

AS 60095.1:2022



Lead-acid starter batteries

**Part 1: General requirements and methods of test (IEC 60095-1:2018
(ED. 8.0), MOD)**



AS 60095.1:2022

This Australian Standard ® was prepared by EL-005, Secondary Batteries. It was approved on behalf of the Council of Standards Australia on 05 August 2022.

This Standard was published on 19 August 2022.

The following are represented on Committee EL-005:

- Australasian Fire and Emergency Service Authorities Council
- Australian Industry Group
- Clean Energy Council
- Communications, Electrical and Plumbing Union — Electrical Division
- Consumers Federation of Australia
- CSIRO
- Deakin University
- Electrical Regulatory Authorities Council, Australia
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- Institute of Electrical Inspectors
- International Copper Association Australia
- Joint Accreditation System of Australia & New Zealand
- Master Electricians Australia
- National Association of Testing Authorities Australia
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This Standard was issued in draft form for comment as DR AS 60095.1:2022.

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ISBN 978 1 76113 909 3

Lead-acid starter batteries

Part 1: General requirements and methods of test (IEC 60095-1:2018 (ED. 8.0), MOD)

Originated as AS D2—1958. Revised and redesignated as AS 2149—1990. Fourth edition 2003. Revised and redesignated as AS 60095.1:2022.



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Preface

This Standard was prepared by the Standards Australia Committee EL-005, Secondary Batteries, to supersede AS 2149:2003, *Starter batteries—Lead acid*.

The objective of this document is to specify the general requirements, essential functional characteristics, relevant test methods and results required, for several classes of starter batteries according to the general type of application and the type of product.

This document is applicable to lead-acid batteries with a nominal voltage of 12 V, used primarily as a power source for the starting of internal combustion engines, lighting, and for auxiliary equipment of internal combustion engine vehicles.

The major changes in this edition are as follows:

- (a) New test procedures with reduced number of specimens for tests.
- (b) Cranking performance test, endurance tests, vibration resistance test are more comprehensive.
- (c) Endurance test acceptance criteria are defined.

A list of all parts in the 60095 series can be found in the Standards Australia online catalogue.

This document is an adoption with national modifications, and has been reproduced from, IEC 60095-1:2018, *Lead-acid starter batteries –Part 1: General requirements and methods of test*. The modifications are additional requirements and are set out in [Appendix ZZ](#), which has been added at the end of the source text.

[Appendix ZZ](#) lists the variations to IEC 60095-1:2018 for the application of this document in Australia.

As this document has been reproduced from an International document, the following applies:

- (i) In the source text “this part of IEC 60095” should read “this document”.
- (ii) A full point substitutes for a comma when referring to a decimal marker.

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The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

Section National Foreword

AS 60095.1:2022 and AS 60095.6:2022 are modified adoptions of IEC 60095-1:2018 and IEC 60095-6:2019 respectively. For more information, also refer to IEC 60095-2:2021 and 60095-4:2021.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LEAD-ACID STARTER BATTERIES –

Part 1: General requirements and methods of test

FOREWORD

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International Standard IEC 60095-1 has been prepared by IEC technical committee 21: Secondary cells and batteries.

This eighth edition cancels and replaces the seventh edition published in 2006. This edition constitutes a technical revision.

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

- a) charge acceptance test;
- b) cranking performance test;
- c) charge retention test; and
- d) endurance test added.

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

FDIS	Report on voting
21/974/FDIS	21/987/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 parts in the IEC 60095 series, published under the general title *Lead-acid starter batteries*, can be found on the IEC website.

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

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

A bilingual version of this publication may be issued at a later date.

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LEAD-ACID STARTER BATTERIES –

Part 1: General requirements and methods of test

1 Scope

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

This document is applicable to batteries for the following purposes:

- batteries for passenger cars;
- batteries for commercial and industrial vehicles.

This document is not applicable to batteries for other purposes, such as the starting of railcar internal combustion engines or for motorcycles and other power sport vehicles.

This document defines many general properties of lead-acid batteries. Single sections can be referenced in other parts of the IEC 60095 series even if the application is excluded in the scope of this document.

This document specifies the:

- general requirements;
- essential functional characteristics, relevant test methods and results required,

for several classes of starter batteries:

- according to the general type of application;
- according to the type of product.

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 – Chapter 482: Primary and secondary cells and batteries*

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 vehicles*

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>

3.1

flooded battery

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

3.2

enhanced flooded battery

EFB battery

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

3.3

valve regulated lead-acid battery

VRLA battery

lead-acid battery which is 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 to entry: The VRLA battery cannot receive addition to the electrolyte and after activation of dry-charged VRLA.

Note 2 to entry: In VRLA batteries the electrolyte is immobilized.

3.4

absorbent glass mat battery

AGM battery

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

3.5

gel battery

VRLA battery in which the electrolyte is immobilized by fixing as a gel

4 Designation of starter batteries – Electrolyte density and open circuit voltage

4.1 Designation according to type

Batteries are designated according to their type, as follows:

- flooded batteries (vented);
- enhanced flooded batteries, EFB;
- valve regulated lead-acid batteries, VRLA;
 - absorbent glass mat batteries, AGM;
 - gel batteries.

4.2 Dry-charged batteries

Lead-acid batteries may be supplied in a dry-charged state. Dry-charged batteries can be activated by filling with the defined electrolyte indicated by internal or external marks or according to the manufacturer's activation instructions. After activation, these batteries are ready to use.