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Interested committees:

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Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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UK Vote

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Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
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1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



21A/922/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER: IEC 61951-2 ED5	
DATE OF CIRCULATION: 2025-02-28	CLOSING DATE FOR COMMENTS: 2025-04-25
SUPERSEDES DOCUMENTS: 21A/863/RR	

IEC SC 21A : SECONDARY CELLS AND BATTERIES CONTAINING ALKALINE OR OTHER NON-ACID ELECTROLYTES	
SECRETARIAT: France	SECRETARY: Mr Jean-Marie Bodet
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 35	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED:	

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Recipients of this document are invited to submit, with their comments, notification of any local regulations or technical reasons that may exist and should be considered should this proposal proceed, recognizing that failure to address such requirements could result in the need for new or existing "In Some Countries" clauses. (SEE AC/22/2007 OR NEW GUIDANCE DOC).

TITLE:

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

NOTE FROM TC/SC OFFICERS:

Circulation of CD after presentation of the proposed modifications to the SC21A/WG1 during the Fall Meeting held in Saint Denis on 2024-11-19



Documents

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SECONDARY CELLS AND BATTERIES CONTAINING
ALKALINE OR OTHER NON-ACID ELECTROLYTES –
SECONDARY SEALED CELLS AND BATTERIES
FOR PORTABLE APPLICATIONS –****Part 2: Nickel-metal hydride****FOREWORD**

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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 61951-2 edition 4.1 contains the fourth edition (2017-03) [documents 21A/623/FDIS and 21A/629/RVD] and its amendment 1 (2022-10) [documents 21A/809/FDIS and 21A/816/RVD].

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

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

173 This fourth edition constitutes a technical revision.

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

- 176 • addition of battery type;
- 177 • addition of 'F' (high recovery type) designation for cells and batteries;
- 178 • addition of 'I' (low self-discharge type) designation for cells;
- 179 • revision of Figure 3 (6.1.3.1);
- 180 • addition of "optional pip" note to positive contact;
- 181 • changed leader line position from pip to flats of positive contact (B and G).

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

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

186 The committee has decided that the contents of the base publication and its amendment will
187 remain unchanged until the stability date indicated on the IEC web site under webstore.iec.ch
188 in the data related to the specific publication. At this date, the publication will be

- 189 • reconfirmed,
- 190 • withdrawn,
- 191 • replaced by a revised edition, or
- 192 • amended.

193

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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 which are conveniently hand-carried, suitable use for portable applications.

Examples of portable applications are remote controllers, flashlights, toys, electric toothbrush, power tools and similar equipment.

This standard also covers portable cells and batteries for the following applications as a performance reference standard (specific standards or regulations take precedence):

- a) Fixed application: in-vehicle accessories, emergency lights and similar equipment;
- b) Personal mobility application: mobility scooters or electric bicycles that are not required to be registered for use on the road, and similar equipment.

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*

IEC 62902, *Secondary cells and batteries – Marking symbols for identification of their chemistry*

3 Terms and definitions

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

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

- 239 • IEC Electropedia: available at <http://www.electropedia.org/>
- 240 • ISO Online browsing platform: available at <http://www.iso.org/obp>

241 3.1

242 nominal voltage

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

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

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

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

248 3.2

249 rated capacity

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

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

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

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

259 3.3

260 small prismatic cell

261 cell in the form of a rectangular parallelepiped whose width and thickness dimensions are not
262 more than 25 mm

263 3.4

264 cylindrical cell

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

267 3.5

268 button cell

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

270 3.6

271 nickel-metal hydride cell

272 cell containing a nickel hydroxide compound for the positive electrode, a hydrogen absorbing
273 alloy for the negative electrode, and potassium hydroxide or other alkaline solution as
274 electrolyte

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

276 3.7

277 nickel-metal hydride battery

278 assembly of secondary cell(s) as a source of electrical energy characterized by its voltage, size,
279 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

3.15**trickle charge**

method of charge applied to a battery wherein the state of charge is maintained by a continuous, long term, regulated small electric current

Note 1 to entry: The trickle charge compensates self-discharge effects and maintains the battery in an approximately fully charged state.

Note 2 to entry: The trickle charge is not suitable for cells and batteries that are designed for cycle usage with overcharge protection.

[SOURCE: IEC 60050-482:2004, 482-05-17, modified – Replace secondary battery type not suitable for trickle charge to cells and batteries that are designed for cycle usage with overcharge protection.]

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) $\pm 1\%$ for voltage;
- b) $\pm 1\%$ for current;
- c) $\pm 1\%$ for capacity;
- d) $\pm 2\text{ }^{\circ}\text{C}$ for temperature;
- e) $\pm 0,1\%$ for time;
- f) $\pm 0,1\text{ mm}$ for dimensions;
- g) $\pm 5\%$ 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 [according to discharge rate characteristics](#) 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 [over](#) $7,0 I_t$ 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 $40\text{ }^{\circ}\text{C}$, 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 $50\text{ }^{\circ}\text{C}$, a letter "U" is placed after the letter L, M, J, H or X.

When a cell is intended for surface temperature limitation [under an abnormal situation](#), 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, [and where applicable, followed by a letter T, U, R, F and/or 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, [and where applicable, followed by a letter T, U, S, R, F and/or 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.

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, [typically higher than 40 °C](#), 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 typically at \$1,0 I_t\$ A](#), 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 L or M, [and where applicable, following the letter T, U, S, R, F and/or I](#) may indicate:

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

NOTE Unless a discharge rate type L, M, J, H, or X is specified in the designation, cells dimensionally interchangeable with primary cells correspond to M type

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

EXAMPLE 4 HRMRI03 designation identifies a sealed nickel-metal hydride cylindrical rechargeable single cell, of medium discharge rate capability, also intended for rapid charge typically at 1,0 I_t A, high recovery type and low self-discharge type, dimensionally interchangeable with primary cell and whose type designation is AAA.

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.

5.1.2 Button cells

Sealed nickel-metal hydride button rechargeable single cells shall be designated by the letters "HB" followed by, if designated, letter F and/or 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:

N1 single cell designation – N2

where

- N1* is the number of series connected cells greater than or equal to 2 in the battery;
- N2* is the number of parallel connected cells greater than or equal to 2 in the battery.
- N1 and/or N2 is not shown if its 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, typically higher than 40 °C, 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 typically at 1.0 I_t A, 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 HRMRI03-3 designation identifies a sealed nickel-metal hydride cylindrical rechargeable single cell, of medium discharge rate capability, also intended for rapid charge typically at 1.0 I_t A, 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, [nickel-metal hydride](#) or Ni-MH;
- rated capacity;
- nominal voltage;
- polarity (+ and –);
- date of manufacture (which may be in code);
- name, identification or registered trademark 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 If manufacture and purchaser agree to omit date indication from date of manufacture, they can indicate month of manufacture (YYMM) or week of manufacture (YYWW) on the cell. For test purpose such as Clause 7.2.1, omitted date information of manufacture is recognized the first date of the month or first date of the week. First date rule is based on ISO 8601.

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, identification or registered trademark of manufacturer or supplier.

NOTE If manufacture and purchaser agree to omit date indication from date of manufacture, they can indicate month of manufacture (YYMM) or week of manufacture (YYWW) on the cell. For test purpose such as Clause 7.2.1, omitted date information of manufacture is recognized the first date of the month or first date of the week. First date rule is based on ISO 8601.

5.3.3 Batteries

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

- [sealed rechargeable nickel-metal hydride battery](#), [nickel-metal hydride battery](#), or Ni-MH;
- rated capacity;
- nominal voltage;
- date of manufacture (which may be in code);
- marking symbols (identification of the chemistry according to IEC 62902).

NOTE If manufacture and purchaser agree to omit date indication from date of manufacture, they can indicate month of manufacture (YYMM) or week of manufacture (YYWW) on the battery. For test purpose such as Clause 7.2.1, omitted date information of manufacture is recognized the first date of the month or first date of the week. First date rule is based on ISO 8601.