

INTERNATIONAL STANDARD

IEC 60095-1

Sixth edition
2000-12

Lead-acid starter batteries –

Part 1: General requirements and methods of test

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CONTENTS

	Page
FOREWORD	7
Clause	
1 General.....	11
1.1 Scope and object	11
1.2 Normative references.....	11
1.3 Definitions	11
2 Classification and designation of starter batteries	13
3 Condition on delivery	15
4 General requirements	15
4.1 Identification, labelling	15
4.2 Marking of the polarity	15
4.3 Additional designation.....	17
4.4 Fastening of the battery	17
5 Functional characteristics	17
5.1 Electrical characteristics	17
5.2 Mechanical characteristics	19
6 General test conditions	19
6.1 Sampling of batteries	19
6.2 Preparation of batteries prior to test – Definition of a fully-charged battery.....	21
6.3 Activation of dry-charged or charge-conserved batteries	21
6.4 Measuring instruments.....	23
6.5 Test sequence.....	23
7 Tests/methods and requirements.....	25
7.1 Capacity check C_e	25
7.2 Reserve capacity check $C_{r,e}$	25
7.3 Cranking performance test.....	27
7.4 Charge acceptance test	27
7.5 Charge retention test	27
7.6 Cyclic endurance test for batteries – Class A	29
7.7 Cyclic endurance test for batteries – Class B	29
7.8 Cyclic endurance test for batteries – Class C.....	31
7.9 Water consumption test	31
7.10 Vibration resistance test	33
7.11 Electrolyte retention test	35
7.12 Cranking performance for dry-charged (or conserved-charge) batteries after activation	35

	Page
Annex A (normative) Correlation between C_n and $C_{r,n}$	37
Annex B (normative) Safety labelling.....	39
Figure B.1 – Symbols for safety labelling.....	39
Figure B.2 – Dimensions for symbols in safety labelling	39
Table 1 – Test / Battery.....	25
Table 2 – Values for vibration resistance test	35

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<https://standards.iteh.ai/catalog/standards/iec/6859ba67-1244-4191-90a2-109fa48db04b/iec-60095-1-2000>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LEAD-ACID STARTER BATTERIES –

Part 1: General requirements and methods of test

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
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International Standard IEC 60095-1 has been prepared by IEC technical committee 21: Secondary cells and batteries.

This sixth edition cancels and replaces the fifth edition, published in 1988, amendment 1 (1993) and amendment 2 (1995).

This sixth edition constitutes a technical revision.

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

FDIS	Report on voting
21/518/FDIS	21/525/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 3.

Annexes A and B form an integral part of this standard.

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

- Part 1: General requirements and methods of test
- Part 2: Dimensions of batteries and dimensions and marking of terminals
- Part 4: Dimensions of batteries for heavy trucks

The committee has decided that the contents of this publication will remain unchanged until 2004. At this date, the publication will be

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

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LEAD-ACID STARTER BATTERIES –

Part 1: General requirements and methods of test

1 General

1.1 Scope and object

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 and igniting of internal combustion engines, lighting and for auxiliary equipment of internal combustion engine vehicles. These batteries are commonly called "starter batteries".

This standard is not applicable to batteries for other purposes, such as the starting of railcar internal combustion engines.

The object of this standard is to specify

- 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 climates in which they are predominantly operated,
- according to the type of product.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60095. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 60095 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(486):1991, *International Electrotechnical Vocabulary (IEV) – Chapter 486: Secondary cells and batteries*

IEC 60095-2:1984, *Lead-acid starter batteries – Part 2: Dimensions of batteries and dimensions and marking of terminals*

1.3 Definitions

For the purpose of this International Standard, the definitions of IEC 60050(486) are applicable.

2 Classification and designation of starter batteries

2.1 According to their application, three classes of batteries are defined as follows:

- Class A: corresponds in particular to passenger vehicles, light commercial vehicles and similar applications.
- Class B: corresponds in particular to trucks, buses, taxis, agricultural vehicles, machinery used for public works and similar applications.
- Class C: corresponds in particular to high temperature duty for passenger vehicles, light commercial vehicles and similar applications.

NOTE Characteristics related to class C batteries are under consideration.

2.2 According to their type:

- Vented (flooded) battery: a vented battery is a secondary battery having a cover provided with one or more openings through which gaseous products may escape.
- Valve-regulated (with gas recombination) battery: a valve-regulated battery is a secondary battery which is closed under normal conditions but which has an arrangement which allows the escape of gas if the internal pressure exceeds a predetermined value. The battery cannot normally receive an addition of electrolyte.

In this type of battery, the electrolyte is immobilized.

2.3 According to the climate they are designed for:

Batteries of classes A and B are intended for use in temperate and cold climates. In these batteries, when fully-charged, the density of the electrolyte shall be

$$(1,28^{+0,02}_{-0,01}) \text{ kg/l at } 25 \text{ }^{\circ}\text{C}$$

This density requirement is not applicable to valve-regulated batteries.

Batteries intended for use in warm or tropical climates shall be designated by adding the letter T to the class-designations A and B (i.e. AT and BT). In these batteries, when fully-charged, the density of the electrolyte shall be

$$(1,23^{+0,02}_{-0,01}) \text{ kg/l at } 25 \text{ }^{\circ}\text{C}$$

This density requirement is not applicable to valve-regulated batteries.

3 Condition on delivery

New vented batteries may be supplied either

- in a state ready for use, filled with the appropriate electrolyte to the maximum level. After an initial charge (according to 6.2.1 and 6.2.2), the electrolyte density shall correspond to the relevant figures of 2.3;
- in a dry-and-charged (or charge-conserved) state not filled with electrolyte. The density of the acid to fill these batteries before use (unless otherwise recommended by the manufacturer) shall be
 - 1,28 kg/l \pm 0,01 kg/l at 25 °C for class A and B, and
 - 1,23 kg/l \pm 0,01 kg/l at 25 °C for class AT and BT.

Valve-regulated batteries are normally supplied in a state ready for use. For these batteries, the electrolyte is not accessible and, therefore, its density cannot be checked.

4 General requirements

4.1 Identification, labelling

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

4.1.1 Class of battery: (IEC) A or B or AT or BT (see 2.3).

4.1.2 Nominal voltage: 12 V

4.1.3 Capacity:

- either nominal capacity C_n (Ah), or
- reserve capacity C_r (min).

The values C_n or C_r for all classes of batteries according to 4.1.1 shall correspond to the electrolyte density given in 2.3.

4.1.4 Nominal cranking current: I_s (see 5.1.1)

4.1.5 Safety labelling

Batteries shall be marked with the six coloured symbols as described in B.1. However, to be in compliance with some national regulations, additional wording or special labelling can be used (for example safety label for North America area shown in B.2).

4.1.6 Valve-regulated batteries shall bear a special indication.

4.2 Marking of the polarity

According to clause 14 of IEC 60095-2, at least the positive terminal shall be identified by a "+" mark on the lid or on the terminal itself.