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Specification for

Portable aluminium ladders, steps, trestles and lightweight stagings

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Committees responsible for this British Standard

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- British Hardware and Housewares Manufacturers' Association
- British Ladder Manufacturers' Association
- Consumer Policy Committee of BSI
- Consumers' Association
- Department of Trade and Industry (Consumer Safety Unit, CA Division)
- Electricity Association
- Health and Safety Executive
- Institute of Trading Standards Administration
- National Federation of Master Steeplejacks and Lighting Conductor Engineers
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Foreword

This British Standard has been prepared under the direction of the Technical Sector Board for Building and Civil Engineering. This edition introduces technical changes but it does not reflect a full review or revision of the standard. It supersedes BS 2037 : 1990 together with its amendments Nos. 1 and 2 which are withdrawn. The principal changes from the previous edition are:

- a) deletion of requirements for chemical and mechanical properties of certain aluminium alloys permitted for longitudinally welded tube;
- b) explanation of the effect on this standard of the publication and implementation by the UK of the European Standard for ladders, EN 131;
- c) addition of requirements for combination ladders.

While earlier editions of this standard were concerned with products for use in building and civil engineering, the present standard includes three classes according to the duty rating: class 1, suitable for industrial purposes; class 2 for less demanding applications such as the light trades; and class 3, which is intended for domestic users.

NOTE. Any reference to class 2 in this British Standard is solely related to folding trestles. Class 2 folding trestles under this British Standard are not included in BS EN 131 : Parts 1 and 2.

The possibility of adopting performance requirements for the finished product as a means of allowing a wider choice of aluminium alloys, their condition and form has been considered. However, it has been decided that this would be impractical in the light of existing experience and hence the permitted materials have been listed with some changes to those given in the earlier edition.

As many of the accidents associated with ladders have occurred from misuse, especially overloading, the standard requires the class and duty to be marked on the products. Annex M gives information on the care, use and maintenance of the products covered by the standard that may be provided by the manufacturer or supplier.

Annex A gives general information relating to the tests described in subsequent annexes.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Section 1. General

1.1 Scope

This British Standard specifies requirements for materials, details of construction and performance for portable aluminium ladders, steps, trestles and stagings of the following types:

- a) single-section ladders, including shelf ladders;
- b) extending ladders;
- c) standing step ladders, including swing back steps, folding platform steps and ladder backed steps;
- d) folding trestles;
- e) lightweight stagings;
- f) combination ladders.

This standard does not apply to ladders for special professional use such as fire brigade ladders, or to mobile ladders which require mechanical aids for erection.

1.2 References

1.2.1 Normative references

This British Standard incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on the inside back cover. Subsequent amendments to, or revisions of, any of these publications apply to this standard only when incorporated in it by updating or revision.

1.2.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

1.3 Definitions

For the purposes of this British Standard the following definitions apply.

1.3.1 leaning ladder

A ladder supported in use by a separate structure, e.g. a wall.

1.3.2 single-section ladder

A leaning ladder constructed and used as a single unit.

1.3.3 shelf ladder

A single-section ladder fitted with treads that are intended to be horizontal in use.

1.3.4 extending ladder

A leaning ladder consisting of two or three sections constructed so that the height can be varied, in increments of one rung spacing, by sliding the sections relative to each other.

1.3.5 standing step ladder

A self-supporting ladder consisting of a front and back hinged together, the ascendable front being in the form of a shelf ladder.

1.3.6 swing back steps

A standing step ladder in which the top is in the form of a tread and the back is merely a supporting frame.

1.3.7 folding platform steps

A standing step ladder in which the top is constructed in the form of a working platform.

1.3.8 ladder backed steps

A standing step ladder in which the back is fitted with cross-bearers suitable for supporting a working platform.

1.3.9 folding trestles

An arrangement of two frames hinged together, each fitted with cross-bearers suitable for supporting a working platform.

1.3.10 lightweight stagings

A working platform constructed of stiles, cross-bearers and decking, to provide a flat working surface.

1.3.11 stiles

The side members to which the rungs, treads or cross-bearers are fitted.

1.3.12 spacing (of rungs, treads or cross-bearers)

The distance, measured along the longitudinal axis of the stiles between the same relative positions of the members.

1.3.13 combination ladder

A ladder consisting of two sections which can be used in two or more of the following combinations as:

- a) a leaning or extending ladder;
- b) a standing ladder; or
- c) a stairwell ladder, i.e. a standing ladder which can be adjusted for differences in fore and aft ground level.

1.3.14 standing ladder

A self-supporting ladder consisting of a front and back hinged together, the ascendable front being an assembly constructed from stiles with either treads or rungs.

1.4 Classification of duty rating

The articles covered by this standard shall be classified by the general conditions and probable frequency of use as given in a) to c).

- a) *Class 1: industrial*. For heavy duty where relatively high frequency and onerous conditions of use, carriage and storage occur. Suitable for industrial purposes. Duty rating 130 kg.
- b) *Class 2: light trades (folding trestles only)*. For medium duty where relatively low frequency and reasonably good conditions of use, storage and carriage occur. Suitable for light trade purposes. Duty rating 110 kg.
- c) *Class 3: domestic*. For light duty where frequency of use is low and good storage and carriage conditions pertain. Suitable for domestic and household purposes. Duty rating 95 kg.

1.5 Materials

1.5.1 General

The materials from which the component parts are made shall be in accordance with 1.5.2 to 1.5.6.

1.5.2 Guide brackets and fixed and latching hooks

Guide brackets and fixed and latching hooks shall be made from the materials given in either a), b), c) or d), as follows:

- a) aluminium alloys, as specified in 1.5.6;
- b) mild steel;
- c) whiteheart malleable cast iron conforming to BS 6681 : 1986;
- d) plastics.

1.5.3 Hinges

Hinges shall be made from the materials given in either a), b), c) or d) as follows:

- a) aluminium alloys, as specified in 1.5.6;
- b) forged steel or steel strip;
- c) whiteheart malleable cast iron conforming to BS 6681 : 1986.
- d) plastics.

1.5.4 Feet of stiles and capping for upper ends of stiles or ends of treads

Feet of stiles and capping for upper ends of stiles or ends of treads shall be made from the materials given in either a), b) or c) as follows:

- a) plastics;
- b) rubber;
- c) timber.

1.5.5 Decking of lightweight stagings

Decking of lightweight stagings shall be made from the materials given in either a), b) or c) as follows:

- a) aluminium alloys, as specified in 1.5.6;
- b) plastics;
- c) timber (see 2.7.3).

1.5.6 Other components

Other components shall be made from aluminium alloys as follows:

- a) drawn tube, extruded sections, longitudinally welded tube, components formed from sheet and strip, forging:
 - 1) selected from within the 1000, 3000, 5000 and 6000 series, provided that the material possesses an elongation at rupture A of minimum 5 % when tested in accordance with BS EN 10002;
 - 2) further alloys within the 2000 and 7000 series may be used provided that surface protection is given in accordance with the recommendations given in BS 8118 : Part 2.
- b) castings LM 6 and LM 25 of BS 1490 : 1988.

NOTE 1. When used for class 1 articles, ferrous components should be protected against corrosion preferably to the standards required for external exposure by any of the materials and methods given in BS 729, BS 1706 or BS 4921. In the case of class 2 and class 3 articles, protection against internal environments should suffice, precoated steel is acceptable and enamelling or plastics coating have been found to be adequate.

NOTE 2. Plastics materials and rubber should be selected having regard to the stresses to which they may be subjected and their resistance to environmental deterioration, especially that due to ultraviolet light.

NOTE 3. The four digit identification designation of aluminium alloys in this standard is as given in other British Standards and in the International Registration Record for Aluminium Alloys. Care should be taken not to confuse proprietary or manufacturer's four digit designations with the aligned BS, IRR, or ISO designations. Further information on this identification system may be found in the BS 1470 series.

1.6 Tolerances on sizes

1.6.1 The dimensional tolerances on the aluminium alloys used to fabricate ladders, steps, trestles and stagings shall conform to those given in the appropriate British Standard.

1.6.2 The spacing of rungs and treads on an individual ladder shall not vary by more than 2.0 mm from the nominal spacing selected by the manufacturer from the range specified in section 2.

1.6.3 A tolerance of ± 25 mm shall be permitted on the nominal length of all ladders covered by this standard.

1.7 Marking

1.7.1 Equipment shall be clearly and durably marked with the information specified in **1.7.2**, **1.7.3**, **1.7.4** and **1.7.5** as appropriate. Conformity shall be checked by inspection and by rubbing the marking lightly, first for 15 s with a cloth soaked in water and then for 15 s with a cloth soaked in petroleum spirit. There shall be no reduction in legibility at the conclusion of the test. Adhesive labels, where used, shall not have worked loose or become curled at the edges.

Tie on labels shall not be used to provide the information specified in **1.7.2** and **1.7.3**.

1.7.2 Ladders, steps, trestles and lightweight stagings shall be marked with the following particulars:

- a) the name, trademark or other means of identification of the manufacturer or supplier;
- b) the number and date of this British Standard, i.e. BS 2037 : 1994¹⁾;
- c) the class and duty rating, e.g. 'Class 1 — Industrial duty rating 130 kg'.

1.7.3 Ladders, steps and trestles shall be provided with a separate label displaying the following advice on a background coloured blue for class 1, yellow for class 2 or red for class 3.

'Never use damaged equipment.

Lean ladder at approximately 75° from horizontal (1 m out for each 4 m height).²⁾

Ensure firm and level base.

Check for hazards at top.

Avoid electrical hazards.

Avoid over-reaching.

Keep a secure grip.

Never stand on top rail of step ladder, or on top of swing back steps.³⁾

Extend by at least 1.10 m above any landing place.²⁾

Secure at top and bottom wherever possible.²⁾

1.7.4 Lightweight stagings shall bear a label fitted to the outside of one stile incorporating, in letters not less than 4 mm high, the following:

'Maximum load three men spaced apart and hand tools or 270 kg uniformly distributed.'

1.7.5 Combination ladders shall, in addition to meeting the provisions of **1.7.3**, be marked with the following:

'Never ascend above the hinge/pivot position when used as a stairwell ladder.'

¹⁾ Marking BS 2037 : 1994 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third party certification of conformity, which may also be desirable.

²⁾ Required only for single section ladders, extending ladders and combination ladders incorporating a leaning/extending ladder mode of operation.

³⁾ Not required for single section and extending ladders.

Section 2. Specific types of ladders, steps, trestles and stagings

2.1 Single-section ladders and extending ladders

2.1.1 Construction

2.1.1.1 Lengths

The lengths of single-section ladders and extending ladders when fully extended shall not exceed the lengths given in a) and b), as appropriate to the class.

- a) Class 1: 17 m;
- b) Class 3: 9.1 m.

2.1.1.2 Distance between stiles

The clear distance between the stiles at any point (in mm) shall be not less than that determined by the following equation:

$$\text{Minimum width at any point} = \frac{L}{200} + 230$$

where

L is the distance from any point to the top of the ladder (in mm).

NOTE. This requirement applies whether the ladders have parallel or converging stiles and for extending ladders is based on the length when fully extended. For example, the minimum width of a 4.5 m parallel ladder would be $\frac{4500}{200} + 230 = 252$ mm (to the nearest millimetre).

A tapered ladder of the same length would be at least 230 mm wide at the top $\frac{2250}{200} + 230 = 241$ mm (to the nearest millimetre) at the middle and $\frac{4500}{200} + 230 = 252$ mm to the nearest millimetre at the bottom.

An extended ladder with two sections of different widths each 3.5 m long and with an extended length of 6.2 m would have a top section at least $\frac{3500}{200} + 230 = 248$ mm wide (to the nearest millimetre) and a bottom section at least $\frac{6200}{200} + 230 = 261$ mm.

The width of the sections of extending ladders shall be such as to provide a minimum clearance consistent with the operation of the ladder.

2.1.1.3 Feet

The lower end of each stile shall be closed by blocks of hardwood, plastics or rubber or fitted with an articulated foot soled with slip resistant material. The feet shall project to form a wearing surface and shall be securely fixed but easily removable for renewal. The length of projection of the blocks or fittings shall be taken into account when determining the overall length of the ladder.

2.1.1.4 Rungs

Each rung shall have a textured surface on the working face to reduce slipping. All rungs shall be securely fixed so as not to rotate in their supports and if the ends of the rungs protrude through the stiles they shall be smoothly finished so as not to injure a user's hands.

2.1.1.5 Spacing of rungs

Rungs shall be uniformly spaced at 250 mm to 300 mm centres. The distance from the ends of the stiles to the nearest rung centre shall be 125 mm to 300 mm.

2.1.1.6 Fittings for extending ladders

Fittings for extending ladders shall be such that the width of parts bearing on the rungs is not less than that given in table 1. The shape of hooks shall be such as to require upward movement of the upper section to disengage them from the rungs. The fittings shall have no sharp edges liable to cause indentation. Latching devices, if fitted, shall not be dependent for their operation on springs and, if of the rope-operated type, they shall be such that in the event of the rope breaking or being released they engage automatically and prevent uncontrolled closure of the ladder. Where the latches are acting as a pair, they shall be connected to ensure movement in unison. The latches or fixed hooks shall bear equally on the rungs. Guide brackets shall be formed with no tool marks that would affect their strength or performance. Any sharp corners shall be removed.

Table 1. Fittings for extending ladders

Major horizontal rung dimension or diameter mm	Minimum width of fitting bearing on surfaces of rungs mm
Up to and including 31	12.0
Over 31 and under 39	9.5
39 and greater	6.0

2.1.1.7 Ropes

The strength of rope attachments shall be such as to provide a factor of safety of not less than 8 times the mass of the extending section or sections.

Ropes shall be hemp sash cord, made from yarn, in accordance with table 1 of BS 6125 : 1981 or other material of equivalent strength. The nominal diameter of the ropes and breaking load shall be not less than the appropriate values given in table 2.