

BS 1722-18:2011



BSI Standards Publication

## Fences

Part 18: Specification for  
free-standing temporary steel mesh  
perimeter fencing panels

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### Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 22, an inside back cover and a back cover.

## Foreword

### Publishing information

This part of BS 1722 was published by BSI and came into effect on 31 December 2011. 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.

This part of BS 1722 supersedes DD 1722-18:2007, which is withdrawn.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 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 <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: Specification for electric security fences – Design, installation and maintenance;*
- *Part 18: Specification for free-standing temporary steel mesh perimeter fencing systems.*

### Information about this document

The HSE welcomes this British Standard and will be participating in the development of a British Standard on free-standing temporary steel mesh perimeter fencing systems.

### 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.*

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<sup>1)</sup> Obsolete.

**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.**



## Introduction

This part of BS 1722 has been developed as a result of increasing concerns amongst industry stakeholders whose suggestions for further improvement of the product have been solicited and incorporated into this document.

*NOTE 1 This process was supported by the HSE.*

*NOTE 2 This part of BS 1722 has been written to address the concerns of the construction industry regarding the quality and safety of free-standing temporary steel mesh perimeter fencing systems.*

## 1 Scope

This part of BS 1722 specifies performance requirements for the manufacture of steel mesh site perimeter temporary fencing. It includes test methods for the verification that these requirements have been met. Information on the construction of a typical fence panel that would meet these requirements has also been included.

*NOTE This part of BS 1722 complements and expands on the guidance given by the Health & Safety Executive in its guidance document HS G 151, Protecting the public, your next move [1]. This document is intended to assist the construction industry and ensure the safety of members of the public in the UK.*

## 2 Terms and definitions

For the purposes of this part of BS 1722, the following terms and definitions apply.

### 2.1 climb-deterrent mesh

mesh that hinders climbing by making it difficult to gain foot-holds

## 3 Fence panel

### 3.1 Frame

When tested in accordance with Annex A, the frame, including any joints, shall withstand a force of 7 kN.

*NOTE 1 7 kN is representative of the force that a fence frame joint will be subjected to in normal use conditions. Fence frames that resist such a force should provide a robust and durable structure.*

*NOTE 2 The frame is usually constructed from galvanized hollow section tube (see Note 3). If galvanizing, in accordance with BS EN ISO 1461, is carried out subsequent to fabrication then venting and draining holes should be included in accordance with Annex B of that standard.*

*NOTE 3 For guidance, electric welded tube of 35 mm diameter and 1 mm thickness in accordance with BS EN 10305-3 grades E220 or E235 or produced from pre-galvanized strip in accordance with BS EN 10326 grade S220GD will usually be of sufficient strength to meet these requirements.*

### 3.2 Mesh

#### 3.2.1 General

The mesh shall be attached to the frame in such a way that no hazard exists due to protruding wires or sharp edges.

### 3.2.2 Climb-deterrent mesh

In order to be marked as “climb-deterrent” (see also Clause 4) the mesh used in a fence panel shall withstand  $(6.0 \pm 0.1)$  kg for 20 seconds when tested in accordance with Annex B.

*NOTE 1 The mesh is close-spaced to make it difficult to gain hand- and foot-holds.*

*NOTE 2 Mild steel mesh with a minimum wire diameter of 2.3 mm and pre-galvanized in accordance with BS EN 10244-2 is usually considered to be sufficient to meet this requirement.*

*NOTE 3 Mild steel mesh with a maximum spacing of 42 mm between vertical wires and 254 mm between horizontal wires is usually considered to be sufficient to meet this requirement.*

### 3.2.3 Non climb-deterrent fence panels

If the mesh is not tested in accordance with Annex B, or does not withstand  $(6.0 \pm 0.1)$  kg for 20 seconds when tested in accordance with Annex B, it shall not be marked as “climb-deterrent” (see also Clause 4).

## 3.3 Complete panel

The size of the complete panel shall be as specified by the customer.

*NOTE 1 Typical construction of fence panels are shown in Figure 1. A typical frame is 3.5 m in length and 2.0 m in height.*

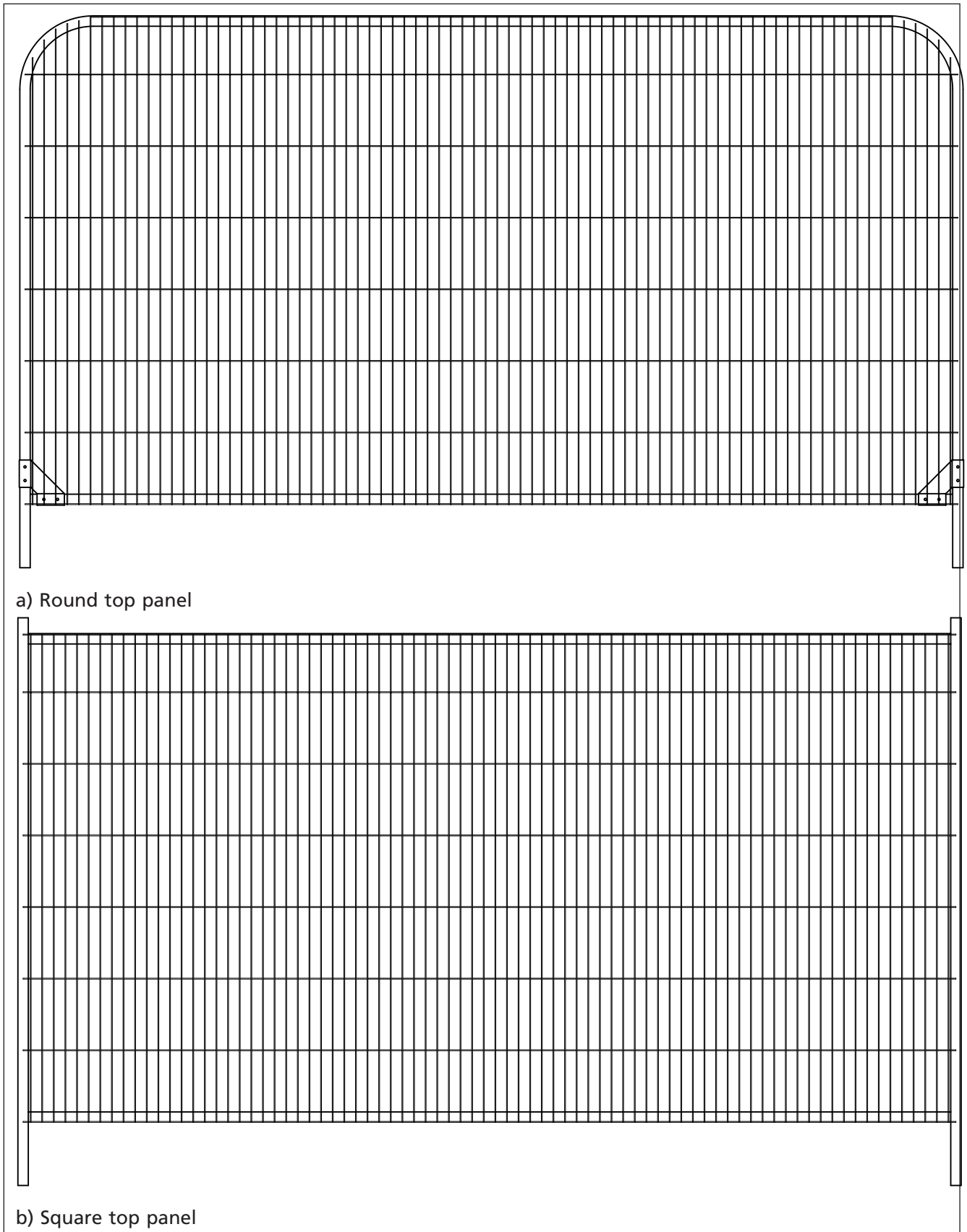
The gap between the bottom horizontal tube and the ground shall be a maximum of 160 mm.

When tested in accordance with Annex C, the complete panel shall carry 1 575 kg with no welds failing.

*NOTE 2 The 1 575 kg load has been derived from the known forces and stresses between the mesh and panel frame through manual handling, erecting / dismantling and normal use of the product. Mesh to tube welding that resists such a load will provide a robust and durable product.*



Figure 1 Typical construction of fence panels



## 4 Marking

Fence panels shall be marked legibly and visibly in an unobtrusive position with the following information:

- a) name and address of the manufacturer;
- b) product reference or, where applicable, the batch of products to which it belongs;
- c) reference to this British Standard, i.e. BS 1722-18:2011 <sup>2)</sup>;

## 5 Installation guidance

The installation guidance given in Annex D shall be provided as a minimum to all purchasers and users of free-standing temporary steel mesh perimeter fencing systems.

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<sup>2)</sup> Marking BS 1722-18:2011 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of the manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third-party certification of conformity.

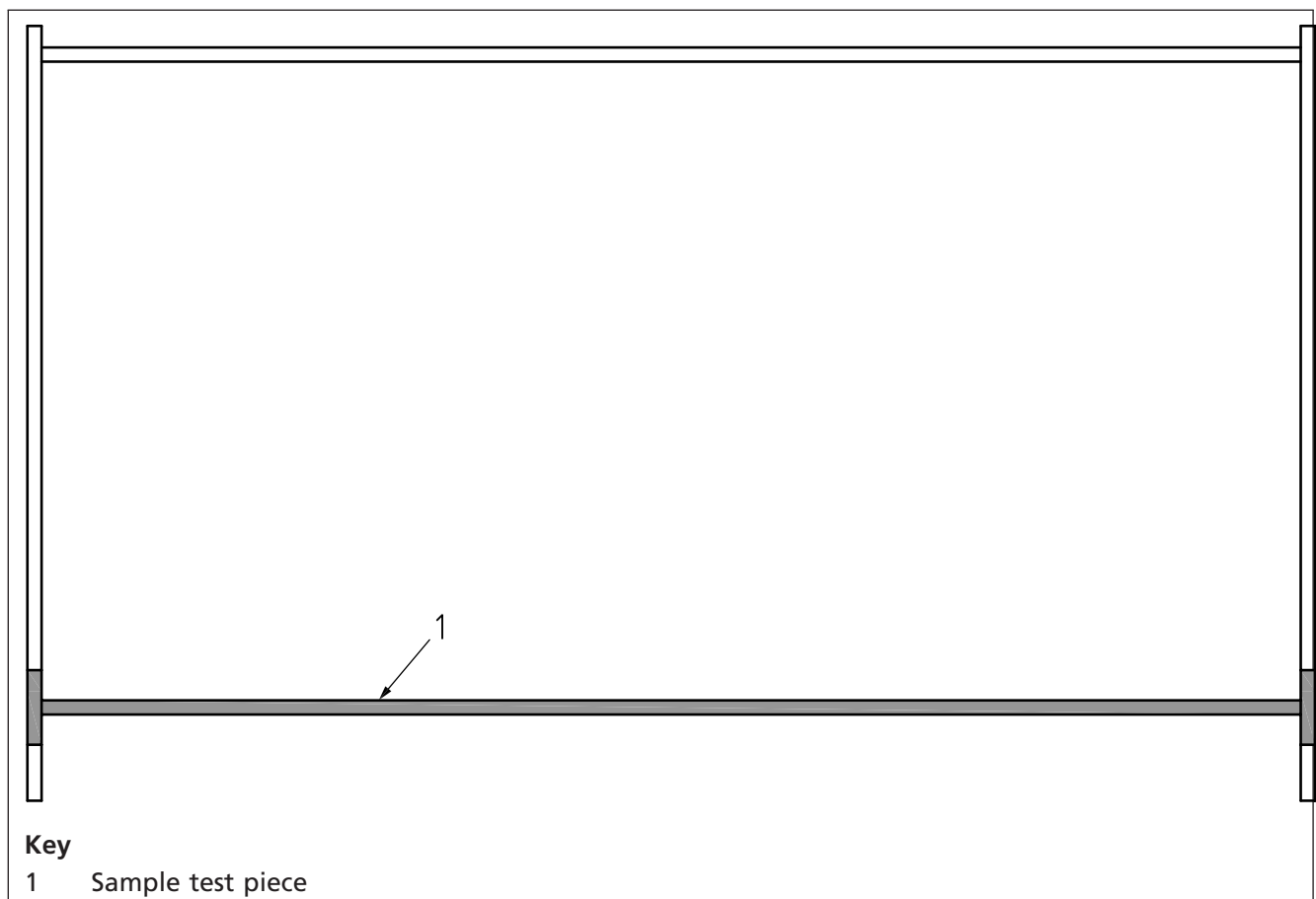
Annex A  
(normative)  
A.1 **Fence panel tube weld test procedure**  
**Principle**

The following procedure explains how to prepare the panel frame sample test piece, how to assemble the sample into a typical test jig ready for testing and the way the sample is tested.

A.2 **Method for preparing sample test piece**

Cut the sample test piece from an existing fence panel frame as shown in Figure A.1. Care should be taken not to damage the existing tube welds whilst preparing the sample.

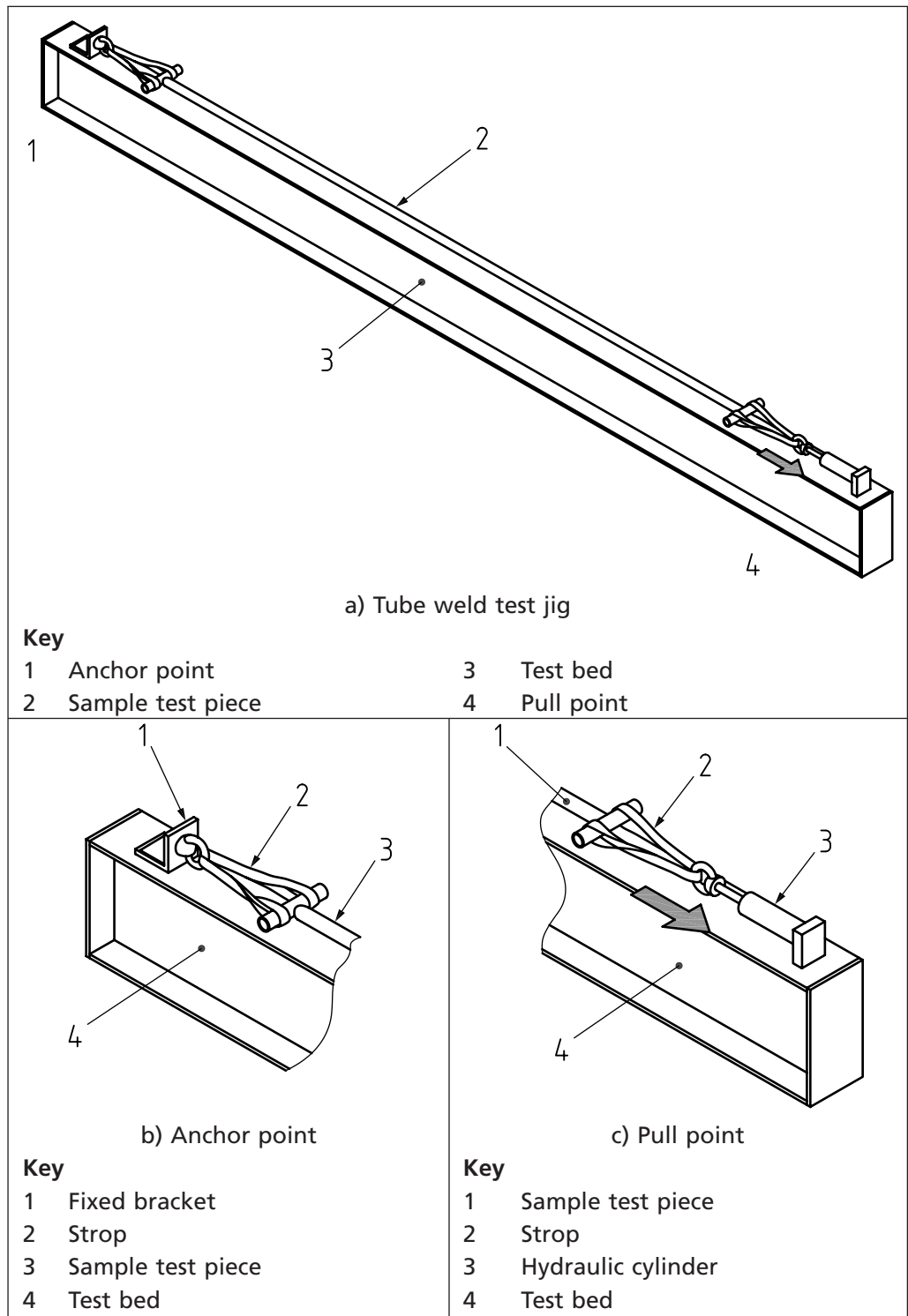
Figure A.1 **Sample test piece**



A.3 **Method of fitting sample test piece into test jig**

Fit the sample test piece into the weld pull test rig generally as shown in Figure A.2.

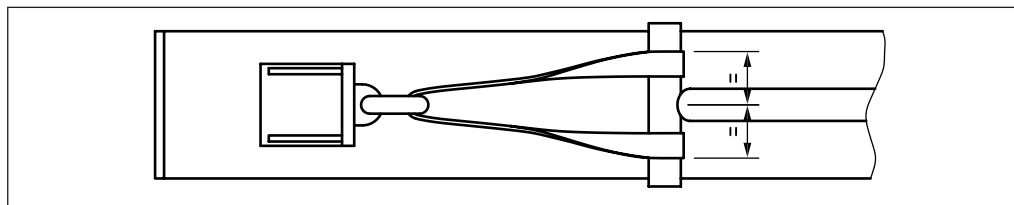
Figure A.2 Tube weld test jig



Restrain one end of the test piece at the anchor point by putting a strop through an eye which in turn is fixed to a bracket. Securely fit the bracket to the top of the test bed. Place the strop around the end of the test piece and arrange so that it sits equally each side of the test piece. (See Figure A.3).

At the other end of the test bed put another strop through an eye on the end of the hydraulic cylinder. Place the strop around the end of the test piece and arrange so that it sits equally each side of the test piece. Activate the hydraulic cylinder to take up any slack in the strops. The sample test piece is now ready for the pull test.

Figure A.3 Plan view at anchor point



#### A.4 Sample test piece testing procedure

With the sample test piece sat in the testing jig increase the force to 7 kN.

The manufacturer shall initially demonstrate compliance to the British Standard testing 5 samples. If any of these samples fail then a further 5 samples should be tested until a point where all 5 samples pass the test.

Further tests shall be carried out every 6 months.

In-house production quality shall be covered by the manufacturers providing a production control procedure for each panel type. This procedure shall be documented in a manual which is available for external viewing.

The in-house controls will consist generally of tests and inspections during and after production.

#### A.5 Results

If the welds are still intact the sample piece is deemed to have passed.

### Annex B (normative)

#### B.1

## Climb deterrent mesh test

### Principle

The following test procedure shows how to test fence panel mesh or other fence panel infill materials to assess its suitability for use as a climb deterrent panel.

The test generally consists of placing a conical test mandrel of a set weight into the aperture of the test sample to see if the sample deforms under the weight. If the sample deforms to a certain amount the sample is deemed to have failed.

The sample test area to be tested should be in board of the fence panel frame so that the frame is not affecting the results on the mesh or other infill material. See Figure B.1.

### B.2 Preparing the test sample

Lay the test sample (in the case of the fence panel) horizontally and supported at each corner at a height of approximately 1.2 m above the floor so that the underside of the sample piece can be accessed to add the test weight to the mandrel. See Figure B.2.

Figure B.1 Sample test area

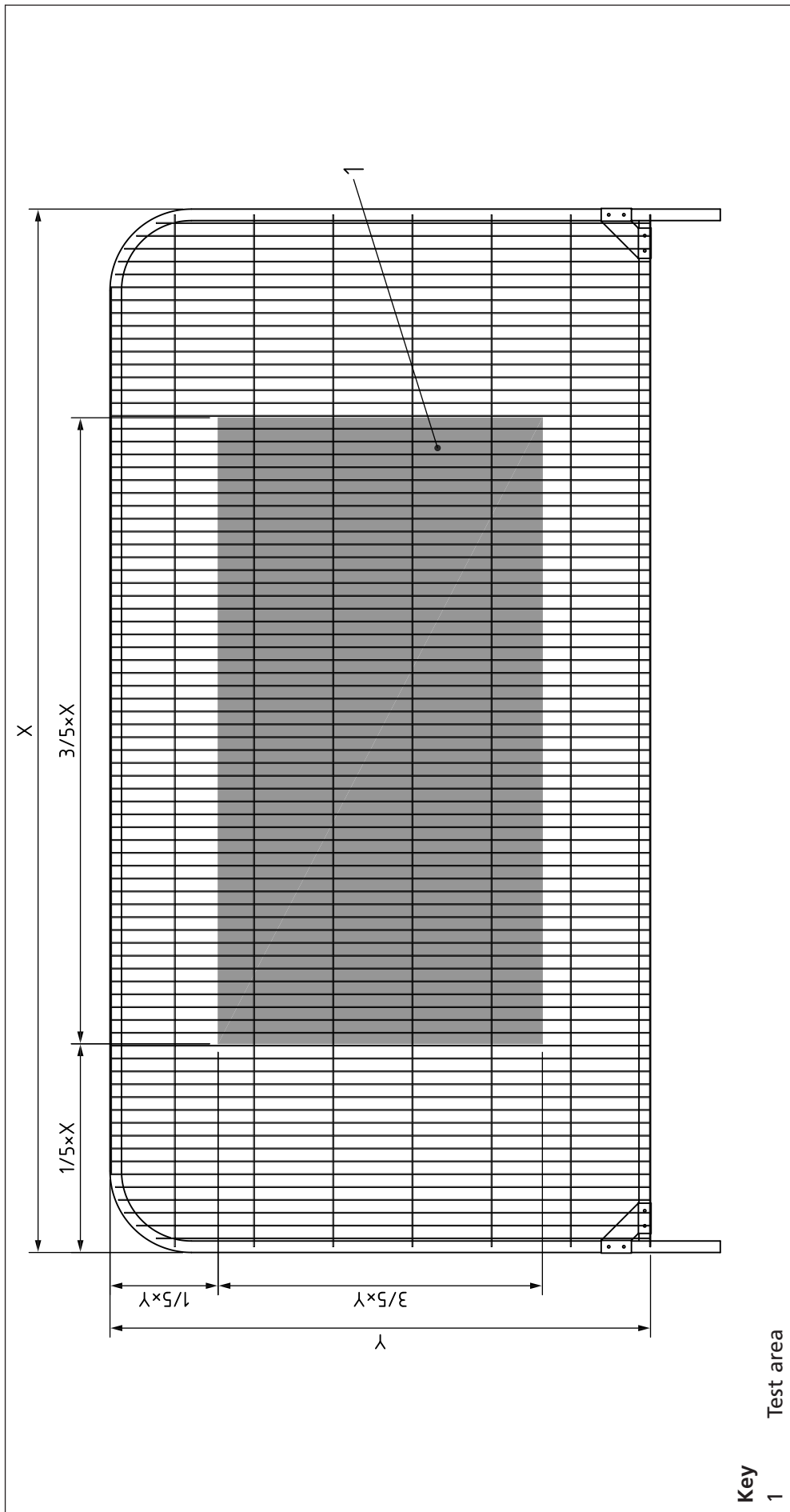
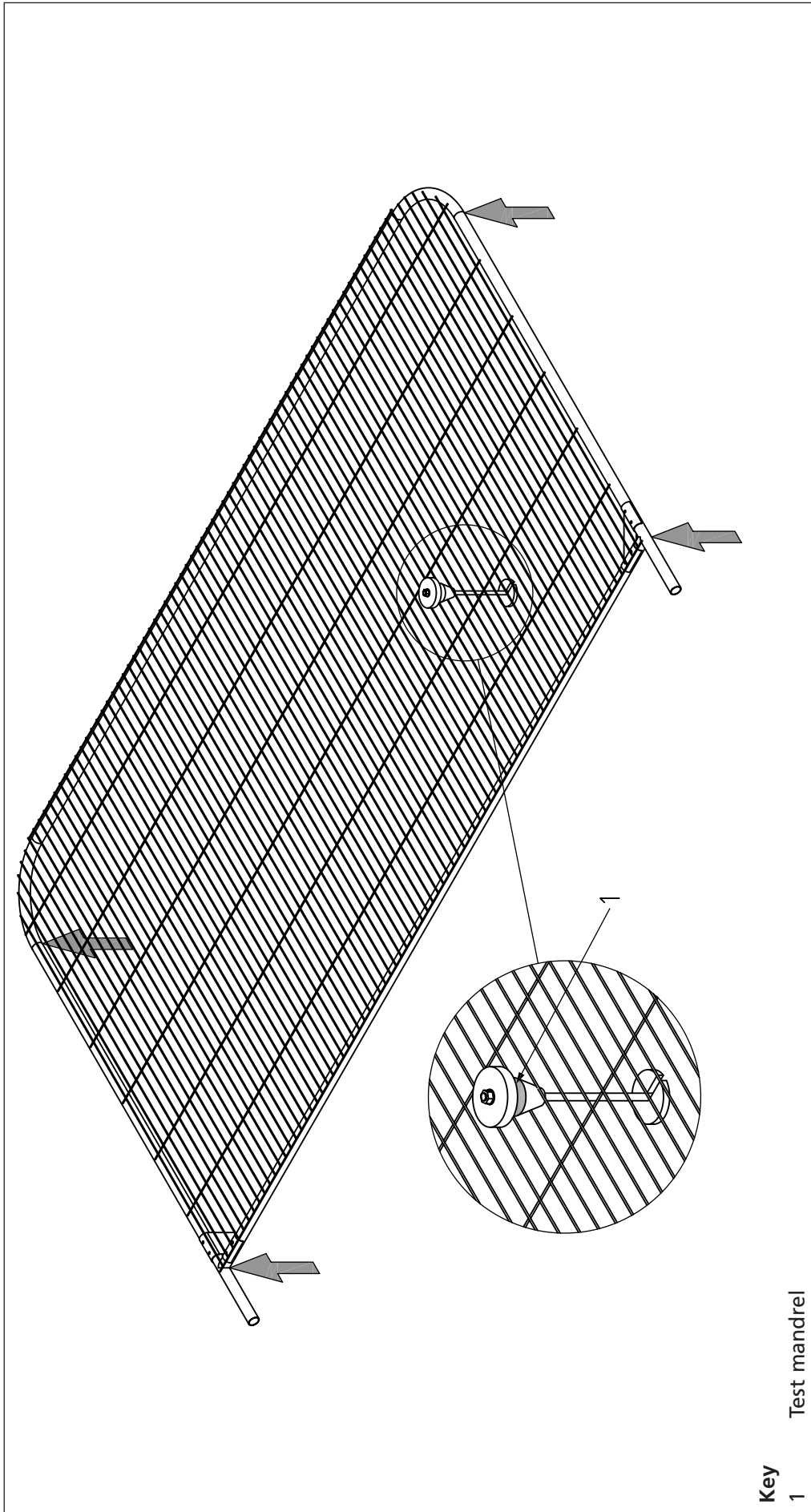
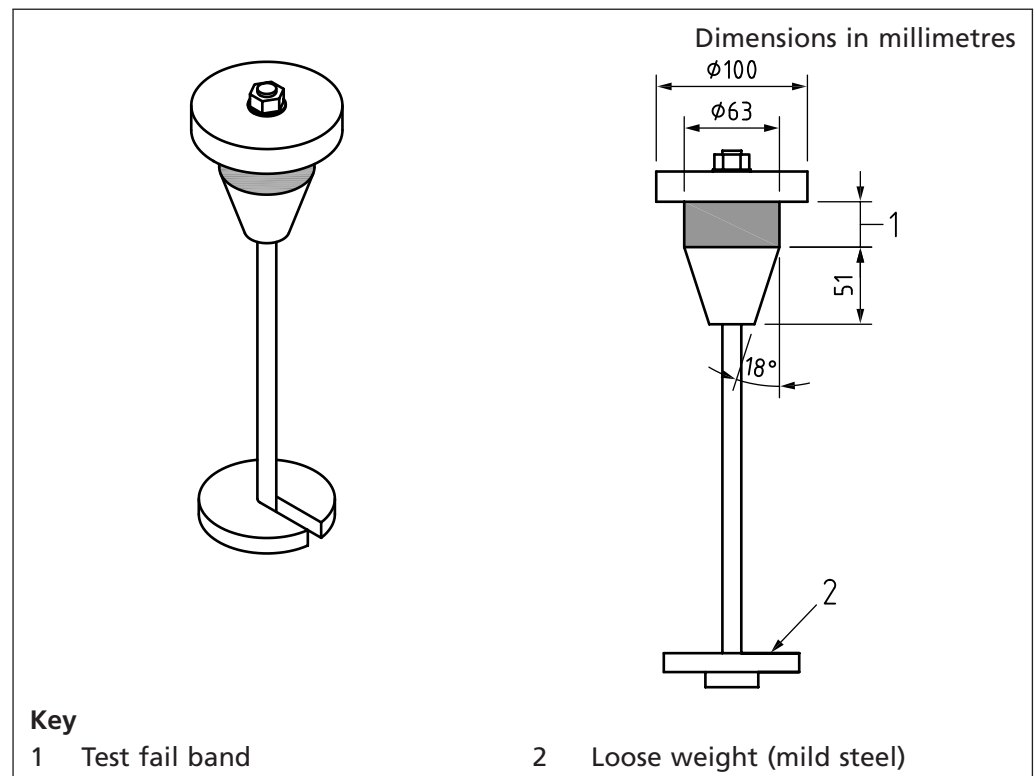


Figure B.2 Attaching the test mandrel to the sample piece



The Test Mandrel should be generally as shown in Figure B.3.

Figure B.3 Test mandrel

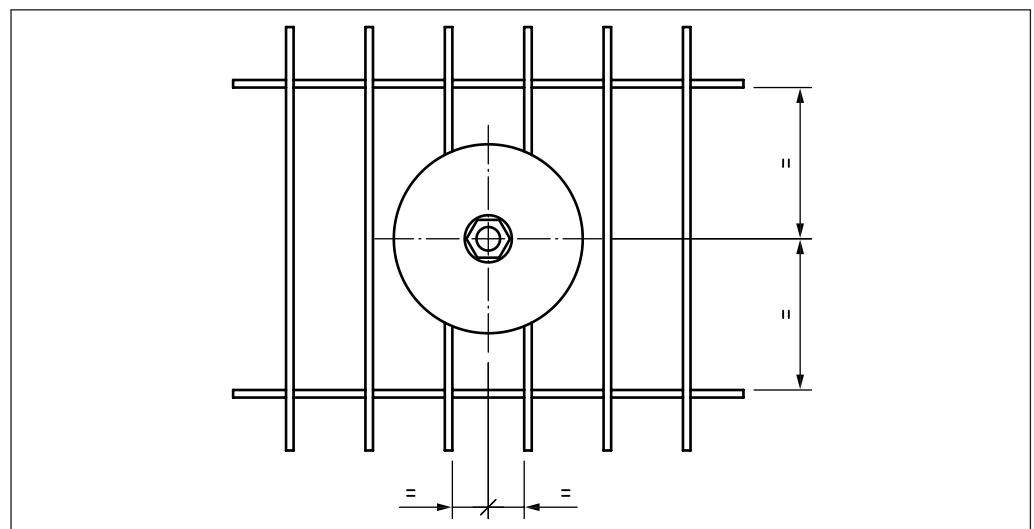


The test mandrel consists of a nylon cone, with shape and dimensions as shown in Figure B.3. The test fail band is cylindrical and parallel. At the top of the mandrel is a larger diameter which prevents the mandrel from completely dropping through the test sample should the test fail. At the bottom of the mandrel is provision for a loose weight to be added so the mandrel can be placed into the test sample from the top side and then have the weight added from the underside.

The weight of the Test Mandrel complete with the loose weight should be  $(6.0 \pm 0.1)$  kg.

Looking down in plan view at the test sample the mandrel without the loose weight should be placed in the centre of the aperture. See Figure B.4.

Figure B.4 Mandrel position central of aperture

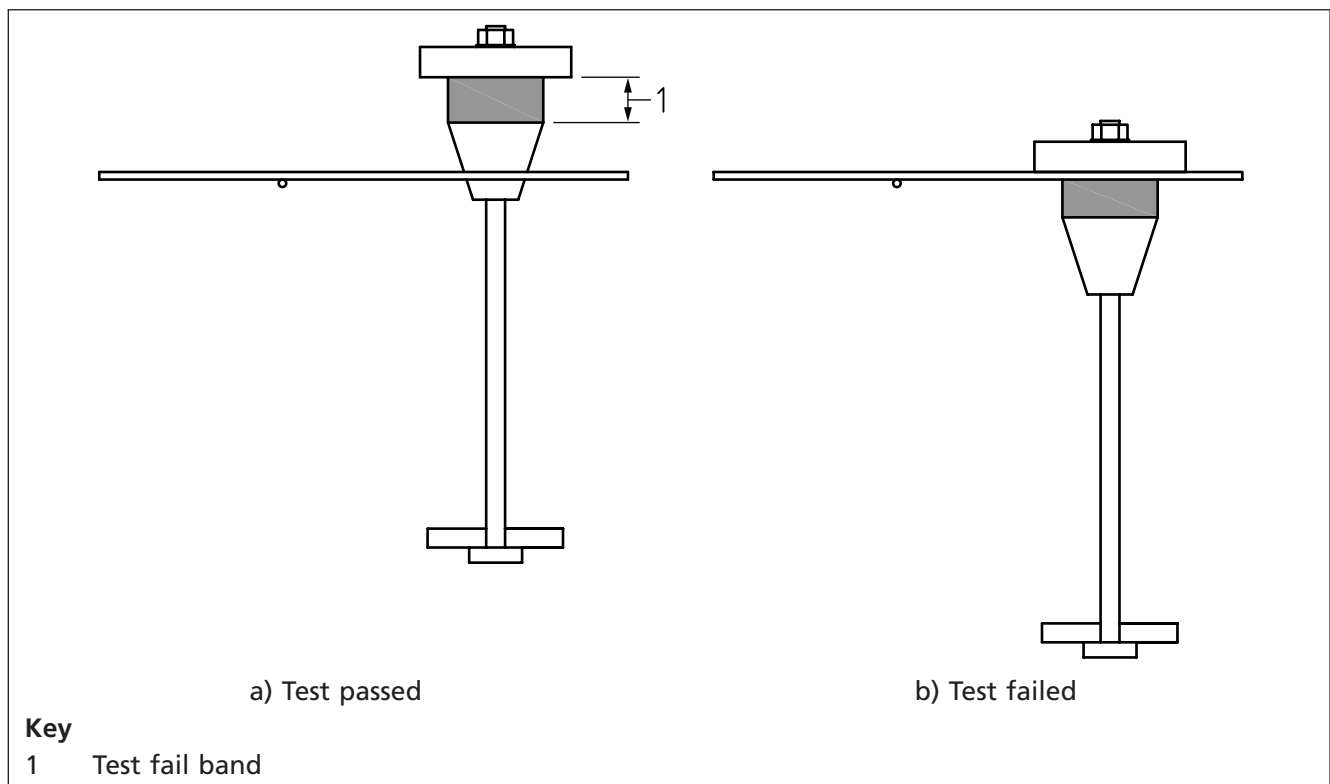




From the underside of the sample the loose weight can be added to the mandrel. The weight should be added slowly whilst keeping the mandrel vertical. The mandrel should be left to sit for approximately 20 seconds after it has found its resting place in the aperture.

If the aperture of the sample deforms enough for the mandrel to pass through the sample and into the Test Fail Band area of the mandrel then the test has failed. If the mandrel does not pass into the Test Fail Band then the test has passed. See Figure B.5.

Figure B.5 Test pass and failure criteria



### B.3 Testing the fence panel samples

Test the test sample in at least three randomly chosen positions within the test area of the sample (See Figure B.1) of each panel type to be tested. Test three fence panels from each type.

The test should be carried out in at least three randomly chosen positions within the test area of the sample (See Figure B.1) of each panel type to be tested. Test five fence panels from each type.

The manufacturer shall initially demonstrate compliance to the British Standard testing 5 samples. If any of these samples fail then a further 5 samples should be tested until a point where all 5 samples pass the test.

Further tests shall be carried out every 6 months.

In-house production quality shall be covered by the manufacturers providing a production control procedure for each panel type. This procedure shall be documented in a manual which is available for external viewing.

The in-house controls will consist generally of tests and inspections during and after production.

## B.4 Results

Any test that results in the mandrel deforming the sample as described in any of the tests is classed as a failure.

Annex C  
(normative)

## Fence panel mesh test procedure for panel with mesh welded to the tube outer face

### C.1 Principle

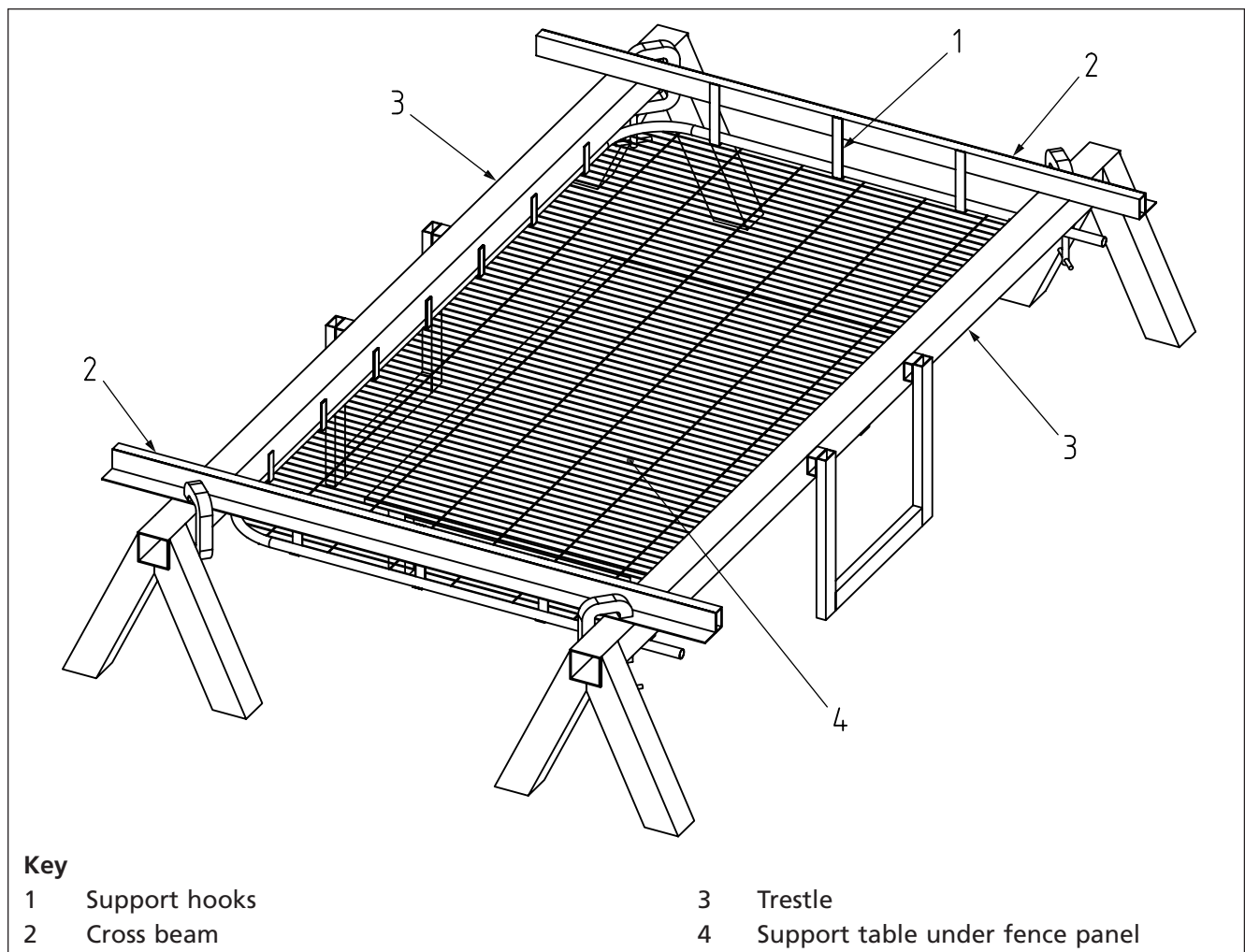
To establish the strength of the welds holding the mesh onto the fence panel frame.

The fence panel is laid down flat inside a support rig that only holds the frame tubes. The mesh on the fence panel is on the under side of the frame tubes so that when sufficient weight is applied to the mesh the mesh is allowed to brake away from the panel frame. The load support frame is designed to spread the load as evenly as possible across all the wires on the mesh.

### C.2 Apparatus

Typical apparatus to test a fence panel is shown in Figure C.1.

Figure C.1 Typical apparatus

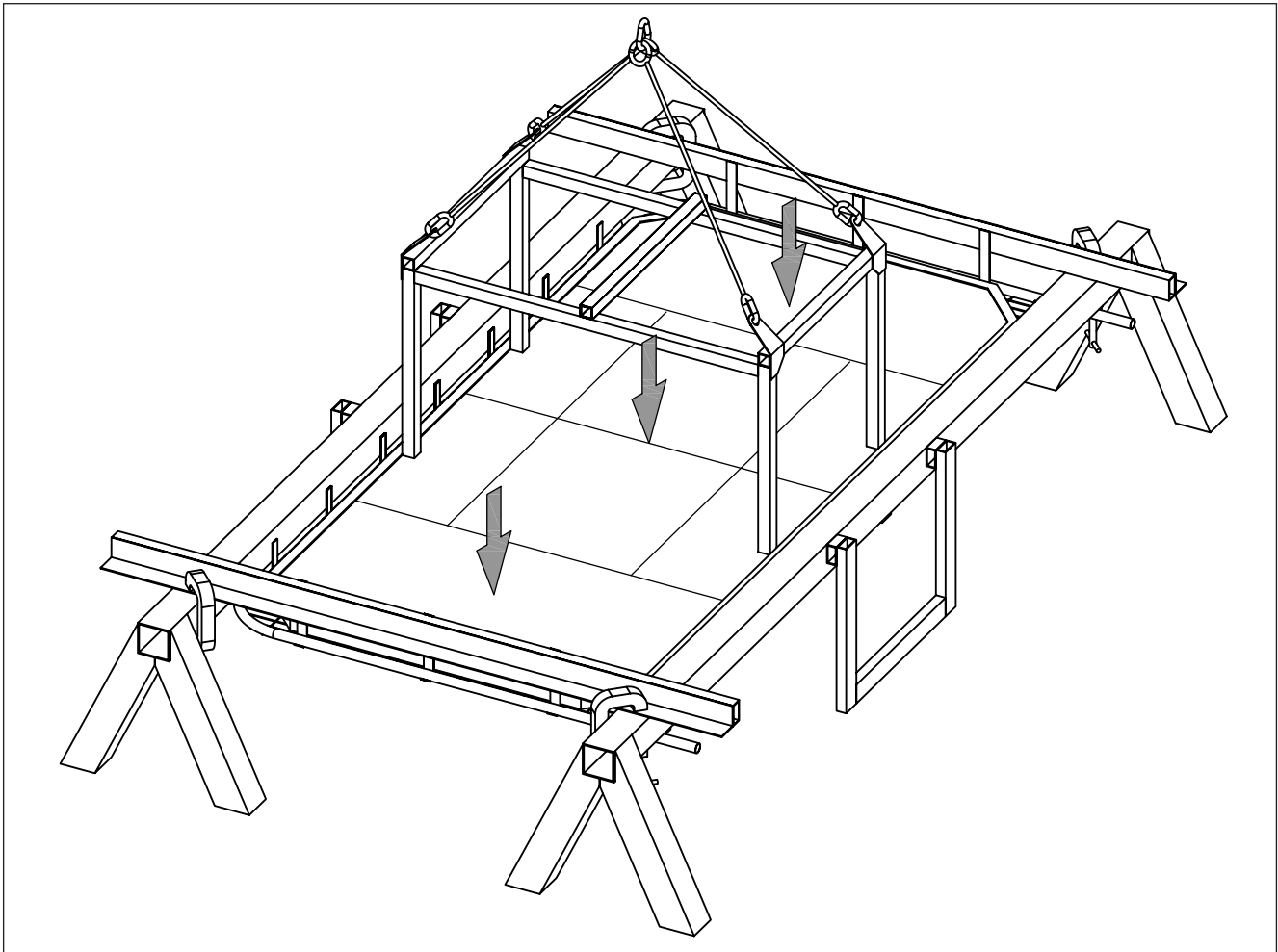




The purpose of the load distribution frame is to spread the test weight evenly across all parts of the mesh on the fence panel.

Once the fence panel is in position the load distribution frame can be lowered onto the mesh. This can be done by using an overhead crane to lift the load distribution frame and position it equally inside the inner faces of the panel tubes. Once in position the frame can be lowered onto the mesh and the crane can be lowered sufficient so the weight of the support frame is off the crane hook but the crane hook is still in a position to catch the distribution frame as it falls through the panel when the mesh comes off the tubes. (See Figure C.4.)

Figure C.4 Lowering the load distribution frame onto the fence panel



### C.3 Procedure

Prior to the fence panel being tested carry out a visual inspection of the panel to check that all the wires that are intended to be welded to the panel frame are in place.

Load the distribution frame with test weights so that the frame and weights have a combined load of 1 575 kg.

Test the mesh on the fence panel by lowering the distribution frame and weights onto the mesh. After placing a load onto the frame leave a period of 5 minutes before carrying out a visual inspection of the welds. Inspect the welds of the mesh to the tubes and the welds of the mesh wire to wire around the edge of the panel.

The manufacturer shall initially demonstrate compliance to the British Standard testing 5 samples. If any of these samples fail then a further 5 samples should be tested until a point where all 5 samples pass the test.

Further tests shall be carried out every 6 months.

In-house production quality shall be covered by the manufacturers providing a production control procedure for each panel type. This procedure shall be documented in a manual which is available for external viewing.

The in-house controls will consist generally of tests and inspections during and after production.

#### C.4 Results

An individual target for a fence panel is to carry 1 575 kg with no welds failing.

The test should be repeated periodically in order to provide reassurance that the manufacturing and design processes are still fit for purpose.

### Annex D (normative)

## Installation guidance

*NOTE Installation guidance should be provided as a minimum to all purchasers and users of free-standing temporary steel mesh perimeter fencing systems.*

#### D.1 General

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 user should ensure the Lead Installer and all other operatives are suitably trained and given sufficient information to safely install the product.

*NOTE Installers may hold a current FISS/CSCS registration card (green card) or equivalent which demonstrates health and safety training.*

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

#### D.2 Footblocks

Footblocks should not be laid parallel to the fencing line as this causes the fence to be unstable.

When a fence is installed alongside a pedestrian walkway or public highway (road, footpath, bridleway, etc.) the fence panels should be inserted into the outside holes of the footblocks (see Figure 2).

*NOTE If the fence panel is inserted into the centre holes the footblock will extend into the pedestrian walkway where it might be a trip hazard.*

#### D.3 Fence panels

The ground on which the fence is to be installed should be levelled such that the gap between the bottom horizontal tube and the ground does not exceed 160 mm (see 2.3).

The typical weight of a panel can range between 12 kg and 25 kg. A manual handling risk assessment should be carried out to ensure safe installation.

#### D.4 Fence couplers

Fence panels should be joined together using a minimum of two fence couplers. The distance between the fence couplers should be at least 1 m and should be uniform throughout the fence.

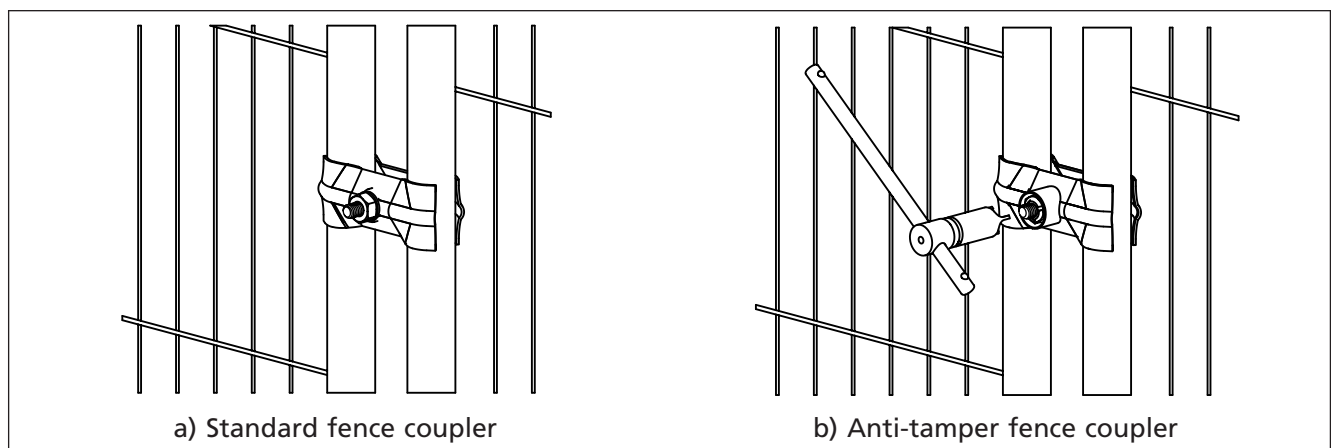
Standard couplers held in place with a nut and bolt should be installed so that the nut is only accessible from inside the fence.

Anti-tamper fence couplers can be installed so that they can only be removed from inside the fence.

*NOTE 1 The use of anti-tamper couplers reduces the possibility of the fence panels being moved without authorization and require a specialized tool which should be safeguarded by the site manager or other authorized person.*

*NOTE 2 Figure D.1 shows a typical standard fence coupler and an anti-tamper fence coupler.*

Figure D.1 Typical fence couplers



#### D.5 Stabilizing system

A stabilizing system should be installed on free-standing temporary steel mesh perimeter fencing systems.

*NOTE The stabilizing system typically consists of struts which are anchored to the posts of the fence panels in the same way as fence couplers.*

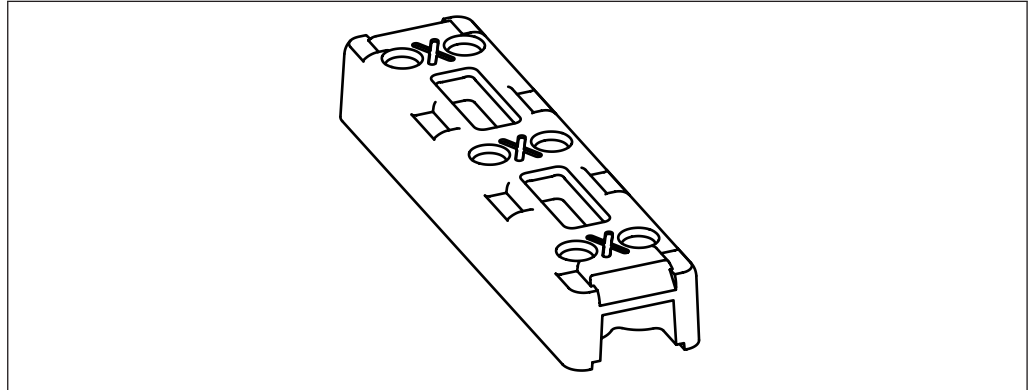
*NOTE 1 A typical footblock as shown in Figure D.2 is:*

- 700 mm in length;
- 125 mm in height;
- 220 mm in width; and
- weighs no more than 24 kg.

*NOTE 2 If the feet of sectional fencing project into pedestrian areas, they should be highlighted to avoid tripping hazards (see HS G 151 [1]).*

*NOTE 3 Attention is drawn to the Health & Safety Executive guide INDG 143 (Rev. 2) Getting to grips with manual handling – A short guide [2] which gives advice on the reduction of the risk of injury from manual handling.*

Figure D.2 Typical footblock



### D.6 Example configurations

Example configurations of free-standing temporary steel mesh perimeter fencing panels are shown in Figure D.3.

Figure D.3 Example configurations (1 of 4)

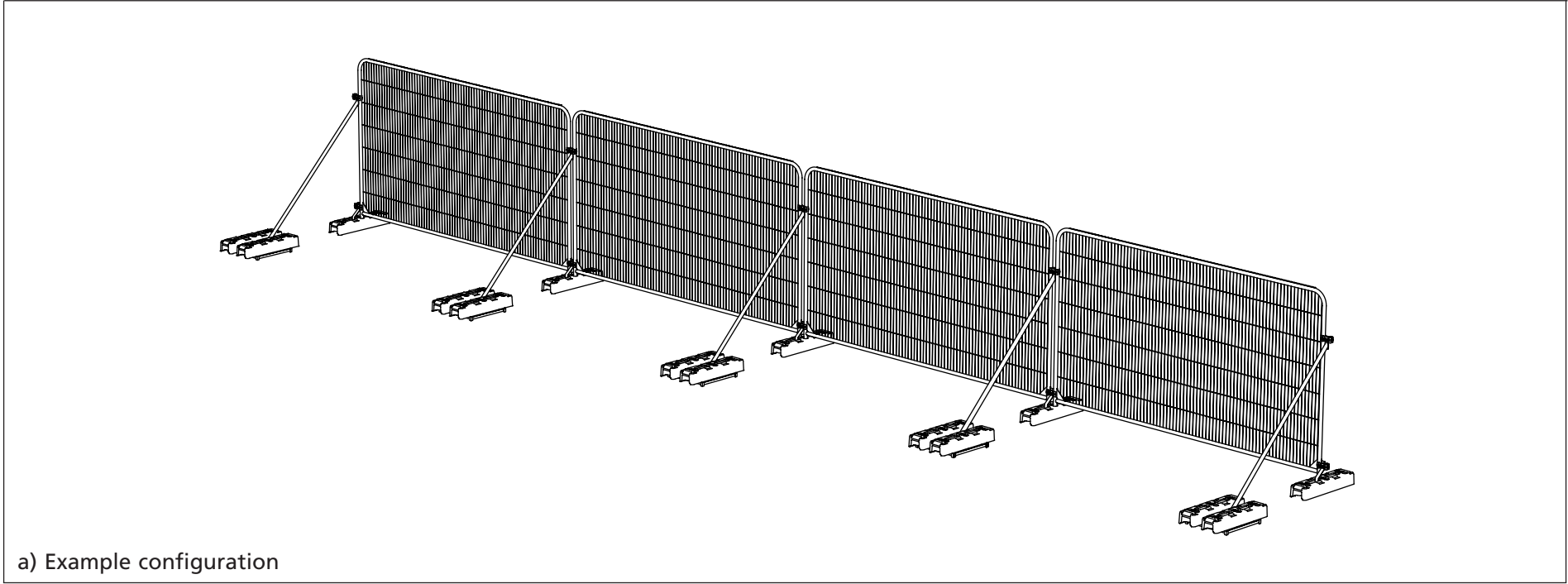




Figure D.3 Example configurations (2 of 4)

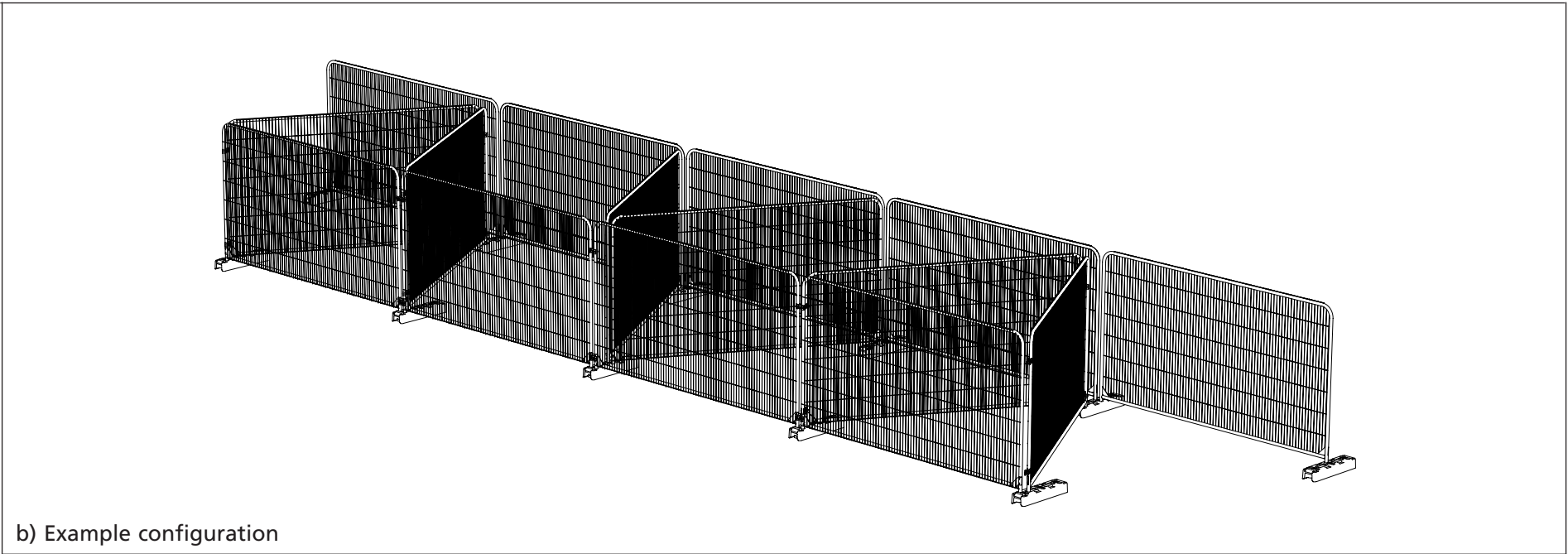


Figure D.3 Example configurations (3 of 4)

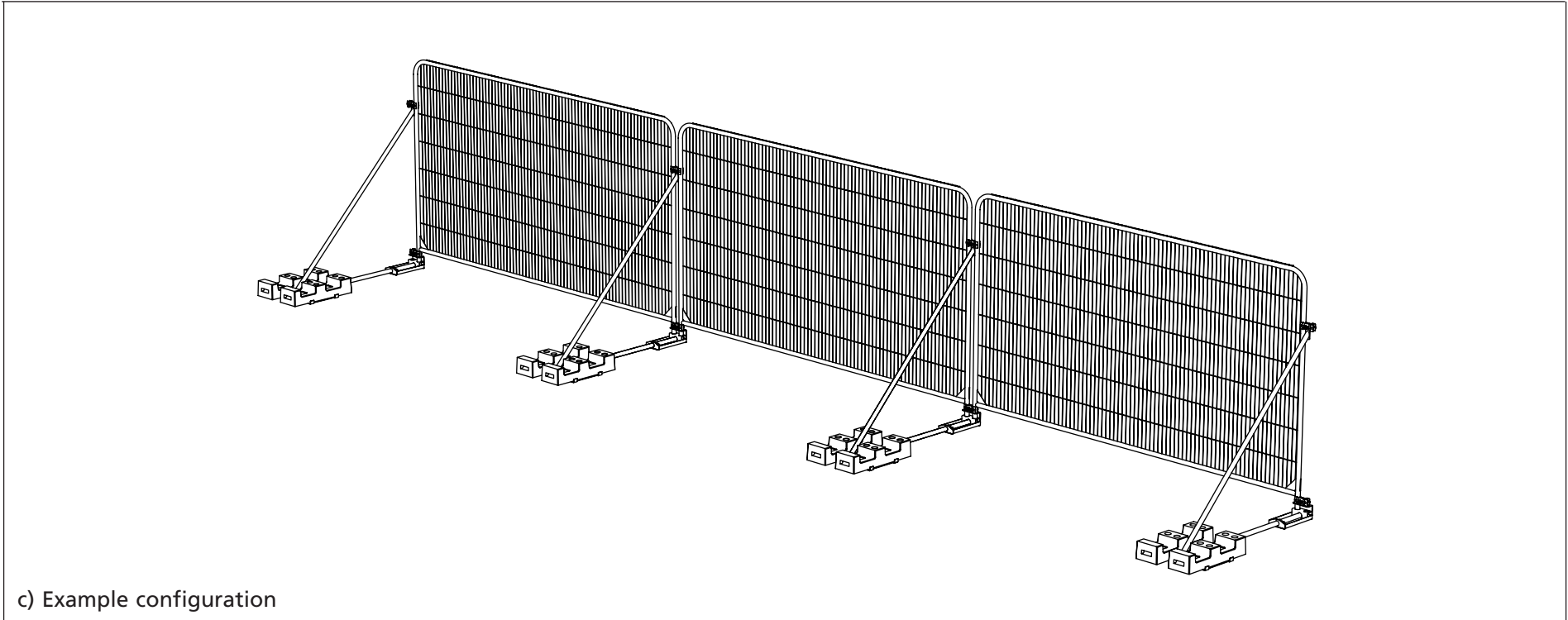
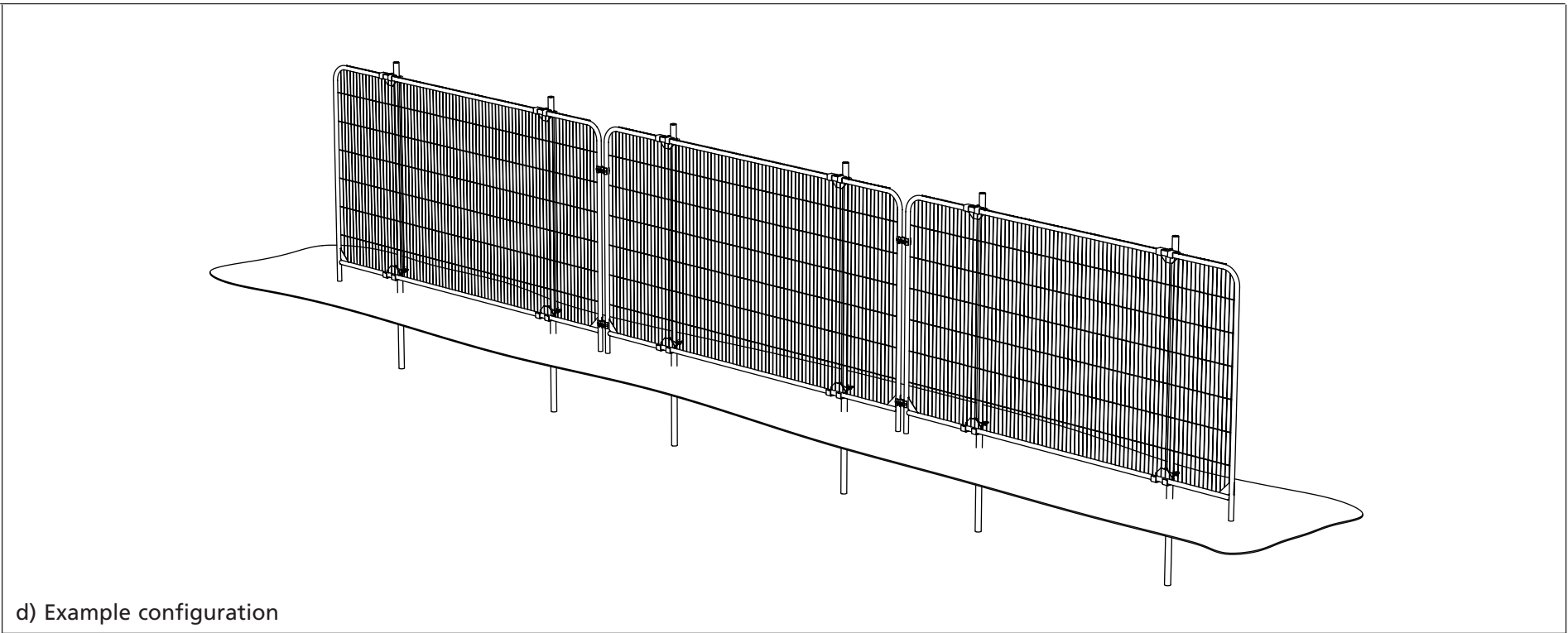


Figure D.3 Example configurations (4 of 4)



## Bibliography

### Standards publications

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

BS EN 10244-2, *Steel wire and wire products – Non-ferrous metallic coatings on steel wire – Part 2: Zinc or zinc alloy coatings*

BS EN 10326, *Continuously hot-dip coated strip and sheet of structural steels – Technical delivery conditions*

### Other publications

- [1] HS G 151, Protecting the public, your next move.
- [2] Health & Safety Executive guide INDG 143 (Rev. 2) Getting to grips with manual handling – A short guide



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