SLOVENSKI STANDARD
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Splošni postopek preverjanja učinkovitosti zaščitnih ukrepov za električno opremo po popravilu

General procedure for verifying the effectiveness of the protective measures of electrical equipment after repair

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17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities

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English Version

General procedure for verifying the effectiveness of the protective measures of electrical equipment after repair

To be completed To be completed

This draft European Standard is submitted to CENELEC members for enquiry.
Deadline for CENELEC: 2019-04-26.

It has been drawn up by CLC/TC 85X.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

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

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document [prEN 50678:2019] has been prepared by CLC/TC **85X** "***Measuring equipment for electrical and electromagnetic quantities***".

This document is currently submitted to the Enquiry.

The following dates are proposed:

• latest date by which the existence of this document has to be announced at national level	(doa)	dor + 6 months
• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	dor + 12 months
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	dor + 36 months (to be confirmed or modified when voting)

Introduction

This standard intends to provide a general test procedure to verify the effectiveness of the basic protective measures for electrical equipment after it has been repaired, thus ensuring the safety of people using repaired equipment.

This standard may be considered to support compliance with the European Directive 2009/104/EG concerning the minimum safety and health requirements for the use of work equipment by workers at work.

In general, the test procedure for verification of products after repair is the responsibility of the related product technical committees. This document may be taken into consideration by product technical committees if they need to take into consideration modified or additional tests for verification after repairs for products falling within their scope.

1 Scope

This document specifies requirements for setting a uniform procedure to verify the effectiveness of the protective measures for current-using electrical equipment or appliances after they have been repaired.

This procedure is applicable to equipment or appliances that are pluggable equipment type A connected to final circuits via a plug or permanently connected equipment, with a rated voltage above 25 V AC and 60 V DC up to 1 000 V AC and 1 500 V DC, and currents up to 63A.

This standard does not cover:

— type tests, routine tests and acceptance tests for product safety requirements and product functional requirements.

NOTE Product safety requirements and product functional requirements are specified in the related product standards.

This document assumes that the electrical equipment under consideration complies with its related product standard, has been introduced on the market, has been in use, has failed, and has then been repaired.

It intends to verify that operations for repairs have not jeopardized basic protective measures, for example to verify the continuity of the protective conductor, the withstand capability of the insulation or to verify that no metallic part is loose or is inadvertently inserted in the device.

This document does not apply to:

— devices and equipment that are part of the fix electrical installations. For these devices, tests for verification after repair are covered by IEC 60364-6;

— audio/video, information and communication technology equipment;

— uninterruptible Power Supply (UPS);

— charging stations for electro-mobility;

— power supplies;

— programmable Logic Controllers (PLC);

— power Drives;

— devices for EX-zones or for mining applications in general;

– products already covered by standards addressing similar topics such as:

  — medical equipment covered by IEC 60601-1. For these devices, tests for verification after repair are covered by IEC 62353;

  — arc welding equipment covered by IEC 60974-1. For these devices, tests for verification after repair are covered by IEC 60974-4.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 60335, *Household and similar electrical appliances*

HD 60364-6, *Low-voltage electrical installations — Part 6: Verification*

EN 61010-1:2010, *Safety requirements for electrical equipment for measurement, control and laboratory use — Part 1: General requirements*

EN 61010-2-030:2010, *Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 2-030: Particular requirements for testing and measuring circuits*

EN 61010-2-032, *Safety requirements for electrical equipment for measurement, control, and laboratory use — Part 2-032: Particular requirements for hand-held and hand-manipulated current sensors for electrical test and measurement*

EN 61557-2, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. — Equipment for testing, measuring or monitoring of protective measures — Part 2: Insulation resistance*

EN 61557-4, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. — Equipment for testing, measuring or monitoring of protective measures — Part 4: Resistance of earth connection and equipotential bonding*

EN 61557-16, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c — Equipment for testing, measuring or monitoring of protective measures — Part 16: Equipment for testing the effectiveness of the protective measures of electrical equipment and/or medical electrical equipment*

EN 62353:2014, *Medical electrical equipment — Recurrent test and test after repair of medical electrical equipment*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

Note 1 to entry: Some of the definitions are different from those in the product standards for type testing, as different measuring methods are used.

3.1
electrical safety
protection within an equipment which limits the effects of electrical current on a user or other individuals

Note 1 to entry: Safety is defined as freedom from unacceptable risk (refer to ISO 14971:2007, definition 2.24).

3.2
testing
visual control, measure and prove the electrical equipment after repair to assure that equipment remains safe to use

3.3
maintenance
combination of all technical and administrative means, including supervising means, to keep or restore an equipment in working condition

3.4
repair
means for restoration of the intended function of the equipment

3.5
(electrically) skilled person
person with relevant education and experience to enable him or her to perceive risks and to avoid hazards which electricity can create

[SOURCE: IEC 60050-195:1998, 195-04-01]

3.6
(electrically) instructed person
person adequately advised or supervised by electrically skilled persons to enable him or her to perceive risks and to avoid hazards which electricity can create

[SOURCE: IEC 60050-195:1998, 195-04-02]

3.7
electrical equipment
single apparatus using electrical energy and connected by plug or permanently connected to a final circuit of the distribution system

Note 1 to entry: Equipment includes those accessories as defined by the manufacturer that are necessary to enable the normal use of the equipment.

3.8
final circuit (of buildings)
electric circuit intended to supply directly electric current to current-using equipment or socket-outlets

[SOURCE: IEC 60050-826:2004, 826-14-03]

3.9
leakage current
current flowing from live parts of the equipment to earth

[SOURCE: IEC 60050-442:1998, 442-01-24 modified – the term has changed and a reference to the absence of an insulation fault has been removed]

3.10
touch-current
electric current passing through a human body or through an animal body when it touches one or more accessible parts of electrical equipment not connected to protective earth

[SOURCE: IEC 60050-195:1998, 195-05-21 modified – the wording of the definition has been narrowed to electrical equipment not connected to protective earth]

3.11
protective conductor current
electric current which flows in a protective conductor and is frequency weighted according to the characteristics of the human body

[SOURCE: IEC 60050-826:2004, 826-11-21, modified – the wording of the definition has been expanded.]

3.12
residual current
vectorial sum of the currents flowing in the live conductors of the mains circuit of the equipment and frequency weighted according to the characteristics of the human body

[SOURCE: IEC 60050-442:1998, 442-05-19 modified – the wording of the definition has been expanded]

3.13
insulation resistance
resistance under specified conditions between two conductive elements separated by insulating materials

[SOURCE: IEC 60050-151:2001, 151-15-43]

3.14
protective bonding resistance
resistance between any accessible conductive part, which has to be connected for safety purposes to the protective earth terminal, and the

— protective terminal of the mains plug, or

— protective terminal of the equipment inlet, or

— protective terminal permanently connected to the supply mains,

resistance between protective earth terminals at each end of a detachable power supply cord, extension leads and multi-way adapters

3.15
SELV
electric system in which the voltage cannot exceed the value of extra-low voltage:

— under normal conditions and

— under single fault conditions, including earth faults in other electric circuits

Note 1 to entry: SELV is the abbreviation for safety extra-low voltage.

[SOURCE: IEC 60050-826:2004, 826-12-31]

3.16
PELV
electric system in which the voltage cannot exceed the value of extra-low voltage:

— under normal conditions and

— under single fault conditions, except earth faults in other electric circuits

Note 1 to entry: PELV is the abbreviation for protective extra-low voltage.

[SOURCE: IEC 60050-826:2004, 826-12-32]

3.17
permanently connected equipment
equipment that can only be electrically connected to or disconnected from the mains by the use of a tool

3.18
pluggable equipment type A
equipment that is intended for connection to the mains via a non-industrial plug and socket outlet or via a non-industrial appliance coupler, or both