BS EN 131-1:2015

BSI Standards Publication

Ladders

Part 1: Terms, types, functional sizes

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National foreword

This British Standard is the UK implementation of EN 131-1:2015. It supersedes BS EN 131-1:2007+A1:2011 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/512, Ladders.

A list of organizations represented on this committee can be obtained on request to its secretary.

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This European Standard was approved by CEN on 11 September 2015.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 131-1:2015) has been prepared by Technical Committee CEN/TC 93 “Ladders”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2016, and conflicting national standards shall be withdrawn at the latest by November 2016.

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

This document supersedes EN 131-1:2007+A1:2011.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

Compared to EN 131-1:2007+A1:2011, the following modifications have been made in order to improve the stability of ladders in use:

a) in figures stabilizers or wider base width for leaning ladders were introduced;

b) further terms 3.48, 3.49 and 3.50 for stabilizers were added in Clause 3;

c) requirements for minimum base width for leaning ladders were specified in 4.2.1, Table 2 and Table 6.

EN 131, *Ladders*, is one of a series about ladders:

— *Part 1: Terms, types, functional sizes* [the present document];

— *Part 2: Requirements, testing, marking*;

— *Part 3: User Instructions*;

— *Part 4: Single or multiple hinge-joint ladders*;

— *Part 6: Telescopic ladders*;

— *Part 7: Mobile ladders with platform*.

The standards of this series are listed in Clause 2 and in the Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard defines terms and specifies the general design characteristics of ladders.

It applies to portable ladders.

It does not apply to ladders designed for specific professional use such as fire brigade ladders, roof ladders and mobile ladders.

NOTE 1 For multiple hinge joint ladders EN 131–4 applies.

NOTE 2 For telescopic ladders EN 131–6 applies.

NOTE 3 For mobile ladders with platforms EN 131–7 applies.

NOTE 4 This standard does not apply to step stools for which EN 14183 applies.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 131-2, *Ladders — Part 2: Requirements, testing, marking*

EN 131-3, *Ladders — Part 3: User Instructions*

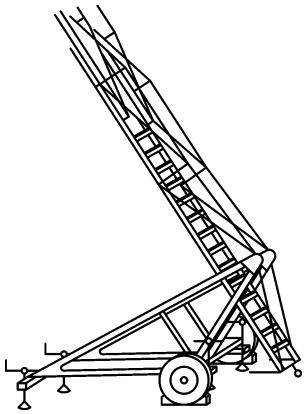
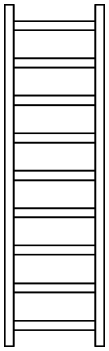
EN 131-4:2007, *Ladders — Part 4: Single or multiple hinge-joint ladders*

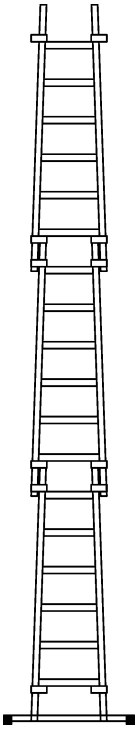
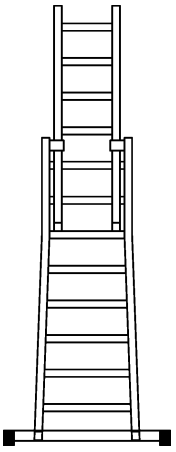
3 Terms and definitions

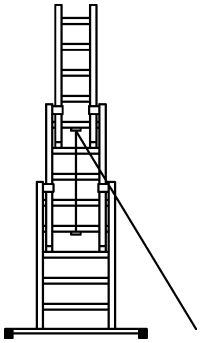
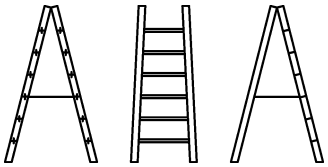
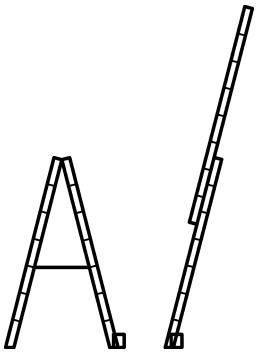
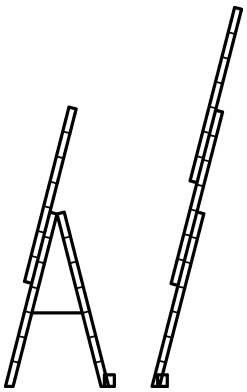
For the purpose of this document, the terms and definitions given in EN 131–4:2007 for single or multiple hinge-joint ladders and the following apply.

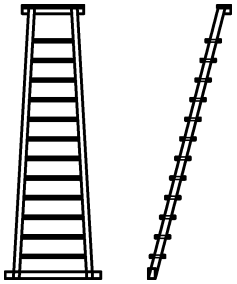
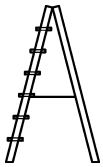
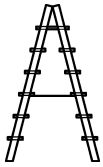
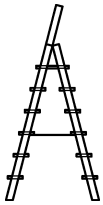
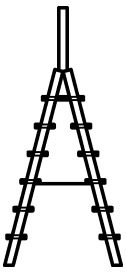
Table 1

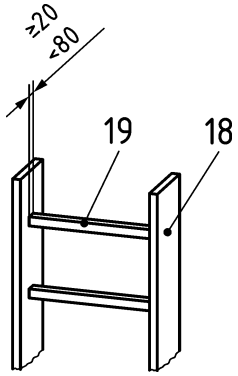
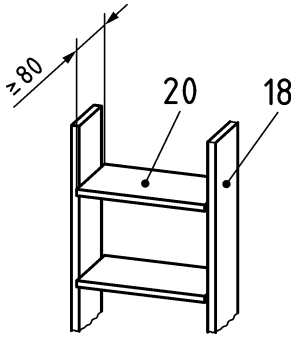
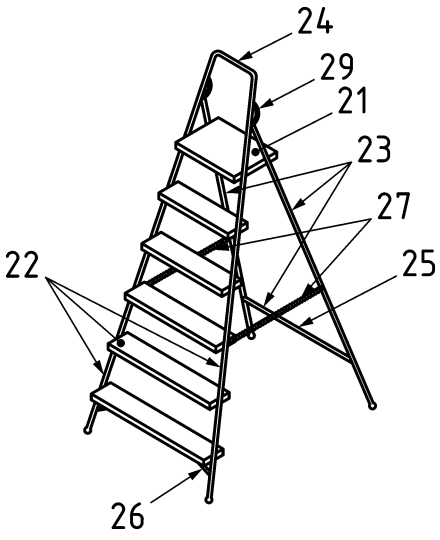
Dimensions in millimetres

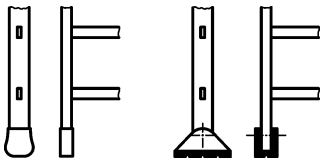
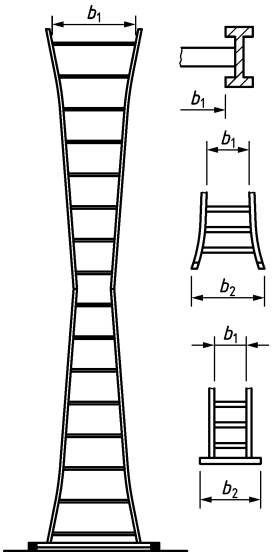
No	Terms	Definition	Figure
3.1	ladder	device incorporating steps or rungs on which a person may step to ascend or descend	
3.2	portable ladder	ladder which can be transported and set up by hand	
3.3	mobile ladder	ladder which is brought to each operational place by means of mobile support	 **Figure 1**
3.4	rung ladder	portable ladder with rungs, which have a standing surface from front to back of less than 80 mm	
3.5	leaning rung ladder	rung ladder which does not have its own support	
3.6	one-piece leaning rung ladder	leaning rung ladder consisting of one part only	 **Figure 2**

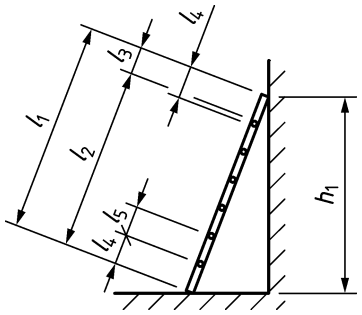
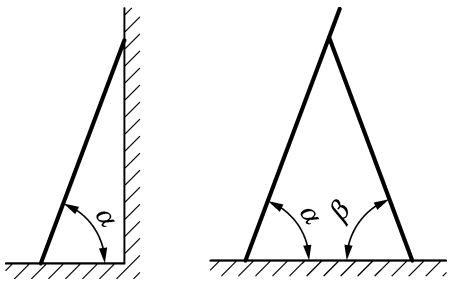
No	Terms	Definition	Figure
3.7	sectional ladder	leaning ladder consisting of several sections that can be fitted together by means of connection devices Note 1 to entry: The length can only be varied by one whole section at a time.	 **Figure 3**
3.8	extending ladder	leaning rung ladder consisting of two or more parts where the length can be regulated by one rung at a time	
3.9	push-up extending ladder	extending ladder where the upper parts are extended by hand	 **Figure 4**

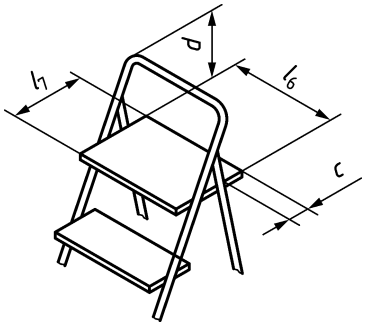
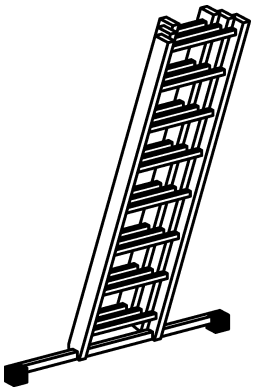
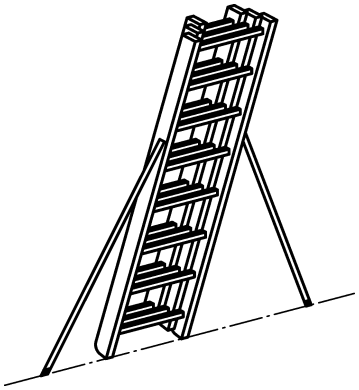
No	Terms	Definition	Figure
3.10	rope-operated extending ladder	extending ladder where the upper parts are extended by means of a rope or other means such as chains, straps or cables	 **Figure 5**
3.11	standing rung ladder	two-piece self-supporting rung ladder, unilaterally or bilaterally ascendable	 **Figure 6**
3.12	combination ladder	rung ladder of several parts, that can be used as, an extending ladder, a standing ladder or as a standing ladder with an extending ladder at the top, and parts of which may be used as one piece leaning ladders	 **Figure 7**  **Figure 8**
3.13	step ladder	portable ladder with steps horizontal during use and a standing surface from front to back equal to or greater than 80 mm	

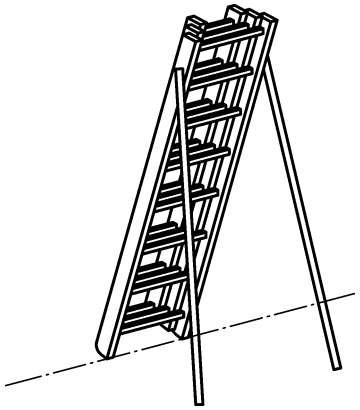
No	Terms	Definition	Figure
3.14	leaning step ladder	step ladder that does not have its own support consisting of one or several parts	 **Figure 9**
3.15	standing step ladder	two-legged self-supporting step ladder, unilaterally or bilaterally ascendable; with or without platform; with or without hand-/knee rail; a platform is regarded as a step	
		unilaterally ascendable step ladder	 **Figure 10**
		bilaterally ascendable step ladder	 **Figure 11**
		unilaterally ascendable step ladder with platform and hand-/knee rail	 **Figure 12**
		bilaterally ascendable step ladder with platform and hand-/knee rail	 **Figure 13**
3.16	standing ladder	ladder (with rungs or steps) which has its own support	
3.17	standing rung and step ladder	standing ladder, one section with rungs and the other section with steps	

No	Terms	Definition	Figure
3.18	stile	lateral part of a ladder which supports the rungs or steps as well as cross struts of supporting legs	
3.19	rung	climbing support with a standing surface from front to back of less than 80 mm and at least 20 mm	 **Figure 14**
3.20	step	climbing support with a standing surface from front to back equal to or greater than 80 mm	 **Figure 15**
3.21	platform	topmost standing surface of a standing step ladder which is different from a step	 **Figure 16**
3.22	ascending leg	leg of a ladder with climbing supports	
3.23	supporting leg	leg of a ladder without climbing supports	
3.24	hand-/knee rail	device for holding onto or gaining support from at the upper end of a standing ladder	
3.25	cross strut	horizontal connection of the stiles of the supporting leg	
3.26	bottom brace	device which secures the lower end of the stile against buckling	
3.27	opening restraint device	device on standing ladders which secures the two legs of the ladder from sliding apart	
3.28	locking device	device to keep ladder hooks engaged on the rung or step during use	

No	Terms	Definition	Figure
3.29	hinge-joint	device on standing ladder which secures the two legs of the ladder	
3.30	foot	device fitted permanently to the bottom of ladders to prevent the ladder from slipping; or, in the case of a wooden ladder, bottom of the stile or a component fitted to the bottom of the stile	 **Figure 17**
3.31	inner width b_1	usable distance between the inner sides of the stiles measured at the upper edge of the topmost rung/step/platform	 **Figure 18**
3.32	outside width b_2	distance between the outer side of stiles measured at the lower end of stiles or the outside width of the supporting points of the stabilizer	
3.33	total length l_1	distance measured over the bottom foot to the top of a ladder	(see Figure 19)
3.34	length of combination ladders l_8	distance from the lower end of the ladder to the upper edge of the standing ladder made with the first two parts of the combination ladder (without considering the top part of a three part combination ladder), measured in the middle line between the stiles"	(see Figures 31 and 33)

No	Terms	Definition	Figure
3.35	length to the topmost rung/step l_2	distance from the lower end of the ladder to the upper edge of the topmost rung/step or to the upper edge of the platform, measured in the middle line between the stiles	
3.36	distance between the upper surface of the topmost rung and the top end l_3	distance between the upper surface of the topmost rung to the top end of the ladder, measured in the middle line between the stiles	
3.37	distance between the bottom end and the lowest rung/step or the top end and the highest rung/step l_4	distance from the lower end of the ladder to the upper edge of the lowest rung/step, or the distance from the upper end of the ladder to the lower edge of the highest rung/step measured in the middle line between the stiles	 **Figure 19**
3.38	distance between rungs/steps l_5	distance between the rungs/steps, measured in the middle line between the stiles from the upper edge of rung/step to the upper edge of rung/step or to the upper edge of platform	
3.39	touch-down height h_1	vertical height measured from floor level to the top contact point, upper edge of a touch down rail or a hooking-in bar when the ladder is standing in its correct working position	
3.40	height to upper edge of rung/step/platform h_2	distance measured vertically from the floor level to the upper edge of the topmost rung/step or platform of the ladder when the ladder is standing in its correct working position	(see Figure 35)
3.41	inclination α, β	angle (α for ascending leg, β for supporting leg) between the horizontal plane and the legs of the ladder	 **Figure 20**

No	Terms	Definition	Figure
3.42	width of platform l_6	distance between the left and the right edges of the platform	 **Figure 21**
3.43	depth of platform l_7	distance between the front and the rear edges of the platform	
3.44	platform overhang c	distance from the rear side of the support legs to the rear edge of the platform	
3.45	hand-/knee rail height d	vertical distance from the top edge of the platform to the top edge of the hand-/knee rail	
3.46	thickness of stile t	outside dimension of the stile, measured perpendicular to the stile axis in the plane of the ladder	(see Figures 28 to 31)
3.47	clearance e	horizontal distance between the rungs of two parallel parts of the ladder, when the locking devices are in the use position	(see Figure 27)
3.48	bar type stabilizer	component fixed across the base of a ladder and acts as a device to increase the base width b_2 and provides increased stability	 **Figure 22**
3.49	lateral type stabilizer	component fixed to the ladder in the plane of the ladders width and acts as a device to increase the base width b_2 and provides increased stability	 **Figure 23**

No	Terms	Definition	Figure
3.50	pole type stabilizer	component fixed to the ladder not in the plane of the ladders width and acts as a device to increase the base width b_2 and provides increased stability	 **Figure 24**

4 Functional sizes

4.1 General

The drawings are examples only and products need not correspond. However, dimensions are binding.

The rungs and steps of a ladder shall be equally spaced with a tolerance of ± 2 mm.

In addition to the requirements on the complete ladder, sections which can be dismantled without the use of tools shall conform, section by section, with the requirements for one piece leaning ladders or leaning rung ladders.

4.2 Leaning rung ladders

4.2.1 General

Functional sizes are given in Table 2.

The minimum permanently available base width for leaning rung ladders shall be derived from the formula b_2 in Table 2. Combination and multi-hinge ladders shall also meet the minimum base width requirements in leaning ladder modes of use. For leaning ladders the method of achieving the permanently available minimum base width is at the discretion of the manufacturer but it shall be permanently incorporated in the design and not provided by removable components or accessories. It is permissible for a device which provides the required base width to be supplied for assembly by the end user with the use of tools. It is permissible for the design to allow for the base width b_2 or its position to be temporarily adjusted by the user. Where the base width can be temporarily adjusted by the user then instructions and markings shall be provided in accordance with the requirements of EN 131-3.

Table 2 — Functional sizes of leaning rung ladders

Dimensions in millimetres

	b_1[a, e]	b_2[a] where $l_1 \leq 3\,000$	b_2[a] where $l_1 > 3\,000$	e[b]	l_3 and l_4[a]	l_5	α
min.	280	340	$b_1 + 0{,}1\ l_1 + 2\ t$[d]	—	$0{,}5\ l_5$	250	65°
max.	—	—[c]	—[c]	45	$l_5 + 15$	300	75°

a This dimension applies also to single parts of a ladder if they can be used separately e.g. as leaning ladder.

b The dimension e for extending ladders (see Figure 27) is relevant only when the upper section slides over the lower section.

c The dimension b_2 for leaning ladders may be limited to a maximum of 1200 mm at the discretion of the manufacturer.

d The thickness of the stile t is the outside dimension of the stile.

e The minimum usable distance between the inner sides of the stiles at any point shall be 280 mm.

4.2.2 One-piece leaning rung ladders

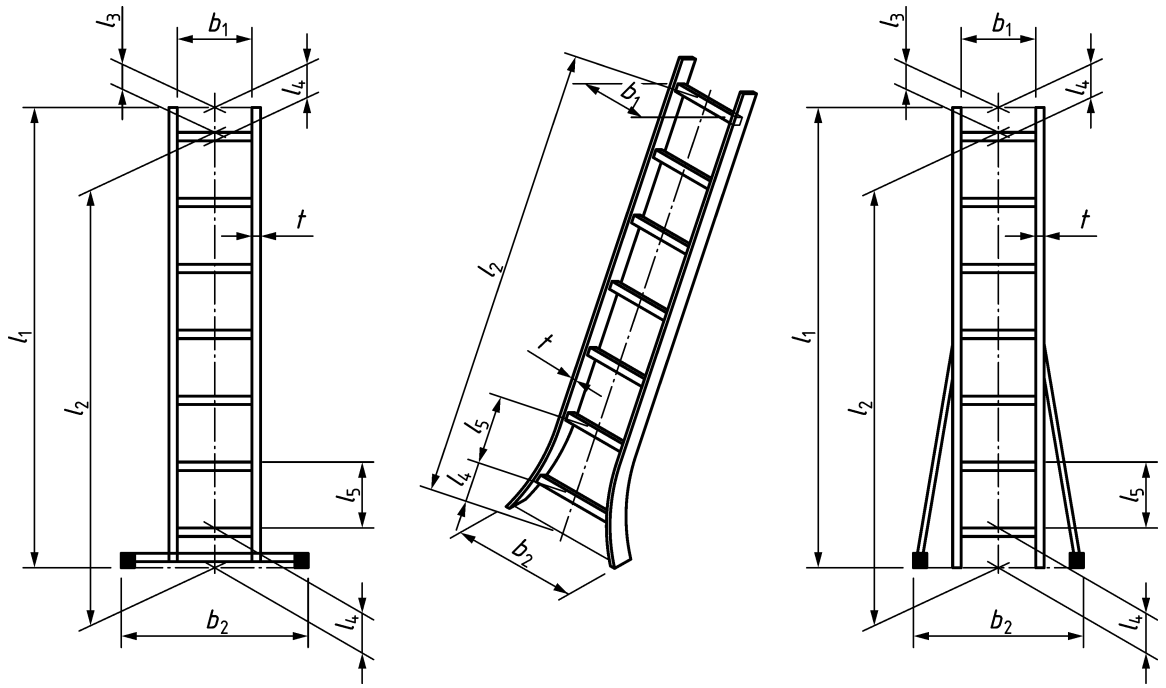


Figure 25 — One-piece leaning rung ladder

4.2.3 Sectional ladders

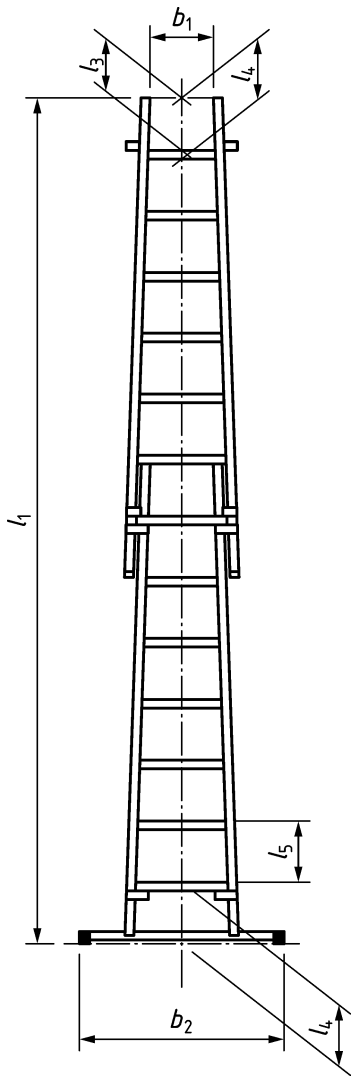
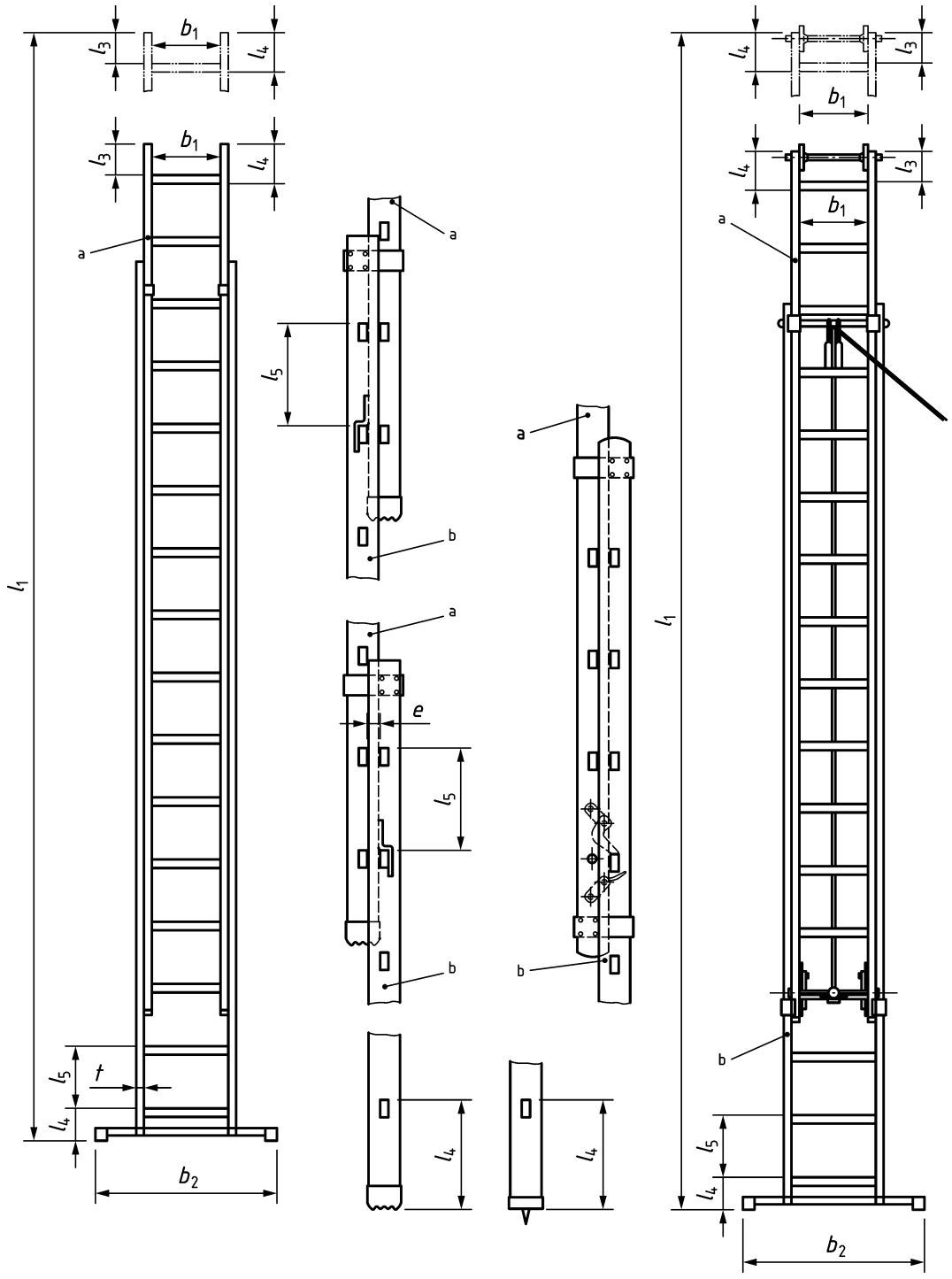


Figure 26 — Sectional ladder

4.2.4 Extending ladders

If the top ladder element is more than 3 000 mm then it should not be separable if the design introduces new hazards in use.

The design of the stabilizer shall not create the possibility of foreseeable misuse or introduce additional hazards. See Figure 32.



Key

a upper ladder

b lower ladder

Figure 27 — Extending ladders

The dimension of the overlap depends on calculation and design of the ladder. It is determined by the manufacturer. The function and carrying capacity of the overlap shall be verified by means of the test according to EN 131-2.

4.3 Standing rung ladders

The legs are connected with hinge joints and shall be secured from sliding apart. Functional sizes are given in Table 3.

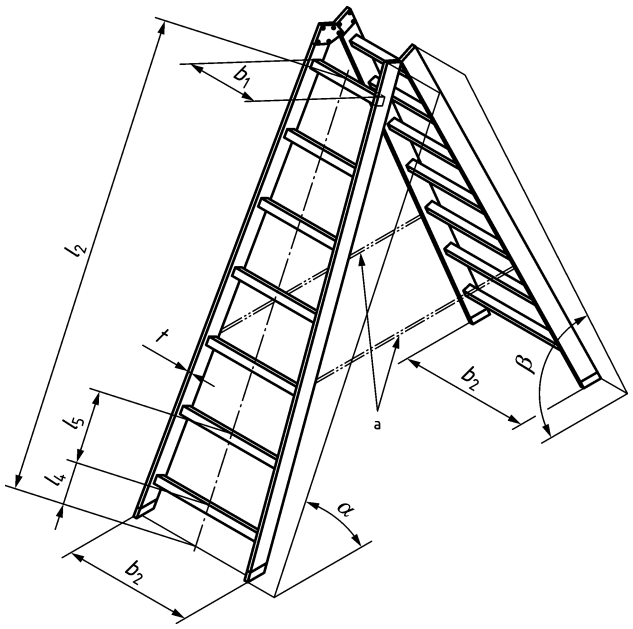
Table 3 — Functional sizes of standing rung ladders

Dimensions in millimetres

	b_1[b]	b_2	l_4	l_5	α	β
min.	280	$b_1 + 0{,}1\ l_2 + 2\ t$[a]	$0{,}5\ l_5$	250	65°	65°
max.	—	—	$l_5 + 15$	300	75°	75°

[a] The thickness of the stile t is the outside dimension of the stile.

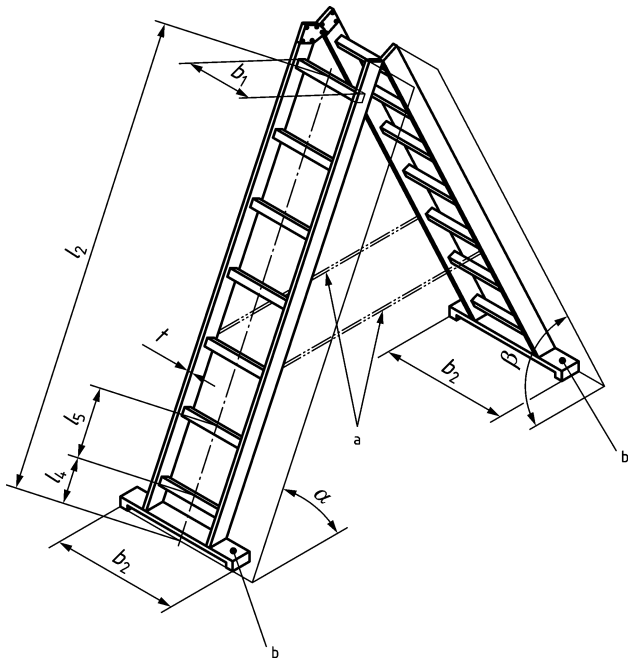
[b] The minimum usable distance between the inner sides of the stiles at any point shall be 280 mm.



Key

[a] example of an opening restraint device

Figure 28 — Standing rung ladder with tapered legs

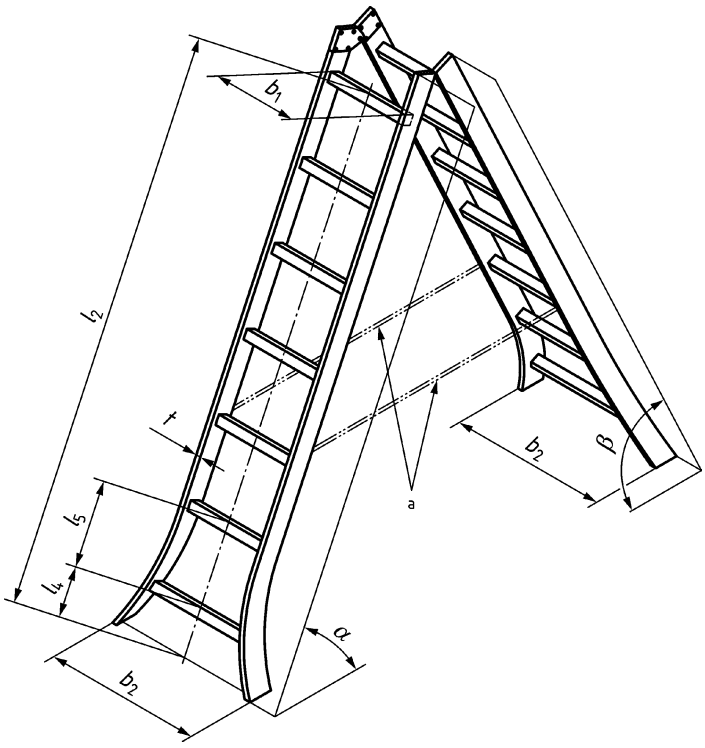


Key

[a] example of an opening restraint device

[b] it shall not be possible to remove the stabilizers by hand.

Figure 29 — Standing rung ladder with parallel stiles and stabilizers at the base of both sections of the ladder



Key

a example of an opening restraint device

Figure 30 — Standing rung ladder with parallel stiles splayed at the bottom of both sections

4.4 Combination ladders

4.4.1 General

When combination ladders are used as standing ladders, the ladder parts shall be secured from sliding apart.

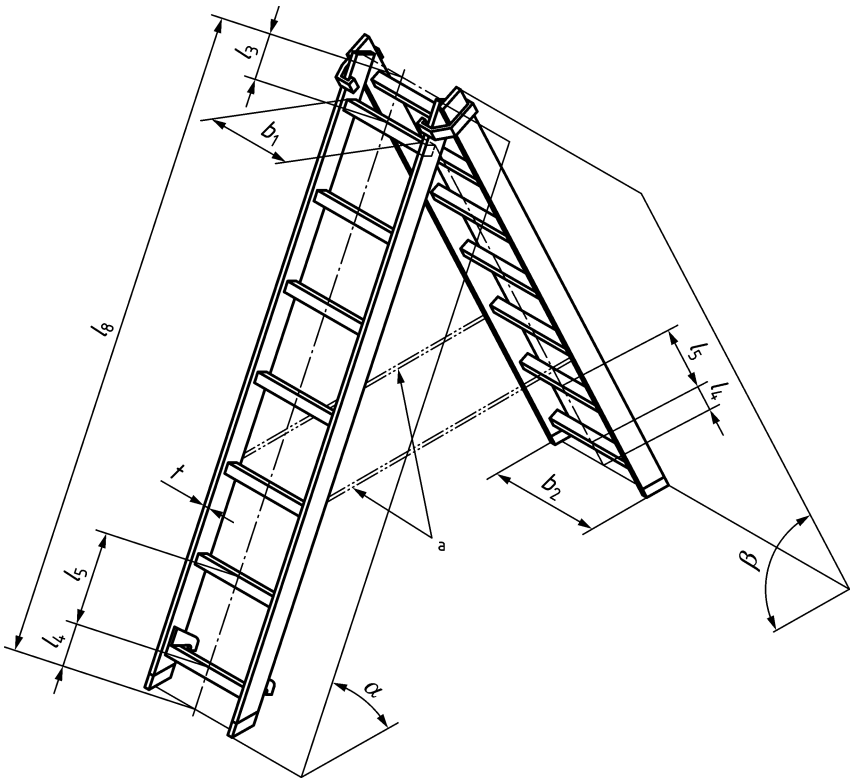
4.4.2 Two-piece combination ladder

If the top ladder element is more than 3000mm then it should not be separable if the design introduces new hazards in use. See Figure 32.

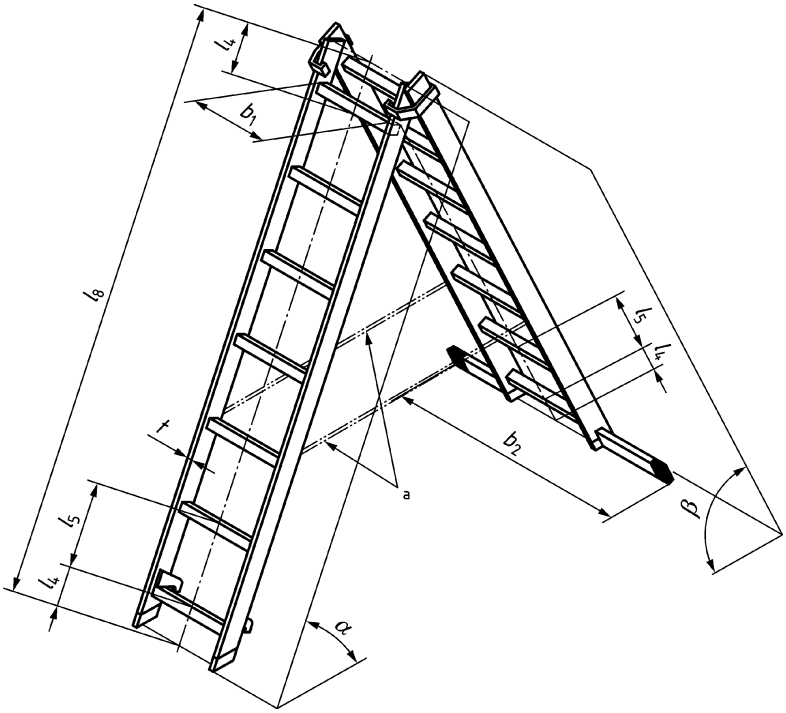
Table 4 — Functional sizes of two-piece combination ladders

Dimensions in millimetres

	b_1[b]	b_2	l_3	l_4	l_5	α	β
min.	280	$b_1 + 0{,}15\ l_8 + 2\ t$[a]	0,5 l_5	0,5 l_5	250	65°	65°
max.	—	—	$l_5 + 15$	$l_5 + 15$	300	75°	75°
If separate parts of the ladder can be used as a leaning ladder refer to Table 2.							
a The thickness of the stile t is the outside dimension of the stile.							
b The minimum usable distance between the inner sides of the stiles at any point shall be 280 mm.							



a)



b)

Key

[a] example of an opening restraint device

Figure 31 — Combination ladder, shown as standing ladder

4.4.3 Three-piece combination ladder

If the top ladder element is more than 3 000 mm then it should not be separable if the design introduces new hazards in use. See Figure 32.

Figure 32 — Example of a hazard in use with a two section extension ladder where the sections may be separated

NOTE In this example where the ladder sections are separable and a bar type stabilizer is fitted to both sections, an additional hazard is created when the two sections are used together.

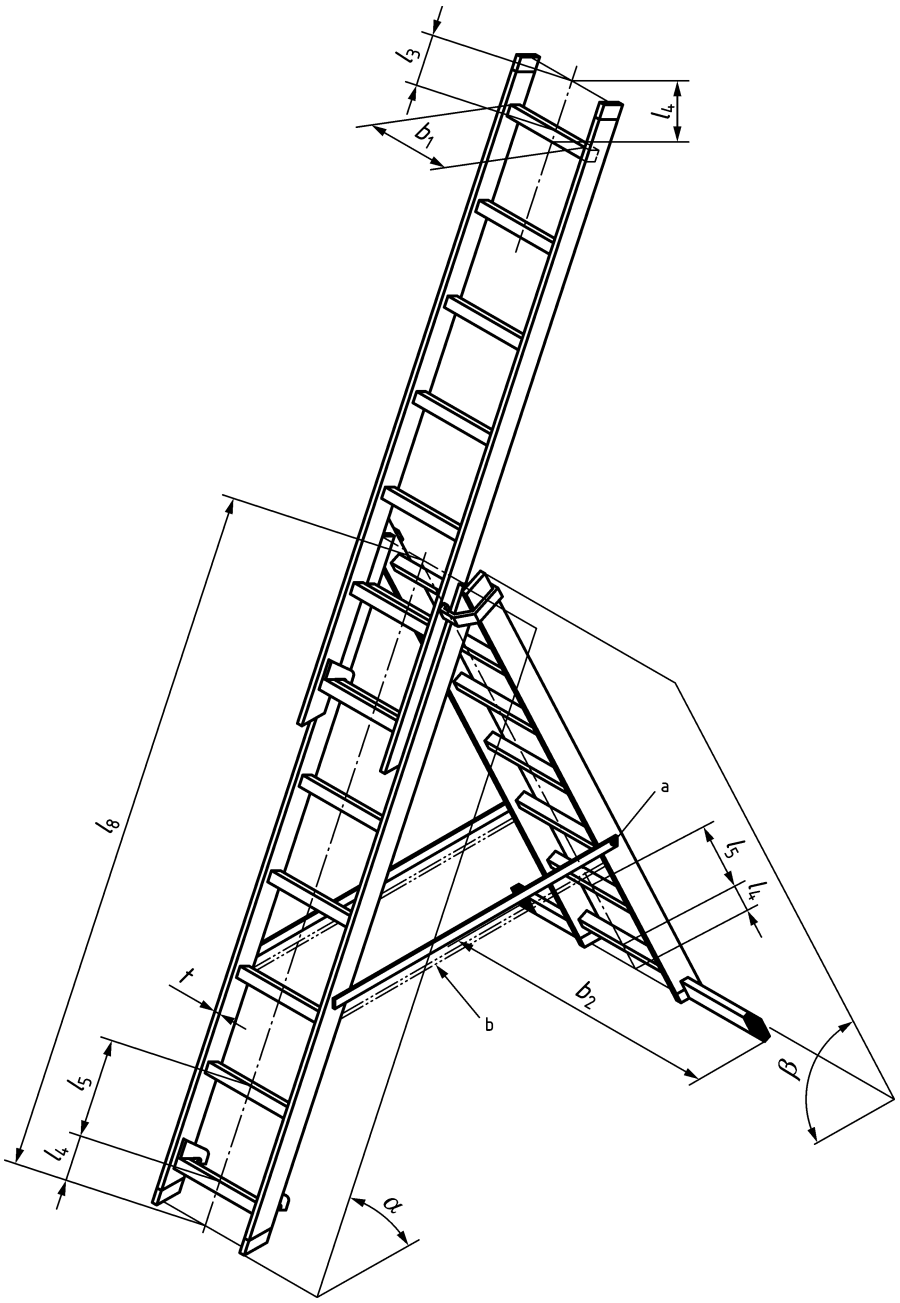
Table 5 — Functional sizes of three-piece combination ladders

Dimensions in millimetres

	b_1[b]	b_2	l_3	l_4	l_5	α	β
min.	280	b_1 + 0,175 l_8 + 2 t[a]	0,5 l_5	0,5 l_5	250	65°	65°
max.	—	—	l_5 + 15	l_5 + 15	300	75°	75°
If separate parts of the ladder can be used as a leaning ladder refer to Table 2.							

a The thickness of stile t is the outside dimension of the stile.

b The minimum usable distance between the inner sides of the stiles at any point shall be 280 mm.



Key

a, b example of opening restraint device

Figure 33 — Combination ladder, shown as standing ladder with an extending ladder at the top

4.5 Leaning step ladders

The permissible inclination α applies to the height of the touch-down surface above floor level, when the steps are in horizontal position. Functional sizes are given in Table 6.

Table 6 — Functional sizes of leaning step ladders

Dimensions in millimetres

	b_1[d]	b_2 where $l_1 \leq 3\,000$[a]	b_2 where $l_1 > 3\,000$[a]	l_4	l_5	α
min.	280	340	$b_1 + 0{,}1\ l_1 + 2\ t$[b]	$0{,}5\ l_5$	230	60°
max.	—	—[c]	—[c]	$l_5 + 15$	300	70°

a This size applies also to single parts of a ladder if they can be used separately e.g. as leaning ladder.

b The thickness of the stile t is the outside dimension of the stile.

c The dimension b_2 for leaning ladders may be limited to a maximum of 1 200 mm at the discretion of the manufacturer.

d The minimum usable distance between the inner sides of the stiles at any point shall be 280 mm.

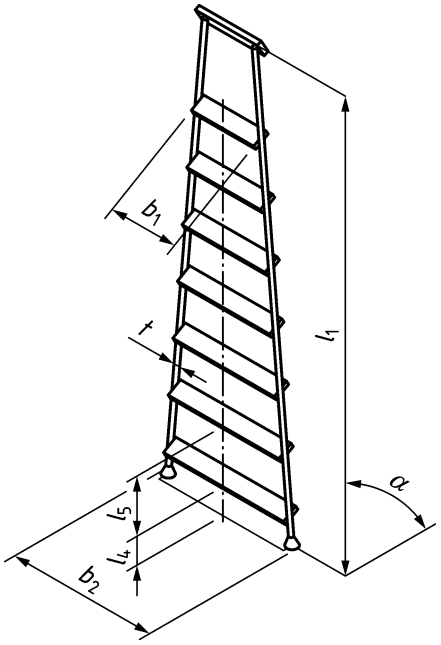


Figure 34 — Leaning step ladder

4.6 Standing step ladders

The legs are connected with hinge joints and shall be secured from sliding apart.

During the use of ladder the steps shall be in horizontal position.

The projection of the handrail onto the platform shall not go beyond the latter.

The radius of the horizontal edges of a platform shall be max 15 mm (see Figure 37) in order to avoid slipping at the edges of the platform.

Functional sizes are given in Table 7.

Table 7 — Functional sizes of standing step ladders

Dimensions in millimetres

	b_1[d]	b_2	c	d	l_4	l_5	l_6[c]	l_7	α	β
min.	280	$b_1 + 0{,}1\ l_2 + 2\ t$[a]	—	600[b]	0,5 l_5	230	250	250	60°	65°
max.	—	—	30	—	$l_5 + 15$	300	—	—	70°	75°

a The thickness of the stile t is the outside dimension of the stile.

b Measured vertically.

c It shall be possible to inscribe a square of 250 mm x 250 mm in the platform (see Figure 37).

d The minimum usable distance between the inner sides of the stiles at any point shall be 280 mm.

Dimensions in millimetres

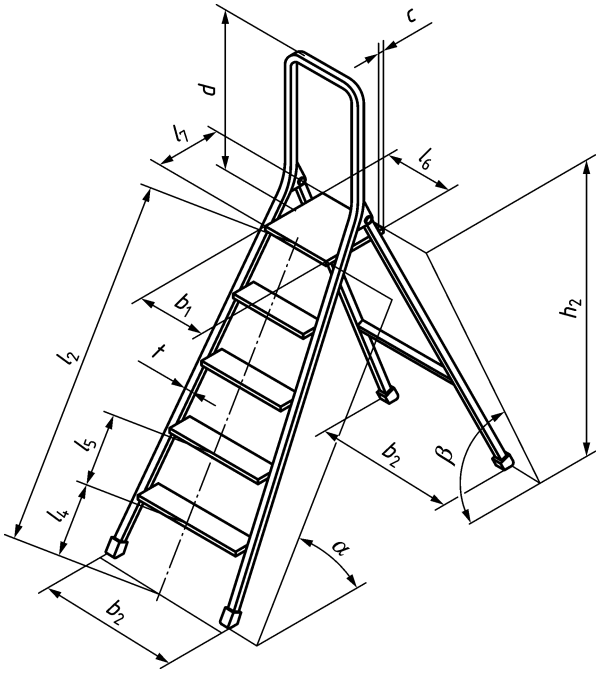
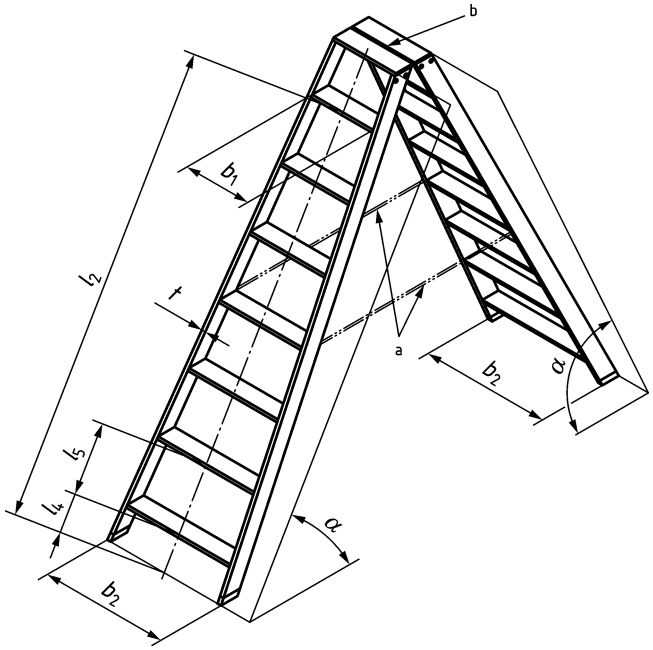


Figure 35 — Unilaterally ascendable standing step ladder with platform and handrail; the platform is considered as step



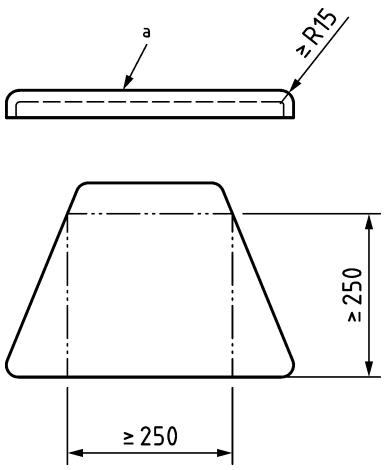
Key

a example of an opening restraint device

b the topmost surface is not regarded as a step

Figure 36 — Bilaterally ascendable standing step ladder

Dimensions in millimetres



Key

[a] tread surface

Figure 37 — Platform

4.7 Standing rung and step ladder

The rung section shall be designed in accordance with 4.3 and the step section in accordance with 4.6.

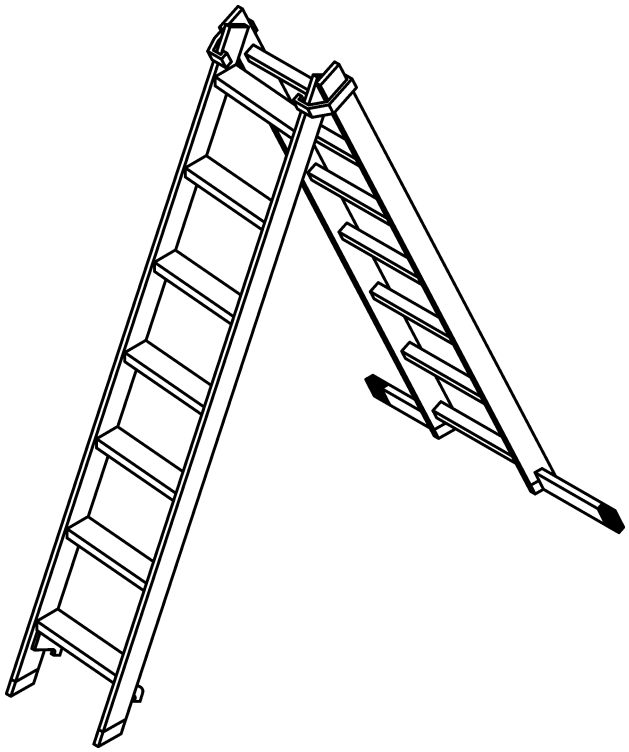


Figure 38 — Standing rung and step ladder

Annex A
(informative)

A-deviations

A-deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CEN/CENELEC member.

This European Standard does not fall under any Directive of the EU.

In the relevant CEN/CENELEC countries these A-deviations are valid instead of the provisions of the European Standard until they have been removed.

Italy

According to the Italian legislation concerning the protection health and safety in the workplace — Italian Legislative Decree d.lgs April 9th, 2008, n. 81 and as amended and supplemented — ladders described in the revision of EN 131-1 are allowed in Italy only if complying with the following requirements:

a) "Ladders, in accordance with Clause 113, point 6 c), shall be also fitted with:

   1) anti-slippage devices at the bottom stiles ends;

   2) holding hooks or anti-slippage supports to the top ends, when necessary to ensure the ladders stability";

b) "For use of sectional ladders assembling two or more elements fitted together (Italian type or similar), besides what already stated in Clause 113 point 3, the following requirements, in accordance with Clause 113 points 8 a) and 8 b), have also to be met:

   1) the length of the ladder made ready for use shall not be more than 15 m, except in case of particular needs, in which case the top ends of stiles shall be secured to fixed parts;

   2) ladders made ready for use longer than 8 m shall be fitted with a length breaker to reduce the deflection";

c) "Standing ladders shall not be longer than 5 m" in accordance with Clause 113 point 9.

d) "Rungs (in case of wooden ladders) shall not present knots and shall be fixed end to the stiles, which have to be held by means of iron tie rods applied under the two end rungs; ladders longer than 4 m shall also present an intermediate tie rod" in accordance with Clause 113 point 3.

The Netherlands

A-deviation in order to reflect the Dutch legal requirement regarding handrails.

'Besluit Draagbaar Klimmaterieel', Appendix A, Article 3' (see Annex 2), in which is mentioned that all step ladders (with top height above 60 cm) shall have a hand-/knee rail of at least 60 cm height measured between the platform and the hand-/knee railt.

Sweden

Ladders according to EN 131-1 are allowed in Sweden only if complying with the requirements in the Swedish Work Environment Act, AFS 2004:3. This means that the inner width, b_1, for all types of ladders shall be minimum 300 mm. For leaning ladders, the outside width, b_2, shall be minimum 400 mm.

Bibliography

[1] EN 131-6, *Ladders — Part 6: Telescopic ladders*

[2] EN 131-7, *Ladders — Part 7: Mobile ladders with platform*

[3] EN 14183, *Step stools*

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