



**SLOVENSKI STANDARD**  
**SIST EN 60851-3:2001**  
**01-september-2001**

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Winding wires - Test methods -- Part 3: Mechanical properties

Wickeldrähte - Prüfverfahren -- Teil 3: Mechanische Eigenschaften

Fils de bobinage - Méthodes d'essai -- Partie 3: Propriétés mécaniques

Ta slovenski standard je istoveten z: **EN 60851-3:1996**

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**ICS:**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 60851-3**

December 1996

ICS 29.060.10

Supersedes HD 490.3 S3:1993

Descriptors: Electrical wire, winding wire, insulated wire, mechanical property

English version

**Winding wires - Test methods  
Part 3: Mechanical properties  
(IEC 851-3:1996)**

Fils de bobinage - Méthodes d'essai  
Partie 3: Propriétés mécaniques  
(CEI 851-3:1996)

Wickeldrähte - Prüfverfahren  
Teil 3: Mechanische Eigenschaften  
(IEC 851-3:1996)

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This European Standard was approved by CENELEC on 1996-10-01. 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, 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 55/472A/FDIS, future edition 2 of IEC 851-3, prepared by IEC TC 55, Winding wires, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60851-3 on 1996-10-01.

This European Standard supersedes HD 490.3 S3:1993.

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) 1997-07-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 1997-07-01

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 annex A is informative.  
Annex ZA has been added by CENELEC.

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Endorsement notice  
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The text of the International Standard IEC 851-3:1996 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 851-1	1996	Winding wires - Test methods Part 1: General	EN 60851-1	1996
IEC 851-2	1996	Part 2: Determination of dimensions	EN 60851-2	1996
IEC 1033	1991	Test methods for the determination of bond strength of impregnating agents to an enamelled wire substrate	-	-
ISO 178	1993	Plastics - Determination of flexural properties <a href="https://standards.iteh.ai/catalog/standards/sist/1f062ea5-8f20-4413-9045-f4c4efb5f4f6/sist-en-60851-3-2001">SIST EN 60851-3:2001</a> <a href="https://standards.iteh.ai/catalog/standards/sist/1f062ea5-8f20-4413-9045-f4c4efb5f4f6/sist-en-60851-3-2001">https://standards.iteh.ai/catalog/standards/sist/1f062ea5-8f20-4413-9045-f4c4efb5f4f6/sist-en-60851-3-2001</a>	-	-

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Deuxième édition  
Secod edition  
1996-10

Fils de bobinage – Méthodes d'essai –

Partie 3:  
Propriétés mécaniques

iTeh STANDARD PREVIEW

(Winding wires - Test) methods –

Part 3: EN 60851-3:2001

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Mechanical properties

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International Electrotechnical Commission  
Международная Электротехническая Комиссия

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For price, see current catalogue

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## WINDING WIRES - TEST METHODS -

## Part 3: Mechanical properties

## 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 cooperation 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 reports or guides and they are accepted by the National Committees in that sense.
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- 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 851-3 has been prepared by IEC technical committee 55: Winding wires.

This second edition cancels and replaces the first edition published in 1985 and its amendment 2 (1992) and constitutes a technical revision.

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

FDIS	Report on voting
55/472A/FDIS	55/513/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.

Annex A is for information only.

## INTRODUCTION

This part of IEC 851 forms an element of a series of standards which deals with insulated wires used for windings in electrical equipment. The series has three groups describing:

- a) methods of test (IEC 851);
- b) specifications (IEC 317);
- c) packaging (IEC 264).

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## WINDING WIRES – TEST METHODS –

### Part 3: Mechanical properties

#### 1 Scope

This part of IEC 851 specifies the following methods of test:

- Test 6: Elongation;
- Test 7: Springiness;
- Test 8: Flexibility and adherence;
- Test 11: Resistance to abrasion;
- Test 18: Heat or solvent bonding.

For definitions, general notes on methods of test and the complete series of methods of test for winding wires see IEC 851-1.

#### 2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 851. 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 851 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of the IEC and ISO maintain registers of currently valid International Standards.

IEC 851-1: 1996, *Winding wires – Test methods – Part 1: General*

IEC 851-2: 1996, *Winding wires – Test methods – Part 2: Determination of dimensions*

IEC 1033: 1991, *Test methods for the determination of bond strength of impregnating agents to an enamelled wire substrate*

ISO 178: 1993, *Plastics – Determination of flexural properties*

#### 3 Test 6: Elongation

##### 3.1 Elongation at fracture

Elongation is the increase in length expressed as a percentage of the original length.

A straight piece of wire shall be elongated to the point of fracture of the conductor at a rate of  $(5 \pm 1)$  mm/s with an elongation tester or with a tensile testing equipment with a free measuring length of between 200 mm and 250 mm. The linear increase at fracture shall be calculated as a percentage of the free measuring length.

Three specimens shall be tested. The three single values shall be reported. The mean value represents elongation at fracture.

### 3.2 Tensile strength

Tensile strength is the ratio of the force at fracture to initial cross-section.

A straight piece of wire shall be elongated to the point of fracture of the conductor at a rate of  $(5 \pm 1)$  mm/s with tensile testing equipment with a free measuring length of between 200 mm and 250 mm and which records the force at fracture.

Three specimens shall be tested. The initial cross-section and the three single values of the force at fracture shall be reported. The mean value of the ratio of the force at fracture and the initial cross-section represents the tensile strength.

## 4 Test 7: Springiness

Springiness is the recoil measured in degrees after the wire is wound in the form of a helical coil or bent through an angle.

### 4.1 Round wire with a nominal conductor diameter from 0,080 mm up to and including 1,600 mm

#### 4.1.1 Principle

A straight piece of wire is wound five times around a mandrel with a diameter and under a tension applied to the wire as specified in the relevant standard. The reading of the angle by which the end of the five turns recoils is the measure of springiness.

#### 4.1.2 Equipment

Figure 1 shows an example of the test equipment with details of the mandrel given in figure 2 and table 1. Figure 2 indicates a helical groove, which may be used to facilitate winding. The provision of this groove, however, is not mandatory. The dial is marked with 72 equally spaced divisions so that with five turns of the wire the reading corresponds to the number of degrees that each turn springs back.