

BRITISH STANDARD

Fences –

Part 7: Specification for wooden post and rail fences

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iii, a blank page, pages 1 to 24, an inside back cover and a back cover.

Foreword

Publishing information

This part of BS 1722 was published by BSI and came into effect on 30 November 2006. It was prepared by Technical Committee B/201, *Fences and Gates*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This part of BS 1722 supersedes BS 1722-7:1999, which is withdrawn.

Relationship with other publications

BS 1722 is published in parts as follows:

- *Part 1: Specification for chain link fences*
- *Part 2: Specification for strained wire and wire mesh netting fences*
- *Part 4: Specification for cleft chestnut pale fences*
- *Part 5: Specification for close-boarded fences and wooden palisade fences*
- *Part 7: Specification for wooden post and rail fences*
- *Part 8: Specification for mild steel (low carbon steel) continuous bar fences and hurdles*
- *Part 9: Specification for mild steel (low carbon steel) fences with round or square verticals and flat horizontals*
- *Part 10: Specification for anti-intruder fences in chain link and welded mesh*
- *Part 11: Specification for prefabricated wood panel fences*
- *Part 12: Specification for steel palisade fences*
- *Part 13: Specification for chain link fences for tennis court surrounds ¹⁾*
- *Part 14: Specification for open mesh steel panel fences*
- *Part 16: Specification for organic powder coatings to be used as a plastics finish to components and mesh*
- *Part 17: Electric security fences. Design, installation and maintenance – Specification*
- *Part 18: Specification for steel mesh site perimeter temporary fencing systems ²⁾*

¹⁾ Obsolete.

²⁾ Part 18 is in development and will be published as a Draft for Development (DD).

Information about this document

The various parts specify requirements for the types of fence that are considered suitable for standardization. No attempt has been made to standardize fences or gates of a purely decorative nature, nor to specify requirements for “patent” proprietary fencing systems. It is recommended, however, that such fences or gates should be designed in accordance with the relevant clauses of this part of BS 1722.

This is a full revision of the standard, and introduces the following principal changes:

- a) revised section on preservatives in Annex A;
- b) scope extended to include cleft post and rails;
- c) minor change to tolerances on size in clauses **5.2.1, 6.4, 6.5**;
- d) revised Annex C, **C.3** Construction of fence.

It has been assumed in the drafting of this part of BS 1722 that the execution of its provision is entrusted to appropriately qualified and experienced people. Before installation commences the Lead Installer should hold a current FISS/CSCS registration card skilled level (blue card) or equivalent and all other operatives should hold the basic fence operative card (green card) or equivalent.

At the time of publication of this British Standard the registration cards are validated by the Joint Fencing Industry Skills Scheme (FISS) and Construction Scheme Skills Certification Scheme (CSCS). FISS/CSCS maintains a national register of fence installers and operatives. There might be other schemes available.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Requirements in this standard are drafted in accordance with *The BSI guide to standardization – Section 2: Rules for the structure, drafting and presentation of British Standards*, subclause **11.3.1**, which states, “Requirements should be expressed using wording such as: ‘When tested as described in Annex A, the product shall ...’”. This means that only those products that are capable of passing the specified test will be deemed to conform to this standard.

Contractual and legal considerations

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

Compliance with a British Standard cannot confer immunity from legal obligations.

1 Scope

This part of BS 1722 specifies requirements for wooden post and rail fences, using both sawn and cleft components. It includes requirements for the installation of the fencing at the specified location.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS EN ISO 1461, *Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods*

BS 957-2, *Specification for feeler gauges – Part 2: Metric units*

BS 1202-1, *Specification for nails – Part 1: Steel nails*

BS 4978, *Specification for visual strength grading of softwood*

BS 8417, *Preservation of timber. Recommendations*

BS 8500-1:2002, *Concrete – Complementary British Standard to BS EN 206-1 – Part 1: Method of specifying and guidance for the specifier*

BS 8500-2:2002, *Concrete – Complementary British Standard to BS EN 206-1 – Part 2: Specification for constituent materials and concrete*

BS EN 335-2, *Durability of wood and wood-based products – Definition of use classes – Part 2: Application to solid wood*

BS EN 350-2, *Durability of wood and wood-based products – Natural durability of solid wood – Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe*

BS EN 844-9, *Round and sawn timber – Terminology – Part 9: Terms relating to features of sawn timber*

BS EN 212, *Wood preservatives – General guidance on sampling and preparation for analysis of wood preservatives and treated timber*

BS EN 12620, *Aggregates for concrete*

3 Terms and definitions

For the purposes of this part of BS 1722, the terms and definitions given in BS EN 844-9 apply, together with the following.

3.1 structural components

main posts and main rails, with the exception of prick posts

3.2 non-structural components

prick posts

4 Dimensions, designation and general characteristics

4.1 The dimensions and general characteristics of sawn post and rail fences, and their corresponding designation, shall be as given in Table 1.

NOTE Figure 1 shows the general characteristics of sawn post and rail fences. It is not intended to illustrate any particular requirements of this standard.

4.2 The dimensions and general characteristics of fences which have morticed sawn or cleft posts and cleft rails, and their corresponding designation, shall be as given in Table 2.

Table 1 Designation, dimensions and general characteristics of sawn post and rail fences

Fence type designation		Height from ground to top of top rail	Length of main posts	Length of prick posts ^{A)}	Number of rails	Spacing between rails at posts, from top to bottom ^{B)}
Morticed	Nailed	m	m	m		mm
MPR 11/3	SPR 11/3	1.1	1.80	1.60	3	325, 275
MPR 11/4	SPR 11/4	1.1	1.80	1.60	4	225, 200, 175
MPR 13/4	SPR 13/4	1.3	2.10	1.80	4	250, 250, 225

^{A)} Only used in morticed fences.

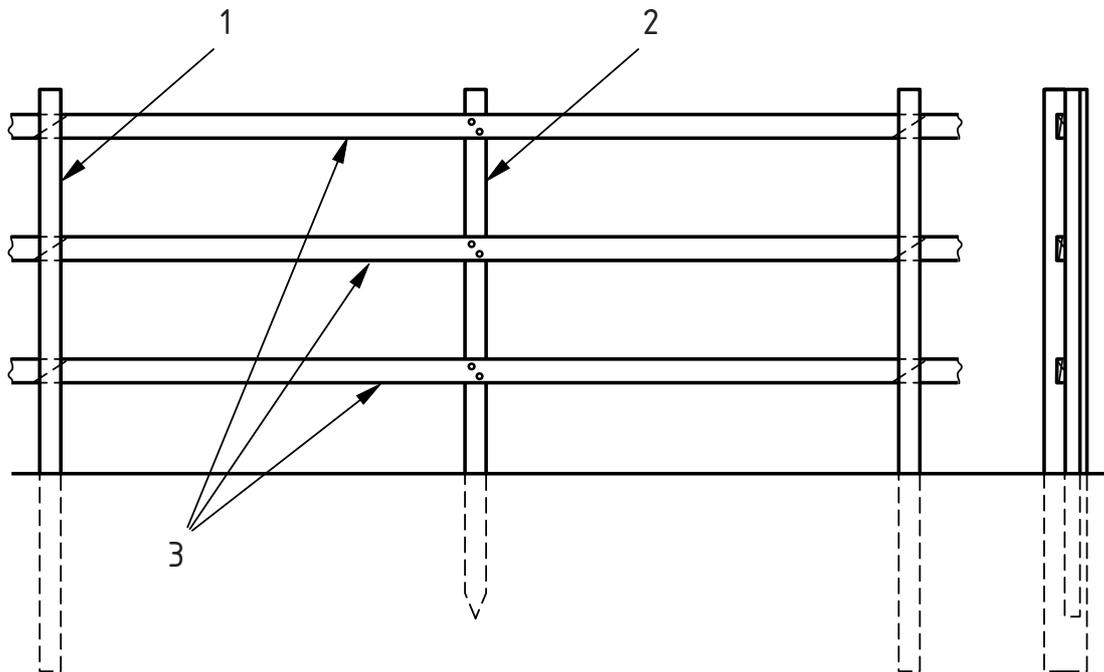
^{B)} See 8.1.3.1 for the relative position of the top rail.

Table 2 Designation, dimensions and general characteristics of morticed sawn or cleft post and cleft rail fences

Fence type designation		Height from ground to top of top rail	Length of main posts	Number of rails	Spacing between rails at posts, from top to bottom ^{A)}
Sawn posts	Cleft posts	m	m		mm
SPCR 105/2	CPCR 105/2	1.05	1.8	2	415
SPCR 125/2	CPCR 125/2	1.25	2.1	2	540
SPCR 125/3	CPCR 125/3	1.25	2.1	3	323

^{A)} See 8.1.3.1 for the relative position of the top rail.

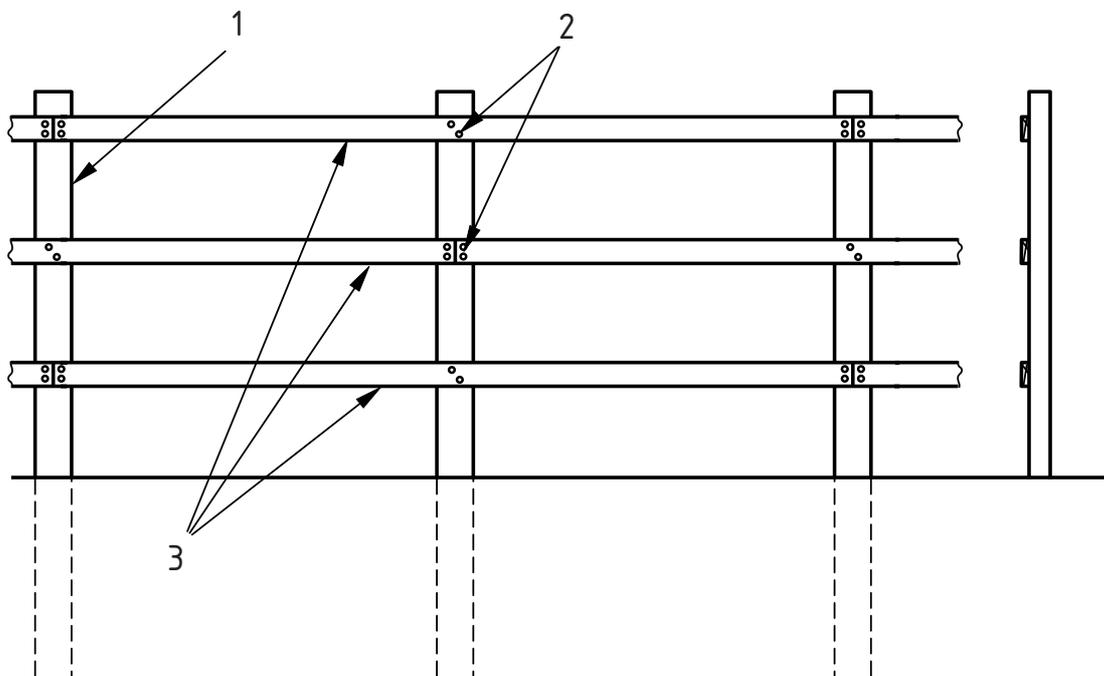
Figure 1 General characteristics of sawn post and rail fences



a) Morticed fence

Key

- 1 Main post
- 2 Prick post
- 3 Rails



b) Nailed fence

Key

- 1 Main post
- 2 Joints normally staggered
- 3 Rails

5 Timber components for sawn post and rail fences

5.1 Material

Timber components shall be of sawn timber conforming to Annex A.

NOTE Annex B gives a suggested method of sampling for fence timber.

5.2 Tolerances on size

5.2.1 The following tolerances apply to the specified dimensions:

- a) length of posts: $+^{25}_0$ mm
- b) length of rails: $+^5_0$ mm
- c) other dimensions:
 - 1) specified dimensions <75 mm: ± 3 mm
 - 2) specified dimensions ≥ 75 mm: ± 6 mm

5.2.2 A maximum sawing deviation is permitted on 10% of pieces only within a batch, or on 10% of a sample (see Annex B).

5.2.3 Moisture content shall not exceed 28% when measured with a calibrated moisture meter of the electrical resistance type, fitted with insulated probes that can be hammered into wood to the depth specified in Table 3.

When determining the suitability of a charge of timber for preservation, moisture readings shall be made on no fewer than $\sqrt{(n/2)}$ separate components, where n is the total number of components in the charge. The components to be measured shall be taken from random positions in the charge. The number of heartwood and sapwood faces sampled shall reflect the relative proportions of these types of wood in the charge as a whole.

If a moisture meter is not used, the oven-dry method of determining moisture content as described in BS EN 212 shall be used.

To achieve the recommended moisture content of 28% (m/m) timber shall be either air dried or kiln dried. For either process, fencing timber shall be debarked and stacked so that air can circulate freely. Kiln drying shall be used if natural drying is unlikely, for example in winter conditions.

Table 3 **Determination of moisture content of timber to be treated for use in fencing**

Type of timber	Length of electrodes within the timber	Maximum indicated moisture content in any sample %
a) All sapwood	25 mm, or sapwood thickness if less	—
b) Heartwood of wood species other than those listed in c):		
posts	25 mm	28
other components	12 mm	—
c) Heartwood of sweet chestnut, dahoma, danta, guarea, kapur, kempas, oak	5 mm	—

5.3 Posts

5.3.1 Main posts

The length of main posts shall be as specified in Table 1. Main posts shall have a cross-section of 75 mm × 150 mm, which shall be the same throughout their length. They shall either be cut square across at their base or be pointed for a length not exceeding 225 mm. Posts for morticed fences shall have mortices of sufficient size to receive the full section of the rail. The mortices shall be cut in the centre of the 150 mm face of the post and spaced as indicated in Table 1.

5.3.2 Prick posts

The length of prick posts shall be as given in Table 1.

They shall have a cross-section of 38 mm × 87 mm and shall be pointed for driving.

5.4 Rails

Rails shall have a cross-section of 38 mm × 87 mm.

6 Timber components for fences with cleft hardwood rails and sawn, round or cleft posts

6.1 Material

All timber components shall be of material conforming to **A.1** and **A.3**. Sawn timber shall conform also to **A.2**.

6.2 Tolerances on size

Tolerances on the size of sawn timber shall be as specified in **5.2**.

6.3 Sawn posts

The length of main posts shall be as specified in Table 2. Main posts shall have a cross-section of 75 mm × 150 mm, except that, where a single mortice is used, they may have a cross-section of 100 mm × 125 mm. The cross-section shall be the same throughout the length of the post. Posts shall either be cut square across at their base or be pointed for a length not exceeding 225 mm.

The top mortice shall be set 150 mm down from the top of the post to the top of the mortice. Other rails shall be set evenly below (see Table 2). The mortices shall be cut in accordance with Figure 2 or Figure 3, as appropriate.

6.4 Round posts

The length of round posts shall be as specified in Table 2. Round posts shall have a girth at ground level of not less than 500 mm and shall maintain sufficient section to conform to Figure 2 or Figure 3 as appropriate.

NOTE Round posts have bark and a considerable sapwood content. This can make them unsuitable for use in ground where rotting is a problem.

6.5 Cleft posts

The length of cleft posts shall be as specified in Table 2. Cleft posts shall have a cross-section such that the girth measured at ground level ($A + B + C$ in Figure 4 or $A + B$ in Figure 5) is not less than 500 mm. They shall maintain sufficient section to conform to Figure 2 or Figure 3 as appropriate.

NOTE Cleft posts have some bark and sapwood content. This can make them unsuitable for use in ground where rotting is a problem.

6.6 Cleft rails

Cleft rails shall be triangular in section. Their length shall not exceed 3.05 m. The cutting tolerance for length shall be $^{+50}_0$ mm. When measured in accordance with Figure 4, the girth ($A + B + C$ in Figure 4) over the middle third of any span shall not be less than 250 mm, with a minimum of 70 mm for the dimension A or B (see Figure 4).

The section at the rail ends shall be sufficient to produce a tenon that adequately fills the mortice.

Figure 2 Position and dimensions of side-by-side mortices for cleft rails

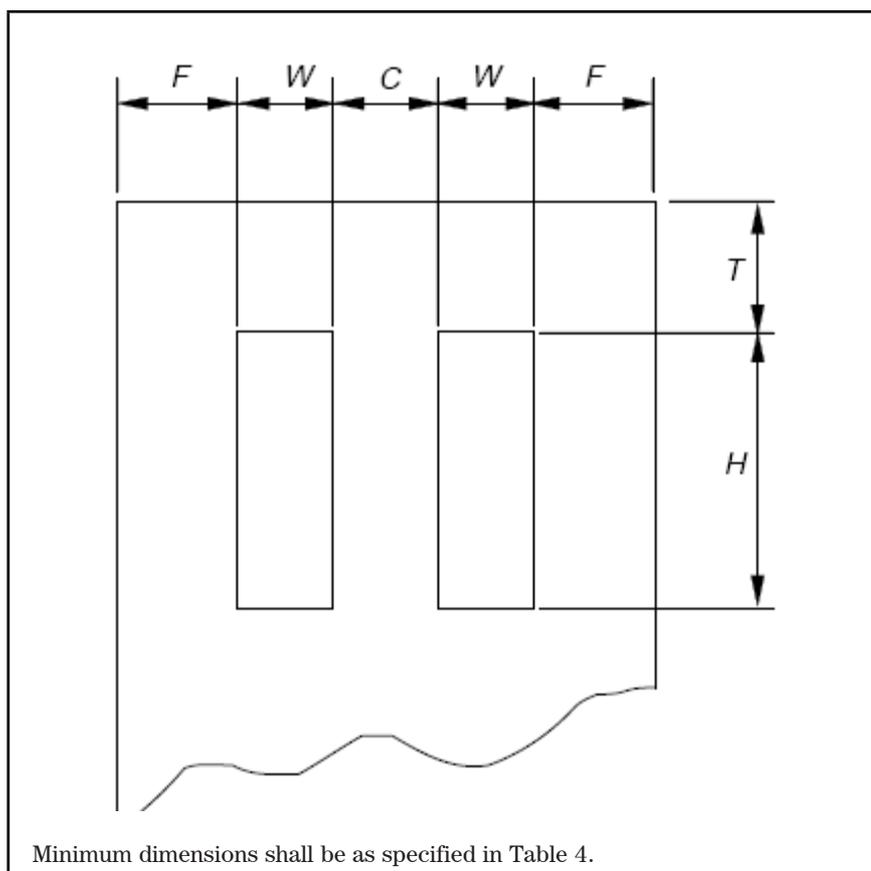


Table 4 Minimum dimensions of side-by-side mortices for cleft rails

Post type	Minimum dimensions (see Figure 2)				
	mm				
	<i>F</i>	<i>W</i>	<i>C</i>	<i>H</i>	<i>T</i>
Sawn post	37	25	25	75	150
Cleft post	45	25	25	75	150

Figure 3 Position and dimensions of single mortices for cleft rails

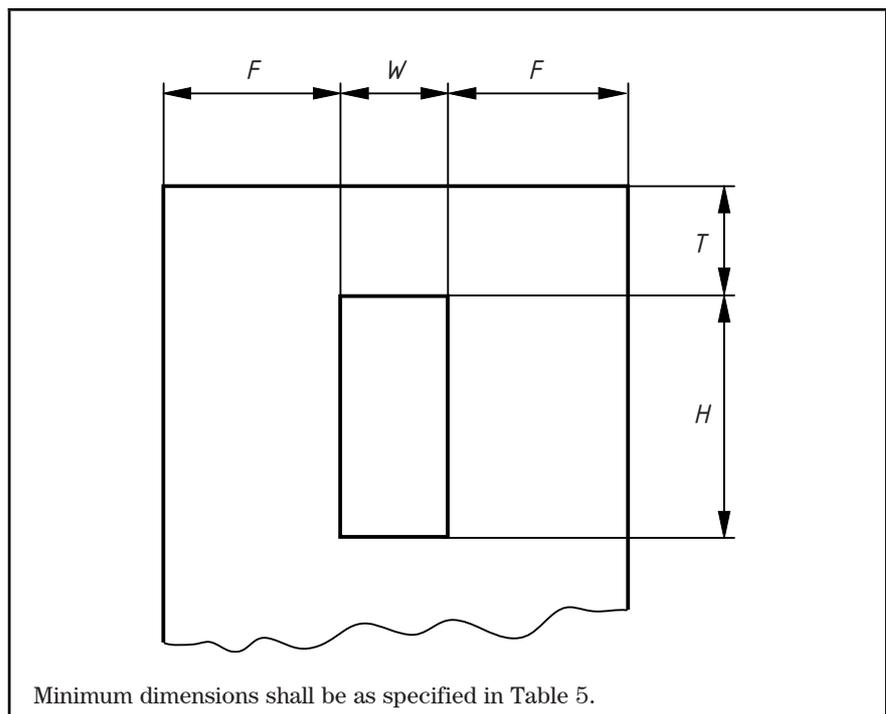


Table 5 Minimum dimensions of single mortices for cleft rails

Post type	Minimum dimensions (see Figure 3)				
	mm				
	<i>F</i>	<i>W</i>	<i>C</i>	<i>H</i>	<i>T</i>
Sawn post	38	38	110	150	38
Cleft post	50	38	110	150	50

Figure 4 Measurement of girth of cleft posts and rails

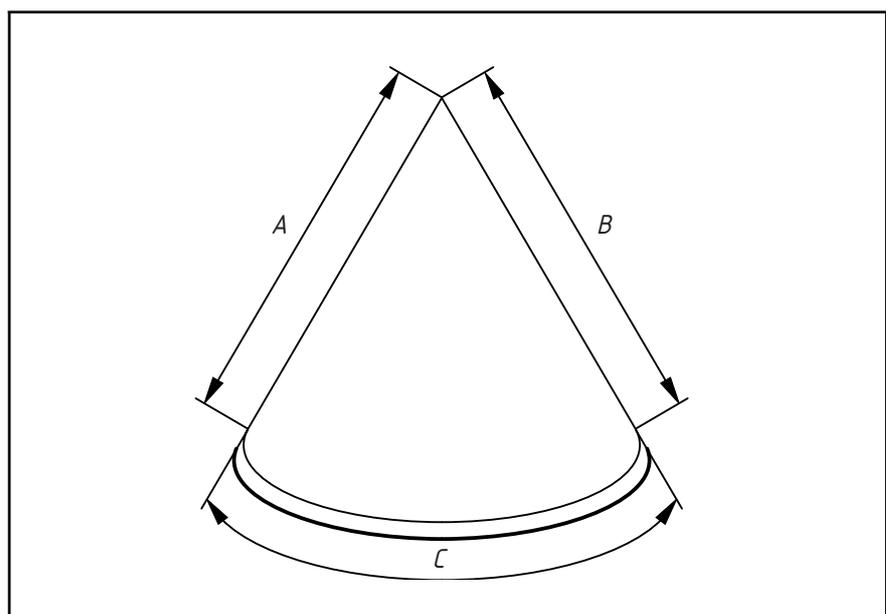
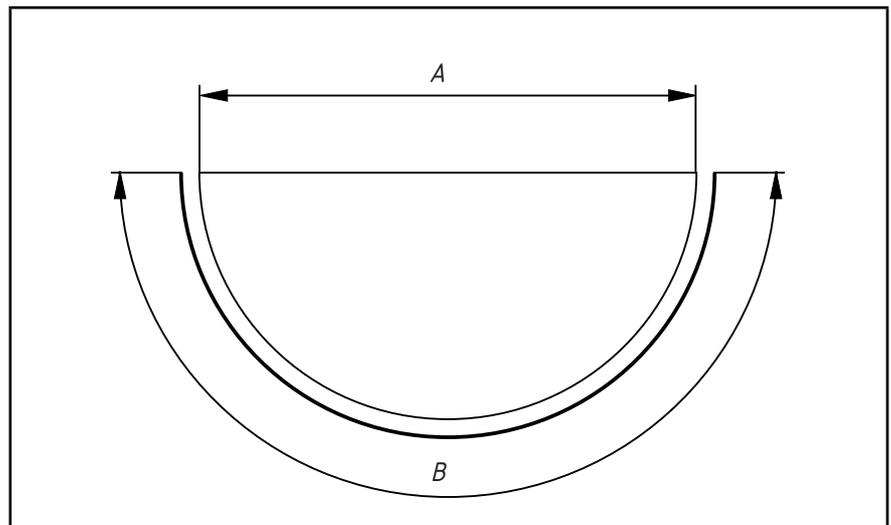


Figure 5 Measurement of girth of cleft posts



7 Other components

7.1 Fittings

Nails shall be round, plain-head nails conforming to BS 1202-1 and hot-dip galvanized in accordance with BS EN ISO 1461.

7.2 Concrete surrounding bases of posts

Concrete for surrounding the bases of posts and struts shall be at least one part cement to 10 parts 20 mm all-in ballast to BS EN 12620:2002 mixed with the minimum requisite quantity of clean water, or grade C8/10 or ST2 concrete to BS 8500 parts 1 and 2. The concrete shall be placed in position before commencement of the initial set.

8 Installation

8.1 Fences with sawn rails

8.1.1 Line and level

The fence shall follow lines and levels specified by the purchaser. The top of the fence shall follow approximately the profile of the ground, to levels previously indicated by the purchaser.

The presence of any electricity, gas, water or other underground services shall be established prior to commencement of excavation, drilling or erection in the working area.

NOTE Unless specified (see Annex C), the installation of the fence does not include cutting or filling of the ground to vary the levels.

8.1.2 Posts**8.1.2.1 Main posts****8.1.2.1.1 Spacing**

Main posts shall be provided at intervals, measured centre-to-centre of the posts, of not more than 2.85 m for morticed fences and not more than 1.8 m for nailed fences.

8.1.2.1.2 Setting

Main posts shall be set vertically in the ground to a depth of 0.6 m for fences 1.1 m high, and to a depth of 0.7 m for fences 1.3 m high. Holes for main posts set in concrete shall be not less than 0.3 m × 0.3 m in plan, or, if round, as produced by an auger, not less than 0.3 m in diameter. Alternatively posts may be driven. The holes for posts set only in rammed backfill shall be as small as is practicable to allow for refilling with backfill and ramming. All holes shall have vertical sides.

NOTE 1 It is realized that the ground at the top of a hole is damaged during digging. This is acceptable provided that the damage is limited to the top of the hole and does not extend downward such that the hole itself is tapered out towards the top.

Concrete surrounding the base of main posts shall fill at least half the depth of the hole. The remainder of the hole shall be filled with backfill.

NOTE 2 The concrete should be placed after insertion of the post and should be well rammed as the filling proceeds. The backfill should be well rammed before the commencement of the initial set of the concrete.

If main posts are set directly in the ground they shall be surrounded by rammed backfill.

NOTE 3 The backfill should be well rammed as filling proceeds.

8.1.2.2 Prick posts

One prick post shall be provided in each bay of a morticed fence and shall be driven vertically into the ground to a depth of 0.45 m. It shall be positioned centrally within the bay.

8.1.3 Rails**8.1.3.1 General**

The top rail shall be fixed so that its top edge is 100 mm ± 5 mm from the top of the main post. The spacing of subsequent rails shall be as given in Table 1. The centreline of the rail shall not at any point deviate by more than 25 mm from a straight line within the length between any two consecutive main posts of a nailed fence, or between any consecutive main post and prick post of a morticed fence.

8.1.3.2 Morticed fences

The rails shall fit into the mortices in the main posts and shall be nailed to each prick post with two 4 mm × 100 mm nails. The nails shall be clenched.

When side-by-side mortices are used, the tenons shall pass through the posts. When single mortices are used, the rails shall be scarfed over and under, or side by side. The length of the scarf shall be not less than 150 mm.

8.1.3.3 Nailed fences

Rails shall be butt-jointed within the middle third of the 150 mm face of a main post. The joints shall be staggered so that alternate joints occur on one post.

The rails shall be nailed on to each post with two 4 mm × 100 mm nails, driven in on the skew.

8.2 Fences with cleft rails

8.2.1 Level

The fence shall follow lines and levels specified by the purchaser. The top of the fence shall follow approximately the profile of the ground, to levels previously indicated by the purchaser.

The presence of any electricity, gas, water or other underground services shall be established prior to commencement of excavation, drilling or erection in the working area.

NOTE Unless specified (see Annex C), the installation of the fence does not include cutting or filling of the ground to vary the levels.

8.2.2 Posts

Posts shall be installed in accordance with 8.1.2.1.2, except that posts for fences 1.05 m high shall be set vertically in the ground to a depth of 0.6 m, and fences 1.25 m high, to a depth of 0.7 m.

8.2.3 Rails

Cleft rails shall be tenoned into the posts and shall fit properly into the mortices. When side-by-side mortices are used, the tenons shall pass through the posts. When single mortices are used, the rails shall be scarfed over and under, or side by side. The length of the scarf shall be not less than 200 mm. The top mortices shall be set 150 mm down from the top of the post to the top of the mortice. The spacing of subsequent rails shall be as given in Table 2. The rails shall be fixed so that the bark is on the underside.

9 Statement of Conformity

9.1 Fence manufacturer

On delivery, the manufacturer/supplier of the fence shall provide the installer with a certificate, conforming to 9.3, confirming that the fence and/or gates are manufactured in accordance with the client's instructions.

NOTE This certificate can be in the form of an invoice, provided this conforms to 9.3.

9.2 Fence installer

On completion, the fence installer shall provide the end user with a certificate, conforming to **9.3**, confirming that the installation and materials used are in accordance with the client's instructions.

NOTE This certificate can be in the form of an invoice provided this conforms to 9.3.

9.3 Certificate

In addition to the requirements of **9.1** and **9.2**, the certificate shall also include the following information:

- a) the supplier's name and address;
- b) the contract or order number;
- c) the date of delivery or installation, as appropriate;
- d) the purchaser's name and address.

9.4 Statement

The manufacturer and/or installer shall make a statement to the effect that it is their policy to conform to a previously client-agreed and documented specification and to offer goods and/or services accordingly.

NOTE This could be done by inclusion in trade advertising and "terms of trading" statements supplied with quotations.

Annex A (normative) Timber components

A.1 General

Timber shall be of a species suitable for use in fencing. Timber fencing components shall be suitably designed to avoid the collection of water at joints, and suitably protected against premature failure due to natural decay, by the use of suitable preservative treatment (see **A.3**).

NOTE This annex is concerned with ensuring the durability of timber components. In some cases economic or aesthetic constraints will influence the choice of species.

Timber shall be of the appropriate durability recommended in BS EN 335-2, BS EN 350-2 and BS 8417:2003, Table 2.

A.2 Quality of sawn timber

A.2.1 Limiting characteristics

When measured in accordance with **A.2.2**, either at any time within 14 days of delivery to the preservation treatment works or at any time within 14 days of delivery to the site, the timber shall conform to Table A.1.

NOTE 1 The method of sampling should be agreed between the supplier and the specifier. A suggested sampling procedure is given in Annex B.

NOTE 2 Defects caused by changing climatic conditions should not be considered a valid reason for subsequent rejection after the initial inspection within 14 days of delivery, either to the preservation treatment works or to the site.

A.2.2 Methods of measurement

A.2.2.1 Knots in structural components

(See Figure A.1a and Figure A.1b.)

Knots or groups of knots in the same cross-section shall be limited by their knot area ratio (K.A.R.), which shall be taken as the ratio of the sum of the projected cross-sectional areas of the knots to the cross-sectional area of the piece. Knots shall be considered as part of the same cross-section if any parts of the knots, or the grain disturbances for which they are responsible, overlap along the length of the piece. Knots or knot holes of diameters equal to or less than 5 mm are ignored. No distinction shall be made between knot holes, dead knots or intergrown knots.

NOTE 1 **A.2.3** describes a method for measuring K.A.R., for use in verifying the grading of a piece of timber, for instance in the case of a dispute.

NOTE 2 An intergrown knot is a knot having fibres intergrown with those of the surrounding wood to the extent of approximately 75% or more of the cross-sectional perimeter.

A.2.2.2 Knots in non-structural components

(See Figure A.1c.)

Only knots emerging on the face of non-structural components are considered. Take the size of the individual knots and knot clusters as being the minimum dimension (k) that can be enclosed by a pair of parallel lines. Measure the dimension k on each face; the greatest value of k shall not exceed $0.5w$, where w is the width of the face. Dead knots are acceptable if their diameter is less than 25 mm.

NOTE A dead knot is a knot whose fibres are intergrown with those of the surrounding wood to an extent of less than 25% of the cross-sectional area.

Table A.1 **Characteristics and defects of sawn softwoods and hardwoods**

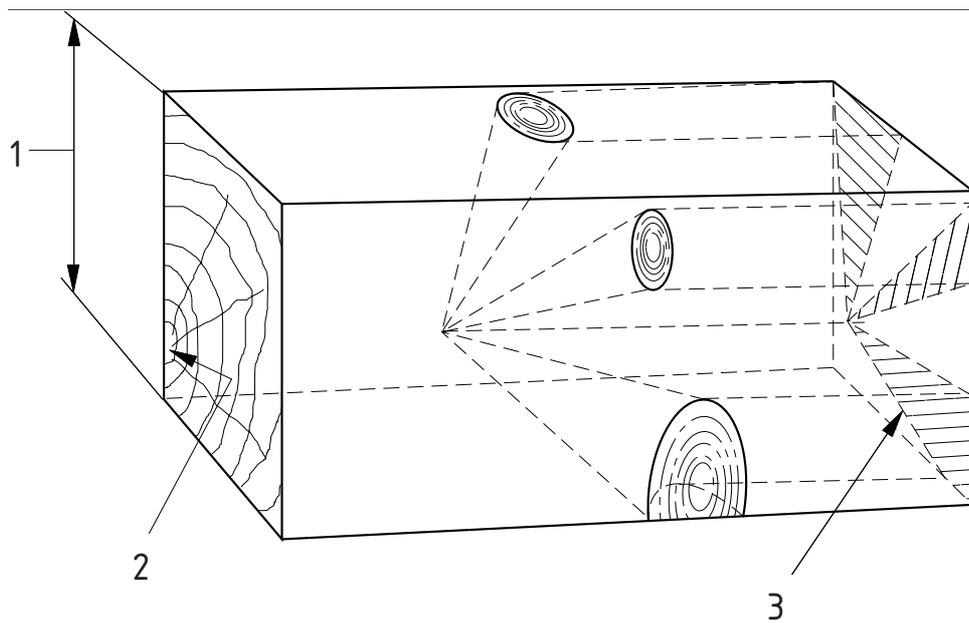
Characteristics	Structural components		Non-structural components
	Posts	Rails	
Knots	Total K.A.R. (see A.2.2.1) not greater than $\frac{1}{2}$ ^{A)}		Size of knot shall not exceed half width of face
Wane	Not more than 15 mm on any corner. At least two adjacent corners shall be free of wane	Not more than 10 mm on any corner At least two adjacent corners shall be free of wane	
Slope of grain	Not more than 1 in 6 to the longitudinal axis of the piece		
Rate of growth	Unlimited		
Checks ^{B)}	The depth of each check shall not exceed one half of the thickness of the piece		
End shakes ^{B)}	Not longer than 150 mm		
Resin pockets	Unlimited	Not longer than the width of the piece	
Bark pockets	Unlimited	Not longer than the width of the piece and not wider than 5 mm	
Rot	Not permitted		
Active insect attack	Not permitted		
Lyctus damage	Not permitted		
Pin holes	Not more than 20 in any 0.3 m length	Not more than 10 in any 0.6 m length	
Blackheart	Unlimited ^{C)}		
Blue stain	Unlimited ^{C)}		
Straightness ^{B)}	Bow	Not more than 10 mm per 1 m length	
	Spring	Not more than 10 mm per 1 m length	
	Twist	Not more than 2 mm per 25 mm width	
	Cup	Not more than 1 mm per 25 mm width	
Boxed heart	Unlimited		

A) Within a parcel, no fewer than 90% of the pieces shall have a K.A.R. of $\frac{1}{2}$ or less. A K.A.R. not exceeding $\frac{3}{5}$ is permitted in up to 10% of the pieces in the parcel.

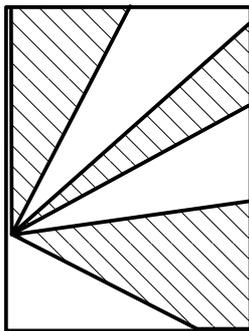
B) Defects affected by changing climatic conditions (see Note 2 to A.2.1).

C) Not considered a defect.

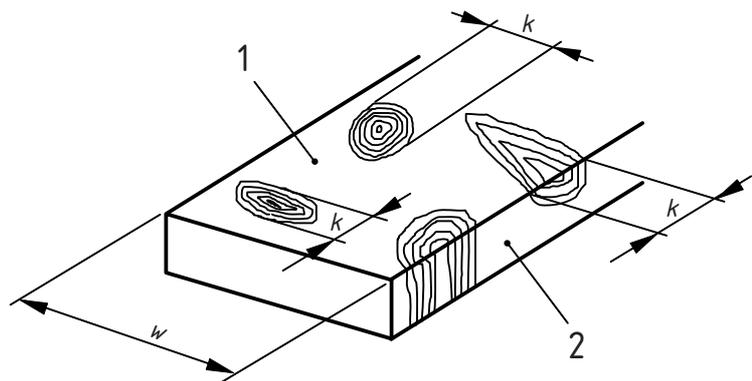
Figure A.1 Knot projection



a) View showing in three dimensions a group of knots and their projection on a cross-sectional plane



b) Front view of projection plane, showing projection of knots (hatched)



d) knots emerging in face

Key

- 1 Width
- 2 Pith
- 3 Plane of projection
- 4 Face
- 5 Edge

Figure A.2 **Measurement of wane**

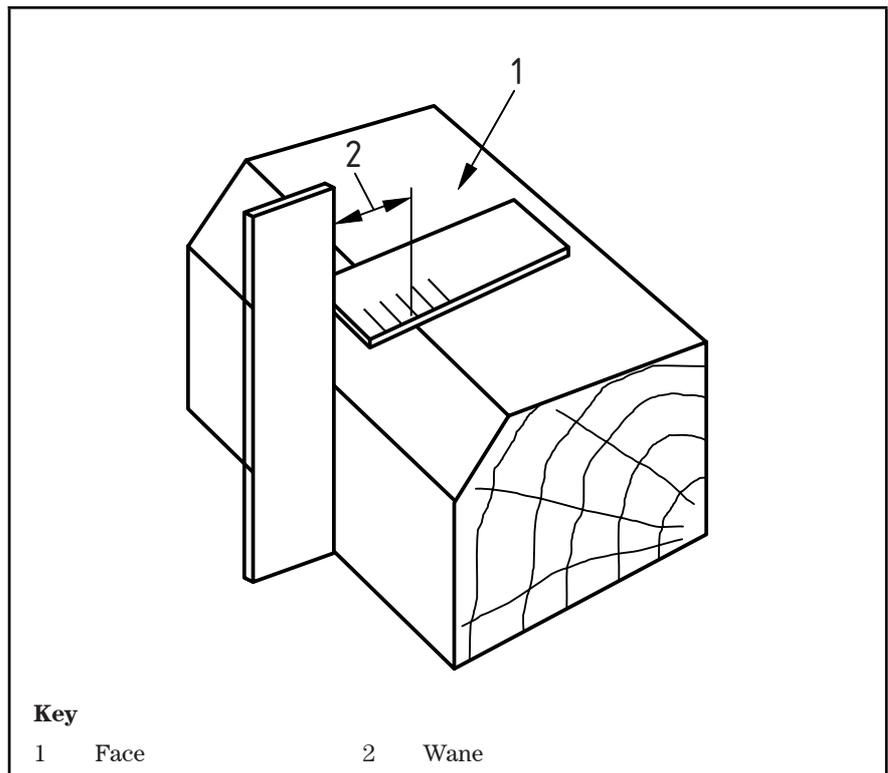
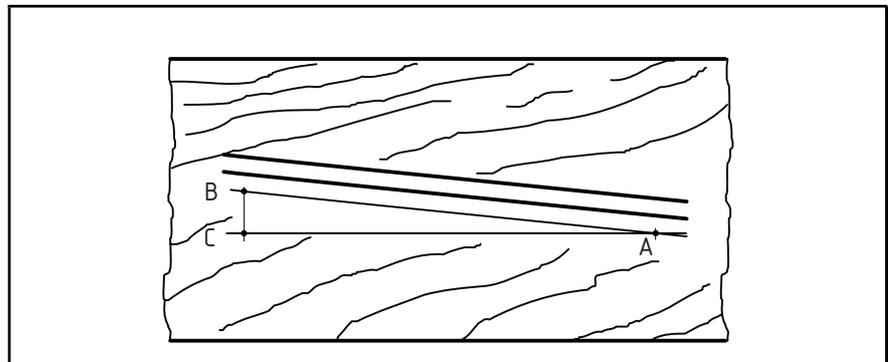


Figure A.3 **Measurement of slope of grain**



A.2.2.3 Wane

(See Figure A.2.)

Place a straightedge against a face or edge of the piece and measure the wane.

A.2.2.4 Slope of grain

(See Figure A.3.)

Measure the slope of grain either:

- a) by taking a line parallel to the surface fissures; or
- b) by using a grain detector as described in BS 4978.

The slope of grain shall be determined over a distance sufficiently great to determine the general slope, disregarding local deviations. Measure the inclination of grain as shown in Figure A.3, in which AB is a line indicating grain direction, AC is a line drawn parallel to the edge of the member, and BC is of length one unit (any convenient unit may be used) and is at right angles to AC. Express the slope of grain as 1 in x , where x is the length of AC measured in terms of the length of BC.

A.2.2.5 Checks

(See Figure A.4a.)

Measure the maximum depth to which a 0.2 mm feeler gauge conforming to BS 957-2 can be inserted without using excessive force.

A.2.2.6 End shakes

(See Figure A.4b.)

Measure the maximum distance from the split end of the piece to a point at which a 0.2 mm feeler gauge conforming to BS 957-2 can be inserted to a depth of half the piece without using excessive force.

A.2.2.7 Straightness

Measure bow, spring, twist and cup as shown in Figure A.5, taking the actual length or width (as relevant) of the piece as the reference.

A.2.3 Method for determining the knot area ratio (K.A.R.) for structural components

A.2.3.1 General

If it is necessary to verify the visual assessment of the K.A.R. of a structural component, for instance in the case of a dispute, the method described in **A.2.3.2** shall be used.

Figure A.4 Measurement of checks and end shakes

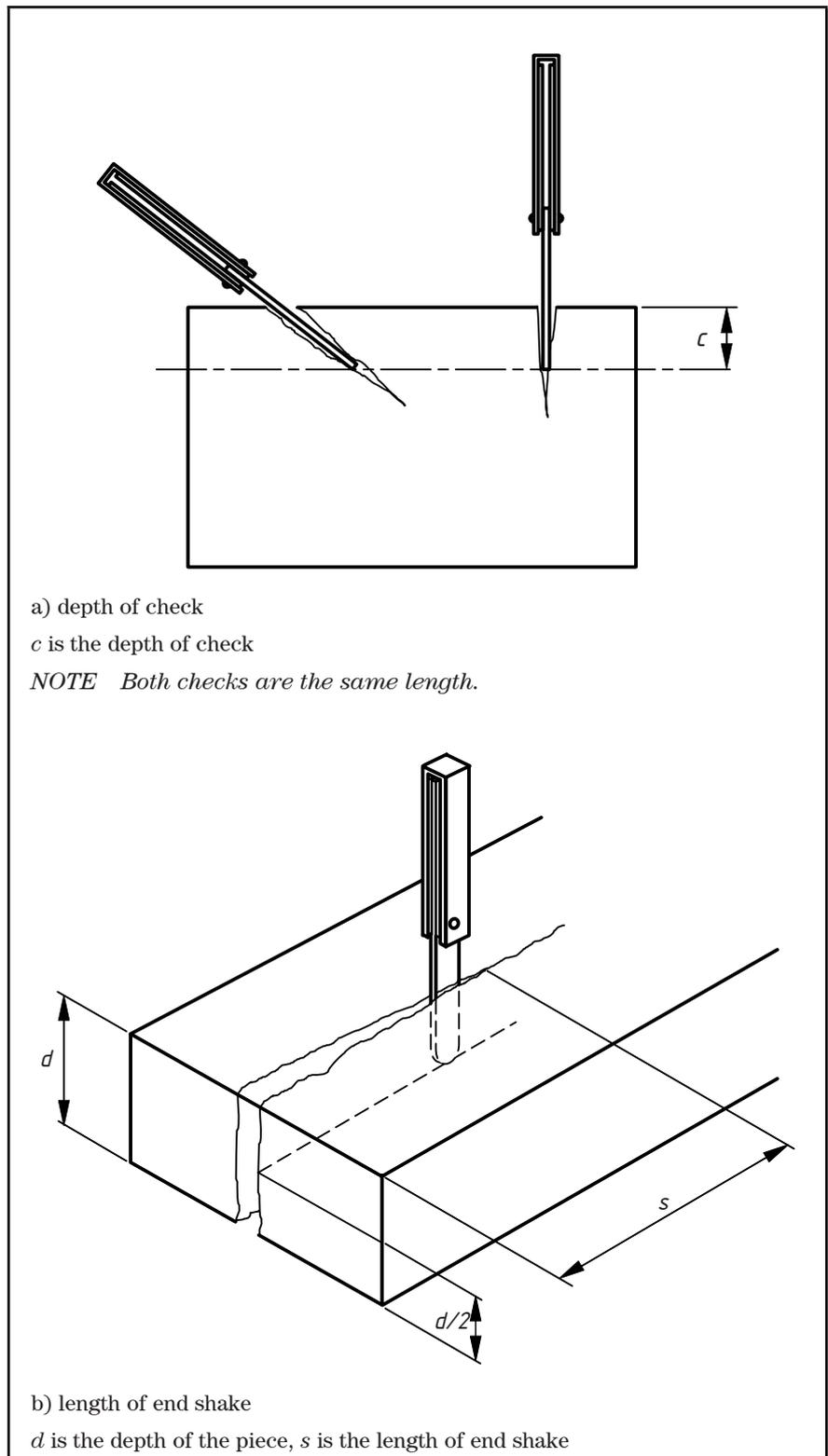
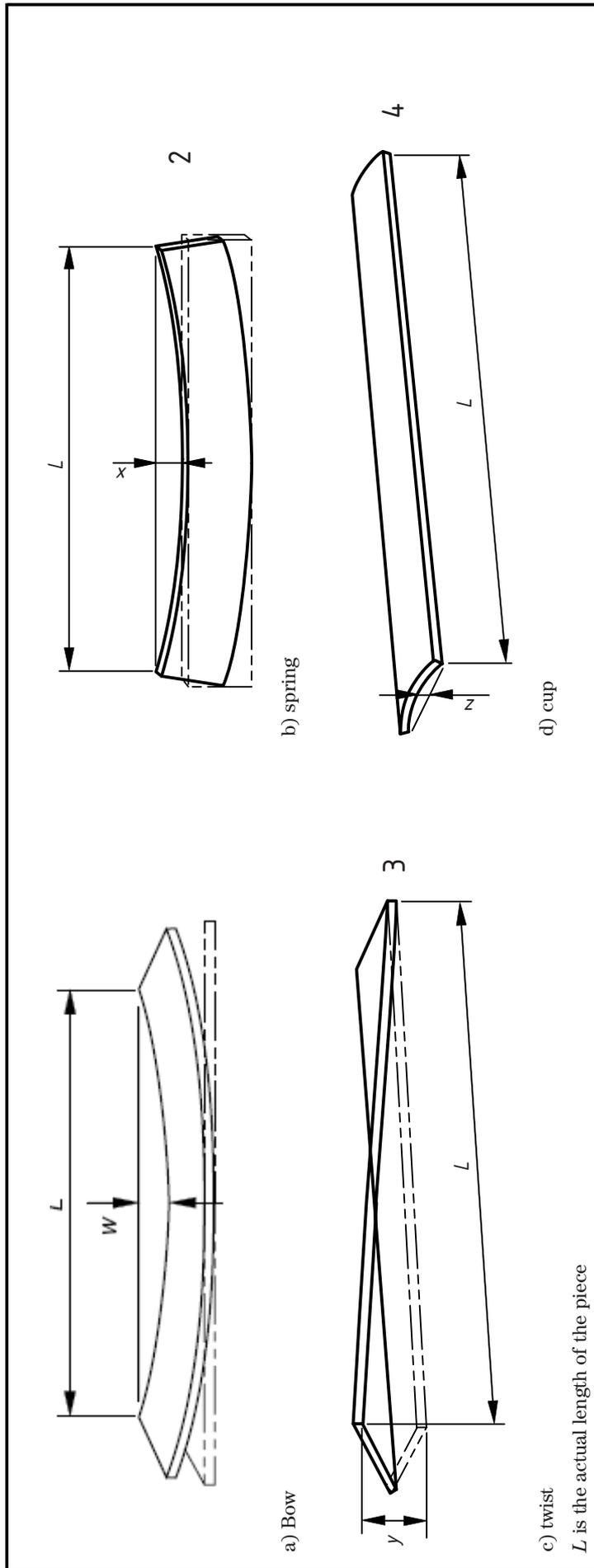


Figure A.5 Measurement of straightness



A.2.3.2 Procedure

A.2.3.2.1 Select a section in the piece that intersects the knot or group of knots.

A.2.3.2.2 In calculating the knot area ratio of the whole piece, consider all the knots and knot holes with diameters greater than 5 mm which are intersected by the chosen section.

A.2.3.2.3 Make full scale drawings of the chosen section. Mark points on the appropriate side of the rectangle representing any knot on that surface. The points marked shall represent the widest projection of the knot on that face or edge.

A.2.3.2.4 Measure the total area of knots as described in either a) or b), according to whether or not the pith occurs within the cross-section. For the purpose of estimating the position of the pith, within or outside the cross-section, examine the nearest end of the piece and assume that all annual rings are concentric with the pith.

- a) If the pith is within the cross-section (see Figure A.1), join the points representing the limits of the knots on the drawing by straight lines to a point representing the estimated position of the pith. Measure the area within those lines which corresponds to knots for the whole cross-section.
- b) Where the pith is outside the cross-section, mark its estimated position at an appropriate position on the drawing. Join up the points on the perimeter of the drawing in a manner appropriate to the assumption that each knot is approximately a cone with its apex at the pith. Measure the area thus enclosed, corresponding to the estimated position of the knots, for the whole cross-section.

In both cases a) and b), express the total area of knots within the cross-sectional area of the piece as a proportion of the cross-sectional area of the piece, to determine the knot area ratio. (See **A.2.2.1.**)

A.3 Preservative treatment

The decision whether to use timber in or out of ground contact shall be based on BS EN 335-2. The decision whether to use timbers the heartwood of which can be used with and without preservation in different use classes, based on their natural durability, is given in BS 8417 (Table 2).

Timber shall be preserved in accordance with the recommendations for fencing timber (rails Use Class 3; posts Use Class 4) given in BS 8417.

Under normal conditions the life expectancy of timber components shall be 15 years, subject to the maintenance recommended by the manufacturer where prescribed; if a longer service life is required 30 years shall be specified. Where preservation is required to achieve this service life, Tables 4, 5, 6 and 9 of BS 8417:2003 shall apply.

NOTE Certain species of timber do not require treatment, depending upon the intended use and provided that there is not excessive sapwood. Durability classes for common species are given in BS EN 350-2, and guidance on which of these can be used without preservation is given in BS 8417. Whenever an amount of sapwood is present, the loss of which would render the fence component unfit for its intended use, the timber should be treated with preservative.

A.4 Regulations regarding wood preservatives

Users are reminded of two regulations regarding the wood preservatives chromated copper arsenate (CCA) and creosote.

NOTE 1 Marketing and use of chromated copper arsenate (CCA): The Environmental Protection (Controls on Dangerous Substances) Regulations 2003, SI 2003/3274 [1] and The Marketing and Use of Dangerous Substances (No. 4) Regulations (Northern Ireland) 2003, SR 2003/548 [2] restrict the marketing and use of chromated copper arsenate (CCA) treated timber. Examples of uses for which treated timber is not permitted include residential or domestic structures (whatever the purpose) and in any application where there is a risk of repeated skin contact. Guidance on the restrictions is available from the Wood Protection Association [3].

NOTE 2 Marketing and use of creosote: The Creosote (Prohibition on Use and Marketing) (No. 2) Regulations 2003 [4] restrict the marketing and use of creosote treated timber. Examples of uses for which treated timber is not permitted include uses in parks, gardens or outdoor leisure facilities where there is a risk of frequent skin contact. Guidance on the restrictions is available from the Wood Protection Association [5].

Annex B (informative)

Suggested sampling method for use when measuring the limiting characteristics of timber

B.1 Purpose

This sampling plan is for use in determining initially if a parcel of timber pieces conforms to Table A.1. It does not preclude the subsequent rejection of individual pieces for non-conformity with Table A.1, except for defects due to changing climatic conditions (see Table A.1).

B.2 Procedure

Sample in accordance with Table B.1. Take the pieces comprising the sample at random. Inspect by defective pieces, not by defects (i.e. a piece containing one or more defects is to be counted as a defective piece).

Reject a parcel if the number of defective pieces is equal to, or exceeds, the rejection number.

Table B.1 **Single sampling plan**

Number of pieces in parcel ^{A)}	Number of pieces in sample	Rejection number
91 to 150	20	4
151 to 280	32	6
281 to 500	50	8
501 to 1 200	80	11
1 201 to 3 200	125	15
3 201 to 10 000	200	22

^{A)} For parcels comprising fewer than 91 pieces, 100% inspection is recommended.

Annex C (informative) Specifying a wooden post and rail fence

C.1 General

This standard specifies requirements for materials and how they are combined and installed to provide a serviceable fence. Because a fence is made up of a number of separate components whose particular features may vary, a number of combinations are available to the user. When preparing a specification for a fence, it is therefore important to give precise details, including details of the installation site. This annex lists those items which typically need to be specified. However, as conditions vary from site to site, this list should not be assumed to be exhaustive.

C.2 Site conditions

The following items typically need to be specified:

- a) line and length of fence;
- b) site preparation:
 - 1) site clearance;
 - 2) cutting or filling of ground level;
- c) any specific requirements for non-standard post lengths due to ground conditions (see Foreword);
- d) number and position of any gates or stiles.

NOTE 1 The requirements given in this standard for the length of posts (see Table 1 and Table 2) and for foundation sizes relate to "normal" ground conditions. This standard does not cover situations where the ground is particularly firm or soft, when it may be necessary to modify the specified lengths or foundation sizes. The method used to set posts in the ground is also determined by the local ground conditions.

NOTE 2 Morticed post and rail fences cannot be installed on a tight radius. This problem is most marked with scarfed rails.

C.3 Construction of fence

The following items typically need to be specified:

- a) height of fence (related to the proposed use of the fence) (see Table 1);
- b) type of post:
 - 1) sawn;
 - 2) round;
 - 3) cleft;
- c) method of fixing rails (see Table 1):
 - 1) morticed;
 - 2) nailed;
- d) setting and spacing of posts (see **8.1.2**):
 - 1) method of setting the posts in the ground:
 - i) in concrete;
 - ii) in rammed backfill;
 - iii) driven;
 - 2) any specific requirements for the spacing of posts.

NOTE 8.1.2.1.1 specifies a maximum spacing of main posts for sawn rails of 1.8 m or 2.85 m centres, according to the method used to fix the rails. If shorter bays are required, they should be specified.

For cleft rails, the spacing of posts will be approximately 150 mm to 250 mm less than the length of the rails, according to the method used to fix the rails. Rails are traditionally cut at 3.05 m or 2.91 m lengths.

Bibliography

Standards publications

BS 7359:1991, *Nomenclature of commercial timbers including sources of supply*

BS EN 335-1:1992, *Use classes of wood and wood-based products against biological attack – Part 1: Classification of use classes*

BS EN 350-1:1994, *Durability of wood and wood-based products – Natural durability of solid wood – Part 1: Guide to the principles of testing and classification of natural durability of wood*

BS EN 460:1994, *Durability of wood and wood-based products – Natural durability of solid wood – Guide to the durability requirements for wood to be used in use classes*

Other publications

- [1] GREAT BRITAIN. Statutory Instrument 2003 No. 3274: The Environmental Protection (Controls on Dangerous Substances) Regulations 2003. London: The Stationery Office.
- [2] GREAT BRITAIN. Statutory Rules 2003 No. 548: The Marketing and Use of Dangerous Substances (No. 4) Regulations (Northern Ireland) 2003. London: The Stationery Office.
- [3] Wood Protection Association. *Use of CCA wood preservatives and CCA-treated timber.*³⁾
- [4] GREAT BRITAIN. Statutory Instrument 2003 No. 1511: The Creosote (Prohibition on Use and Marketing) (No. 2) Regulations 2003. London: The Stationery Office.
- [5] Wood Protection Association. *Use of creosote and creosote-treated timber.*³⁾

³⁾ Wood Protection Association WPA, 1 Gleneagles House, Vernongate, Derby, UK, DE1 1UP, www.wood-protection.org

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