

Fences —

Part 1: Specification for chain link fences

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- British Precast Concrete Federation Ltd
- British Steel Industry (Wire Section)
- British Timber Merchants' Association
- British Wire Netting Association
- British Wood Preserving Association
- Cement and Concrete Association
- Concrete Society
- Country Landowners' Association
- Department of Agriculture and Fisheries for Scotland
- Department of the Environment (Building Research Establishment, Princes Risborough Laboratory)
- Department of the Environment (Property Services Agency)
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- Fencing Contractors' Association
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- National Farmers' Union
- Royal Institution of Chartered Surveyors
- Society of Chain Link Fencing Manufacturers
- Society of Chestnut Fencing Manufacturers
- Timber Growers United Kingdom
- Timber Research and Development Association
- Timber Trade Federation
- Wire Products Association

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

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- Cold Rolled Sections Association
- Consumer Standards Advisory Committee of BSI
- County Surveyor's Society
- Fencing Industry Association

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Foreword

This British Standard has been prepared under the direction of the Road Engineering Standards Committee. It is a revision of BS 1722-1:1972, taking into account current practice, and also incorporates and revises Supplement No. 1 (1974) to BS 1722-1:1972. Both publications are withdrawn.

BS 1722 is published in separate Parts as follows:

- *Part 1: Specification for chain link fences;*
- *Part 2: Specification for rectangular wire mesh and hexagonal wire netting fences;*
- *Part 3: Specification for strained wire fences;*
- *Part 4: Specification for cleft chestnut pale fences;*
- *Part 5: Specification for close boarded fences;*
- *Part 6: Specification for wooden palisade fences;*
- *Part 7: Specification for wooden post and rail fences;*
- *Part 8: Specification for mild steel (low carbon steel) continuous bar fences;*
- *Part 9: Specification for mild steel (low carbon steel) fences with round or square verticals and flat posts and horizontals;*
- *Part 10: Specification for anti-intruder fences in chain link and welded mesh;*
- *Part 11: Specification for woven wood and lap boarded panel fences;*
- *Part 12: Specification for steel palisade fences;*
- *Part 13: Specification for wire mesh fencing for tennis court surrounds.*

The various Parts specify requirements for the types of fence that are considered suitable for standardization. It should be noted that no attempt has been made to standardize fences or gates of a purely decorative nature, or to suit special requirements, or to specify requirements for “patent” proprietary fencing systems. It is recommended that the structure of such fences or gates should comply with those parts of this Part of BS 1722 that are applicable.

It has been assumed in the drafting of this British Standard that the execution of its provisions is entrusted to appropriately qualified and experienced people.

The purpose of this standard is to establish minimum requirements for materials and workmanship for the more common types of fence in order to ensure satisfactory service for the purchaser, and to assist manufacturers and erecting contractors by eliminating unnecessary minor variations in the demands of purchasers. It specifies requirements for the components that make up a fence and the way in which the fence needs to be constructed. Throughout this standard there are requirements for sizes of components, together with the permissible tolerances on size. These are minimum requirements and it will normally be acceptable to use larger sizes, except where it would otherwise adversely affect the fit of components or where replacement parts need to match up with those already present.

The choice of a fence is affected by factors such as the intended purpose of the fence, the desired service life, aesthetic considerations and the availability of components. The specifier of the fence will know its intended purpose and by reference to Table 1 and Table 2 a suitable choice can be made. This then gives those erecting the fence the basic characteristics that need to be provided. This standard includes requirements for protective treatments. However, an important aspect of providing an extended service life is the maintenance of the fence after its erection; this is outside the scope of this standard. Premature failure can be avoided by taking care not to overstrain coated wire or to damage protective treatments during installation.

Ground conditions may indicate that a variation in the length of a post or strut, or of the depth to which it should be set, is desirable. The posts and struts and setting depths specified in this standard are intended for use in normal ground but if special conditions exist that warrant a change in the specification, e.g. ground that is softer or firmer than normal, such a change needs to be agreed with the specifier, as for other variations.

To assist those specifying and/or providing a fence, appendix E provides guidance on the more important details, which often take the form of selected options, that need to be specified at the time of ordering a fence. This is a new feature of the standard.

This revision has retained the method of allocating a reference code to each type of fence indicating its height, the type and weight of infill used, and the material used for the posts. These type references are given in full in Table 1 and Table 2. The first two letters indicate the type of protection given to the mesh or the wire. The third letter indicates the material of the post, and the numbers give an indication of the height of the fence, e.g. GLC 90 indicates a 0.9 m high fence with zinc coated chain link mesh supported on concrete posts. For the sake of uniformity the quoted heights are those of the main infill material and exclude any ground clearance at the base or the additional height provided by any extension arms for barbed wire. This is at slight variance with the previous edition in which in the case of 213 type fences the height quoted was to the level of the uppermost strand of barbed wire. This type reference has been deleted and replaced by three new type 180 references. The fourth letter, if present, indicates that there are further requirements for the size and/or weight of the chain link mesh. Wire and chain link sizes have been selected from BS 4102.

Designations of bolt size are in accordance with BS 4190.

The proof test of concrete strength has been deleted as experience has shown that there were technical problems associated with the application and interpretation of the test. Cube tests of concrete strength are now required and the frequency of testing is specified to ensure that regular quality checks are made.

The type of gate described in this standard has a steel frame with a chain link infill. However, in the domestic situation it may be appropriate to use timber or "wrought iron" gates. These types are described in BS 4092.

Since the publication of the previous edition of this standard BS 5589 has been published, and the timber appendix in this standard been revised to include the recommendations of BS 5589.

At the time of publishing this standard it has not been possible to agree a suitable standard specification for the protection of steelwork by plastic coating. Work continues on this subject and when a standard is agreed it will be included by amendment in appendix B.

In appendix C details have been included of methods for measuring defects in timber, and in particular the measurement of knots. In the case of structural members of a fence, i.e. posts and struts, the principle of knot area ratio (K.A.R.) has been introduced as a means of determining, by visual assessment of the proportion of the cross section occupied by knots, the maximum permissible knots for fencing grade timber. Although the application of this method of knot measurement is new, in so far as timber fencing components are concerned, it has been applied to the grading of structural timber for more than a decade. K.A.R. is a firmly established and widely accepted method of knot assessment which in itself is a critical part of all timber grading. The adoption of K.A.R. as part of grading timber for fencing is a logical move in unifying timber grading rules where the question of strength is involved.

Appendix D contains a suggested sampling procedure.

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 to iv, pages 1 to 26, 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.

Section 1. General

1.1 Scope

This Part of BS 1722 specifies requirements for chain link fences and for gates and gateposts for use in conjunction with chain link fences. The gates described are in steel and have a chain link infill (see foreword).

This Part specifies requirements for fences with a chain link mesh infill of up to 1.8 m high. For anti-intruder chain link fences reference should be made to BS 1722-10, and for chain link fences for tennis court surrounds reference should be made to BS 1722-13.

This Part of BS 1722 is divided into sections that specify separate requirements for the material components for fences (see section two) and the erection of the fences (see section three).

NOTE The titles of the publications referred to in this Part of BS 1722 are listed on the inside back cover.

1.2 Definitions

For the purposes of this Part of BS 1722, the timber definitions given in BS 6100-4.1 shall apply.

NOTE For convenience, the relevant definitions have been repeated in C.2.

1.3 Dimensions and general characteristics

1.3.1 Fences

The overall dimensions of chain link fences shall be as given in Table 1 and Table 2. Other dimensions shall comply with section three.

NOTE 1 The spacings of line wires in Table 1 and Table 2 are given for guidance only.

NOTE 2 Figure 1 illustrates the general characteristics of chain link fences. It is not intended to illustrate any particular requirements of this Part of the standard but provides guidance as to the general layout of a typical fence, and on the terminology associated with this form of fencing.

1.3.2 Gates

Either single or double gates shall be used to fill openings up to and including 5 m in width. Double gates having leaves of equal width shall be used to fill openings of over 5 m and up to 10 m in width. Gates complying with 2.3.3 shall be the same height as the chain link mesh of the adjacent fence when installed in accordance with 3.4. Other dimensions shall comply with section three (see Table 5 and Table 6).

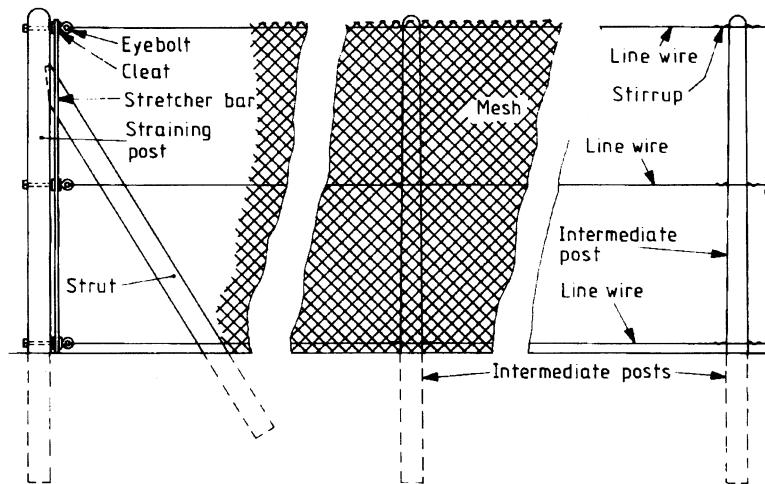
1.3.3 Provision of additional security

Fences designated 180C, 180D and 180E (see the foreword) shall be provided with three lines of barbed wire set on straight (vertical) or cranked extension arms complying with 2.5.2. Where a fence is provided with barbed wire the associated gates shall also be provided with barbed wire on straight (vertical) extension arms complying with 2.5.2.

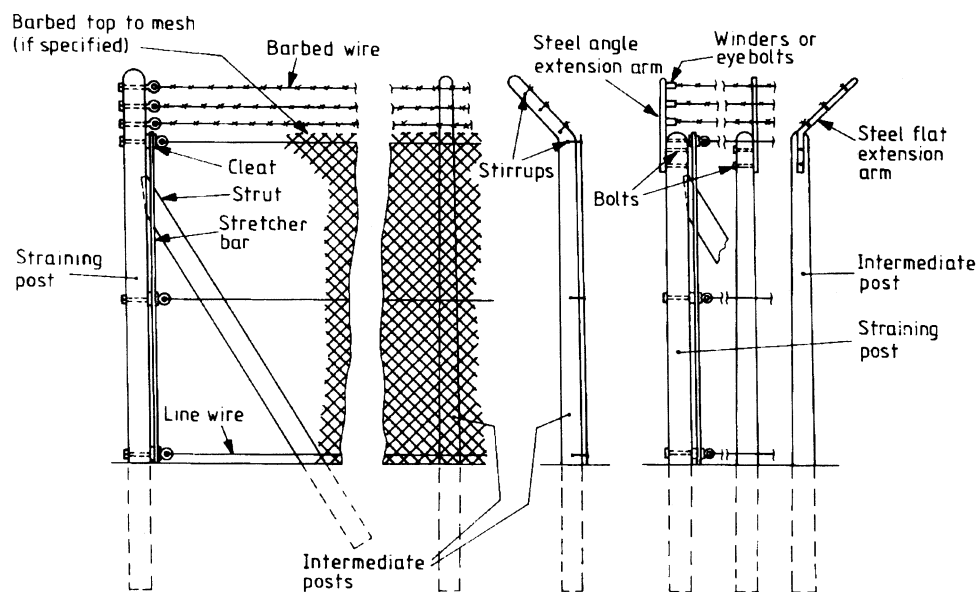
NOTE 1 Extension arms (for concrete or steel posts) may be either integral with the post or provided as separate components requiring attachment. 2.2.5 is primarily concerned with separate extension arms, but the requirements for the spacing of wires apply equally to integral and separate extension arms.

NOTE 2 Additional security may be provided by the use of chain link mesh having a barbed top (see footnote to Table 1 and Table 2).

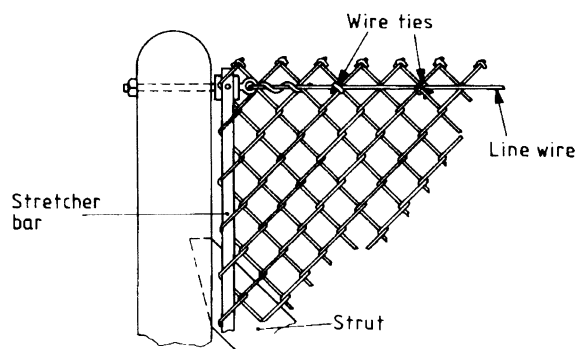
NOTE 3 BS 1722-10 specifies requirements for anti-intruder security fences.



(a) Chain link fence without extension arms for barbed wire



(b) Chain link fence with extension arms for barbed wire



(c) Details of mesh at straining post

NOTE. This figure shows various details of a chain link fence on concrete posts. The details of fences using steel or timber posts will be similar except for the use of cleats.

Figure 1 — General characteristics of a chain link fence

Section 2. Materials

2.1 Wire

NOTE Wire fixings are described in 2.5.1.4 and 2.5.1.5.

2.1.1 General

All wire shall comply with BS 4102.

2.1.2 Chain link mesh

Chain link mesh shall be zinc coated and/or plastics coated and shall comply with Table 1 or Table 2, as appropriate.

NOTE Plastics coated wire may be either grade A or grade B. The difference between the two grades is that in the case of grade A the wire core is also zinc coated.

2.1.3 Line wire

Line wire shall be zinc coated and/or plastics coated and shall either be low carbon steel (mild steel) wire with a nominal wire diameter complying with Table 1 or Table 2, as appropriate, or high tensile wire with a nominal wire diameter of 3.15 mm.

NOTE Plastics coated wire may be either grade A or grade B. The difference between the two grades is that in the case of grade A the wire core is also zinc coated.

2.1.4 Stirrup wire

Zinc coated stirrup wire shall be of low carbon steel (mild steel) and shall have a nominal wire diameter of 2.5 mm. Plastics coated stirrup wire shall be grade A and shall have a nominal core diameter of 2.5 mm and a nominal outside diameter of 3.55 mm.

2.1.5 Tying wire

Zinc coated tying wire shall be low carbon steel (mild steel) wire with a nominal wire diameter of 2 mm.

Plastics coated tying wire shall be grade A and shall have a nominal core diameter of 1.4 mm and a nominal outside diameter of 2 mm.

2.1.6 Barbed wire

Barbed wire shall be zinc coated and shall be made from either low carbon steel (mild steel) wire or high tensile steel wire.

2.2 Concrete components

2.2.1 General

2.2.1.1 Material. Concrete posts and struts shall be of steel reinforced concrete complying with appendix A.

2.2.1.2 Tolerances on size. The following permissible deviations shall apply to the specified size of concrete components when determining the actual sizes.

- a) A demoulding draw allowance of up to 4 mm on each of two opposing sides.

- b) An allowance on the base dimensions of intermediate posts resulting from the use of a mould having the base dimensions given in Table 3 that has been shortened by means of a stopping-off plate located not more than 300 mm from the base of the mould.

c) Additional deviations on size of:

- 1) length: $\begin{smallmatrix} +50 \\ -25 \end{smallmatrix}$ mm;
- 2) cross section: $\begin{smallmatrix} +6 \\ -4 \end{smallmatrix}$ mm.

NOTE The cross section is measured about the centre lines.

2.2.1.3 General constructional details. The long arrises formed in the mould shall either be rounded or have all sharp edges removed. The heads of posts shall be either weathered or half rounded in order to prevent lodgement of water.

Posts shall be holed to allow the fixing of line wires, etc. as specified in 2.2.2. The hole for the top line wire shall be approximately 75 mm below the top of the post (excluding any extension for barbed wire). Holes for bolts shall allow the bolt to be freely inserted. Holes for wire shall allow an M6 bolt to be freely inserted. All holes shall be free from obstructions and shall be accurately positioned.

Posts for use with barbed wire shall have integral extensions (see 2.2.2) or be holed for the attachment of extension arms (see also 2.5.2).

2.2.2 Posts and struts

2.2.2.1 Fence posts and struts. The dimensions of concrete fence posts and struts shall be as given in Table 3. Fence posts and struts shall be reinforced with four steel reinforcing bars of the size given in Table 3, except that if steel having a characteristic strength greater than 250 N/mm² is used it shall be permissible for the cross section of the reinforcing bars to be proportionately reduced.

Straining posts and struts shall not be tapered. Straining posts shall be provided with a firm bearing for struts. This bearing shall be at a point within the top third of the length of the straining post (excluding the length of any extension for barbed wire), measured above the ground level. Straining posts shall be holed for the attachment of straining fittings.

Intermediate posts without integral cranked extensions shall be tapered to 75 mm × 75 mm at the top. Intermediate posts with integral cranked extensions shall be tapered to not less than 75 mm × 75 mm just below the crank and shall be not less than 75 mm × 75 mm at the end of the cranked top. Intermediate posts shall be holed to allow the attachment of line wires.

NOTE For guidance only, the recommended positions of line wires are given in Table 1 and Table 2.

2.2.2.2 Gate posts and struts. The dimensions of concrete gate posts and struts shall be as given in Table 3. Gate posts and struts shall be reinforced with four steel reinforcing bars of the size specified in Table 3, except that if steel having a characteristic strength greater than 250 N/mm² is used it shall be permissible for the cross section of the reinforcing bars to be proportionately reduced.

Gate posts and struts shall not be tapered. Gate posts shall be holed for the attachment of hanging and shutting fittings. In addition, where chain link is to be attached directly to the gate post it shall be provided with holes to allow the attachment of straining fittings and with a firm bearing for a strut (see 2.2.2.1).

2.3 Steel components

NOTE See 2.5 for steel fittings.

2.3.1 General

2.3.1.1 Materials and protective treatment. Steel posts and struts shall comply with appendix B.

2.3.1.2 Tolerances on size. The following permissible deviations shall apply to the specified sizes of steel components when determining the actual sizes:

- 1) length: $\begin{smallmatrix} + 50 \\ - 25 \end{smallmatrix}$ mm;
- 2) cross section as specified in the appropriate material standards given in B.1.

2.3.1.3 General constructional details. Steel components shall be free from sharp edges and burrs. The tops of all hollow steel posts shall be capped.

Posts shall be holed for the attachment of line wires, etc. as specified in 2.3.2. The hole for the top line wire shall be approximately 25 mm below the top of the post (excluding any extension for barbed wire). All holes shall be free from obstructions and shall be accurately positioned.

Posts for use with barbed wire shall either have integral extensions having the same cross section as the post or shall be provided with means for the attachment of extension arms (see also 2.5.2).

NOTE Separate extension arms may be either bolted or welded on.

2.3.2 Posts and struts

2.3.2.1 Fence posts and struts. The dimensions of steel posts and struts of rolled steel angle or rectangular or circular hollow section shall be as given in Table 4.

Straining posts and struts shall either be fitted with baseplates (see 2.3.2.3) or have spragged ends. Straining posts and struts shall be holed to allow the two to be bolted together with an M8 bolt at a point within the top third of the length of the straining post (excluding the length of any extension for barbed wire), measured above the ground level. In addition, straining posts shall be holed to allow the attachment of straining fittings.

Intermediate posts of rolled steel angle for use with fences designated 180C, 180D or 180E shall either have spragged ends or be fitted with baseplates. Intermediate posts of other sections for use with fences designated 180C, 180D or 180E shall either have dowels fitted through their base or be fitted with baseplates (see 2.3.2.3). Intermediate posts for use with other types of fence shall have spragged or dowelled ends, or be fitted with baseplates, or be pointed for driving into the ground. Intermediate posts shall be holed to allow the attachment of line wires.

NOTE For guidance only, the recommended positions of line wires are given in Table 1 and Table 2.

2.3.2.2 Gate posts and struts. The dimensions of steel gate posts shall be as given in Table 5. Struts for use with gate posts shall be as given in Table 4. Gate posts and struts shall be fitted with baseplates or dowels (see 2.3.2.3).

2.3.2.3 Baseplates and dowels. Steel baseplates shall be fabricated from rolled steel plate complying with grade 43C of BS 4360 and shall have a minimum thickness of 3 mm.

They shall be either bolted or welded to their associated posts. If welded on, the baseplates shall be welded in two places and for a length not less than 50 % of the sum of the external faces of the posts or struts. Baseplates for steel straining posts and struts shall project not less than 50 mm from all external faces of a post. Baseplates for steel intermediate posts shall project not less than 40 mm from at least one external face of a post. The size of baseplates for steel gate posts shall be as given in Table 5, and shall be so positioned that they do not interfere with any adjacent straining post.

Dowels shall be of steel and shall be at least 10 mm in diameter. They shall be driven through the post within 250 mm of the base of the post and shall project not less than 50 mm from either side of the post.

2.3.3 Gates

2.3.3.1 General. The overall dimensions of steel gate frames and braces constructed from hollow sections shall be as given in Table 6.

2.3.3.2 Construction. Gates shall be of welded construction, and welding shall be in accordance with the requirements of BS 5135. Vertical braces shall be fixed at not more than 1.2 m centres and there shall be at least one horizontal brace except that in the case of gates of height and width of 1.2 m or less it shall be permissible for the vertical and horizontal braces to be replaced by a diagonal brace. Where barbed wire is to be fitted the extension arms shall comply with 2.5.2.

2.3.3.3 Infill. The infill shall be chain link mesh of the same mesh size and gauge as the fence, and shall be attached by means of stretcher bars (see 2.5.1) which are bolted with hot dip galvanized M8 bolts to 60 mm × 25 mm × 5 mm lugs welded to the framework of the gate.

2.3.3.4 Hinges. Hinges and pins shall be of steel. The bottom hinge shall be of either the heel and socket or plate and pin type. In the case of heel and socket hinges, for gate leaves up to 2 m wide, the heel plate shall be not less than 12 mm thick and the pin shall have a diameter not less than 20 mm; for gate leaves of greater width, the heel plate shall be not less than 25 mm thick and the pin shall have a diameter not less than 25 mm. When the bottom hinge is of the heel and socket type, it shall be permissible for a block and band top hinge to be used, in which case the band shall be not less than 50 mm × 6 mm.

Plate and pin hinges for gate leaves up to 2 m wide shall be made from plate not less than 12 mm thick with a 20 mm diameter pin; for gates of greater width, the hinges shall be made from 25 mm thick plate with 25 mm diameter pins. The female halves of the hinges shall be welded to the gate frame.

Hinge plates for steel gate posts shall be either welded to the gate posts or holed to take two M12 bolts. Hinge plates for concrete gate posts shall be holed to take a single M16 bolt. Hinge plates for timber gate posts shall be holed to take either a single M16 bolt or, in the case of gates of height 1.2 m or less and width 1.2 m or less, at least four countersunk head no. 12 screw gauge wood screws (see 3.4).

NOTE Where additional security is required the top hinge should be inverted.

2.3.3.5 Drop bolts and slam plates. Low carbon steel (mild steel) drop bolts not less than 20 mm in diameter shall be fitted to each leaf of a double leaf gate frame. Double gates shall be provided with a slam plate of not less than 10 mm thickness.

2.3.3.6 Locking device. Each gate shall be fitted with a locking bar not less than 40 mm × 10 mm flat, secured in a frame of 40 mm × 10 mm flat or 40 mm × 40 mm × 5 mm angle iron welded to the gate frame at the junction of the horizontal brace on the shutting stile. In the case of double leaf gates, the locking bar shall shoot into a staple not less than 25 mm × 5 mm.

2.4 Timber components

2.4.1 General

2.4.1.1 Material. Timber posts and struts shall be of square sawn timber complying with appendix C.

NOTE Appendix D gives a suggested method of sampling for fence timber, for use when specified.

2.4.1.2 Tolerances on size. The following permissible deviations shall apply to the specified sizes of timber components when determining the actual size.

- a) The sizes specified in this standard all relate to timber with a moisture content of 28 % determined in accordance with BS 5589. When timber has a lower moisture content than this an additional allowance (reduction) on size of 1 % for every 5 % of moisture content below 28 % shall be permitted.
- b) Additional deviations on size of:
 - 1) length of posts: ± 50 mm;
 - 2) other dimensions:
 - specified size, under 75 mm: ± 3 mm
 - specified size, 75 mm and over: ± 6 mm

2.4.2 Posts and struts

2.4.2.1 Fence posts and struts. The dimensions of timber fence posts and struts shall be as given in Table 7. Fence posts and struts shall have the same cross section throughout except that a reduction of cross section at the bearing for a strut shall be permitted.

Straining posts and struts shall be cut square across at their base. Straining posts shall be notched to receive struts at a point within the top third of the length of the straining post measured above the ground level.

Intermediate posts for use with fences designated 90 and 120 shall either be cut square across or be pointed for driving. Intermediate posts for use with fences designated 140 and 180 shall be cut square across at their base.

2.4.2.2 Gate posts and struts. The dimensions of timber gate posts and struts shall be as given in Table 7. Gate posts and struts shall have the same cross section throughout except that a reduction of cross section at the bearing for a strut shall be permitted. Gate posts and struts shall be cut square across at their base.