



SLOVENSKI STANDARD SIST EN 60893-2:2005

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Insulating materials - Industrial rigid laminated sheets based on thermosetting resins for electrical purposes -- Part 2: Methods of test

Isolierstoffe - Tafeln aus technischen Schichtpressstoffen auf der Basis warmehärtender Harze für elektrotechnische Zwecke -- Teil 2: Prüfverfahren

Matériaux isolants - Stratifiés industriels rigides en plaques à base de résines thermodurcissables à usages électriques -- Partie 2: Méthodes d'essai

Ta slovenski standard je istoveten z: EN 60893-2:2004

ICS:

29.035.20 Úlæ cã} ãÁ { ^} ã [|æã \ã Plastics and rubber insulating materials

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EUROPEAN STANDARD

EN 60893-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2004

ICS 29.035.01

Supersedes EN 60893-2:1994

English version

**Insulating materials –
Industrial rigid laminated sheets
based on thermosetting resins for electrical purposes
Part 2: Methods of test
(IEC 60893-2:2003)**

Matériaux isolants –
Stratifiés industriels rigides en planches
à base de résines thermodurcissables
à usages électriques
Partie 2: Méthodes d'essai
(CEI 60893-2:2003)

Isolierstoffe –
Tafeln aus technischen
Schichtpressstoffen auf der Basis
warmehärtender Harze für
elektrotechnische Zwecke
Teil 2: Prüfverfahren
(IEC 60893-2:2003)

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This European Standard was approved by CENELEC on 2004-05-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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 15C/1488/FDIS, future edition 2 of IEC 60893-2, prepared by SC 15C, Specifications, of IEC TC 15, Insulating materials, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60893-2 on 2004-05-01.

This European Standard supersedes EN 60893-2:1994.

The major changes during the revision of the EN 60893 series are the following:

- a) new material types have been included;
- b) changes have been made to the property requirements of some existing types;
- c) a new method for testing permittivity and dissipation factor has been added;
- d) all non-specification data for each type has been moved to a new Part 4 document – IEC/TR 60893-4: Typical values.

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) 2005-02-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2007-05-01

Annex ZA has been added by CENELEC:

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Endorsement notice

The text of the International Standard IEC 60893-2:2003 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE Where 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 60112	- 1)	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112	2003 2)
IEC 60167	1964	Methods of test for the determination of the insulation resistance of solid insulating materials	HD 568 S1	1990
IEC 60212	1971	Standard conditions for use prior to and during the testing of solid electrical insulating materials	HD 437 S1	1984
IEC 60216-1	2001	Electrical insulating materials - Properties of thermal endurance Part 1: Ageing procedures and evaluation of test results	EN 60216-1	2001
IEC 60243-1	1998	Electrical strength of insulating materials - Test methods Part 1: Tests at power frequencies	EN 60243-1	1998
IEC 60250	1969	Recommended methods for the determination of the permittivity and dielectric dissipation factor of electrical insulating materials at power, audio and radio frequencies including metre wavelengths	-	-
IEC 60296	1982	Specification for unused mineral insulating oils for transformers and switchgear	-	-
IEC 60587	1984	Test methods for evaluating resistance to tracking and erosion of electrical insulating materials used under severe ambient conditions	HD 380 S2	1987

1) Undated reference.

2) Valid edition at date of issue.

EN 60893-2:2004

- 4 -

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60695-11-10	1999	Fire hazard testing Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	1999
IEC 60893-1	2004	Insulating materials - Industrial rigid laminated sheets based on thermosetting resins for electrical purposes Part 1: Definitions, designations and general requirements	EN 60893-1	2004
IEC 60893-3	Series	Part 3: Specifications for individual materials	EN 60893-3	Series
IEC/TR 60893-4	2003	Part 4: Typical values	-	-
ISO 62	1999	Plastics - Determination of water absorption	EN ISO 62	1999
ISO 178	2001	Plastics - Determination of flexural properties	EN ISO 178	2003
ISO 179-1	2000	Plastics - Determination of Charpy impact properties Part 1: Non-instrumented impact test	EN ISO 179-1	2000
ISO 179-2	1997	Part 2: Instrumented impact test	EN ISO 179-2	1999
ISO 180	2000	Plastics Determination of Izod impact strength	EN ISO 180	2000
ISO 527-1	1993	Plastics - Determination of tensile properties Part 1: General principles	-	-
ISO 527-4	1997	Part 4: Test conditions for isotropic and orthotropic fibre-reinforced plastic composites	EN ISO 527-4	1997
ISO 604	2002	Plastics - Determination of compressive properties	EN ISO 604	2003
ISO 1183	1987	Plastics - Methods for determining the density and relative density of non- cellular plastics	-	-
ISO 3611	1978	Micrometer callipers for external measurement	-	-

**NORME
INTERNATIONALE
INTERNATIONAL
STANDARD**

**CEI
IEC**

60893-2

Deuxième édition
Second edition
2003-06

**Stratifiés industriels rigides en planches
à base de résines thermodurcissables
à usages électriques –**

**Partie 2:
Méthodes d'essai**

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**Industrial rigid laminated sheets
based on thermosetting resins
for electrical purposes –**

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**Part 2:
Methods of test**

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International Electrotechnical Commission, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
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For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**INDUSTRIAL RIGID LAMINATED SHEETS
BASED ON THERMOSETTING RESINS
FOR ELECTRICAL PURPOSES –****Part 2: 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.
- 2) The formal decisions or agreements of the 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 National Committees.
- 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.
- 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.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60893-2 has been prepared by subcommittee 15C: Specifications, of IEC technical committee 15: Insulating materials.

This second edition cancels and replaces the first edition, published in 1992, and constitutes a technical revision.

The major changes during the revision of series of the IEC 60893 were the following:

- a) new material types have been included;
- b) changes have been made to the property requirements of some existing types;
- c) a new method for testing permittivity and dissipation factor has been added;
- d) all non-specification data for each type has been moved to a new Part 4 of IEC 60893.

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

FDIS	Report on voting
15C/1488/FDIS	15C/1514/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.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

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

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INTRODUCTION

This part of IEC 60893 is one of a series which deals with industrial rigid laminated sheets based on thermosetting resins for electrical purposes.

This series consists of four parts:

- Part 1: Definitions, designations and general requirements (IEC 60893-1)
- Part 2: Methods of test (IEC 60893-2)
- Part 3: Specifications for individual materials (IEC 60893-3)
- Part 4: Typical values (IEC 60893-4)

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INDUSTRIAL RIGID LAMINATED SHEETS BASED ON THERMOSETTING RESINS FOR ELECTRICAL PURPOSES –

Part 2: Methods of test

1 Scope

This part of IEC 60893 describes methods of test for the materials defined in IEC 60893-1 (referred to also as Part 1).

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 60112, *Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions*

IEC 60167:1964, *Methods of test for the determination of the insulation resistance of solid insulating materials*

IEC 60212:1971, *Standard conditions for use prior to and during the testing of solid electrical insulating materials*

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IEC 60216-1:2001, *Electrical insulating materials – Properties of thermal endurance – Part 1: Ageing procedures and evaluation of test results*

IEC 60243-1:1998, *Electric strength of solid insulating materials – Test methods – Part 1: Tests at power frequencies*

IEC 60250:1969, *Recommended methods for the determination of the permittivity and dielectric dissipation factor of electrical insulating materials at power, audio and radio frequencies including metre wavelengths*

IEC 60296:1982, *Specification for unused mineral insulating oils for transformers and switchgear*

IEC 60587:1984, *Test method for evaluating resistance to tracking and erosion of electrical insulating materials used under severe ambient conditions*

IEC 60695-11-10:1999, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60893-1, *Industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 1: Definitions, designations and general requirements*¹

¹ Use edition 2 when published.

IEC 60893-3 (all parts 3), *Industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 3: Specifications for individual materials*

IEC 60893-4:2003, *Industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 4: Typical values*

ISO 62:1999, *Plastics – Determination of water absorption*

ISO 178:2001, *Determination of flexural properties*

ISO 179-1:2000, *Plastics – Determination of Charpy impact properties – Part 1: Non-instrumented impact test*

ISO 179-2:1997, *Plastics – Determination of Charpy impact properties – Part 2: Instrumented impact test*

ISO 180:2000, *Plastics – Determination of Izod impact strength*

ISO 527-1: 1993, *Plastics – Determination of tensile properties – Part 1: General principles*

ISO 527-4:1997, *Plastics – Determination of tensile properties – Part 4: Test conditions for isotropic and orthotropic fibre-reinforced plastic composites*

ISO 604:2002, *Plastics – Determination of compressive properties*

ISO 1183:1987, *Plastics – Methods for determining the density and relative density of non-cellular plastics*

ISO 3611:1978, *Micrometer callipers for external measurement*

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3 Conditioning of test specimens

Unless otherwise specified, test specimens shall be conditioned for at least 24 h in standard atmosphere B according to IEC 60212 (temperature $23\text{ °C} \pm 2\text{ K}$ relative humidity $(50 \pm 5)\%$).

Unless otherwise specified, each specimen shall be tested in the conditioning atmosphere and at the conditioning temperature, or the tests shall commence within 3 min of removal of each test specimen from the conditioning atmosphere.

Where testing at an elevated temperature is required in one of the specification sheets of IEC 60893-3, test specimens shall be conditioned for 1 h at that elevated temperature immediately before testing.

4 Dimensions

4.1 Thickness

4.1.1 General

Any method which enables the thickness of the laminated sheet to be measured at an appropriate number of points may be used, provided that the equipment used and the method of measurement are capable of a precision of 0,01 mm or better.