SLOVENSKI STANDARD
SIST EN 61951-2:2017/oprA1:2022

01-januar-2022

Sekundarni členi in baterije z alkalnimi ali drugimi nekislinskimi elektroliti - Sekundarni zatesnjeni členi in baterije za prenosne naprave - 2. del: Nikelj-kovinski hidrid

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

Sekundärzellen und -batterien mit alkalischen oder anderen nichtsäurehaltigen Elektrolyten - Tragbare wiederaufladbare gasdichte Zellen und Batterien - Teil 2: Nickel-Metallhydrid

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

Ta slovenski standard je istoveten z: **EN 61951-2:2017/prA1:2021**

ICS:

29.220.30	Alkalni sekundarni členi in baterije	Alkaline secondary cells and batteries

SIST EN 61951-2:2017/oprA1:2022 **en**

21A/777/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 61951-2/AMD1 ED4**	
DATE OF CIRCULATION: **2021-11-05**	CLOSING DATE FOR VOTING: **2022-01-28**
SUPERSEDES DOCUMENTS: **21A/765/CD, 21A/771/CC**	

IEC SC 21A : SECONDARY CELLS AND BATTERIES CONTAINING ALKALINE OR OTHER NON-ACID ELECTROLYTES

SECRETARIAT: France	SECRETARY: Mr Pierre Bourg
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 21,TC 35	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING

☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

Attention IEC-CENELEC parallel voting

The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting.

The CENELEC members are invited to vote through the CENELEC online voting system.

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

PROPOSED STABILITY DATE: 2024

NOTE FROM TC/SC OFFICERS:

The attached IEC 61951-2 ED4 amendment CDV draft is based on decision of compilation of comments on CD (21A/771/CC).

IEC 61951-2 4th Edition Amendment

Change to 2 Rationale: IEC 62902 should be added to normative references.

Change to 3.15 Rationale: Trickle charge definition should be added to help user understanding.

Change to 5.3.1 and 5.3.2 Rationale: Marking of registered trademark should be added after name and identification.

Change to 5.3.3 Rational: Marking symbols for identification of the chemistry according to IEC 62902 should be added.

Change to Table 3 in 6.1.3.2 Rationale: It is not necessary to specify the dimensions of cells other than dimensionally interchangeable with primary cells in detail. This is because the marking of cell and battery is not required to be described such the designation of dimensions. As with other IEC standards (eg IEC 62675:2014, IEC 63115-1:2019), it only needs to show how to dimension a cell. Also, other international standards such as IEC 62620:2014 and IEC 63115-1:2019 require a rule to describe dimensions in cell designation. Similar description rules have already been described in 5.1, and the reason for the description in 6.1 is unclear.

Change to Table 3 in 6.1.3.2 Rationale: 6 sizes are missing from the chart that were not found during development.

Change to Table 3 in 6.1.3.2 Rationale: Typos that were not found during development. HR/23/60 is not the correct designation. This should be HR/23/61

Change to Table 6 in 7.3.2.2 Rationale: J and JT designations should be separated from "M/MT/MU/MS" because there are difference of discharge characteristics between M cells and J cells (also see defined in 5.1.1.1)

Change to 7.5.1.2 Rationale: "LS" and "MS" are not listed. LS and MS should be included in 500 cycle requirement.

Change to Table 16 in 7.5.1.4 Rationale: The 0.2 ItA cycle life check every 50 cycles should be eliminated since it can lead to misleading accelerated cycle life test results. Test termination at 60% capacity at 0.5 ItA more accurately reflects the actual usage conditions of most consumer devices.

Change to 7.5.1.4 Rationale: IEC designations should be used.

Change to 7.5.2.2 and Table 17 in 7.5.2.2 Rationale: Typos that were not found during development. "J" is not listed. J designation should be added.

Change to 7.7.2 Rationale: Typos that were not found during development. This sentence should refer to table 10, not 9.

Change to 7.8 Rationale: The term "gas escape mechanism" is more accurate for this test than "safety device operation" since it describes a specific function.

Change to 7.13.1 Rationale: Note should be added to clarify that internal resistance

measurement is not required.

Change to 7.13.2 Rationale: Formula should be corrected, and units of measurement should be clarified.

Change to 7.13.3 Rationale: Formula should be corrected, and units of measurement should be clarified.

Change to Table 25 in 7.13.3 Rationale: Typos that were not found during development. "MRJ", "U", and "F" are not listed. Add designations to table.

Change to Table 26, 27, 28, and 29 in 10.2.1 Rationale: Tables should reference clause 7.5.1 rather than 7.5.

Change to Table 34 in 10.3 Rationale: "as agreed" should be changed to footnote "a" in order to add detail.

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*

3.15

trickle charge

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

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, identification or registered trademark of manufacturer or supplier;

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.
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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);

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

96 **Table 3 – Example of dimensions of jacketed cylindrical cells**
97 **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	0
HR 15/30	14.5		30.0	−1,5
HR 15/43	14,5		43,0	
HR 15/49	14,5	0	49,0	
HR 15/51	14,5	−0,7	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	0
HR 17/67	17,0		67,0	−2,0
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	0
HR 23/43	23,0		43,0	−1,5
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	0	47,0	
HR 26/50	25,8	−1,0	50,0	0
HR 33/36	33,0		36,0	−2,0
HR 33/62	33,0		61,5	
HR 33/91	33,0		91,0	0/−2,5
HR 34/60	33,5		59,5	0/−2,0
HR 43/91	43.0		91.0	0/−2,5

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

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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.

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

- 400 for small prismatic cells;
- 500 for L/LS/LR, M/MS/MR, J/JR, H/HR or X/XR cells;
- 50 for LT/LU, MT/MU, JT or HT/HU cells;
- 500 for button cells.

7.5.1.4 Cylindrical cells dimensionally interchangeable with primary cells

In order to use cycling conditions realistic to actual consumer usage of cylindrical cells dimensionally interchangeable with primary cells, one of the following procedures, shown in Table 16 shall be carried out.

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

Cycle Number	Charge	Stand in charged condition	Discharge	Subsequent rest
1-49	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 –ΔV = 5 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.

Cycles 1 to 50 shall be repeated until the discharge duration to the final voltage of 1,0 V on any 50th cycle becomes less than 3 h. At this stage, a repeat capacity measurement

condition as specified for cycle 50 shall be carried out and if the discharge time is less than 3 h again, the test shall be terminated.

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 2100 mAh;
- 100 for HR6 cells with a rated capacity of 2100 mAh or more;
- 200 for HR20 and HR14 cells.

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

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

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

7.8 Gas escape mechanism

Warning: EXTREME CAUTION SHALL BE EXERCISED WHEN CARRYING OUT THIS TEST ! CELLS SHALL BE TESTED INDIVIDUALLY, AND IT SHOULD BE NOTED THAT CELLS FAILING TO MEET THE REQUIREMENT COULD BURST WITH EXPLOSIVE FORCE EVEN AFTER THE CELL HAS BEEN DISCONNECTED FROM THE CHARGE CURRENT.

FOR THIS REASON, THE TEST SHALL BE CARRIED OUT IN A PROTECTIVE CHAMBER.

The following test shall be carried out in order to establish that the gas escape mechanism 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

The internal resistance of sealed nickel-metal hydride small prismatic or cylindrical rechargeable single cells shall be checked either by the alternating current (AC) or by the direct current (DC) method.

Should the need arise for the internal resistance to be measured by both AC and DC methods on the same cell, then the AC method shall be used first, followed by the DC method. In this case, it is not necessary to discharge and charge the cell between conducting AC and DC methods.

There is no requirement for internal resistance, but when the value is requested, measurement is performed according to the method described here.

7.13.2 Measurement of the internal AC resistance

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

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 RMS voltage (V);

I_a is the alternating RMS current (A).

7.13.3 Measurement of the internal DC resistance

The cell shall be discharged at a constant current of value I_1 as specified in Table 25. At the end of a discharge period of 10 s, the voltage U_1 during discharge shall be measured and recorded. The discharge current shall then be immediately increased to a constant value of I_2 as specified in Table 25 and the corresponding voltage U_2 during discharge shall be measured and recorded again at the end of a discharge period of 3 s.

All voltage measurements shall be made at the terminals of the cell independently of contacts used to carry current.

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);

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

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

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.