



**SLOVENSKI STANDARD**  
**SIST EN 61230:2000**  
**01-junij-2000**

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**Delo pod napetostjo - Prenosna oprema za ozemljitev ali ozemljitev in kratki stik  
(IEC 61230:1993, spremenjen)**

Live working - Portable equipment for earthing or earthing and short-circuiting

Arbeiten unter Spannung - Ortsveränderliche Geräte zum Erden oder Erden und Kurzschließen

Travaux sous tension - Dispositifs portables de mise à la terre ou de mise à la terre et en court-circuit

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**Ta slovenski standard je istoveten z: EN 61230:1995**

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**ICS:**

13.260	Varstvo pred električnim udarom. Delo pod napetostjo	Protection against electric shock. Live working
29.260.01	Električna oprema za delo v posebnih razmerah na splošno	Electrical equipment for working in special conditions in general

**SIST EN 61230:2000**

**en**

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ICS 13.340.20

Descriptors: Hot-line works, safety device, earthing, short circuiting, performance evaluation, tests

English version

**Live working**  
**Portable equipment for earthing or earthing and short-circuiting**  
(IEC 1230:1993, modified)

Travaux sous tension  
Dispositifs portables de mise à la terre  
ou de mise à la terre et en court-circuit  
(CEI 1230:1993, modifiée)

Arbeiten unter Spannung  
Örtsveränderliche Geräte zum Erden  
oder Erden und Kurzschließen  
(IEC 1230:1993, modifiziert)

This European Standard was approved by CENELEC on 1995-07-04. 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 the International Standard IEC 1230:1993, prepared by IEC TC 78, Tools for live working, together with common modifications prepared by the Technical Committee CENELEC TC 78, was submitted to the formal vote and was approved by CENELEC as EN 61230 on 1995-07-04.

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) 1996-07-01
  
- latest date by which national standards  
conflicting with the EN have to be withdrawn (dow) 1996-07-01

For products which have complied with the relevant national standard before 1996-07-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 2001-07-01.

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given only for information.

In this standard, annexes A to D and ZB are normative and annex ZA is informative.

Annexes ZA and ZB have been added by CENELEC.

## Endorsement notice

The text of the International Standard IEC 1230:1993 was approved by CENELEC as a European Standard with agreed common modifications as given below.

### COMMON MODIFICATIONS

#### CONTENTS

**Add** in the list of annexes the word "normative" as follows:

Annex A (normative)

Annex B (normative)

Annex C (normative)

Annex D (normative)

**Add:**

Annex ZA (informative) - Acceptance tests

Annex ZB (normative) - Normative references to international publications with their corresponding European publications

#### 1 Scope

**Replace** the first sentence by:

This standard is applicable to portable equipment, with or without matching fixed connection points, for temporary earthing or earthing and short-circuiting of electrically isolated a.c. installations, transmission and distribution networks whatever their rated voltages and including railway systems, for the protection of workers.

#### 5 Requirements

##### 5.1 **Replace** the second sentence of the second paragraph by:

For indoor use, the material of the device shall be selected and dimensioned so as to prevent the arising of toxic vapours in such amounts, which can risk the health of persons, seriously damage installations or buildings, or impair the evacuation of personnel.

**Add** at the end of the subclause:

NOTE : The requirements on special temperatures are not covered by a referenced test. A test may be added (under consideration).

**5.7 Replace the second paragraph by:**

No cable shall follow an earthing pole, either outside or inside, if the insulating level of the cable and/or the pole does not meet the requirements of sufficient insulation according to the operating voltage of the installation. The cable shall be anchored by reliable means.

**6 Tests**

**6.1 Replace in the third paragraph, "between 5 °C and 40 °C" by "between - 10 °C and + 40 °C".**

**6.1.1 Add at the end of the subclause:**

For visual inspection, a complete device shall be submitted to test. If the test house prepares test samples from the complete device (see 6.6.3), it is not necessary to provide an additional device for the visual examination.

For destructive test a special tests sample shall be selected and prepared from a complete device by the test house.

**6.1.2 Replace table 3 by the new table 3.**

**6.1.4 Add at the end of the subclause: "(see annex ZA)".**

**Add a new subclause 6.1.5:**

**6.1.5 *Quality assurance plan***

In order to assure the delivery of products that meet this standard, the manufacturer shall employ an approved quality assurance plan that complies with the provisions of the ISO 9000 series.

The quality assurance plan shall ascertain that the products meet the requirements contained in this standard.

In the absence of an accepted quality assurance plan as specified above the sampling procedure detailed in annex B shall be carried out.

**6.3 Replace the first sentence by:**

The humidity penetration test on a device with copper cables shall be carried out in conjunction with the fatigue test specified in 6.2.

Table 3 – List of tests referred to subclauses and test categories

Test number	Nature of test	Subclause		Description	Test method	Category of test		
		Description	Test			Type	Sampling	Routine
1	Non-destructive	5.1	5.1	Check that cables and insulating elements are suitable for the prescribed climatic conditions and fields of application	- Visual inspection	x		x
2	Non-destructive	5.2	5.2	Check material and cross-section designations of conductors	- Visual inspection	x		x
3	Non-destructive	5.4	5.4	Check of connecting methods	- Visual inspection	x		x
4	Destructive	5.4	6.2	Fatigue test on cable with end fittings	- Testing	x <sup>4)</sup>	x	
5	Destructive	5.4	6.3	Humidity penetration test on copper cable with end fittings	- Testing	x <sup>4)</sup>		
6	Destructive	5.4	6.4	Pull test on cable with clamps	- Testing	x <sup>4)</sup>	x	
7	Non-destructive	5.5	5.5	Suitability of line clamp	- Manual checking	x		
8	Destructive	5.4-5.5	6.5	Test on clamps, fixed connection points and connections within devices with respect to ability of standing connecting forces	- Testing	x <sup>4)</sup>		
9	Non-destructive	5.6	5.6	Check that there are no bare parts of conductors	- Visual inspection	x		x
10	Destructive	5.6	6.6	Short-circuit current test	- Testing	x <sup>2)</sup>		
11	Non-destructive	5.7	5.7	Check fitting and removal forces of detachable couplings of earthing poles	- Measurement	x	x	
12	Non-destructive	5.7	5.7	Check that no cable is drawn within or along the pole	- Visual inspection	x		x
13	Non-destructive	5.8	5.8	Check of marking	- Visual inspection	x		x
14	Non-destructive	5.8	6.7	Testing durability of marking	- Testing	x	x	
15	Non-destructive	5.9	5.9	Check that the manufacturer's instructions for use are delivered and acceptable	- Visual inspection	x		x
16	Destructive	Annex C		Bending test on earthing pole	- Testing	x	x	
17	Destructive	Annex C		Torsion test on earthing pole with couplings	- Testing	x	x	

1) Test on test pieces 2) Test on device

**6.6.1 Add after the second paragraph:**

When the device is designed for a range of conductor diameter, the test shall be performed with a conductor of minimum diameter and with a conductor of maximum diameter.

**6.6.3 Add after the second paragraph:**

The test pieces shall be taken from a complete device given by the manufacturer to the test house. The test pieces shall be made by the test house.

**Replace** the beginning of the third paragraph by:

Clamps and associated nuts and bolts shall be conditioned before the test, ...

**6.6.4 Replace the last two paragraphs by:**

These test set-ups may be used to test the earthing cable of a device other than an overhead line device.

The tests shall be representative of the conditions under which the device is normally used. If line clamps are connected directly to the line conductor, aged conductor material shall be used. Copper, aluminium or aluminium-alloy shall be aged artificially (in case of copper, it shall be aged for 10 days in accordance with IEC 68-2-42).

Rubbing and polishing of the conductor or the fixed connecting points is not permitted but cleaning the salt deposit is necessary before test.

**6.6.5 Add after the first paragraph:**

The test shall be repeated three times:

- one test with appropriate conductors for the maximum diameter of clamps;
- one test with appropriate conductors for the minimum diameter of clamps;
- the third test with the most unfavourable combination.

Appropriate conductors for minimum diameters are limited by the short-circuit current. This shall be agreed between manufacturer and customer.

**6.6.6 Add at the end of the third paragraph:**

Acceptable tolerances according to IEC 694 shall be used:

- 0 to + 5% for the peak current;
- 0 to + 10 % for the Joule integral  $I^2.t$ .



6.6.7 Add after the sixth dash:

NOTE: Guidance is under consideration to satisfy the requirements of IEC 479-1.

Figures

Figure 1 Replace figure 1a by:

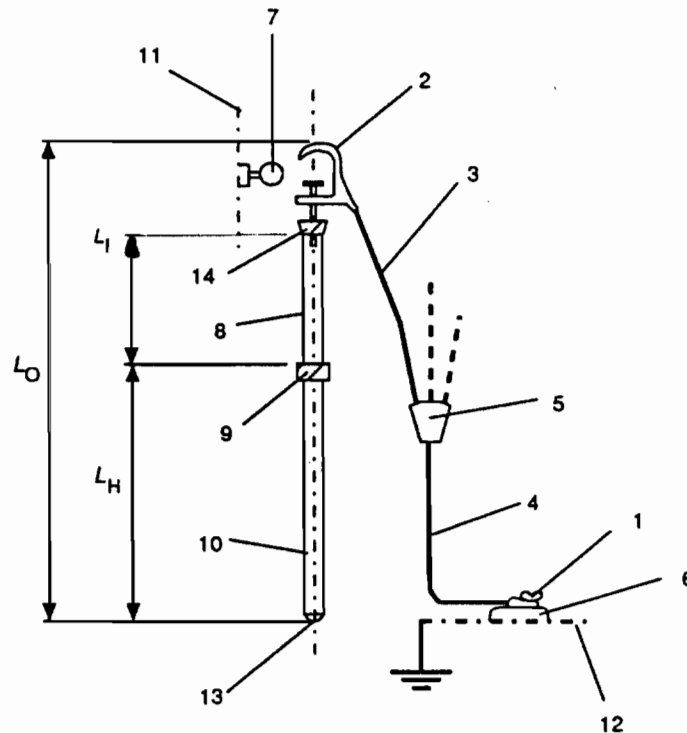


Figure 5

- add the reference number "4" (earthing cable) at the right of the two vertical lines of figure 5c;

- add the following note between b and c:

NOTE: Other values of b can be used according to the value of the short-circuit current.

## **Annexes**

**Add the following new annexes:**

### **Annex ZA** (informative)

#### **Acceptance tests**

As defined in IEC 151-04-20, an acceptance test is a contractual test to prove to the customer that the device meets certain conditions of its specification. These tests may be carried out on every unit (routine tests) or on a sampling of the units (sampling tests).

If a customer indicates in his specification that the device meet this standard only, the acceptance tests are those (both routine and sampling) which are specified in this document.

The customer may wish to witness the tests, have someone witness them, or simply accept the results of the tests as carried out by the manufacturer. He may also specify that the tests be carried out in an independent laboratory of his choosing or even in his own laboratory.

Further, the customer may specify additional tests or larger sampling sizes, when he is purchasing from a new manufacturer, because he has experienced problems with a particular manufacturer, or he is purchasing a new product or a new design.

**Annex ZB**  
(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 modification, 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 50(151)	1978	International Electrotechnical Vocabulary (IEV) - Chapter 151: Electrical and magnetic devices	-	-
IEC 60-1	1989	High-voltage test techniques Part 1: General definitions and test requirements	HD 588.1 S1	1991
IEC 68-2-42	1982	Environmental testing - Part 2: Tests Test Kc: Sulphur dioxide test for contacts and connections	-	-
IEC 71-3	1982	Insulation co-ordination Part 3: Phase-to-phase insulation co-ordination - Principles, rules and application guide	HD 540.3 S1	1991
IEC 410	1973	Sampling plans and procedures for inspection by attributes	-	-
IEC 479-1	1984	Effects of current passing through the human body - Part 1: General aspects Chapter 1: Electrical impedance of the human body - Chapter 2: Effects of alternating current in the range of 15 Hz to 100 Hz - Chapter 3: Effects of direct current	-	-
IEC 694 (mod)	1980	Common clauses for high-voltage switchgear and controlgear standards	HD 448 S3 <sup>1)</sup>	1995
IEC 855 (mod)	1985	Insulating foam-filled tubes and solid rods for live working	HD 496 S1	1988

1) HD 448 S3 includes A1:1985 + A2:1993 to IEC 694.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 1138	1992	Cables for portable earthing and short-circuiting equipment	-	-
IEC 1235 (mod)	1993	Live working - Insulating hollow tubes for electrical purposes	EN 61235	1995
ISO 9000	series	Quality management and quality assurance standards	EN ISO 9000	series

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