
| Designation of cell:                                                                                                                                                                                                                                                      | IFpR19/66                                                                          |
| Rated voltage of cell:                                                                                                                                                                                                                                                    | 3,2 V                                                                              |
| Rated capacity of cell:                                                                                                                                                                                                                                                   | 1800 mAh                                                                           |
| Maximum charge current of cell:                                                                                                                                                                                                                                           | 1800 mA                                                                            |

| IEC 62133-2 |                                                                                                                                                                                                                            |                                                                                    |         |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|---------|
| Clause      | Requirement + Test                                                                                                                                                                                                         | Result - Remark                                                                    | Verdict |
| <b>4</b>    | <b>PARAMETER MEASUREMENT TOLERANCES</b>                                                                                                                                                                                    |                                                                                    | P       |
|             | Parameter measurement tolerances                                                                                                                                                                                           |                                                                                    | P       |
| <b>5</b>    | <b>GENERAL SAFETY CONSIDERATIONS</b>                                                                                                                                                                                       |                                                                                    | P       |
| <b>5.1</b>  | <b>General</b>                                                                                                                                                                                                             |                                                                                    | P       |
|             | Cells and batteries so designed and constructed that they are safe under conditions of both intended use and reasonably foreseeable misuse                                                                                 |                                                                                    | P       |
| <b>5.2</b>  | <b>Insulation and wiring</b>                                                                                                                                                                                               | Cell only                                                                          | N/A     |
|             | The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ                                                 |                                                                                    | N/A     |
|             | Insulation resistance (MΩ) ..... :                                                                                                                                                                                         |                                                                                    | —       |
|             | Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements                                                                                               |                                                                                    | N/A     |
|             | Orientation of wiring maintains adequate clearance and creepage distances between conductors                                                                                                                               |                                                                                    | N/A     |
|             | Mechanical integrity of internal connections accommodates reasonably foreseeable misuse                                                                                                                                    |                                                                                    | N/A     |
| <b>5.3</b>  | <b>Venting</b>                                                                                                                                                                                                             |                                                                                    | P       |
|             | Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition            | Cell: A pressure relief mechanism was used to relieve excessive internal pressure. | P       |
|             | Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief                                                                      | Cell only                                                                          | N/A     |
| <b>5.4</b>  | <b>Temperature, voltage and current management</b>                                                                                                                                                                         | Cell only                                                                          | N/A     |
|             | Batteries are designed such that abnormal temperature rise conditions are prevented                                                                                                                                        |                                                                                    | N/A     |
|             | Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer                                                                                                             |                                                                                    | N/A     |
|             | Batteries are provided with specifications and charging instructions for equipment manufacturers so that specified chargers are designed to maintain charging within the temperature, voltage and current limits specified |                                                                                    | N/A     |
| <b>5.5</b>  | <b>Terminal contacts</b>                                                                                                                                                                                                   | Cell only                                                                          | N/A     |
|             | The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current                                                                                                                     |                                                                                    | N/A     |

| IEC 62133-2 |                                                                                                                                                                                                                                            |                 |         |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause      | Requirement + Test                                                                                                                                                                                                                         | Result - Remark | Verdict |
|             | External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance                                                                                                             |                 | N/A     |
|             | Terminal contacts are arranged to minimize the risk of short-circuit                                                                                                                                                                       |                 | N/A     |
| <b>5.6</b>  | <b>Assembly of cells into batteries</b>                                                                                                                                                                                                    | Cell only       | N/A     |
| 5.6.1       | General                                                                                                                                                                                                                                    |                 | N/A     |
|             | Each battery have an independent control and protection for current, voltage, temperature and any other parameter required for safety and to maintain the cells within their operating region                                              |                 | N/A     |
|             | This protection may be provided external to the battery such as within the charger or the end devices                                                                                                                                      |                 | N/A     |
|             | If protection is external to the battery, the manufacturer of the battery provide this safety relevant information to the external device manufacturer for implementation                                                                  |                 | N/A     |
|             | If there is more than one battery housed in a single battery case, each battery have protective circuitry that can maintain the cells within their operating regions                                                                       |                 | N/A     |
|             | Manufacturers of cells specify current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly                                                                                     |                 | N/A     |
|             | Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate circuitry to prevent operation of cells outside the limits specified by the cell manufacturer                             |                 | N/A     |
|             | Protective circuit components added as appropriate and consideration given to the end-device application                                                                                                                                   |                 | N/A     |
|             | The manufacturer of the battery provide a safety analysis of the battery safety circuitry with a test report including a fault analysis of the protection circuit under both charging and discharging conditions confirming the compliance |                 | N/A     |
| 5.6.2       | Design recommendation                                                                                                                                                                                                                      |                 | N/A     |
|             | For the battery consisting of a single cell or a single cellblock, it is recommended that the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 2                                    |                 | N/A     |

| IEC 62133-2 |                                                                                                                                                                                                                                                                                                                                                          |                 |         |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause      | Requirement + Test                                                                                                                                                                                                                                                                                                                                       | Result - Remark | Verdict |
|             | For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, it is recommended that the voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Table 2, by monitoring the voltage of every single cell or the single cellblocks |                 | N/A     |
|             | For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, it is recommended that charging is stopped when the upper limit of the charging voltage is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks                |                 | N/A     |
|             | For batteries consisting of series-connected cells or cell blocks, nominal charge voltage not be counted as an overcharge protection                                                                                                                                                                                                                     |                 | N/A     |
|             | For batteries consisting of series-connected cells or cell blocks, cells have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer                                                                                                                                                              |                 | N/A     |
|             | It is recommended that the cells and cell blocks not discharged beyond the cell manufacturer's specified final voltage                                                                                                                                                                                                                                   |                 | N/A     |
|             | For batteries consisting of series-connected cells or cell blocks, cell balancing circuitry incorporated into the battery management system                                                                                                                                                                                                              |                 | N/A     |
| 5.6.3       | Mechanical protection for cells and components of batteries                                                                                                                                                                                                                                                                                              |                 | N/A     |
|             | Mechanical protection for cells, cell connections and control circuits within the battery provided to prevent damage as a result of intended use and reasonably foreseeable misuse                                                                                                                                                                       |                 | N/A     |
|             | The mechanical protection can be provided by the battery case or it can be provided by the end product enclosure for those batteries intended for building into an end product                                                                                                                                                                           |                 | N/A     |
|             | The battery case and compartments housing cells designed to accommodate cell dimensional tolerances during charging and discharging as recommended by the cell manufacturer                                                                                                                                                                              |                 | N/A     |
|             | For batteries intended for building into a portable end product, testing with the battery installed within the end product considered when conducting mechanical tests                                                                                                                                                                                   |                 | N/A     |
| 5.7         | <b>Quality plan</b>                                                                                                                                                                                                                                                                                                                                      |                 | P       |

| IEC 62133-2 |                                                                                                                                                                                                                               |                                                                    |         |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|---------|
| Clause      | Requirement + Test                                                                                                                                                                                                            | Result - Remark                                                    | Verdict |
|             | The manufacturer prepares and implements a quality plan that defines procedures for the inspection of materials, components, cells and batteries and which covers the whole process of producing each type of cell or battery | ISO 9001 certificate was submitted.<br>See Attachment 5 for detail | P       |
| <b>5.8</b>  | <b>Battery safety components</b>                                                                                                                                                                                              |                                                                    | N/A     |
|             | According annex F                                                                                                                                                                                                             |                                                                    | N/A     |

|          |                                                                                                                                                                                                        |                                                                                                                             |     |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|-----|
| <b>6</b> | <b>TYPE TEST AND SAMPLE SIZE</b>                                                                                                                                                                       |                                                                                                                             | P   |
|          | 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                                                               | Tests are performed according to test items specified in table 1 of the standard<br>The samples were produced in Jun. 2019. | P   |
|          | Coin cells with resistance $\leq 3 \Omega$ (measured according annex D) are tested according table 1                                                                                                   |                                                                                                                             | N/A |
|          | Unless otherwise specified, tests are carried out in an ambient temperature of $20^\circ\text{C} \pm 5^\circ\text{C}$                                                                                  |                                                                                                                             | P   |
|          | The safety analysis of 5.6.1 identify those components of the protection circuit that are critical for short-circuit, overcharge and overdischarge protection                                          | Cell only                                                                                                                   | N/A |
|          | When conducting the short-circuit test, consideration given to the simulation of any single fault condition that is likely to occur in the protecting circuit that would affect the short-circuit test |                                                                                                                             | N/A |

|            |                                                                                                                                                                                                                       |  |   |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|---|
| <b>7</b>   | <b>SPECIFIC REQUIREMENTS AND TESTS</b>                                                                                                                                                                                |  | P |
| <b>7.1</b> | <b>Charging procedure for test purposes</b>                                                                                                                                                                           |  | P |
| 7.1.1      | First procedure                                                                                                                                                                                                       |  | P |
|            | This charging procedure applies to subclauses other than those specified in 7.1.2                                                                                                                                     |  | P |
|            | Unless otherwise stated in this document, the charging procedure for test purposes is carried out in an ambient temperature of $20^\circ\text{C} \pm 5^\circ\text{C}$ , using the method declared by the manufacturer |  | P |
|            | Prior to charging, the battery have been discharged at $20^\circ\text{C} \pm 5^\circ\text{C}$ at a constant current of 0,2 It A down to a specified final voltage                                                     |  | P |
| 7.1.2      | Second procedure                                                                                                                                                                                                      |  | P |
|            | This charging procedure applies only to 7.3.1, 7.3.4, 7.3.5, and 7.3.9                                                                                                                                                |  | P |

| IEC 62133-2 |                                                                                                                                                                                                                                                                                                                                                    |                            |         |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------|
| Clause      | Requirement + Test                                                                                                                                                                                                                                                                                                                                 | Result - Remark            | Verdict |
|             | After stabilization for 1 h and 4 h, respectively, at ambient temperature of highest test temperature and lowest test temperature, as specified in Table 2, cells are charged by using the upper limit charging voltage and maximum charging current, until the charging current is reduced to 0,05 It A, using a constant voltage charging method |                            | P       |
| <b>7.2</b>  | <b>Intended use</b>                                                                                                                                                                                                                                                                                                                                |                            | P       |
| 7.2.1       | Continuous charging at constant voltage (cells)                                                                                                                                                                                                                                                                                                    |                            | P       |
|             | Fully charged cells are subjected for 7 days to a charge using the charging method for current and standard voltage specified by the cell manufacturer                                                                                                                                                                                             |                            | P       |
|             | Results: No fire. No explosion. No leakage.....:                                                                                                                                                                                                                                                                                                   | (See appended table 7.2.1) | P       |
| 7.2.2       | Case stress at high ambient temperature (battery)                                                                                                                                                                                                                                                                                                  | Cell only                  | N/A     |
|             | Oven temperature (°C).....:                                                                                                                                                                                                                                                                                                                        |                            | N/A     |
|             | Results: No physical distortion of the battery case resulting in exposure of internal protective components and cells                                                                                                                                                                                                                              |                            | N/A     |
| <b>7.3</b>  | <b>Reasonably foreseeable misuse</b>                                                                                                                                                                                                                                                                                                               |                            | P       |
| 7.3.1       | External short-circuit (cell)                                                                                                                                                                                                                                                                                                                      |                            | P       |
|             | The cells were tested until one of the following occurred:                                                                                                                                                                                                                                                                                         |                            | —       |
|             | - 24 hours elapsed; or                                                                                                                                                                                                                                                                                                                             |                            | N/A     |
|             | - The case temperature declined by 20 % of the maximum temperature rise                                                                                                                                                                                                                                                                            |                            | P       |
|             | Results: No fire. No explosion.....:                                                                                                                                                                                                                                                                                                               | (See appended table 7.3.1) | P       |
| 7.3.2       | External short-circuit (battery)                                                                                                                                                                                                                                                                                                                   | Cell only                  | N/A     |
|             | The batteries were tested until one of the following occurred:                                                                                                                                                                                                                                                                                     |                            | —       |
|             | - 24 hours elapsed; or                                                                                                                                                                                                                                                                                                                             |                            | N/A     |
|             | - The case temperature declined by 20 % of the maximum temperature rise                                                                                                                                                                                                                                                                            |                            | N/A     |
|             | In case of rapid decline in short circuit current, the battery pack remained on test for an additional one hour after the current reached a low end steady state condition                                                                                                                                                                         |                            | N/A     |
|             | A single fault in the discharge protection circuit conducted on one to four (depending upon the protection circuit) of the five samples before conducting the short-circuit test                                                                                                                                                                   |                            | N/A     |
|             | A single fault applies to protective component parts such as MOSFET, fuse, thermostat or positive temperature coefficient (PTC) thermistor                                                                                                                                                                                                         |                            | N/A     |
|             | Results: No fire. No explosion.....:                                                                                                                                                                                                                                                                                                               |                            | N/A     |

| IEC 62133-2 |                                                                                                                                                                                                                                                                        |                 |         |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|
| Clause      | Requirement + Test                                                                                                                                                                                                                                                     | Result - Remark | Verdict |
| 7.3.3       | Free fall                                                                                                                                                                                                                                                              |                 | P       |
|             | Results: No fire. No explosion                                                                                                                                                                                                                                         |                 | P       |
| 7.3.4       | Thermal abuse (cells)                                                                                                                                                                                                                                                  |                 | P       |
|             | Oven temperature (°C) ..... : 130°C                                                                                                                                                                                                                                    |                 | P       |
|             | Results: No fire. No explosion                                                                                                                                                                                                                                         |                 | P       |
| 7.3.5       | Crush (cells)                                                                                                                                                                                                                                                          |                 | P       |
|             | The crushing force was released upon:                                                                                                                                                                                                                                  |                 | —       |
|             | - The maximum force of 13 kN ± 0,78 kN has been applied; or                                                                                                                                                                                                            |                 | P       |
|             | - An abrupt voltage drop of one-third of the original voltage has been obtained                                                                                                                                                                                        |                 | N/A     |
|             | Results: No fire. No explosion..... : (See appended table 7.3.5)                                                                                                                                                                                                       |                 | P       |
| 7.3.6       | Over-charging of battery                                                                                                                                                                                                                                               | Cell only       | N/A     |
|             | The supply voltage which is:                                                                                                                                                                                                                                           |                 | —       |
|             | - 1,4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6,0 V) for single cell/cell block batteries or                                                                                                                                  |                 | N/A     |
|             | - 1,2 times the upper limit charging voltage resented in Table A.1 per cell for series connected multi-cell batteries, and                                                                                                                                             |                 | N/A     |
|             | - Sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached                                                                                                                                              |                 | N/A     |
|             | Test was continued until the temperature of the outer casing:                                                                                                                                                                                                          |                 | —       |
|             | - Reached steady state conditions (less than 10 °C change in 30-minute period); or                                                                                                                                                                                     |                 | N/A     |
|             | - Returned to ambient                                                                                                                                                                                                                                                  |                 | N/A     |
|             | Results: No fire. No explosion..... :                                                                                                                                                                                                                                  |                 | N/A     |
| 7.3.7       | Forced discharge (cells)                                                                                                                                                                                                                                               |                 | P       |
|             | If the discharge voltage reaches the negative value of upper limit charging voltage within the testing duration, the voltage is maintained at the negative value of the upper limit charging voltage by reducing the current for the remainder of the testing duration |                 | N/A     |
|             | If the discharge voltage does not reach the negative value of upper limit charging voltage within the testing duration, the test is terminated at the end of the testing duration                                                                                      |                 | P       |
|             | Results: No fire. No explosion..... : (See appended table 7.3.7)                                                                                                                                                                                                       |                 | P       |
| 7.3.8       | Mechanical tests (batteries)                                                                                                                                                                                                                                           | Cell only       | N/A     |
| 7.3.8.1     | Vibration                                                                                                                                                                                                                                                              |                 | N/A     |

| IEC 62133-2 |                                                                                                                                                                           |                                      |         |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|---------|
| Clause      | Requirement + Test                                                                                                                                                        | Result - Remark                      | Verdict |
|             | Results: No fire, no explosion, no rupture, no leakage or venting. .... :                                                                                                 |                                      | N/A     |
| 7.3.8.2     | Mechanical shock                                                                                                                                                          |                                      | N/A     |
|             | Results: No leakage, no venting, no rupture, no explosion and no fire .... :                                                                                              |                                      | N/A     |
| 7.3.9       | Design evaluation – Forced internal short-circuit (cells)                                                                                                                 | Japan, Korea, France and Switzerland | P       |
|             | The cells complied with national requirement for ..... :                                                                                                                  |                                      | —       |
|             | The pressing was stopped upon:                                                                                                                                            |                                      | —       |
|             | - A voltage drop of 50 mV has been detected; or                                                                                                                           |                                      | N/A     |
|             | - The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached                                                                             | Cylindrical cells: 800 N             | P       |
|             | Results: No fire .... :                                                                                                                                                   | (See appended table 7.3.9)           | P       |
| <b>8</b>    | <b>INFORMATION FOR SAFETY</b>                                                                                                                                             |                                      | P       |
| <b>8.1</b>  | <b>General</b>                                                                                                                                                            |                                      | P       |
|             | Manufacturers of secondary cells ensure that information is provided about current, voltage and temperature limits of their products                                      | See Attachment 4 for detail          | P       |
|             | Manufacturers of batteries ensure that equipment manufacturers and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards | See Attachment 2 for detail.         | P       |
|             | Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product                     |                                      | N/A     |
|             | As appropriate, any information relating to hazard avoidance resulting from a system analysis provided to the end user                                                    |                                      | N/A     |
|             | Do not allow children to replace batteries without adult supervision                                                                                                      |                                      | N/A     |
| <b>8.2</b>  | <b>Small cell and battery safety information</b>                                                                                                                          |                                      | N/A     |
|             | The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:                                |                                      | N/A     |
|             | - Keep small cells and batteries which are considered swallowable out of the reach of children                                                                            |                                      | N/A     |
|             | - Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion                                                     |                                      | N/A     |
|             | - In case of ingestion of a cell or battery, seek medical assistance promptly                                                                                             |                                      | N/A     |

| IEC 62133-2 |                                                                                                                                                                                                                   |                              |            |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------|
| Clause      | Requirement + Test                                                                                                                                                                                                | Result - Remark              | Verdict    |
| <b>9</b>    | <b>MARKING</b>                                                                                                                                                                                                    |                              | <b>P</b>   |
| <b>9.1</b>  | <b>Cell marking</b>                                                                                                                                                                                               | See marking plate for detail | <b>P</b>   |
|             | Cells marked as specified in IEC 61960, except coin cells                                                                                                                                                         |                              | <b>P</b>   |
|             | Coin cells whose external surface area is too small to accommodate the markings on the cells show the designation and polarity                                                                                    |                              | <b>P</b>   |
|             | By agreement between the cell manufacturer and the battery and/or end product manufacturer, component cells used in the manufacture of a battery need not be marked                                               |                              | <b>N/A</b> |
| <b>9.2</b>  | <b>Battery marking</b>                                                                                                                                                                                            |                              | <b>N/A</b> |
|             | Batteries marked as specified in IEC 61960, except for coin batteries                                                                                                                                             | Cell only                    | <b>N/A</b> |
|             | Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity. Batteries also marked with an appropriate caution statement               |                              | <b>N/A</b> |
|             | Terminals have clear polarity marking on the external surface of the battery                                                                                                                                      |                              | <b>N/A</b> |
|             | Batteries with keyed external connectors designed for connection to specific end products need not be marked with polarity markings if the design of the external connector prevents reverse polarity connections |                              | <b>N/A</b> |
| <b>9.3</b>  | <b>Caution for ingestion of small cells and batteries</b>                                                                                                                                                         |                              | <b>N/A</b> |
|             | Coin cells and batteries identified as small batteries according to 8.2 include a caution statement regarding the hazards of ingestion in accordance with 8.2                                                     |                              | <b>N/A</b> |
|             | When small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion given on the immediate package                                                            |                              | <b>N/A</b> |
| <b>9.4</b>  | <b>Other information</b>                                                                                                                                                                                          |                              | <b>N/A</b> |
|             | Storage and disposal instructions                                                                                                                                                                                 |                              | <b>N/A</b> |
|             | Recommended charging instructions                                                                                                                                                                                 |                              | <b>N/A</b> |
| <b>10</b>   | <b>PACKAGING AND TRANSPORT</b>                                                                                                                                                                                    |                              | <b>P</b>   |
|             | Packaging for coin cells not small enough to fit within the limits of the ingestion gauge of Figure 3                                                                                                             |                              | <b>N/A</b> |
|             | The materials and packaging design are chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants                       | See Attachment 3 for detail  | <b>P</b>   |

| IEC 62133-2    |                                                                                         |                                                                      |         |
|----------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------|---------|
| Clause         | Requirement + Test                                                                      | Result - Remark                                                      | Verdict |
| <b>ANNEX A</b> | <b>CHARGING AND DISCHARGING RANGE OF SECONDARY LITHIUM ION CELLS FOR SAFE USE</b>       |                                                                      | P       |
| <b>A.1</b>     | <b>General</b>                                                                          |                                                                      | P       |
| <b>A.2</b>     | <b>Safety of lithium ion secondary battery</b>                                          |                                                                      | P       |
| <b>A.3</b>     | <b>Consideration on charging voltage</b>                                                |                                                                      | P       |
| A.3.1          | General                                                                                 |                                                                      | P       |
| A.3.2          | Upper limit charging voltage                                                            |                                                                      | P       |
| A.3.2.1        | General                                                                                 |                                                                      | P       |
| A.3.2.2        | Explanation of safety viewpoint                                                         |                                                                      | P       |
| A.3.2.3        | Safety requirements, when different upper limit charging voltage is applied             | The upper limit charging voltage is 3,6 V during test.               | P       |
| <b>A.4</b>     | <b>Consideration of temperature and charging current</b>                                |                                                                      | P       |
| A.4.1          | General                                                                                 |                                                                      | P       |
| A.4.2          | Recommended temperature range                                                           |                                                                      | P       |
| A.4.2.1        | General                                                                                 |                                                                      | P       |
| A.4.2.2        | Safety consideration when a different recommended temperature range is applied          | The test recommended temperature range is 0 to 45°C in specification | P       |
| A.4.3          | High temperature range                                                                  | The upper charging temperature is 45°C                               | N/A     |
| A.4.3.1        | General                                                                                 |                                                                      | N/A     |
| A.4.3.2        | Explanation of safety viewpoint                                                         |                                                                      | N/A     |
| A.4.3.3        | Safety considerations when specifying charging conditions in the high temperature range |                                                                      | N/A     |
| A.4.3.4        | Safety considerations when specifying a new upper limit in the high temperature range   |                                                                      | N/A     |
| A.4.4          | Low temperature range                                                                   | The lower charging temperature is 0°C                                | P       |
| A.4.4.1        | General                                                                                 |                                                                      | P       |
| A.4.4.2        | Explanation of safety viewpoint                                                         |                                                                      | P       |
| A.4.4.3        | Safety considerations, when specifying charging conditions in the low temperature range |                                                                      | P       |
| A.4.4.4        | Safety considerations when specifying a new lower limit in the low temperature range    |                                                                      | P       |
| A.4.5          | Scope of the application of charging current                                            |                                                                      | P       |
| A.4.6          | Consideration of discharge                                                              |                                                                      | P       |
| A.4.6.1        | General                                                                                 |                                                                      | P       |
| A.4.6.2        | Final discharge voltage and explanation of safety viewpoint                             |                                                                      | P       |
| A.4.6.3        | Discharge current and temperature range                                                 |                                                                      | P       |

| IEC 62133-2    |                                                                                               |                          |            |
|----------------|-----------------------------------------------------------------------------------------------|--------------------------|------------|
| Clause         | Requirement + Test                                                                            | Result - Remark          | Verdict    |
| A.4.6.4        | Scope of application of the discharging current                                               |                          | P          |
| <b>A.5</b>     | <b>Sample preparation</b>                                                                     |                          | P          |
| A.5.1          | General                                                                                       |                          | P          |
| A.5.2          | Insertion procedure for nickel particle to generate internal short                            |                          | P          |
| A.5.3          | Disassembly of charged cell                                                                   |                          | P          |
| A.5.4          | Shape of nickel particle                                                                      |                          | P          |
| A.5.5          | Insertion of nickel particle in cylindrical cell                                              |                          | P          |
| A.5.5.1        | Insertion of nickel particle in winding core                                                  |                          | P          |
| A.5.5.2        | Marking the position of the nickel particle on both ends of the winding core of the separator |                          | P          |
| A.5.6          | Insertion of nickel particle in prismatic cell                                                |                          | N/A        |
| <b>A.6</b>     | <b>Experimental procedure of the forced internal short-circuit test</b>                       |                          | P          |
| A.6.1          | Material and tools for preparation of nickel particle                                         |                          | P          |
| A.6.2          | Example of a nickel particle preparation procedure                                            |                          | P          |
| A.6.3          | Positioning (or placement) of a nickel particle                                               |                          | P          |
| A.6.4          | Damaged separator precaution                                                                  |                          | P          |
| A.6.5          | Caution for rewinding separator and electrode                                                 |                          | P          |
| A.6.6          | Insulation film for preventing short-circuit                                                  |                          | P          |
| A.6.7          | Caution when disassembling a cell                                                             |                          | P          |
| A.6.8          | Protective equipment for safety                                                               |                          | P          |
| A.6.9          | Caution in the case of fire during disassembling                                              |                          | P          |
| A.6.10         | Caution for the disassembling process and pressing the electrode core                         |                          | P          |
| A.6.11         | Recommended specifications for the pressing device                                            |                          | P          |
| <b>ANNEX B</b> | <b>RECOMMENDATIONS TO EQUIPMENT MANUFACTURERS AND BATTERY ASSEMBLERS</b>                      |                          | <b>N/A</b> |
| <b>ANNEX C</b> | <b>RECOMMENDATIONS TO THE END-USERS</b>                                                       |                          | <b>N/A</b> |
| <b>ANNEX D</b> | <b>MEASUREMENT OF THE INTERNAL AC RESISTANCE FOR COIN CELLS</b>                               |                          | <b>N/A</b> |
| <b>D.1</b>     | <b>General</b>                                                                                |                          | N/A        |
| <b>D.2</b>     | <b>Method</b>                                                                                 |                          | N/A        |
|                | A sample size of three coin cells is required for this measurement..... :                     | (See appended table D.2) | N/A        |

| IEC 62133-2    |                                                                                                                                           |                 |            |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------|
| Clause         | Requirement + Test                                                                                                                        | Result - Remark | Verdict    |
|                | Coin cells with an internal resistance of less than or equal to 3 $\Omega$ are subjected to the testing according to Clause 6 and Table 1 |                 | N/A        |
|                | Coin cells with an internal resistance greater than 3 $\Omega$ require no further testing                                                 |                 | N/A        |
| <b>ANNEX E</b> | <b>PACKAGING AND TRANSPORT</b>                                                                                                            |                 | <b>P</b>   |
| <b>ANNEX F</b> | <b>COMPONENT STANDARDS REFERENCES</b>                                                                                                     |                 | <b>N/A</b> |

| IEC 62133-2                                                                            |                                           |                     |                                                                                                               |                                       |                                     |   |
|----------------------------------------------------------------------------------------|-------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------|---|
| Clause                                                                                 | Requirement + Test                        |                     | Result - Remark                                                                                               |                                       | Verdict                             |   |
|                                                                                        | TABLE: Critical components information    |                     |                                                                                                               |                                       |                                     | P |
| Object / part No.                                                                      | Manufacturer / trademark                  | Type / model        | Technical data                                                                                                | Standard                              | Mark(s) of conformity <sup>1)</sup> |   |
| Cell                                                                                   | Haidi Energy Technology Co., Ltd.         | HDCF18650-1800-3.2V | 3,2 V<br>1800 mAh                                                                                             | IEC 62133-2: 2017<br>EN 62133-2: 2017 | Tested with appliance               |   |
| -CID                                                                                   | ZHONGRUI                                  | Φ16.57*1.36         | Deflated pressure: 1,8 – 2,5 MPa                                                                              | --                                    | --                                  |   |
| - Electrolyte                                                                          | Huarui New Material Technology Co., Ltd.  | HR521               | Composition: LiPF <sub>6</sub> + MEC +DMC +EMC<br>Conductivity: 8 mS/cm                                       | --                                    | --                                  |   |
| - Separator                                                                            | Zhongke New Material Technology Co., Ltd. | dry process         | Material: PP<br>Dimensions: 1754 mm * 61 mm * 0,016 mm<br>Shut down temperature: 150°C                        | --                                    | --                                  |   |
| - Anode                                                                                | Keda New Materials Co., Ltd.              | artificial          | C content: 99,9 %<br>Dimensions: 839 mm * 59 mm * 0,1 mm<br>Specific capacity: 350 mAh/g                      | --                                    | --                                  |   |
| -Cathode                                                                               | Anda Nanotechnology Co., Ltd.             | B7                  | Material system: LiFePO <sub>4</sub><br>Dimensions: 778 mm * 57 mm * 0,144 mm<br>Specific capacity: 145 mAh/g | --                                    | --                                  |   |
| Supplementary information:                                                             |                                           |                     |                                                                                                               |                                       |                                     |   |
| <sup>1)</sup> Provided evidence ensures the agreed level of compliance. See OD-CB2039. |                                           |                     |                                                                                                               |                                       |                                     |   |

| IEC 62133-2                                                                 |                                                               |                                                   |                       |          |
|-----------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------|-----------------------|----------|
| Clause                                                                      | Requirement + Test                                            |                                                   | Result - Remark       | Verdict  |
| <b>7.2.1</b>                                                                | <b>TABLE: Continuous charging at constant voltage (cells)</b> |                                                   |                       | <b>P</b> |
| Sample no.                                                                  | Recommended charging voltage V <sub>c</sub> (Vdc)             | Recommended charging current I <sub>rec</sub> (A) | OCV before test (Vdc) | Results  |
| Cell: HDCF18650-1800-3.2V (# 1)                                             | 3,6                                                           | 1,8                                               | 3,335                 | Pass     |
| Cell: HDCF18650-1800-3.2V (# 2)                                             | 3,6                                                           | 1,8                                               | 3,337                 | Pass     |
| Cell: HDCF18650-1800-3.2V (# 3)                                             | 3,6                                                           | 1,8                                               | 3,341                 | Pass     |
| Cell: HDCF18650-1800-3.2V (# 4)                                             | 3,6                                                           | 1,8                                               | 3,335                 | Pass     |
| Cell: HDCF18650-1800-3.2V (# 5)                                             | 3,6                                                           | 1,8                                               | 3,337                 | Pass     |
| <b>Supplementary information:</b><br>- No fire or explosion<br>- No leakage |                                                               |                                                   |                       |          |

| <b>7.3.1</b>                                                                                                                                                                                                                                                                           | <b>TABLE: External short-circuit (cell)</b> |                       |                            |                                      | <b>P</b> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------|----------------------------|--------------------------------------|----------|
| Sample no.                                                                                                                                                                                                                                                                             | Ambient T (°C)                              | OCV before test (Vdc) | Resistance of circuit (mΩ) | Maximum case temperature rise ΔT (K) | Results  |
| <b>Samples charged at charging temperature upper limit <sup>1)</sup></b>                                                                                                                                                                                                               |                                             |                       |                            |                                      |          |
| Cell: HDCF18650-1800-3.2V (# 6)                                                                                                                                                                                                                                                        | 56,2                                        | 3,334                 | 82,2                       | 59,9                                 | Pass     |
| Cell: HDCF18650-1800-3.2V (# 7)                                                                                                                                                                                                                                                        | 56,2                                        | 3,332                 | 86,1                       | 52,9                                 | Pass     |
| Cell: HDCF18650-1800-3.2V (# 8)                                                                                                                                                                                                                                                        | 56,2                                        | 3,329                 | 85,9                       | 56,8                                 | Pass     |
| Cell: HDCF18650-1800-3.2V (# 9)                                                                                                                                                                                                                                                        | 56,2                                        | 3,334                 | 82,6                       | 62,6                                 | Pass     |
| Cell: HDCF18650-1800-3.2V (# 10)                                                                                                                                                                                                                                                       | 56,2                                        | 3,337                 | 84,5                       | 64,9                                 | Pass     |
| <b>Samples charged at charging temperature lower limit <sup>2)</sup></b>                                                                                                                                                                                                               |                                             |                       |                            |                                      |          |
| Cell: HDCF18650-1800-3.2V (# 11)                                                                                                                                                                                                                                                       | 55,2                                        | 3,332                 | 87,4                       | 48,4                                 | Pass     |
| Cell: HDCF18650-1800-3.2V (# 12)                                                                                                                                                                                                                                                       | 55,2                                        | 3,325                 | 83,5                       | 52,8                                 | Pass     |
| Cell: HDCF18650-1800-3.2V (# 13)                                                                                                                                                                                                                                                       | 55,2                                        | 3,327                 | 81,9                       | 58,8                                 | Pass     |
| Cell: HDCF18650-1800-3.2V (# 14)                                                                                                                                                                                                                                                       | 55,2                                        | 3,331                 | 83,4                       | 51,2                                 | Pass     |
| Cell: HDCF18650-1800-3.2V (# 15)                                                                                                                                                                                                                                                       | 55,2                                        | 3,335                 | 84,6                       | 48,0                                 | Pass     |
| <b>Supplementary information:</b><br>- No fire or explosion<br><sup>1)</sup> Cells charged at 45°C by using 3,6 V and 1,8 A until the charging current reduced to 0,09 A;<br><sup>2)</sup> Cells charged at 0°C by using 3,6 V and 1,8 A until the charging current reduced to 0,09 A. |                                             |                       |                            |                                      |          |

| IEC 62133-2                |                                         |                       |                            |                                      |                                  |         |
|----------------------------|-----------------------------------------|-----------------------|----------------------------|--------------------------------------|----------------------------------|---------|
| Clause                     | Requirement + Test                      |                       |                            | Result - Remark                      |                                  | Verdict |
| 7.3.2                      | TABLE: External short-circuit (battery) |                       |                            |                                      |                                  | N/A     |
| Sample no.                 | Ambient T (°C)                          | OCV before test (Vdc) | Resistance of circuit (mΩ) | Maximum case temperature rise ΔT (K) | Component single fault condition | Results |
| --                         | --                                      | --                    | --                         | --                                   | --                               | --      |
| Supplementary information: |                                         |                       |                            |                                      |                                  |         |
| --                         |                                         |                       |                            |                                      |                                  |         |

|                                                                                                                                                                                                                                                                                                                                                                            |                       |                                        |                                                     |         |   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------------------------------|-----------------------------------------------------|---------|---|
| 7.3.5                                                                                                                                                                                                                                                                                                                                                                      | TABLE: Crush (cells)  |                                        |                                                     |         | P |
| Sample no.                                                                                                                                                                                                                                                                                                                                                                 | OCV before test (Vdc) | OCV at removal of crushing force (Vdc) | Maximum force applied to the cell during crush (kN) | Results |   |
| Samples charged at charging temperature upper limit <sup>1)</sup>                                                                                                                                                                                                                                                                                                          |                       |                                        |                                                     |         |   |
| Cell: HDCF18650-1800-3.2V (# 29)                                                                                                                                                                                                                                                                                                                                           | 3,335                 | 3,335                                  | 13,0                                                | Pass    |   |
| Cell: HDCF18650-1800-3.2V (# 30)                                                                                                                                                                                                                                                                                                                                           | 3,334                 | 3,334                                  | 13,0                                                | Pass    |   |
| Cell: HDCF18650-1800-3.2V (# 31)                                                                                                                                                                                                                                                                                                                                           | 3,332                 | 3,332                                  | 13,0                                                | Pass    |   |
| Cell: HDCF18650-1800-3.2V (# 32)                                                                                                                                                                                                                                                                                                                                           | 3,328                 | 3,328                                  | 13,0                                                | Pass    |   |
| Cell: HDCF18650-1800-3.2V (# 33)                                                                                                                                                                                                                                                                                                                                           | 3,331                 | 3,331                                  | 13,0                                                | Pass    |   |
| Samples charged at charging temperature lower limit <sup>2)</sup>                                                                                                                                                                                                                                                                                                          |                       |                                        |                                                     |         |   |
| Cell: HDCF18650-1800-3.2V (# 34)                                                                                                                                                                                                                                                                                                                                           | 3,328                 | 3,328                                  | 13,0                                                | Pass    |   |
| Cell: HDCF18650-1800-3.2V (# 35)                                                                                                                                                                                                                                                                                                                                           | 3,334                 | 3,334                                  | 13,0                                                | Pass    |   |
| Cell: HDCF18650-1800-3.2V (# 36)                                                                                                                                                                                                                                                                                                                                           | 3,332                 | 3,332                                  | 13,0                                                | Pass    |   |
| Cell: HDCF18650-1800-3.2V (# 37)                                                                                                                                                                                                                                                                                                                                           | 3,329                 | 3,329                                  | 13,0                                                | Pass    |   |
| Cell: HDCF18650-1800-3.2V (# 38)                                                                                                                                                                                                                                                                                                                                           | 3,334                 | 3,334                                  | 13,0                                                | Pass    |   |
| <b>Supplementary information:</b><br>- No fire or explosion<br>- The maximum force of 13 kN ± 0,78 kN has been applied, the force was released.<br><sup>1)</sup> Cells charged at 45°C by using 3,6 V and 1,8 A until the charging current reduced to 0,09 A;<br><sup>2)</sup> Cells charged at 0°C by using 3,6 V and 1,8 A until the charging current reduced to 0,09 A. |                       |                                        |                                                     |         |   |

| IEC 62133-2                         |                                        |                              |                                     |            |
|-------------------------------------|----------------------------------------|------------------------------|-------------------------------------|------------|
| Clause                              | Requirement + Test                     |                              | Result - Remark                     | Verdict    |
| <b>7.3.6</b>                        | <b>TABLE: Over-charging of battery</b> |                              |                                     | <b>N/A</b> |
| Constant charging current (A) ..... |                                        | --                           |                                     | —          |
| Supply voltage (Vdc) .....          |                                        | --                           |                                     | —          |
| Sample no.                          | OCV before charging (Vdc)              | Total charging time (minute) | Maximum outer case temperature (°C) | Results    |
| --                                  | --                                     | --                           | --                                  | --         |
| Supplementary information:          |                                        |                              |                                     |            |
| --                                  |                                        |                              |                                     |            |

| 7.3.7                            | TABLE: Forced discharge (cells)                |                                            |                                     |         | P |
|----------------------------------|------------------------------------------------|--------------------------------------------|-------------------------------------|---------|---|
| Sample no.                       | OCV before application of reverse charge (Vdc) | Measured reverse charge I <sub>t</sub> (A) | Lower limit discharge voltage (Vdc) | Results |   |
| Cell: HDCF18650-1800-3.2V (# 39) | 2,746                                          | 1,8                                        | 2,5                                 | Pass    |   |
| Cell: HDCF18650-1800-3.2V (# 40) | 2,745                                          | 1,8                                        | 2,5                                 | Pass    |   |
| Cell: HDCF18650-1800-3.2V (# 41) | 2,760                                          | 1,8                                        | 2,5                                 | Pass    |   |
| Cell: HDCF18650-1800-3.2V (# 42) | 2,752                                          | 1,8                                        | 2,5                                 | Pass    |   |
| Cell: HDCF18650-1800-3.2V (# 43) | 2,757                                          | 1,8                                        | 2,5                                 | Pass    |   |
| Supplementary information:       |                                                |                                            |                                     |         |   |
| - No fire or explosion           |                                                |                                            |                                     |         |   |

|                            |                       |                      |                      |                     |         |     |
|----------------------------|-----------------------|----------------------|----------------------|---------------------|---------|-----|
| 7.3.8.1                    | TABLE: Vibration      |                      |                      |                     |         | N/A |
| Sample no.                 | OCV before test (Vdc) | OCV after test (Vdc) | Mass before test (g) | Mass after test (g) | Results |     |
| --                         | --                    | --                   | --                   | --                  | --      |     |
| Supplementary information: |                       |                      |                      |                     |         |     |
| --                         |                       |                      |                      |                     |         |     |

|                            |                         |                      |                      |                     |         |     |
|----------------------------|-------------------------|----------------------|----------------------|---------------------|---------|-----|
| 7.3.8.2                    | TABLE: Mechanical shock |                      |                      |                     |         | N/A |
| Sample no.                 | OCV before test (Vdc)   | OCV after test (Vdc) | Mass before test (g) | Mass after test (g) | Results |     |
| --                         | --                      | --                   | --                   | --                  | --      |     |
| Supplementary information: |                         |                      |                      |                     |         |     |
| --                         |                         |                      |                      |                     |         |     |

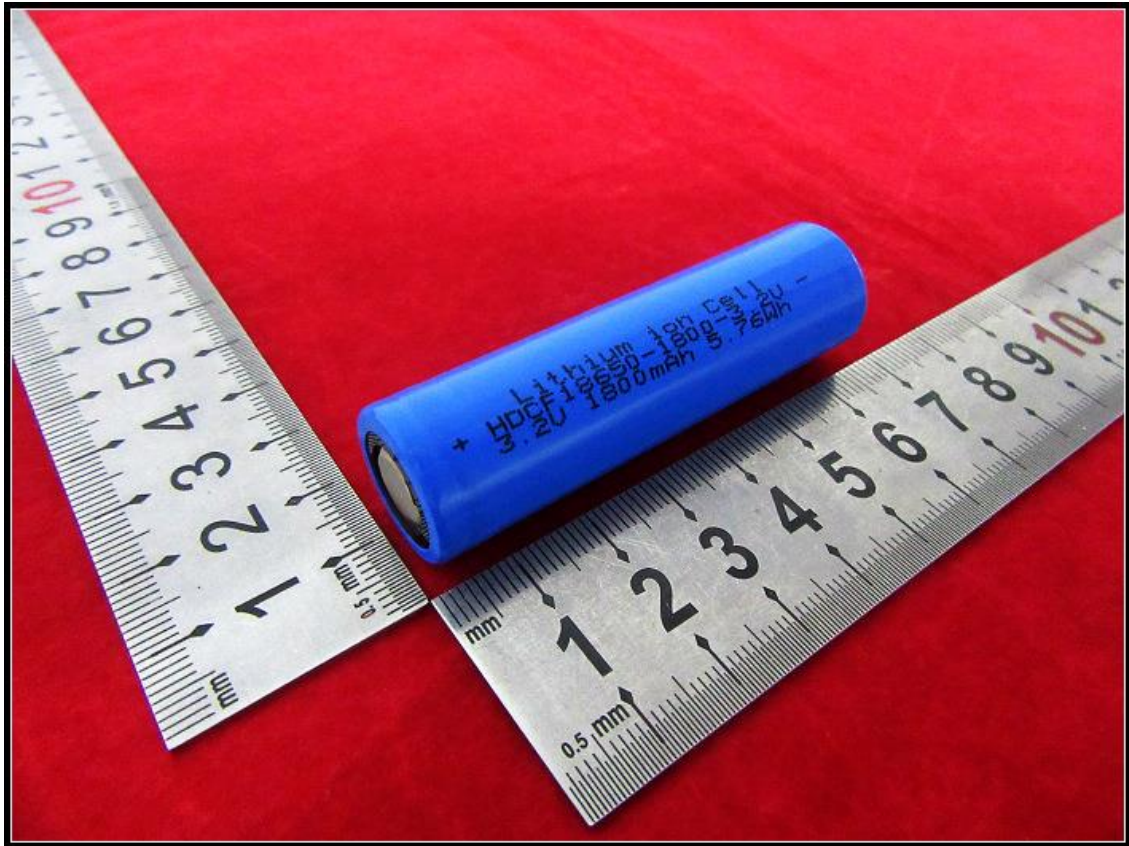
| IEC 62133-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     |                       |                                 |                              |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------|---------------------------------|------------------------------|----------|
| Clause                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Requirement + Test                                  |                       |                                 | Result - Remark              | Verdict  |
| <b>7.3.9</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>TABLE: Forced internal short circuit (cells)</b> |                       |                                 |                              | <b>P</b> |
| Sample no.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Chamber ambient T (°C)                              | OCV before test (Vdc) | Particle location <sup>1)</sup> | Maximum applied pressure (N) | Results  |
| <b>Samples charged at charging temperature upper limit <sup>2)</sup></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |                       |                                 |                              |          |
| Cell: HDCF18650-1800-3.2V (# 44)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 45,0                                                | 3,337                 | 1                               | 800,0                        | Pass     |
| Cell: HDCF18650-1800-3.2V (# 45)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 45,0                                                | 3,332                 | 1                               | 800,0                        | Pass     |
| Cell: HDCF18650-1800-3.2V (# 46)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 45,0                                                | 3,331                 | 1                               | 800,0                        | Pass     |
| Cell: HDCF18650-1800-3.2V (# 47)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 45,0                                                | 3,334                 | 1                               | 800,0                        | Pass     |
| Cell: HDCF18650-1800-3.2V (# 48)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 45,0                                                | 3,328                 | 1                               | 800,0                        | Pass     |
| <b>Samples charged at charging temperature lower limit <sup>3)</sup></b>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |                       |                                 |                              |          |
| Cell: HDCF18650-1800-3.2V (# 49)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0,0                                                 | 3,327                 | 1                               | 800,0                        | Pass     |
| Cell: HDCF18650-1800-3.2V (# 50)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0,0                                                 | 3,332                 | 1                               | 800,0                        | Pass     |
| Cell: HDCF18650-1800-3.2V (# 51)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0,0                                                 | 3,335                 | 1                               | 800,0                        | Pass     |
| Cell: HDCF18650-1800-3.2V (# 52)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0,0                                                 | 3,334                 | 1                               | 800,0                        | Pass     |
| Cell: HDCF18650-1800-3.2V (# 53)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0,0                                                 | 3,327                 | 1                               | 800,0                        | Pass     |
| <b>Supplementary information:</b><br><sup>1)</sup> Identify one of the following:<br>1: Nickel particle inserted between positive and negative (active material) coated area.<br>2: Nickel particle inserted between positive aluminium foil and negative active material coated area.<br><sup>2)</sup> Cells charged at 45°C by using 3,6 V and 1,8 A until the charging current reduced to 0,09 A;<br><sup>3)</sup> Cells charged at 0°C by using 3,6 V and 1,8 A until the charging current reduced to 0,09 A.<br>- No fire. |                                                     |                       |                                 |                              |          |

|                            |                                              |                |                |                    |                       |
|----------------------------|----------------------------------------------|----------------|----------------|--------------------|-----------------------|
| D.2                        | TABLE: Internal AC resistance for coin cells |                |                |                    | N/A                   |
| Sample no.                 |                                              | Ambient T (°C) | Store time (h) | Resistance Rac (Ω) | Results <sup>1)</sup> |
| --                         |                                              | --             | --             | --                 | --                    |
| Supplementary information: |                                              |                |                |                    |                       |
| --                         |                                              |                |                |                    |                       |

---End report---

Attachment 1 Photo documentation

Cell



Attachment 1 Photo documentation

- - - End of Attachment 1 - - -

## Attachment 2 Information for safety

### 8. 电芯使用时警告事项及注意事项 Warning and cautions in handling the lithium-ion cell

为防止电芯可能发生泄露，发热，爆炸，请注意以下预防措施：

TO prevent the possibility of the cell from leaking, heating, explosion, please observe the following precautions:

- 严禁将电芯浸入水中。
- Don't immerse the cell in water.
- 禁止将电芯在热高温源旁，如火、加热器等旁边使用和留置。
- Don't use and leave the cell near a heat source such as fire or heater.
- 充电时请选用锂离子电芯专用充电器。
- When charging, use a cell charge specifically for that purpose.
- 严禁颠倒正负极后使用电芯。
- Don't reverse the positive and negative terminals.
- 严禁将电芯直接插入电源插座。
- Don't connect the cell to an electrical outlet directly.
- 禁止将电芯丢入火或加热器中。
- Don't discard the cell in fire or heater.
- 禁止用金属直接连接电芯正负极，造成短路。
- Don't connect the positive and negative terminal directly with metal objects.
- 禁止将电芯与金属，如发卡、项链等一起运输或存储。
- Don't transport and store the cell together with metal objects such as necklaces, hairpins.
- 禁止敲击，抛掷或踩踏电芯等。
- Don't strike, throw or trample the cell.
- 禁止用钉子或其它利器刺穿电芯。
- Don't pierce the cell with a nail or other sharp object.
- 禁止在高温下（直热的阳光下或很热的汽车中）使用或放置电芯，否则可能会引起电芯过热，起火或功能失效，寿命减短。
- Don't use or leave the cell at very high temperature conditions ( for example, strong direct or a vehicle in extremely hot conditions ).
- 如果电芯发生泄露，电解液进入眼睛，请不要搓揉，应用清水冲洗眼睛，必要时请立即前往医院接受治疗，否则会伤害眼睛。
- If the cell leaks and the electrolyte get into your eyes, don't wipe eyes, instead, thoroughly rinse the eyes with clean running water for at least 15 minutes, and immediately seek medical attention. Otherwise, eyes injury an result.
- 如果电芯发出异味，发热，变色，变形或使用、存储、充电过程中出现任何异常现象，立即将电芯从装置或充电器中移开并停用。
- If the cell gives off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during usage, recharging or storage, immediately remove it from the device or cell charger and stop using it.
- 如果电芯弄脏，使用前应用干布抹净。
- In case the terminals get dirty, clean the terminals with a dry cloth before use.
- 如果电池使用寿命达到极限，请将电池放电至 2.0V 以下，将电池头部用绝缘胶纸粘住，送至专业的废品回收站回收。
- If the cell beyond the useful-life, please fully discharge, sticks the cell with insulating tape, then put the cell to the specialized recycle bin.

**Attachment 3 Packaging**

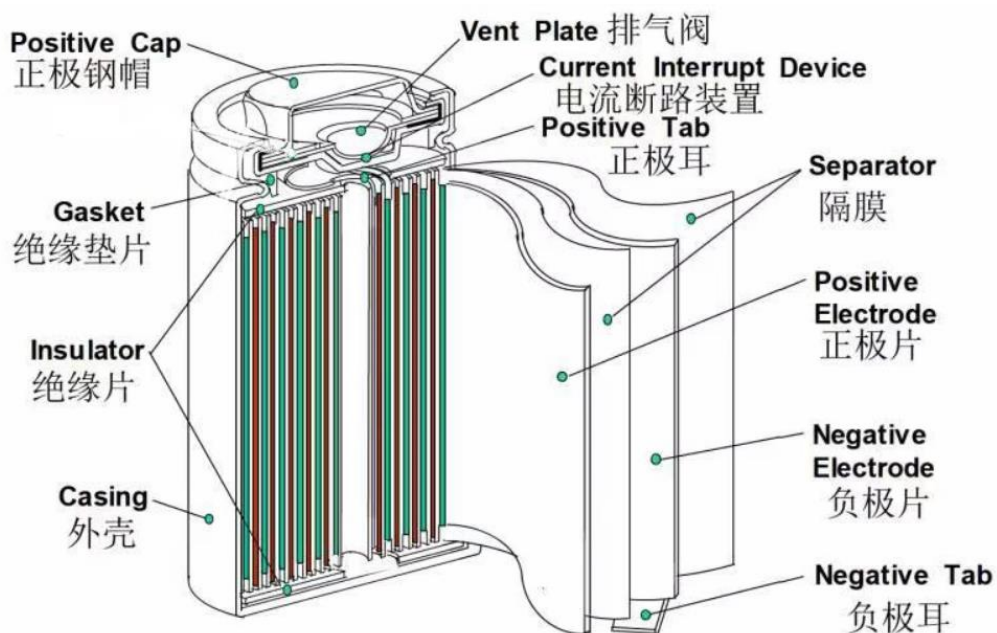
**Attachment 3 Packaging**



- - End of Attachment 3 - - -

**Attachment 4 Product specification**Specification of Cell

|                                                                             |                                           |
|-----------------------------------------------------------------------------|-------------------------------------------|
| 标称容量 Nominal capacity                                                       | 1800mAh@0.2C                              |
| 标称电压 nominal voltage                                                        | 3.2V                                      |
| 能量密度 energy density                                                         | 137Wh/kg                                  |
| 最小放电电压 min. discharging voltage                                             | 2.50V                                     |
| 最大充电电压 max. charging voltage                                                | 3.60±0.03V                                |
| 标准充电电流 std. charging current                                                | 0.5A                                      |
| 标准放电电流 std. discharging current                                             | 0.9A                                      |
| 最大充电电流 max. charging current                                                | 1.8A                                      |
| 最大放电电流 max. discharging current                                             | 5.4A                                      |
| 推荐的电芯充放电表面温度 max. recommended charge and discharge cell surface temperature | 充电 Charge: 0~45℃<br>放电 Discharge: -20~60℃ |

Internal structure

- - - End of Attachment 4 - - -

Attachment 5 ISO 9001 certificate

**Certificate of Management System Certification**

This is to certify the quality management system of

**Haidi Energy Technology Co., Ltd**

Unified Social Credit Code: 91370400588767324N

ADDRESS: NO.6, YONGFU SOUTH ROAD, XUECHENG DISTRICT, ZAOZHUANG CITY, SHANDONG PROVINCE P.C.: 277100

Is in conformity with

ISO 9001:2015

This certificate covers the following area

**PRODUCTION OF LITHIUM BATTERIES, LITHIUM BATTERY MODULE**

Initial Certification Date: JUN.14,2017 Issue Date: From JUN.14,2017

Validity Period: From JUN.14,2017 To JUN.13,2020

Certificate No.: M43117Q30549R0S General Manager: 郑宇兵

MANAGEMENT SYSTEM  
M4310809CB

Certified client shall receive at least one surveillance audit every year within the validity period, the certificate shall only be valid when used in conjunction with the Notice Letter of Annual Surveillance Certification Decision.

Information on this certificate could be verified on the official website of Certification and Accreditation Administration of the People's Republic of China ([www.cnca.gov.cn](http://www.cnca.gov.cn)) and <http://www.jas-anz.org/register> and [www.hxqc.cn](http://www.hxqc.cn)

**Beijing Daluhangxing Quality Certification Center Co., Ltd.**

Address: No. Jia 12, Yuquan road, Haidian district, Beijing, P.R. China P.C.: 100143

