BS EN 16664:2015

BSI Standards Publication

Playing field equipment — Lightweight goals — Functional, safety requirements and test methods

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 16664:2015.

The UK participation in its preparation was entrusted to Technical Committee SW/136/22, Sports, Playground and other Recreational Equipment - Gymnasium and Playing Field Equipment.

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.

ISBN 978 0 580 83722 7

ICS 97.220.30; 97.220.40

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 31 July 2015.

Amendments issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16664

July 2015

ICS 97.220.30; 97.220.40

English Version

Playing field equipment - Lightweight goals - Functional, safety requirements and test methods

Équipements de jeux - Buts légers - Exigences fonctionnelles, exigences de sécurité et méthodes d'essai

Spielfeldgeräte - Leichtgewicht-Tore - Funktionale, sicherheitstechnische Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 27 May 2015.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

European foreword

This document (EN 16664:2015) has been prepared by Technical Committee CEN/TC 136 “Sports, playground and other recreational facilities and equipment”, 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of an identical text or by endorsement, at the latest by January 2016, and conflicting national standards shall be withdrawn at the latest by January 2016.

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.

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 the functional and safety requirements and test methods for lightweight goals, which are classified in Clause 4.

This standard is not applicable to goals:

a) according to EN 748 (football);

b) EN 749 (handball);

c) EN 750 (hockey);

d) EN 1270 (basketball);

e) EN 15312 (free access multi-sports);

f) EN 13451-4 (water polo);

g) prEN 16579 (portable and fixed goals);

h) inflatable goals;

i) goals which are classified as toys under the responsibility of technical committees CEN/TC 52 "Safety of toys";

j) goals which are intended to move in use (e.g. rink hockey and roller hockey).

It is applicable to playing field goals used for training or recreational play, indoor and outdoor including educational and public establishments and recreational areas.

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 913:2008, *Gymnastic equipment - General safety requirements and test methods*

prEN 16579, *Playing field equipment - Portable and fixed goals - Functional, safety requirements and test methods*

EN ISO 1806, *Fishing nets - Determination of mesh breaking force of netting (ISO 1806)*

EN ISO 13938-1, *Textiles - Bursting properties of fabrics - Part 1: Hydraulic method for determination of bursting strength and bursting distension (ISO 13938-1)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 16579 and the following apply.

3.1
lightweight goal
mobile, conveniently portable goal, generally smaller and lighter versions, made stable by measures such as ballast or any other attachment fixture or by the design

3.2
lightweight goal frame
crossbar and uprights or similar design not necessarily rectangular, which form the lightweight goal mouth/opening and fitted, a ball catch net if fitted

Note 1 to entry: The goal frame can incorporate a net supporting system.

3.3
net fixings
attachments on the lightweight goal frame to which the net may be fixed

3.4
anchoring/ballast system
system intended to prevent the lightweight goal from tipping over or being blown away by wind load during normal use

Note 1 to entry: The anchoring/ballast system can be incorporated in the design or may be fixed separately.

3.5
intended use
purpose for which the lightweight goal has been designed by the manufacturer to be used in line with this standard

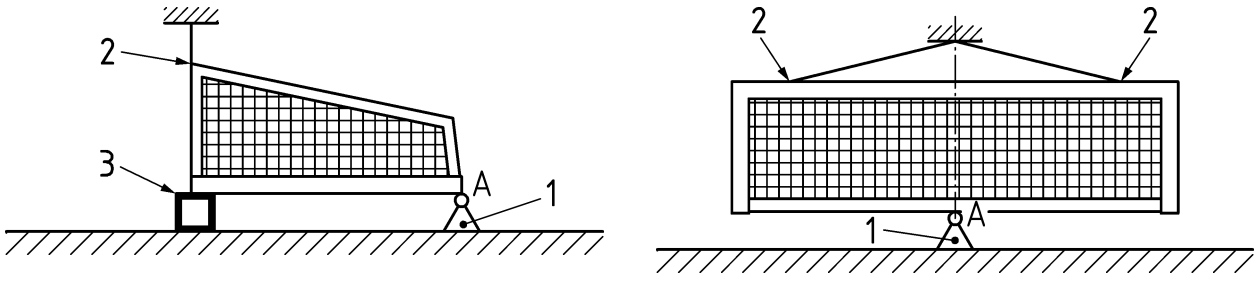
4 Classification

In order to be classified as a lightweight goal it shall meet the following criteria:

a) the total mass including the net, excluding any separate anchoring/ballast system, shall not exceed 10 kg;

b) when laid with the lightweight goal mouth/opening face to the ground (as shown in Figure 1) the total force exerted at point A shall not exceed 50 N. The lightweight goal is either supported or suspended in such a way that the maximum force exerted by the crossbar at the highest point is measured when the lightweight goal mouth/opening is horizontal to the ground.

NOTE The highest point is determined when the lightweight goal is assembled for normal use.



a) Side view **b) Front view**

Key

A measuring point

1 force measuring device capable of measuring with a precision equal to or better than ± 1 N

2 suspension system

3 supporting block (alternative)

Figure 1 — Example for measuring

5 Material

The selection of materials and their use shall be in accordance with the appropriate European Standards.

Further information for the selection of material is given in Annex C.

The materials should be selected so that potential hazards through direct contact with the skin can be avoided.

6 Requirements

6.1 Strength

The lightweight goal shall be tested in accordance with 7.1 and the lightweight goal frame shall not come apart break or collapse to create sharp, pointed fragments that no longer conform to 6.6.

6.2 Anchorage

Lightweight goals with a total mass exceeding 2 kg shall have at least one anchorage point/ballast system. The ballast shall be at least twice the weight of the lightweight goal.

6.3 Entrapment

Lightweight goals shall be designed and constructed so that, when assembled ready for use there shall be no crushing or shearing hazards between moving parts and/or fixed parts or risk of entrapment of finger, head and neck when assessed in accordance with the procedure given in EN 913:2008, Annex A with the additional requirements according to Annex A of this standard.

6.4 Net fixings

When tested according to 7.2 no visible fracture and/or permanent deformation shall occur at the net fixings and the net fixing shall not dislodge.

Any opening in the net fixing outside the profile of the lightweight goal frame shall not result in entrapment when tested in accordance with 6.3.

Metal cup hooks and metal spring cup hooks shall not be used as a means of fixing the net to the lightweight goal frame.

The spacing between net fixings shall not allow a ball for which the lightweight goal is intended to be used to pass and shall not create any entrapment when tested in accordance with 6.3.

6.5 Net

Net yarn shall have a minimum diameter of 2 mm to reduce the risk of cutting.

Net dimensions shall comply with the requirements of lightweight goal frame dimensions and the associated lightweight goal frame net supports, for which it is intended to be used.

The mesh size shall not allow a ball for which the lightweight goal is intended to be used to pass through nor create any head and neck entrapment when tested in accordance with 6.3.

The net shall meet at least the requirement for mesh breaking strength of Table 1.

Table 1 — Mesh breaking strength

Mesh type	Minimum value	Test method
open mesh	400 N	EN ISO 1806
close mesh	300 kPa	EN ISO 13938-1

6.6 Finish of equipment

The requirements of EN 913:2008, 5.1 shall be met, when assessed by visual inspection and measurement.

7 Test methods

7.1 Impact test

7.1.1 Test principle

The lightweight goal frame assembled as ready for use, with the net in place, is struck at a velocity of (1 ± 0,05) m/s by a soft body suspended from a pendulum, simulating an adult player running into the lightweight goal.

To simulate the worst case scenario, the lightweight goal is restrained by blocks placed on the ground behind the frame on the opposite side to the point of impact so that it cannot slide or tip over when impacted.

The lightweight goal is struck with a series of three single impacts, if the design permits (e.g. for products like given in Figure B.6 the side impact test cannot be carried out):

— First impact, horizontally from the side, impacting the top of the lightweight goal frame (see Figure 4);

— Second impact, horizontally from the front, impacting the centre of the crossbar or the highest point of the lightweight goal frame (see Figure 3);

— Third impact, perpendicular to the lightweight goal, impacting the top of the crossbar or the highest point of the lightweight goal frame (see Figure 5).

Following each impact the lightweight goal is examined for evidence of breakage or collapse and any such damage recorded.

Before conducting the next impact in the series, the restraints securing the lightweight goal should be checked and adjusted as necessary to resist impact from a different direction. If any parts of the lightweight goal have become loose or dislodged, but are otherwise undamaged, these should be re-fixed between impacts.

The test report shall record and fully describe any partial or total collapse of the lightweight goal; and/or any evidence of breakage of any component of the lightweight goal.

7.1.2 Test set up

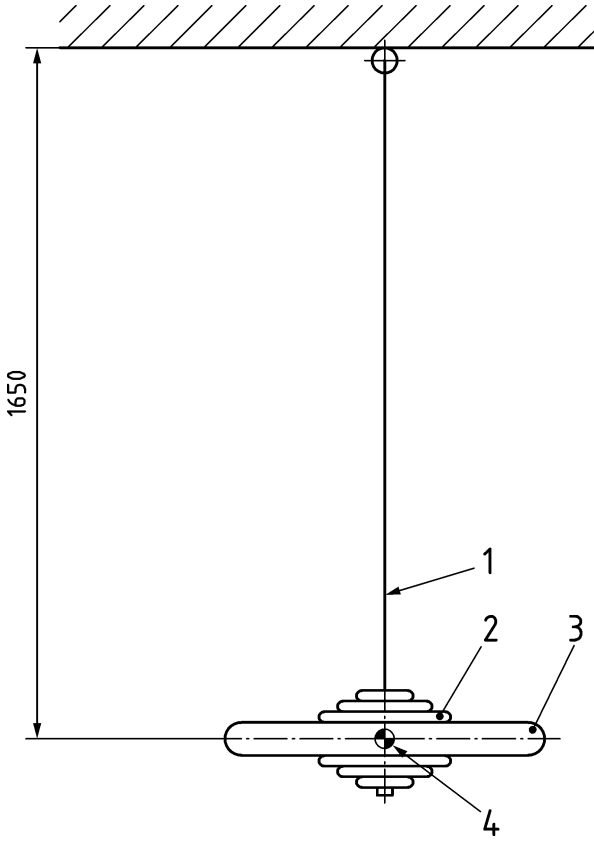
The soft body impactor (see Figure 2) comprises a pneumatic rubber trailer tyre or equivalent, size ca. 508 mm (20 inches), 203 mm (8 inches) wide, mounted on a ca. 254 mm (10 inches) rim, inflated to a pressure of (200 ± 10) kPa [(2,0 ± 0,1) bars], suspended on a rigid pendulum such that the distance from the point of suspension to the centre of the edge of the tyre is (1 650 ± 100) mm.

The total mass of the impactor is adjusted to be (75 ± 0,1) kg by the use of supplementary weights, evenly positioned on either side of the tyre such that the centre of gravity of the total mass of the impactor (include pendulum device) lies on the centre-plane of the tyre.

The pendulum is raised to the angle necessary to create an impact velocity of (1,0 ± 0,05) m/s.

NOTE From the formula: $V = \sqrt{2gL(1-\cos\theta)}$, by releasing the pendulum whose length (*L*) is 1,65 m from an angle of 14,3º to the vertical, the Velocity (*V*) at the point of impact is 1,0 m/s .

Dimensions in millimetres



Key

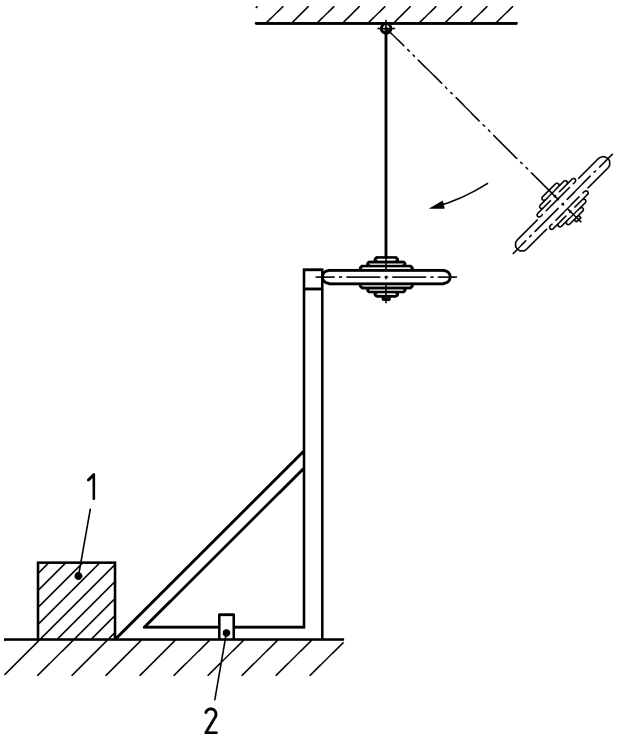
1 impactor freely suspended trough a rigid connecting device

2 supplementary weights to total 75 kg

3 pneumatic tyre

4 centre of gravity of impactor

Figure 2 — Soft body impactor

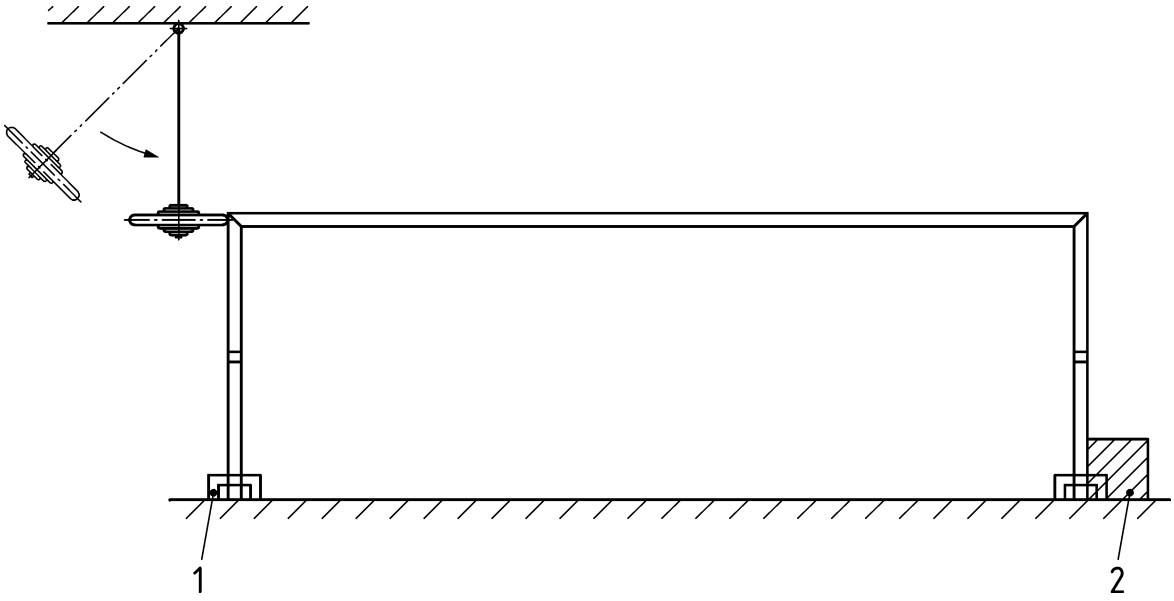


Key

1 additional restraint

2 any anchoring/ballast system normally supplied

Figure 3— Front impact test at centre of crossbar

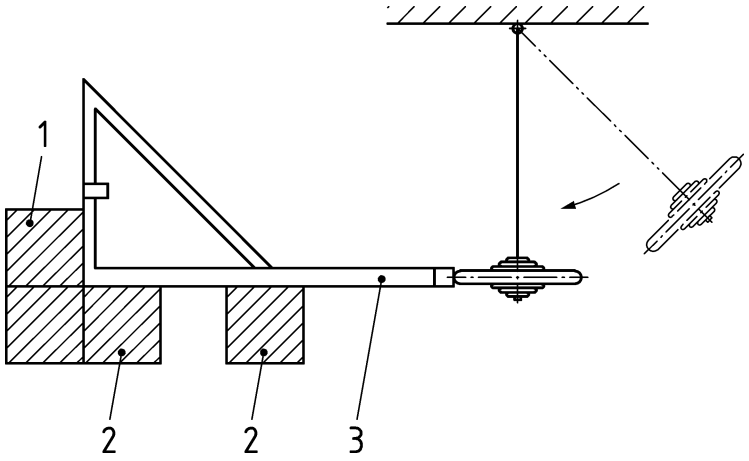


Key

1 any anchoring/ballast system normally supplied

2 additional restraint to prevent movement

Figure 4 — Side impact test



Key

1 additional restraint

2 blocks to raise lightweight goal above ground level

3 lightweight goal supported horizontally

Figure 5 — Top impact at centre of crossbar

7.2 Determination of strength of net fixings

Take a rigid circular disc (400 ± 10) mm in diameter, with rounded edges, with a mass of ≤ 5 kg and with a metal ring at its centre.

Place the disc against the inside face of the net at the point of loading with the ring through the net (see Figure 6). The disc shall be located at the centre of the net.

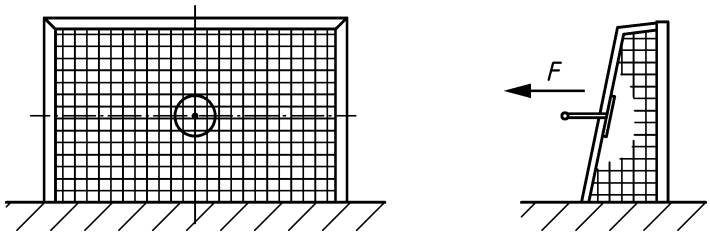


Figure 6 — Determination of the strength of the net fixings

The base shall be fixed to the ground to prevent the lightweight goal from sliding or tilting during the test.

Apply a horizontal force of (400 ± 50) N to the disc at the centre of the lightweight goal.

Apply the force for 10^{+1}_{-0} s. Remove the force and check for any visible crack and/or permanent deformation and that the net fixings have not dislodged.

7.3 Test report

Test reports shall include at least the following:

— date, name of tester;

— the reference to this European Standard, i.e. EN 16664;

— details of the test conditions (e.g. temperature);

— details of the equipment tested (e.g. classification, type if any);

— details of the condition of the equipment included any defects observed before the tests;

— details of any change in the condition of the equipment observed after the tests;

— test result.

8 Assembly, Installation and Maintenance instruction

With the lightweight goals the manufacturer shall provide written instructions for assembly, installation, transportation, storage and maintenance in the appropriate language(s) of the country in which the lightweight goal is to be installed and used.

For lightweight goals above 2 kg, the information supplied shall include detailed instructions for use of the anchoring/ballast system (e. g. appropriate counterweights).

The instructions shall describe the anchoring/ballast system (if any) supplied with the lightweight goals including a list of all components required. Maintenance information should provide instruction on how a lightweight goal should be inspected in accordance with applicable European Standard, including the removal of the lightweight goal(s) from use until any damaged parts have been replaced or repaired.

The manufacturer/supplier shall supply copies of test reports (self or third party) to purchasers upon request.

9 Marking

9.1 Warning label

Lightweight goals shall have fixed to them a durable warning label displaying the following information in the official language(s) of the country in which the equipment is to be installed and used:

a) This lightweight goal is intended to be used for …;

b) Secure and fully tighten all fittings and fastenings before use (where applicable);

c) Ensure that this lightweight goal is secured at all times by means of the appropriate anchoring/ballast system (e.g. counterweights) (where applicable);

d) Do not affix additions/appendages to parts of the lightweight goal frame that could affect the essential safety of the lightweight goal;

e) Do not climb, hang or swing on the net or lightweight goal framework.

NOTE An appropriate graphical symbol may be used in conjunction. Guidance on suitable safety signs is given in ISO 3864-1 and ISO 3864-3.

9.2 Product identification

Lightweight goals shall be durably marked with the following information:

a) the number and date of this European Standard;

b) the name or trademark of the manufacturer, retailer or importer and the year of manufacturing of the frame;

c) the nominal size of the lightweight goal frame.

NOTE Marking European Standard EN 16664 on or in relation to a product represents the 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 therefore solely the responsibility of the person making the claim. It is advised not to confuse such a declaration with third party certification of conformity, which may also be desirable.

Annex A
(normative)

Test methods for head and neck entrapment

A.1 General

Unless stated otherwise, tolerances of the probes in this annex are as follows:

a) ± 1 mm for dimensions; and

b) ± 1 ° for angles.

In situations of doubt when using the probes relating to the tolerance an accurate measurement should be made to ensure the opening is in accordance with the nominal dimension of the probe.

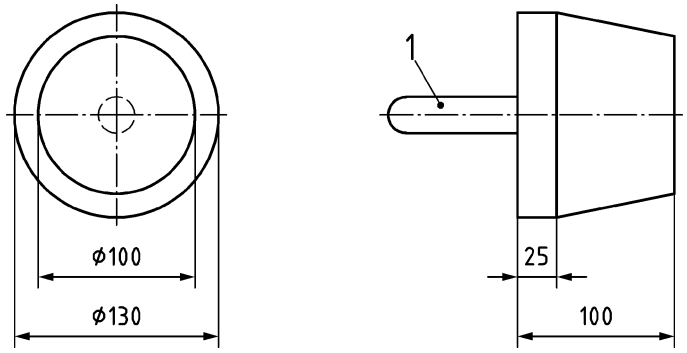
All tests shall be performed in the most onerous way.

A.2 Completely bound openings

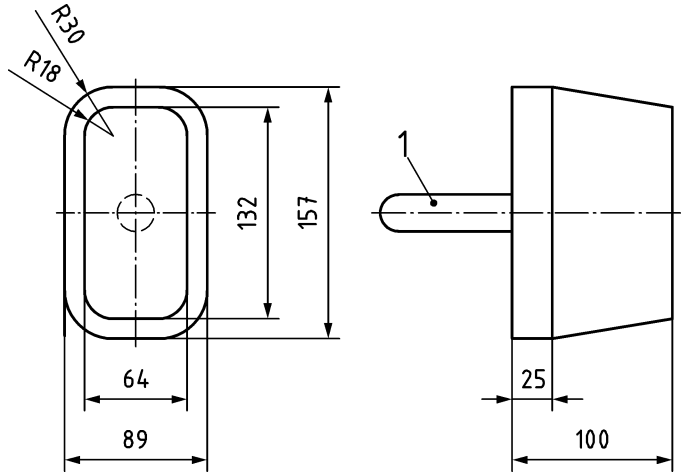
A.2.1 Apparatus

Three probes, as illustrated in Figure A.1:

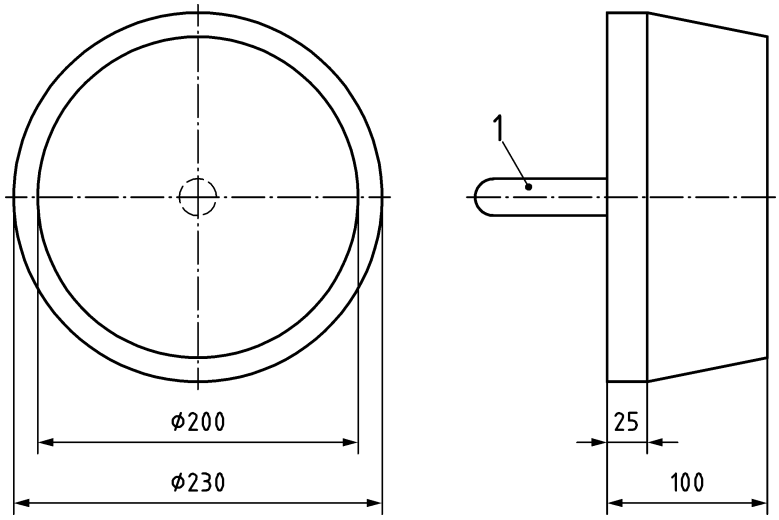
Dimensions in millimetres



a) Probe E (small head)



b) Probe C (torso)



c) Probe D (large head)

Key

1 handle

Figure A.1 — Probes for determination of head and neck entrapment in completely bound openings

A.2.2 Procedure

Apply successively the probes as illustrated in Figure A.1 to each relevant opening. Record and report the passage of any probe through the opening. If any of the probes are not freely passing through the opening apply a force of (222 ± 5) N to the probe. When the torso probe is used, it is safer to force the body through the opening first because if the body passes through then the head will also pass through. Apply the probe with the axis perpendicular to the plane of the opening.

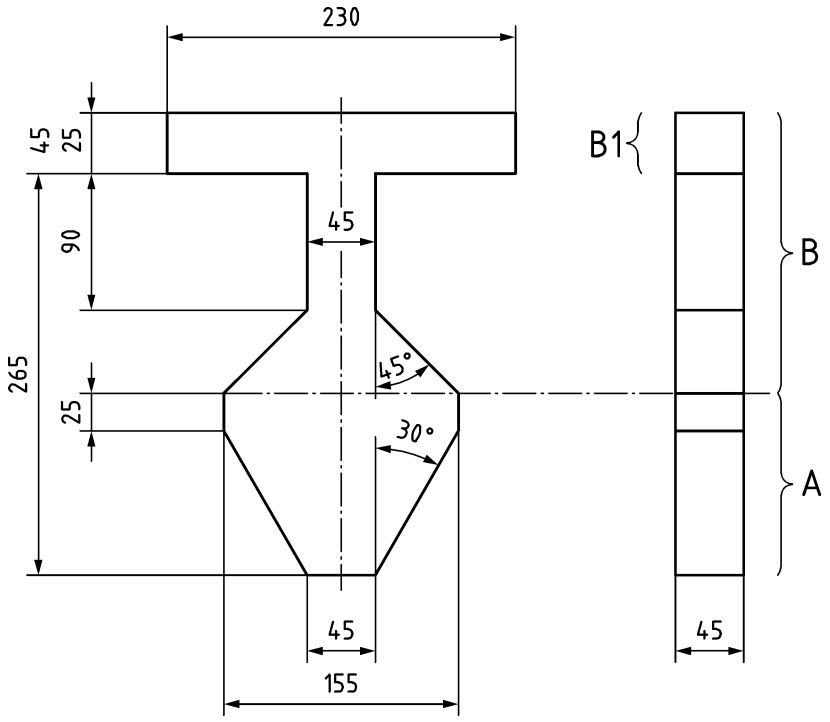
NOTE The head probe dimensions are based on those for an older child and, therefore, there will be a large tolerance if assessing equipment for use by a young child.

A.3 Partially bound and V-shaped openings

A.3.1 Apparatus

Test template, as illustrated in Figure A.2.

Dimensions in millimetres



Key

A "A" portion of probe

B "B" portion of probe

B1 shoulder section

Figure A.2 — Test template for assessment of head and neck entrapment in partially bound and V-shaped openings

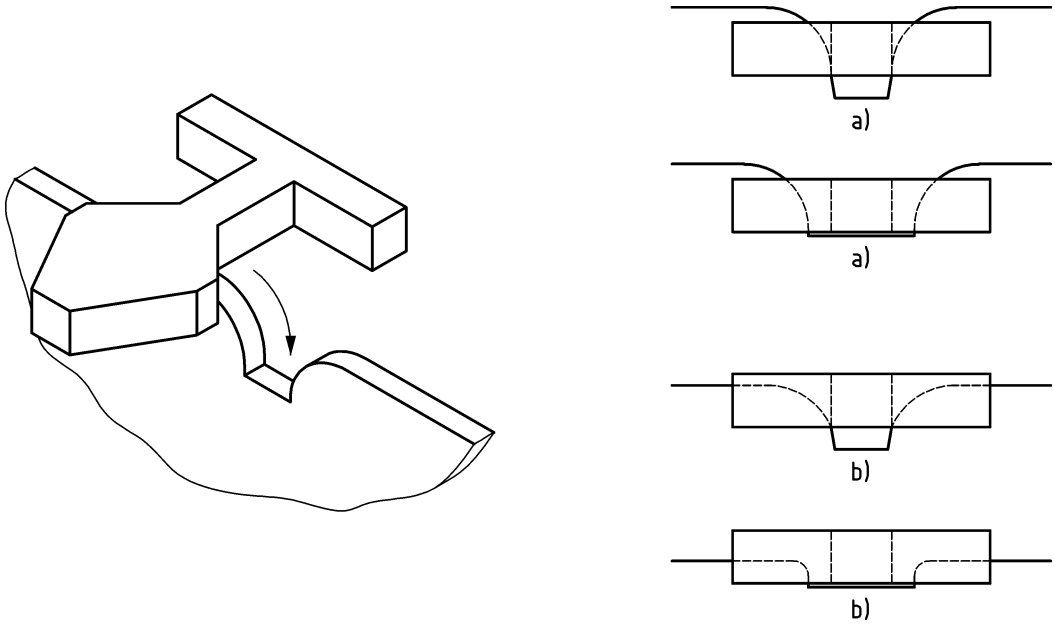
A.3.2 Procedure

Position the ‘B’ portion of the test template between and perpendicular to the boundaries of the opening, as shown in Figure A.3. Record and report whether the template fits within the boundaries of the opening or if it cannot be inserted to its full thickness.

If the test template can be inserted to a depth greater than the thickness of the template (45 mm), apply the ‘A’ portion of the test template, so that its centre line is orientated to check the extremities of the opening as well as the centreline.

Ensure that the plane of the test template is parallel and applied in line with the opening, as shown in Figure A.4 a).

Insert the test template along the opening until its motion is arrested by contact with the boundaries of the opening. Record and report the results including the angle of the template centreline relative to the vertical and horizontal axes (see Figure A.4) as this will determine the pass/fail requirements given in 6.3. See Figures A.5 and A.6 for examples of the assessment for the different angular ranges.

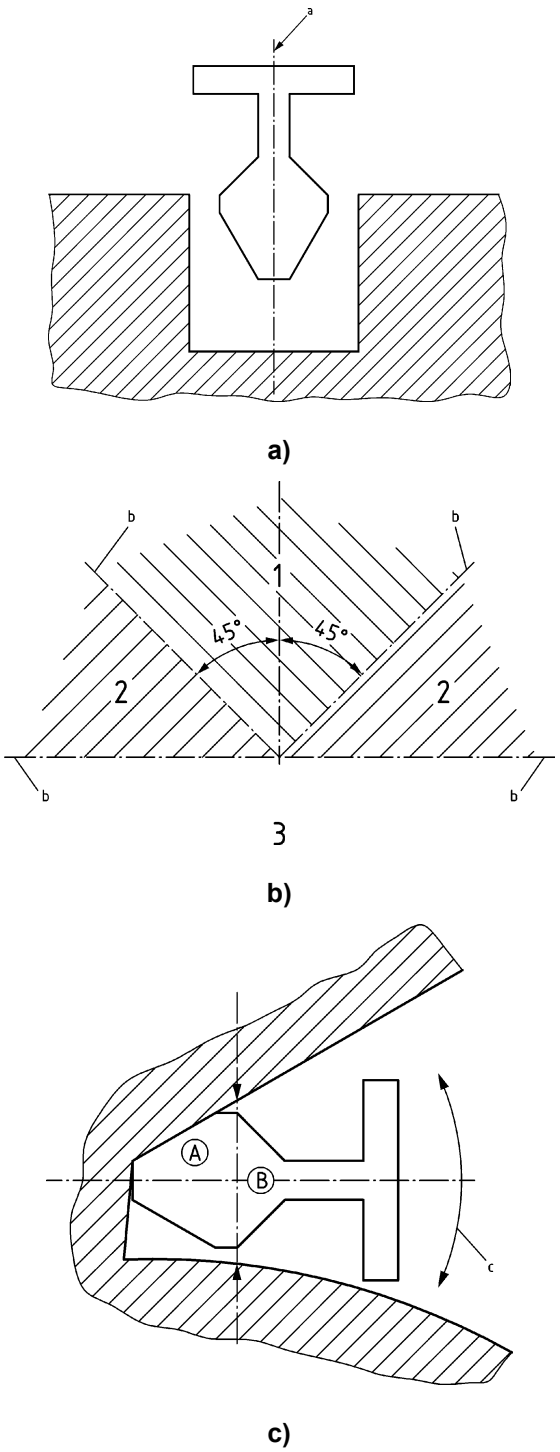


Key

a) accessible

b) not accessible

Figure A.3 — Methods of insertion of the "B" portion of the test template



Key

1 range 1

2 range 2

3 range 3

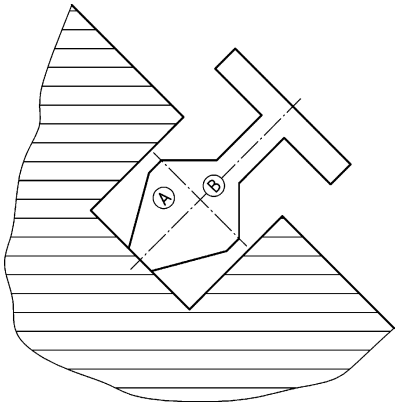
a insertion angle for assessing the range

b template centre line

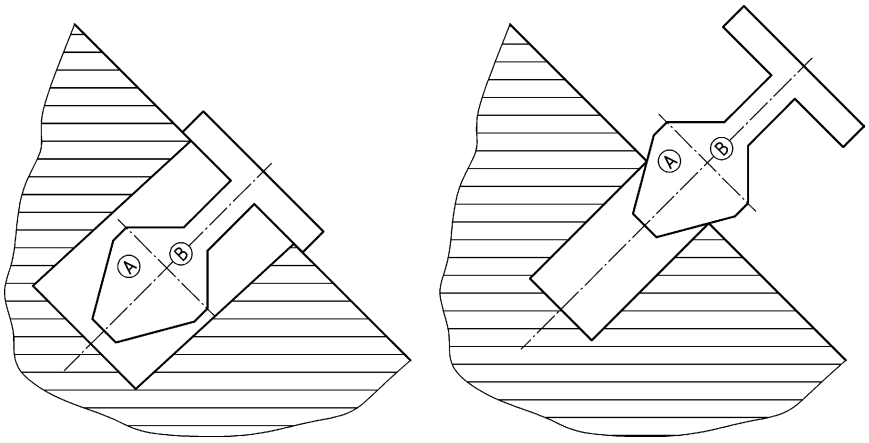
c check all insertion angles

Figure A.4 — Checking of insertion angles to determine range

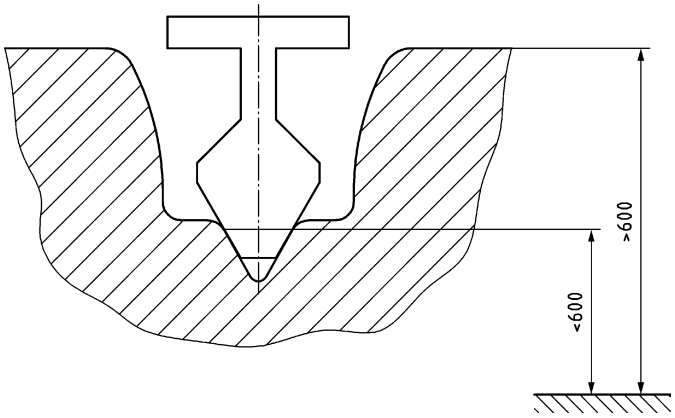
Dimensions in millimetres



a) Passes if front section fully enters aperture to a maximum depth (template shoulder depth) of 265 mm



b) Fail



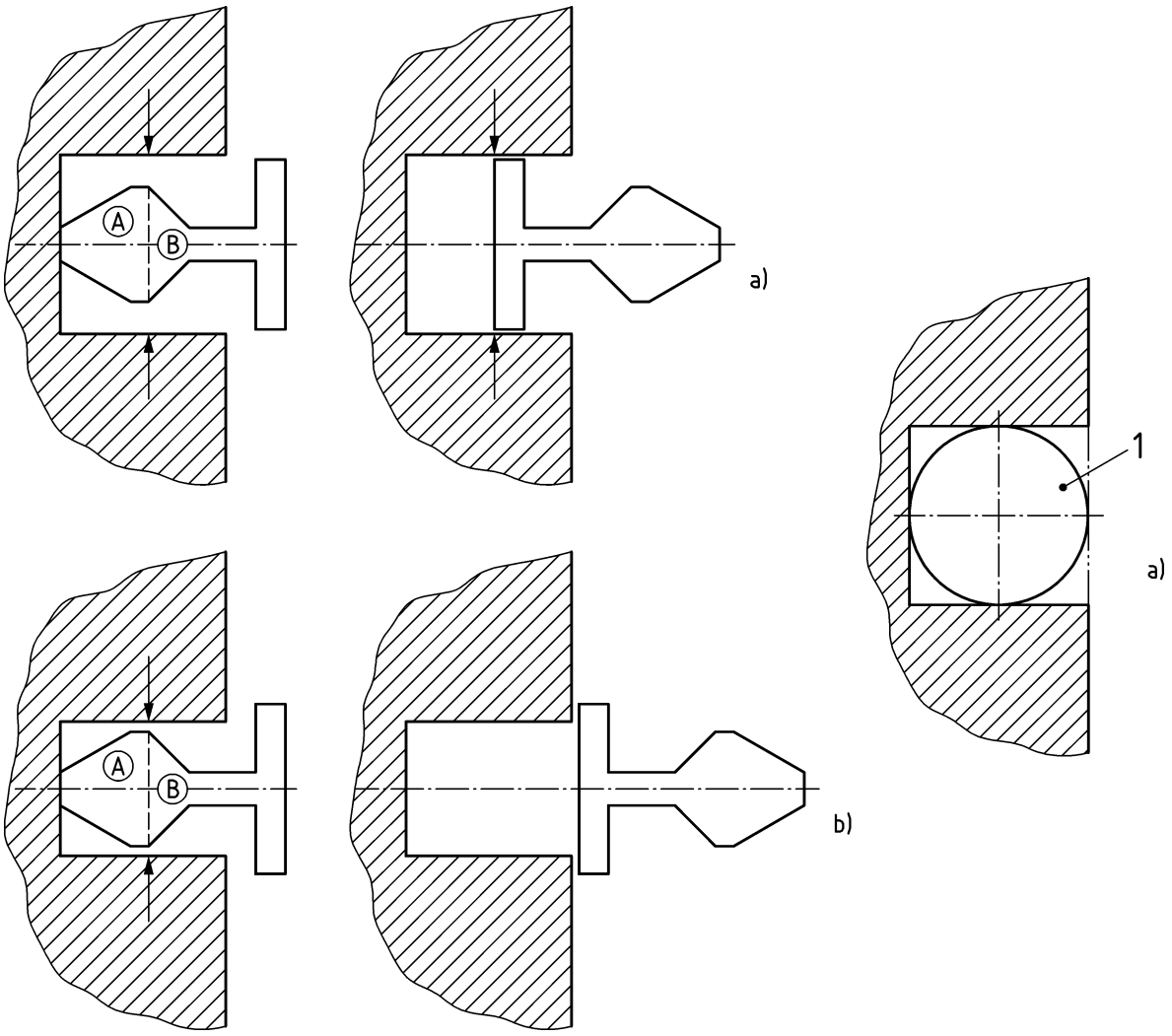
c) Pass

Key

> 600 mm = more than 600 mm above the playing surface

< 600 mm = less than 600 mm above the playing surface

Figure A.5 — Range 1 method of insertion of the 'A' portion of the test template



a) Test part 2 **b) Test part 3**

Key

a) pass

b) fail

1 large head probe D

Figure A.6 — Range 2 method of insertion of the 'A' portion of the test template followed by insertion of the shoulder of the template or Probe D

Annex B
(informative)

Examples of typical lightweight goals to this standard

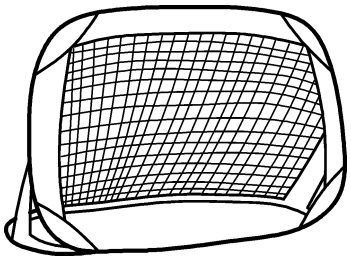


Figure B.1

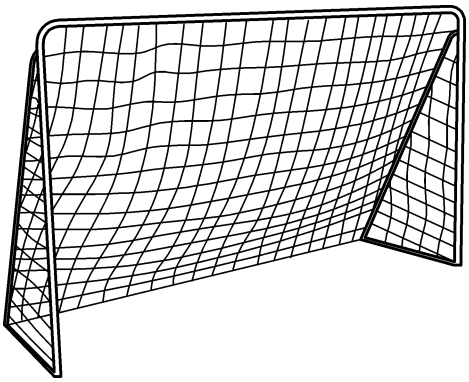


Figure B.2

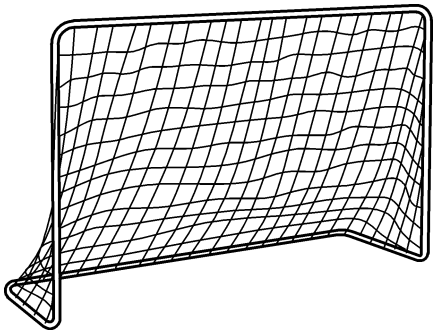


Figure B.3

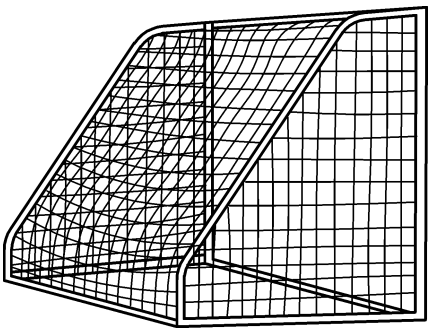


Figure B.4

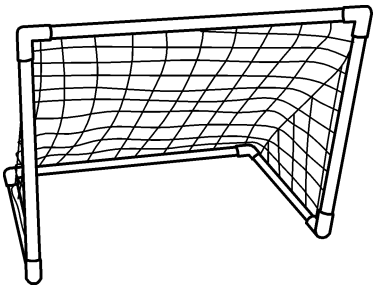


Figure B.5

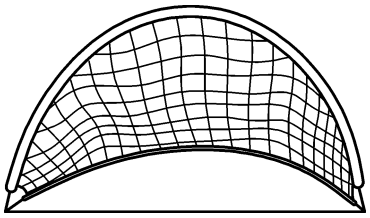


Figure B.6

Annex C
(informative)

Recommendations regarding the selection of material

Materials should be selected and protected such that the structural integrity of the lightweight goal should not be affected during use, transportation and under extreme climatic conditions.

NOTE 1 The provisions relating to certain materials in this European Standard do not imply that other equivalent materials are unsuitable in the manufacture of a lightweight goal.

In the choice of a material for a lightweight goal, consideration should be given to the eventual disposal of the material or substance having regard to any possible environmental toxic hazard.

NOTE 2 Information on the identification and classification of such substances can be found in the Directive 67/548/EEC (classification, packaging and labelling of dangerous substances) [10] as well as in the Regulation (EC) no.1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) [11]."

Bibliography

[1] EN 748, *Playing field equipment - Football goals - Functional and safety requirements, test methods*

[2] EN 749, *Playing field equipment - Handball goals - Functional and safety requirements, test methods*

[3] EN 1176-1:2008, *Playground equipment and surfacing - Part 1: General safety requirements and test methods*

[4] EN 1270, *Playing field equipment - Basketball equipment - Functional and safety requirements, test methods*

[5] EN 13451-7, *Swimming pool equipment - Part 7: Additional specific safety requirements and test methods for water polo goals*

[6] EN 15312, *Free access multi-sports equipment — Requirements, including safety and test methods*

[7] EN ISO 2062, *Textiles - Yarns from packages - Determination of single-end breaking force and elongation at break using constant rate of extension (CRE) tester (ISO 2062)*

[8] ISO 3864-1, *Graphical symbols — Safety colours and safety signs — Part 1: Design principles for safety signs and safety markings*

[9] ISO 3864-3, *Graphical symbols — Safety colours and safety signs — Part 3: Design principles for graphical symbols for use in safety signs*

[10] Directive 67/548/EEC, Council Directive of 27 June 1967 on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances

[11] Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

This page deliberately left blank

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.™