

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

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



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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

AMENDMENT 1

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Amendment 1 to IEC 61951-2:2017 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.

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

Draft	Report on voting
21A/809/FDIS	21A/816/RVD

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

The language used for the development of this Amendment is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications/.

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- withdrawn,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

2 Normative references

Add, at the end of the existing list, IEC 62902 to the list of normative references, as follows:

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

3 Terms and definitions

Add the following term and definition for "trickle charge":

3.15

trickle charge

charge method by supplying a small electrical current to the cell while disconnecting the cell from load to supplement self-discharge of the cell

5.3.1 Small prismatic cells and cylindrical cells

Replace, in the sixth bullet point, "name or identification" with "name, identification or registered trademark" as follows:

- name, identification or registered trademark of manufacturer or supplier;

5.3.2 Button cells

Replace, in the fourth bullet point, "name or identification" with "name, identification or registered trademark" as follows:

- name, identification or registered trademark of manufacturer or supplier.

5.3.3 Batteries

Add a fourth bullet point at the end of the existing bulleted list as follows:

- marking symbols (identification of the chemistry according to IEC 62902).

Table 3 – Dimensions of jacketed cylindrical cells not dimensionally interchangeable with primary cells

Replace the existing Table 3 with the following Table 3 (various changes and corrections have been made):

Table 3 – Example of dimensions of jacketed cylindrical cells not dimensionally interchangeable with primary cells

Cell designation ^a	Diameter mm	Height mm
HR 11/30	10,5	30,0
HR 11/45	10,5	44,5
HR 11/51	10,5	50,5
HR 11/67	10,5	67,0
HR 15/18	14,5	17,5
HR 15/28	14,5	28,0
HR 15/30	14,5	30,0
HR 15/43	14,5	43,0
HR 15/49	14,5	49,0
HR 15/51	14,5	50,5
HR 15/67	15,0	67,0
HR 17/29	17,0	28,5
HR 17/43	17,0	43,0
HR 17/50	17,0	50,0
HR 17/67	17,0	67,0
HR 18/44	18,0	43,5
HR 18/67	18,0	67,0
HR 19/67	19,0	67,0
HR 19/68	18,5	67,5
HR 23/34	23,0	34,0
HR 23/43	23,0	43,0
HR 23/44	23,0	43,5
HR 23/50	23,0	50,0
HR 23/61	23,0	61,0
HR 26/47	25,8	47,0
HR 26/50	25,8	50,0
HR 33/36	33,0	36,0
HR 33/62	33,0	61,5
HR 33/91	33,0	91,0
HR 34/60	33,5	59,5
HR 43/91	43,0	91,0

^a The letters HR to be followed by L, M, H or X and T and/or R as appropriate (see 5.1).

Table 6 – Discharge performance at 20 °C for small prismatic cells and cylindrical cells

Replace the existing Table 6 with the following new Table 6 (J and JT designations have been separated from "M/MT/MU/MS"):

Table 6 – Discharge performance at 20 °C for small prismatic cells and cylindrical cells

Discharge conditions		Minimum discharge duration h/min					
Rate of constant current A	Final voltage V	Cell designation					
		L/LT/LU/LS	M/MT/MU/MS/	J	JT	H/HT/HU	X
0,2 I_t ^a	1,0	5 h	5 h	5 h	5 h	5 h	5 h
1,0 I_t	0,9	–	42 min	48 min	43 min	48 min	54 min
5,0 I_t ^b	0,8	–	–	–	–	6 min	9 min
10,0 I_t ^b	0,7	–	–	–	–	–	4 min

^a Five cycles are permitted per cell for this test. The test shall be terminated at the end of the first cycle of each cell which meets the requirement.

^b Prior to the 5 I_t A and 10 I_t A tests, a conditioning cycle may be included if necessary. This cycle shall consist of charging at 0,1 I_t A in accordance with 7.2 and discharging at 0,2 I_t A in an ambient temperature of 20 °C ± 5 °C according to 7.3.2.

(standards.iteh.ai)

7.5.1.2 Small prismatic, button and cylindrical cells not dimensionally interchangeable with primary cells

IEC 61951-2:2017/AMD1:2022

Add, in the second bullet point of the bulleted list, "LS" and "MS" to the 500 cycle requirement, as follows:

61951-2-2017-amd1-2022

- 500 for L/LS/LR, M/MS/MR, J/JR, H/HR or X/XR cells;

7.5.1.4 Cylindrical cells dimensionally interchangeable with primary cells

In Table 16, add a new footnote b and a footnote reference to that footnote in the first row of the "Discharge" column as follows (the original footnote b becomes footnote c):

Table 16 – Endurance in cycles for cylindrical cells dimensionally interchangeable with primary cells

Cycle number	Charge	Stand in charged condition	Discharge	Subsequent rest
1 to 49	0,5 I_t A for ^a	20 min to 30 min	0,5 I_t A to 1,0 V ^b	10 min to 90 min
50	0,10 I_t A for 16 h	1 h to 4 h	0,2 I_t A to 1,0 V	^c

^a Charge termination is $-\Delta V = 5$ mV to 10 mV or 132 min. Additionally, if charge termination does not comply with the aforementioned condition, testing shall be terminated.

^b If discharge duration to the final voltage of 1,0 V on any cycle becomes less than 72 min, testing shall be terminated.

^c It is permissible to allow sufficient open-circuit rest time after the completion of discharge at cycle 50, so as to start cycle 51 at a convenient time. A similar procedure may be adopted at cycles 100, 150.

Replace the existing bulleted list, including the introductory sentence to the list, with the following:

The total number of cycles obtained when the test is completed shall not be less than:

- 200 for HR03 cells with a rated capacity less than 800 mAh;
- 100 for HR03 cells with a rated capacity of 800 mAh or more;
- 200 for HR6 cells with a rated capacity less than 2 100 mAh;
- 100 for HR6 cells with a rated capacity of 2 100 mAh or more;
- 200 for HR20 and HR14 cells.

7.5.2.2 L, M, H or X cylindrical cells

Add the J designation to the title of 7.5.2.2 as follows:

7.5.2.2 L, M, J, H or X cylindrical cells

Add the J designation to the title of Table 17 as follows:

Table 17 – Permanent charge endurance for L, M, J, H or X cells

7.7.2 LT/LU, MT/MU or HT/HU cylindrical cells

Replace, in the final sentence of 7.7.2, the reference to Table 9 with a reference to Table 10 as follows:

The duration of discharge shall not be less than that specified in Table 10.

7.8 Safety device operation

Replace the existing title to 7.8 with the following:

7.8 Pressure relief feature

Replace the first paragraph after the warning statement with the following paragraph:

The following test shall be carried out in order to establish that the pressure relief feature of the cell will operate to allow the escape of gas when the internal pressure exceeds a critical value.

7.13 Internal resistance

7.13.1 General

Add, after the second paragraph, the following paragraph:

There is no requirement for internal resistance, but when there is a value requested, measurement is performed according to the method described in this document.

7.13.2 Measurement of the internal AC resistance

Replace the first sentence with the following:

The alternating root mean square voltage, U_a , shall be measured when applying to the cell an alternating root mean square current, I_a , at the frequency of 1,0 kHz \pm 0,1 kHz for a period of 1 s to 5 s.

Replace the introductory sentence to the formula, the formula itself, and the list of symbols, with the following:

The internal AC resistance, R_{AC} , is given by

$$R_{AC} = \frac{U_a}{I_a}$$

where

R_{AC} is the internal AC resistance (Ω);

U_a is the alternating root mean square voltage (V);

I_a is the alternating root mean square current (A).

7.13.3 Measurement of the internal DC resistance

Replace the introductory sentence to the formula, the formula itself, and the explanation of the symbols, as follows (units of measurement have been clarified):

The internal DC resistance, R_{DC} , of the cell shall be calculated using the following formula:

$$R_{DC} = \frac{U_1 - U_2}{I_2 - I_1}$$

where

R_{DC} is the internal DC resistance (Ω);

U_1, U_2 are the appropriate voltages measured during discharge (V);

I_1, I_2 are the constant discharge currents (A).

Replace the existing Table 25 with the following new Table 25 ("HRJ", "U", "F" and "I" have been added):

Table 25 – Constant discharge currents used for measurement of DC resistance

Current	Cell designation		
	HRL ^a	HRM ^a HRJ ^a HRH ^a	HRX
I_1	0,2 I_t A	0,5 I_t A	1,0 I_t A
I_2	2,0 I_t A	5,0 I_t A	10,0 I_t A

^a And corresponding "T", "U", "S", "R", "F" and "I" cells.

In Table 26, Table 27, Table 28, and Table 29, replace the reference to "7.5" in the "Clause or Subclause" column, with a reference to "7.5.1" instead.

Table 34 – Recommended test sequence for batch acceptance

Replace the existing Table 34 with the following new Table 34 (the wording "as agreed" has been replaced with the new footnote "a" in order to add detail):

Table 34 – Recommended test sequence for batch acceptance

Group	Clause or subclause	Inspection/tests	Recommendation	
			Inspection level	AQL %
A		Visual inspection		
		– absence of mechanical damage	II	4
		– absence of corrosion on case and terminals	II	4
		– number, position and secure fittings of connection tabs ^a	S3	1
		– absence of liquid electrolyte on case and terminals	II	0,65
B	Clause 6 5.3	Physical inspection		
		– dimensions	S3	1
		– weight ^a	S3	1
		– marking	S3	1
C	7.3.2 7.3.2	Electrical inspection		
		– open-circuit voltage and polarity ^a	II	0,65
		– discharge at 20 °C at 0,2 I _t A	S3	1
		– discharge at 20 °C at 1,0 I _t A	S3	1
NOTE Two or more failures on a single cell are not cumulative. Only the failure corresponding to the lowest AQL is taken into consideration ^a According to agreement between supplier and purchaser.				

