

BRITISH STANDARD

Fences –

Part 12: Specification for steel palisade fences

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Foreword

Publishing information

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

Supersession

This part of BS 1722-12 supersedes BS 1722-12:1999, which is withdrawn.

Relationship with other publications

BS 1722 is published in the following parts:

- *Part 1: Specification for chain link fences;*
- *Part 2: Specifications for strained wire and wire mesh netting 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 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: 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: Specification for electric security fences – Design, installation and maintenance;*
- *Part 18: Specification for steel mesh site perimeter temporary fencing systems.²⁾*

Information about this document

It should be noted that no attempt has been made to standardize fences or gates of a purely decorative nature, or those to suit special requirements; or to specify requirements for “patent” proprietary fencing systems. However, such fences or gates should be designed in accordance with the relevant clauses of this part of BS 1722.

¹⁾ Obsolete.

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

This standard establishes 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 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 should be constructed, including requirements for sizes of components, together with the permissible tolerances on size.

NOTE It should normally be acceptable to use larger size components, 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 Tables 1 and 2, and also inform those erecting the fence of the basic characteristics required.

This standard includes requirements for protective treatments but does not include requirements on maintenance. Premature failure of the fence can be avoided by taking care not to damage protective treatments during installation.

Ground conditions might 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 are 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.

Other changes include the following:

- 1) More emphasis is placed on the requirements of pales and fixing devices to meet performance standards.
- 2) The use of rivets is no longer specified, but the standard includes the use of cold swaged pin and flanged collar fastenings.
- 3) The use of zinc coatings for nuts, bolts, etc. is permitted, but extra treatments might be required where long term use is envisaged.
- 4) Recommendations for additional security measures are made.
- 5) Requirements for gates and gate posts have been revised.
- 6) A requirement for a statement of conformity has 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 can 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 Annexes A, B and 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 BS 1722 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, primed 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.

Use of this document

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 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 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 steel palisade fences and gates for general purposes (“GP” fences) in corrugated and angle pales for heights up to 2.4 m, and for security purposes (“SP” fences) 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 should 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 , at right angles to the plane of the fence of 900 N/m^2 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 is necessary to carry out a special appraisal and for the design criteria to be specified.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the publication (including any amendments) applies.

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

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

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

BS 7371-3, *Coatings on metal fasteners – Part 3: Specification for electroplated zinc and cadmium coatings*

BS 7371-6, *Coatings on metal fasteners – Part 6: Specification for hot dipped galvanized coatings*

BS 7371-8, *Coatings on metal fasteners – Part 8: Specification for sherardized coatings*

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

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 287-1, *Qualification test of welders – Fusion welding – Part 1: Steels*

BS EN 1011-1, *Welding – Recommendations for welding of metallic materials – Part 1: General guidance for arc welding*

BS EN 1011-2, *Welding – Recommendations for welding of metallic materials – Part 2: Arc welding of ferritic steels*

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

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 10056-1, *Specification for structural steel equal and unequal angles – Part 1: Dimensions*

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

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

BS EN 10210-2, *Hot finished structural hollow sections of non-alloy and fine grain structural steels – Part 2: Technical delivery requirements*

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

BS EN 10219-2, *Cold formed welded structural sections of non-alloy and fine grain steels – Part 2: Tolerances, dimensions and sectional properties*

BS EN 10240, *Internal and/or external protective coatings for steel tubes – Specification for hot dip galvanized coatings applied in automatic plants*

BS EN 10263-1, *Steel rod, bars and wire for cold heading and cold extrusion – Part 1: General technical delivery conditions*

BS EN 10263-2, *Steel rod, bars and wire for cold heading and cold extrusion – Part 2: Technical delivery conditions for steels not intended for heat treatment after cold working*

BS EN 10263-3, *Steel rod, bars and wire for cold heading and cold extrusion – Part 3: Technical delivery conditions for case hardening steels*

BS EN 10263-4, *Steel rod, bars and wire for cold heading and cold extrusion – Part 4: Technical delivery conditions for steels for quenching and tempering*

BS EN 10296-1, *Welded circular steel tubes for mechanical and general engineering purposes – Technical delivery conditions – Part 1: Non-alloy and alloy steel tubes*

BS EN 12620, *Aggregates for concrete*

BS EN ISO 376, *Metallic materials – Calibration of force-proving instruments used for the verification of uniaxial testing machines*

BS EN ISO 1461:1999, *Hot dip galvanized coatings on fabricated iron and steel articles – Specification and test methods*

BS EN ISO 7500-1, *Metallic materials – Verification of static uniaxial testing machines – Part 1: Tension/compression testing machines – Verification and calibration of the force-measuring system*

3 Dimensions and general characteristics

3.1 Dimensions and tolerances

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

Steel components shall conform to their specified sizes within the normal allowance on cross sections as specified in the applicable material standard.

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 fastener head protection.

3.2.2 Performance

When tested in accordance with Annex A, pales shall conform to the relevant load/deflection as follows:

- a) For SP fencing, the maximum deflection at the middle of the span under a test load of 3.5 kN shall not exceed 10 mm.
- b) For GP fencing, the maximum deflection at the middle of the span under a test load of 2.5 kN shall not exceed 8 mm.

Pales shall also withstand the relevant loading for the pale to fence rail assembly in **5.2**.

The pale thickness shall conform to the requirements of **3.2.2**. Pale nominal thickness shall be exclusive of finish and shall conform to the rolling tolerances in BS EN 10051.

NOTE Pale strength is dependant on the profile section and the fabrication methods used. Typical pale thicknesses are given in Table 6.

3.2.3 Spacing and face to view

The maximum spacing of pales centre to centre shall be:

- a) for corrugated pales: 155 mm;
- b) for angle pales: 135 mm.

The minimum face to view (width) shall be:

- a) for corrugated pales for SP fences: 70 mm;
- b) for corrugated pales for GP fences: 65 mm;
- c) for angle pales: 56 mm.

3.3 Statement of conformity

The pale manufacturer shall provide a statement of conformity (see 9.1) to confirm that the pales conform to the specified requirements.

4 Materials

4.1 Steel

The steel grade(s) employed shall be specified on the basis of the mechanical properties, formability and weldability required.

NOTE 1 The steel grade should be specified by the customer (the purchaser, fence designer, supplier, component manufacturer, fabricator or erector), as applicable, see Annex D.

Appropriate mild steel grades shall be selected from Table 7.

As a general guideline, steel grades to be considered shall have a minimum yield strength in excess of 235 N/mm², unless the design permits lower strength materials to be employed.

NOTE 2 Materials can be hot or cold formed.

Where components are to be hot dipped galvanized, the purchaser shall confirm with the supplier that the steel composition is suitable.

NOTE 3 A non-exhaustive range of recommended material grades is given in Table 7.

4.2 Bolts, nuts and washers

Bolts shall be strength grade 4 for GP fences and strength grade 8.8 for SP fences. Panel fixing bolts shall be cup square headed. Bolts for pales shall have special formed heads to suit pale profiles and shall be tamper resistant, i.e. not easily removed using simple tools.

Nuts shall be strength grade 4 for grade 4.6 fasteners, and grade 8 for grade 8.8 fasteners.

Washers, if specified, shall conform to BS 4320.