

BS 4875-5:2009



BSI British Standards

Strength and stability of furniture

Part 5: Requirements for strength,
durability and stability of tables and
trolleys for domestic use

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

raising standards worldwide™

BSI
British Standards

Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© BSI 2009

ISBN 978 0 580 64433 7

ICS 97.140

The following BSI references relate to the work on this standard:

Committee reference FW/0/2

Draft for comment 08/30189241 DC

Publication history

First published as BS 4875-5, September 1985

Second edition November 2001

Third (present) edition April 2009

Amendments issued since publication

Date	Text affected
------	---------------

Contents

Foreword *ii*

- 1 Scope 1
- 2 Normative references 1
- 3 Principle of the performance tests 1
- 4 Requirements 2
- 5 Tests 3
- 6 Test report 5

Annexes

- Annex A (informative) Test levels in relation to application 6
- Annex B (normative) Horizontal impact test 7
- Annex C (normative) Sustained load test 9
- Annex D (normative) Additional drop tests 10

Bibliography 12

List of figures

- Figure B.1 – Horizontal impact device 8
- Figure D.1 – Drop test for tables or trolleys weighing up to and including 20 kg 10
- Figure D.2 – Drop test for tables or trolleys weighing more than 20 kg and for stacking tables – Drop height relative to mass 11

List of tables

- Table 1 – Purpose of tests 2
- Table 2 – Tests 4
- Table A.1 – Relationship of test levels to use of furniture 6

Summary of pages

This document comprises a front cover, an inside front cover, pages i to ii, pages 1 to 12, an inside back cover and a back cover.

Foreword

Publishing information

This part of BS 4875 is published by BSI and came into effect on 30 April 2009. It was prepared by Subcommittee FW/0/2, *Domestic and contract furniture*, under the authority of Technical Committee FW/0, *Furniture*. A list of organizations represented on these committees can be obtained on request to their secretary.

Supersession

Together with BS EN 15372:2008, this part of BS 4875 supersedes BS 4875-5:2001, which is withdrawn.

Information about this document

This new edition of BS 4875-5 incorporates changes made necessary by the publication of BS EN 15372. It does not represent a full review or revision of the standard, which will be undertaken in due course. BS EN 15372 specifies strength, stability and durability requirements for non-domestic tables. Therefore, this new edition of BS 4875-5 has been prepared to cover domestic tables and trolleys only.

The performance requirements are verified by tests that reproduce normal use and common types of misuse to which tables and trolleys can be subjected. The tests are designed to be applied to an article that is fully assembled and ready for use. Five test levels are given corresponding to the variations in severity of end-use to be expected for various types of tables and trolleys, e.g. delicate styles, short-life furniture, robust serviceable styles. While the tests reproduce normal use and common types of misuse, they do not reproduce any abuse to which the article may be subjected.

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.

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 4875 specifies performance requirements for the strength, durability and stability of the structure of tables and trolleys for domestic use. It does not apply to non-domestic tables, tables intended for educational institutions or office desks. It also does not apply to kitchen furniture, which is covered by BS EN 14749:2005.

NOTE 1 The requirements of this standard are intended to demonstrate the ability of the item to give satisfactory service in its intended environment. Conformity to the standard does not ensure that structural failure will not eventually occur as a result of habitual misuse or after an excessively long period of service.

NOTE 2 Test methods from BS EN 1730 are specified where appropriate.

NOTE 3 The specified tests can be carried out on glass topped tables or trolleys, but the tests do not guard against accidental damage and attention is drawn to the additional requirements for tables and trolleys containing glass which are contained in BS 7376.

NOTE 4 If a table or trolley incorporates storage facilities, reference should also be made to BS 4875-7 and BS EN 14749.

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 EN 1730:2000, *Domestic furniture – Tables – Test methods for determination of strength, durability and stability*

3 Principle of the performance tests

3.1 General

Conformity to the requirements given in Clause 4 for the strength, durability and stability of the structure of an article of furniture is verified by applying loads or forces simulating normal functional use, as well as acceptable misuse, according to a graded scale of severity (see Annex A).

The purpose of the tests is summarized in Table 1. A summary of the tests is given in Table 2.

The test sequence as a whole determines the following:

- a) static strength and initial damage;
- b) fatigue strength and damage propagation;
- c) ability to withstand acceptable misuse, and demonstration of sufficient residual strength.

The severity of loading is graded by varying the number of applications or the magnitude of the forces applied.

Table 1 Purpose of tests

Name of test	Primary purpose	Secondary purpose	Type of test
Stability: horizontal impact vertical force	Basic strength	Damage initiation	Functional (normal use)
Vertical static			
Horizontal static			
Horizontal fatigue Vertical fatigue Sustained load	Service durability	Damage propagation	
Vertical impact Drop	Handling/Impact strength	Residual strength	Acceptable misuse

3.2 Stability tests

Stability tests assess the ability of the table or trolley to withstand forces that tend to cause it to overturn.

3.3 Static load tests

Static load tests assess the static strength of the table or trolley, under the high levels of loading that occur only occasionally.

3.4 Fatigue tests

Fatigue tests assess the strength of the component parts of the table or trolley under the repeated operations, movement, or loads which will occur during daily use.

3.5 Impact tests

Impact tests assess the impact strength of the table or trolley under the rapid rates of loading that occur only occasionally.

4 Requirements

Each table or trolley shall be subjected to each of the tests specified in Table 2, at the same test level and in the sequence specified in Table 2. At the end of the tests, none of the following shall have occurred:

- a) in the stability tests (BS EN 1730:2000, 6.7, and Annex B of this standard), overturning of the table or trolley;
- b) any fracture of any member, joint or component;
- c) any loosening, shown to be permanent by hand pressure applied to relevant members, of joints intended to be rigid;
- d) any free movement in the top, legs or components of the table or trolley greater than that noted in the initial inspection;
- e) any deformation of any part that will adversely affect the function or appearance of the table or trolley;
- f) any clearly audible noise developed during testing;

- g) any permanent deformation of the legs greater than 1/14 of the table (or trolley) height;
- h) in the sustained load test (Annex C), no deflection exceeding 1/250 of the span for particle board, 1/150 of the span for wood, or 1/100 of the span for other materials. In the case of composite structures, the requirement relating to the material for which the largest maximum deflection is specified shall be met (e.g. for particle board supported by steel, the deflection shall not exceed span/100);
- i) in the horizontal static load test (BS EN 1730:2000, 6.2), total horizontal movement of the top of the table or trolley, when the load is applied first at one side and then at the opposite side, of more than 2 mm for every 25 N of horizontal force applied.

5 Tests

5.1 General

The table or trolley shall be tested in accordance with BS EN 1730:2000 and with Annex B, Annex C and Annex D of this standard, as specified in Table 2. All tests shall be carried out at the same test level (see Table 2), and in the sequence given in Table 2.

The term "table" in the test procedures given in BS EN 1730:2000 also includes trolleys.

The test results are only valid for the table or trolley tested. When the test results are intended to cover other similar articles, the test specimen should be truly representative of the production model.

5.2 Tolerances

Unless otherwise specified, the tolerances used in all the tests shall be as follows.

- Forces shall have an accuracy of $\pm 5\%$ of the nominal force.
- Masses shall have an accuracy of $\pm 0.5\%$ of the nominal mass.
- Dimensions shall have an accuracy of ± 1 mm of the nominal dimension.

NOTE Some of the tests may be carried out by means of loads or forces. For the practical purposes of this standard, a force of 10 N may be regarded as equal to the downward force due to a mass of 1 kg.

5.3 Moisture content and conditioning

Before testing, parts made of timber products shall be checked with an electric moisture meter to determine whether the moisture content is between 8% and 12%. If the moisture content is outside this range the table or trolley shall be placed in a suitable environment until the moisture content is between 8% and 12%.

5.4 Inspection before and after testing

Immediately before testing, each table or trolley shall be thoroughly inspected. Any defects in the members, joints or attachments shall be noted, so that they are not attributed to the effect of the tests.

A complete dimensional check shall be carried out on all articles likely to suffer permanent deformation as a result of testing.

Immediately after completion of the tests, the table or trolley shall again be thoroughly inspected. Any apparent defects and any changes that have taken place since the initial inspection shall be recorded.

Table 2 Tests

Test ^{A)}	Test description	Loading	Test level				
			1	2	3	4	5
BS EN 1730, 6.7	Stability under vertical load	Test force, N					
		V_1	300	300	300	300	300
		V_2	600	600	600	600	600
Annex B ^{B)}	Stability – horizontal impact	Drop height, mm:	–	30	35	35	40
		Total mass of impactor, kg:	–	40	45	45	50
BS EN 1730, 6.2	Horizontal static load	Test force, N: Number of cycles: 10	175	300	450	600	750
BS EN 1730, 6.3	Vertical static load	Test force, N					
		a) main working surface:	500	750	1 000	1 250	1 500
		b) ancillary working surface:	125	250	350	500	650
		Number of cycles: 10					
BS EN 1730, 6.4	Horizontal fatigue	Number of cycles: Test force: 150 N	5 000	10 000	15 000	30 000	60 000
BS EN 1730, 6.5	Vertical fatigue for cantilever or pedestal tables	Number of cycles: Test force: 300 N	5 000	10 000	15 000	30 000	60 000
Annex C ^{B)}	Sustained load	Test load, kg/m ² :	100	100	150	200	250
BS EN 1730, 6.6	Vertical impact	Drop height, mm: Number of cycles: 10	–	140	180	240	300
Annex D ^{B)}	Drop test for single tables weighing up to and including 20 kg	Nominal drop height, mm:	100	150	200	300	600
BS EN 1730, 6.8 [Annex D ^{B)}]	Drop test for single tables weighing more than 20 kg	Determined by Figure D.2 (using nominal drop height) Number of cycles: 10					
BS EN 1730, 6.8 [Annex D ^{B)}]	Drop test for stacking tables	Determined by Figure D.2 (using nominal drop height) Number of cycles: 10					

^{A)} Subclause number of BS EN 1730:2000, unless otherwise stated.

^{B)} Annex of this standard, BS 4875-5:2009.

6 Test report

The test report shall include the following:

- a) the number and date of the British Standard, i.e. BS 4875-5:2009;
- b) details of the table or trolley tested;
- c) the test level at which the table or trolley has been tested;
- d) details of any defects observed before the tests;
- e) details of any defects observed after the tests;
- f) the test result;
- g) details of any deviation from the test procedures.

Annex A (informative) Test levels in relation to application

Table A.1 shows the type of use that might be expected from furniture in relation to the five test levels.

Table A.1 **Relationship of test levels to use of furniture**

Test level	Performance category	Example of use
1	Delicate	Fine tables of delicate appearance
2	Light	Domestic bedroom
3	General	Domestic living/dining room
4	Heavy	Tables where rough treatment and careless handling occur
5	Severe	Tables intended for exceptionally severe use

Annex B (normative) Horizontal impact test**B.1 Apparatus**

B.1.1 Horizontal impact device (see Figure B.1), consisting of a basketball inflated to a pressure of (73.5 ± 5) kPa and attached by a network of elastic cords to a mounting ring. The ball mounting shall consist of a ring of timber (or timber derivative), as detailed in Figure B.1a, having an outside diameter of (150 ± 5) mm and an inside diameter of (90 ± 5) mm. The rear face of this ring shall be attached to the main body of the impact device and its front face shall be shaped to fit the ball.

The impact device shall consist of a mass supported by cords or flexible wire (850 ± 50) mm long so that the longitudinal axis of the impactor remains horizontal when the support cords are displaced from the vertical. The impact device shall be of such a mass that the total mass of all moving parts, excluding the support cords, shall be as specified in Table 2 for the appropriate test level.

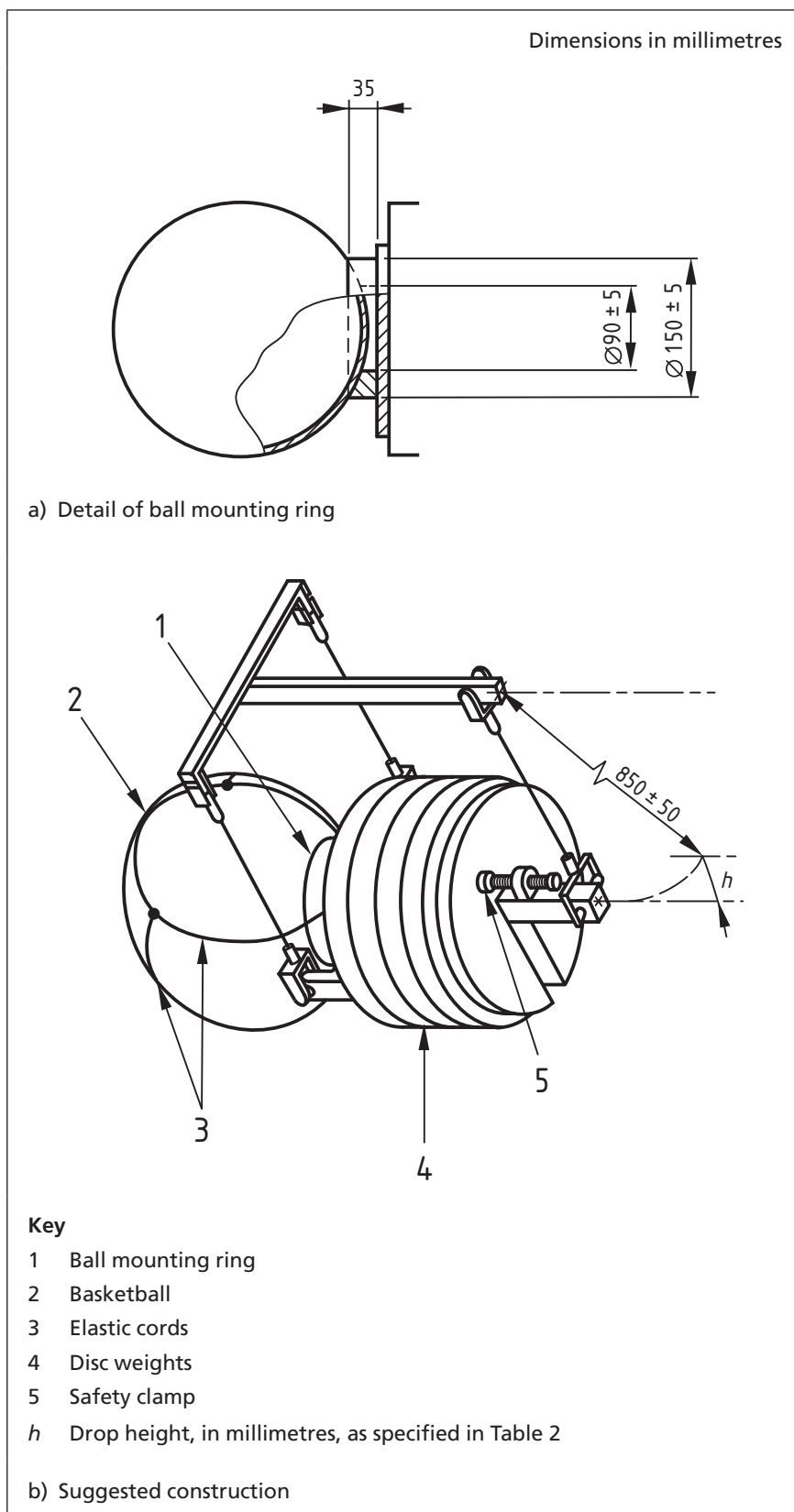
B.1.2 Floor, as specified in BS EN 1730:2000, 5.4.

B.1.3 Stops, as specified in BS EN 1730:2000, 5.5.

B.2 Procedure

Place the table or trolley on the floor (**B.1.2**) with the stops (**B.1.3**) positioned against the bottom of the legs furthest from the position of the impact. Drop the horizontal impact device (**B.1.1**) from the height specified in Table 2 for the appropriate test level, so that it strikes the edge of the table or trolley at the position likely to have the most adverse effect, for example the top edge. The maximum height of the point of impact from the floor shall be 1.6 m.

Figure B.1 Horizontal impact device



Annex C (normative) Sustained load test

C.1 If the deflection of the main working surface of the table or trolley measured in the vertical static load test (BS EN 1730:2000, 6.3) exceeds 1/250 of the span for particle board, 1/150 of the span for timber products or 1/100 of the span for other materials, carry out the sustained load test specified in C.2.

C.2 Position the table or trolley on the floor (B.1.2) and load the top evenly with the appropriate load specified in Table 2. Leave the table or trolley loaded for 7 days and then measure the maximum deflection of the top.

Annex D (normative) Additional drop tests

D.1 Drop test on to one leg for tables or trolleys weighing up to and including 20 kg

Support the table or trolley so that one leg is just in contact with the floor (B.1.2), whilst the line joining that leg to the leg diagonally opposite is inclined at $10^\circ \pm 2^\circ$ to the horizontal and the line joining the remaining feet is horizontal (see Figure D.1). In the case of three-legged tables, support the table so that the line joining two legs is horizontal and the line from the third leg to the mid-point of the line joining the other two legs is inclined upwards at $10^\circ \pm 2^\circ$ to the horizontal.

Lift up the table to the appropriate nominal drop height specified in Table 2 (with a tolerance of ± 1.0 mm), as indicated in Figure D.1. Drop the table or trolley on to the floor, 10 times on one leg and then 10 times on the leg diagonally opposite for four-legged tables or trolleys, and on to either of the other legs for three-legged tables.

D.2 Drop test for tables or trolleys weighing more than 20 kg

Carry out the test described in BS EN 1730:2000, 6.8, using the drop height calculated in accordance with Figure D.2 from the appropriate nominal drop height specified in Table 2.

D.3 Drop test for stacking tables

Stacking tables shall be dropped in a stack of six tables as specified in D.2.

Figure D.1 Drop test for tables or trolleys weighing up to and including 20 kg

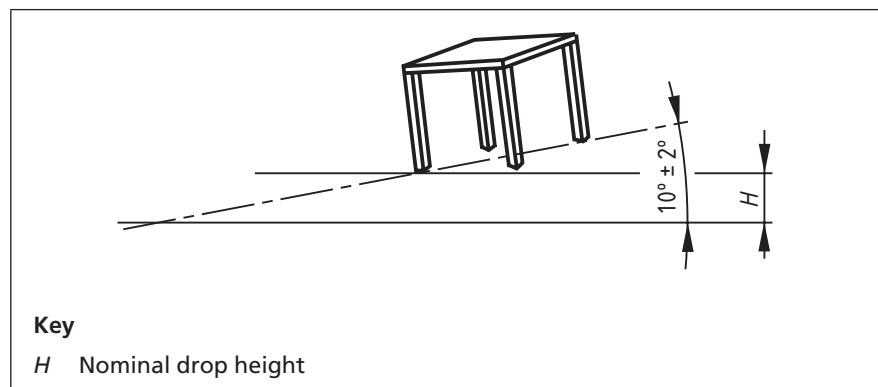
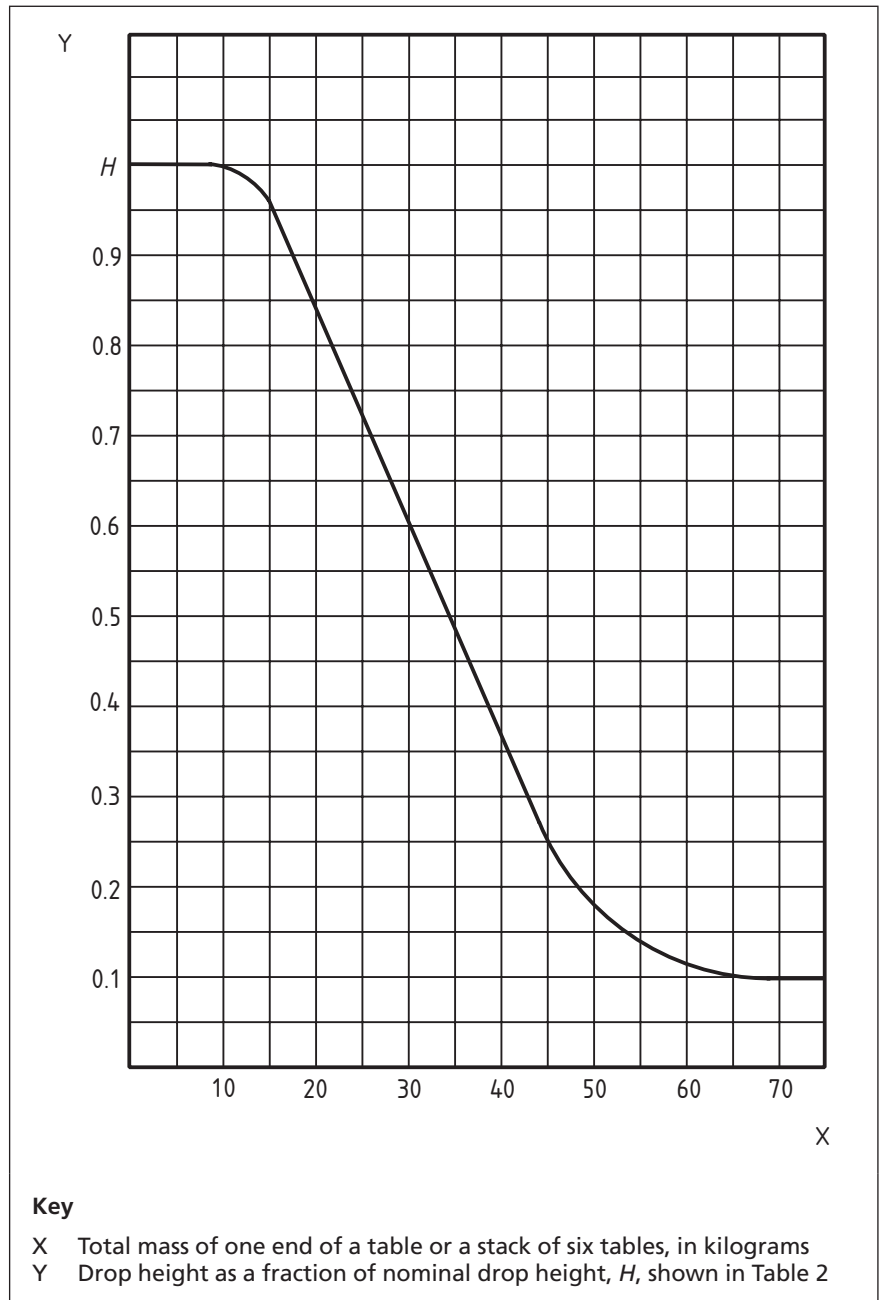


Figure D.2 Drop test for tables or trolleys weighing more than 20 kg and for stacking tables – Drop height relative to mass



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 4875-7:2006, *Strength and stability of furniture – Part 7: Domestic and contract storage furniture – Performance requirements*

BS 7376:2009, *Inclusion of glass in the construction of tables and trolleys for domestic use – Specification*

BS EN 14749:2005, *Domestic and kitchen storage units and worktops – Safety requirements and test methods*

BS EN 15372:2008, *Furniture – Strength, durability and safety – Requirements for non-domestic tables*

British Standards Institution (BSI)

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 BSI Customer Services.

Tel: +44 (0)20 8996 9001 Fax: +44 (0)20 8996 7001
Email: orders@bsigroup.com

You may also buy directly using a debit/credit card from the BSI Shop on the website www.bsigroup.com/shop

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.

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@bsigroup.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@bsigroup.com

Information regarding online access to British Standards via British Standards Online can be found at www.bsigroup.com/BSOL

Further information about BSI is available on the BSI website at www.bsigroup.com

Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained. Details and advice can be obtained from the Copyright & Licensing Manager.

Tel: +44 (0)20 8996 7070 Email: copyright@bsigroup.com

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Tel +44 (0)20 8996 9001

Fax +44 (0)20 8996 7001

www.bsigroup.com/standards

raising standards worldwide™

