IEC 61951-2

Edition 4.0 2017-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary sealed cells and batteries for portable applications – Part 2: Nickel-metal hydride

Accumulateurs alcalins et autres accumulateurs à électrolyte non acide – Accumulateurs étanches pour applications portables – Partie 2: Nickel-métal hydrure

IEC 61951-2:2017-03(en-fr)

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Part 2: Nickel-metal hydride

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International Standard IEC 61951-2 has been prepared by subcommittee 21A: Secondary cells and batteries containing alkaline or other non-acid electrolytes, of IEC technical committee 21: Secondary cells and batteries.

This fourth edition cancels and replaces the third edition published in 2011 of which it constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- addition of battery type;
- addition of 'F' (high recovery type) designation for cells and batteries;
- addition of 'I' (low self-discharge type) designation for cells;

- revision of Figure 3 (6.1.3.1);
- addition of “optional pip” note to positive contact;
- changed leader line position from pip to flats of positive contact (B and G).

The text of this standard is based on the following documents:

FDIS	Report on voting
21A/623/FDIS	21A/629/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 61951 series can be found, under the general title *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary sealed cells and batteries for portable applications*, on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

SECONDARY CELLS AND BATTERIES CONTAINING ALKALINE OR OTHER NON-ACID ELECTROLYTES – SECONDARY SEALED CELLS AND BATTERIES FOR PORTABLE APPLICATIONS –

Part 2: Nickel-metal hydride

1 Scope

This part of IEC 61951 specifies marking, designation, dimensions, tests and requirements for secondary sealed nickel-metal hydride small prismatic, cylindrical and button cells and batteries, suitable for use in any orientation, for portable applications.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-482:2004, *International Electrotechnical Vocabulary (IEV) – Part 482: Primary and secondary cells and batteries*

IEC 60086-1, *Primary batteries – Part 1: General*

IEC 60086-2, *Primary batteries – Part 2: Physical and electrical specifications*

IEC 61959, *Secondary cells and batteries containing alkaline or other non-acid electrolytes – Mechanical tests for sealed portable secondary cells and batteries*

IEC 62133-1, *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 – Part 1: Nickel systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-482 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1
nominal voltage
suitable approximate value of the voltage used to designate or identify a cell or a battery

Note 1 to entry: The nominal voltage of a sealed nickel-metal hydride rechargeable single cell is 1,2 V.

Note 2 to entry: The nominal voltage of a battery of n series connected cells is equal to n times the nominal voltage of a single cell.

[SOURCE: IEC 60050-482:2004, 482-03-31, modified – Addition of Notes 1 and 2 to entry.]

3.2
rated capacity
capacity value of a cell or battery determined under specified conditions and declared by the manufacturer

Note 1 to entry: The rated capacity is the quantity of electricity C_5 Ah (ampere-hours) declared by the manufacturer which a single cell can deliver during a 5 h period when charging, storing and discharging under the conditions specified in 7.3.2.

Note 2 to entry: The capacity of a battery is the quantity of electricity C_5 Ah (ampere-hours) declared by the manufacturer which a battery can deliver during a 5 h period, when charged, stored and discharged under the procedure described in 7.3.2.

[SOURCE: IEC 60050-482:2004, 482-03-15, modified – Addition of Notes 1 and 2 to entry.]

3.3
small prismatic cell
cell in the form of a rectangular parallelepiped whose width and thickness dimensions are not more than 25 mm

3.4
cylindrical cell
cell of circular cross-section in which the overall height is equal to, or greater than the overall diameter

3.5
button cell
cell of circular cross-section in which the overall height is less than the overall diameter

3.6
nickel-metal hydride cell
cell containing a nickel hydroxide compound for the positive electrode, a hydrogen absorbing alloy for the negative electrode, and potassium hydroxide or other alkaline solution as electrolyte

Note 1 to entry: Positive electrodes are isolated from negative electrodes by a separator

3.7
nickel-metal hydride battery
assembly of secondary cell(s) as a source of electrical energy characterized by its voltage, size, terminal arrangement, capacity and rate capability

3.8
sealed cell
cell which remains closed and does not release either gas or liquid when operated within the limits of charge and temperature specified by the manufacturer

Note 1 to entry: The cell is equipped with a safety device to prevent dangerously high internal pressure.

Note 2 to entry: The cell does not require addition to the electrolyte and is designed to operate during its life in its original sealed state.

Note 3 to entry: The nickel-metal hydride cell, however, may release gas towards the end of its life due to the accumulation of hydrogen in the cell.

[SOURCE: IEC 60050-482:2004, 482-05-17, modified – The existing note has been developed into Notes 1, 2 and 3 to entry.]

3.9
portable cell
cell designed mainly for use in an easily hand-carried battery

3.10
battery for portable applications
battery for use in device or appliance which is conveniently hand-carried

3.11
surface temperature limited cell
cell which performs a function that prevents the temperature increase from a certain standard point even at the moment of an abnormal occurrence such as short circuit of cell

3.12
high recovery type cell or battery
cell or battery which has lower “permanent capacity loss” than normal type after storage

Note 1 to entry: It is defined as “high recovery type” in 7.10.2, Table 22.

3.13
low self-discharge type cell
cell which is able to retain higher charge capacity than normal type after storage by reducing self-discharge

Note 1 to entry: It is defined as “low self-discharge type” in 7.4.

3.14
9 V type nickel-metal hydride battery
nickel-metal hydride battery which is interchangeable with 9 V primary batteries and is composed of cylindrical cells, small prismatic cells or button cells

4 Parameter measurement tolerances

The overall accuracy of controlled or measured values, relative to the specified or actual values, shall be within the following tolerances:

a) ±1 % for voltage;

b) ±1 % for current;

c) ±1 % for capacity;

d) ±2 °C for temperature;

e) ±0,1 % for time;

f) ±0,1 mm for dimensions;

g) ±5 % for humidity.

These tolerances comprise the combined accuracy of the measuring instruments, the measurement techniques used and all other sources of error in the test procedure.

The details of the instrumentation used shall be provided in each report of results.

5 Cell and battery designation and marking

5.1 Cell and battery designation

5.1.1 Small prismatic cells and cylindrical cells

5.1.1.1 General

Sealed nickel-metal hydride small prismatic rechargeable single cells and cylindrical rechargeable single cells shall be designated by a letter L, M, J, H or X which signifies:

- low rate of discharge (L);
- medium rate of discharge (M);
- medium high rate of discharge (J);
- high rate of discharge (H);
- very high rate of discharge (X).

NOTE 1 These cells are typically but not exclusively used for the following discharge rates:

- L up to 0,5 I_t A;
- M up to 3,5 I_t A;
- J up to 5,0 I_t A;
- H up to 7,0 I_t A;
- X up to and above 7,0 I_t A.

NOTE 2 These currents are expressed as multiples of I_t A, where I_t A = C_5 Ah/1 h (see IEC 61434).

When a cell is intended for permanent charge at elevated temperatures, typically higher than 40 °C, a letter "T" is placed after the letter L, M, J, H or X.

When a cell is intended for permanent charge at elevated temperatures, typically higher than 50 °C, a letter "U" is placed after the letter L, M, J, H or X.

When a cell is intended for surface temperature limitation, a letter “S” is placed after the letter L or M.

When a cell is intended for rapid charge, typically at 1,0 I_t A, a letter "R" is placed after the letter L, M, J, H or X.

When a cell or battery is intended as a high recovery type, a letter “F” is placed after the letter L, M, J, H or X.

When a cell is intended as a low self-discharge cell, a letter “I” is placed after the letter L, M, J, H or X.

5.1.1.2 Small prismatic cells

Sealed nickel-metal hydride small prismatic rechargeable single cells shall be designated by the letters "HF" followed by a letter L, M, J, H or X followed by letter F, followed by, if designated, letter I, followed by three groups of figures, each group being separated by a solidus, as follows:

a) The two figures to the left of the first solidus shall indicate the maximum width specified for the cell, expressed in millimetres, rounded up to the next whole number.

b) The two figures in the middle shall indicate the maximum thickness specified for the cell, expressed in millimetres, rounded up to the next whole number.

c) The two figures to the right of the second solidus shall indicate the maximum height specified for the cell, expressed in millimetres, rounded up to the next whole number.

EXAMPLE HFLF 18/07/49 designation identifies a small prismatic cell of low discharge rate capability, high recovery type with a maximum width of 18 mm, a maximum thickness of 7 mm and a maximum height of 49 mm.

5.1.1.3 Cylindrical cells

Sealed nickel-metal hydride cylindrical rechargeable single cells shall be designated by the letters "HR" followed by a letter L, M, J, H or X followed by letter F, followed by, if designated, letter I, followed by two groups of figures, each group being separated by a solidus, as follows:

a) The two figures to the left of the solidus shall indicate the maximum diameter specified for the cell, expressed in millimetres, rounded up to the next whole number.

b) The two figures to the right of the solidus shall indicate the maximum height specified for the cell, expressed in millimetres, rounded up to the next whole number.

When a manufacturer designs a cell with dimensions and tolerances which make it interchangeable with a primary cell, the designation of Table 2 shall also be marked on the cell.

EXAMPLE 1 HRLF 33/62 designation identifies a cylindrical cell of low discharge rate capability, high recovery type with a maximum diameter of 33 mm and a maximum height of 61,5 mm.

EXAMPLE 2 HRLTF 33/62 designation identifies a cylindrical cell of low discharge rate capability, intended for permanent charge at elevated temperatures, high recovery type, with a maximum diameter of 33 mm and a maximum height of 61,5 mm.

EXAMPLE 3 HRXRFI 23/43 designation identifies a cylindrical cell of very high discharge rate capability, intended for rapid charge, high recovery type, low self-discharge type with a maximum diameter of 23 mm and a maximum height of 43 mm.

For cells dimensionally interchangeable with primary cells, the following single or double figures following the letter F or I may indicate:

- 20- Size D;
- 14- Size C;
- 6- Size AA;
- 03- Size AAA.

NOTE Cells dimensionally interchangeable with primary cells correspond to M type unless otherwise specified

For the purpose of this explanation, an example is given below.

EXAMPLE 4 HRMRFI03 designation identifies a sealed nickel-metal hydride cylindrical rechargeable single cell, of medium discharge rate capability, also intended for rapid charge, high recovery type and low self-discharge type, dimensionally interchangeable with primary cell and whose type designation is AAA.

5.1.2 Button cells

Sealed nickel-metal hydride button rechargeable single cells shall be designated by the letters "HB" followed by letter F, followed by, if designated, letter I, followed by two groups of figures, each group being separated by a solidus, as follows:

a) The three figures to the left of the solidus shall indicate the maximum diameter specified for the cell, expressed in tenths of millimetres, rounded up to the next whole number.

b) The three figures to the right of the solidus shall indicate the maximum height specified for the cell, expressed in tenths of millimetres, rounded up to the next whole number.

EXAMPLE HBFI 116/054 designation identifies a button cell, intended as a high recovery type, low self-discharge type, with a maximum diameter of 11,6 mm and a maximum height of 5,4 mm.

5.1.3 Batteries

Sealed nickel-metal hydride rechargeable batteries shall be designated with the following form:

*N*1 *single cell designation* – *N*2

where

*N*1 is the number of series connected cells in the battery;

*N*2 is the number of parallel connected cells if 2 or greater (not shown if value is 1).

Sealed nickel-metal hydride battery designation will be identified based on single cells within the series and not the battery as a whole.

- Small prismatic cells in battery

  EXAMPLE 1 2HFLF 18/07/49 designation identifies a small prismatic cell of low discharge rate capability, high recovery type with a maximum width of 18 mm, a maximum thickness of 7 mm and a maximum height of 49 mm with two series connected cells.

- Cylindrical cells in battery

  EXAMPLE 2 3HRLF 33/62 designation identifies a cylindrical cell of low discharge rate capability, high recovery type with a maximum diameter of 33 mm and a maximum height of 61,5 mm with three series connected cells.

  EXAMPLE 3 4HRLTF 33/62 designation identifies a cylindrical cell of low discharge rate capability, intended for permanent charge at elevated temperatures, high recovery type, with a maximum diameter of 33 mm and a maximum height of 61,5 mm with four series connected cells.

  EXAMPLE 4 HRXRFI 23/43 -2 designation identifies a cylindrical cell of very high discharge rate capability, intended for rapid charge, high recovery type, low self-discharge type with a maximum diameter of 23 mm and a maximum height of 43 mm with two parallel connected cells.

- Cells interchangeable with primary cells in batteries

  EXAMPLE 5 HRMRFI03-3 designation identifies a sealed nickel-metal hydride cylindrical rechargeable single cell, of medium discharge rate capability, also intended for rapid charge, high recovery type and low self-discharge type, dimensionally interchangeable with primary cell whose type designation is AAA with three parallel connected cells.

- Button cells in battery

  EXAMPLE 6 HB 116/054-3 designation identifies a button cell, with a maximum diameter of 11,6 mm and a maximum height of 5,4 mm with three parallel connected cells.

5.2 Cell or battery termination

This standard does not specify cell or battery termination.

5.3 Marking

5.3.1 Small prismatic cells and cylindrical cells

Each jacketed cell supplied without connections shall carry durable markings giving the following minimum information:

- sealed rechargeable nickel-metal hydride or Ni-MH;
- rated capacity;
- nominal voltage;
- polarity (+ and –);
- date of manufacture (which may be in code);
- name or identification of manufacturer or supplier;
- mark for promoting useful use of cell resources.

NOTE 1 This mark is applied where a recycling programme is available.

NOTE 2 In general, sealed nickel-metal hydride rechargeable single cells with connection tabs need no labels if they form an integral part of a battery, in which case, the battery itself is marked with the above information.

5.3.2 Button cells

Each button cell supplied without connection shall carry durable markings giving the following minimum information:

- designation as specified in 5.1;
- polarity (+ and –);
- date of manufacture (which may be in code);
- name or identification of manufacturer or supplier.

5.3.3 Batteries

Each battery shall carry durable markings giving the following minimum information:

- rated capacity;
- nominal voltage;
- date of manufacture (which may be in code).

5.4 Exemption of wording

Each cell or battery shall include minimum information on the label as specified in 5.3.1 to 5.3.3. Therefore, additional information such as safety cautions should be included in the form of a manual not on the cell or battery label.

Each cell or battery shall include minimum information on the label as specified in 5.3.1 to 5.3.3. Therefore, cells or batteries encased in soft or hard plastic with the safety cautions printed on the outside should not include caution details on the cell or battery label.

6 Dimensions

6.1 Small prismatic cells and cylindrical cells

6.1.1 General

Figures 1 and 2 show the shape of the cells.