

Fences —

Part 12: Specification for steel palisade fences

ICS 91.090

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee B/201, Fences and gates, upon which the following bodies were represented:

Association of Security Consultants
British Precast Concrete Federation Ltd.
Countryside Commission
County Surveyors' Society
Department of the Environment, Transport and the Regions
(Building Research Establishment)
Department of the Environment, Transport and the Regions (Highways Agency)
European Fencing Industry Association
Fencing Contractors' Association
Forestry Commission
National Farmers' Union
National Fencing Training Authority
Open Spaces Society
Security Facilities Executive
Timber Trade Federation
UK Steel Association
United Kingdom Forest Products Association

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

Cold-rolled Sections Association
National Association of Steel Stockholders
National Council of Building Material Producers

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Foreword

This part of BS 1722 has been prepared by Technical Committee B/201. It supersedes BS 1722-12:1990, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **[A1]** **[A1]**. Tags indicating changes to text carry the number of the amendment. For example, text altered by amendment no.1 is indicated by **[A1]** **[A1]**.

BS 1722 is published in the following parts:

- *Part 1: Specification for chain link fences;*
- *Part 2: Specification for rectangular wire mesh and hexagonal wire netting fences¹⁾;*
- *Part 3: Specification for strained wire fences;*
- *Part 4: Specification for cleft chestnut pale fences;*
- *Part 5: Specification for close boarded 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 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 chain link fences for tennis court surrounds;*
- *Part 14: Specification for open mesh steel panel fences;*
- *Part 16: Specification for organic powder coatings for use as a plastics finish to components and mesh.*

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, or those to suit special requirements; 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 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 fencing 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 should be constructed. The standard includes requirements for sizes of components, together with the permissible tolerances on size. These are minimum requirements and it should 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 by reference to Table 1 and Table 2, and also inform those erecting the fence of the basic characteristics required.

This standard includes requirements for protective treatments. However, maintenance requirements for 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.

¹⁾ In course of revision.

Ground conditions may 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 needs to be agreed with the specifier. This also applies to other similar changes.

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

One of the major changes in this revision of BS 1722-12 is the removal of the 2.4 m high fence from the list of security (SP) palisade fences. This revision also places more emphasis on the requirements of pales and fixing devices to meet performance standards. The use of rivets is no longer specified, but the standard includes the use of cold swaged pin and flanged collar fastenings. The use of zinc coatings for nuts, bolts, etc. is permitted, but extra treatments may be required where long term use is envisaged. The standard also makes recommendations for additional security measures. Requirements for gates and gate posts have been revised. A requirement for a statement of conformity has also been included.

The general purpose (GP) palisade fence is intended for use in those situations where it is deemed necessary to deter the casual intruder or trespasser from gaining access to areas within the fence where property or goods that are vulnerable to vandalism or interference are located. It is not considered that this fence in itself would prevent unauthorized access. Where dangerous situations could exist for the intruder, a fence of minimum height of 2.4 m should be used.

On those occasions where greater protection from trespass and vandalism is required, the SP fence should be used. Where an improved resistance to vandalism is required for a GP fence fixings specified for SP fences may be used. However, it should be appreciated that it is not possible to erect a fence that cannot be negotiated by a determined intruder given adequate time, freedom from observation and suitable climbing aids or tools for forcing an entry.

A number of different profiles have been developed for corrugated pales for use in palisade fencing but it would be impracticable to attempt to describe all such profiles in this standard. Such an approach would also present a risk of stifling further development. To avoid this, requirements are now included to ensure an adequate profile by specifying minimum performance requirements for a pale in terms of bending (flexural) strengths and post to rail fixing assembly. Verification is by means of the test procedures described in Annex A and Annex C. These requirements have been based on the results of an extensive series of tests carried out on a range of different profiles.

In developing the design and installation of palisade fences the supplier and installer should exercise care to avoid providing projections or footholds on the face of the fence and gates that could aid climbing. Junctions of the palisade with existing buildings or other types of fencing should also receive special attention to ensure that corners, angle returns in the palisade, rain water pipes, lighting standards, signboards etc. do not negate the security being provided by the palisade. Each type of fence has been subdivided according to its height and duty. Height is considered to be the height of the top of the pale above the general ground level as measured at the posts.

It should be noted that throughout this part of BS 1722 the fence post spacings are given in terms of centre distances. All references to rails mean horizontal rails and all references to pales mean vertical pales.

This part of this standard specifies requirements for fence materials and their combination and installation. Because a fence is made up of a number of separate components of which the particular features vary, e.g. galvanized, prime or painted pales, a number of combinations are available to the user. Annex D provides details of the fence requirements and installation site that should be agreed between the fence supplier and purchaser at the time of ordering a fence. However, as conditions vary from site to site, Annex D should not be assumed to be exhaustive.

It has been assumed in the drafting of this part of BS 1722 that the execution of its provisions is entrusted to appropriately qualified and experienced people. Before installation commences, the lead installer should hold the relevant Construction Skills Certification Scheme/Fencing Industry Skills Scheme card for fencing, having undertaken training in health and safety, passed a health and safety test and registered for or achieved the appropriate National Vocational Qualification NVQ or Scottish Vocational Qualification SVQ in Fencing (level 2 or 3).

Annex A, Annex B and Annex C are normative. Annex D is informative.

This publication does not purport to include all necessary provisions of a contract. Users of are responsible for its 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 24, an inside back cover and a back cover.

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1 Scope

This part of BS 1722 specifies requirements for steel palisade fences and gates for general purposes (GP) in corrugated and angle pales for heights up to 2.4 m and for security (SP) purposes in corrugated pales for heights of 3.0 m and 3.6 m, all with posts at 2.75 m centres. This standard also covers fences between 2.4 m and 3.0 m in height with components constructed to the SP specification.

NOTE 1 Where greater resistance against penetration is required for fences below 2.4 m in height the SP components may be specified by the purchaser.

NOTE 2 Requirements in this standard for the minimum sizes of fence components are based on a design wind loading, q , (see CP 3-V-2) at right angles to the plane of the fence of 900 N/m² employing a shape factor of 1.9 on the net area presented to the wind.

NOTE 3 In situations of extreme exposure or abnormal loading it will be necessary to carry out a special appraisal and for the design criteria to be specified.

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 4-1, *Structural steel sections — Part 1: Specification for hot-rolled sections*.

BS 3692:2001, *ISO metric precision hexagon bolts, screws and nuts — Specification*. A1

BS 907, *Specification for dial gauges for linear measurement*.

BS 1449-1.1:1991, *Steel plate, sheet and strip — Part 1: Carbon and carbon-manganese plate, sheet and strip — Section 1.1: General specification*.

BS 1610-1:1992, *Materials testing machines and force verification equipment — Part 1: Specification for the grading of forces applied by materials testing machines when used in the compression mode*.

BS 1706:1990, *Method for specifying electroplated coatings of zinc and cadmium on iron and steel*.

BS 3111-1:1987, *Steel for cold forged fasteners and similar components — Part 1: Specification for carbon and low alloy steel wire*.

BS 3693, *Recommendations for design of scales and indexes on analogue indicating instruments*.

BS 4320, *Specification for metal washers for general engineering purposes — Metric series*.

BS 4484-1, *Specification for measuring instruments for constructional works — Part 1: Metric graduation and figuring of instruments for linear measurement*.

BS 4848-4, *Hot-rolled structural steel sections — Part 4: Equal and unequal angles*.

BS 5328-1:1997, *Concrete — Part 1: Guide to specifying concrete*.

BS 5493, *Code of practice for protective coating of iron and steel structures against corrosion*.

BS 7805-1, *Swaged collar grooved rivets — Part 1: Specification for sizes up to and including 10 mm diameter*.

CP 3-V-2, *Code of basic data for the design of buildings — Chapter V: Loading — Part 2: Wind loads*.

BS EN 10002-3, *Tensile testing on metallic materials — Part 3: Calibration of force proving instruments used for the verification of uniaxial testing machines*.

BS EN 10025:1993, *Hot-rolled products of non-alloy structural steels — Technical delivery conditions*.

BS EN 10051, *Specification for continually hot-rolled uncoated plate, sheet and strip of non-alloy and alloy steels — Tolerances on dimensions and shape*.

BS EN 10210-1:1994, *Hot finished structural hollow sections of non-alloy and fine grain structural steels — Part 1: Technical delivery requirements*.

BS EN 10219-1:1997, *Cold formed welded structural sections of non-alloy and fine grain steels — Part 1: Technical delivery requirements*.

BS EN ISO 1461:1999, *Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods*. A1

3 Dimensional and general characteristics

3.1 Dimensions

The minimum dimensions of components shall be as given in Table 1, Table 2, Table 3, Table 4 and Table 5.

3.2 Characteristics of pales

3.2.1 *General*

 Pales shall be hot or cold formed. General purpose (GP) fences (see Table 1 and Table 6) shall be either corrugated or angle section; security (SP) fences (see Table 2 and Table 6) shall be corrugated with its fastener having minimal head protection. 

Table 1 — Basic dimensions for GP fences with posts at 2.75 m centres

BS type reference	Fence height ^a above ground	Basic dimensions										
		Posts			Rails (horizontal)		Pales					
							Angle (Minimum face to view = 56 mm)				Corrugated (Minimum face to view, 65 mm)	
		Rolled steel joist section		Embedded length ^b	Rolled steel angle section	Connector bolt diameter	Rolled steel angle ⚠️ <i>Text deleted</i> ⚠️	Oversail		Nominal thickness	Oversail	
								Top	Bottom ^e		Top	Bottom ^e
	m	mm	kg/m	mm	mm	mm	mm	mm	mm		mm	mm
GP 15	1.50	102 × 44	7.44	525	40 × 40 × 6 ^c	10	40 × 40 × 5	225	150	See 3.2.3 and Table 6	225	150
GP 18	1.80	102 × 44	7.44	525	40 × 40 × 6 ^c	10	40 × 40 × 5	225	150		225	150
GP 21	2.10	102 × 44	7.44	625	45 × 45 × 6 ^d	10	40 × 40 × 5	275	200		275	200
GP 24 ^f	2.40	102 × 44	7.44	725	45 × 45 × 6 ^d	12	40 × 40 × 5	300	210		300	210

^a For other heights of fence, unless stated, the specification for the nearest higher fence given in the table should be used.

^b The embedded length shall be derived from the formula: embedded length = $\frac{\text{fence height}}{3} - 75$ (all dimensions in millimetres, minimum 525).

^c One intermediate support shall be provided (see 5.7).

^d Two intermediate supports shall be provided (see 5.7).

^e Maximum ground clearance 50 mm.

^f If fences are required above this height, use fixings as specified for SP fences.

Table 2 — Basic dimensions for SP fences with posts at 2.75 m centres

BS type reference	Fence height ^a above ground	Basic dimensions							
		Posts		Rails (horizontal)		Corrugated pales (minimum face to view, 70 mm)			
						Nominal thickness	Oversail		
		Rolled steel joist section		Embedded length ^b	Rolled steel angle section ^c	Connector bolt diameter		Top	
	m	mm	kg/m					mm	Bottom ^d mm
SP 30	3.00	127 × 76 UB	13.0	925	50 × 50 × 6	12	See 3.2.3 and Table 6	475	380
SP 36	3.60	127 × 76 UB	13.0	1 125	65 × 50 × 6 ^e	12		650	550

NOTE For added security see 6.2 and 6.3.

For other heights of fence, unless stated, the specification for the nearest higher fence given in the table should be used.

The embedded length shall be derived from the formula: embedded length = $\frac{\text{fence height}}{3} - 75$ (all dimensions in millimetres).

If pales are not embedded two intermediate supports shall be provided (see 5.7).

Maximum ground clearance 50 mm.

65 mm leg horizontal.

Table 3 — A_1 RHS frame sizes for individual gate leaf widths (pairs or singles) A_1

A_1 Fence height m	Frame sizes for individual gate leaf widths							
	$\leq 1.5 \text{ m}$	$\leq 1.5 \text{ m} \leq 1.75 \text{ m}$	$> 1.75 \text{ m} \leq 2.5 \text{ m}$	$> 2.5 \text{ m} \leq 3.5 \text{ m}$	$> 3.5 \text{ m} \leq 3.75 \text{ m}$	$> 3.75 \text{ m} \leq 4.75 \text{ m}$	$> 4.75 \text{ m} \leq 5.5 \text{ m}$	$> 5.5 \text{ m} \leq 6.5 \text{ m}$
1.5	$60 \times 40 \times 4.0$	$60 \times 40 \times 4.0$	$80 \times 40 \times 4.0$	$90 \times 50 \times 3.6$	$90 \times 50 \times 3.6$	$90 \times 50 \times 3.6$	$90 \times 50 \times 3.6$	$100 \times 60 \times 5.0$
1.8	$60 \times 40 \times 4.0$	$60 \times 40 \times 4.0$	$80 \times 40 \times 4.0$	$90 \times 50 \times 3.6$	$90 \times 50 \times 3.6$	$90 \times 50 \times 3.6$	$90 \times 50 \times 3.6$	$100 \times 60 \times 5.0$
2.1	$60 \times 40 \times 4.0$	$60 \times 40 \times 4.0$	$80 \times 40 \times 4.0$	$90 \times 50 \times 3.6$	$90 \times 50 \times 3.6$	$90 \times 50 \times 3.6$	$100 \times 60 \times 5.0$	$100 \times 60 \times 5.0$
2.4	$60 \times 40 \times 4.0$	$60 \times 40 \times 4.0$	$80 \times 40 \times 4.0$	$90 \times 50 \times 3.6$	$90 \times 50 \times 3.6$	$100 \times 60 \times 5.0$	$100 \times 60 \times 5.0$	$100 \times 60 \times 5.0$
3 ^a	$90 \times 50 \times 3.6$	$90 \times 50 \times 3.6$	$100 \times 60 \times 5.0$	$100 \times 60 \times 5.0$	$100 \times 60 \times 5.0$	$100 \times 60 \times 5.0$	$120 \times 60 \times 6.0$	$120 \times 60 \times 6.0$
3.6 ^a	$90 \times 50 \times 3.6$	$90 \times 50 \times 3.6$	$100 \times 60 \times 5.0$	$100 \times 60 \times 5.0$	$100 \times 60 \times 5.0$	$100 \times 60 \times 5.0$	$120 \times 60 \times 6.0$	$120 \times 60 \times 6.0$
NOTE 1 Where the clear opening of a gateway is critical this should be specified.								
NOTE 2 The dimensions of the steel sections specified are minimum dimensions.								
^a See Clause 7 for construction details. A_1								

Table 4 — Size of steel posts in RSJ, UB or UC for individual gate leaf widths (pairs or singles)

A1 Fence height m	Embedded length (see 8.3) mm	Size of steel posts for individual gate leaf widths							
		≤ 1.5 m mm	> 1.5 m ≤ 1.75 m mm	> 1.75 m ≤ 2.5 m mm	> 2.5 m ≤ 3.5 m mm	> 3.5 m ≤ 3.75 m mm	> 3.75 m ≤ 4.75 m mm	> 4.75 m ≤ 5.5 m mm	> 5.5 m ≤ 6.5 m mm
1.5	525	178×102×19	178×102×19	152×152×37	152×152×37	203×203×60	203×203×60	203×203×60	203×203×86
1.8	525	178×102×19	178×102×19	152×152×37	152×152×37	203×203×60	203×203×60	203×203×60	203×203×86
2.1	625	178×102×19	178×102×19	152×152×37	203×203×60	203×203×60	203×203×86	203×203×86	254×254×107
2.4	725	178×102×19	152×152×37	152×152×37	203×203×60	203×203×60	203×203×86	254×254×89	254×254×107
3	925	152×152×37	152×152×37	203×203×60	203×203×60	203×203×86	254×254×89	254×254×89	305×305×97
3.6	1 125	152×152×37	152×152×37	203×203×60	203×203×60	203×203×86	254×254×89	254×254×89	305×305×97
NOTE The dimensions of the steel sections specified are minimum dimensions.									