SLOVENSKI STANDARD
SIST EN 60060-2:1998

01-januar-1998

High-voltage test techniques - Part 2: Measuring systems (IEC 60060-2:1994)

High-voltage test techniques - Part 2: Measuring systems (IEC 60060-2:1994)

Hochspannungs-Prüftechnik -- Teil 2: Meßsysteme

Techniques des essais à haute tension -- Partie 2: Systèmes de mesure

Ta slovenski standard je istoveten z: **EN 60060-2:1994**

ICS:

19.080	Električno in elektronsko preskušanje	Electrical and electronic testing

SIST EN 60060-2:1998 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60060-2

December 1994

ICS 19.080

Descriptors: High-voltage test techniques, alternating voltage, lightning impulse voltage, switching impulse voltage, impulse current

English version

High-voltage test techniques
Part 2: Measuring systems
(IEC 60-2:1994)

Techniques des essais à haute tension
Partie 2: Systèmes de mesure
(CEI 60-2:1994)

Hochspannungs-Prüftechnik
Teil 2: Meßsysteme
(IEC 60-2:1994)

This European Standard was approved by CENELEC on 1994-12-06. 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 42(CO)54, future edition 2 of IEC 60-2:1994, prepared by IEC TC 42, High-voltage testing techniques, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60060-2 on 1994-12-06.

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) 1995-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1995-12-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes A and ZA are normative and annexes B, C, D, E, F and G are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60-2:1994 was approved by CENELEC as a European Standard without any modification.

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD WITH THE REFERENCES OF THE RELEVANT 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.

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

IEC Publication	Date	Title	EN/HD	Date
50(301)	1983	International Electrotechnical Vocabulary (IEV) Chapter 301: General terms on measurements in electricity	-	-
50(302)	1983	Chapter 302: Electrical measuring instruments	-	-
50(303)	1983	Chapter 303: Electronic measuring instruments	-	-
50(321)	1986	Chapter 321: Instrument transformers	-	-
51	series	Direct acting indicating analogue electrical-measuring instruments and their accessories	EN 60051	series
52	1960	Recommendations for voltage measurement by means of sphere-gaps (one sphere earthed)	-	-
60-1	1989	High-voltage test techniques Part 1: General definitions and test requirements (corrigendum March 1990 and March 1992)	HD 588.1 S1	1991
71-1	1993	Insulation co-ordination - Part 1: Definitions, principles and rules	-	-
790	1984	Oscilloscopes and peak voltmeters for impulse tests	HD 479 S1	1986
833	1987	Measurement of power-frequency electric fields	-	-
1083-1	1991	Digital recorders for measurements in high-voltage impulse tests - Part 1: Requirements for digital recorders	EN 61083-1	1993

NORME INTERNATIONALE
INTERNATIONAL STANDARD

CEI
IEC
60-2

Deuxième édition
Second edition
1994-11

Techniques des essais à haute tension

Partie 2:
Systèmes de Mesure

High-voltage test techniques

Part 2:
Measuring Systems

Bureau Central de la Commission Electrotechnique Internationale 3, rue de Varembé Genève, Suisse

Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

CODE PRIX
PRICE CODE XB

Pour prix, voir catalogue en vigueur
For price, see current catalogue

CONTENTS

Clause Page

Clause Page

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HIGH-VOLTAGE TEST TECHNIQUES –

Part 2: Measuring Systems

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, 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 60-2 has been prepared by IEC technical committee 42: High-voltage testing techniques.

This second edition cancels and replaces IEC 60-3, Measuring devices, published in 1976, and IEC 60-4, Application guide for measuring devices, published in 1977. This second edition constitutes a technical revision.

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

DIS	Report on voting
42(CO)54	42(CO)57

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

IEC 60 consists of the following parts, under the general title: *High-voltage test techniques:*

- Part 1: 1989, General definitions and test requirements
- Part 2: 1994: Measuring Systems

Annex A forms an integral part of this standard and provides normative requirements for countries choosing to use accreditation systems.

Annexes B to G are for information only.

HIGH-VOLTAGE TEST TECHNIQUES –

Part 2: Measuring Systems

1 Scope

This part of IEC 60 is applicable to complete Measuring Systems, and to their components, used for the measurement of high-voltages and currents during tests with direct voltage, alternating voltage, lightning and switching impulse voltages and for tests with impulse currents, or with combinations of them as specified in IEC 60-1.

The limits on measurement uncertainties stated in this International Standard apply to test levels stated in IEC 71-1. The principles of this International Standard apply also to higher levels but the uncertainty may be greater.

This standard:

- defines the terms used,
- states the requirements which the Measuring Systems shall meet,
- describes the methods for approving a Measuring System and checking its components,
- describes the procedure by which the user will show that a Measuring System meets the requirements of this standard.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60. 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 60 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(301, 302, 303): 1983, *International Electrotechnical Vocabulary (IEV) – Chapter 301: General terms on measurements in electricity; Chapter 302: Electrical measuring instruments; Chapter 303: Electronic measuring instruments*

IEC 50(321): 1986, *International Electrotechnical Vocabulary (IEV) – Chapter 321: Instrument transformers*

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

IEC 52: 1960, *Recommendations for voltage measurement by means of sphere-gaps (one sphere earthed)*

IEC 60-1: 1989, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 71-1: 1993, *Insulation co-ordination – Part 1: Definitions, principles and rules*

IEC 790: 1984, *Oscilloscopes and peak voltmeters for impulse tests*

IEC 833: 1987, *Measurement of power-frequency electric fields*

IEC 1083-1: 1991, *Digital recorders for measurements in high-voltage impulse tests – Part 1: Requirements for digital recorders*

3 Definitions and symbols

For the purposes of this part of IEC 60, the following apply.

3.1 *Measuring Systems*

3.1.1 **Measuring System**: Complete set of devices suitable for performing a high-voltage or impulse-current measurement.

NOTES

1 A Measuring System usually comprises the following components: a converting device with the leads required for connecting this device to the test object or into the current circuit and the connections to earth, a transmission system connecting the output terminals of the device to the indicating or recording instruments with its attenuating, terminating and adapting impedances or networks, and indicating or recording instruments together with any connections to the power supply. Measuring Systems which comprise only some of the above components or which are based on non-conventional principles are acceptable if they meet the accuracy requirements specified in this standard. Components may be made of many elements or a single element, for example, a high-voltage capacitor of a capacitor divider may consist of many low-voltage capacitors or it may consist of a single gas capacitor.

2 The environment in which a Measuring System functions, its clearances to live and earthed structures and the presence of electric or magnetic fields may significantly affect its accuracy.

3.1.2 **Record of Performance of a Measuring System**: Detailed record, established by the user, describing the system and containing evidence that the requirements given in this standard have been met. This evidence shall include the results of the initial Performance Test and the schedule and results of each subsequent Performance Test and Performance Check.

3.1.3 **Approved Measuring System**: Measuring System which is shown to comply with one or more of the sets of requirements set out in this standard by:

- an initial Performance Test,
- successive Performance Checks and Performance Tests,
- inclusion of the results of these tests in the Record of Performance.

The system is approved only for the arrangements and operating conditions included in its Record of Performance.

3.1.4 **Reference Measuring System**: Measuring System having sufficient accuracy and stability for use in the approval of other systems by making simultaneous comparative measurements with specific types of waveform and ranges of voltage or current.

NOTE – A Reference Measuring System (maintained according to the requirements of this standard) can be used as an Approved Measuring System but the converse is not true.

3.1.5 **IEC Standard Measuring Device**: Device that can be used for measuring high-voltage with the specified accuracy (for example a sphere-gap or a rod/rod gap used according to IEC 60-1).

3.2 *Converting devices*

3.2.1 **converting device**: Device for converting the quantity to be measured into another quantity, compatible with the indicating or recording instrument.

3.2.2 **voltage divider**: Converting device consisting of a high-voltage and a low-voltage arm such that the input voltage is applied across the complete device and the output voltage is taken from the low-voltage arm. [IEV 301-05-13, modified]

NOTE – The elements of the two arms are usually resistors or capacitors or combinations of these and the device is described by the type and arrangement of its elements (for example, resistor, capacitor or resistor-capacitor).

3.2.3 **voltage transformer**: Step-down transformer for the measurement of the parameters of high alternating voltages. [IEV 321-03-01, modified]

3.2.4 **high-voltage measuring impedance**: Device which carries a current proportional to the applied voltage.

3.2.5 **current-measuring shunt**: Resistor across which the voltage is proportional to the current to be measured. [IEV 301-06-05, modified]

3.2.6 **compensated current-measuring device**: Current-measuring device which includes a compensating circuit.

3.2.7 **current transformer**: Transformer which produces an output proportional to the input current. [IEV 321-02-01, modified]

NOTE – A Rogowski coil used with an integrating circuit is a wide-band current transformer.

3.2.8 **electric-field probe**: Converting device for the measurement of the amplitude and waveform of an electric field.

NOTE – An electric-field probe may be used to measure the waveform of the voltage producing the field provided that the measurement is not affected by corona.

3.3 **transmission system**: Set of devices which transfers the output signal of a converting device to an indicating and/or recording instrument.

NOTES

1 A transmission system generally consists of a coaxial cable with its terminating impedance, but it may include attenuators or other devices connected between the converting device and the instrument. For example, an optical link includes the transmitter, the optical cable and the receiver as well as related amplifiers.

2 A transmission system may be partially or completely included in the converting device.

3.4 **indicating or recording instrument**: Device intended to display or provide a record of the value of a measurand or a related value. [IEV 301-02-11 and 12, modified]