SLOVENSKI STANDARD
oSIST prEN IEC 61557-14:2022

01-julij-2022

Električna varnost v nizkonapetostnih razdelilnih sistemih za izmenične napetosti do 1 000 kV in enosmerne napetosti do 1 500 kV - Oprema za preskušanje, merjenje ali nadzorovanje zaščitnih ukrepov - 14. del: Oprema za preskušanje varnosti električne opreme strojev

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 14: Equipment for testing the safety of electrical equipment for machinery

Sécurité électrique dans les réseaux de distribution basse tension de 1 000 V c.a. et 1 500 V c.c. - Dispositifs de contrôle, de mesure ou de surveillance de mesures de protection - Partie 14: Dispositifs de contrôle de la sécurité des appareils électriques sur machines

Ta slovenski standard je istoveten z: **prEN IEC 61557-14:2022**

ICS:

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities
29.080.01	Električna izolacija na splošno	Electrical insulation in general
29.240.01	Omrežja za prenos in distribucijo električne energije na splošno	Power transmission and distribution networks in general

oSIST prEN IEC 61557-14:2022 **en,fr,de**

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COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 61557-14 ED2**	
DATE OF CIRCULATION: **2022-06-03**	CLOSING DATE FOR VOTING: **2022-08-26**
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IEC TC 85 : MEASURING EQUIPMENT FOR ELECTRICAL AND ELECTROMAGNETIC QUANTITIES	
SECRETARIAT: China	SECRETARY: Ms Guiju HAN
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 44,TC 66	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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TITLE:

Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC - Equipment for testing, measuring or monitoring of protective measures - Part 14: Equipment for testing the safety of electrical equipment of machinery

PROPOSED STABILITY DATE: 2028

NOTE FROM TC/SC OFFICERS:

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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ELECTRICAL SAFETY IN LOW VOLTAGE DISTRIBUTION SYSTEMS UP TO 1 000 V AC AND 1 500 V DC - EQUIPMENT FOR TESTING, MEASURING OR MONITORING OF PROTECTIVE MEASURES

Part 14: Equipment for testing the safety of electrical equipment of machinery

FOREWORD

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International Standard IEC 1557-14 has been prepared by WG8: Measuring and monitoring equipment for testing protective devices in energy distribution systems, of IEC technical committee TC85: Measuring equipment for electrical and electromagnetic quantities.

This second edition cancels and replaces the first edition published in 2013. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Clarifying the introduction;
a) Replaced ‘dielectric strength’ by ‘voltage test’;
b) Requirement for maximum output current has been added in 4.2.6.1

c) Tripping time at electrical switching activated by two-hand operation has been added in 4.2.6.1

d) Additional time limiting capability for the protection against electric shock for test persons and bystanders in 4.2.6.2

e) Updated references for safety testing;

f) Alignment of the structure with that of the whole IEC 61557 series.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

This International Standard is to be used in conjunction with IEC 61557-1:2019

A list of all parts in the IEC 61557 series, published under the general title *ELECTRICAL SAFETY IN LOW VOLTAGE DISTRIBUTION SYSTEMS UP TO 1 000 V AC AND 1 500 V DC – EQUIPMENT FOR TESTING, MEASURING OR MONITORING OF PROTECTIVE MEASURES*, can be found on the IEC website

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

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

INTRODUCTION

This standard defines particular requirements for test and measurement equipment used to determine the electrical safety of electrical equipment of machinery. IEC 61010, other parts of the IEC 61557 series and IEC 60204 do not cover all safety aspects of equipment used for testing electrical equipment of machinery in accordance with the test sequence of IEC 60204-1.

This part of IEC 61557 provides additional measures to reduce the risk of electric shock for the test persons and bystanders during voltage tests in the field. The standard also defines performance requirements for each test and measurement function to ensure reliable and comparable results.

ELECTRICAL SAFETY IN LOW VOLTAGE DISTRIBUTION SYSTEMS UP TO 1 000 V AC AND 1 500 V DC – EQUIPMENT FOR TESTING, MEASURING OR MONITORING OF PROTECTIVE MEASURES -

Part 14: Equipment for testing the safety of electrical equipment of machinery

1 Scope

This part of IEC 61557 defines special requirements for test and measurement equipment used to determine the electrical safety of electrical equipment of machinery in accordance with IEC 60204-1.

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.

IEC 60204-1, *Safety of machinery – Electrical equipment of machines – Part 1: General requirements*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 61000-4-8, *Electromagnetic compatibility – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61010-2-034, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-034: Particular requirements for measurement equipment for insulation resistance and test equipment for electric strength*

IEC 61557-1:2019, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 1: General requirements*

IEC 61557-2:2019, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 2: Insulation resistance*

IEC 61557-3:2019, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 3: Loop impedance*

IEC 61557-4:2019, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 4: Resistance of earth connection and equipotential bonding*

IEC 61557-6:2019, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 6: Effectiveness of residual current devices (RCD) in TT, TN and IT systems*

IEC 61557-10:2019, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 10: Combined measuring equipment for testing, measuring and monitoring of protective measures*

IEC 61557-13:2011, *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures – Part 13: Hand-held and hand-manipulated current clamps and sensors for measurement of leakage currents in electrical distribution systems*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61557-1, IEC 61557-2, IEC 61557-3, IEC 61557-4, IEC 61557-6, IEC 61557-10 and IEC 61557-13 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

4 Requirements

4.1 General requirements

In addition to the requirements of IEC 61557-1:2019, Clause 4, the following requirements shall apply.

4.2 Measuring functions

4.2.1 Required measuring functions

The measuring equipment shall be capable of measuring the following quantities as a minimum:

– resistance of protective bonding;
– fault loop impedance;
– effectiveness of residual current protective devices (RCDs);
– insulation resistance.

The following test or measuring functions may be combined with those listed above:

– voltage test;
– residual voltage;
– leakage current;

The measuring equipment may include further measurement functions, provided that the measuring functions listed above are not influenced.

NOTE A missing measuring function in combined equipment can be completed with a single instrument designed in accordance with the IEC 61557 series.

4.2.2 Measurement of resistance of protective bonding

This part of the measuring equipment shall be in accordance with IEC 61557-4.

4.2.3 Measurement of fault loop impedance

This part of the measuring equipment shall be in accordance with IEC 61557-3.

NOTE In addition the earth resistance may be measured in accordance with IEC 61557-5.

4.2.4 Measurement of insulation resistance

The measuring equipment shall be in accordance with IEC 61557-2.

4.2.5 Testing of the effectiveness of protective measures with RCD

This part of the measuring equipment shall be in accordance with IEC 61557-6.

4.2.6 Voltage tests

4.2.6.1 Requirements for voltage tests

If the equipment includes a voltage test, it shall generate a quasi-sinusoidal voltage at mains frequency with values in accordance with Table 1.

NOTE 1 The test voltage is commonly derived from mains voltage.

NOTE 2 A waveform that is not a perfect sine curve, but is close enough to be considered sinusoidal, for all practical purposes.

Table 1 – Test voltages

Nominal voltage U_n of equipment under test (EUT)	Test voltage
≤ 500 V	1 000 V
> 500 V	2 x U_n

The rated test current shall be 100 mA AC with a tolerance of 0 % to +2 %. The minimum prospective short circuit current shall be 200 mA. The maximum output current measured via a resistor with a maximum value of 2 kΩ shall not exceed 250 mA.

If the test equipment has a display to indicate the actual test voltage, the maximum operating uncertainty shall be ± 5 %.

The amplitude of the test voltage output shall be regulated such that any variation is within -10 % and +30 % of the rated test voltage within 500 ms after changing the load from an unloaded condition (open circuit) to a loaded condition (100 mA) and vice versa. The maximum voltage overshoot shall be less than 200 % of the rated test voltage.

The touch current measured at each output terminal via the measuring circuit in accordance with IEC 61010-1:2010, Figure A.1, to earth shall not exceed 3,5 mA AC. The EUT shall not be connected.

NOTE The voltage test duration is defined in IEC 60204-1.

The test equipment shall have provisions against unintended energizing of the output. Such methods of protection shall include one of the examples in accordance with IEC 61010-2-034:2017, 6.9.101, a), b) or c) and in addition two-hand operation method d).

Two-hand operation can be provided by electronic or mechanical means.

In case of electrical switching activated by two-hand operation, the tripping time shall not exceed 70 ms.

4.2.6.2 Additional time limiting capability

If the equipment provides the possibility to set a tripping current of 30 mA for the output current, then the setting shall be clearly indicated and the maximum tripping time shall be 250 ms.