



SLOVENSKI STANDARD

SIST EN 60893-3-4:2004/A1:2014

01-februar-2014

Izolacijski materiali - Industrijske toge laminirane plošče iz smol s toplotnim utrjevanjem za električne namene - 3-4. del: Specifikacije za posamezne materiale - Zahteve za toge laminirane plošče na osnovi fenolnih smol - Dopolnilo A1 (IEC 60893-3-4:2003/A1:2012)

Insulating materials - Industrial rigid laminated sheets based on thermosetting resins for electrical purposes - Part 3-4: Specifications for individual materials - Requirements for rigid laminated sheets based on phenolic resins

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Isolierstoffe - Tafeln aus technischen Schichtpressstoffen auf der Basis warmhärtender Harze für elektrotechnische Zwecke - Teil 3-4: Bestimmungen für einzelne Werkstoffe - Anforderungen für Tafeln aus Schichtpressstoffen auf der Basis von Phenolharzen

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Matériaux isolants - Stratifiés industriels rigides en planches à base de résines thermodurcissables à usages électriques - Partie 3-4: Spécification pour matériaux particuliers - Prescriptions pour stratifiés rigides en planches à base de résine phénolique

Ta slovenski standard je istoveten z: EN 60893-3-4:2004/A1:2012

ICS:

29.035.20 Plastični in gumeni izolacijski materiali Plastics and rubber insulating materials

SIST EN 60893-3-4:2004/A1:2014 en

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60893-3-4/A1

December 2012

ICS 29.035.01

English version

**Insulating materials -
Industrial rigid laminated sheets based on thermosetting resins
for electrical purposes -
Part 3-4: Specifications for individual materials -
Requirements for rigid laminated sheets based on phenolic resins
(IEC 60893-3-4:2003/A1:2012)**

Matériaux isolants - Stratifiés industriels rigides en planches à base de résines thermodurcissables à usages électriques - Partie 3-4: Spécification pour matériaux particuliers - Prescriptions pour stratifiés rigides en planches à base de résine phénolique (CEI 60893-3-4:2003/A1:2012)

Isolierstoffe - Tafeln aus technischen Schichtpressstoffen auf der Basis warmhärtender Harze für elektrotechnische Zwecke - Teil 3-4: Bestimmungen für einzelne Werkstoffe - Anforderungen für Tafeln aus Schichtpressstoffen auf der Basis von Phenolharzen (IEC 60893-3-4:2003/A1:2012)

[SIST EN 60893-3-4:2004/A1:2014](https://standards.iteh.ai/catalog/standards/sist/cd08d0d0-fl10-4d85-b3af-2004-4a00330000-172004a1)

<https://standards.iteh.ai/catalog/standards/sist/cd08d0d0-fl10-4d85-b3af-2004-4a00330000-172004a1>

This amendment A1 modifies the European Standard EN 60893-3-4:2004; it was approved by CENELEC on 2012-11-16. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 CEN-CENELEC Management Centre 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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document 15/682/FDIS, future amendment 1 to edition 2 of IEC 60893-3-4, prepared by IEC/TC 15 "Solid electrical insulating materials" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60893-3-4:2004/A1:2012.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2013-08-16
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2015-11-16

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60893-3-4:2003/A1:2012 was approved by CENELEC as a European Standard without any modification.

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IEC 60893-3-4

Edition 2.0 2012-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

**Insulating materials – Industrial rigid laminated sheets based on thermosetting resins for electrical purposes –
Part 3-4: Specifications for individual materials – Requirements for rigid laminated sheets based on phenolic resins**

<https://standards.iteh.ai/catalog/standards/sist/cd08d0d0-f110-4d85-b3af-3411-6ca1c0000000/iec-60893-3-4-2004-a1-2014>

**Matériaux isolants – Stratifiés industriels rigides en planches à base de résines thermodurcissables à usages électriques –
Partie 3-4: Spécifications pour matériaux particuliers – Prescriptions pour stratifiés rigides en planches à base de résine phénolique**

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FOREWORD

This amendment has been prepared by IEC technical committee 15: Solid electrical insulating materials.

This amendment introduces revised limits for CHARPY and IZOD impact strengths for the requirements of all types of rigid laminated sheets based on phenolic resins. These revised limits are based on the results of round-robin testing.

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

| FDIS | Report on voting |
|-------------|------------------|
| 15/682/FDIS | 15/688/RVD |

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

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Replace the existing Table 5 with the following new Table 5:

Table 5 – Property requirements (1 of 2)

| Property | Test method in IEC 60893-2 Subclause | Unit | Minimum or maximum | Nominal thickness of sheet to which test is applicable | Type | | | | | | | Remarks | |
|--|--------------------------------------|---|--------------------|--|-----------|------------------|---------------------|---------------------|---------------------|---------------------|-------------|---------------------|--|
| | | | | | PF CP 201 | PF CP 202 | PF CP 203 | PF CP 204 | PF CP 205 | PF CP 206 | PF CP 207 | | PF CP 308 |
| Flexural strength | 5.1 | MPa | Minimum | ≥ 1,5 | 135 | 120 | 120 | 75 | 75 | 85 | 80 | 85 | |
| Charpy impact strength or Izod impact strength parallel to laminations | 5.4.2 or 5.4.3 | https://standards.iteh.ai/catalog/standards/sist/cc08d0d0-f110-4d85-b3af-122b6442aed8/sist-en-60893-3-4-2004-a1-2014 | Minimum | ≥ 5 | – | – | – | – | – | – | – | – | |
| Electric strength at 90 °C in oil perpendicular to laminations | 6.1 | kV/mm | Minimum | ≤ 3 | – | – | – | See Table 6 | See Table 6 | See Table 6 | – | See Table 6 | |
| Breakdown voltage at 90 °C in oil parallel to laminations | 6.1 | kV | Minimum | > 3 | – | 60 ¹⁾ | 15 | 25 | 20 | 25 | – | 25 | 1) After preconditioning in air at 105 °C ± 5 K for 96 h immediately before test and transferring immediately into the hot oil |
| Insulation resistance after immersion in water | 6.3 | MΩ | Minimum | All | – | – | 5 × 10 ¹ | 1 × 10 ⁴ | 1 × 10 ³ | 1 × 10 ³ | – | 1 × 10 ³ | |
| Flammability | 7.2 | Category | | 3 | – | – | – | – | V-1 | – | – | V-1 | The small-scale laboratory test used in this standard for assigning a flammability category is primarily for monitoring consistency of production of laminates. The results so obtained should not, in any circumstances, be considered as an overall indication of the potential fire hazards presented by these laminates under actual conditions of use |
| Water absorption | 8.2 | mg | Maximum | All | – | – | – | See Table 7 | See Table 7 | See Table 7 | See Table 7 | See Table 7 | |

NOTE A dash "–" indicates that there is no requirement for this type.

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Table 5 (2 of 2)

| Property | Test method in IEC 60893-2 Subclause | Unit | Minimum or maximum | Nominal thickness of sheet to which test is applicable | Type | | | | | | | | | | Remarks | |
|--|--------------------------------------|--|--------------------|--|-------------|-----------|---------------------|-----------|---------------------|-----------|---------------------|-----------|---------------------|---------------------|--|---|
| | | | | | PF CC 201 | PF CC 202 | PF CC 203 | PF CC 204 | PF CC 305 | PF GC 201 | PF WV 201 | PF WV 202 | PF WV 303 | PF WV 304 | | |
| Flexural strength | 5.1 | MPa | Minimum | ≥ 1,5 mm | 100 | 90 | 110 | 100 | 125 | 220 | 100 | 100 | 180 | 170 | | |
| Charpy impact strength or Izod impact strength parallel to laminations | 5.4.2 or 5.4.3 | https://standards.iteh.ai/catalog/standards/sist/c0840d01-110-4d85-b3af-110-4d85-b3af kJ/m ² | Minimum | | See Table 6 | 7 | 6 | 6 | 30 | 10 | 10 | 25 | 20 | | Conformance with the requirements for either Charpy or Izod test constitutes, in this respect, conformance with this specification | |
| Electric strength at 90 °C in oil perpendicular to laminations | 6.1.1 | kV/mm | Minimum | ≤ 3 | See Table 6 | | | | | | | | | | | To be agreed between purchaser and supplier |
| Breakdown voltage at 90 °C in oil parallel to laminations | 6.1.1 | kV | Minimum | > 3 | | 1 | 20 | 1 | 20 | 1 | 20 | 1 | 20 | 20 | | |
| Insulation resistance after immersion in water | 6.3 | MΩ | Minimum | All | | 1 | 5 × 10 ¹ | 1 | 5 × 10 ¹ | 1 | 1 × 10 ² | 1 | 1 × 10 ¹ | 1 × 10 ¹ | | |
| Water absorption | 8.2 | mg | Maximum | All | | | | | | | | | | | | |

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NOTE A dash “-” indicates that there is no requirement for this type.