



DPC: 17/30363336 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 27 November 2017

Origin: International

Latest date for receipt of comments: 10 January 2018

Project No. 2017/02221

Responsible committee: PEL/21 Secondary cells and batteries

Interested committees:

Title: Draft BS IEC 60095-6 Ed.1.0 Lead-Acid Starter Batteries. Part 6: Batteries for Micro-Cycle Applications.

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

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD. THIS DRAFT IS NOT CURRENT BEYOND 10 January 2018

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <https://standardsdevelopment.bsigroup.com/>.

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
------------------	------------------------

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.	



21/950/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER: IEC 60095-6 ED1	
DATE OF CIRCULATION: 2017-11-17	CLOSING DATE FOR COMMENTS: 2018-02-09
SUPERSEDES DOCUMENTS: 21/913/NP,21/928A/RVN	

IEC TC 21 : SECONDARY CELLS AND BATTERIES	
SECRETARIAT: France	SECRETARY: Mr Yves Boudou
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY	

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:
Lead-Acid Starter Batteries - Part 6: Batteries for Micro-Cycle Applications

NOTE FROM TC/SC OFFICERS:

CONTENTS

1			
2			
3	FOREWORD.....		2
4			
5	1 Scope.....		3
6	2 Normative references		4
7	3 Terms and conditions		4
8	4 Designation of starter batteries – Electrolyte density and open circuit voltage.....		4
9	5 Condition on delivery		5
10	6 General requirements		5
11	6.1 Identification, labelling		5
12	6.2 Marking of the polarity		6
13	6.3 Fastening of the battery		6
14	7 Functional characteristics		6
15	7.1 Electrical characteristics		6
16	7.2 Mechanical characteristics		7
17	8 General test conditions		7
18	8.1 Sampling of batteries		7
19	8.2 Charging method - Definition of a fully-charged battery.....		7
20	8.3 Test equipment.....		7
21	8.4 Test sequence		8
22	9 Tests methods		10
23	9.1 20 hour capacity check C_e		10
24	9.2 Reserve capacity check $RC_{r,e}$		10
25	9.3 Cranking performance test		10
26	9.4 Charge acceptance tests		10
27	9.5 Charge retention test		17
28	9.6 Endurance test for batteries		17
29	9.7 Vibration resistance test.....		19
30	9.8 Electrolyte retention test		19
31	10 Requirements		21
32			
33	Table 1 - Test/Battery OPTION A.....		10
34	Table 2 – Test/Battery OPTION B		11
35	Table 3 — DCA – Pre-cycling.....		13
36	Table 4 — DCA – Charge Acceptance qDCA procedure		14
37	Table 5 - DCA – The DCApp procedure		14
38	Table 6 — DCA – The DCRss part		16
39	Table 7 — Endurance 17,5 % DoD – Cycling units		18
40	Table 8 - Battery preparation		19
41	Table 9 - Micro-cycle		20
42	Table 10 - Check-up after cycling.....		20
43	Table 11 - Summary of requirements OPTION A		22
44	Table 12 - Summary of requirements OPTION B		23
45			

INTERNATIONAL ELECTROTECHNICAL COMMISSION**LEAD-ACID STARTER BATTERIES –****Part 6: Batteries for Micro-Cycle Applications****FOREWORD**

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may Participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also Participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60095-6 has been prepared by IEC technical committee 21: Secondary cells and batteries.

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

FDIS	Report on voting
21/644/FDIS	21/649/RVD

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

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

IEC 60095 consists of the following parts, under the general title *Lead-acid starter batteries*:

Part 1: General requirements and methods of test

99 Part 2: Dimensions of batteries and dimensions and marking of terminals

100 Part 4: Dimensions of batteries for heavy trucks

101 The committee has decided that the contents of this publication will remain unchanged until
102 the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in
103 the data related to the specific publication. At this date, the publication will be

- 104 • reconfirmed;
- 105 • withdrawn;
- 106 • replaced by a revised edition, or
- 107 • amended.

108

109

110

111

112

113

114

115

LEAD-ACID STARTER BATTERIES –

Part 6: Batteries for Micro-Cycle Applications

1 Scope

This part of IEC 60095 is applicable to lead-acid batteries with a nominal voltage of 12 V, used primarily as power source for the starting of internal combustion engines (ICE), lighting and also for auxiliary equipment of ICE vehicles. These batteries are commonly called “starter batteries”.

The batteries under scope of this standard are used for micro-cycle applications in vehicles which can also be called Start-Stop (or Stop-Start, idling-stop system, micro-hybrid or idle-stop-and-go) applications. In cars with this special capability, the internal combustion engine is switched off during a complete vehicle stop, during idling with low speed or during idling without the need of supporting the vehicle movement by the internal combustion engine. During the phases in which the engine is switched off, most of the electric and electronic components of the car need to be supplied by the battery without support of the alternator. In addition, in most cases an additional regenerative braking (recuperation or regeneration of braking energy) function is installed. The batteries under these applications are stressed in a completely different way compared to classical starter batteries. Aside of these additional properties, these batteries need to crank the ICE and support the lighting and also auxiliary functions in a standard operating mode with support of the alternator when the internal combustion engine is switched on. All batteries under this scope need to fulfil basic functions, which are tested under application IEC 60095-1.

The object of this standard is to specify the general requirements and methods of test specific for the lead-acid Batteries used for Micro-Cycle Applications.

This IEC Standard is applicable to batteries for the following purposes:

- Lead-acid batteries of the dimensions according to 60095-2 for vehicles with the capability to automatically switch off the ICE during vehicle operation either in standstill or moving (“Start-Stop”);
- Lead-acid batteries of the dimensions according to 60095-2 for vehicles with Start-Stop applications with the capability to recover braking energy or energy from other sources.

The Li-ion technology is excluded of this Standard.

NOTE - The applicability of this standard also for batteries according to 60095-4 is under consideration.

2 Normative references

The following referenced documents are indispensable for the application 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) – Chapter 482: Primary and secondary cells and batteries*

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

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

IEC 60095-4, *Lead-acid starter batteries – Part 4: Dimensions of batteries for heavy trucks*

ISO 7010. Safety symbols

3 Terms and definitions

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

3.1

flooded batteries (vented)

lead-acid batteries having a cover provided with one or more openings through which gaseous products may escape

3.2

enhanced Flooded Batteries, EFB

lead-acid batteries with additional special design features to significantly improve the cycling capability compared to standard flooded batteries

3.3

valve regulated lead-acid batteries, VRLA

valve regulated lead-acid batteries are secondary batteries which are closed under normal conditions but which has an arrangement that allows the escape of gas if the internal pressure exceeds a predetermined value

NOTE 1 - The VRLA battery cannot receive addition to the electrolyte and after activation of dry-charged VRLA.

NOTE 2 - In VRLA batteries the electrolyte is immobilized.

3.4

absorbent glass mat batteries, AGM

VRLA batteries in which the electrolyte is immobilized by absorption in a glass mat

3.5

gel batteries

VRLA batteries in which the electrolyte is immobilized by fixing as gel

4 Designation of batteries for Micro-Cycle Applications – Electrolyte density and open circuit voltage

4.1 Designation according to type

The sub-clause 4.1 of IEC 60095-1 is applicable.

4.2 Electrolyte density and open circuit voltage

The sub-clause 4.2 of IEC 60095-1 is applicable.

5 Condition on delivery

The clause 5 of IEC 60095-1 is applicable.

6 General requirements

6.1 Identification, labelling

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

6.1.1 The identification of manufacturer or supplier

The name of the manufacturer or supplier shall be indicated.

6.1.2 Nominal voltage: 12 V

The nominal voltage of 12 V shall be indicated.

6.1.3 Capacity or Reserve Capacity (see 7.1.2) and Nominal cranking current (see 7.1.1)

The sub-clause 6.1.3 of IEC 60095-1 is applicable.

6.1.4 Production date code

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

6.1.5 Safety labelling

The sub-clause 6.1.5 of IEC 60095-1 is applicable.

6.1.6 Recycling labelling

The sub-clause 6.1.6 of IEC 60095-1 is applicable.

6.1.7 Identification Start & Stop

In addition to the mandatory information defined in IEC 60095-1, the battery could be marked with a symbol showing the *Micro-Cycle Application*.

For better identification and comparison of batteries under the scope of this standard, a special marking could be used by the battery manufacturer.

Examples: Europe EN label and Japan label :



6.1.8 Valve-regulated batteries

The sub-clause 6.1.7 of IEC 60095-1 is applicable.

6.2 Marking of the polarity

The terminals shall be identified according to the requirements of IEC 60095-2 or IEC 60095-4.

6.3 Fastening of the battery

Where batteries are fastened to the vehicle by means of integral parts (for example, bottom ledges), these shall be in compliance with the requirements of IEC 60095-2 or IEC 60095-4.

7 Functional characteristics

7.1 Electrical characteristics

The cranking performance, the 20h capacity, the reserve capacity, the charge retention and the water consumption have the same definition than in the 60095-1.

The Charge Acceptance tests and the Endurance tests are adapted for the Micro-cycle Applications.

7.1.1 The cranking performance is the discharge current I_{CC} , as indicated by the manufacturer according to the option chosen (option 1 or option 2), which a battery can supply according to 9.3.

7.1.2 The capacity of a starter battery is defined for a temperature of $25\text{ °C} \pm 2\text{ °C}$.

It may be indicated by the manufacturer as either:

- nominal 20 hour capacity C_{20} , or
- nominal reserve capacity RC_n .

C_{20} and RC_n are defined in 60095-1 in sub-clause 7.1.2.