BS EN 12572-3:2017

BSI Standards Publication

Artificial climbing structures

Part 3: Safety requirements and test methods for climbing holds

bsi.

National foreword

This British Standard is the UK implementation of EN 12572-3:2017. It supersedes BS EN 12572-3:2008 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee SW/136/19, Artificial climbing structures.

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 2017

ISBN 978 0 580 89900 3

ICS 97.220.10

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 January 2017.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12572-3

January 2017

ICS 97.220.10

Supersedes EN 12572-3:2008

English Version

Artificial climbing structures - Part 3: Safety requirements and test methods for climbing holds

Structures artificielles d'escalade - Partie 3 : Exigences de sécurité et méthodes d'essai relatives aux prises d'escalade

Künstliche Kletteranlagen - Teil 3: Sicherheitstechnische Anforderungen und Prüfverfahren für Klettergriffe

This European Standard was approved by CEN on 29 October 2016.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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 ... **3**

Introduction ... **4**

1 Scope ... **5**

2 Normative references ... **5**

3 Terms and definitions ... **5**

4 Size classification ... **6**

5 Safety requirements ... **7**
5.1 General ... **7**
5.2 Material ... **7**
5.3 Ergonomic requirements ... **7**
5.4 Resistance to fixation force ... **7**
5.5 Resistance to breakage in use ... **7**
5.6 Dimension ratio ... **7**
5.7 Volumes ... **8**

6 Test methods ... **9**
6.1 Sample preparation ... **9**
6.2 Resistance to fixation force ... **9**
6.3 Structural integrity ... **10**
6.3.1 Holds ... **10**
6.3.2 Structural integrity of volumes ... **10**

7 Information to be provided by the manufacturer/supplier ... **11**

8 Marking ... **11**

Annex A (informative) **Setup for testing the structural integrity** ... **12**

Bibliography ... **13**

European foreword

This document (EN 12572-3:2017) 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 July 2017, and conflicting national standards shall be withdrawn at the latest by July 2017.

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

This document supersedes EN 12572-3:2008.

This standard EN 12572, *Artificial climbing structures*, consists of the following parts:

— *Part 1: Safety requirements and test methods for ACS with protection points*

— *Part 2: Safety requirements and test methods for bouldering walls*

— *Part 3: Safety requirements and test methods for climbing holds*

The following technical changes have been made in comparison with EN 12572-3:2008:

— size classification and hold size has been added;

— safety requirements and test methods has been modified;

— setup for test the structural integrity have been added.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The working group recognize that there is a potential danger to ACS users from being struck by falling pieces of climbing holds that break whilst in use on an ACS. Some propriety systems within climbing holds have been developed by manufacturers in response to this problem but the systems have not been perfected and further development work is required. The aim is to develop a system that would prevent 'large' pieces of a broken hold that could cause serious injury to ACS users, from being able to 'break-off' and fall from the ACS.

Designers and manufacturers are requested to work on new systems that would address this problem.

1 Scope

This European Standard specifies the safety requirements and test methods for climbing holds.

This European Standard is applicable to climbing holds, which are used for the natural progression of the climber, i.e. without the use of artificial means (e.g. ice axes, crampons, hooks, nuts) on artificial climbing structures (ACS) and bouldering walls. Climbing holds are designed to be mounted on the ACS with bolts, screws, etc. Climbing holds include large volumes or features that are designed for use without additional climbing holds being attached to them. The main fixation points for climbing holds forms part of the existing layout of the ACS and are considered in EN 12572-1 and EN 12572-2.

This European Standard is not applicable to ice climbing, dry tooling and playground equipment.

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 12572-1, *Artificial climbing structures - Part 1: Safety requirements and test methods for ACS with protection points*

EN 12572-2, *Artificial climbing structures - Part 2: Safety requirements and test methods for bouldering walls*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12572-1 and EN 12572-2 and the following apply.

3.1
artificial climbing structure
(ACS)
sports equipment consisting of a purpose-built climbing structure, which shows various construction characteristics, and is designed for various uses in sport climbing objectives

3.2
bouldering wall
artificial climbing structure allowing climbing without protection points including a falling space and impact area

3.3
protection point
attachment point on the ACS designed to protect the climber

Note 1 to entry: It can be permanent (cannot be removed with tools, e.g. a glue in anchor) or non-permanent (removable with tools, e.g. a hanger).

3.4
hold
removable climbing component used for progression on an ACS or bouldering wall including bigger three dimensional, structural attachment without additional panel insert or other means of hold fixation

Note 1 to entry: It should be noted that holds bigger than size XXL are called macros (see Table 1).

3.5
volume
removable three dimensional, structural attachment with panel insert or other means of hold fixation designed for temporary extension of the climbing surface

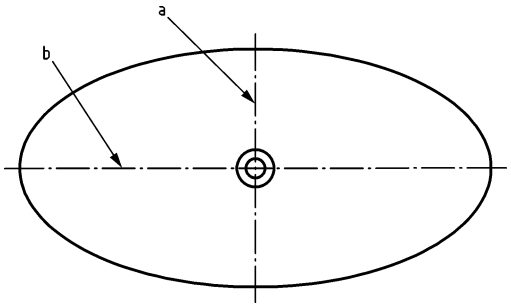
3.6
panel insert
point on which a climbing hold is attached

4 Size classification

Table 1 allows a hold to be categorized in terms of its average hold diameter. The average hold diameter (as a projection) is taken as the sum of the major, a, and minor, b, axis (see Figure 1) divided by two.

Table 1 — Hold size and corresponding average diameter range

Hold Size	Diameter range mm
XS	0 to ≤ **50**
S	> 50 to ≤ **80**
M	> 80 to ≤ **130**
L	> 130 to ≤ **210**
XL	> 210 to ≤ **340**
XXL	> 340 to ≤ **550**
Macro	> 550



Key

a major axis

b minor axis

Figure 1 — Footprint of a climbing hold

5 Safety requirements

5.1 General

No hold, when tested in accordance with 6.2 and 6.3, shall break when applying the force given in Table 2. Only holds greater than 100 g shall be tested.

5.2 Material

Dangerous substances shall not be used in the manufacture of climbing holds in such a way that they can cause adverse health effects to the user of the equipment.

NOTE Attention is drawn to the provisions of the Dangerous Substances Directive 1907/2006 and its successive modifications. Prohibited materials include but are not limited to, asbestos, lead, formaldehyde, coal tar oils, carbolineums and polychlorinated biphenyls (PCBs).

5.3 Ergonomic requirements

a) The climbing surface of a hold shall be free from accessible sharp edges with a radius less than 0,5 mm and burrs;

b) There shall be no pointed climbing holds with a diameter less than 15 mm, which protrude more than 40 mm from the wall;

c) There shall be no gaps between 8 mm and 25 mm and with a depth greater than 15 mm which can lead to entrapment, unless specifically designed for climbing.

5.4 Resistance to fixation force

Climbing holds shall be tested in accordance with 6.2 and they shall not fracture.

5.5 Resistance to breakage in use

Climbing holds shall be tested in accordance with 6.3 and they shall not fracture.

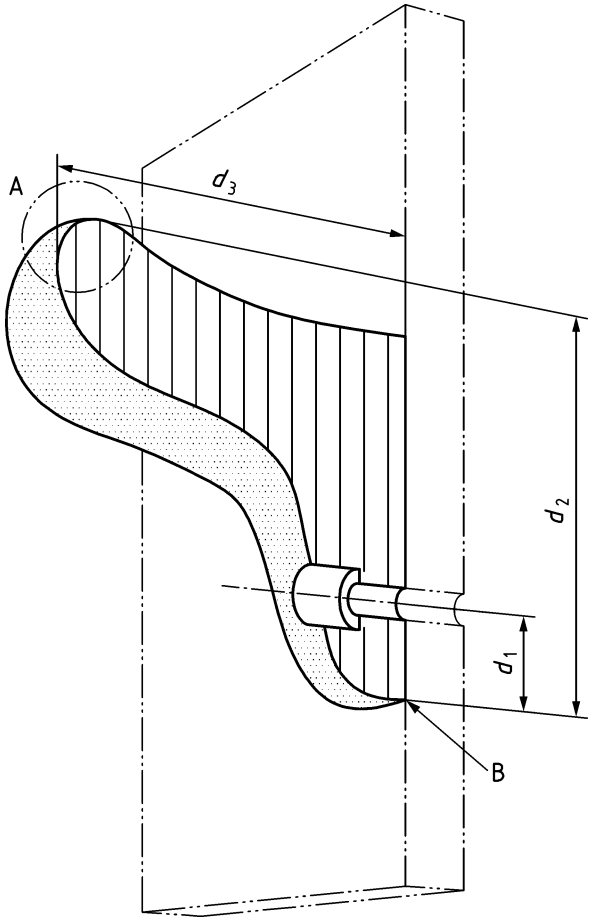
5.6 Dimension ratio

This requirement is to protect the surface of the ACS and the panel insert.

The hold shall be designed in such a way that:

$d_2 \leq 3d_1$ and

$d_3 \leq 3d_1$ according to Figure 2.



Key

A is the holding point where the climber can exert the greatest force

B opposite edge to point A

d_1 is the distance between the fixation hole axis and the opposite edge B to point A

d_2 is the parallel to the surface distance between point A and opposite edge B

d_3 is the perpendicular to the surface distance between point A and opposite edge B

Figure 2 — Dimension Ratios of the hold

5.7 Volumes

Volumes shall be fixed to the ACS ensuring the maximum load transfers efficiently to the ACS in accordance with the manufacturer's instructions.

The volume surface, body and panel inserts shall fulfil the requirements for climbing surfaces according EN 12572-1 and EN 12572-2.

Volumes shall not have protection points.

Volumes shall be fixed using multiple fixation points.

6 Test methods

6.1 Sample preparation

Hold samples shall be subjected to five temperature cycles each for a period of 1 h at –30 °C followed by a period of 1 h at +70 °C. Before performing the test cycles the climbing holds shall be wetted by submerging in tap water for 10 min. There shall be no visible signs of damage to the climbing holds after conditioning. Undamaged climbing holds shall then be tested according to 6.2 and 6.3.

6.2 Resistance to fixation force

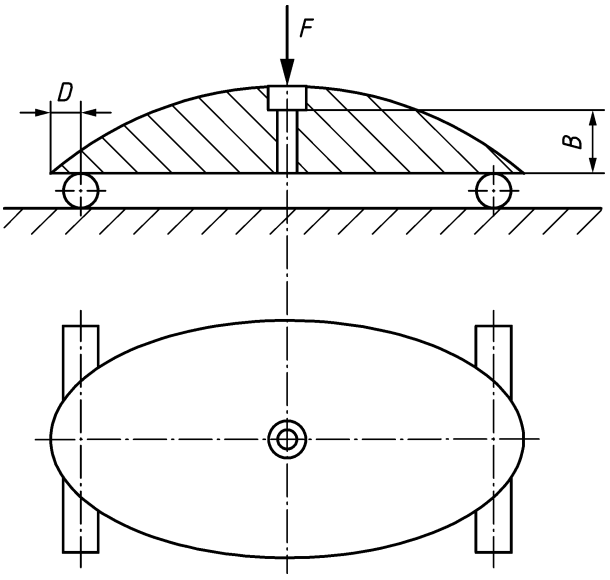
Testing shall be carried out with the climbing hold in a three-point bend scenario (see Figure 3) as follows:

a) Find the maximum width of a hold passing through the fixing hole.

b) Define two perpendicular lines on the base at a distance *D* (see Figure 3 and Table 2) from the edge of the hold.

c) Put iron rod bearings with a minimum radius of 10 mm under the hold on a flat and solid (e.g. steel plate) surface were the lines are located.

d) The hold shall be loaded with the force *F* (see Table 2) in the bolt hole using a tool with the same form as the manufacturer's recommended fixing (e.g. cap-head or countersunk) for 1 min at ambient temperature with relative humidity (50 ± 5) %.



Key

B bolt-hole depth

D distance

F force

Figure 3 — Resistance to fixation force test

Table 2 — Test distances and maximum forces according to the hold size

Climbing hold size	Distance D mm	Force F kN
S and smaller	5 to 10	2
M	10 to 15	5
L and bigger	15 to 20	8

Holds to be tested shall be selected as follows:

a) divide each set of holds into size according to Table 1;

b) chose for each size the hold with the biggest major axis to bolt-hole depth ratio;

c) at least 5 % of the total number of different holds available from the manufacturer.

6.3 Structural integrity

6.3.1 Holds

Fix the hold to a rigid surface with a torque on the fixation screw using the manufacturer's recommended maximum tightening torque. Load the hold with a device which pushes or pulls in the most unfavourable usable position and direction against breakage in use with a force of 2,4 kN for 1 min (see Figure 3). An example test setup is given in Annex A.

Holds to be tested shall be selected as follows:

a) divide each set of holds into size according to Table 1;

b) chose for each size the hold with the largest dimension ratio.

NOTE The value of 2,4 kN results from the maximum pushing force from the foot of a climber: 0,8 kN resulting from the weight of the climber, × 2 resulting from the dynamic movement, × 1,5 (safety factor).

6.3.2 Structural integrity of volumes

Fix the volume to a panel with all recommended fixation screws.

Fix an exe bolt at the most unfavourable volume insert an pull with a force of 2,4 kN for 1 min in the most unfavourable direction(s).

7 Information to be provided by the manufacturer/supplier

The information to be supplied shall include the following information:

a) details of the type of fixing;

b) maximum fixation tightening torque for all types of fixation screws required to attach the climbing holds;

c) recommended use;

d) maintenance (intervals, cleaning, visual inspection);

e) repair;

f) disposal;

g) compliance to this standard, i.e. EN 12572-3.

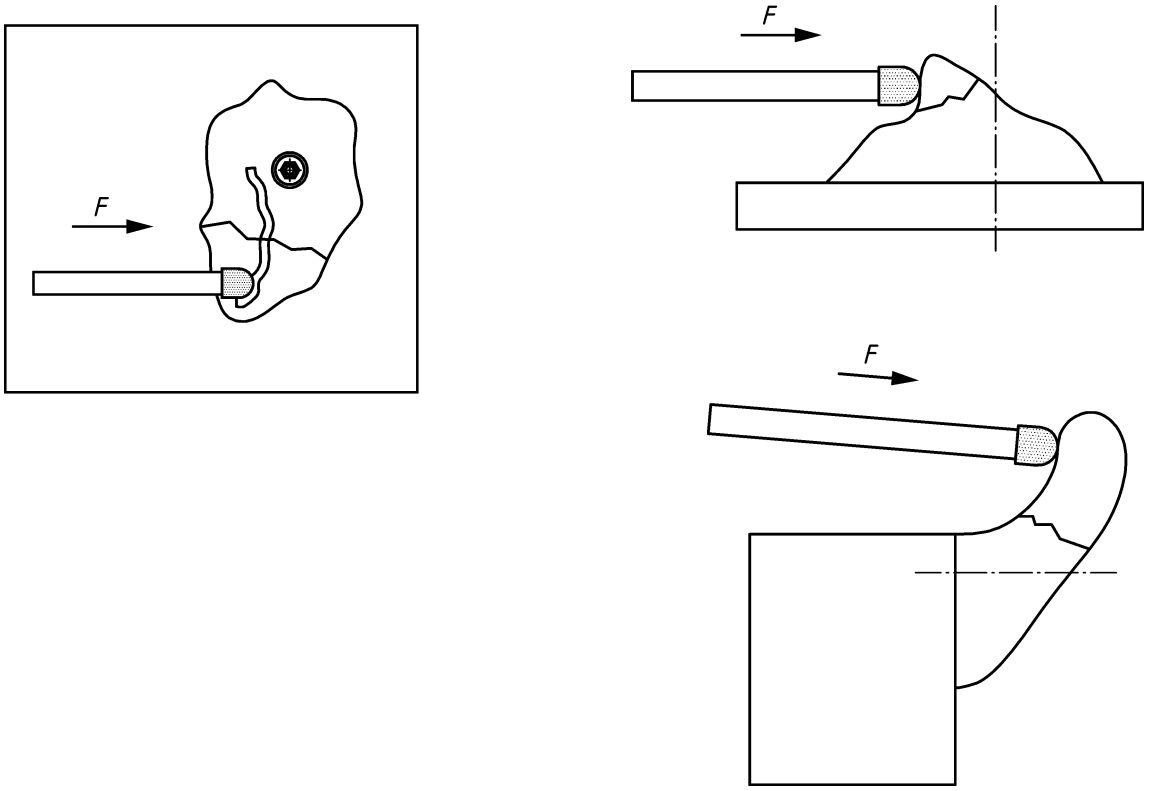
8 Marking

Each climbing hold shall at least be marked with the logo of the manufacturer/supplier, a system of identification (e.g. for product recalls), except for climbing holds < 100 g in weight.

Annex A
(informative)

Setup for testing the structural integrity

Test rig is a system that is capable of delivering a pushing force by means of a rounded, rubber coated tip measuring between 10 mm and 15 mm DIA, this is attached to load cell giving a resulting force. This apparatus should be able to be positioned in a number of angles in all 3-axis to test all shapes and variety of holds.



Key

F force

Figure A.1 — Setup (3 examples) for testing the structural integrity

Bibliography

[1] Council Directive 1907/2006 of 27 July 1976 on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations

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.

Copyright in BSI publications

All the content in BSI publications, including British Standards, is the property of and copyrighted by BSI or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use.

Save for the provisions below, you may not transfer, share or disseminate any portion of the standard to any other person. You may not adapt, distribute, commercially exploit, or publicly display the standard or any portion thereof in any manner whatsoever without BSI's prior written consent.

Storing and using standards

Standards purchased in soft copy format:

- A British Standard purchased in soft copy format is licensed to a sole named user for personal or internal company use only.
- The standard may be stored on more than 1 device provided that it is accessible by the sole named user only and that only 1 copy is accessed at any one time.
- A single paper copy may be printed for personal or internal company use only.

Standards purchased in hard copy format:

- A British Standard purchased in hard copy format is for personal or internal company use only.
- It may not be further reproduced – in any format – to create an additional copy. This includes scanning of the document.

If you need more than 1 copy of the document, or if you wish to share the document on an internal network, you can save money by choosing a subscription product (see 'Subscriptions').

Reproducing extracts

For permission to reproduce content from BSI publications contact the BSI Copyright & Licensing 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 subscriptions@bsigroup.com.

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.

Useful Contacts

Customer Services
Tel: +44 345 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 345 086 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 Group Headquarters

389 Chiswick High Road London W4 4AL UK

bsi.