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Interested committees:

Title: BS EN IEC 60095-8 Lead-acid starter batteries

Part 8: 12V Batteries used in automobiles for auxiliary or backup purposes

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

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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.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

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	Commend (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.	



21/1213/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

IEC 60095-8 ED1

DATE OF CIRCULATION:

2024-09-13

CLOSING DATE FOR COMMENTS:

2024-11-08

SUPERSEDES DOCUMENTS:

21/1175/CD, 21/1186A/CC

IEC TC 21 : SECONDARY CELLS AND BATTERIES

SECRETARIAT:

France

SECRETARY:

Mr Yves BOUDOU

OF INTEREST TO THE FOLLOWING COMMITTEES:

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:

Lead-acid starter batteries - Part 8 : 12V Batteries used in automobiles for auxiliary or backup purposes

NOTE FROM TC/SC OFFICERS:

Comments will be discussed during the meeting scheduled in paris on 20th November 2024

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LEAD-ACID STARTER BATTERIES –

Part 8: 12V BATTERIES USED IN AUTOMOBILES FOR AUXILIARY OR BACKUP PURPOSES

FOREWORD

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International Standard IEC 60095-8 has been prepared by IEC technical committee 21: Secondary cells and batteries.

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

FDIS	Report on voting
21/975/FDIS	21/985/RVD

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

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

A list of all the parts in the IEC 62660 series, published under the general title *Secondary lithium-ion cells for the propulsion of electric road vehicles*, can be found on the IEC website.

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

- 117 • reconfirmed,
- 118 • withdrawn,
- 119 • replaced by a revised edition, or
- 120 • amended.

121

Introduction

122

123

124

125 With the growth of xEV vehicles (vehicles featuring increasing degrees of electrification), 12V
126 batteries are being used to support 12V functions also in case where the ICE (internal combustion
127 engine) is not present or is coupled with a high voltage electrical engine, thus not requiring or having
128 limited engine cranking functionalities. Additional functionalities like the ones related to functional
129 safety (e.g. in case of disruption of the main high voltage energy source) require new methods for
130 establishing the power capability of such batteries when requested to provide the function, as well
131 as potential different ageing mechanisms related to different usage profiles (e.g. extended float
132 charge exposure).

133 Current production vehicles, including some ICE / Start Stop vehicles, but mainly xEV (HEV, PHEV,
134 BEV) already feature one or more low voltage (12V) support batteries and are supposed to equip
135 such batteries as far as a low voltage board net will be part of the electrical system of the vehicles.

LEAD-ACID STARTER BATTERIES –

Part 8: 12V BATTERIES USED IN AUTOMOBILES FOR AUXILIARY OR BACKUP PURPOSES

1 Scope

This part of IEC 60095 is applicable to lead acid batteries with a nominal voltage of 12 V, for automobile passenger cars applications, used as auxiliary energy storage and power source in vehicles, but not featuring the classical function of engine starting / cranking. This includes applications in battery-electric vehicles, as well as in vehicles with an internal combustion engine (ICE) that is started out of another (12 V, 48 V or high-volt) battery. This standard can be used for batteries with auxiliary or backup purposes.

This document specifies the:

- general requirements;
- essential functional characteristics, relevant test methods and results required, for several classes of batteries:
 - according to the general type of application
 - according to the type of product
 - according the categories as defined in Clause 3

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

IEC 60095-1:2018, *Lead-acid starter batteries – Part 1: General requirements and methods of test*

IEC 60095-2:2021, *Lead-acid starter batteries – Part 2: Dimensions of batteries and dimensions and marking of terminals*

IEC 60095-6:2019, *Lead-acid starter batteries – Part 6: Batteries for micro-cycle applications*

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>
- IEC 60095-1
- IEC 60095-6

Batteries defined for auxiliary or backup purposes relate to vehicle applications which are very diverse and undergo fast technical changes. However, they can typically be associated with one of the following three categories:

- **Category (1):** 12V central-storage (main) battery, with most functions of modern automotive batteries except engine starting. These functions typically include: power supply during parking, vehicle activation and after-run, over-the air update and as well transient power delivery and absorption, along with voltage stabilization, during normal vehicle operation.

Such batteries are typically sized for energy or capacity (e.g., to support parking loads for a certain duration) *and* power or high-rate discharge current (e.g., powering electric chassis actuators) simultaneously. As 12 V batteries in electric vehicles can be recharged out of the traction battery while parking, and as cold-cranking performance is not a requirement, they are often downsized and then subjected to higher relative cyclic throughput at greater depth-of-discharge, compared to a starter or micro-hybrid battery in an ICE vehicle with otherwise identical electrical loads.

Emergency power support might be required in system architectures where such functionality is not supported by any additional dedicated energy and power source

Three requirement levels (1A), (1B), (1C) shall take into account different capacity throughput as predicted by the OEM for specific applications.

- **Category (2):** 12 V backup battery that is stabilizing voltage and providing emergency power for a sensitive – often safety relevant – electrical component or sub-net of the power supply system. Such batteries are often disconnected from the 12 V loads when alternator or dc/dc converter are not feeding the 12 V system, protecting them from discharge while parking etc. In such cases, the operating state-of-charge (SOC) range may be narrow (and close to fully charged)

Requirements for category (2) will take into account limited capacity throughput during life and appropriate voltage response when supporting high-rate discharge currents.

- **Category (3):** 12 V auxiliary batteries in stop/start or micro-hybrid vehicles that stabilize system voltage during engine restart, which would be powered out of the 12 V starter battery. This application is similar to the backup case described above, but battery discharge occurs frequently during normal operation, and is not safety relevant. Requirements for category (3) shall take into account limited capacity throughput and power.

3.2 Abbreviated terms and symbols

EN	European Standard (Euro Norm) created by CENELEC (European Committee for Electrotechnical Standardization)
CHA	Charge Battery; to be charged with given parameters
DCH	Discharge Battery; to be discharged with given parameters
PAU	Pause; no charging or discharging but measurement of voltage as required. If the battery is connected to the test unit, there shall be no quiescent current
RPT	Repeat; instruction to repeat certain steps several times
C_e	Effective capacity [Ah]
C_n	Nominal capacity [Ah]
C_{rch}	Recharged capacity [Ah]
DoD	Depth of discharge [% of C_n]
BOL	Beginning of Life
EOS	End of step
EOL	End of Life

218	I_{CC}	Discharge current for cranking [A]
219	I_n	Nominal discharge current [A], $I_n [A] = C_n [Ah] / 20 [h]$
220	Q_{CHA}	Charged capacity [Ah]
221	R_i	Internal resistance [Ω]
222	RCn	Nominal Reserve capacity (discharge with a fixed current of 25 A to $U = 10,5$ V)
223	RCe	Effective Reserve capacity
224	SoC	State of charge
225	U_c	Charging voltage [V]
226	U_{EOD}	Voltage at the end of discharge step [V]
227		
228	PPC	Pulse power characterization
229	PP1	
230	PP2	
231		

232 **4 Designation of batteries for Auxiliary or Backup applications – Electrolyte**

233 **density and open circuit voltage**

234 **4.1 Designation according to type**

235 Subclause 4.1 of IEC 60095-1:2018 is applicable

236 **5 Condition on delivery**

237 Clause 5 of IEC 60095-1:2018 is applicable

238 **6 General requirements**

239 **6.1 Identification, labelling**

240 **6.1.1 General**

241 Batteries according to this document shall bear the following characteristics on at least the top or
242 one of their four sides.

243 **6.1.2 The identification of manufacturer or supplier**

244 The name of the manufacturer or supplier shall be indicated.

245 **6.1.3 Nominal voltage: 12 V**

246 The nominal voltage of 12 V shall be indicated.

247 **6.1.4 Capacity or reserve capacity and nominal high rate current CCA**

248 **General-use automotive batteries**

249 Subclause 6.1.4 of IEC 60095-1:2018 is applicable for batteries that are qualified for starter application
250 according to IEC 60095-1 or IEC 60095-6 and shall be qualified for additional use in auxiliary or backup
251 applications.

252 **Dedicated auxiliary or backup batteries**

253 Batteries designed specifically for auxiliary or backup applications shall carry indications of capacity and CCA
254 in line with subclause 6.1.4 of IEC 60095-1:2018, too. However, this norm defines a shorter cranking
255 performance test for such batteries that will only be applied with a new, more application-specific pulse-power
256 performance characterization (PPC) test.

257 **6.1.5 Production date code**

258 Batteries shall be marked with the date of production. This can be part of a more complex code.

259 **6.1.6 Safety labelling**

260 Subclause 6.1.6 of IEC 60095-1:2018 is applicable

261 **6.1.7 Recycling labelling**

262 Subclause 6.1.7 of IEC 60095-1:2018 is applicable

263 **6.1.8 Valve-regulated batteries**

264 Subclause 6.1.8 of IEC 60095-1:2018 is applicable

265 **6.2 Marking of the polarity and fastening of the battery**

266 For battery whose dimensions are defined by IEC 60095-2, the terminals shall be identified
267 according to the requirements of IEC 60095-2. Where batteries are fastened to the vehicle by means
268 of integral parts (for example, bottom ledges), these shall be in compliance with the requirements
269 of IEC 60095-2

270 **7 Functional characteristics**

271 **7.1 Electrical characteristics**

272 **7.1.1** The 20 h capacity, the reserve capacity and the charge retention have the same definition
273 as in IEC 60095-1:2018.

274 **7.1.2** The high rate discharge performance CCA(AUX) is the discharge current I_{cc} , as indicated
275 by the manufacturer which a battery can supply according to 9.3. Engine-cranking not being a
276 requested function, the test result shall be used as an indicator of generalized power performance
277 and as a parameter for the Pulse Power Characterization (PPC) procedure.

278

279 **7.1.3 The capacity is defined for a temperature of $25\text{ °C} \pm 2\text{ °C}$. It may be indicated by the**
280 **manufacturer as either:**

- 281 • nominal 20 h capacity C20,
- 282 • or nominal reserve capacity RCn.

283 **C20 and RCn are defined in IEC 60095-1:2018 in 7.1.2.**

284 **7.1.4 The power pulse characterization (PPC) is a sequence of progressively increasing**
285 **short pulses at constant current, where current is fixed within a defined range or**
286 **proportional to the nominal current I_{cc} , and executed at full or partial state of**
287 **charge and low temperature:**

- 288 • at the beginning of life, as part of the initial characteristics sequence
- 289 • at the end of life or when the specification target (number of cycles, number of units) of the
290 intended performance level is achieved

291 **7.1.5 the charge acceptance (at 0 °C) defined in IEC 60095-1:2018, 7.1.3.**

292 **7.1.6 the charge recovery test (at 25 °C) is a specific requirement based on specific**
293 **usage profiles more aligned with current applications and looking over charge**
294 **performance on a longer timespan and on specific power performance recovery at**
295 **established intervals during the charging process**

296 **7.1.7 The charge retention is defined in IEC 60095-1:2018, 7.1.4.**

297 **7.1.8 The endurance test consists in the following parts:**

- 298 • the "corrosion test" represents the ability of a battery to perform repeated overcharge/storage
299 periods.
- 300 • the "cycling test 50 % DoD" represents the ability of a battery to perform repeated discharge/
301 recharge cycles and long rest periods on open circuit. This ability shall be tested by a series of
302 cycles and rest periods under specified conditions after which the cold cranking or the capacity
303 performances shall be determined.
- 304 • The Light Load life cycles test represents the ability to perform significantly high number of
305 shallow charge/recharge cycles at a relatively high State of Charge
- 306 • the "cycling test 17,5 % DoD" represents the ability to deliver energy under high cyclic
307 conditions in a partially discharged state of charge.

308 **7.1.9 The water consumption is defined in IEC 60095-1:2018, 7.1.6.**
309