BS 4592-3:2006

BRITISH STANDARD

Industrial type flooring and stair treads –

Part 3: Cold formed metal planks – Specification

ICS 91.060.30

Confirmed
February 2012

BSI
British Standards

Publishing and copyright information

ISBN 0 580 48256 1

The following BSI references relate to the work on this standard:
Committee reference B/208
Draft for comment 06/30094364 DC

Publication history

First published July 1987
Second edition (present) edition December 2006

Amendments issued since publication

Amd. no.	Date	Text affected

Contents

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 10, an inside back cover and a back cover.

This page deliberately left blank

Foreword

Publishing information

This part of BS 4592 was published by BSI and came into effect on 29 December 2006. It was prepared by Subcommittee B/208/1, *Stairs and walkways – Industrial*, under the authority of Technical Committee B/208, *Stairs and walkways*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This part of BS 4592, together with Part 0, supersedes BS 4592-3:1987, which is withdrawn.

Information about this document

BS 4592 is published in seven parts, as follows:

- *Part 0: Common design requirements and recommendations for installation;*
- *Part 1: Metal open bar gratings – Specification;*
- *Part 2: Expanded metal sections – Specification;*
- *Part 3: Cold formed metal planks – Specification;*
- *Part 4: Glass reinforced plastics (GRP) open bar gratings – Specification;*
- *Part 5: Solid plates in metal and glass reinforced plastics (GRP) – Specification;*
- *Part 6: Glass reinforced plastics (GRP) moulded open mesh gratings – Specification*[1)].

The requirements in this part cover areas that are not addressed by BS EN ISO 14122, *Safety of machinery – Permanent means of access to machinery*, which is published in the following parts:

- *Part 1: Choice of fixed means of access between two levels;*
- *Part 2: Working platforms and walkways;*
- *Part 3: Stairways, stepladders and guard-rails;*
- *Part 4: Fixed ladders.*

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

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.

1) In preparation.

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 4592 specifies requirements for the design, manufacture, supply and installation of cold formed metal planks intended for use in industrial flooring and stair treads.

It is not applicable where access to machinery is required, in which case the requirements of BS EN ISO 14122 apply.

NOTE 1 Annex A gives additional recommendations for installation of planks.

NOTE 2 For the common requirements for industrial flooring and stair treads, see BS 4592-0.

In addition to the definitive requirements, this standard also requires the items detailed in BS 4592-0:2006, Clause **4** to be documented. For compliance with this standard, both the definitive requirements and the documented items have to be satisfied.

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 documents (including any amendments) applies.

BS 1449-1 (all parts), *Steel plate, sheet and strip – Part 1: Carbon and carbon-manganese plate, sheet and strip*

BS 4592-0:2006, *Industrial type flooring, walkways and stair treads – Part 0: Common requirements*

BS EN 10025 (all parts), *Hot rolled products of non-alloy structural steels*

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

BS EN 10327, *Continuously hot-dip coated strip and sheet of low carbon steels for cold forming – Technical delivery conditions*

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

BS EN 12020-1, *Aluminium and aluminium alloys – Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 – Part 1: Technical conditions for inspection and delivery*

BS EN 12020-2, *Aluminium and aluminium alloys – Extruded precision profiles in alloys EN AW-6060 and EN AW-6063 – Part 2: Tolerances on dimensions and form*

3 Terms and definitions

For the purposes of this part of BS 4592, the terms and definitions given in BS 4592-0 and the following apply.

3.1 plank
cold formed metal section produced by pressing or rolling

3.2 open plank
plank with rungs

NOTE See Figure 1a).

3.3 closed plank
plank with a continuous walking surface

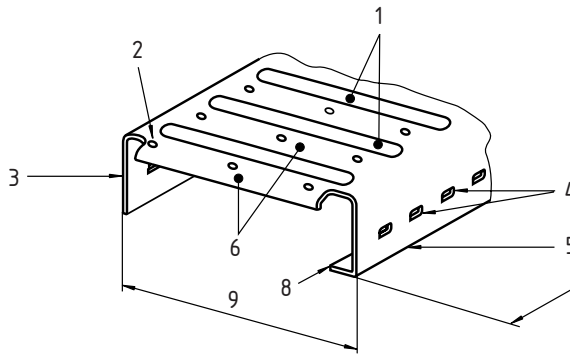
NOTE 1 Closed planks can incorporate small holes for drainage.

NOTE 2 See Figure 1b).

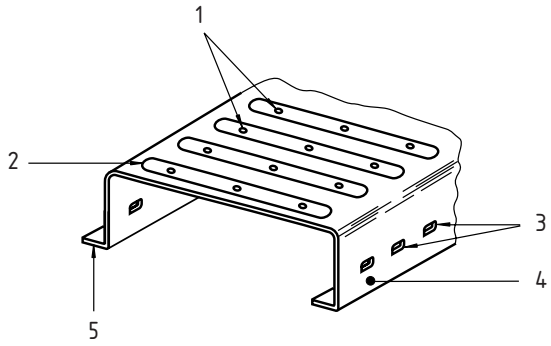
3.4 perforated plank
plank with a perforated walking surface

NOTE See Figure 1c).

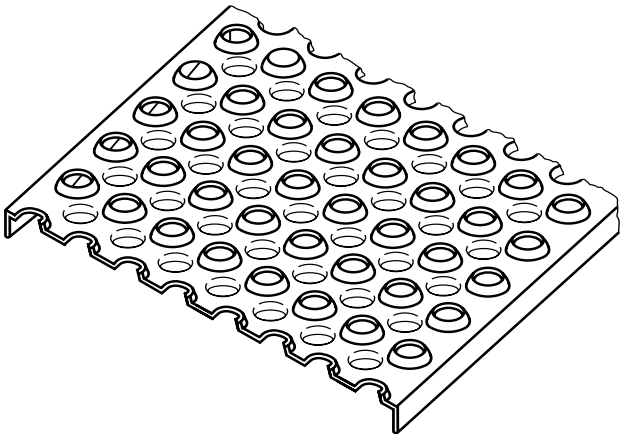
Figure 1 **Types of plank**



a) Open plank



b) Closed plank



c) Perforated plank

Key for Figure 1a)

1 Voids
2 Pimple
3 Stiffening web without lip
4 Fixing hole pattern for stitching bolts
5 Stiffening web with lip
6 Rungs
7 Normal direction of span
8 Lip
9 Width of plank

Key for Figure 1b)

1 Drainage holes
2 Corrugated surface
3 Fixing hole pattern for stitching bolts
4 Stiffening web
5 Lip

4 Information to be supplied

The following items to be agreed between the contracting parties are specified in the clauses referred to and shall be fully documented. For compliance with the standard both the definitive requirements specified throughout this part of BS 4592 and those specified in BS 4592-0:2006, Clause **4** and the following documented item shall be satisfied.

a) Requirements for protection against corrosion shall be agreed between the manufacturer and the purchaser.

5 Material requirements

5.1 Steel

Low carbon steel used for cold formed metal planks shall conform to BS EN 10025.

Stainless steel shall be austenitic and conform to BS 1449-1, excluding free machining specifications.

5.2 Aluminium

Aluminium used for cold formed metal planks shall conform to BS EN 12020-1 and BS EN 12020-2.

5.3 Protection against corrosion

Planks shall be designed so that they are free draining, e.g. on the lips of stiffening webs.

Pre-galvanized sheeting used for cold formed metal planks shall conform to BS EN 10327 or BS EN 10326.

When hot-dip galvanizing is applied, it shall conform to BS EN ISO 1461.

Requirements for protection against corrosion shall be agreed between the manufacturer and the purchaser.

NOTE 1 The requirements vary, depending on the end-use and the exposure environment. However, hot-dip galvanizing is recommended for external protection.

NOTE 2 Guidance on the required level of protection should be sought by referring to BS EN ISO 14713.

NOTE 3 Steel galvanized after fabrication generally has thicker galvanized coatings (providing longer life) than those coatings provided on pre-galvanized steel sheet.

6 Size requirements

6.1 Any raised portion of plank shall not exceed 4 mm in height.

6.2 Cold formed metal planks shall not be wider than 300 mm.

7 Tolerance requirements

The maximum permissible tolerances from work sizes of planks shall be as follows:

a) length of a cold form metal plank:

   1) up to 2 m, ± 2.5 mm;

   2) 2 m and over, ± 3.5 mm.

b) width of cold form metal plank, ± 2.5 mm;

c) depth of cold form metal plank, ± 1.5 mm;

d) difference between diagonals, 5 mm (out of squareness of plank).

8 Performance requirements

8.1 Planks used as industrial flooring

Cold formed planks used as industrial flooring shall withstand the appropriate loads specified in BS 4592-0:2006, Clause **5**.

8.2 Planks used as stair treads

Cold formed planks used as stair treads shall withstand the appropriate loads specified in BS 4592-0:2006, Clause **6**.

NOTE For imposed loads on treads, see BS 4592-0.

Annex A (informative) Recommendations for installation of planks

A.1 General

Cold form metal planks should be fixed or contained so that they cannot move on their supporting members.

Planks can be used in traditional structural platform layouts, provided that the spacing of supporting beams, or purlins, is adjusted to suit the spans of the planks.

It is preferable to stagger the planks as described in **A.2** (see also Figure A.1). The staggered layout provides maximum strength and rigidity.

However, the in-line layout described in **A.3** (see also Figure A.2) is simpler than the staggered layout and allows large composite panels to be assembled and raised into position as one unit.

A.2 Fixing

A.2.1 Staggered layout

Wherever practical, joints between planks should be placed at a distance that is approximately equal to one-quarter of the span of the plank on either side of the supporting members (see Figure A.3). However, at the extreme ends of a platform or floor, any joints should be placed three-quarters of the plank span in from the end in order to give maximum strength.

It is essential to bolt individual planks through the side flanges to adjacent planks at both ends and in the centre of each span between joints. Where joints occur along the side of a platform or floor, splicing pieces should be bolted to the inside of the perimeter flanges (see Figure A.1). Where planks cross supporting beams or purlins, they should be secured to the supporting member using a cleat [see Figure A.3a) and Figure A.3b)]. The cleat should be positioned alternately on each side of the supporting member across the structure (see Figure A.1).

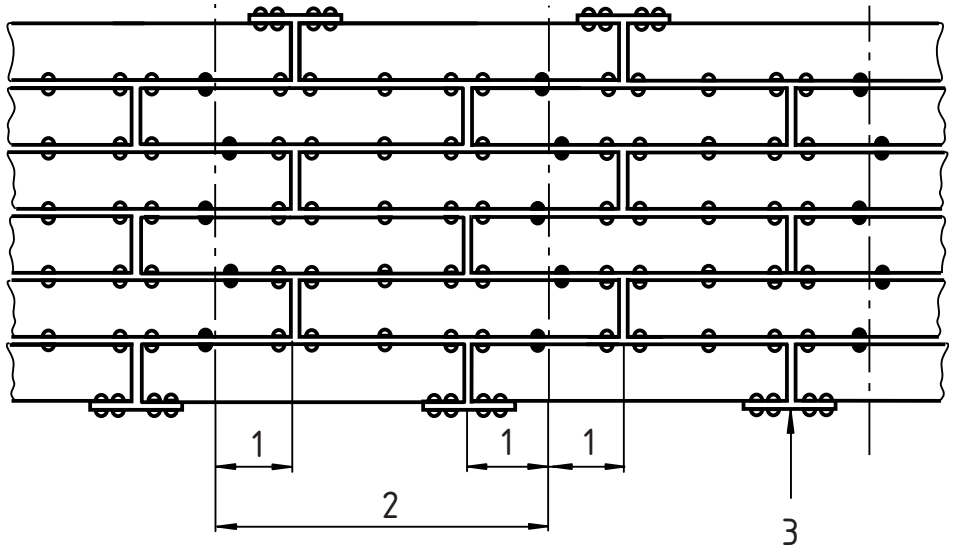
A.2.2 In-line layout

Joints should be made directly over the centre of the supporting beam or purlin, with each plank having a minimum bearing of 25 mm. Cold form metal planks should be secured together in the centre of each span and at the ends, as described in **A.2.1**. End bolts can be used to secure cleats for fixing each pair of plank ends to the supporting member [see Figure A.2 and Figure A.3a)].

A.3 Planks used as stair treads

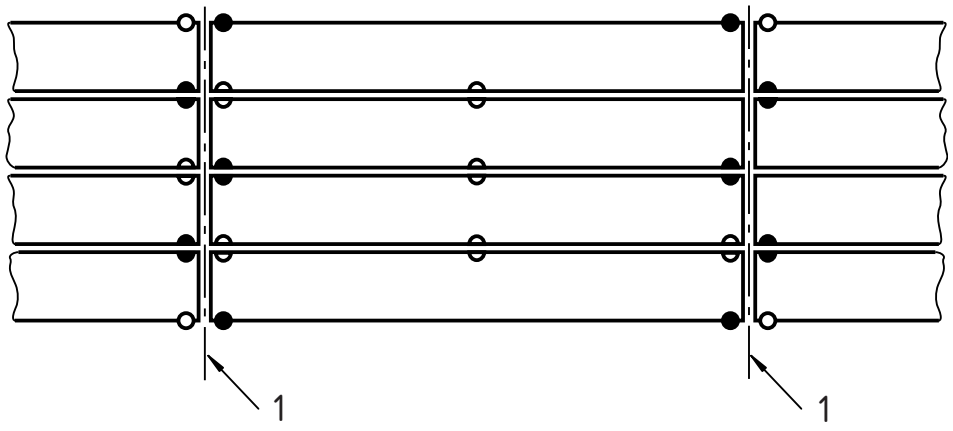
For typical details of cold form metal planks used as stair treads, see Figure A.4.

Figure A.1 **Staggered layout of planks**



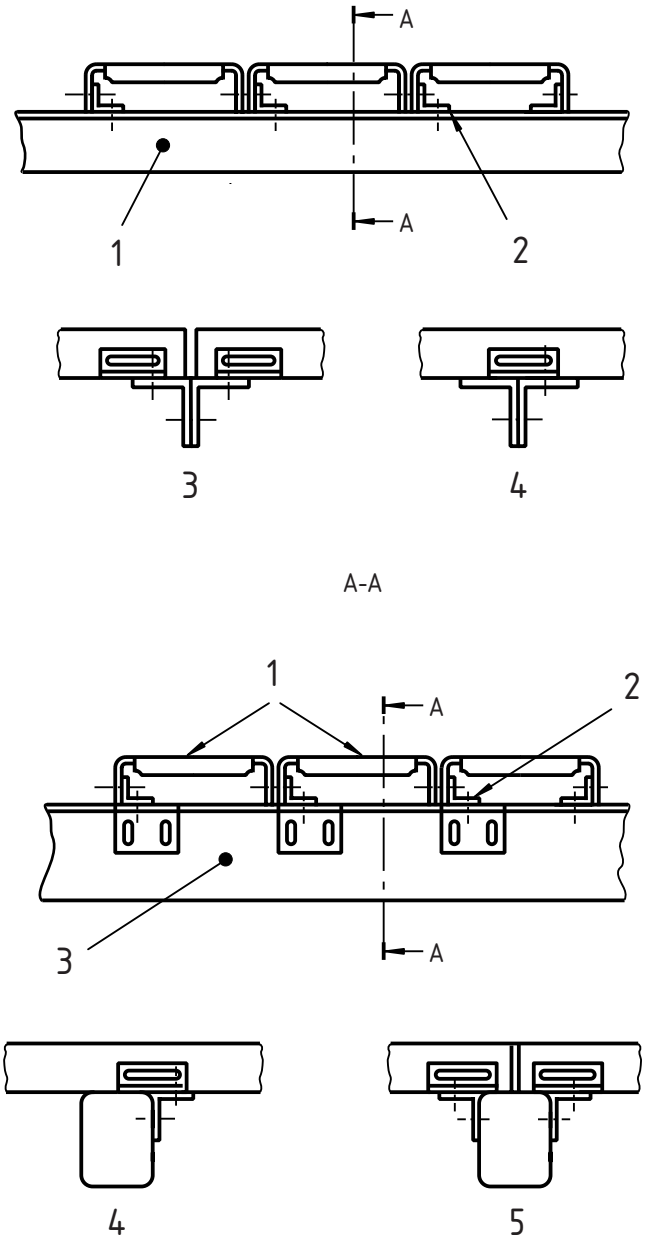
Key
1 Span
2 Plank span
3 Splice
4 Bolts and cleats
5 Bolts

Figure A.2 **In-line layout of planks**



Key
1 Centreline beam
2 Bolts
3 Cleats

Figure A.3 **Securing planks to supporting members**



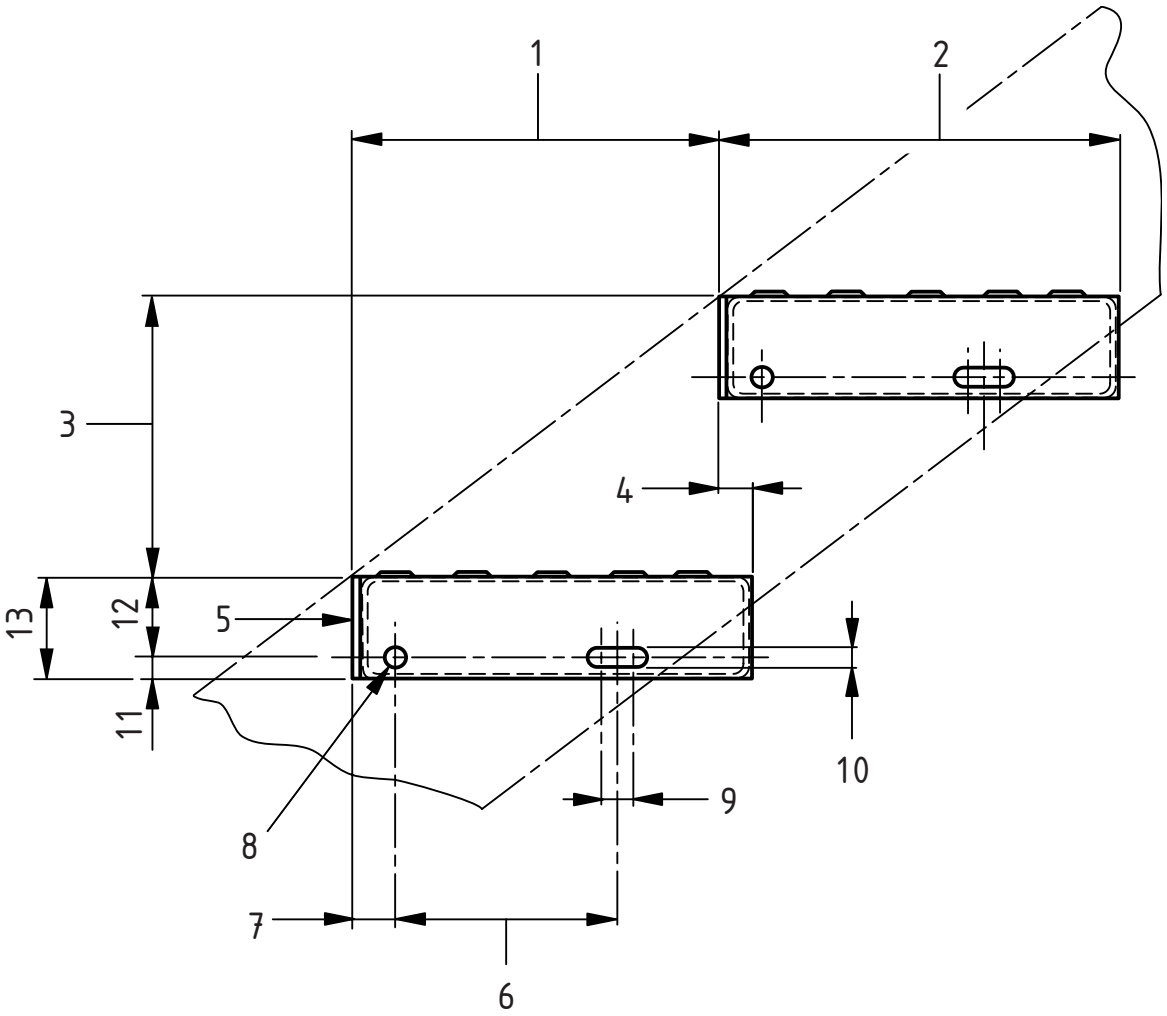
Key to Figure A.3a)

1 Beam
2 Cleat
3 In-line
4 Staggered

Key to Figure A.3b)

1 Planks
2 Cleat
3 Beam or purlin
4 Continuous planks
5 Joined planks

Figure A.4 **Drilling details for end plates to perforated metal plank stair treads**



Key

1 Going
2 Tread width
3 Rise
4 Overlap
5 Machine serrated front bar
6 Centre of bolts (see Notes 1 and 2)
7 Distance to centre of first bolt (30 mm)
8 Diameter of first bolt hole (13 mm)
9 Centre of holes in slot (20 mm)
10 13 mm wide
11 Distance from bottom of tread to centre of bolts (15 mm)
12 Distance from top of tread to centre of bolts (55 mm)
13 Overall depth of end plate (70 mm)

NOTE 1 For tread widths of 270 to 299 mm, 150 mm.

NOTE 2 For tread widths of 30 to 329 mm, 180 mm.

Bibliography

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

Standards publications

BS 5395-1, *Stairs, ladders and walkways – Part 1: Code of practice for the design, construction and maintenance of straight stairs and winders*

BS 5395-3, *Stairs, ladders and walkways – Part 3: Code of practice for the design of industrial type stairs, permanent ladders and walkways*

BS EN ISO 14122, *Safety of machinery – Permanent means of access to machinery*

BS EN ISO 14713, *Protection against corrosion of iron and steel in structures – Zinc and aluminium coatings – Guidelines*

Further reading

BS 5502, *Buildings and structures for agriculture*

BS 5950, *Structural use of steelwork in building*

BS 6100-1, *Glossary of building and civil engineering terms*

BS EN 10143, *Continuously hot-dip metal coated steel sheet and strip – Tolerances on dimensions and shape*

This page deliberately left blank

BSI – British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover.
Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001.
Fax: +44 (0)20 8996 7001. Email: orders@bsi-global.com. Standards are also available from the BSI website at http://www.bsi-global.com.

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact the Information Centre. Tel: +44 (0)20 8996 7111.
Fax: +44 (0)20 8996 7048. Email: info@bsi-global.com.

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002.
Fax: +44 (0)20 8996 7001. Email: membership@bsi-global.com.

Information regarding online access to British Standards via British Standards Online can be found at http://www.bsi-global.com/bsonline.

Further information about BSI is available on the BSI website at http://www.bsi-global.com.

Copyright

389 Chiswick High Road
London
W4 4AL