



**SLOVENSKI STANDARD**  
**SIST EN 60896-2:1997**

**01-februar-1997**

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**Stacionarne svinčeno-kislinske baterije - Splošne zahteve in metode preskušanja -  
2. del: Ventilsko regulirani tipi (IEC 60895-2:1995)**

Stationary lead-acid batteries - General requirements and methods of test -- Part 2:  
Valve regulated types

Orstfeste Blei-Akkumulatoren - Allgemeine Anforderungen und Prüfungen -- Teil 2:  
Wartungsfreie verschlossene Batterien

Batteries stationnaires au plomb - Prescriptions générales et méthodes d'essais -- Partie  
2: Batteries étanches à soupapes

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**Ta slovenski standard je istoveten z: EN 60896-2:1996**

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**ICS:**

29.220.20	Kislinski sekundarni člani in baterije	Acid secondary cells and batteries
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**EN 60896-2**

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Descriptors: Lead-acid batteries, stationary batteries, valve regulated batteries, specifications, characteristics, tests

English version

**Stationary lead-acid batteries  
General requirements and methods of test  
Part 2: Valve regulated types  
(IEC 896-2:1995)**

Batteries stationnaires au plomb  
Prescriptions générales et méthodes  
d'essais  
Partie 2: Batteries étanches à soupapes  
(CEI 896-2:1995)

Orstfeste Blei-Akkumulatoren  
Allgemeine Anforderungen und  
Prüfungen  
Teil 2: Wartungsfreie verschlossene  
Batterien  
(IEC 896-2:1995)

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Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

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**CENELEC**

European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

### Foreword

The text of document 21/376/DIS, future edition 1 of IEC 896-2, prepared by IEC TC 21, Secondary cells and batteries, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60896-2 on 1995-11-28.

The following dates were fixed:

- latest date by which the EN has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 1996-11-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 1996-11-01

Annexes designated "normative" are part of the body of the standard.  
Annexes designated "informative" are given for information only.  
In this standard, annex ZA is normative and annexes A to D are informative.  
Annex ZA has been added by CENELEC.

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### Endorsement notice

The text of the International Standard IEC 896-2:1995 was approved by CENELEC as a European Standard without any modification.

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**Annex ZA (normative)****Normative references to international publications  
with their corresponding European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 50(151)	1978	International Electrotechnical Vocabulary (IEV) Chapter 151: Electrical and magnetic devices	-	-
IEC 50(486)	1991	Chapter 486: Secondary cells and batteries	-	-
IEC 51	series	Direct acting indicating analogue electrical-measuring instruments and their accessories	EN 60051	series
IEC 359	1987	Expression of the performance of electrical and electronic measuring equipment	-	-
IEC 417	1973	Graphical symbols for use on equipment Index, survey and compilation of the single sheets	HD 243 S12 <sup>1)</sup>	1995
IEC 485	1974	Digital electronic d.c. voltmeters and d.c. electronic analogue-to-digital converters	-	-
IEC 707	1981	Methods of test for the determination of the flammability of solid electrical insulating materials when exposed to an igniting source	HD 441 S1	1983
IEC 896-1	1987	Stationary lead-acid batteries General requirements and methods of test Part 1: Vented types	EN 60896-1 <sup>2)</sup>	1991
ISO 8601	1988	Data elements and interchange formats Information interchange - Representation of dates and times	-	-

1) HD 243 S12 includes supplements A:1974 to M:1994 to IEC 417.

2) EN 60896-1 includes A1:1988 to IEC 896-1.

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**Batteries stationnaires au plomb –  
Prescriptions générales et méthodes d'essais –**

**Partie 2:**

Batteries étanches à soupapes

**Stationary lead-acid batteries –**

**General requirements and methods of test –**

**Part 2:**

Valve regulated types

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

STATIONARY LEAD-ACID BATTERIES –  
GENERAL REQUIREMENTS AND METHODS OF TEST –

Part 2: Valve regulated types

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.
- 2) The formal decisions or agreements of the IEC on technical matters, prepared by technical committees on which all the National Committees having a special interest therein are represented, express as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 3) They have the form of recommendations for international use published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

International Standard IEC 896-2 has been prepared by IEC technical committee 21: Secondary cells and batteries.

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

DIS	Report on voting
21/376/DIS	21/392/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.

Annexes A to D are for information only.

# STATIONARY LEAD-ACID BATTERIES – GENERAL REQUIREMENTS AND METHODS OF TEST –

## Part 2: Valve regulated types

### Section 1: General

#### 1.1 Scope and object

This part of IEC 896 applies to valve regulated stationary lead-acid cells and batteries for service in a fixed location (i.e. not habitually to be moved from place to place) and permanently connected to a load and to a d.c. power supply.

#### NOTES

- 1 Typical applications for stationary batteries, with recommended tests are shown in table 2.
- 2 Different types of construction of lead-acid cell or battery may be used for stationary battery applications. Typical types and constructions are given in IEC 896-1 which specifies general requirements and test methods for vented types of stationary lead-acid cells and batteries.

The object of this part of IEC 896 is to specify the main characteristics and corresponding test methods associated with all types and construction of valve regulated stationary lead-acid cells and batteries and their related applications. The tests may be used for type qualification, product acceptance, and as a functional test during service. The tests in the informative annexes A, B, C, and D, are not mature and are still under development. As a consequence the tests are not in common use, and are subject to agreement between the user and the supplier.

NOTE – Table 2 details the test relevant to the various stationary battery applications. Some tests are valid for certain applications only. Recommendations relating the type of cell or monobloc battery with the use of the tests are given in table 3.

#### 1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 896. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 896 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 50(151): 1978, *International Electrotechnical Vocabulary (IEV) – Chapter 151: Electrical and magnetic devices*

IEC 50(486): 1991, *International Electrotechnical Vocabulary (IEV) – Chapter 486: Secondary cells and batteries*

IEC 51, *Direct acting indicating analogue electrical-measuring instruments and their accessories*

IEC 359: 1987, *Expression of the performance of electrical and electronic measuring equipment*

IEC 417: 1973, *Graphical symbols for use on equipment – Index, survey and compilation of the single sheets*

IEC 485: 1974, *Digital electronic d.c. voltmeters and d.c. electronic analogue-to-digital converters*

IEC 707: 1981, *Methods of test for the determination of the flammability of solid electrical insulating materials when exposed to an igniting source*

IEC 896-1: 1987, *Stationary lead-acid batteries – General requirements and methods of test – Part 1: Vented types*

ISO 8601: 1988, *Data elements and interchange formats – Information interchange – Representation of dates and times*

### 1.3 Definitions

For the purpose of this part of IEC 896, the following definitions apply.

**1.3.1 valve regulated cell:** A secondary cell 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 cell cannot normally receive addition to the electrolyte. [IEV 486-01-20]

**1.3.2 thermal runaway:** A critical condition arising during constant voltage charging in which the current and the temperature of the battery produce a cumulative mutually reinforcing effect which further increases them and can lead to the destruction of the battery. [IEV 486-03-34]

## Section 2: General requirements

### 2.1 Mechanical strength

Valve regulated stationary lead-acid cells or monobloc batteries shall be designed to withstand the mechanical stresses met during normal transportation and handling.

NOTE – Resistance of batteries including racks to earthquakes, shocks and vibration, if required, should be individually specified.

### 2.2 Control valves

In valve regulated stationary lead-acid cells or monobloc batteries the control valves shall not allow gas (air) to enter into the cell or monobloc battery but shall allow gas to escape from the cell or monobloc battery above a certain internal pressure which does not lead to deformation or other damage to the cell or monobloc battery container.

NOTE – The maximum pressure reached in the cell or monobloc battery under any or limited sets of circumstances should be indicated by or requested from the manufacturer.

### 2.3 Flammability of containers and lids/covers

In battery installations where it is essential that the plastic components used are flame retardant, the battery manufacturer shall indicate the category of flame retardancy in accordance with test method FV: flame-vertical specimen, of IEC 707.

### 2.4 Gas emission

Under recommended operating conditions the quantity of hydrogen released from valve regulated stationary lead-acid cells or monobloc batteries shall be sufficiently low to make these cells or monobloc batteries suitable for use in office or equipment environments, for example. However, ventilation is required and the cells or monobloc batteries shall not be installed in containers or enclosures that have no exchange of air with the ambient atmosphere. Local and national/regional regulations shall take precedence for the ventilation of batteries.

NOTE – By agreement between the user and supplier, the measurement of gas emission may be performed by the test given in annex D.

### 2.5 Heat generation (thermal runaway)

Under recommended operation conditions, the temperature of valve regulated stationary lead-acid cells or monobloc batteries shall be sufficiently low to prevent thermal runaway. The temperature limits shall be stated by the manufacturer.

NOTE – By agreement between the user and supplier, the proposals given in annex B may be used to reduce the risk of thermal runaway.

### 2.6 Marking

#### 2.6.1 Polarity

Valve regulated stationary lead-acid cells or monobloc batteries shall carry the polarity marking of at least the positive terminal.

Symbols used for the marking of the polarity shall be in accordance with IEC 417.

The marking of the positive terminal shall be according to the symbol 417-IEC-5005: positive polarity, and shall be indented or in relief on the lid adjacent to the positive terminal.

Where used, the marking of the negative terminal shall be according to the symbol 417-IEC-5006: negative polarity, and shall be indented or in relief on the lid adjacent to the negative terminal.

The value of dimension "a" of the symbols shall be not less than 5 mm, which corresponds to a minimum total length of each arm of the symbol of 6 mm.

#### 2.6.2 Information

The following information shall be permanently marked on the cell or monobloc battery:

- a) nominal voltage;
- b) name of manufacturer or supplier and manufacturer's or supplier's type reference;