BRITISH STANDARD

BS 459:1988

Incorporating Amendment No. 1

Specification for

Matchboarded wooden door leaves for external use

Confirmed December 2011

UDC 674 – 4:69.028.1:674.214:692.817.1:691.178:[696.134.5.002.2]:(083.71)

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Timber Standards Committee (TIB/-) to Technical Committee TIB/23, upon which the following bodies were represented:

Association of Builders Hardware Manufacturers
British Furniture Manufacturers' Federation
British Lock Manufacturers' Association
British Standards Society
British Woodworking Federation
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Department of the Environment [Building Research Establishment (Fire Research Station)]
Department of the Environment [Building Research Establishment (Princes Risborough Laboratory)]
Department of the Environment [Construction Industry Directorate (Building Regulations)]
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Institute of Carpenters
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Intumescent Fire Seals Association
Joinery Managers' Association Ltd.
London Housing Consortium
Royal Institute of British Architects
Timber Research and Development Association

This British Standard, having been prepared under the direction of the Timber Standards Committee, was published under the authority of the Board of BSI and comes into effect on
30 November 1988

First published as BS 459, June 1932
First revision (War emergency series), May 1941
Second revision (War emergency series), August 1942 (withdrawn 1944)
Third revision as BS 459-4, September 1951
Fourth revision, February 1965
Fifth revision, November 1988

The following BSI references relate to the work on this standard:
Committee reference TIB/23
Draft for comment 86/10538 DC

ISBN 0 580 16483 7

Amendments issued since publication

Amd. No.	Date of issue	Comments
8737	July 1995	Indicated by a sideline in the margin

Contents

Foreword

This British Standard, which is a revision of BS 459-4:1965, has been prepared under the direction of the Timber Standards Committee. BS 459-4:1965 is withdrawn.

The door leaves specified in this standard are for external use only, primarily for stores and out-buildings, including garages, but not for use as gates. Door leaves of this type are not recommended for internal use.

The revision includes an additional door leaf type of framed and ledged construction and metric sizes have been introduced. A new method of nailing the matchboarding to the framing has also been specified to reflect modern production techniques. Recommendations for maintaining the moisture content are now included in an advisory appendix and follow those given in the 1986 revision of BS 1186-1.

Parts 1, 2 and 3 of this standard have been withdrawn as obsolete. DD 171, giving guidance on the specification of performance requirements for hinged or pivoted doors of all materials, and BS 8214, a code of practice for fire door assemblies with non-metallic door leaves, are now available.

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.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 6, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard specifies size limitations, materials, workmanship and construction for ledged and braced doors, framed and ledged doors and framed, ledged and braced doors, all with tongued and grooved matchboarded facings and for external use.

NOTE 1 Recommendations for maintaining moisture content are given in Appendix A.
NOTE 2 The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard, the definitions given in BS 6100-4.1 and BS 6100-4.4 apply.

NOTE The term "door" is sometimes used for convenience in this standard where "door leaf" would be the correct term as defined in BS 6100.

3 Size limitations and permissible deviations

NOTE All sizes specified are at the time the doors are handed over to the first purchaser.

3.1 For ledged and braced doors and framed and ledged doors, the maximum size shall be 840 mm wide × 2 055 mm high.

3.2 For framed, ledged and braced doors, the maximum size shall be 1 075 mm wide × 2 135 mm high.

3.3 Deviations on work sizes for height and width shall not exceed ± 1.5 mm.

NOTE Some framed, ledged and braced doors are supplied with the matchboarding extending beyond the finished size of the door below the bottom rail to allow final height adjustment by the purchaser.

3.4 Deviations from plane, when measured in accordance with BS 5277, shall not exceed the following:

a) bow in the length: 4 mm;

b) cup (horizontal bow): 2 mm;

c) deviation from true plane (twist): 6 mm.

3.5 The deviation from squareness, when measured in accordance with BS 5278, shall not exceed 1.5 mm in 500 mm.

4 Timber and preservation

The timber shall be class 3, surface category "exposed", to receive an opaque finish all complying with BS 1186-1, preservatively treated in accordance with BS 5589 if required by BS 1186-1.

5 Workmanship

The workmanship shall be in accordance with BS 1186-2.

6 Adhesives

Adhesives, where used in framed and ledged doors and framed, ledged and braced doors, shall be one of the following:

a) a type WBP, BR or MR adhesive complying with BS 1204-2; or

b) an adhesive whose performance is not inferior to type MR adhesive complying with BS 1204-2, when tested in accordance with that standard.

7 Construction

7.1 Sections

The arrangement of the members shall be as shown in Figure 1 to Figure 7 as appropriate. The minimum sizes prior to assembly shall be in accordance with Table 1.

NOTE The members should be machined cleanly and accurately.

7.2 Matchboarding

The matchboarding shall be not less than 15 mm thick, tongued and grooved and V-jointed on both sides. The length of the tongues shall be not less than 6 mm and not more than 12 mm, and shall be sufficient to prevent shrinkage clear of the groove. The width of the boards (except edge boards for framed and ledged doors and framed, ledged and braced doors), excluding the tongues, shall be not less than 70 mm and not more than 115 mm. In any one door all boards, other than the edge boards, shall be of the same width.

Edge boards for framed and ledged and framed, ledged and braced doors shall be not less than 50 mm wide, excluding the tongues.

Matchboarding shall not distort if the moisture content increases.

NOTE Distortion can be avoided by ensuring that the matchboarding is not overcramped and that there is a small clearance between boards.

7.3 Ledged and braced doors

7.3.1 *Ledges and braces.* Each door shall have three horizontal ledges and two braces. The braces shall fit tightly against the ledges. The ends of the ledges shall be set back 15 ± 5 mm from the edges of the doors, and the braces shall be parallel to each other, with their lower ends at the hinged side of the door or they can be fitted arrow headed for hanging on either side (see Figure 3).

Table 1 — Minimum sizes of members prior to assembly

Component	Ledged and braced doors	Framed and ledged doors	Framed, ledged and braced doors
	mm	mm	mm
Stiles and top rail	—	91 × 44	91 × 44
Ledges	91 × 20	—	—
Middle and bottom rail	—	142 × 27	142 × 27
Braces	91 × 20	—	91 × 27

7.3.2 *Matchboarding.* Each board shall be fixed to the ledges and braces, with not less than two fixings at each ledge and one at each brace, by one of the following methods:

a) nailing, with 50 mm nominal length steel nails, clenched tight, parallel with the grain of the ledges or braces;

b) tosh nailing with steel nails, 32 mm nominal length with lost heads;

c) stapling with 18 gauge (minimum) clenching or diverging steel staples 30 mm long (minimum), driven by mechanically operated tools;

d) nailing with T headed or ringed steel nails, 32 mm nominal length, driven by mechanically operated tools.

7.3.3 *Screwing of ledge ends.* In addition to the fixing specified in **7.3.2**, the ends of ledges shall be screwed using 30 mm (minimum) no. 6 gauge, countersunk screws, zinc plated in accordance with classification no. Zn 3 of BS 3382-7 (allowance A or D).

7.3.4 *Fixings.* Fixings shall be staggered to avoid splitting the boards, ledges or braces and shall be driven below the surface. There shall be no fixings within 30 mm of the edges of the doors.

NOTE To enable the handing of parallel braces to be reversed, temporary fixing is permitted until the door is installed and the braces permanently fixed as specified in **7.3.2** and **7.3.4**.

7.4 Framed and ledged doors

7.4.1 *Framing.* The framing shall consist of stiles and top, middle and bottom rails. Where matchboarding runs over the face of the bottom rail, the lower edge of the bottom rail shall be 20 mm minimum to 40 mm maximum above the bottom of the door. The middle rail shall be positioned equidistant between the top and bottom rails. The rails shall be through-tenoned into stiles, the tenons being not less than 12 mm and not more than 16 mm thick and approximately central in the thickness of stiles. The tenons to the rails shall be haunched. Each tenon shall be secured by two wedges and an adhesive.

As an alternative to mortice and tenon construction, it is permissible for framing members to be dowel jointed, provided that not less than two 15 mm × 110 mm overall length wooden dowels are used at each joint and secured by the use of an adhesive.

7.4.2 *Matchboarding.* The boards shall either be tongued into the top rail and stiles with tongues as shown in Figure 4 and Figure 6, or be rebated a minimum of 12 mm into the top rail and stiles and also into the bottom rail when the boarding does not run over its face. Where plain rebates are used, the boards shall be fixed as described in the following paragraph. Fixings on to plain rebated stiles shall be not more than 200 mm apart.

Boards set back from the face of the framing shall not be set back more than 2 mm.

NOTE Fixings are not required to boards notched into rebates with undercut shoulders.

Each board shall be fixed to all applicable rails with not less than two fixings at each rail, by one of the following methods:

a) tosh nailing with steel nails 38 mm nominal length with lost heads;

b) stapling with 18 gauge (minimum) clenching or diverging steel staples, 30 mm long (minimum) driven by mechanically operated tools;

c) nailing with T headed or ringed steel nails, 32 mm nominal length, driven by mechanically operated tools.

7.4.3 *Fixings.* Fixings shall be staggered to avoid splitting the boards and rails and shall be driven below the surface.

7.5 Framed, ledged and braced doors

7.5.1 *Framing.* The framing shall consist of stiles, top, middle and bottom rails and two braces. The braces shall be shaped to fit tightly against the stiles and rails, and shall be parallel to each other, with their lower ends at the hinged side of the door or they can be fitted arrow headed for hanging on either side (see Figure 3) Where matchboarding runs over the face of the bottom rail, the lower edge of the bottom rail shall be 20 mm minimum to 40 mm maximum above the bottom of the door. The middle rail shall be positioned equidistant between the top and bottom rails.

The rails shall be through-tenoned into the stiles, the tenons being not less than 12 mm and not more than 16 mm thick and approximately central in the thickness of the stiles. The tenons to the rails shall be haunched. Each tenon shall be secured by two wedges and an adhesive.

As an alternative to mortice and tenon construction, it is permissible for framing members to be dowel jointed, provided that not less than two 15 mm × 110 mm overall length wooden dowels are used at each joint and secured by the use of an adhesive.

7.5.2 *Matchboarding.* The boards shall either be tongued into the top rail and stiles with tongues as shown in Figure 4 and Figure 6, or be rebated a minimum of 12 mm into the top rail and stiles and also into the bottom rail when the boarding does not run over its face. Where plain rebates are used, the boards shall be fixed as described in **7.4.2**.

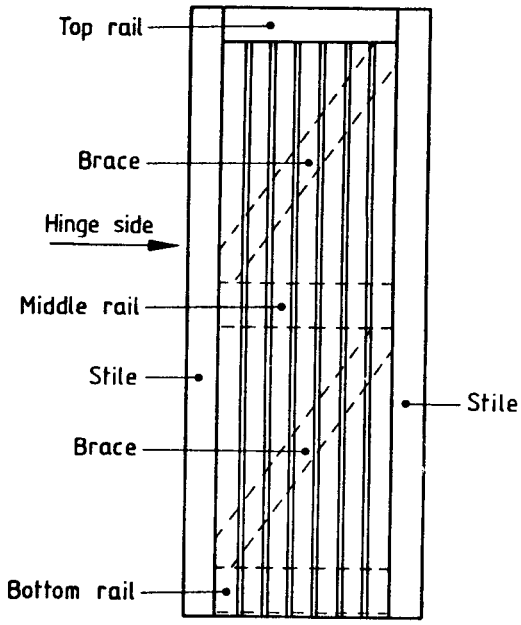
Fixings on to plain rebated stiles shall not be more than 200 mm apart.

Boards set back from the face of the framing shall not be set back more than 2 mm.

NOTE Fixings are not required to boards notched into rebates with undercut shoulders.

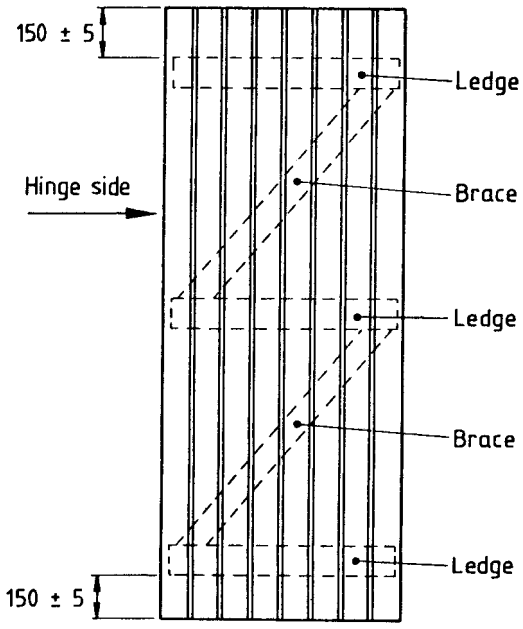
Each board shall be fixed to all applicable rails, with not less than two fixings at each rail and one at each brace, by one of the methods described in **7.4.2**.

7.5.3 *Fixings.* Fixings shall be staggered to avoid splitting the boards and rails and shall be driven below the surface.



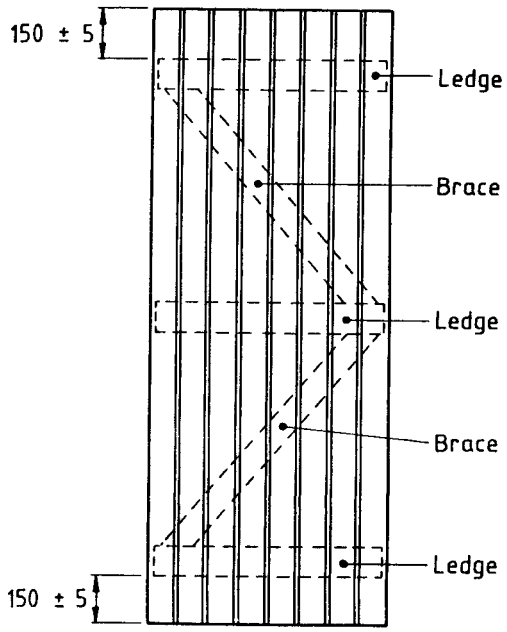
NOTE 1 Braces can be fitted arrow headed as shown in Figure 3.
NOTE 2 A framed and ledged door is similar to this figure but without braces.

Figure 1 — Front elevation of framed, ledged and braced door



NOTE Braces can be fitted arrow headed as shown in Figure 3.

Figure 2 — Front elevation of ledged and braced door



NOTE Doors with arrow headed braces can be hinged either side.

Figure 3 — Front elevation of ledged and braced door with braces fitted arrow headed

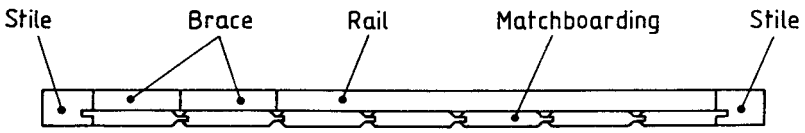


Figure 4 — Plan of framed, ledged and braced door

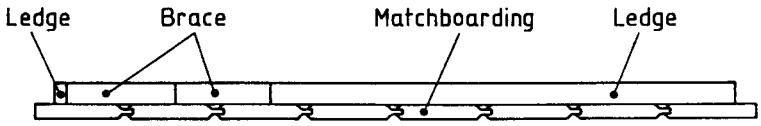


Figure 5 — Plan of ledged and braced door

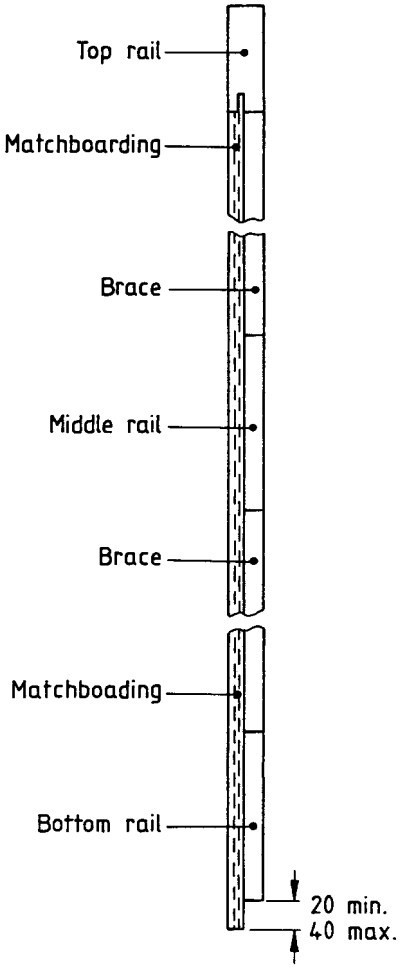


Figure 6 — Section of framed, ledged and braced door

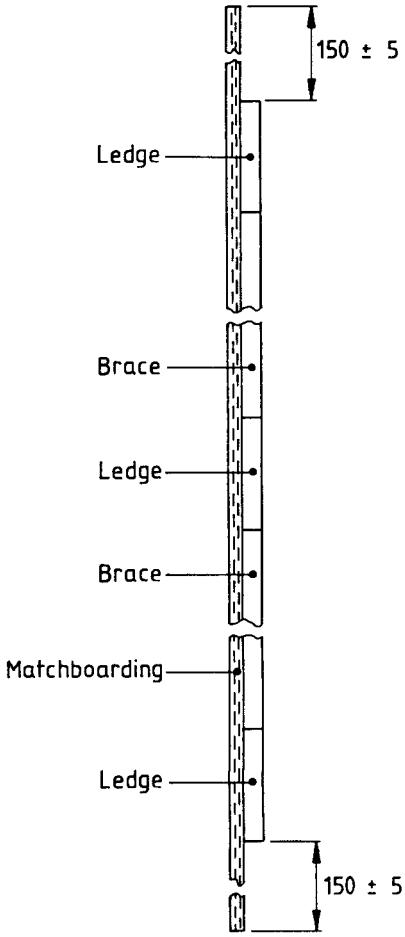


Figure 7 — Section of ledged and braced door

Appendix A Recommendations for maintaining the moisture content

A.1 Doors supplied in the white should be primed or sealed immediately after delivery; particular attention should be paid to all exposed end grain.

NOTE Whilst priming provides some measure of protection from moisture, it is essential to apply further coats of finish as soon as possible. Low build and non-film-forming finishes are unsuitable for this purpose.

A.2 Precautions should be taken during storage prior to delivery, and during transport to and on site, to ensure that the joinery is adequately protected so that changes in moisture content caused by weather conditions are minimized.

A.3 Joinery should at all times be stored on dry bases raised above ground level and wherever possible stored under cover. Doors should be stacked matchboarded face unp on not less than three equal sized bearers across the full width of the door. If it is necessary to store joinery in the open under temporary cover then it should be covered with clean tarpaulins or other impermeable material so arranged to give full protection and at the same time to permit free passage of air around the stored joinery. Where storage in the open is necessary, this should only be for short periods and deliveries should be arranged accordingly.

A.4 In new building work, where considerable water is used, the moisture content of timber will increase and this could cause distortion to take place. Timber should therefore be protected against ingress of moisture during the building process and in particular should be kept clear, if possible, from direct contact with wet work. Ample ventilation should be provided to reduce the risk of moisture pick up and to ensure quicker drying out.Where joinery is to be fixed in close proximity to a source of heat, gradual conditioning is required.

Publications referred to

BS 1186, *Timber for and workmanship in joinery.*

BS 1186-1, *Specification for timber.*

BS 1186-2, *Quality of workmanship.*

BS 1204, *Synthetic resin adhesives (phenolic and aminoplastic) for wood.*

BS 1204-2, *Specification for close-contact adhesives.*

BS 3382, *Specification for electroplated coatings on threaded components.*

BS 3382-7, *Thicker platings for threaded components.*

BS 5277, *Doors. Measurement of defects of general flatness of door leaves.*

BS 5278, *Doors. Measurement of dimensions and of defects of squareness of door leaves.*

BS 5589, *Code of practice for preservation of timber.*

BS 6100, *Glossary of building and civil engineering terms.*

BS 6100-4.1, *Characteristics and properties of timber and wood based panel products.*

BS 6100-4.4, *Carpentry and joinery.*

DD 171, *Guide to specifying performance requirements for hinged or pivoted doors (including test methods)*[1)].

[1)] Referred to in the foreword only.

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