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BSI Standards Publication

Portable ladders for fire service use

National foreword

This British Standard is the UK implementation of EN 1147:2010. It supersedes BS EN 1147:2001 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee FSH/17/9, Fire appliances and associated operational equipment.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Portable ladders for fire service use

Échelles portables à l'usage des services d'incendie

Tragbare Leitern für die Verwendung bei der Feuerwehr

This European Standard was approved by CEN on 29 April 2010.

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Contents

Page

Foreword

This document (EN 1147:2010) has been prepared by Technical Committee CEN/TC 192 “Fire service equipment”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by November 2010, and conflicting national standards shall be withdrawn at the latest by November 2010.

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 1147:2000.

Annexes A, B, C, D, E, F, G, H, I, J, K and L are normative; Annexes M, N and O are informative.

This European Standard contains A-deviations referring to Clauses 6 and 9.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Standard is based on the performance of portable fire and rescue service ladders in normal use and includes safety requirements. A safety factor of the order of 3:1 has been used and the mass of a firefighter including personal equipment and breathing apparatus has been taken as 108 kg.

The standard sets out minimum and/or maximum values within which the customer may specify his own requirements.

In preparing this standard it has been recognized that the operational use of portable ladders varies throughout Europe.

1 Scope

This European Standard specifies requirements, test methods and performance criteria for portable ladders for fire and rescue service use and associated purposes.

The tests in this European Standard are type tests and not periodical tests.

Non-portable ladders for fire and rescue service use are excluded from this standard.

NOTE For ladders for other uses see EN 131 (all parts).

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 131-2:1993, *Ladders — Requirements, testing, marking*

3 Terms and definitions

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

3.1
access ladder
ladder designed for gaining access

NOTE Access ladders are not recommended for rescue by carry-down or carry-up.

3.2
angle of pitch
angle between the horizontal plane and the underside of the stiles of the ladder in use

3.3
cable
wire rope for mechanically extending and housing an extension ladder

3.4
carry-down and carry-up
lifting of the whole weight of another person

3.5
compulsory pole ladder
ladder where the use of poles to support the ladder is mandatory

3.6
distance between rungs
distance measured in the middle line between the stiles from the upper edge of a rung to the upper edge of an adjacent rung

3.7
extending ladder
ladder consisting of two or more sliding sections

3.8
extending line
rope for manually extending and housing extending ladder sections

3.9
foot, anti-skid device
device fitted to the bottom of ladders to prevent slipping

3.10
hook ladder
ladder which has (a) hook(s) from which it is suspended in use

3.11
internal ladder
narrow ladder primarily for use inside buildings or restricted spaces

3.12
length overall
distance measured from the bottom of the foot to the top of a ladder at its maximum length

3.13
mechanically operated extending ladder
extending ladder where the upper parts are extended by mechanical means for example by extending lines or cables

3.14
multifunction ladder
ladder which can be configured to serve more than one function

3.15
one-piece ladder
ladder consisting of one section only

3.16
pawl
load-bearing mechanism which holds the sections of an extending ladder in the extended position

3.17
pole
device used for handling and/or support and to improve the stability of the ladder

3.18
pulley sheave
wheel with a groove in its rim for a rope or cable

3.19
push-up extending ladder
extending ladder where the upper parts are extended by hand

3.20
rescue ladder
ladder designed for rescue by carry-down or carry-up

3.21
roof ladder
ladder which follows the surface of a roof and has a hook which hooks over the ridge of the roof

3.22
rung
horizontal climbing support with a walking surface attached to stiles to form a ladder

3.23
sectional ladder
ladder consisting of several sections that can be fitted together by means of connection devices but the length can only be varied by one whole section at a time

3.24
stabilizing means
device or part of the ladder the function of which is to improve the stability of the ladder in use

3.25
step in/step out
distance between adjacent rung centres where ladder sections overlap

3.26
stile
lateral part of a ladder which supports the rungs

3.27
stick ladder
ladder with hinged rungs enabling the stiles to fold together

3.28
total mass
mass of the ladder complete with all extras and fittings as specified

4 Categorization

Ladders shall be categorized by their type, the maximum number of persons and mode of use (see Table 1).

Table 1 — Ladder categories

Type of ladder	Maximum number of persons	Mode of use
Extending	3	Rescue and access
	2	Rescue and access
	1	Access
Hook	1	Access
One piece	3	Rescue and access
	2	Rescue and access
	1	Access
Roof	1	Access
Sectional	3	Rescue and access
	2	Rescue and access
	1	Access
Stick	1	Access

NOTE For multifunction ladders reference should be made to the manufacturer's instructions.

5 Dimensions and total masses

5.1 Length

The maximum length of a hook ladder shall be 5 000 mm.

5.2 Width between stiles

5.2.1 The minimum width between stiles for different types of ladder (see Figure 1) shall be:

— for roof ladders 240 mm;

— for hook ladders 170 mm;

— for stick and internal ladders 230 mm;

— for all other ladders 295 mm.

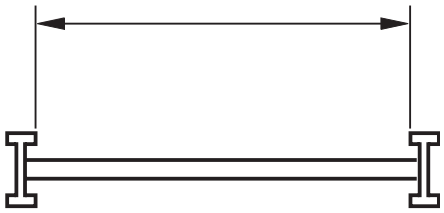


Figure 1 — Width between stiles

5.2.2 The maximum width between stiles on hook ladders shall be 250 mm.

5.3 Mass

The mass for different types of ladders shall not be more than:

— 25 kg for a ladder operated by one person;

— 15 kg for hook ladders;

— 8 kg/m of overall length for all other ladders.

6 Rungs

6.1 The distance between rungs shall remain constant throughout a ladder except where the hook is attached on a hook ladder:

— for hook ladders the distance between rungs shall be a maximum of 365 mm and a minimum of 280 mm except for the rungs supporting the hook where the distance may be reduced to a minimum of 180 mm;

— for all other ladders the distance between rungs shall be a maximum of 305 mm and a minimum of 250 mm.

6.2 Rungs shall have a flat or arched non-slip tread surface. Where the non-slip tread surface is a rung covering, the covering shall not move (see also Annex O).

6.3 Roof ladder rungs shall have a flat or arched non-slip surface on all sides.

6.4 The minimum width/diameter for rungs shall be 25 mm except for wooden rungs where the minimum width shall be 20 mm.

6.5 Where ladder sections overlap, maximum step-in and step-out shall be 90 mm between adjacent rung centres (see Figure 2).

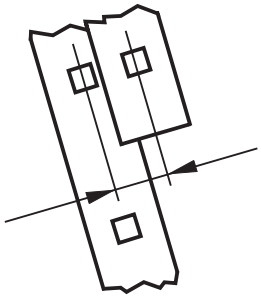
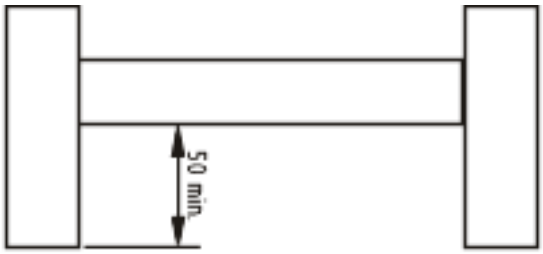


Figure 2 — Position of adjacent rung centres

6.6 Rungs shall be fitted with their tread surface perpendicular to the stile axis (see Figure 2).

6.7 For hook and roof ladders, the minimum clearance between the underside of a rung and a flat surface roof or wall shall be 50 mm in the user position (see Figures 3a) and 3b)) (see also Annex O).

a) Direct contact type



b) Stand-off bracket

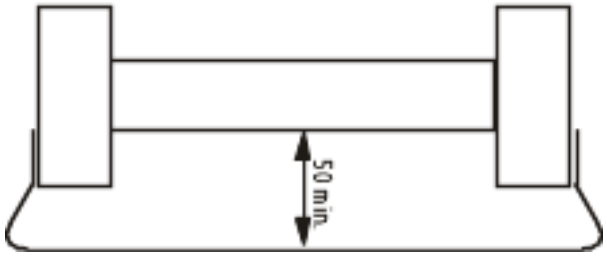


Figure 3 — Roof/wall clearance

7 Extending ladder requirements

7.1 Force

The force to fully extend the ladder shall not exceed 500 N for mechanically operated extending ladders and shall not exceed 260 N for push-up extending ladders.

7.2 Lines

The minimum line diameter shall be 8 mm for ladders up to 260 N to extend and 14 mm for ladders between 260 N and 500 N to extend.

Lines shall not obstruct the climbing of the ladder and, where they lie on the front face, a fitting shall be provided to secure the line.

The line shall be attached to the ladder such that the surplus does not foul its operation.

7.3 Cables

Cables shall have a:

— minimum breaking load of 2 845 N including its attachments;

— means of adjustment;

— closed eyes when used on cable attachments;

— pulley that is only removable by pulling it through the eye.

7.4 Additional safety requirements

Ladders shall be designed and constructed so that it cannot be over-extended.

When operating the ladder, it shall be designed and constructed in such a manner that if the rope is released in operation, the ladder shall stop or the section(s) shall be lowered in a controlled manner.

NOTE Compliance with this section should be without affecting the continued safe operation of the ladder.

7.5 Pawls

Pawls shall be fitted two to a section, to hold the ladder at any extension at which the section rungs coincide.

Each pawl shall be capable of supporting the required loads (see Annex G) on its own.

NOTE 1 Pawls should be visible from the ground and when climbing the ladder.

NOTE 2 Pawls should preferably be independent but may be linked if desired.

8 Fittings

8.1 Hooks

Hooks, where fitted, shall conform to the following.

The tip of any hook shall be not less than 260 mm and not greater than 600 mm from the adjacent side of the ladder.

Roof ladder hooks shall be constructed so as to minimize damage to the roof surface when the hook comes into contact with the roof.

Where two hooks are fitted side by side the contact points shall be not less than 250 mm apart (see Figure 4).

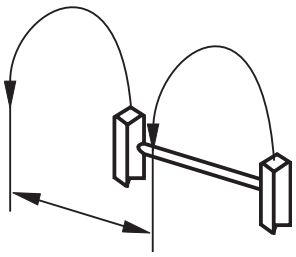


Figure 4 — Measurement between contact points

8.2 Feet

The parts of all types of ladders in contact with the ground shall have non-skid fitments.

8.3 Wheels

The fitting of wheels to ladders shall be allowed where these are considered necessary for the safe and satisfactory operation of the ladder.

NOTE Where wheels are fitted, they should have a resilient solid contact surface, should be able to withstand a temperature (in air) of 80 °C without malfunctioning and should be fitted to the ladder in such a way as to enable the ladder to roll up or roll down a wall or roof.

9 Stabilizing means

All ladders over 11 m in length shall be fitted with stabilizing means, which may, for example, be in the form of a pole (see also Annex O).

10 Poles

Poles designed to form an integral part of the stabilizing means and/or used for handling the ladder into position shall have a non-slip grip surface extending from the bottom of the pole (closed where telescopic) for a distance of 2 000 mm.

Poles designed to form an integral part of the stabilizing means shall have non-slip feet at the bottom of each pole.

NOTE Where poles are used as stabilizing means, the top section of the ladder should always rest on a structure.

11 Materials and finishes

Where wood is used, this shall be in accordance with 3.1.4 of EN 131-2:1993.

NOTE Those parts of ladders liable to corrosion should have a protective finish and there should be no sharp edges or burrs which may present a hazard to the user.

Wooden ladders shall be finished in accordance with 3.3 of EN 131-2:1993.

12 Marking

12.1 The ladder shall be clearly marked in accordance with Figures 5 or 6 or 7 which show its use.

NOTE In addition to these markings additional marking may be necessary for some ladders. Particular attention should be paid to the marking of individual sections of ladders to avoid overloading.

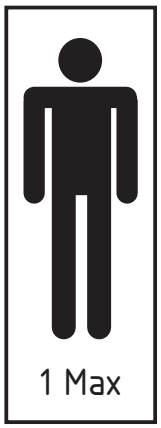


Figure 5 — One person label

Figure 6 — Two person label

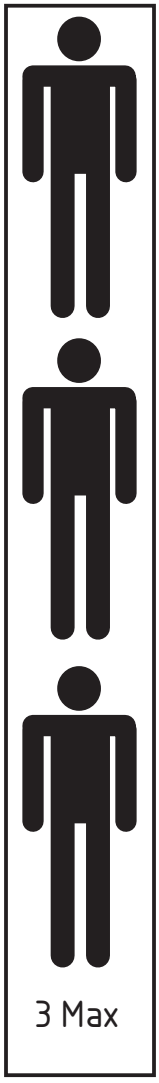


Figure 7 — Three person label

Colours:

— black figures;

— white background.

12.2 Access ladders shall be clearly marked to indicate that rescue by carry-down or carry-up is not recommended (see Figure 8).

Colours:

— figures: black and white;

— cross: red;

— background: white.

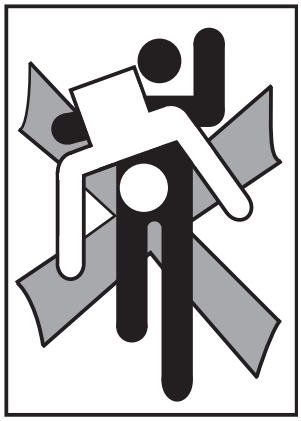


Figure 8 — Non-carry-down/carry-up marking

12.3 On compulsory pole ladders, the poles shall be marked with a red colour band of 75 mm minimum width around the full circumference of the pole.

12.4 Markings shall be positioned between 1,5 m and 2 m above the foot of the ladder and shall be clearly visible.

12.5 Ladders shall be marked or labelled with this standard number and date, the manufacturer's name or identification and year of manufacture.

12.6 All markings shall be permanent and durable.

13 Performance requirements

13.1 Deflection – All ladders

When tested in accordance with Annex A, all ladders except hook ladders and compulsory pole ladders shall meet the following requirements.

The deflection due to the load applied in A.4 shall not exceed 2,5 % of the span between the trestles (see Figure A.3).

The deflection due to the load applied in A.5 shall not exceed 1,5 times the deflection resulting from A.4 (see Figure A.4).

Within 60 s after removal of the load in A.5 the distance D in Figure A.5 shall be the same as distance B in Figure A.3.

13.2 Deflection – Compulsory pole

When tested in accordance with Annex B, compulsory pole ladders shall meet the following requirements.

The deflection due to the load applied in B.4 shall not exceed 2,5 % of the span between the top two trestles (see Figure B.3).

The deflection due to the load applied in B.5 shall not exceed 1,5 times the deflection resulting from B.4 (see Figure B.3).

Within 60 s after removal of the load in B.5 the distance D in Figure B.5 shall be the same as distance B in Figure B.3.

13.3 Other tests

Ladders shall be tested in accordance with the following annexes.

— Annex C, on completion of the test there shall be no discernible movement when turning the rung by hand;

— Annex D, for compulsory pole ladders there shall be no visible damage after completion of the test;

— Annex E, ladders except 3-person compulsory pole ladders and hook ladders shall support the load for the time specified;

— Annex F, 3-person compulsory ladders shall support the load for the time specified;

— Annex G, extension ladders shall support the load for the time specified;

— Annex H, rescue ladders shall support the load for the time specified;

— Annex I, access ladders shall support the load for the time specified;

— Annex J, ladders fitted with tip-loaded hooks shall support the load for the time specified;

— Annex K, ladders fitted with mid-loaded hooks shall support the load for the time specified;

— Annex L, for ground standing ladders on completion of the test the permanent deformation obtained by subtracting measurement L.6 from L.3 and L.9 from L.6, shall not exceed 3 mm in each case.

14 General test parameters

When carrying out the tests set out in Annexes A to L the following conditions shall apply:

NOTE 1 The following tests are type tests and not periodical tests.

— loads shall be applied gradually with no dynamic or sudden loading;

— a measuring tolerance of ± 3 mm shall apply to all test measurements and results. Loads and forces shall be within ± 1 % of stated figures;

— where fitted, extras shall be present at the time of testing;

— support of the test load shall be the only requirement in destructive tests;

NOTE 2 Permanent deformation resulting from destructive tests should not be taken as failure of the test.

— the maximum distribution of test loads shall be one rung space either side of the application point;

— the sections of extending ladders shall be secured to prevent the extension of the sections from the pawled test position without enhancing the strength of the ladder.

Annex A
(normative)

Deflection test: applicable to all ladders not covered by Annex B except hook ladders (non-destructive)

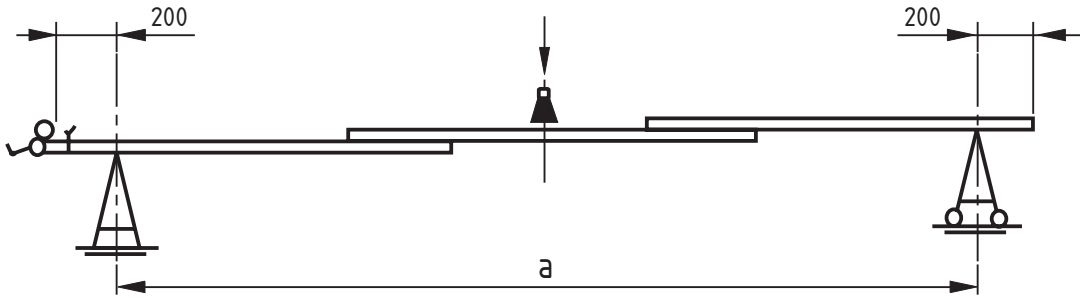
A.1 Support the ladder horizontally at its maximum length, on trestles placed 200 mm in from each end of the stile, in accordance with Figure A.1. Fix one trestle and ensure the other is mobile. Secure both trestles to the ladder.

A.2 Apply the second load from Table A.1 for a minimum of 60 s at a point on the ladder mid-span between the trestles (see Figure A.1).

Table A.1 — Deflection test loads

Ladder type	Material	First load	Second load
3 person ladder	Wooden	490 N (50 kg)	735 N (75 kg)
	All other	686 N (70 kg)	1 029 N (105 kg)
2 person ladder	Wooden	392 N (40 kg)	588 N (60 kg)
	All other	588 N (60 kg)	882 N (90 kg)
1 person ladder	All	490 N (50 kg)	735 N (75 kg)
Roof ladder	All	588 N (60 kg)	882 N (90 kg)

Dimensions in millimetres



Key
a = Span

Figure A.1 — Deflection test − Layout

A.3 Remove the load and measure the distance A from a point on the ladder mid-span between the trestles to a horizontal datum on the ground vertically below (see Figure A.2).

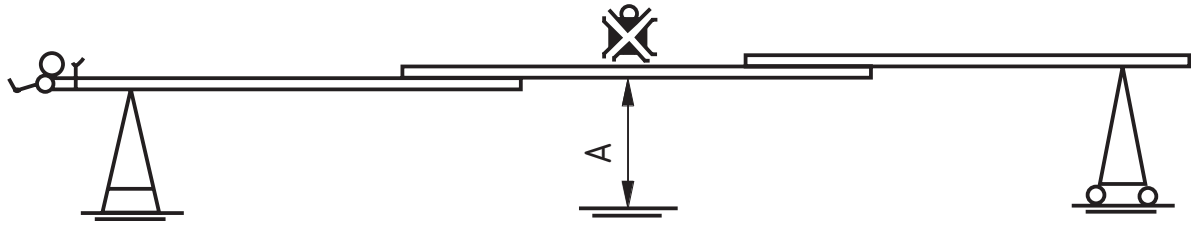


Figure A.2 — Deflection test − Datum

A.4 Apply the first load as specified in Table A.1 for a minimum of 60 s at a point on the ladder mid-span between the trestles. Measure the distance B from the point on the ladder mid-span between the trestles to the horizontal datum (see Figure A.3).

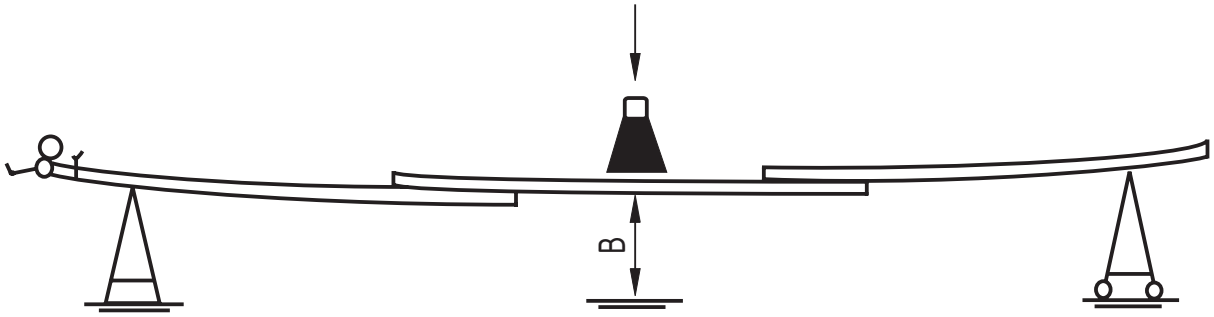


Figure A.3 — Deflection test − First deflection

A.5 Increase the load to the second load specified in Table A.1 and apply it for a minimum of 60 s at a point on the ladder mid-span between the trestles. Measure the distance C from the point on the ladder mid-span between the trestles to the horizontal datum (see Figure A.4).

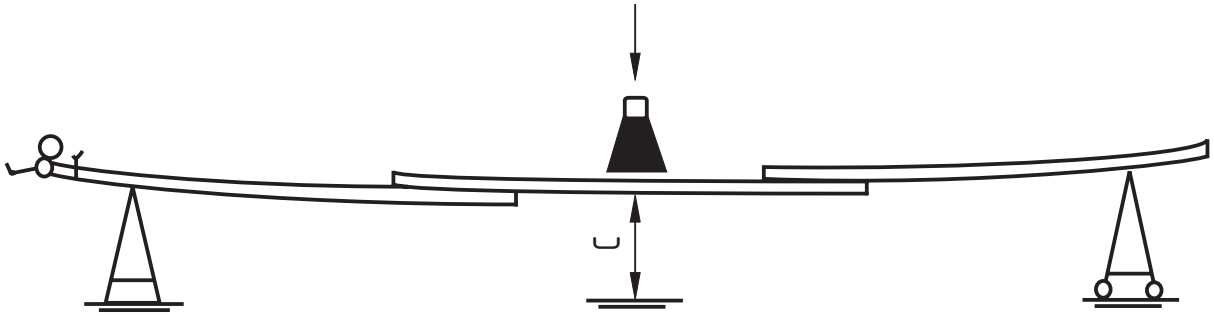


Figure A.4 — Deflection test − Second deflection

A.6 Not more than 60 s after removal of the load in A.5, measure the distance D from the point on the ladder mid-span between the trestles to the horizontal datum (see Figure A.5).

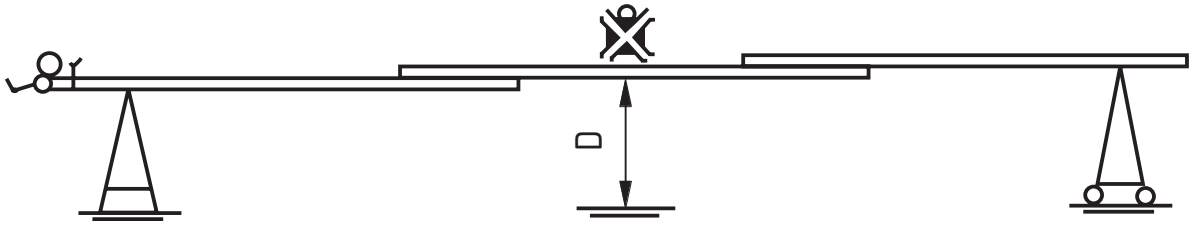


Figure A.5 — Deflection test − Return

A.7 The ladder shall not touch the ground during the test.

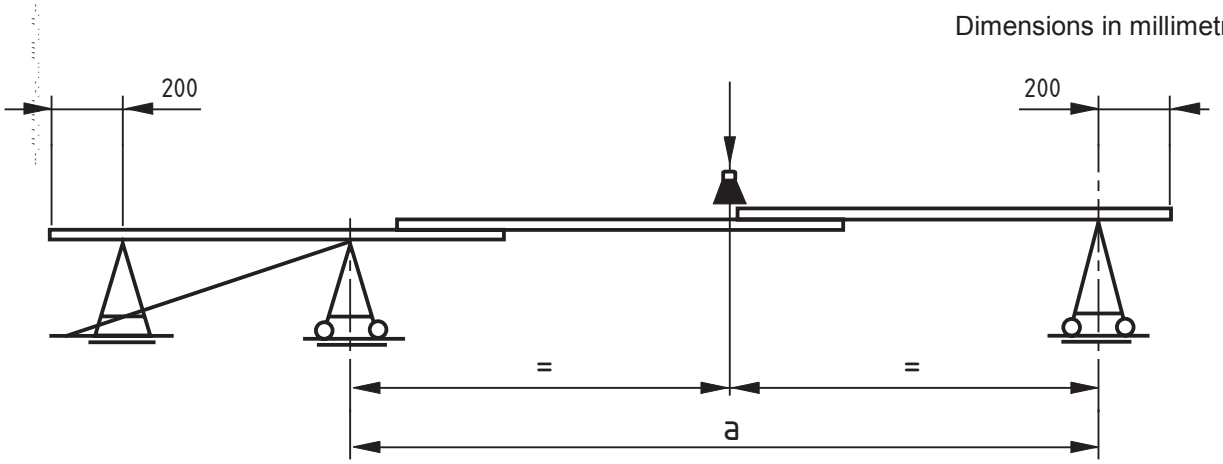
Annex B
(normative)

Deflection test: applicable to 3-person compulsory pole ladder (non-destructive)

B.1 Support the ladder horizontally at its maximum working length, on trestles placed 200 mm in from each end of the stile, with a third trestle at the joining point of the poles to the ladder. Ensure the trestle at the bottom end of the ladder is fixed and the other two are mobile. Secure the trestles to the ladder (see Figure B.1).

B.2 Apply the second load from Table B.1 for a minimum of 60 s at a point on the ladder mid-span between the two mobile trestles (see Figure B.1).

Dimensions in millimetres



Key
a = Span

Figure B.1 — Deflection test − Layout

B.3 Remove the load and measure the distance A from a point on the ladder mid-span between the two mobile trestles to a horizontal datum on the ground vertically below (see Figure B.2).

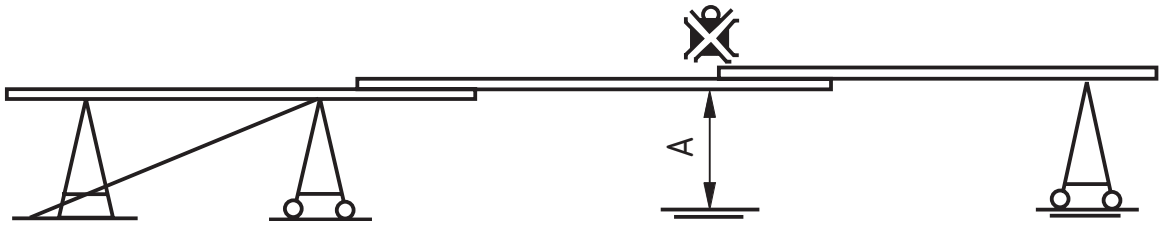


Figure B.2 — Deflection test − Datum

B.4 Apply the first load from Table B.1 for a minimum of 60 s at a point on the ladder mid-span between the two trestles. Measure the distance B from the point on the ladder mid-span between the two mobile trestles to the horizontal datum (see Figure B.3).

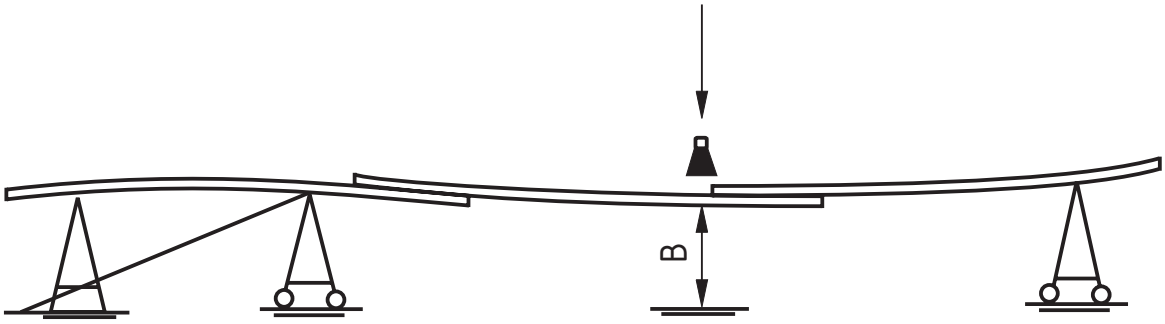


Figure B.3 — Deflection test − First deflection

B.5 Increase the load to the second load in Table B.1 and apply it for a minimum of 60 s. Measure the distance C from the point on the ladder mid-span between the two mobile trestles to the horizontal datum (see Figure B.4).

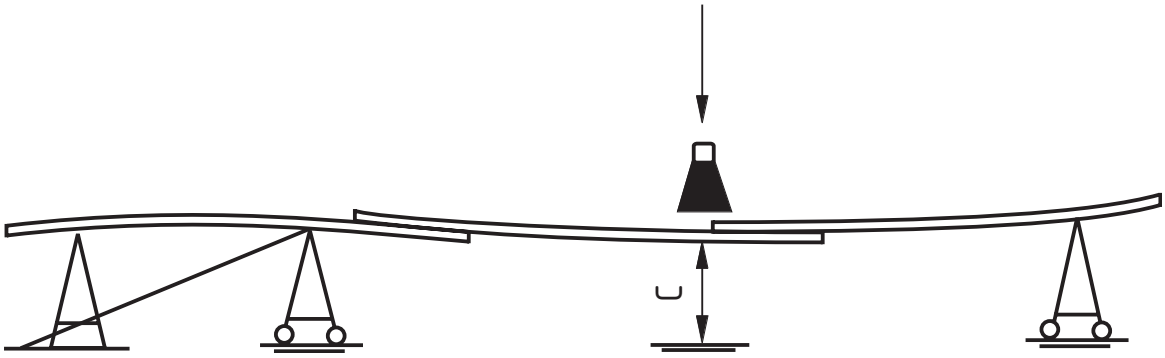


Figure B.4 — Deflection test − Second deflection

Table B.1 — Deflection test loads

Material	First load	Second load
Wooden	490 N (50 kg)	735 N (75 kg)
All other	686 N (70 kg)	1 029 N (105 kg)

B.6 Not more than 60 s after removal of the load in B.5, measure the distance D from a point on the ladder mid-span between the two mobile trestles to the horizontal datum (see Figure B.5).

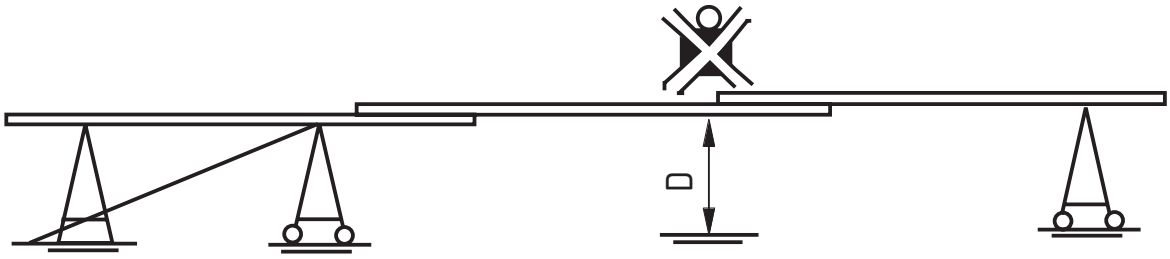


Figure B.5 — Deflection test − Return

B.7 The ladder shall not touch the ground during this test.

Annex C
(normative)

Rung torque test: all ladders (non-destructive)

C.1 Secure the section of ladder in the vertical and apply a torque of 50 Nm for a minimum of 30 s in a clockwise direction and then in a C.2 anti-clockwise direction for a minimum of 30 s (see Figure C.1). Repeat this ten times.

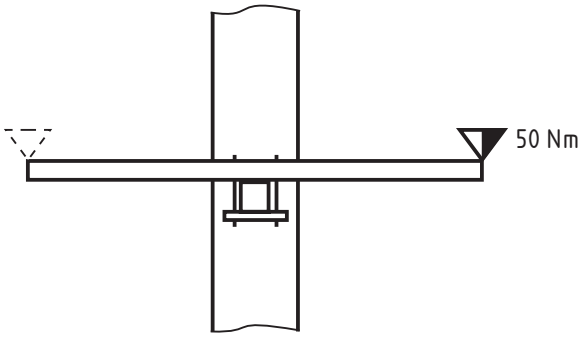


Figure C.1 — Rung torque test (cross sectional view of the ladder in Figure 2)

C.2 Spread the load over a width of 100 mm in accordance with Figure C.2.

Dimensions in millimetres

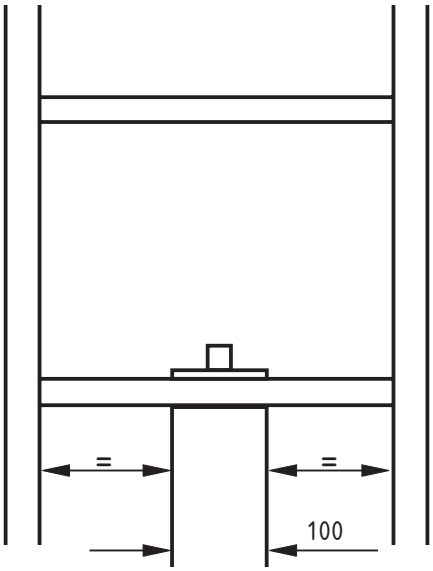


Figure C.2 — Load spread

Annex D
(normative)

Pole test (non-destructive)

Set up the closed ladder in a tripod configuration as shown in Figure D.1 with a ladder angle of 15° to the vertical.

Restrain the bottom of the ladder and the poles from movement.

Apply a load as specified in Table D.1 for a minimum of 60 s. Spread the load over the full width of the rung, just below the attachment point of the poles.

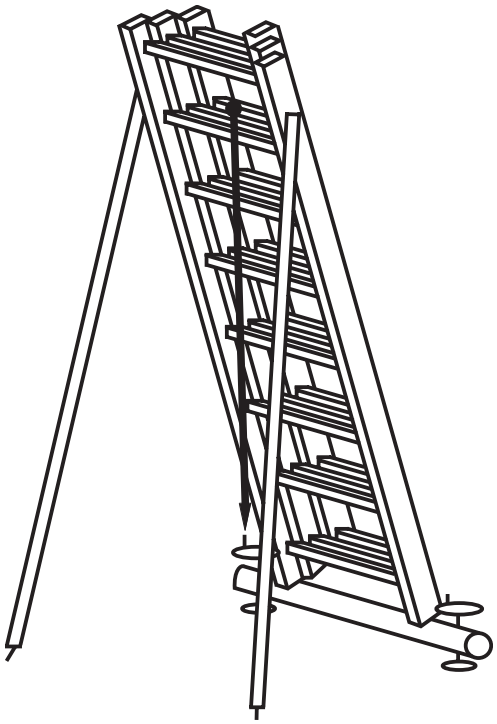


Figure D.1 — Pole test

Table D.1 — Non-destructive pole test loads

Ladder type	Load
Compulsory pole	3 630 N (370 kg)
Other	1 962 N (200 kg)

Annex E
(normative)

Horizontal test: applicable to all ladders not covered by Annex F except hook ladders (destructive)

Support the ladder horizontally at its maximum length, on trestles placed 200 mm in from each end of the stile, in accordance with Figure E.1. Fix one trestle and ensure the other is mobile. Secure both trestles to the ladder.

Apply a load as specified in Table E.1 for a minimum of 60 s at a point on the ladder mid-span between the trestles.

The ladder shall not touch the ground during this test.

Dimensions in millimetres

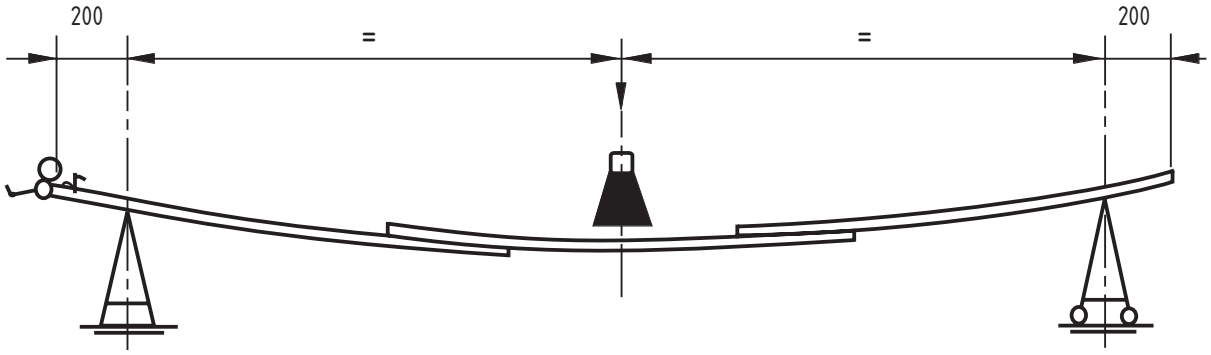


Figure E.1 — Horizontal type test − Layout

Table E.1 — Horizontal destructive test loads

Ladder type	Material	Load
3 person ladder	Wooden	1 472 N (150 kg)
	Other	1 962 N (200 kg)
2 person ladder	Wooden	1 226 N (125 kg)
	Other	1 717 N (175 kg)
1 person ladder	All	1 472 N (150 kg)
Roof ladder	All	1 717 N (175 kg)

Annex F
(normative)

Horizontal test: applicable to 3-person compulsory pole ladder (destructive)

Support the ladder horizontally at its maximum working length, on trestles placed 200 mm in from each end of the stile, with a third trestle at the joining point of the poles to the ladder. Ensure the trestle at the bottom end of the ladder is fixed and the other two are mobile. Secure the trestles to the ladder (see Figure F.1).

Apply a load as specified in Table F.1 for a minimum of 60 s at a point on the ladder mid-span between the two mobile trestles.

The ladder shall not touch the ground during this test.

Dimensions in millimetres

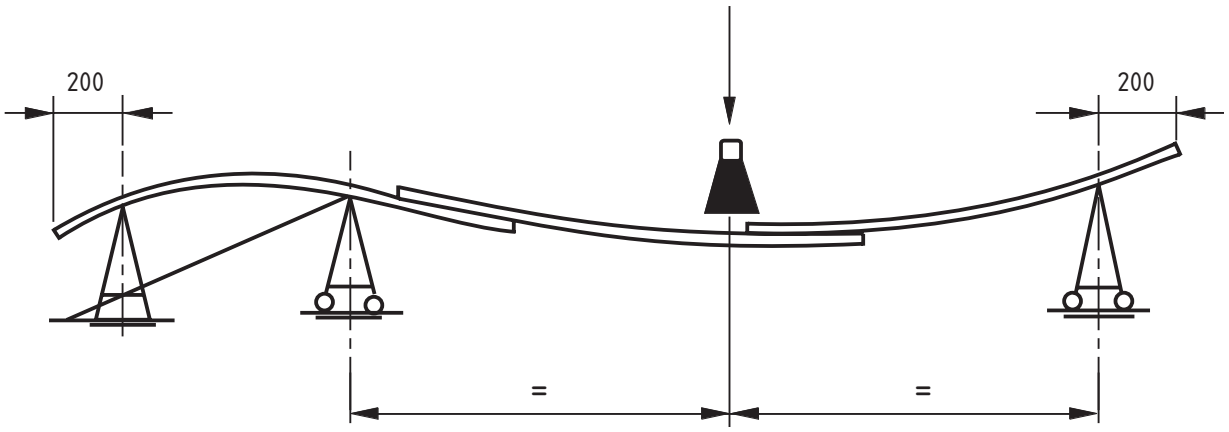


Figure F.1 — Horizontal test − Layout

Table F.1 — Horizontal destructive test − Loads

Material	Load
Wooden	1 472 N (150 kg)
All other	1 962 N (200 kg)

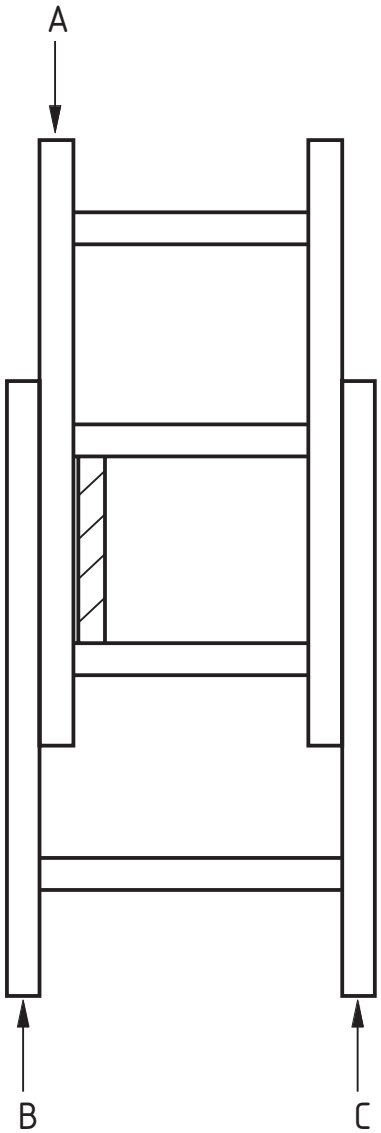
Annex G
(normative)

Pawl test: applicable to all extension ladders (destructive)

Test each rung width used.

Use two sliding sections of ladder and a single pawl, supported at B and C, as shown in Figure G.1.

Apply an inline load A of 5 641 N (575 kg) to the top section for a minimum of 60 s.



Key
A = Inline load
B, C = Lower section support points

Figure G.1 — Pawl test − Layout

Annex H
(normative)

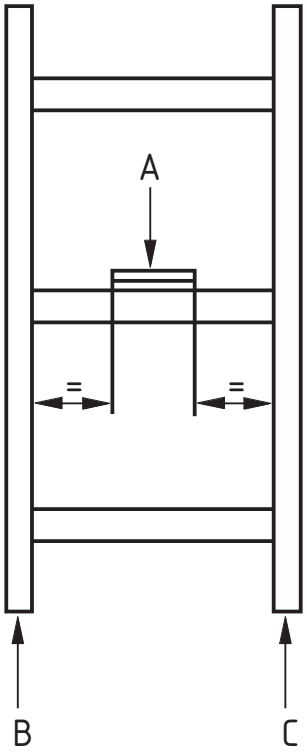
Rescue ladder rung test: applicable to all rescue ladders (destructive)

Test on each rung width used.

Use a section of ladder comprising three rungs or more, supported at B and C, as shown in Figure H.1.

Apply an inline load A of 4 905 N (500 kg) to the centre of a rung for a minimum of 60 s.

Spread the load centrally over a width of 100 mm.



Key
A = Inline load
B, C = Lower section support points

Figure H.1 — Rescue ladder rung – Layout

Annex I
(normative)

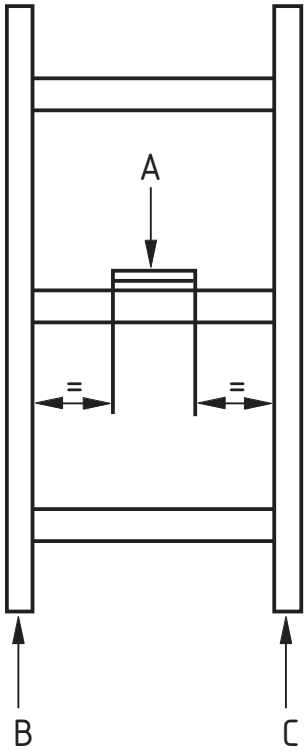
Access ladder rung test: applicable to all access ladders (destructive)

Test on each rung width used.

Use a section of ladder comprising three rungs or more, supported at B and C as shown in Figure I.1.

Apply a load A of 2 943 N (300 kg) to the centre of a rung for a minimum of 60 s.

Spread the load centrally over a width of 100 mm.



Key
A = Inline load
B, C = Lower section support points

Figure I.1 — Access ladder rung test

Annex J
(normative)

Hook rung and ladder integrity test: for tip-loaded hooks (destructive)

Restrain the ladder from the tip of the hook (see Figure J.1).

Gradually apply a load of 2 943 N (300 kg) to one of the rungs, in line with the stile, for a minimum of 60 s.

Spread the load centrally over a width of 100 mm.

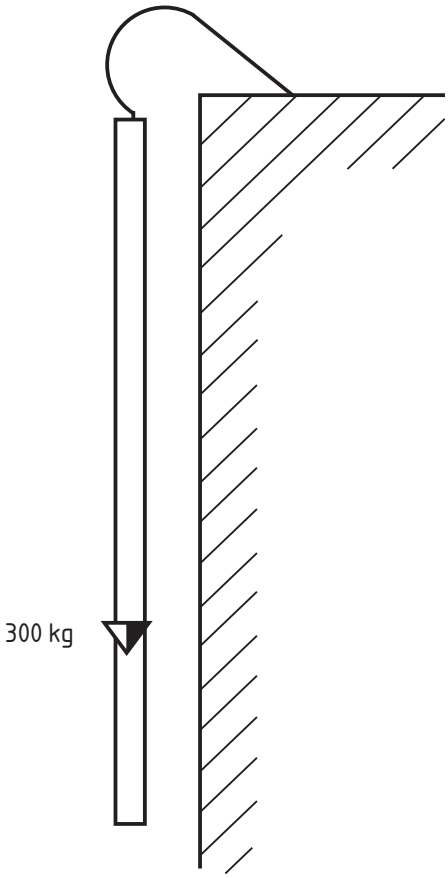


Figure J.1 — Hook test (point loaded hook)

Annex K
(normative)

Hook rung and ladder integrity test: for mid-loaded hooks (destructive)

Restrain the ladder from a point mid-span of the hook (see Figure K.1).

Gradually apply a load of 2 943 N (300 kg) to one of the rungs, in line with the stile, for a minimum of 60 s.

Spread the load centrally over a width of 100 mm.

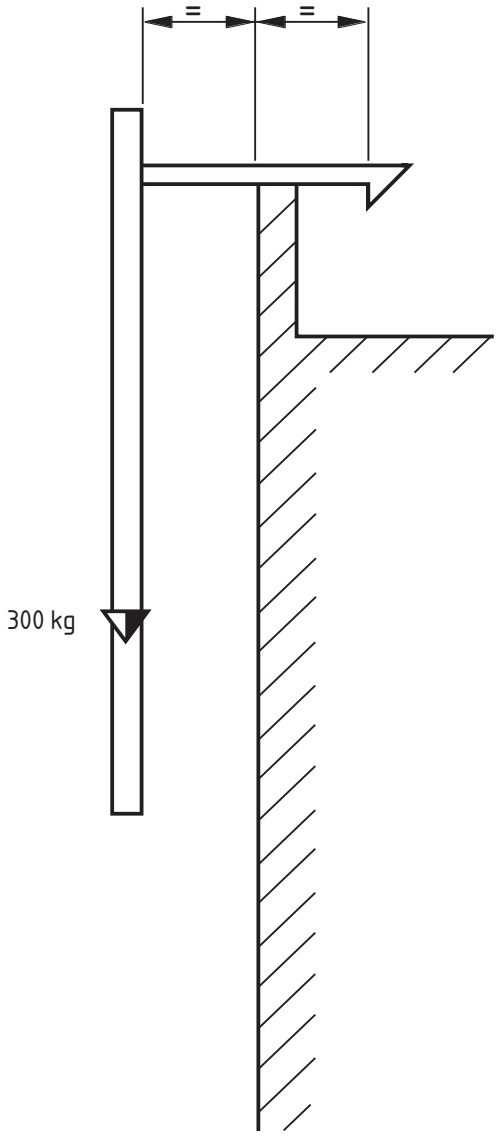


Figure K.1 — Hook test (mid-span loaded hook)

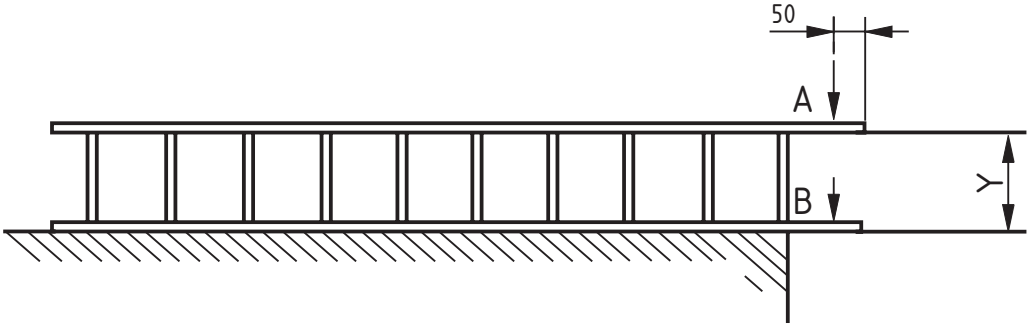
Annex L
(normative)

Foot side strength test: ground standing ladders (destructive)

L.1 This test is applied to the part of the ladder which touches the ground.

L.2 Support the ladder horizontally on edge as shown in Figure L.1.

Dimensions in millimetres



Key
A = Load 1
B = Load 2
Y = Distance from the underside of the end of the foot to the support surface

Figure L.1 — Foot side strength test: layout

L.3 Measure the distance Y from the underside of the end of the foot to the support surface.

L.4 Spread the load over a width of 50 mm across the whole stile.

L.5 At a point A, 50 mm from the extreme end of the stile, apply a load of 882 N (90 kg) for a minimum of 60 s, perpendicular to the stile.

L.6 Following removal of the load, measure distance Y in Figure L.1.

L.7 Spread the load over a width of 50 mm across the whole stile.

L.8 At a point B, 50 mm from the extreme end of the stile, apply a load of 882 N (90 kg) for a minimum of 60 s, perpendicular to the stile.

L.9 Following removal of the load, measure distance Y in Figure L.1.

L.10 Turn the ladder over and repeat steps L.2 to L.9.

Annex M
(informative)

Recommendations for test frequency, repair, servicing and design considerations

M.1 Inspection and maintenance

M.1.1 The following test schedule is recommended for all types of ladders in use. Facilities and ladder usage vary throughout Europe and therefore the actual test programme should be determined by the relevant authority in each country.

M.1.2 Ladders should be inspected and maintained by competent personnel in accordance with the manufacturer's instructions, for example once every month, and after each usage.

M.1.3 The following items should be included in the inspection where applicable:

— all rungs for tightness;

— all bolts and rivets, for tightness (without crushing the structure);

— welds, for any cracks or apparent defects;

— stiles and rungs, for cracks, splintering, breaks, gouges or deformation;

— feet, for excessive wear or other defects;

— an operational check of the pawl and locking assemblies for proper operation.

M.1.4 Ensure that ladder markings are clearly legible and replace when necessary.

M.1.5 If, in an emergency, ladders have been used other than as specified in this standard, they should be removed from service, inspected and tested prior to further use.

M.1.6 Damaged ladders, or ladders having defects, should be removed from service, repaired and tested prior to further use.

M.2 Non-destructive test schedule

M.2.1 All ladders should be tested according to the following schedule:

— annually;

— at any time a ladder is suspected of being unsafe;

— after the ladder has been subjected to other than normal use;

— after the ladder has been subjected to impact loading or unusual conditions of use;

— after heat exposure;

— after any deficiencies have been repaired, unless the only repair was replacing the rope or cable.

M.2.2 Any ladders that are unserviceable should be repaired and tested. If they cannot be repaired satisfactorily they should be destroyed.

M.2.3 Wooden ladders which develop dark streaks in the stile should be removed from service and tested prior to further use.

M.2.4 Ladders not maintained in accordance with manufacturer's instructions and as specified in this standard should be removed from service and tested prior to further use.

M.2.5 The user should keep a permanent record of all test results.

M.3 Design

The ladder should be designed so as to keep to a minimum the amount of side deflection and side float in the structure of the ladder.

Annex N
(informative)

Information and recommendations for user safety

N.1 The ladders covered by this standard are designed for use by professionally trained fire personnel.

N.2 Access ladders should not normally be used for rescue by carry-down or carry-up.

N.3 Whilst in use, the foot of the pole on compulsory pole ladders should remain firm either by manning the pole or by mechanical means and the ladder should preferably be used close to a 75° angle of pitch.

N.4 Where poles and/or other stabilizing means are used, the top section of the ladder should always rest on a structure.

N.5 Where a section of an extending ladder has been detached for separate use, care should be taken to re-attach the extending line correctly and to check pawl operation.

N.6 In normal use it is recommended that persons should be evenly spaced along the length of the ladder but the minimum distance between persons should not be less than 2 m.

N.7 A safety factor of the order of 3 to 1 and/or values calculated from data available from existing ladders currently in use, has been generally applied for the ladders in normal use (for example at an angle of 75° for pitched ladders). In exceptional circumstances of emergency only, this may be reduced at the discretion of the user.

N.8 The mass of a firefighter with personal equipment is to be taken as 90 kg.

EN 137:2006 specifies a maximum mass of 18 kg for breathing apparatus. Therefore a total mass of 108 kg is used in this standard for a firefighter including personal equipment and breathing apparatus.

Annex O
(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 national member.

This European Standard does not fall under any EU Directive.

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

A-deviation: Germany

6.2 – Rung covering

Based on § 6 of GUV-V D 36:1997-01, Accident prevention rule "ladders and steps" with execution instructions in conjunction with 6.3 of GUV-G 9102:2007-04, Test principles for equipment and devices of the fire-brigade, issued by the German Statutory Accident Insurance DGUV, portable ladders for fire service use made of aluminium shall have rung coverings as grasping protection against cold. The rung coverings shall fulfil the requirements for the non-slip tread surface according to this standard.

A-deviation: Sweden

Clause 9 – Stabilization means

According to the Swedish National Board of Occupational Safety and Health's ordinance on Ladders and Trestles, AFS 1999:10, § 14, portable ladders for fire service use exceeding a length of 5 m shall be anchored or braced when used.

Bibliography

[1] EN 131-1, *Ladders — Part 1: Terms, types, functional sizes*

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

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

[4] EN 137:2006, *Respiratory protective devices — Self-contained open-circuit compressed air breathing apparatus — Requirements, testing, marking*

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