



**SLOVENSKI STANDARD**  
**SIST EN 50528:2024**

**01-julij-2024**

**Nadomešča:**  
**SIST EN 50528:2010**

---

**Izolirne lestve za uporabo na nizkonapetostnih električnih inštalacijah ali v njihovi bližini**

Insulating ladders for use on or near low voltage electrical installations

Isolierende Leitern für Arbeiten an oder in der Nähe von Niederspannungsanlagen

Echelles isolantes pour utilisation sur ou à proximité des installations électriques basse tension

**Ta slovenski standard je istoveten z: EN 50528:2024**

SIST EN 50528:2024

<https://standards.iteh.ai/catalog/standards/sist/71f7310af-7288-4133-88ef-dfa48947b2f5/sist-en-50528-2024>

**ICS:**

13.260	Varstvo pred električnim udarom. Delo pod napetostjo	Protection against electric shock. Live working
97.145	Lestve	Ladders

**SIST EN 50528:2024**

**en**



EUROPEAN STANDARD

**EN 50528**

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2024

ICS 97.145; 13.260

Supersedes EN 50528:2010

English Version

## Insulating ladders for use on or near low voltage electrical installations

Échelles isolantes pour utilisation sur ou à proximité des installations électriques basse tension

Isolierende Leitern für Arbeiten an oder in der Nähe von Niederspannungsanlagen

This European Standard was approved by CENELEC on 2024-04-29. 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 CEN-CENELEC Management Centre 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 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Document Preview

[SIST EN 50528:2024](https://standards.iteh.ai/catalog/standards/sist/7f7310af-7288-4133-88ef-dfa48947b2f5/sist-en-50528-2024)

<https://standards.iteh.ai/catalog/standards/sist/7f7310af-7288-4133-88ef-dfa48947b2f5/sist-en-50528-2024>



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

# Contents

	Page
European foreword .....	6
Introduction .....	7
1 Scope .....	9
2 Normative references .....	9
3 Terms and definitions .....	10
3.1 Types of ladder .....	10
3.2 Components and devices constituting a ladder .....	12
3.3 Materials .....	15
4 Requirements .....	15
4.1 General .....	15
4.2 Classification .....	16
4.3 Constituent parts of ladders - Dimensional characteristics .....	16
4.3.1 General .....	16
4.3.2 General dimensions of a ladder .....	16
4.3.3 Rungs and steps .....	19
4.3.4 Platforms .....	20
4.4 Mechanical characteristics of the different types of ladders .....	23
4.4.1 Standing ladder .....	23
4.4.2 Leaning rung ladders .....	25
4.4.3 Combination ladder .....	27
4.4.4 General test requirements .....	29
4.5 Mechanical requirements .....	30
4.5.1 Materials .....	30
4.5.2 Design .....	30
4.6 Electrical requirements .....	36
4.7 Marking .....	36
4.7.1 General .....	36
4.7.2 Specific marking for insulating ladders .....	37
4.7.3 Maximal use of a ladder in accordance with its configuration .....	37
4.8 Instructions for use .....	38
5 Verification and testing .....	38
5.1 Generality .....	38
5.1.1 General conditions - environmental conditions .....	38
5.1.2 General tolerances .....	39
5.2 Verification, design, dimensions, construction .....	39
5.3 Test methods for composite materials for ladders .....	39
5.3.1 Principle .....	39
5.3.2 Shock test .....	40
5.3.3 Bending test .....	40
5.3.4 Tensile test .....	41
5.4 Tests on sub-assemblies and components .....	42
5.4.1 Feet pull test .....	42
5.4.2 Foot slip test .....	42
5.4.3 Test on stabilizer ladder device .....	43
5.4.4 Test on the pole leaning devices .....	43
5.4.5 Test on rungs and steps .....	43
5.4.6 Tests on standing platforms .....	43
5.4.7 Test on working platforms .....	44
5.4.8 Swaying test .....	44
5.5 Tests on complete ladders .....	45

5.5.1	Stability test for mobile ladders with platform .....	45
5.5.2	Lateral deflection test of the ladder .....	45
5.5.3	Bottom stile end test .....	45
5.5.4	Bending test of the stiles .....	46
5.5.5	Strength test of the stiles .....	46
5.5.6	Endurance test of the ladder .....	46
5.5.7	Dynamic drop test.....	47
5.5.8	Hooks and locking devices test .....	48
5.5.9	Test of opening restraint devices and hinges of ladders .....	49
5.5.10	Vertical load test on rungs, steps and platform .....	49
5.5.11	Torsion test of rungs and steps .....	49
5.5.12	Compression test for locking devices .....	49
5.5.13	Maximum extending ladder test .....	50
5.5.14	3-part combination ladder in A-position test .....	50
5.5.15	Torsion test for standing ladders .....	50
5.5.16	Torsion test for leaning ladder .....	50
5.6	Electrical tests .....	51
5.6.1	On stiles and rungs.....	51
5.6.2	Other non conductive parts .....	53
5.7	Durability test on the marking .....	53
5.8	Instruction for use .....	53
6	Alternative means for ladders having completed the production phase .....	53
7	Methods for assessment of defects and verification of performance .....	53
8	Modifications .....	53
Annex A	(normative) Classification of defects and associated requirements and tests .....	54
Annex B	(informative) In-service recommendations .....	55
B.1	General .....	55
B.2	Use and storage .....	55
B.3	Inspection before use .....	55
B.4	Periodic maintenance .....	55
Annex C	(normative) Type test procedure .....	57
C.1	General type test procedure .....	57
C.2	Independent type tests .....	57
C.3	Sequential type tests .....	57
Annex D	(normative) Suitable for live working; double triangle (IEC 60417-5216:2002-10) .....	59
Annex E	(informative) Rationale to explain how the stability of the leaning ladders is ensured .....	60
E.1	General .....	60
E.2	Rationale .....	60
E.3	Test method .....	60
E.4	Presentation and use of the different accessories .....	62
Bibliography	.....	68

**EN 50528:2024 (E)****Figures**

Figure 1 — Example of standing ladders .....	11
Figure 2 — Example of combination ladders .....	12
Figure 3 — Example of ladder security system by clamp cleats .....	14
Figure 4 — Outer width of a ladder .....	16
Figure 5 — Different lengths of a ladder .....	17
Figure 6 — Clearance of a ladder .....	18
Figure 7 — Inclination of a ladder .....	18
Figure 8 — Thickness of the stiles .....	19
Figure 9 — Rungs .....	19
Figure 10 — Steps .....	20
Figure 11 — Example of standing platform .....	21
Figure 12 — Minimum size of a standing platform .....	21
Figure 13 — Examples of working platform .....	22
Figure 14 — Examples of standing rung ladder .....	24
Figure 15 — Example of unilaterally ascendable standing step ladder with platform .....	25
Figure 16 — Example of one part leaning rung ladder .....	26
Figure 17 — Examples of extending leaning rung ladder .....	26
Figure 18 — Example of a combination ladder, shown as a standing ladder .....	27
Figure 19 — Example of a combination ladder, shown as a standing ladder with an extending ladder at the top .....	28
Figure 20 — Example of a hazard in use with a two section extension ladder where the sections may be separated .....	29
Figure 21 — Example of type of lateral stabilizer acting as ladder feet .....	32
Figure 22 — Position of the rungs between two adjacent parts .....	32
Figure 23 — Examples of pole leaning devices .....	33
Figure 24 — Example of adjustable levelling device .....	34
Figure 25 — Examples of ladder stabilizer .....	35
Figure 26 — Marking 'reserved for professional use only' .....	37
Figure 27 — Marking .....	38
Figure 28 — Foot slip test .....	42
Figure 29 — Swaying test installation .....	45
Figure 30 — Cycle of the applied force .....	47
Figure 31 — Dynamic drop test .....	48
Figure 32 — Compression test installation .....	50
Figure 33 — Torsion on leaning ladder .....	51
Figure 34 — Test on stiles – Configuration .....	52
Figure 35 — Test on stiles – Example of type of electrodes used .....	52
Figure B.1 — Configuration for the electrical test on the stiles .....	56
Figure D.1 — Suitable for live working .....	59
Figure E.1 — installation to test leaning ladders .....	61
Figure E.2 — Example of pole leaning device .....	63
Figure E.3 — Example of clam cleat with a rope .....	64
Figure E.4 — Example of ladder with a front type stabilizer .....	65
Figure E.5 — Example of ladder with a lateral type stabilizer .....	66
Figure E.6 — Example of adjustable levelling device .....	66

**Tables**

Table 1 — Functional sizes of standing rung ladders .....	23
Table 2 — Functional sizes of standing step ladders .....	25
Table 3 — Functional sizes of leaning rung ladders .....	26
Table 4 — Functional sizes of two-part combination ladders .....	27
Table 5 — Functional sizes of three-part combination ladders .....	28
Table 6 — Load for the foot slip test .....	42
Table 7 — Test load for the ladder with a front type stabilizer .....	43
Table 8 — Test load for the ladder with a lateral type stabilizer or bar type stabilizer .....	43

Table 9 — Test load for the test on rungs and steps .....	43
Table 10 — Test load for the test for the standing platform .....	44
Table 11 — Test load for the working platform .....	44
Table 12 — F load for the swaying test.....	45
Table 13 — Maximal deflection allowed .....	45
Table 14 — Load for the bending test of the stiles.....	46
Table 15 — Test load $F_1$ for the Strength test for leaning ladders.....	46
Table 16 — Test of opening restraint devices and hinges of standing ladders .....	49
Table 17 — Test for the vertical load on rungs, steps and platform.....	49
Table 18 — Value of F.....	49
Table 19 — Value of $F_1$ and $F_2$ .....	50
Table 20 — Value of $F_1$ and $F_2$ .....	51
Table A.1 — Classification of defects and associated requirements and tests .....	54
Table C.1 — Independent type test.....	57
Table C.2 — Sequential order for performing type tests.....	58
Table E.1 — Functional sizes of leaning rung ladders.....	61
Table E.2 — Dimension of $b_2$ .....	61
Table E.3 — Configuration: against a pole on a flat ground .....	63
Table E.4 — Configuration: against a pole on a flat ground .....	64
Table E.5 — Configuration: against a wall on a flat ground .....	65
Table E.6 — Configuration: against a pole.....	65

iTeh Standards  
(<https://standards.itih.ai>)  
Document Preview

[SIST EN 50528:2024](https://standards.itih.ai/catalog/standards/sist/7f7310af-7288-4133-88ef-dfa48947b2f5/sist-en-50528-2024)

<https://standards.itih.ai/catalog/standards/sist/7f7310af-7288-4133-88ef-dfa48947b2f5/sist-en-50528-2024>

**EN 50528:2024 (E)****European foreword**

This document (EN 50528:2024) has been prepared by CLC/TC 78 “Live working”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2025-04-29
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2027-04-29

This document supersedes EN 50528:2010 and all of its amendments and corrigenda (if any).

EN 50528:2024 includes the following significant technical changes with respect to EN 50528:2010:

- The previous edition (EN 50528:2010) was written as a complementary document of the EN 131 series for insulating ladders for use on or near low voltage electrical installations. Consequently, these ladders shall fulfil the relevant EN 131 series documents and EN 50528:2010. The philosophy of this edition is completely different: this document is completely self-supporting. It is completely disconnected from the EN 131 series. In this document, the requirements of the EN 131 series, which are retaken, are retaken individually in the relevant clause. Consequently:
  - all requirements of the EN 131 series which are retaken in this document are clearly identified and are in the relevant subclause;
  - specific national deviations which European countries have in EN 131-1 are no longer automatically applicable; only specific national deviations expressed in this document are applicable on insulating ladders for use on or near low voltage electrical installations.
- Two classes of maximum total load are introduced: 150daN and 170 daN.
- The types of ladders covered by this document are clearly defined:
  - standing ladders with rungs or steps and stepladders with platform;
  - leaning ladders with rungs (single ladders, extending ladders, ladders with working platform);
  - combination ladders with rungs (two parts, three parts).
- new type tests have been added:
  - foot slip test (5.4.2);
  - swaying test (5.4.8);
  - strength test of the stiles (5.5.5);
  - dynamic drop test (5.5.7);
  - hook and locking device test (5.5.8);
  - torsion test for the leaning ladder (5.5.16).



- For the electrical test on the stiles and rungs, the test voltage has become 36 kV instead of 10 kV (5.6.1).
- Reference documents have been updated.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

## iTeh Standards (<https://standards.iteh.ai>) Document Preview

[SIST EN 50528:2024](https://standards.iteh.ai/catalog/standards/sist/7f7310af-7288-4133-88ef-dfa48947b2f5/sist-en-50528-2024)

<https://standards.iteh.ai/catalog/standards/sist/7f7310af-7288-4133-88ef-dfa48947b2f5/sist-en-50528-2024>

**EN 50528:2024 (E)****Introduction**

Ladders covered by this document are used to work on low voltage live parts, such as to perform connector fittings, repairs on pole, switching actions. They are also used to carry out operations prior to dead working, as in the case of voltage detection, earthing and short-circuiting, etc.

In all these cases the ladders have 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 a distance between the worker and the live or potentially live installation to avoid electrification.

Taking the local risk assessment into account, additional protection (either personal or collective) can be furthermore considered.

This document contributes to the safety of the users provided they are trained to the operations envisaged.

A risk assessment may determine that additional protection (either personal or on the adjacent live system) should be considered.

The ladder is used in accordance with the EN 50110 series.

This document contributes to the safety of the users provided they are trained in accordance with the relevant operational requirements.

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

In 1999 the European Commission launched a standardization mandate to CEN relative to the safety of consumers and children for the ladders (mandate M/285). As it is written clause 9 of this mandate that ladders for professional use are excluded, this mandate does not concern ladders defined in this document.

**iTeh Standards**  
**(<https://standards.iteh.ai>)**  
**Document Preview**

[SIST EN 50528:2024](https://standards.iteh.ai/catalog/standards/sist/7f7310af-7288-4133-88ef-dfa48947b2f5/sist-en-50528-2024)

<https://standards.iteh.ai/catalog/standards/sist/7f7310af-7288-4133-88ef-dfa48947b2f5/sist-en-50528-2024>

## 1 Scope

This document is applicable to portable ladders made only of non-conductive stiles, including accessories (pole leaning device, adjustable levelling device, adjustable ladder stabilizer, etc.) used to work on or near electrical systems and installations in the low voltage range (up to 1 000 V AC/1 500 V DC).

These ladders are used to provide temporary access, generally on overhead line structures, and to undertake electrical operations. They are expected to be used by one person only.

These ladders, in conjunction with other protective equipment provide sufficient insulation level to protect against inadvertent contact with live low voltage installations.

This document does not cover ladders used for live working on electrical installations at voltages above 1 000 V AC and above 1 500 V DC. These insulating ladders are separately covered by EN 61478.

This document does not cover products not made entirely with non-conductive stiles generally called mixed ladders. In this case the EN 131 series apply.

This document does not cover step stools, which are covered by EN 14183.

These ladders are only for specific professional use. Only skilled persons, after an appropriate training, can use this type of ladder for professional applications.

The products designed and manufactured according to this document contribute to the safety of the users provided they are used by skilled persons, in accordance with safe methods of work and the manufacturer instructions for use (where appropriate).

Annex E gives a rationale to explain how a ladder which fulfils the requirements of this document used with correct accessories gives better safety for the user than an ordinary ladder.

## 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 59, *Glass reinforced plastics - Determination of indentation hardness by means of a Barcol hardness tester*

EN 131-2:2010+A2:2017, *Ladders - Part 2: Requirements, testing, marking*

EN 131-3:2018, *Ladders - Part 3: Marking and user instructions*

EN 131-4:2020, *Ladders - Part 4: Single or multiple hinge-joint ladders*

EN 131-7:2013, *Ladders - Part 7: Mobile ladders with platform*

EN 16165:2021, *Determination of slip resistance of pedestrian surfaces - Methods of evaluation*

EN 60060-2, *High-voltage test techniques - Part 2: Measuring systems*

EN 60068-1, *Environmental testing - Part 1: General and guidance*

EN 60068-2-11, *Environmental testing - Part 2: Tests - Test Ka: Salt mist*

EN IEC 61318:2021, *Live working - Methods for assessment of defects and verification of performance applicable to tools, devices and equipment*

IEC 60417:2002-10, *Graphical symbols for use on equipment*

EN ISO 179-1, *Plastics - Determination of Charpy impact properties - Part 1: Non-instrumented impact test (ISO 179-1)*

**EN 50528:2024 (E)**

EN ISO 527-4, *Plastics - Determination of tensile properties - Part 4: Test conditions for isotropic and orthotropic fibre-reinforced plastic composites (ISO 527-4)*

EN ISO 527-5, *Plastics - Determination of tensile properties - Part 5: Test conditions for unidirectional fibre-reinforced plastic composites (ISO 527-5)*

EN ISO 1140, *Fibre ropes - Polyamide - 3-, 4-, 8- and 12-strand ropes (ISO 1140)*

EN ISO 1141, *Fibre ropes - Polyester - 3-, 4-, 8- and 12-strand ropes (ISO 1141)*

EN ISO 1346, *Fibre ropes - Polypropylene split film, monofilament and multifilament (PP2) and polypropylene high-tenacity multifilament (PP3) - 3-, 4-, 8- and 12-strand ropes (ISO 1346)*

EN ISO 14125, *Fibre-reinforced plastic composites - Determination of flexural properties (ISO 14125)*

EN ISO 14731, *Welding coordination - Tasks and responsibilities (ISO 14731)*

EN ISO 3834-1, *Quality requirements for fusion welding of metallic materials - Part 1: Criteria for the selection of the appropriate level of quality requirements (ISO 3834-1)*

EN ISO 3834-4, *Quality requirements for fusion welding of metallic materials - Part 4: Elementary quality requirements (ISO 3834-4)*

EN ISO 4892-2:2013, *Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps (ISO 4892-2:2013)*

EN ISO 7010, *Graphical symbols - Safety colours and safety signs - Registered safety signs (ISO 7010)*

### 3 Terms and definitions

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

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

— ISO Online browsing platform: available at <https://www.iso.org/obp>

— IEC Electropedia: available at <https://www.electropedia.org/>

NOTE The term “ladder” is used in this document for “ladder for use on or near low voltage installations”.

#### 3.1 Types of ladder

##### 3.1.1

##### **ladder**

device incorporating steps or rungs on which a person may step to ascend or descend

##### 3.1.2

##### **portable ladder**

ladder which can be transported and set up by hand

##### 3.1.3

##### **rung ladder**

portable ladder with rungs which have a standing surface from front to back of less than 80 mm

**3.1.4****leaning rung ladder**

rung ladder which does not have its own support

Note 1 to entry: It can be made of one or more parts.

**3.1.5****extending ladder**

leaning rung ladder consisting of two or more parts where the length can be regulated by one rung at a time

Note 1 to entry: The extension can be made by hand or rope operated.

Note 2 to entry: In some countries, the wording extension ladder is used instead of extending ladder with the same meaning.

**3.1.6****standing ladder**

self supporting ladder, unilaterally or bilaterally ascendable

EXAMPLES See Figure 1.

Note 1 to entry: This type of ladder can be made of two or more parts.

Note 2 to entry: This type of ladder can be equipped with hand rail, knee rail or platform.

Note 3 to entry: This type of ladder can be equipped with rungs or steps.



**Figure 1 — Example of standing ladders**

**3.1.7****combination ladder**

rung ladder of several parts that can be used as an extending ladder, a standing ladder or a standing ladder with an extending third part ladder at the top

EXAMPLES See Figure 2.

Note 1 to entry: One part, if any, may be used as single part ladder.

Note 2 to entry: These ladders shall fulfil leaning and standing requirements (which are applicable).

Note 3 to entry: Foldable ladders such as single joint ladder described in EN 131-4 are compliant with this definition.

## EN 50528:2024 (E)



Figure 2 — Example of combination ladders

### 3.1.8

#### base part of a ladder

lowest part of an extending ladder

Note 1 to entry: This first element of a ladder is designed to support other parts.

### 3.1.9

#### total length

distance measured over the bottom foot to the top of a fully extended ladder

Note 1 to entry: See Figure 5.

## 3.2 Components and devices constituting a ladder

### 3.2.1

#### stile

lateral part of a ladder which supports the rungs or steps, and in certain cases accessories if any

Note 1 to entry: For the standing ladders, the word “leg” is often used instead of “stile”.

### 3.2.2

#### sliding guides

sleeves that help to slide parts of extending ladders and avoid rim damage to the ladder stiles

### 3.2.3

#### rung

part used for ascending or descending a ladder

Note 1 to entry: The difference between a rung and a step is the dimension of this part of the ladder (see 4.3.3).

### 3.2.4

#### step

part used for ascending or descending a ladder

Note 1 to entry: The difference between a rung and a step is the dimension of this part of the ladder (see 4.3.3).

### 3.2.5

#### hand/knee rail

device for holding onto or gaining support from at the upper end of a standing ladder

### 3.2.6

#### opening restraint device

device on standing ladders which secures the two legs of the ladder from sliding apart