



**SLOVENSKI STANDARD**  
**oSIST prEN IEC 60086-2-1:2024**  
**01-november-2024**

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**Primarne baterije - 2-1. del: Fizikalne in električne značilnosti (specifikacije) baterij z vodnim elektrolitom**

Primary batteries - Part 2-1: Physical and electrical specifications of batteries with aqueous electrolyte

Piles électriques - Partie 2-1: Spécifications physiques et électriques des piles à électrolyte aqueux

**Ta slovenski standard je istoveten z: prEN IEC 60086-2-1:2024**

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<https://standards.iteh.ai/catalog/standards/sist/1520857b-a5d2-430b-9d45-e2e8583c257f/osist-pren-iec-60086-2-1-2024>

**ICS:**

29.220.10      Primarni členi in baterije      Primary cells and batteries

**oSIST prEN IEC 60086-2-1:2024      en**





# 35/1550/CDV

## COMMITTEE DRAFT FOR VOTE (CDV)

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SECRETARIAT: Japan	SECRETARY: Mr Takao Uyama
OF INTEREST TO THE FOLLOWING COMMITTEES: SC 3C,TC 21,SC 21A,TC 61,TC 108	HORIZONTAL FUNCTION(S):
ASPECTS CONCERNED:	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING <input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING	
<p><b>Attention IEC-CENELEC parallel voting</b></p> <p>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.</p> <p>The CENELEC members are invited to vote through the CENELEC online voting system.</p>	

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Recipients of this document are invited to submit, with their comments, notification of any relevant "In Some Countries" clauses to be included should this proposal proceed. Recipients are reminded that the CDV stage is the final stage for submitting ISC clauses. (SEE [AC/22/2007](#) OR [NEW GUIDANCE DOC](#)).

TITLE:

**Primary batteries - Part 2-1: Physical and electrical specifications of batteries with aqueous electrolyte**

PROPOSED STABILITY DATE: 2029

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**PRIMARY BATTERIES –**

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**Part 2-1:**

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**Physical and electrical specifications  
of batteries with aqueous electrolyte**

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**FOREWORD**

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International Standard IEC 60086-2-1 has been prepared by IEC technical committee 35: Primary cells and batteries.

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This first edition cancels and replaces the fourteenth edition of IEC 60086-2 published in 2021. This edition constitutes a technical revision.

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

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a) separation of lithium batteries into a separate Part 2-2: Physical and electrical specifications;

b) clause 3, Terms and definitions, was changed from alphabetical order to hierarchy order;

c) TR03 and TR6 were added in Category 1, Round batteries;

d) load of digital audio test for LR03, TR03 and R03 was changed from 50mA to 75mA and MAD was modified;

e) personal grooming test of LR6 was added instead of high drain application test;

f) high drain application test was added for TR6;

- 169 g) radio /clock /remote control test was added for R6S;  
 170 h) CD, digital audio, wireless gaming and accessories test was removed for LR6, R6P and  
 171 R6S;  
 172 i) 4,5 V of common designation was added for 3LR12, 3R12P and 3R12S;  
 173 j) Annex D for common designation of IEC 60086-2:2021 was moved to IEC 60086-1, as  
 174 Annex H.

175 k)

176 The text of this International Standard is based on the following documents:

CD	Report on voting
35/XXXX/CDV	35/XXXX/XX

177  
 178 Full information on the voting for the approval of this International Standard can be found in the  
 179 report on voting indicated in the above table.

180 The language used for the development of this International Standard is English.

181 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in  
 182 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available  
 183 at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are  
 184 described in greater detail at [www.iec.ch/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

185 A list of all parts in the IEC 60086 series, under the general title *Primary batteries*, can be found  
 186 on the IEC website.

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

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

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196

## INTRODUCTION

197 The technical content of this part of IEC 60086 provides physical dimensions, discharge test  
198 conditions and discharge performance requirements. IEC 60086-2-1 and IEC 60086-2-2  
199 complement the general information and requirements of IEC 60086-1. Safety information of  
200 IEC 60086-2-1 is available in IEC 60086-5.

201 This part was prepared to benefit primary battery users, device designers and battery  
202 manufacturers by furnishing the specifics of form, fit and function for individual standardized  
203 primary cells and batteries. Over the years, this part has been changed to improve its contents  
204 and may again be revised in due course in the light of comments made by national committees  
205 and experts on the basis of practical experience and changing technology.

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## PRIMARY BATTERIES –

### Part 2-1:

## Physical and electrical specifications of batteries with aqueous electrolyte

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### 215 **1 Scope**

216 This part of IEC 60086 is applicable to primary batteries which are based on standardised  
217 electrochemical systems using aqueous electrolytes.

218 It specifies

- 219 – the physical dimensions,
- 220 – the discharge test conditions and discharge performance requirements.

### 221 **2 Normative references**

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

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

227 ISO 1101, *Geometrical product specifications (GPS) – Geometrical tolerancing – Tolerances of*  
228 *form, orientation, location and run-out*

### 229 **3 Terms and definitions**

230 For the purposes of this document, the terms and definitions given in IEC 60086-1 and the  
231 following apply.

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

- 234 • IEC Electropedia: available at <https://www.electropedia.org>
- 235 • ISO Online browsing platform: available at <https://www.iso.org/obp>

#### 236 **3.1**

237 **primary cell**

238 **primary battery**

239 cell or battery that is not designed to be electrically recharged

#### 240 **3.2**

241 **round cell**

242 **round battery**

243 cell or battery with circular cross section button cell or battery

#### 244 **3.3**

245 **button cell**

246 **button battery**

247 small round cell or battery where the overall height is less than the diameter, containing  
248 aqueous electrolyte

- 249 **3.4**  
 250 **coin cell**  
 251 **coin battery**  
 252 **lithium button cell**  
 253 **lithium button battery**  
 254 small round cell or battery where the overall height is less than the diameter, containing non-  
 255 aqueous electrolyte
- 256 Note 1 to entry: The nominal voltage of lithium batteries is typically greater than 2 V.  
 257 Note 2 to entry: For the specifications, refer to IEC 60086-2-2.
- 258 **3.5**  
 259 **nominal voltage**  
 260  $U_n$   
 261 suitable approximate value of the voltage used to designate or identify a cell, a battery or an  
 262 electrochemical system
- 263 [SOURCE: IEC 60050-482:2004, 482-03-31, modified – addition of  $U_n$ .]
- 264 **3.6**  
 265 **open-circuit voltage**  
 266 **OCV**  
 267 voltage across the terminals of a cell or battery when it is off discharge
- 268 **3.7**  
 269 **end-point voltage**  
 270 **EV**  
 271 specified voltage of a battery at which the battery discharge is terminated
- 272 [SOURCE: IEC 60050-482:2004, 482-03-30]
- 273 **3.8**  
 274 **minimum average duration**  
 275 **MAD**  
 276 minimum average time on discharge which is met by a sample of batteries
- 277 Note 1 to entry: The discharge test is carried out according to the specified methods or standards and designed to  
 278 show conformity with the standard applicable to the battery types.
- 279 **3.9**  
 280 **application test**  
 281 simulation of the actual use of a battery in a specific application
- 282 **3.10**  
 283 **service output**  
 284 service life, or capacity, or energy output of a battery under specified conditions of discharge
- 285 **3.11**  
 286 **service output test**  
 287 test designed to measure the service output of a battery
- 288 Note 1 to entry: A service output test may be prescribed, for example, when  
 289 a) an application test is too complex to replicate;  
 290 b) the duration of an application test would make it impractical for routine testing purposes.
- 291 **3.12**  
 292 **terminal**  
 293 conductive parts of a battery providing connection to an external circuit
- 294 [SOURCE: IEC 60050-482:2004, 482-02-22, modified – “conductive part of a device, electric  
 295 circuit or electric network, provided” replaced by to “conductive parts of a battery providing” and  
 296 “device, electric circuit or electric network to one or more external conductor” replaced by “an  
 297 external circuit”.]

## 298 **4 Battery dimensions, symbols**

299 The symbols used to denote the various dimensions are as follows:

- 300  $h_1$  maximum overall height of the battery;
- 301  $h_2$  minimum distance between the flats of the positive and negative contacts;
- 302  $h_3$  minimum projection of the flat positive contact;
- 303  $h_4$  maximum recess of the negative flat contact surface;
- 304  $h_5$  minimum projection of the flat negative contact;
- 305  $d_1$  maximum and minimum diameters of the battery;
- 306  $d_2$  minimum diameter of the flat positive contact;
- 307  $d_3$  maximum diameter of the positive contact within the specified projection height;
- 308  $d_4$  minimum diameter of the flat negative contact;
- 309  $d_5$  maximum diameter of the negative contact within the specified projection height;
- 310  $d_6$  minimum outer diameter of the negative flat contact surface;
- 311  $d_7$  maximum inner diameter of the negative flat contact surface;
- 312  $\varnothing P$  concentricity of the positive contact.

## 313 **5 Dimensional stability**

314 Refer to IEC 60086-1 for dimensional stability.

## 315 **6 Validity of testing**

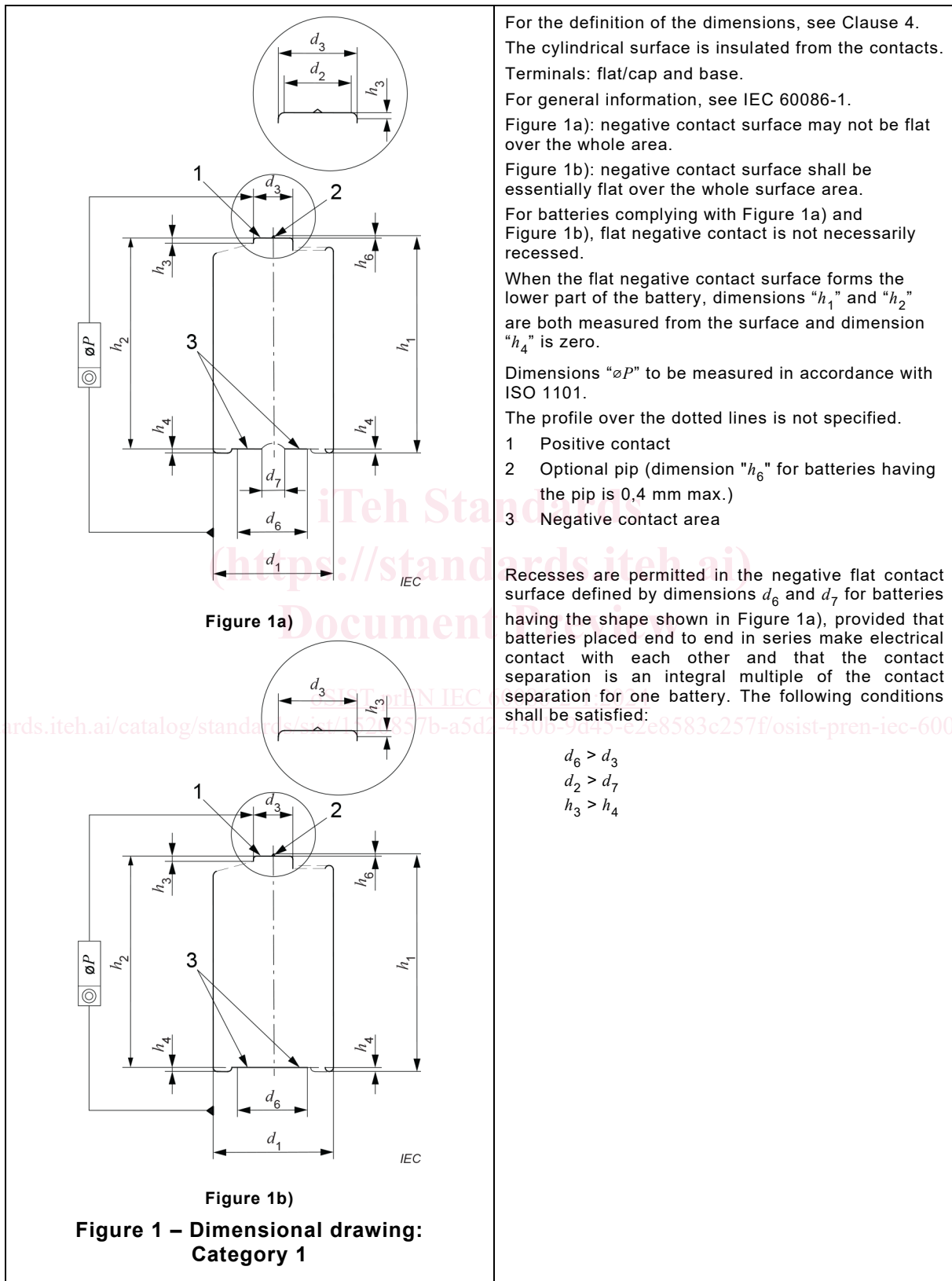
316 Portable primary batteries shall be subjected to the tests, as required in the IEC 60086 series.  
317 Testing remains valid until a design change or requirement revision has been made. Retesting  
318 is required when:

- 319 a battery specification changes by more than 0,1 g or 20 % mass, whichever is greater, for the  
320 cathode, anode or electrolyte;
- 321 a battery specification changes that would lead to a failure of any of the tests;
- 322 there is an addition of new tests or requirements; or
- 323 there is a requirement change that would lead to a failure on any of the tests.

## 324 **7 Constitution of the battery specification tables**

- 325 – Batteries are categorized into several groups according to their shapes.
- 326 – In each category, batteries having the same shape but belonging to a different  
327 electrochemical system are grouped together and shown in succession.
- 328 – Batteries are always listed in ascending order of nominal voltage and, within each nominal  
329 voltage, in ascending order of volume.
- 330 – One common shape drawing of these batteries which fall in the same group is exhibited.
- 331 – Designation, nominal voltage, dimensions, discharge conditions, minimum average duration  
332 and application for these batteries which fall into the same group are summarized in one  
333 table.
- 334 – When a drawing represents only one type of battery, the dimensions of the relevant battery  
335 may be directly shown on the drawing.
- 336 – Batteries are categorized into the following groups:
- 337 a) Category 1 : Round batteries according to Figure 1
- 338 R1, R03, R6P, R6S, R14P, R14S, R20P, R20S

- 339 LR8D425, LR1, LR03, LR6, LR14, LR20  
 340 TR03, TR6  
 341 b) Category 2 : Round battery  
 342 Void  
 343 c) Category 3 : Round battery according to Figure 7  
 344 LR9  
 345 d) Category 4 : Round batteries according to Figure 8  
 346 PR70, PR41, PR48, PR44, PR1154  
 347 LR41, LR55, LR54, LR43, LR44  
 348 SR62, SR63, SR65, SR64, SR60, SR67, SR66, SR58, SR68, SR59, SR69, SR41,  
 349 SR57, SR55, SR48, SR54, SR42, SR43, SR44  
 350 e) Category 5: Other round batteries – Miscellaneous  
 351 4LR44  
 352 4SR44  
 353 8LR932  
 354 AR40  
 355 5AR40  
 356 6AR40  
 357 5PR175/172  
 358 6PR 225/155  
 359 f) Category 6: Non-round batteries – Miscellaneous  
 360 3R12P, 3R12S, 3LR12  
 361 4LR61  
 362 AS4, AS6P, AS6S, AS8, AS10, AS12, PS8S, PS8P, PS10  
 363 4R25X, 4LR25X  
 364 4R25Y  
 365 4R25-2, 4LR25-2  
 366 6F22, 6LR61, 6LP3146  
 367 6AS4S, 6PS4S, 6PS4P  
 368 6AS6P, 6AS6S, 6PS6P, 6PS6S  
 369 – The specification drawings show the shape of the relevant batteries. Dimensions for each  
 370 battery are shown in the tables of Clause 8 and in Figure 1 to Figure 27.  
 371 NOTE 1: See Annex A, Annex B and Annex C for ease of locating battery sizes.  
 372 NOTE 2: For lithium batteries, see IEC 60086-2-2: Physical and electrical specifications of lithium batteries.  
 373

374 **8 Physical and electrical specifications**375 **8.1 Category 1 batteries**376 **8.1.1 General**

377

378 **8.1.2 Category 1 – Specifications: LR1, R1, LR8D425**

Dimensions in millimetres