

**BRITISH STANDARD**

# **Fences –**

## **Part 9: Specification for mild steel (low carbon steel) fences with round or square verticals and flat horizontals**

ICS 91.090

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**BSi**  
British Standards

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## **Summary of pages**

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# 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This part of BS 1722-9 supersedes BS 1722-9:2000, which is withdrawn.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 <sup>1)</sup>*
- *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 <sup>2)</sup>*

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<sup>1)</sup> Obsolete.

<sup>2)</sup> 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 new edition represents a full revision of the standard, and introduces the following principal changes:

- a) the removal of flat posts from the standard, the inclusion of RHS posts;
- b) removal of requirements for angle corner posts, which in this edition are specified as for line posts;
- c) revision of the requirements for gates.

The opportunity has also been taken to simplify the construction and installation requirements in line with current practice.

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.

This standard aims to establish minimum requirements for materials and workmanship of the more common types of fence in order to ensure satisfactory service for the purchaser, and to assist manufacturers and installers 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. The standard includes 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 if this could adversely affect the fitting of components or if replacement parts are required to match with those already present.

Choosing a fence is affected by factors such as intended purpose, desired service life, aesthetic considerations and availability of components. The specifier can match a suitable choice of fence to its intended purpose and also inform those installing the fence of the basic characteristics required. This standard includes requirements for protective treatment. However, maintenance requirements of the fence after installation are outside the scope of this standard. Premature failure of the fence can be avoided by taking care not to damage protective treatments during installation.

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

It is generally assumed in this standard that the fence is installed on horizontal ground. Where it is installed on a gradient, special measures can be required.

It should be noted that throughout this part of BS 1722 the fence post spacings are given in terms of centre distances. It should also be noted that, while 110 mm spacing (as clear space, not between centres) “general purpose fencing” is common, local authorities often test for a 100 mm clear space.

This standard specifies requirements for fence materials and their combination and installation to provide a serviceable fence. Because a fence is made up of a number of separate components, of which the particular features can vary, a number of permissible combinations are available to the user. When preparing a specification for a fence it is therefore important to give precise details of the requirements of the fence and of the site. Annex A provides details of the fence requirements and installation site that should be agreed between the fence supplier and purchaser. However, as conditions vary from site to site, Annex A should not be assumed to be exhaustive.

Annex A is informative.

### **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 self-adjusting (nibbed) or welded mild steel (low carbon steel) fences with round or square verticals and rolled hollow section (RHS) or rolled steel joist (RSJ) posts and flat horizontals. It also specifies requirements for their installation.

Maintenance of the fence after installation is outside the scope of this standard.

# 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 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 12620, *Aggregates for concrete*

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

BS EN ISO 2063:2005, *Thermal spraying – Metallic and other inorganic coatings – Zinc, aluminium and their alloys*

BS EN 10058:2003, *Hot rolled flat steel bars for general purposes – Dimensions and tolerances on shape and dimensions*

BS EN 10059:2003, *Hot rolled square steel bars for general purposes – Dimensions and tolerances on shape and dimensions*

BS EN 10060:2003, *Hot rolled round steel bars for general purposes – Dimensions and tolerances on shape and dimensions*

BS EN 10210-2:2006, *Hot finished structural hollow sections of non-alloy and fine grain steels – Part 2: Tolerances, dimensions and sectional properties*

BS EN 10219-1:2006, *Cold formed welded structural hollow sections of non-alloy and fine grain steels – Part 1: Technical delivery conditions*

BS EN 10025-2:2004, *Hot rolled products of structural steels – Part 2: Technical delivery conditions for non-alloy structural steels*

### 3 Dimensional and general characteristics

Except for make-up purposes, panels shall be 2.72 m long. The dimensions of the metal sections for vertical bar fences and the centre to centre distance between verticals shall be as shown in Tables 2, 3 and 4.

## 4 Materials

### 4.1 Steel

The steel grade(s) employed for the production of fences and gates shall be specified by the customer (the purchaser, fence designer, supplier, component manufacturer, fabricator or erector, as applicable), on the basis of the mechanical properties, formability and weldability required. Appropriate mild steel grades shall be selected from National or International Standards or suitable equivalent proprietary materials can be used.

Steel used in the construction of fences shall conform to designation S235JR of BS EN 10025:2000 or equivalent. Where components are to be hot dipped galvanized, the purchaser shall confirm with the supplier that the steel composition is suitable.

*NOTE* A non-exhaustive range of recommended material grades is given in Table 1.

Table 1 Recommended steel grades

Material	Dimensional standard	Material standard	Material grade <sup>A)</sup>
Flat bar	BS EN 10058	BS EN 10025-2	S185 / S235JR
Square bar	BS EN 10059	BS EN 10025-2	S185 / S235JR
Round bar	BS EN 10060	BS EN 10025-2	S185 / S235JR
Flat bar	BS EN 10058	BS EN 10025-2	S185 / S235JR
Square bar	BS EN 10059	BS EN 10025-2	S185 / S235JR
Round bar	BS EN 10060	BS EN 10025-2	S185 / S235JR
Rectangular hollow sections (RHS)	BS EN 10210-2	BS EN 10210-1	S235JRH
	BS EN 10219-2	BS EN 10219-1	S235JRH
Plate for baseplates, caps, etc.	—	BS EN 10025-2	S185 / S235JR

<sup>A)</sup> Higher strength or more enhanced grades than those shown can be used, provided that they meet the necessary requirements for formability, weldability or galvanizing.

## 4.2 Construction

### 4.2.1 Self-adjusting fences

Self-adjusting fences shall be manufactured so that when the vertical bars are passed through holes in the horizontals each vertical is held in place by mechanically formed nibs and/or other permanent means of fixing.

### 4.2.2 Welded fences

Welded panels shall be manufactured by passing the vertical bars through holes in the top horizontal and welding their bottom and top ends to the horizontals. The length of weld shall be a minimum of 50% of the perimeter of the bar.

*NOTE* The weld can be either above or below the horizontals.

## 4.3 Components

*NOTE* The components involved in the production of a typical fence are illustrated in Figure 1.

### 4.3.1 Verticals

The cross section and orientation of the fence line shall be in accordance with Tables 2, 3 and 4.

In self-adjusting panels the verticals shall extend 75 mm below the bottom horizontal.

Verticals shall be bow top, pointed top, domed top, blunt top or have ornamental heads.

*NOTE* Pointed tops afford the greatest deterrent but are not recommended for use on fences less than 1.80 m high.

The spacing of verticals and the number per panel shall be in accordance with Tables 2, 3 and 4. Verticals shall be set symmetrically in panels so that the spacing at each end is equal.

### 4.3.2 Posts

Posts shall have the cross-sections shown in Tables 2, 3 and 4 and shall be sealed with a cap at the top.

### 4.3.3 Horizontals

For fences up to 1.00 m in height, the position of the horizontal rail shall be  $130 \text{ mm} \pm 5 \text{ mm}$  from the top of the fence. For fences over 1.00 m in height and up to 1.50 m in height, the position of the horizontal rail shall be  $150 \text{ mm} \pm 5 \text{ mm}$  from the top of the fence. For fences over 1.50 m in height, the position of the horizontal rail shall be  $200 \text{ mm} \pm 5 \text{ mm}$  from the top of the fence.

*NOTE* Adjustments might be necessary if ornamental heads are used.

The bottom of the fence shall give an average ground clearance of  $75 \text{ mm} \pm 5 \text{ mm}$ .

Horizontals shall be joined at the posts with fish plates or cleats and minimum 10-mm bolts.

#### 4.3.4 Supports

If fencing is fixed in the ground, the support cross section shall not exceed 10 mm less than the horizontal width, e.g. 50 × 10 horizontal, 40 × 10 mm cross section. Supports shall be bent twice at right angles, i.e. Z-shaped, 50 mm ± 5 mm from each end, and of sufficient length with a minimum 200 mm in the ground.

If the fencing is fixed on top of brickwork or concrete walls either of the following types of support shall be used:

- a) 175 mm ± 5 mm to 250 mm ± 5 mm long supports, bent at right-angles, i.e. L-shaped, 50 mm ± 5 mm from one end only to facilitate grouting into pre-formed pockets;
- b) round bar threaded supports of the same cross-section as the verticals and secured with two nuts.

Supports for welded fencing shall be spaced as near as possible to 910 mm ± 5 mm apart and 910 mm ± 5 mm from each end post and securely fixed to the bottom horizontal. Supports for self-adjusting vertical bar fencing shall be spaced as near as possible to 700 mm ± 5 mm apart and 700 mm ± 5 mm from each end.

#### 4.4 Protective treatment

After fabrication of gates and fencing components, including the punching or drilling of any holes and all welding, the fencing and gates shall be hot dip galvanized in accordance with BS EN ISO 1461, unless otherwise specified by the purchaser.

#### 4.5 Renovation of coatings

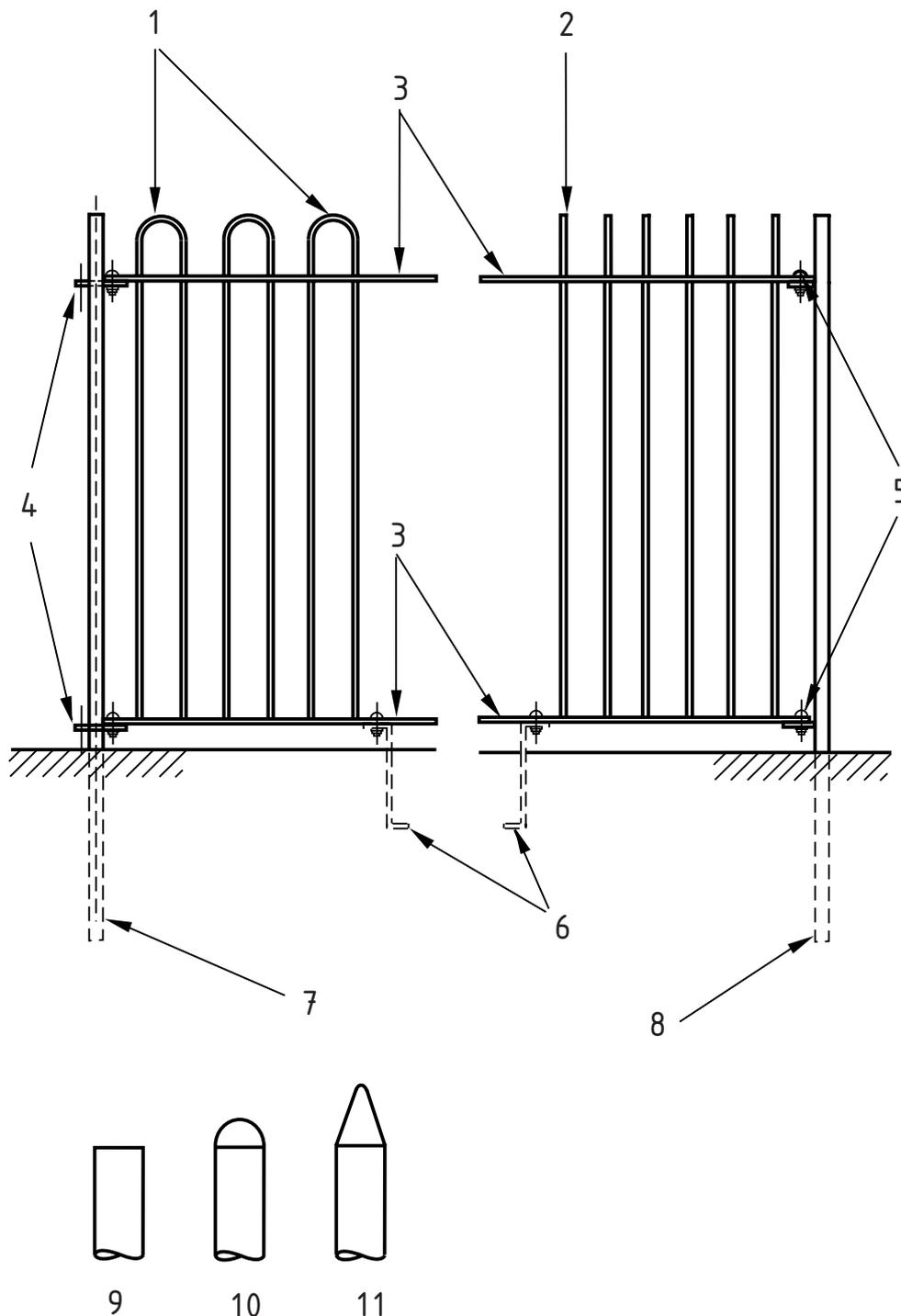
Small areas (as defined in BS EN ISO 1461) of hot dip galvanized coating damaged by welding, cutting or excessively rough treatment during transit and installation shall be renovated as specified in BS EN ISO 1461.

Sufficient material shall be applied to provide a zinc coating at least equal in thickness to the original layer.

#### 4.6 Concrete surrounding bases of posts

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

Figure 1 Typical fence with round and square verticals and flat horizontals

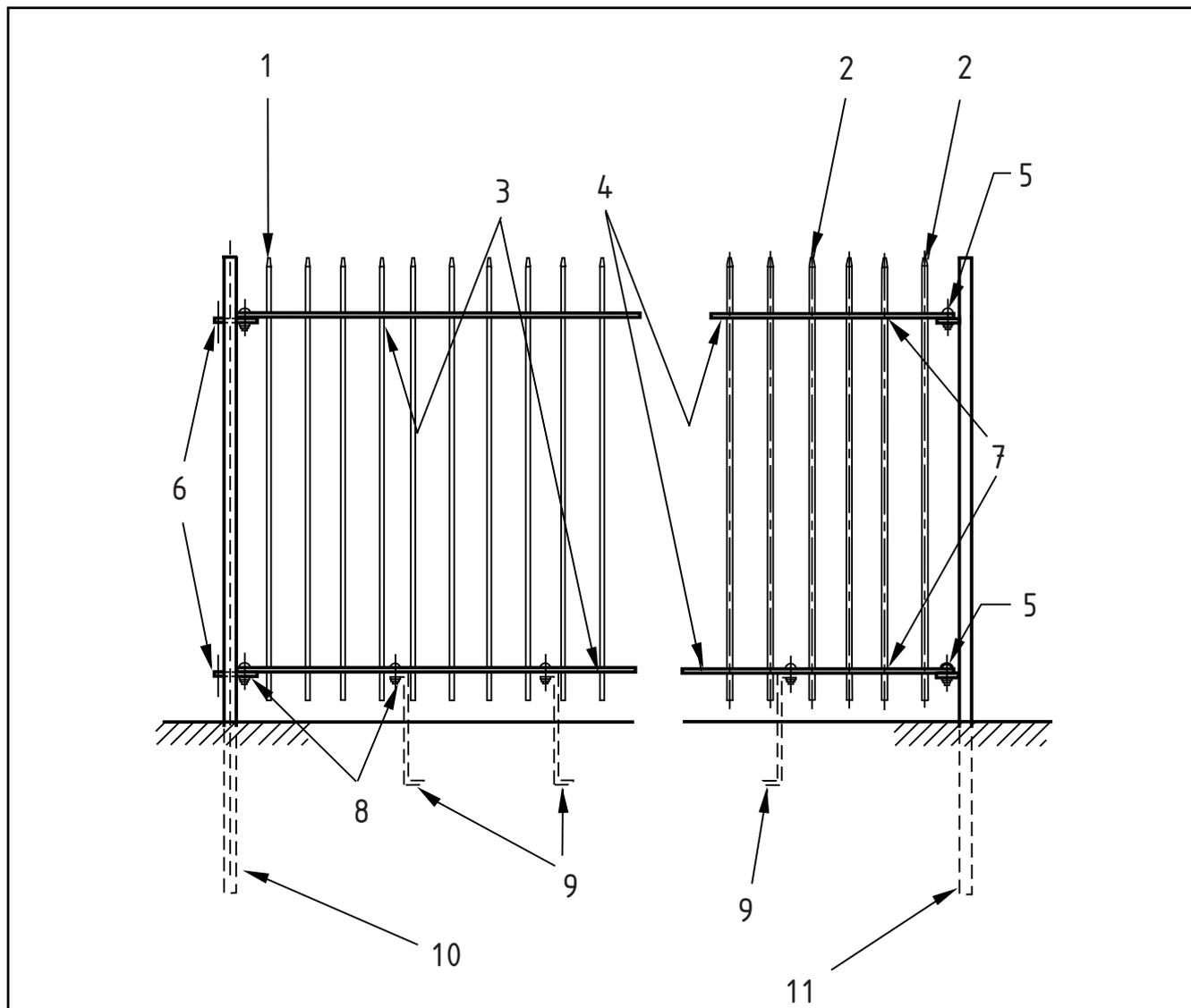


a) Welded vertical bar (bow top and round verticals)

**Key**

- |                                       |                    |
|---------------------------------------|--------------------|
| 1 Round, bare bow, top verticals      | 7 RSJ section post |
| 2 Blunt, domed, pointed top verticals | 8 RHS post         |
| 3 Flat horizontals                    | 9 Blunt            |
| 4 Fishplates                          | 10 Domed           |
| 5 10 mm bolts                         | 11 Pointed         |
| 6 Supports (two per 2.72 m panel)     |                    |

Figure 1 Typical fence with round and square verticals and flat horizontals (continued)



b) Self-adjusting vertical bar (round or square, angle to view)

**Key**

- |                                       |  |
|---------------------------------------|--|
| 1 Blunt, domed, pointed top verticals | 7 Mechanically formed nibs above and below horizontals |
| 2 Square verticals, angles to view    | 8 Permanent fixing                                     |
| 3 Mechanically formed nibs            | 9 Supports (three per 2.72 m panel)                    |
| 4 Flat horizontals                    | 10 RSJ section post                                    |
| 5 10 mm bolts                         | 11 RHS section post                                    |
| 6 Fishplates                          |  |

Table 2 Dimensions for bow top fences <sup>A)</sup>

Height of fence	Embedded length of post	Diameter of vertical (round)	Spacing of verticals (centres) <sup>B)</sup>	Number of verticals per 2.72 m panel	Size of horizontals	Size of RSJ post	Size of RHS post
m	mm	mm	mm		mm	mm	mm
0.60	450	10	79	34	30 × 6	—	40 × 40 × 3
0.80	450	10	79	34	30 × 6	—	40 × 40 × 3
1.00	450	10	79	34	30 × 6	—	40 × 40 × 3
1.00	450	12	112	24	30 × 10	102 × 44	50 × 50 × 3
1.20	550	12	112	24	30 × 10	102 × 44	50 × 50 × 3
1.00	450	16	112	24	40 × 10	102 × 44	50 × 50 × 3
1.20	550	16	112	24	40 × 10	102 × 44	50 × 50 × 3
1.40	550	16	112	24	40 × 10	102 × 44	50 × 50 × 3
1.20	550	20	120	22	50 × 10	102 × 44	50 × 50 × 3
1.40	550	20	120	22	50 × 10	102 × 44	50 × 50 × 3
1.60	600	20	120	22	50 × 10	102 × 44	50 × 50 × 3
1.80	600	20	120	22	50 × 10	102 × 44	70 × 70 × 3
2.00	600	20	120	22	50 × 10	102 × 44	70 × 70 × 3
2.40	600	22	120	22	50 × 10	102 × 44	80 × 80 × 3

<sup>A)</sup> Fencing having round bar verticals with bow tops. Welded construction only.

<sup>B)</sup> The gap between the end vertical of the panel and the face of the adjacent post can vary depending on the type of post used.

Table 3 Dimensions for round or square bar square to view fences <sup>A)</sup>

Height of fence	Embedded length of post	Diameter of round vertical or side of square vertical	Spacing of verticals (centres) <sup>B)</sup>	Number of verticals per 2.72 m panel	Size of horizontals	Size of RSJ post	Size of RHS post
m	mm	mm	mm		mm	mm	mm
1.00	450	12 <sup>C)</sup>	112	24	30 × 10	102 × 44	50 × 50 × 3
1.20	550	12 <sup>C)</sup>	112	24	30 × 10	102 × 44	50 × 50 × 3
1.00	450	16	112	24	40 × 10	102 × 44	50 × 50 × 3
1.20	550	16	112	24	40 × 10	102 × 44	50 × 50 × 3
1.40	550	16	112	24	40 × 10	102 × 44	50 × 50 × 3
1.20	550	20	120	22	50 × 10	102 × 44	50 × 50 × 3
1.40	550	20	120	22	50 × 10	102 × 44	50 × 50 × 3
1.60	550	20	120	22	50 × 10	102 × 44	50 × 50 × 3
1.80	600	20	120	22	50 × 10	102 × 44	70 × 70 × 3
2.00	600	20	120	22	50 × 10	102 × 44	70 × 70 × 3
1.60	600	22	120	22	50 × 10	102 × 44	70 × 70 × 3
1.80	600	22	120	22	50 × 10	102 × 44	70 × 70 × 3
2.00	600	22	120	22	50 × 10	102 × 44	70 × 70 × 3
2.40	600	22	120	22	50 × 10	102 × 44	80 × 80 × 3

<sup>A)</sup> Fencing having round bar or square bar, flat face to view verticals with blunt/pointed tops; welded or self-adjusting construction.

<sup>B)</sup> The gap between the end vertical of the panel and the face of the adjacent post can vary depending on the type of post used.

<sup>C)</sup> Verticals below 16 mm round or square are not suitable for mechanical nibbing.

Table 4 Dimensions for square bar angle to view fences <sup>A)</sup>

Height of fence	Embedded length of post	Side of vertical (square)	Spacing of verticals (centres) <sup>B)</sup>	Number of verticals per 2.72 m panel	Size of horizontals	Size of RSJ post	Size of RHS post
m	mm	mm	mm		mm	mm	mm
1.00	450	12 <sup>C)</sup>	116	23	30 × 10	102 × 44	50 × 50 × 3
1.20	550	12 <sup>C)</sup>	116	23	30 × 10	102 × 44	50 × 50 × 3
1.00	450	16	120	22	40 × 10	102 × 44	50 × 50 × 3
1.20	550	16	120	22	40 × 10	102 × 44	50 × 50 × 3
1.40	550	16	120	22	40 × 10	102 × 44	50 × 50 × 3
1.20	550	20	125	21	50 × 10	102 × 44	50 × 50 × 3
1.40	550	20	125	21	50 × 10	102 × 44	50 × 50 × 3
1.60	550	20	125	21	50 × 10	102 × 44	50 × 50 × 3
1.80	600	20	125	21	50 × 10	102 × 44	70 × 70 × 3
2.00	600	20	125	21	50 × 10	102 × 44	70 × 70 × 3
1.60	600	22	130	21	50 × 10	102 × 44	70 × 70 × 3
1.80	600	22	130	21	50 × 10	102 × 44	70 × 70 × 3
2.00	600	22	130	21	50 × 10	102 × 44	80 × 80 × 3
2.40	600	22	130	21	50 × 10	102 × 44	80 × 80 × 3

<sup>A)</sup> Fencing having square bar angle to view verticals with blunt/pointed tops; welded or self-adjusting construction.

<sup>B)</sup> The gap between the end vertical of the panel and the face of the adjacent post can vary depending on the type of post used.

<sup>C)</sup> Verticals below 16 mm square are not suitable for mechanical nibbing.

## 5 Construction of gates

### 5.1 General

Gates shall be of comparable quality and provide a comparable degree of security to the adjacent fencing. The overall height of the gates when fixed shall not be less than the adjacent fencing height. The top and bottom rails of the gate shall be at the same level as the fence rails, unless otherwise specified.

When the gate is in the closed position, the distance from the bottom edge to the surface of the ground shall reflect the distance from the bottom edge of the fence to the mean ground level below it.

The spacing of vertical bars on the gates shall not be greater than that used on the fencing. The clear distance between any vertical framing of the gates and adjacent posts shall not be greater than the clear distance between vertical bars on the adjacent fencing.

All gate frames shall be constructed of steel flats or rectangular hollow sections, and joints shall be continuously welded. The minimum section sizes of frames shall be as specified in Table 5.

To provide rigidity and to limit deflection and sag in service all vertical bars shall be fully welded, so that they form an integral part of the structure of the gate.

When heel and socket bottom hinges are used for gates 2.4 m high or higher and over 3.5 m wide (see Table 5) a six mm thick triangular gusset shall be welded between the hanging stile and the bottom rail in order to strengthen the bottom overhang of the stile which carries the hinge. The vertical height of the gusset shall be equal to the oversail and the horizontal dimension shall be 0.6 of the vertical height.

## 5.2 Hinges

Hinges and posts shall be designed to take the full load of the gate plus an allowance for superimposed vertical loads applied at the nose of the gate without deflection in any position detrimental to its operation.

Hinges shall be designed so that it is impossible to remove the gates by lifting at the hinges when they are in the shut and locked position. The hinges shall be provided with a simple and easily applied system of adjustment for the correction of sag, settlement or misalignment during installation and service.

The bottom hinge shall be attached to the gate frame and the gatepost.

*NOTE* Typical hinge arrangements are shown in Figure 2.

## 5.3 Drop bolts and slam plates

When supplied with gate frames, drop bolts shall be fitted to all gate frames so they cannot be removed. Corresponding sleeves to receive the bolts shall be set securely in the ground and concreted in to enable the gate to be secured in both the closed and opened position. Double gates shall be provided with slam plates on the first closing leaf.

*NOTE* Easy clean sockets can be used.

## 5.4 Locking devices

Double gates shall be fitted with a sliding horizontal locking bar, secured to a locking plate welded to the gate frame at approximately mid-height (but not exceeding 1.5 m) to ensure that the locking bar passes through both of the meeting stiles so that the two gate leaves are firmly held in the shut position. For single gates the locking bar shall shoot into a socket on the gatepost.

*NOTE 1* Locking bar guides welded to the stile are regarded as an integral part of the stile.

Locking bars shall be either holed to receive a padlock or the locking plate shall be prepared for alternative locking devices if these are specified.

*NOTE 2* Other locking devices can be used, if specified by the purchaser.

## 5.5 Gateposts

Gateposts shall be of the dimensions given in Table 5.

*NOTE* In calculating the dimensions it has been assumed that the major axis of the post is perpendicular to the line of the fence.

Base plates not less than 6 mm thick shall be provided for all gateposts.

Gateposts fabricated from hollow sections shall be capped to exclude water.

The size and depth of gatepost foundations shall be purpose designed. The embedded length given in Table 5 shall not be assumed to define the required depth.

Figure 2 Examples of typical hinge profiles

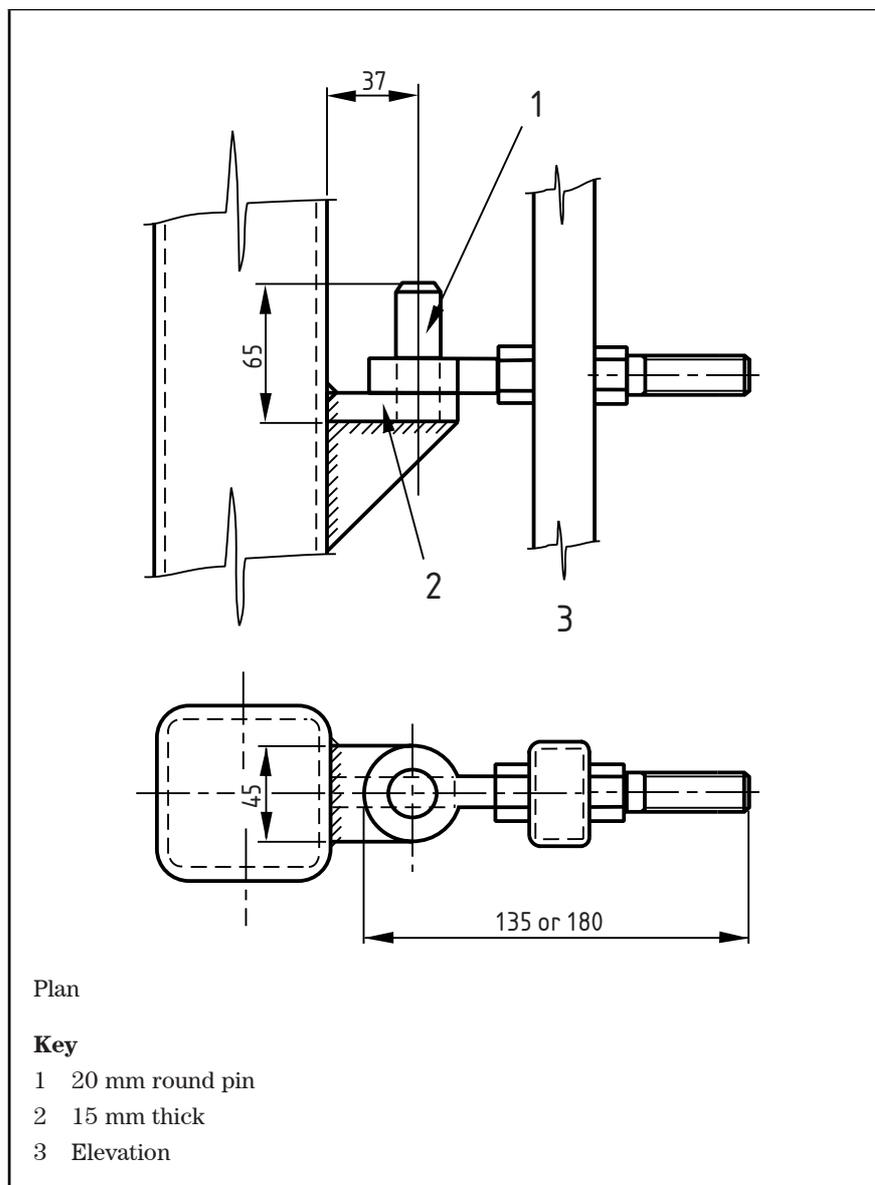


Figure 2 Examples of typical hinge profiles (continued)

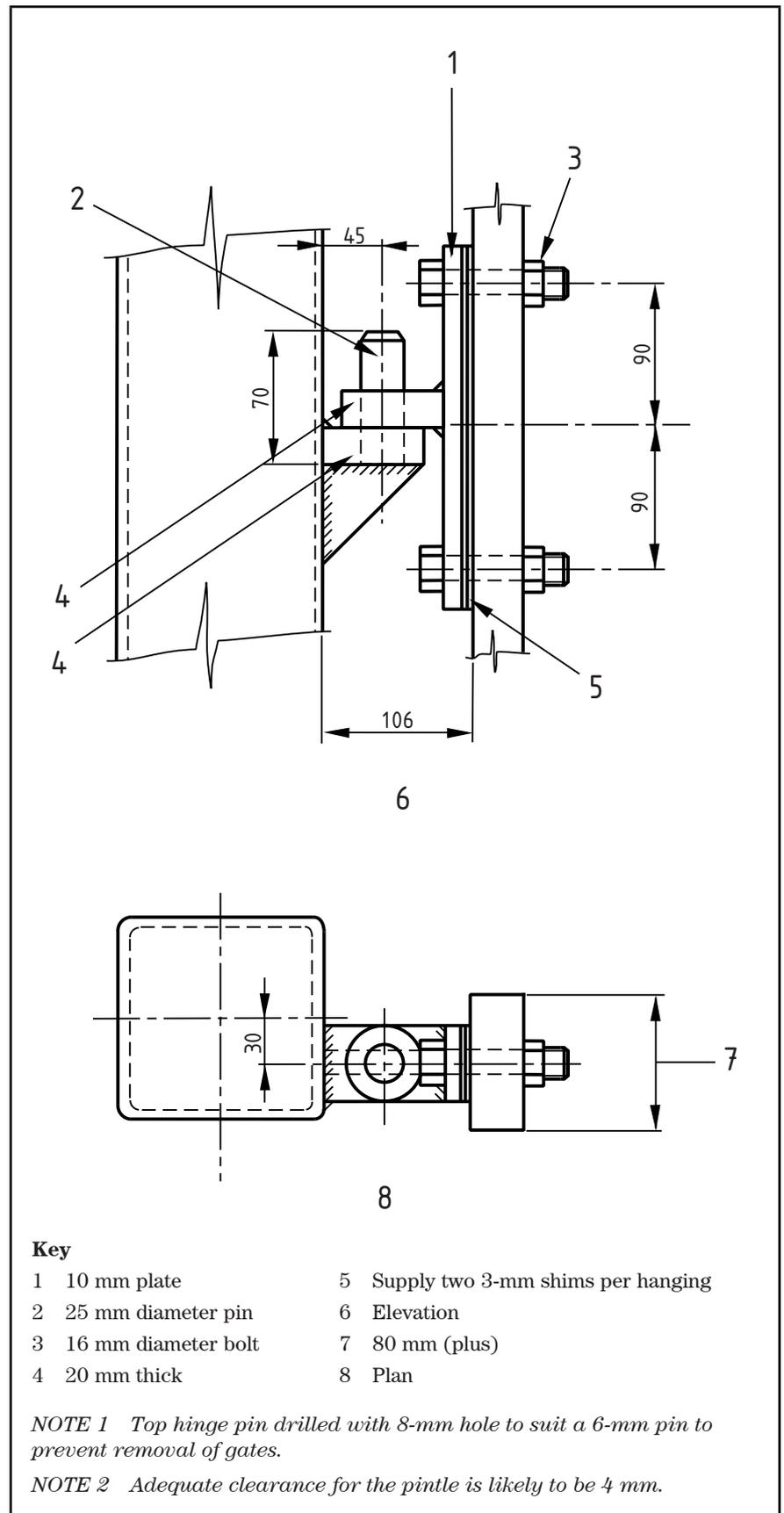


Table 5 Vertical bar – Minimum gate specification

Gates					Gateposts	
Height mm	Width of each leaf mm	Frame material			Size RHS <sup>A)</sup> mm	Embedded length mm
		Hang mm	Slam mm	Rail mm		
1 000	Up to 1 500	40 × 15 flat	40 × 12 flat	40 × 10 flat	70 × 70 × 4	500
	1 501 to 2 000	50 × 50 × 3	50 × 50 × 3	50 × 50 × 3	100 × 100 × 5	500
	2 001 to 3 000	50 × 50 × 3	50 × 50 × 3	50 × 50 × 3	100 × 100 × 5	500
	3 001 to 4 000	70 × 70 × 3.6	70 × 70 × 3.6	70 × 70 × 3.6	120 × 120 × 5	500
	4 001 to 5 000	70 × 70 × 3.6	70 × 70 × 3.6	70 × 70 × 3.6	120 × 120 × 5	600
1 200	Up to 1 500	40 × 15 flat	40 × 12 flat	40 × 10 flat	70 × 70 × 4	600
	1 501 to 2 000	50 × 50 × 3	50 × 50 × 3	50 × 50 × 3	100 × 100 × 5	600
	2 001 to 3 000	50 × 50 × 3	50 × 50 × 3	50 × 50 × 3	100 × 100 × 5	600
	3 001 to 4 000	70 × 70 × 3.6	70 × 70 × 3.6	70 × 70 × 3.6	120 × 120 × 5	600
	4 001 to 5 000	70 × 70 × 3.6	70 × 70 × 3.6	70 × 70 × 3.6	120 × 120 × 5	700
1 400	Up to 1 500	40 × 15 flat	40 × 12 flat	40 × 10 flat	100 × 100 × 5	600
	1 501 to 2 000	50 × 50 × 3	50 × 50 × 3	50 × 50 × 3	100 × 100 × 5	600
	2 001 to 3 000	50 × 50 × 3	50 × 50 × 3	50 × 50 × 3	120 × 120 × 5	600
	3 001 to 4 000	70 × 70 × 3.6	70 × 70 × 3.6	70 × 70 × 3.6	120 × 120 × 5	700
	4 001 to 5 000	70 × 70 × 3.6	70 × 70 × 3.6	70 × 70 × 3.6	120 × 120 × 5	700
1 600	Up to 1 500	50 × 15 flat	50 × 12 flat	50 × 10 flat	100 × 100 × 5	650
	1 501 to 2 000	50 × 50 × 3	50 × 50 × 3	50 × 50 × 3	100 × 100 × 5	650
	2 001 to 3 000	70 × 70 × 3.6	70 × 70 × 3.6	70 × 70 × 3.6	150 × 150 × 5	700
	3 001 to 4 000	80 × 80 × 4	80 × 80 × 4	80 × 80 × 4	200 × 200 × 6	700
	4 001 to 5 000	80 × 80 × 4	80 × 80 × 4	80 × 80 × 4	200 × 200 × 6	800
1 800	Up to 1 500	50 × 15 flat	50 × 12 flat	50 × 10 flat	100 × 100 × 5	650
	1 501 to 2 000	50 × 50 × 3	50 × 50 × 3	50 × 50 × 3	100 × 100 × 5	650
	2 001 to 3 000	70 × 70 × 3.6	70 × 70 × 3.6	70 × 70 × 3.6	150 × 150 × 5	700
	3 001 to 4 000	80 × 80 × 4	80 × 80 × 4	80 × 80 × 4	200 × 200 × 6	900
	4 001 to 5 000	80 × 80 × 4	80 × 80 × 4	80 × 80 × 4	200 × 200 × 6	900
2 000	Up to 1 500	50 × 15 flat	50 × 12 flat	50 × 10 flat	100 × 100 × 5	700
	1 501 to 2 000	50 × 50 × 3	50 × 50 × 3	50 × 50 × 3	120 × 120 × 5	800
	2 001 to 3 000	70 × 70 × 3.6	70 × 70 × 3.6	70 × 70 × 3.6	150 × 150 × 5	900
	3 001 to 4 000	80 × 80 × 4	80 × 80 × 4	80 × 80 × 4	200 × 200 × 6	1 000
	4 001 to 5 000	80 × 80 × 4	80 × 80 × 4	80 × 80 × 4	200 × 200 × 6	1 000
2 400	Up to 1 500	60 × 15 flat	60 × 15 flat	60 × 10 flat	120 × 120 × 5	750

<sup>A)</sup> Equivalent sizes and strengths of universal beam can be used in place of RHS.

## 6 Installation

### 6.1 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 installation in the working area.

*NOTE 1 Unless otherwise agreed between the purchaser and supplier (see Annex A) the installation of the fence does not include work required to cut or fill the ground to vary levels nor does it cover special work to secure culverts, ditches, etc.*

*NOTE 2 On sloping ground the panels can be raked (self-adjusting or welded) or stepped, as necessary, to suit the ground line as specified. Welded fencing can be prefabricated to suit specific gradients.*

### 6.2 Posts

Posts shall be fixed in the ground to the depth given in Tables 2, 3 and 4 and shall be vertical. Posts shall be set in the ground and surrounded by concrete. Holes for posts to be set in concrete shall be sized so that the thickness of concrete cover is not less than 100 mm round and below the post.

### 6.3 Supports

If the fencing is installed on the ground the top of the supports shall be bolted to the bottom horizontal with one 10 mm bolt, and the bottom of the support shall be firmly set in the ground. The support shall also be set in concrete. If the fencing is fixed on top of brickwork or concrete walls, supports shall either finish flush with the top of the brickwork or wall or be embedded.

## 7 Statement of conformity

### 7.1 Fence manufacturer

On delivery, the manufacturer of the fence and/or gates shall provide the installer with a certificate conforming to **7.3** confirming that the fence and/or gates are manufactured in accordance with Clauses **3**, **4** and **5**.

### 7.2 Fence installer

On completion, the fence installer shall provide the end user with a certificate conforming to **7.3** confirming that the installation of the fence and/or gates are in accordance with Clause **6** and that the materials used were in accordance with Clause **4**.

### **7.3 Certificate**

In addition to the requirements of **7.1** and **7.2**, 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 manufacture or installation, as appropriate;
- d) the purchaser's name and address.

### **7.4 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 (informative) Specifying a vertical bar fence

### A.1 General

When preparing a specification for a fence it is important that precise details of the requirements of the fence and the installation site are provided. This annex lists those items that should be specified at the time of ordering the fence. As conditions vary from site to site, this annex should not be assumed to be exhaustive.

### A.2 Site conditions

The following items should at least be agreed between the supplier and purchaser at the time of enquiry and/or order:

- a) line and length of fence (see Foreword and Clause 6);
- b) height and type of fence, general purpose or security (see Tables 2, 3 and 4);
- c) site preparation (see 6.1):
  - 1) site clearance;
  - 2) cutting or filling of ground level;
- d) any specific requirements for non-standard post lengths due to ground conditions (see Foreword);

*NOTE The requirements for the lengths of posts and stays in this standard and foundation sizes have been related to "normal ground conditions". This standard does not cover conditions of particularly firm or soft ground, where other lengths or foundation sizes might be required. Unless otherwise agreed between the purchaser and supplier, the installation of the fence does not include the work required to cut or fill the ground to vary the levels.*

- e) any special measures required due to site gradients (see 6.1);
- f) number, specification and position of any gates (see Clause 5).

### A.3 Construction of fence

The following items should at least be agreed between the supplier and purchaser at the time of enquiry and/or order:

- a) fabrication:
  - 1) self-adjusting or welded (see 4.2);
  - 2) number of verticals to be welded to both horizontals (see 4.3);
- b) verticals:
  - 1) bow top, blunt or pointed;
  - 2) round or square section and size (see Tables 2, 3 and 4);
  - 3) face to view or square verticals (see Tables 3 and 4);
- c) supports: special requirements if fencing on concrete or brickwork;

- d) protective treatment:
  - 1) initial protective treatment;
  - 2) final finish required;
- e) gates (see also **A.2**):
  - 1) type of post (see Table 5);
  - 2) locking devices (see **5.4**);
  - 3) ground profile (see **5.1**).

#### **A.4 Installation of fence**

The method of dealing with gradients/panels to be raked or stepped (see **6.1**) should at least be agreed between the supplier and purchaser at the time of enquiry and/or order.

## Bibliography

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 4-1, *Structural steel sections – Part 1: Specification for hot-rolled sections*

BS 5709, *Gaps, gates and stiles – Specification*

BS EN 4652, *Specification for zinc-rich priming paint (organic media)*

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