

BRITISH STANDARD

Fences –

Part 14: Specification for open mesh steel panel

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 29 and a back cover.

Foreword

Publishing information

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

Supersession

This part of BS 1722 supersedes BS 1722-14:2001, which is withdrawn.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, 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.

¹⁾ Obsolescent.

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

The principal changes introduced in this revision are to bring the requirements up to date with other parts of BS 1722 and to accommodate changes in cross references to other standards. This revision includes requirements for very high security fences and for concrete posts for fences.

This standard aims to establish minimum performance requirements for materials and workmanship. It specifies requirements for open mesh steel panel fences of four types:

- a) a fence for boundary or general purposes up to 2 400 mm in height;
- b) a fence for security purposes of minimum 2 400 mm in height;
- c) a fence for high security use of minimum 3 000 mm in height;
- d) a fence for extra high security of minimum 3 000 mm in height.

The general purpose fence is intended for use as a boundary marker or for those locations where it is deemed necessary merely to deter the casual intruder or trespasser.

The security fence is designed for use in areas where greater protection is required from vandalism or trespass, and can be considered suitable for use for general industrial security such as for industrial estates, airfields and oil installations.

The high security fence is designed for areas where protection against determined intrusion is required. However, it should be appreciated that it is not possible to install 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.

The extra high security fence does not permit finger holds and therefore cannot be scaled without climbing aids.

Choosing a fence is affected by factors such as the intended purpose, desired service life, aesthetic consideration 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 installing the fence of the basic characteristics required.

Ground conditions might indicate that a variation in the length of a post or strut, or the depth, to which it should be set, is desirable. The posts and struts 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.

NOTE The service life/durability is dependent on environmental conditions and can vary considerably. For this reason service life/durability is not included in this standard. For information relating to finishes and durability refer to the manufacturer.

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.

Use of this document

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

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

Presentational conventions

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

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

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

Contractual and legal considerations

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

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

1 Scope

This part of BS 1722 specifies requirements for the following categories of open mesh steel panel fences:

- a) Category 1: general purpose fences up to 2 400 mm high.
- b) Category 2: security fences at least 2 400 mm high.
- c) Category 3: high security fences at least 3 000 mm high.
- d) Category 4: extra high security fences at least 3 000 mm high.

Requirements for the performance of panel fences for this standard are based upon loadings described in Clause 5.

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

NOTE Annex A list items that should be agreed between the fence supplier and the purchaser.

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 referenced document (including any amendments) applies.

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

BS 405, *Specification for uncoated expanded metal carbon steel sheets for general purposes*

BS 1722, *Fences*

BS 3892, *Pulverized-fuel ash*

BS 4027, *Specification for sulfate-resisting Portland cement*

BS 4102, *Specification for steel wire for general fencing purposes*

BS 4449, *Steel for the reinforcement of concrete – Weldable reinforcing steel – Bar, coil and decoiled product – Specification*

BS 4482, *Steel wire for the reinforcement of concrete products – Specification*

BS 4483, *Steel fabric for the reinforcement of concrete – Specification*

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 197-1, *Cement – Part 1: Composition, specifications and conformity criteria for common cements*

BS EN 197-4, *Cement – Part 4: Composition, specifications and conformity criteria for low early strength blastfurnace cements*

BS EN 206-1:2000, *Concrete – Part 1: Specification, performance, production and conformity*

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

BS EN 480, *Admixtures for concrete, mortar and grout – Test methods*

BS EN 934, *Admixtures for concrete, mortar and grout*

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

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

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

BS EN 10219-2, *Cold formed welded structural hollow 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 10244, *Steel wire and wire products*

BS EN 10255, *Non-alloy steel tubes suitable for welding or threading – Technical delivery conditions*

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 12839:2001, *Precast concrete products – Elements for fences*

BS EN 12878, *Pigments for the colouring of building materials based on cement and/or lime – Specifications and methods of test*

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

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

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

DIN 1615, *Welded circular unalloyed steel tubes not subject to special requirements; technical delivery conditions*

3 Dimensions and general characteristics

Dimensions and general characteristics of fences shall conform to the requirements of Table 1 and Table 2 and Clause 5.

Table 1 Basic characteristics of suitable expanded metal for panel fences

Category	Height of fence (excluding topping) mm	Typical applications	Typical expanded metal specifications						Solidity %
			BS 405 reference	Vertical centres of mesh (LWM) mm	Horizontal centres of mesh (SWM) mm	Strand		Mass	
						Thickness mm	Width mm	Uncoated kg/m ²	Galvanized kg/m ²
1	Max. 2 400	General purpose fence	Special	76	64	2.00	2.00	0.96	1.056
			EX41	100	50	2.50	2.69	2.08	2.288
2	Min. 2 400	Security	Special	76	64	3.00	3.00	2.21	2.431
			EX42	100	50	3.00	3.53	3.106	3.417
3	Min. 3 000	High Security	EX44	100	50	3.00	5.03	4.66	5.126
			EX37	76	34	3.00	3.58	4.96	5.456
			EX32	50	23	3.00	3.12	6.52	7.172
4	Min. 3 000	Extra high security	Special ^{A)}	10 (SWM)	70 (LWM)	3.00	5.50 Main strand	9.00	9.90

NOTE 1 LWM denotes centre to centre of longest way of mesh; SWM denotes centre to centre of shortest way of mesh.

NOTE 2 "Special" refers to meshes designed by manufacturers in accordance with BS 405 but which do not have a specific reference number.

NOTE 3 Hot dip galvanizing refers to BS EN ISO 1461.

A) Category 4. Aperture finger grip proof. Probe "no go" 11 mm diameter.

Table 2 Basic characteristics of suitable welded mesh for panel fences

Category	Height of fence (excluding topping)	Typical applications	Typical welded mesh specifications				Solidity %
			Vertical mesh spacing	Horizontal mesh spacing	Vertical wire diameter	Horizontal wire diameter	
	mm		mm	mm	mm	mm	
1	Max. 2 400	General purpose boundary fence	200	50	5	7	14
			200	50	6	8+8 ^{A)}	16
			50	50	3	3	12
			75	25	3	3	16
			12.5 ^{B)}	12.5 ^{B)}	3	3	20
2	Min. 2 400	Security	75	75	3	3	16
			100	25	4	4	12
			200	50	5	5	13
			150	50	5	5	14
			12.5	50	4	4	36
			50	50	3	3	12
3	Min. 3 000	High security	50	50	4	4	16
			75	25	4	4	16
			75	25	3	3	16
4	Min. 3 000 ^{C)}	Extra high security	12.5	75	4	4	36
			12.5	75	3	3	21
			12.5 ^{D)}	12.5	4	4	58

A) 8+8 indicates a double horizontal wire.

B) Mixed mesh panel wire 50 mm and 12.5 mm meshes along the panel.

C) Category 4. Aperture finger grip proof. Probe “no go” 11 mm diameter.

D) Double skin.

4 Materials

4.1 Infill

Typical infill meshes shall be as given in Table 1 and Table 2.

NOTE 1 Specifications for expanded metal and welded mesh are contained in BS 405 and BS 4102.

NOTE 2 Examples of typical expanded metal and welded mesh panels are shown in Figure 1 and Figure 2.

4.2 Steel posts

NOTE 1 See 4.4 for steel fittings.

Steel posts shall conform to the requirements of Clause 5. The tops of tubes or hollow section posts shall be closed by either a welded cap or a push fit plastic cap.

NOTE 2 Recommended steel grades and details of corrosion protective treatments that can be applied are given in Annex B.

NOTE 3 Tolerances of +50 mm and –25 mm are permissible on the specified lengths of steel posts when determining the actual lengths.

The steel post sections shall have a section moment of inertia of at least 5.4 cm^4 for fences up to 1 800 mm high and 12.5 cm^4 for fences over 1 800 mm high. The wall thickness shall be at least 2.5 mm for general purpose fences and 3.5 mm for high and maximum security fences.

Figure 1 Example of typical expanded mesh

