BS EN 12430:2013

BSI Standards Publication

Thermal insulating products for building applications — Determination of behaviour under point load

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 12430:2013. It supersedes BS EN 12430:1998 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/540, Energy performance of materials components and buildings.

A list of organizations represented on this committee can be obtained on request to its secretary.

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

Published by BSI Standards Limited 2013

ISBN 978 0 580 78052 3

ICS 91.100.60

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

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2013.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12430

March 2013

ICS 91.100.60

Supersedes EN 12430:1998

English Version

Thermal insulating products for building applications - Determination of behaviour under point load

Produits isolants thermiques destinés aux applications du bâtiment - Détermination du comportement sous charge ponctuelle

Wärmedämmstoffe für das Bauwesen - Bestimmung des Verhaltens unter Punktlast

This European Standard was approved by CEN on 15 December 2012.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword **3**
1 Scope **5**
2 Normative references **5**
3 Terms and definitions **5**
4 Principle **5**
5 Apparatus **5**
6 Test specimens **7**
7 Procedure **8**
8 Calculation and expression of results **9**
9 Accuracy of measurement **10**
10 Test report **10**
Annex A (normative) **Modifications to the general test method for cellular glass products** **11**

Foreword

This document (EN 12430:2013) has been prepared by Technical Committee CEN/TC 88 “Thermal insulating materials and products”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2013, and conflicting national standards shall be withdrawn at the latest by September 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12430:1998.

The revision of this standard contains no major changes, only minor corrections and clarifications of an editorial nature.

This European Standard is one of a series of standards which specify test methods for determining dimensions and properties of thermal insulating materials and products. It supports a series of product standards for thermal insulating materials and products which derive from the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products (Directive 89/106/EEC) through the consideration of the essential requirements.

This European Standard has been drafted for applications in buildings but it may also be used in other areas where it is relevant.

This European test standard is one of the following group of interrelated standards on test methods for determining dimensions and properties of thermal insulation materials and products, all of which fall within the scope of CEN/TC 88:

— EN 822, *Thermal insulating products for building applications — Determination of length and width*

— EN 823, *Thermal insulating products for building applications — Determination of thickness*

— EN 824, *Thermal insulating products for building applications — Determination of squareness*

— EN 825, *Thermal insulating products for building applications — Determination of flatness*

— EN 826, *Thermal insulating products for building applications — Determination of compression behaviour*

— EN 1602, *Thermal insulating products for building applications — Determination of the apparent density*

— EN 1603, *Thermal insulating products for building applications — Determination of dimensional stability under constant normal laboratory conditions (23 °C/50 % relative humidity)*

— EN 1604, *Thermal insulating products for building applications — Determination of dimensional stability under specified temperature and humidity conditions*

— EN 1605, *Thermal insulating products for building applications — Determination of deformation under specified compressive load and temperature conditions*

— EN 1606, *Thermal insulating products for building applications — Determination of compressive creep*

— EN 1607, *Thermal insulating products for building applications — Determination of tensile strength perpendicular to faces*

— EN 1608, *Thermal insulating products for building applications — Determination of tensile strength parallel to faces*

— EN 1609, *Thermal insulating products for building applications — Determination of short-term water absorption by partial immersion*

— EN 12085, *Thermal insulating products for building applications — Determination of linear dimensions of test specimens*

— EN 12086, *Thermal insulating products for building applications — Determination of water vapour transmission properties*

— EN 12087, *Thermal insulating products for building applications — Determination of long-term water absorption by immersion*

— EN 12088, *Thermal insulating products for building applications — Determination of long-term water absorption by diffusion*

— EN 12089, *Thermal insulating products for building applications — Determination of bending behaviour*

— EN 12090, *Thermal insulating products for building applications — Determination of shear behaviour*

— EN 12091, *Thermal insulating products for building applications — Determination of freeze-thaw resistance*

— EN 12429, *Thermal insulating products for building applications — Conditioning to moisture equilibrium under specified temperature and humidity conditions*

— EN 12430, *Thermal insulating products for building applications — Determination of behaviour under point load*

— EN 12431, *Thermal insulating products for building applications — Determination of thickness for floating floor insulating products*

— EN 13793, *Thermal insulating products for building applications — Determination of behaviour under cyclic loading*

— EN 13820, *Thermal insulating materials for building applications — Determination of organic content*

According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies equipment and procedures for determining the behaviour of products under a force applied to a small area of a test specimen at a given speed. It is applicable to thermal insulating products.

This European Standard can be used to determine whether the products have sufficient strength to withstand forces applied directly to them either during installation or during application, mainly caused by pedestrian traffic.

NOTE The test methods given in the main body of the standard and in Annex A are reported and interpreted in different ways. The similarities that exist between the methods are not sufficient to permit reasonable comparisons to be made.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12085, *Thermal insulating products for building applications — Determination of linear dimensions of test specimens*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
point load
compressive force applied to a test specimen by a circular indentor with a circular cross section of 50 cm^2 (diameter 79,8 mm)

3.2
critical point
point on the force-deformation curve, where a straight line, forming a tangent to the curve, separates from the curve

Note 1 to entry: See Figure 4a).

4 Principle

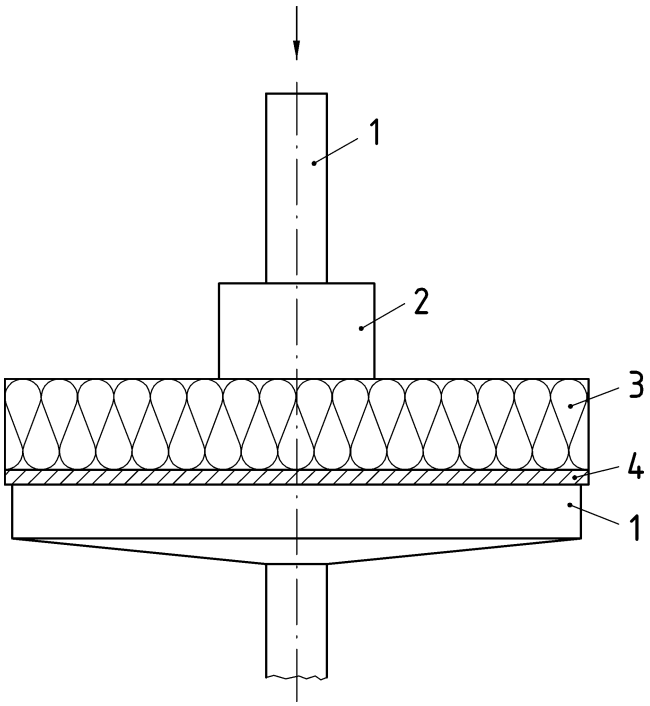
A point load is applied with an indentor at a given speed in an axial direction perpendicular to the major faces of a squarely cut square test specimen and the compressive force at the critical point and/or the force for a given deformation is calculated.

5 Apparatus

5.1 Compression testing machine, appropriate to the range of force and displacement involved and having one rigid, polished, fixed or vertically movable square or circular plane plate of which the length of one side (or the diameter) is at least as large as the length (or the diagonal length) of the test specimen (see Figure 1).

5.2 Cylindrical indentor, steel, having a diameter of (79,8 $\pm$ 0,1) mm, connected to a vertically movable or fixed support.

If appropriate, the indentor shall be connected to the compression machine through a centrally positioned ball joint to ensure that only axial force is applied to the relevant area of the test specimen. The indentor or the supporting plate shall be capable of moving at a constant speed in accordance with 7.2 (see Figures 2 and 3).

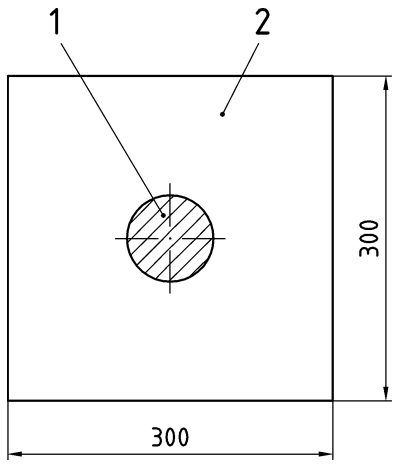


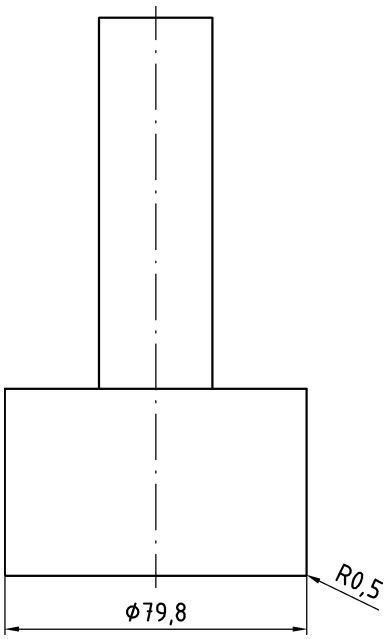
Key

1 connection to the testing machine
2 indentor
3 test specimen
4 supporting plate

Figure 1 — Test setup

Dimensions in millimetres





Key

1 cylindrical indentor
2 test specimen

Figure 2 — Test specimen

Figure 3 — Cylindrical indentor

5.3 Displacement- measuring device, capable of continuous measurement of the displacement of the indenter or the movable plate, permitting a reading to ± 5 % or ± 0,1 mm, whichever is the smaller (see 5.1.1).

5.4 Force-measuring sensor, fitted to the machine plate or the indenter, to measure the force produced by the reaction of the test specimen upon the plate and the indenter.

This sensor shall be such that its own deformation during the course of the measuring operation is negligible compared with that being measured or if not, it shall be taken into account by calculation. In addition, it shall allow the continuous measurement of the force permitting reading to $\pm$ 1 %.

5.5 Recording device, for the simultaneous recording of the force F and the displacement X which provides a curve of F as a function of X (see 7.2).

6 Test specimens

6.1 Dimensions of test specimens

Test specimens shall be at the original product thickness. Any skins, facings, and/or coatings shall be retained. The test specimens shall be squarely cut and square with sides having dimensions of 300 mm $\times$ 300 mm.

Other dimensions may be specified in the relevant product standard or any other European Technical Specification or may be agreed between parties.

The linear dimensions shall be determined in accordance with EN 12085, to the nearest millimetre.

The tolerance on parallelism and flatness between the two major faces of the test specimens shall not be greater than 0,5 % of the test specimen side with a maximum of 0,5 mm.

6.2 Number of test specimens

The number of test specimens shall be as specified in the relevant product standard. If the number is not specified, then at least three test specimens shall be used.

In the absence of a product standard or any other European Technical Specification the number of test specimens may be agreed between parties.

6.3 Preparation of test specimens

Test specimens shall be cut so that the specimen base is normal to the direction of compression of the product in its application. The test specimens shall be cut and prepared by methods that do not change the original structure of the product. Moulded skins that do not remain with the product in use shall be removed.

Rectangular test specimens with parallel major faces shall be cut from the product so that the test specimen base is normal to the direction of the force which is experienced in its application.

6.4 Conditioning of test specimens

The test specimens shall be stored for at least 6 h at (23 ± 5) °C. In case of dispute they shall be stored at (23 ± 2) °C and (50 ± 5) % relative humidity for the time specified in the relevant product standard.

7 Procedure

7.1 Test conditions

The test shall be carried out at (23 ± 5) °C. In case of dispute it shall be carried out at (23 ± 2) °C and (50 ± 5) % relative humidity.

7.2 Test procedure

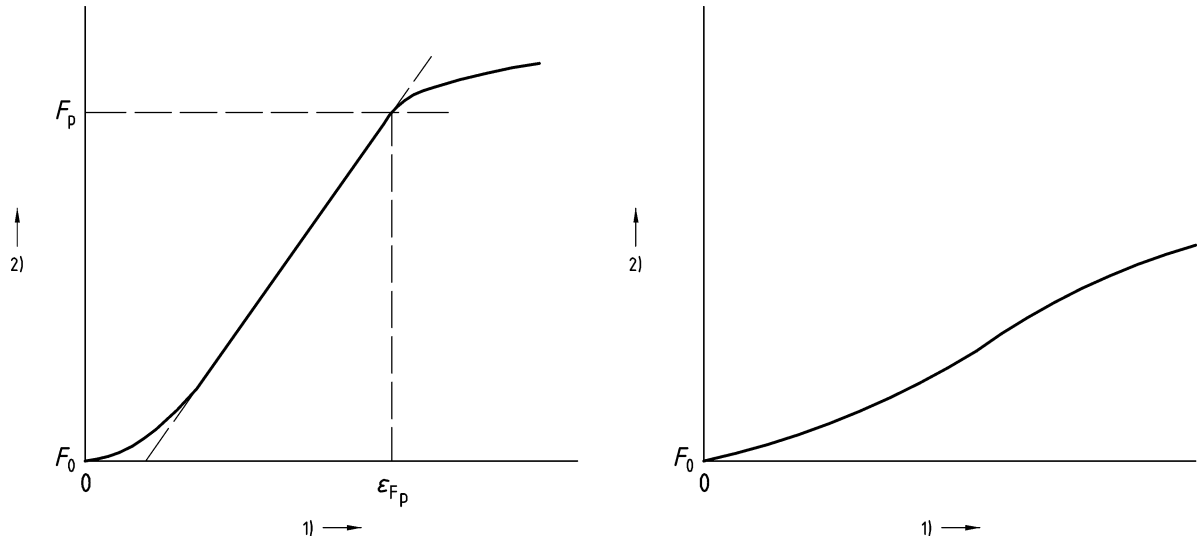
Measure the linear dimensions to the nearest millimetre in accordance with EN 12085.

Place the test specimen in the compression testing machine on the fixed plate so that the indentor is centrally located above the test specimen (see Figure 1).

Preload with a force of (2,5 ± 0,25) N corresponding to a pressure of (500 ± 50) Pa.

Compress the area of the test specimen under the indentor with the indentor set to move at a constant speed of (50 ± 5) mm/min and record the force-deformation curve.

The test shall be stopped when the critical point can be determined (see Figure 4a)) and/or when the deformation reaches 20 % (see Figure 4b)).



Key

F_p compressive force at the critical point

F_o force corresponding to the preload

ε_{Fp} deformation at F_p

Figure 4 — Examples of force-deformation curves

8 Calculation and expression of results

8.1 General

The result is the mean value of the measurements which shall be expressed to two significant figures.

Results should not be extrapolated to other thicknesses.

The results for any given thickness shall be expressed as described in 8.2 to 8.4

8.2 Compressive force/deformation at the critical point

F_p is the compressive force at the critical point for the test specimen, in kilonewtons.

ε_{F_p} is the deformation at the critical point, in millimetres.

In the case of force-deformation curves without a yield point as shown in Figure 4b), the calculation of the F_p is not relevant.

8.3 Point load at a given deformation

If required, record the point load at a deformation of 5 mm, in kilonewtons.

If required, the point load may be recorded for other deformations too.

8.4 Force — deformation curve

When the force-deformation curve is without a yield point (see Figure 4b)) the force-deformation curve shall be given for all test specimens and the maximum force-deformation (expressed in absolute or relative

deformation) as specified in the relevant product standard or any other European Technical Specification or by agreement between parties.

9 Accuracy of measurement

Following the experience of a "round robin test" where comparable test equipment and test specimen preparation were used, the accuracy can be estimated as given below:

Table 1 — Estimated accuracy

Strength/stress	Load to get a deformation of 2 % or 5 %	Point load strength, σ_p
95 % repeatability limit: 95 % reproducibility limit	Approximately 5 % Approximately 15 %	Approximately 8 % Approximately 25 %

The above mentioned terms are applied as described in ISO 5725-2.

10 Test report

The test report shall include the following information:

a) reference to this European Standard;

b) product identification:

   1) product name, factory, manufacturer or supplier;

   2) production code number;

   3) type of product;

   4) packaging;

   5) the form in which the product arrived at the laboratory;

   6) other information as appropriate, e.g. nominal thickness, nominal density;

c) test procedure:

   1) pre-test history and sampling (e.g. who sampled and place of sampling);

   2) conditioning;

   3) deviation from Clauses 6 and 7, if any;

   4) date of testing;

   5) general information relating to the test, e.g. position of facing (or coating) if any in relation to the tested face;

   6) events which may have affected the results. Information about the apparatus and identity of the technician should be available in the laboratory but it need not be recorded in the report;

d) results.

All individual values and the mean value for F_p and/or point load for a given deformation and/or force-deformation curve.

Annex A
(normative)

Modifications to the general test method for cellular glass products

A.1 General

For cellular glass products the test method described in the standard shall be modified in accordance with the following clauses.

A.2 Apparatus

A positioning device mounted on the plane plate allowing the precise positioning of the test specimen relative to the compression testing machine.

The same part of the slab should always be tested to permit reproducibility and comparability of the results (see Figures A.1 and A.2).

A.3 Test specimen

Test specimens shall be full-size products or quarter sections cut to take into account the positions shown in Figures A.1 and A.2.

A.4 Procedure

Position the test specimen under the circular indentor of the compression testing machine using the positioning device. Make sure that the area to be tested is selected in accordance with the requirements of Figures A.1 and A.2.

Figures A.1 and A.2 show the four indentors positions in the case of products having lengths of 600 mm and 500 mm, respectively. For other dimensions, see the relevant product standard.

Apply a preload of (100 $\pm$ 10) N and read the deformation caused by the indentor or adjust the deformation reading to zero.

Increase the force on the indentor to (1 000 $\pm$ 10) N using a displacement speed of 2 mm/min with a tolerance of 25 %.

Turn the test specimen over and repeat the test on the other major face.

Dimensions in millimetres

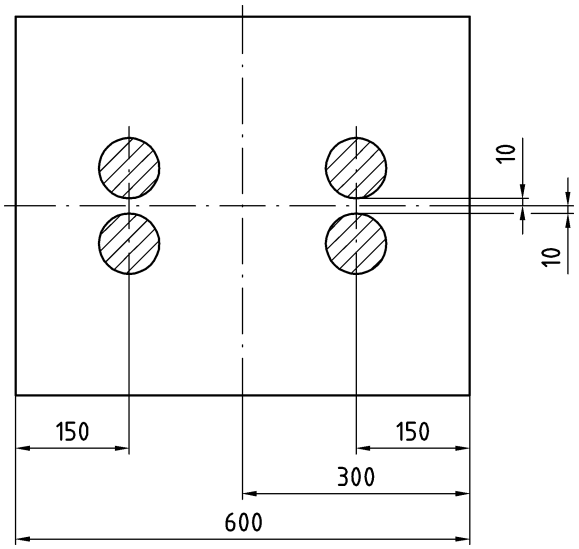


Figure A.1 — Indenter positions in the case of products having lengths of 600 mm

Dimensions in millimetres

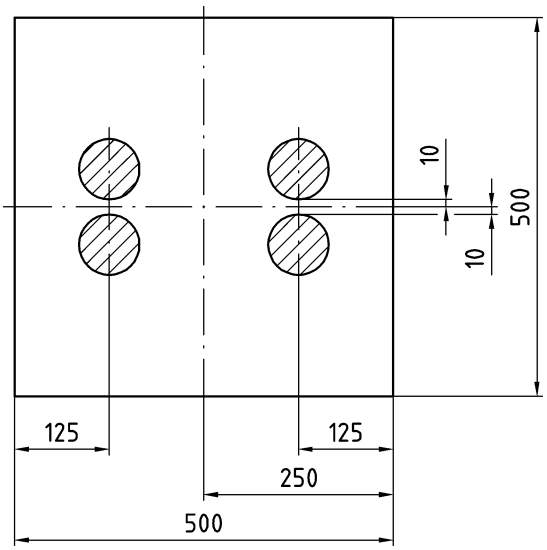


Figure A.2 — Indenter positions in the case of products having lengths of 500 mm

A.5 Calculation and expression of results

Calculate the deformation, P_d, of the test specimen as the net displacement of the indentor under the forces 100 N and 1 000 N.

For each test specimen, the results of the four individual measurements on each major face are determined and the average of the four individual measurements is calculated for each major face.

The deformation, P_d, of the test specimen at the thickness, d, measured in accordance with 7.2, is the largest of the two average values determined for the two faces, in millimetres.

The test result is the average value obtained from three test specimens.

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™