



SLOVENSKI STANDARD

SIST EN 50508:2009

01-junij-2009

**Več namenske izolacijske palice za električno delo na visokonapetostnih
inštalacijah**

Multi-purpose insulating sticks for electrical operations on high voltage installations

Isolierende Mehrzweckstangen für elektrische Betätigungen in Hochspannungsanlagen

Perches isolantes à usage multiple pour les opérations électriques sur les installations
haute tension

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

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English version

**Multi-purpose insulating sticks
for electrical operations on high voltage installations**

Perches isolantes à usage multiple
pour les opérations électriques
sur les installations haute tension

Isolierende Mehrzweckstangen
für elektrische Betätigungen
in Hochspannungsanlagen

This European Standard was approved by CENELEC on 2008-10-21. 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.

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CENELEC

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

Central Secretariat: avenue Marnix 17, B - 1000 Brussels

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 78, Equipment and tools for live working.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50508 on 2008-10-21.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
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- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2011-11-01

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Introduction

Multipurpose insulating sticks are used to operate high voltage (more than 1 kV) live equipment at distance, such as opening and closing switchgear, extracting and replacing fuses, etc. They are also used to carry out operations prior to dead working, as in the case of voltage verification, earthing and short-circuiting, etc.

In all these cases the stick has two main functions, to reach the part of the installation that needs to be operated on and to protect the worker from risk of electrical injury, by providing the insulation level and maintaining the safety distance between the worker and the live or potentially live installation.

According to the working and maintenance procedures adopted, additional protection can be added in order to attain the adequate safety level (see Annex A).

The multipurpose insulating stick is used in accordance with EN 50110.

This standard has been prepared in accordance with the requirements of EN 61477.

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1 Scope

This European Standard specifies the requirements and tests to be fulfilled by the multipurpose insulating sticks intended to perform a range of operations in high voltage installations by means of the attached appropriate tools, for example:

- connection and disconnection of disconnectors or other equipment operated by the stick,
- fuse replacement with an attached tool,

operations like:

- voltage absence verification, using a detector as a separate device in accordance with EN 61243-1;
- earthing and short circuiting installations, using devices in accordance with EN 61230;
- placing insulating screens in order to provide protection against adjacent live parts;
- testing and measurement;
- any other operation or verification on the electrical installation, provided that the mechanical requirements do not exceed those assured by the stick design and the worker shall remain at a safety distance;
- rescue of accident victims.

This European Standard is applicable to the insulating sticks made of a single continuous tube or rod or multiple tube or rod sections connected to each other, to be used both indoors or outdoors on electrical systems for voltages of 1 kV to 765 kV a.c., frequencies of 50 Hz and/or 60 Hz and in the normal range of temperatures of -25 °C to +55 °C and at a relative humidity between 20 % and 93 %.

For the purpose of this standard, “tube” is used for “tube” and “rod”.

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Annex B includes considerations about the use under wet conditions.

NOTE It is a general practice to use an insulating stick on d.c. installations with the same value of nominal voltage. That use shall comply with the national regulations.

This European Standard is not applicable to

- sticks covered by EN 60832,
- telescopic sticks covered by EN 62193,
- sticks with mobile internal or external operating rods, as those used directly for fuse replacement,
- single purpose sticks, especially designed to cover a single operation, generally as a complete equipment such as voltage detectors covered by EN 61243-1.

NOTE Except where otherwise specified, all the voltages defined in this European Standard refer to values of phase-to-phase voltages of three-phase systems. In other systems, the applicable phase-to-phase or phase-to-earth (ground) voltages should be used to determine the operating voltage.

2 Normative references

The following referenced documents are indispensable for the application 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 60068-1	1994	Environmental testing – Part 1: General and guidance (IEC 60068-1:1988 + corrigendum Oct. 1988 + A1:1992)
EN 60068-2-32	1993	Basic environmental testing procedures – Part 2: Tests - Test Ed: Free fall (IEC 60068-2-32:1975 + A2:1990)
EN 60068-2-75	1997	Environmental testing – Part 2-75: Tests - Test Eh: Hammer tests (IEC 60068-2-75:1997)
EN 60855	1996	Insulating foam-filled tubes and solid rods for live working (IEC 60855:1985, mod.)
EN 61235	1995	Live working - Insulating hollow tubes for electrical purposes (IEC 61235:1993, mod.)
EN 61477		Live working - Minimum requirements for the utilization of tools, devices and equipment (IEC 61477)
HD 588.1 S1	1991	High-voltage test techniques – Part 1: General definitions and test requirements (IEC 60060-1:1989 + corrigendum March 1990)
IEC 60050	series	International Electrotechnical Vocabulary (IEV)
IEC 60417	Database	Graphical symbols for use on equipment
ISO 48		Rubber, vulcanized or thermoplastic - Determination of hardness (hardness between 10 IRHD and 100 IRHD)

3 Terms and definitions

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

NOTE Further information on terminology is illustrated in Figure 1.

3.1

cap

protection of the bottom of the stick

3.2

coupling (for multiple section sticks)

element allowing the attachment of the sections of the stick

3.3

critical defect

defect on product that judgement and experience indicate is likely to result in hazardous or unsafe conditions for individuals using and depending on the product

3.4

hand guard

physical guard or sign, visibly different, used to separate the handle from the insulating element

3.5**handle**

part of the stick between the edge of the hand guard and the bottom of the stick where the user should place his hands for correct use

3.6**head**

fixed element on the upper end of the stick that allows attaching tools such as operating hook, voltage detector, earthing devices, etc.

3.7**insulating element**

part of the stick between the hand guard and the limit mark that provides the user with the necessary working distance and insulation related to the nominal voltage of the installation

3.8**limit mark**

differentiating element or sign that indicates to the user the physical limit until which he could insert the stick among live elements or touch them

3.9**major defect**

defect on product, other than critical, that is likely to result in failure, or to reduce significantly the functionality of the product

3.10**operation**

changes brought about to modify the electric state of an electric installation (connection or disconnection), but not entailing any assembly or dismantling of elements

3.11**minor defect**

defect on product that is not likely to reduce significantly the functionality of the product

3.12**multipurpose insulating stick**

insulating stick made with one or several adaptable sections of insulating tube, sized according to the nominal voltage and the working distance, with a head, insulating element, hand guard, handle, cap, limit mark and couplings (for multiple sections sticks) (see Figure 1)

3.13**nominal voltage (U_n)**

suitable approximate value of voltage used to identify a system

[IEV 601-01-21, modified]

3.14**rated voltage (U_r)**

voltage value generally agreed upon by manufacturer and customer to which certain operating specifications are referred

NOTE The rated voltage of the stick is the value selected from Table 2, column 1, which should be the same as, either the nominal voltage (or the higher nominal voltage of a range of nominal voltages) or the following higher value selected in this table.

3.15**routine test**

test performed on each item during or after manufacture to ascertain whether it complies with certain criteria

[IEV 151-16-17]

3.16**safety distance (see 4.4.3)**

safety clearance between the worker and a live part of the installation related with the nominal voltage of the installation, provided by the length of the insulating element when the operating head is in contact with the voltage

3.17**type test**

test performed on one or more items representative of the production, made to show that the product meets certain conditions of its specification

[IEV 151-16-16, modified]

4 Requirements**4.1 Materials**

Tubes and rods of insulating material used in the design of insulating sticks shall meet the requirements of EN 60855 or EN 61235.

The cross-section of these tubes or rods may be circular or not, based on the physical or ergonomic reasons applicable to the sticks.

The head can be constructed of non-conductive or conductive material, even a metallic one.

The insulating element may be made of one or more parts.

Conductive elements outwardly insulated or not, between the limit mark and the hand guard are admitted if the minimum length of the insulating element (see Table 2) is kept.

The limit mark shall be permanent and clearly recognisable by the user.

The hand guard shall be an insulating disk with a higher diameter than the tube or a sign with the same characteristics as those of the limit mark, although it shall have a different colour than the limit mark. The band should have the inscription "hand limit" in national language.

Sticks to be used under wet conditions can include additional non conductive elements as discs.

4.2 Dimensions**4.2.1 Length of the stick**

In order to meet the requirements of this European Standard and allow easy use by a single worker the following distances and combinations (see Annex C) are recommended:

- stick with a single section, total length: 1,5 m, 2 m, 2,5 m and 3 m;
- stick with multiple sections, nominal length of each section of: 1 m, 1,5 m, 2 m, 2,5 m and 3 m.

In sections with an end coupling, the nominal length shall be given by the total length of the element, from one end to the other, minus the part intended to be inserted in another section.

Different sizes and combinations subject to prior agreement between manufacturer and customer shall be permitted if they can pass the applicable tests.

4.2.2 Length of the insulating element

The insulating element shall meet the values specified in Table 2.

In sections with an end coupling, the insulating length shall be measured considering only the useful insulating part of the section with regard to the total length of the insulating element.

The insulating element is considered to be the length constructed with tube according to EN 60855 or EN 61235 electrical requirements.

4.2.3 Tube diameter

The diameter of the tube shall be in the range 19 mm to 51 mm. The recommended diameters are 32 mm or 39 mm according to the length of the stick (see Annex C).

4.2.4 Handle length

In order to permit proper use by the worker, the minimum length of the handle shall be as in Table 1.

Table 1 – Handle length

Total stick length mm	Minimum handle length mm
$L_T \leq 1\,500$	300
$1\,500 < L_T \leq 3\,000$	800
$L_T > 3\,000$	1 100

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4.2.5 External perimeter of the handle

The perimeter shall not be more than 175 mm to permit a good grip by the worker.

4.2.6 Width of the limit mark

The minimum width of the limit mark is 20 mm.

4.2.7 Position of the limit mark

An assembled stick shall not have more than one limit mark. If the stick has more than two sections, the limit mark shall be in the head section.

Where no limit is shown on the stick, the head shall be considered as the limit mark.

4.2.8 Dimensions of the hand guard

When the hand guard is a guard, it shall have a minimum height of 20 mm. If the hand guard is a band, it shall be 20 mm wide.

4.2.9 Type of head

The heads are defined by the dimensions and constructive characteristics of the work tool pins that connect the work tool with the head. Annex D includes a set of test tools for the recommended heads.

4.3 Mechanical requirements

4.3.1 Couplings and connections between elements

All the elements of the stick, different sections, handle and head, shall be firmly attached to each other.

The head shall be solidly fixed to the upper part of the stick.

The sections shall be joined to each other by means of a rigid coupling that shall not permit the accidental loosening of the stick sections.

On interchangeable tool heads the fitting and removal of tools shall not require excessive effort.

The guard of the hand guard, if it exists, shall be solidly fixed.

The stick assembled according to the instructions for use shall meet the mechanical requirements mentioned in 4.3.3 to 4.3.5.

4.3.2 Holding force and deflection

The stick shall be designed in order to enable a good control of the tool. The stick shall be designed so that it allows a controlled movement of the head within the installation. The deflection originated when using it with its accessories, should be as small as possible.

4.3.3 Resistance to shocks

At low temperature the coupling elements shall withstand mechanical shocks.

4.3.4 Resistance to falls

The complete stick shall withstand falls.

4.3.5 Resistance to torque

The stick shall withstand the necessary torsion force needed for its use.

4.4 Electrical requirements

4.4.1 Protection against bridging

The part of the stick between the head and the limit mark shall be so designed that, under working conditions, it does not cause electrical discharges or short circuits between elements at different potential.

This condition is applicable to sticks with a length not exceeding 2 m, to be used in indoor installations with nominal voltages equal or below 52 kV. Higher voltage values are not considered as the distances between parts of the installation are much bigger.

4.4.2 Leakage current

The stick shall be built so that the user is provided with adequate protection against leakage current.

For a multiple section stick, the leakage current shall be measured on all combinations.

4.4.3 Safety distance

The length measured from the limit mark to the hand guard shall provide the necessary safety distance to the user against electrical risks, as indicated in Table 2.