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# EN 16630

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English Version

# Permanently installed outdoor fitness equipment - Safety requirements and test methods

Modules fixes d'entraînement physique de plein air - Exigences de sécurité et méthodes d'essai

Standortgebundene Fitnessgeräte im Außenbereich - Sicherheitstechnische Anforderungen und Prüfverfahren

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# Foreword

This document (EN 16630:2015) 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of an identical text or by endorsement, at the latest by October 2015, and conflicting national standards shall be withdrawn at the latest by October 2015.

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.

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# Introduction

Outdoor fitness equipment is suitable for people who enjoy movement and want to actively engage themselves. The equipment should be designed to promote physical activity across a wide range of abilities. Such activities could include cardiovascular, strength, toning, balance, coordination and flexibility exercises.

When drafting this European Standard, the difficulties have been recognized to address safety issues by age criteria alone, because the ability to handle risks is based on the individual users' level of skill. Also, age groups other than the intended ones will almost certainly make use of the outdoor fitness equipment. Therefore, it was decided to recommend the use of the fitness equipment for youths and adults or users with an overall height greater than 1 400 mm and to specify safety requirements on this basis. This is necessary in order to produce a clear differentiation from playground equipment in accordance with the EN 1176 series. However, relevant requirements of this series have been taken into account wherever it was useful and possible.

The requirements in this European Standard assume that all users of the fitness equipment are aware of the limits of their physical capacity and are able to use the equipment unassisted. Provided that the equipment is used as intended, i.e. in accordance with the exercise instructions attached to each individual piece of equipment, it is assumed that single or multiple body parts are moved and are not incorrectly strained.

As long as there is human interaction with moving equipment there is a residual risk that cannot be further mitigated in order to maintain the function. However, a slightly incorrect execution is considered not to cause severe health consequences for the user. In the case of improper use, bruises, sprains and occasional bone fractures caused (e.g. by falls) might have to be accepted.

In correspondence with the available opportunities, it is advisable to offer introductory courses at regular intervals, in which trained experts explain the individual pieces of equipment, their handling and their possible effects on the body and mind.

The design of outdoor fitness equipment is subject to constant development. Therefore, the design of particular types of equipment might not be specified in this European Standard, however the general requirements of this European Standard apply to all equipment.

# 1 Scope

This European standard specifies general safety requirements for the manufacture, installation, inspection and maintenance of permanently installed, freely accessible outdoor fitness equipment. This standard does not cover electrically driven equipment, functional training facilities (typically with unrestrained weights) nor military style obstacle courses.

The equipment is intended for youths and adults or users having an overall height greater than 1 400 mm to promote fitness by using the equipment to exercise. Equipment covered by this standard is not playground equipment for children (EN 1176 series), indoor stationary training equipment (EN 957 series) or free access multi-sports equipment (EN 15312) even if it meets the requirements of each of these standards.

NOTE In this standard “permanently installed outdoor fitness equipment” is simply called “fitness 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 335-2:2006, *Durability of wood and wood-based products — Definition of use classes — Part 2: Application to solid wood*

EN 350-2:1994, *Durability of wood and wood-based products — Natural durability of solid wood — Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe*

EN 351-1:2007, *Durability of wood and wood-based products — Preservative-treated solid wood — Part 1: Classification of preservative penetration and retention*

EN 636, *Plywood — Specifications*

EN 933-1, *Tests for geometrical properties of aggregates — Part 1: Determination of particle size distribution - Sieving method*

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

EN 1177, *Impact attenuating playground surfacing — Determination of critical fall height*

ISO 1834, *Short link chain for lifting purposes — General conditions of acceptance*

# 3 Terms and definitions

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

**3.1**
**user station**
location of a piece of fitness equipment which the user can occupy while standing, sitting, lying or hanging

Note 1 to entry: See Figure 1.

**3.2**
**area of movement**
base area of movement space

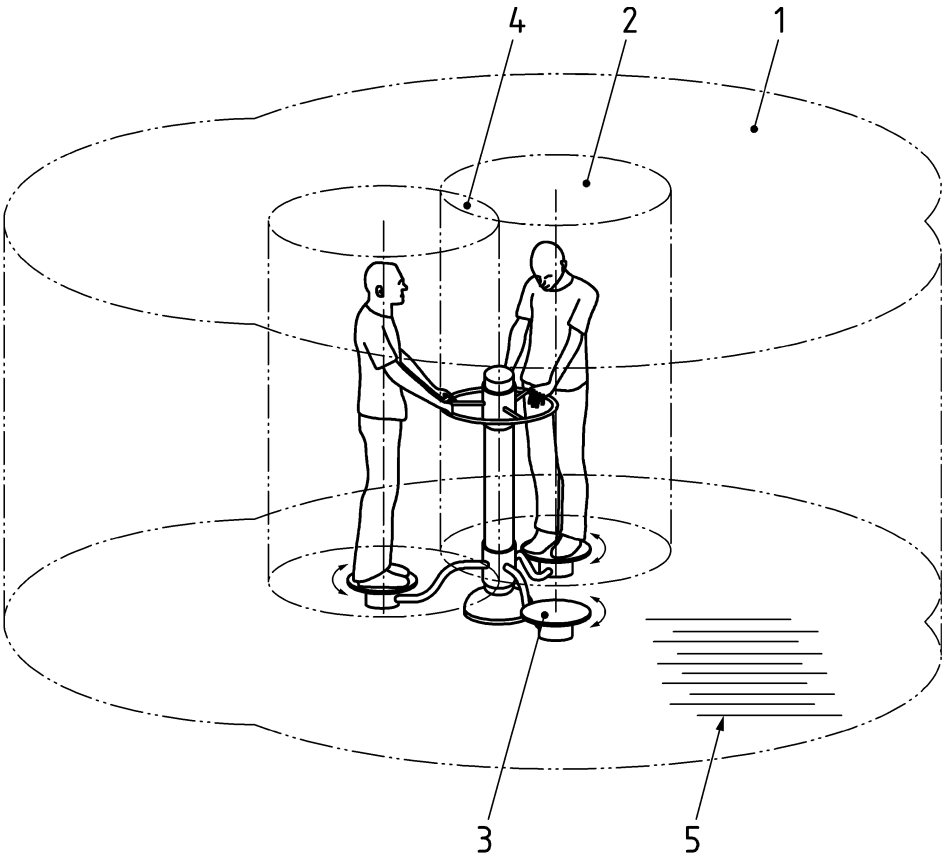
Note 1 to entry: See Figure 1.

**3.3**
**movement space**
space around the fitness equipment necessary for safe use

Note 1 to entry: See Figure 1.

**3.4**
**training space**
space in, above or around the fitness equipment which the users of the equipment need to perform their exercises

Note 1 to entry: See Figure 1.




**Key**

1 movement space
2 training space
3 user station
4 overlapping training space (4.3.14.2)
5 area of movement

**Figure 1 — Spaces and area**

**3.5**
**damping**
combined effect of the supporting component(s) that moderates the speed at which the equipment can move and the reduction of shock effects at the outer positions of the equipment

[SOURCE: EN 1176-6:2008, 3.11]

**3.6**
**forced movement**
movement which the user can no longer stop in a self-determined way, by using their own strength, after the start of the movement

**3.7**
**free height of fall**
greatest vertical distance between the user station and the horizontal surface lying directly underneath

**3.8**
**grasp**
holding of the hand round part of the circumference of a support

Note 1 to entry: See Figure 2.

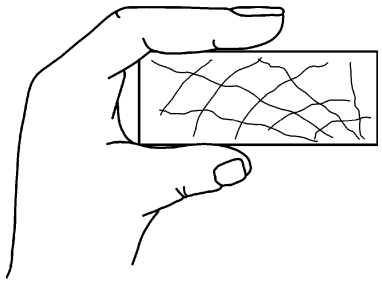


**Figure 2 — Grasp**

[SOURCE: EN 1176-1:2008, 3.16]

**3.9**
**grip**
holding of the hand round the entire circumference of a support

Note 1 to entry: See Figure 3.

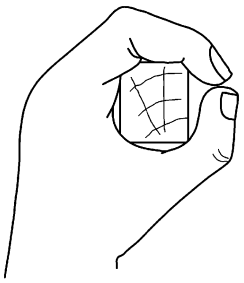


**Figure 3 — Grip**

[SOURCE: EN 1176-1:2008, 3.15]

**3.10**
**body support**
surface of the user station where the user stands, sits or lies

**3.11**
**permanently installed outdoor fitness equipment**
permanently installed, freely accessible equipment upon or with which the intended users, unsupervised and without outside help, can operate with the aim of maintaining or improving their physical and intellectual abilities

**3.12**
**tread surface**
area accommodating one foot or both feet and moved by or with the user

**3.13**
**constrained posture**
physiologically unfavourable posture from which the user cannot free themselves without either outside help or without extreme difficultly or painful discomfort

# 4 Safety requirements

## 4.1 General

Fitness equipment is not intended for installation in the immediate vicinity of children's playgrounds in accordance with the EN 1176 series. If installed in connection with playground equipment, on playgrounds or similar installations, they shall be separated from general playing activities by an appropriate distance, fencing or other structural measures.

## 4.2 Materials

### 4.2.1 General

Materials shall be selected and treated in such a way that the stability of the equipment manufactured from them is not affected before the next relevant maintenance inspection.

Materials should be manufactured in a professional manner.

NOTE The conditions relating to certain materials in this standard do not imply that other equivalent materials are unsuitable in the manufacture of fitness equipment.

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

Special attention shall be given to surface coatings to avoid the risk of toxicity.

In the choice of a material or substance for fitness equipment, consideration shall be given to the eventual disposal of the material or substance in regard to any possible environmental toxic risks.

### 4.2.2 Flammability

To prevent fire and similar dangers, materials known to produce surface flash shall not be used.

### 4.2.3 Timber and associated products

Components from timber or timber products shall be designed in such a way that precipitation can drain or drip off freely and water accumulation is avoided.

In cases of ground contact, one or more of the following methods shall be used:

a) use of timber species with sufficient natural resistance in accordance with classes 1 and 2 of the natural durability classification given in EN 350-2:1994, 4.2.2;

b) construction methods, e.g. post shoe;

c) use of timber treated with wood preservatives in accordance with EN 351-1:2007, Figure A.1 and in accordance with Class 4 given in EN 335-2:2006, 4.4.

All components made of timber and associated products, other than those conforming to a), that affect the stability of the structure and are in constant contact with the ground shall be treated in accordance with c).

When using metal fastenings, consideration should be given to the fact that if certain species of timber and wood preservatives are in contact with each other, they will accelerate corrosion of the metal parts.

Plywood shall be suitable for outdoor use in accordance with EN 636.

#### 4.2.4 Metals

Metal parts shall be protected against atmospheric conditions and cathodic corrosion.

Metals that produce toxic oxide coatings that scale or flake shall be protected by a non-toxic coating.

#### 4.2.5 Rubbers and synthetics

If, by maintenance, it is difficult to determine at what point a material becomes brittle, an indication of the time period after which the part or the equipment should be replaced shall be provided (see 9.4.3).

All structural synthetic components shall be suitably protected to reduce influences of ultraviolet radiation and oxygen.

If rubber is used in structural components, deterioration due to ozone should be taken into consideration

— either by using considerable material thicknesses,

— or by leaving rubber parts visible for inspection.

Consideration should be given to weathering of structural components through ultraviolet influences.

#### 4.2.6 Dangerous substances

Dangerous substances shall not be used in the manufacture of fitness equipment 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 Regulation (EC) No. 1907/2006 and its subsequent modifications. Prohibited materials include, but are not limited to, asbestos, lead, formaldehyde, mercury compounds, coal tar oils.

### 4.3 Design and manufacture

#### 4.3.1 General

Fitness equipment shall be designed or set-up/assembled so that the intended use is/are easily identified by the user.

It shall be considered during the planning and design of fitness equipment that such equipment should also be accessible for people with limited capabilities and should be useable in accordance with these capabilities.

Fitness equipment shall be designed so that marginally incorrect executions of exercises do not lead to serious damage for the user.

When at rest the fitness equipment shall automatically adjust so that the equipment is ready for the following user.

The equipment should be designed so that the user cannot attain a constrained posture.

Fitness equipment shall not permit the functions neck pressing (see Figure 4) and deadlifting (see Figure 5).

NOTE The aim of this requirement is to avoid excessive compression of the spinal column.

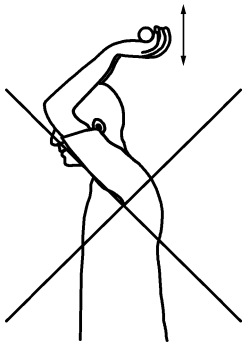


**Figure 4 — Neck press**

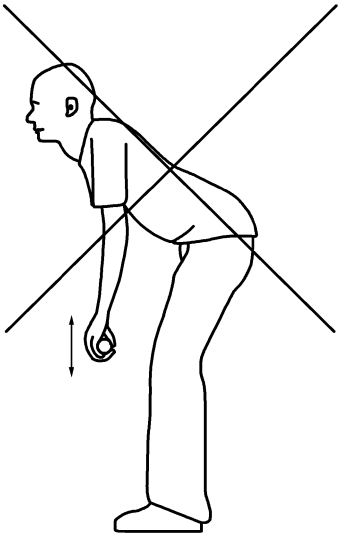


**Figure 5 — Deadlift**

#### 4.3.2 Structural integrity

Fitness equipment shall be permanently connected to the substrate on which it stands.

For fitness equipment, the structural integrity shall be proved for the worst case of the intended combinations.

Structural integrity, including stability, of the equipment shall be evaluated by one of the following methods:

a) calculation on the basis of the applicable specifications in EN 1176-1:2008, Annex A and Annex B, except for Table A.1; Table 1 of this standard should be used instead;

b) physical testing, in accordance with EN 1176-1:2008, Annex C (using weights in accordance with Table 1);

c) combination of a) and b).

**Table 1 — Calculation of loads caused by the users**

| Number of users<br>$n$ | Mass of $n$ users<br>$G_n$<br>kg | Dynamic factor<br>$C_{dyn}$ | Total vertical load of users<br>$F_{tot;v}$<br>N | Vertical load per user<br>$F_{1;v}$<br>N |
|---|---|---|---|---|
| 1 | 99 | 2 | 1 942 | 1 942 |
| 2 | 185 | 1,5 | 2 722 | 1 361 |
| 3 | 270 | 1,33 | 3 523 | 1 174 |
| 4 | 353 | 1,25 | 4 329 | 1 082 |
| 5 | 436 | 1,20 | 5 133 | 1 027 |
| NOTE Values are rounded. | | | | |

The loads resulting from users of fitness equipment shall be based on the formulae:

$$G_n = n \times m + 1,64 \times \sigma\sqrt{n}$$

$$C_{dyn} = \frac{1+n}{n}$$

where

$G_n$ is the total mass of *n* user (kg);

$n$ is the numbers of users;

$m$ is the mean mass of the user;

σ is the standard deviation of the σ user.

NOTE For free accessible fitness equipment the following values can be used:

$m$ = 78 kg (This value is based on data from age 18–65 of adult men 50 percentile)

σ = 12,6 kg

### 4.3.3 Surface finish of accessible parts of equipment

There shall be no protruding nails, protruding wire rope terminations, pointed or sharp-edged components.

Wooden equipment shall be made of wood with a low susceptibility to splintering. The surface finish of equipment made of other materials (e.g. glass fibre) shall be non-splintering.

Rough surfaces shall not present any risk of injury. All weld seams shall be smooth. Protruding bolt threads shall be permanently covered on all accessible parts of equipment (e.g. with dome headed nuts). Nuts and bolt heads that protrude less than 8 mm are permissible on inaccessible parts, provided that they are free from burrs.

Corners, edges and protruding parts within the training space that protrude more than 8 mm, and which are not shielded by adjacent areas that are not more than 25 mm away from the end of the protruding part, shall

be rounded off. The minimum radius of the curve shall be 3 mm. Only edges that the user might hit while using the product need to be rounded.

NOTE This requirement is intended to prevent injuries caused by unintentional contact with components.

Figure 6 shows examples of protection for nuts and bolts and of permissible protruding parts.

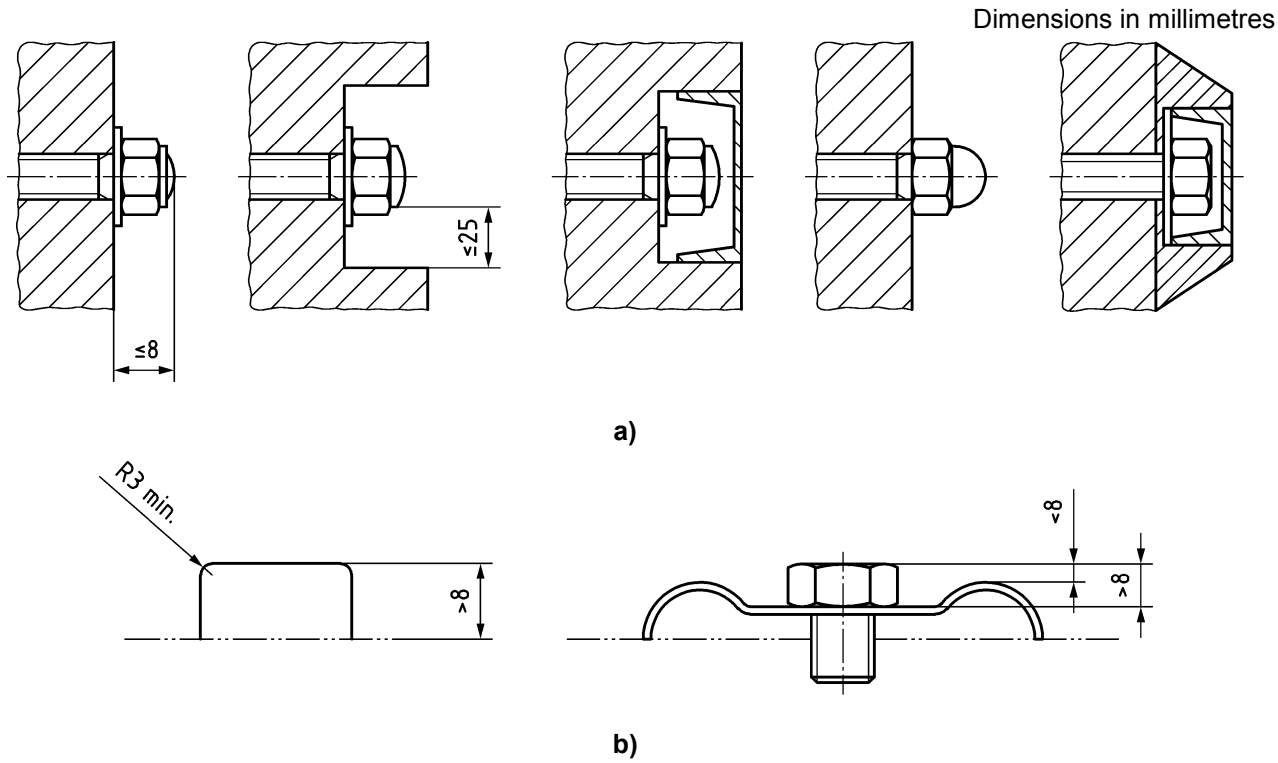



**Figure 6 — Examples of protection and permissible protruding parts**

### 4.3.4 Tread surface

If the equipment is provided with a tread surface, this shall be equipped with a slip-resistant finish. Tread surfaces shall be designed so that liquid can drain off.

A tread surface with a minimum width of 100 mm and minimum length of 300 mm shall be available per foot.

Additionally, the tread surface shall provide at least a three-sided safeguard (at the front, left and right) that is a minimum of 10 mm high and extends over a length of 75 % of the side surface. This requirement is not applicable to rotary discs with a diameter of at least 320 mm.

### 4.3.5 Moving parts

There shall be no crushing or shearing points for the user between moving and/or stationary parts of the equipment during use.

The distance from moving parts to adjacent moving or fixed parts shall be either < 8 mm or ≥ 25 mm, if only the fingers are at risk. Otherwise, it shall be either < 8 mm or ≥ 60 mm.

Any trailing of pedalling equipment shall be reduced by technical means, e.g. braking, free wheel.

For the following rotating parts, trailing shall be reduced by technical means:

— rotary discs with open surfaces;

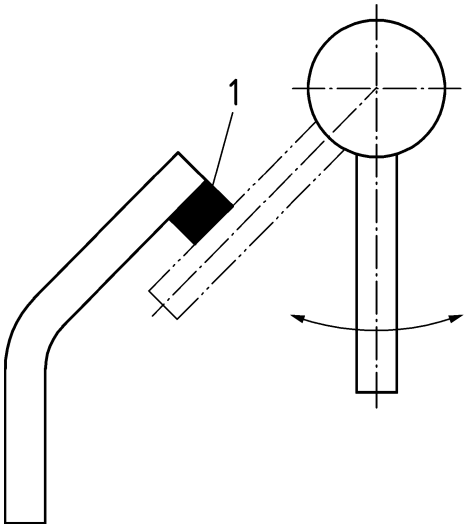
— rotary discs with hand grips.

The distance between the bottom end of a moving part and the ground shall be at least 60 mm.

If the vertically moving parts are found outside of the user's field of view then the distance between vertically moving parts and the ground shall be at least 110 mm.

For rotating user stations (e.g. rotary discs and rotating seats), a guideline of user direction and marking of the original position shall be conspicuous.

End stops shall be dampened. Open end stops shall have a minimum diameter of 35 mm (see Figure 7). End stops in the head, hand or foot areas that are open during the exercise shall not be permissible.




**Key**

1 = open end stop

**Figure 7 — Example of open end stop**

Pulleys and similar parts shall be protected against body parts becoming entrapped.

Rotating user stations shall not exceed a maximum deflection of 105° to the left and right from the body centre line respectively, during use while standing or sitting. Movement damping shall start from 90° and cease at the limit of deflection.

For swinging movements, a movement limitation of < 55° from the vertical shall be available.

### 4.3.6 Entrapment

#### 4.3.6.1 Entrapment of the head and neck

Entrapment of the head and neck is not considered hazardous, if the lowest part of an accessible opening lies less than 600 mm above the ground surface.

Accessible, completely bound openings shall be tested in accordance with 5.2.2.1 if the lowest part of an accessible opening lies more than 600 mm above the ground. Probes E or C shall thereby not fit through any of these openings, unless the large probe D fits through as well (see Figure 13).

Partially bound and V-shaped openings shall be designed so that the opening is either not accessible or, if the opening is accessible at a position of 600 mm above the ground surface, it shall correspond to the following, depending on the angular orientation range (see Figure 16):

— Range 1: (template centre line ± 45° from vertical);
when the template apex contacts the base of the opening, the depth of the opening shall be less than the length of the template to the under-side of the shoulder section.

— Range 2: (template centre line from horizontal to + 45°);
when the template apex contacts the base of the opening, the depth of the opening shall be less than the 'A' portion of the template. If the depth of the opening is greater than the 'A' portion of the template, all parts of the opening above the 'A' portion shall also allow insertion of the shoulder section of the template or probe D.

— Range 3: No template test requirements.

Test in accordance with 5.2.2.2.

#### 4.3.6.2 Entrapment of fingers

Fitness equipment shall be designed so that dangerous situations, including:

— gaps in which fingers can be trapped while the remainder of the body is moving or continues in forced movement;

— pipes with open ends; and

— variable gaps,

in which this type of entrapment can be encountered, are not created.

Openings and holes which have a lower edge of more than 1 000 mm above the ground surface shall conform to the following requirements when tested in accordance with 5.2.3:

a) the 8 mm finger probe shall not fit through the minimum cross-section of the opening and the profile of the opening shall be such that the finger probe cannot be locked in any position when set in motion as shown in Figure 21;

b) if the 8 mm finger probe fits through the opening, the 25 mm finger rod (see Figure 20) shall also fit through the opening, provided that the opening does not permit access to another finger entrapment site.

The ends of pipes shall be closed off. Closures shall not be removable without tools.

#### 4.3.6.3 Entrapment of the foot or leg

Surfaces intended for running/walking shall not contain any gaps, openings or projecting parts which may cause unexpected foot or leg entrapment. Gaps in the main direction of travel shall not be greater than 30 mm when measured across the direction of travel (see Figure 8).

Dimensions in millimetres

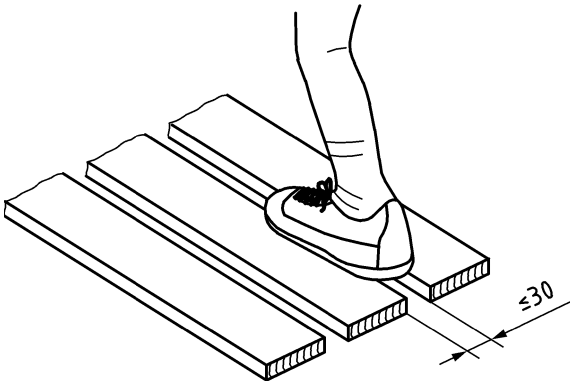



**Figure 8 — Measurement of gaps limited to 30 mm**

#### 4.3.7 Weights and resistance

If resistance or weight is adjustable by the user, these settings shall be clearly conspicuous. Alternatively, weights and resistances shall be automatically adjusted so that the equipment is ready for use for the following user.

Adjustable weights and resistance shall not move independently during training. They are only permissible for multiple joint exercises.

Weights which are not fixed to the equipment or being incorporated are not permitted.

#### 4.3.8 Adjustment and locking mechanisms

Adjustment facilities on the fitness equipment shall be safe, conspicuous and accessible to the user. The possibility of inadvertent alteration shall be eliminated.

The proper function of any locking mechanisms shall be clearly conspicuous.

#### 4.3.9 Access/Egress

Access to or egress from equipment shall take place from a safe position (e.g. standing upright, sitting upright).

For unstable or moveable standing or sitting surfaces, holding devices (grip or grasp) shall be useable for access and egress.

#### 4.3.10 Connections

Connections shall be secured so that they cannot come loose of their own accord, unless specifically designed to do so.

Connections shall be secured so that they cannot be undone without tools.

#### 4.3.11 Consumable components

Consumable components or parts designed to be renewed during the lifespan of the equipment, e.g. bearings, shall be replaceable.

Replaceable components should be protected against unauthorized tampering and should require little maintenance. Any lubricants leaking out should not affect the safe use of the equipment.

#### 4.3.12 Grasp and grip

##### 4.3.12.1 Grasp requirements

The cross section of any element designed to be grasped (see Figure 2) is permitted to have a width not exceeding 80 mm.

##### 4.3.12.2 Grip requirements

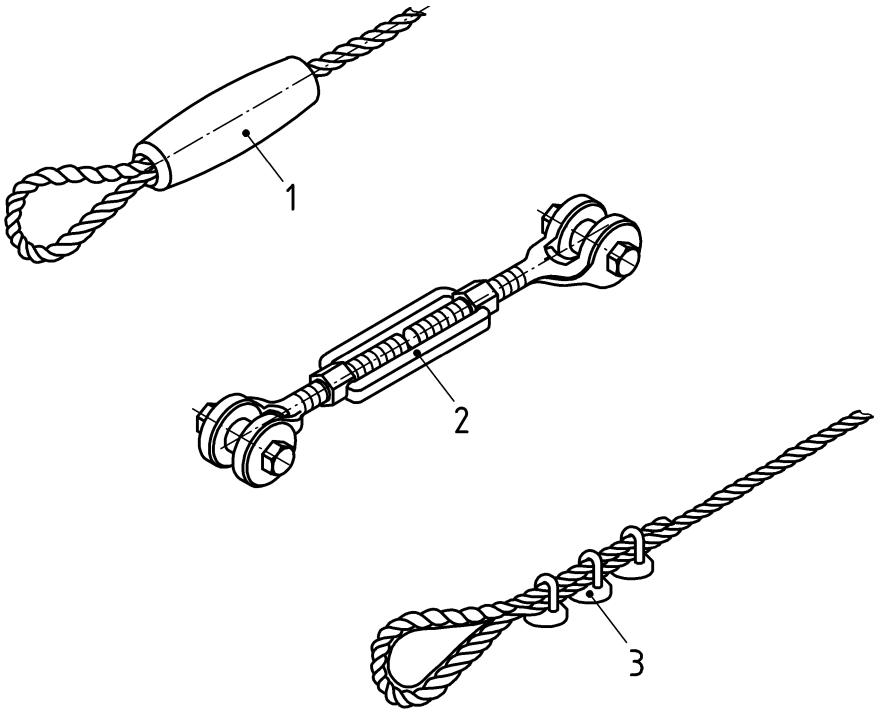
The cross section of any element designed to be gripped (see Figure 3) shall have a dimension of not less than 16 mm and not more than 45 mm in any direction, when measured across its centre line.

#### 4.3.13 Ropes, belts, chains

##### 4.3.13.1 General

Wire ropes shall be free of twists and shall be made of galvanized or corrosion-resistant wire.

The ends of the turnbuckles shall be closed (see Figure 9) and shall be made of corrosion-resistant material.




**Key**

1 ferrule

2 turnbuckle

3 wire rope grips

**Figure 9 — Example of ferrules, turnbuckles and wire rope grips**

When sheathed wire ropes are used, each strand shall be sheathed with yarn made of synthetic or natural fibres.

#### 4.3.13.2 Ropes fixed at one end

For suspended ropes longer than 1 m, the distance between ropes fixed at one end and fixed equipment shall be not less than 600 mm. The distance between ropes fixed at one end and swinging elements shall be not less than 900 mm.

The rope diameter shall be between 25 mm and 45 mm.

NOTE A stiffer rope, depending on its diameter and construction, makes it more difficult to create a loop, thus reducing the danger of strangulation. However, it still allows a good grip.

#### 4.3.13.3 Ropes fixed at both ends

For a rope fixed at both ends, typically for climbing up, it shall not be possible to make a loop in the rope.

NOTE This requirement is intended to eliminate the danger of strangulation.

When a rope fixed at both ends is used in conjunction with another element, care shall be taken not to create entrapment situations, see 4.3.6.1.

#### 4.3.13.4 Chains

Chains for fitness equipment shall conform to the requirements of ISO 1834 as a minimum and shall have a maximum opening of 8,6 mm in any one direction except where connections are made, where the maximum opening shall be greater than 12 mm or less than 8,6 mm.

### 4.3.14 Spaces and areas

#### 4.3.14.1 Minimum spaces

Each piece of fitness equipment requires a minimum space. It shall consist of the following:

a) space occupied by the equipment;

b) training space;

c) movement space.

#### 4.3.14.2 Training space

The training space (see 3.4) shall offer the user sufficient space so that the fitness equipment can be used for the intended exercise without danger.

This space is a series of cylindrical spaces which take the average size of a user and the type of movement into consideration, see Figure 10. Each cylindrical space begins at the body support (see 3.10) and extends vertically upward along the direction of the user’s movement.

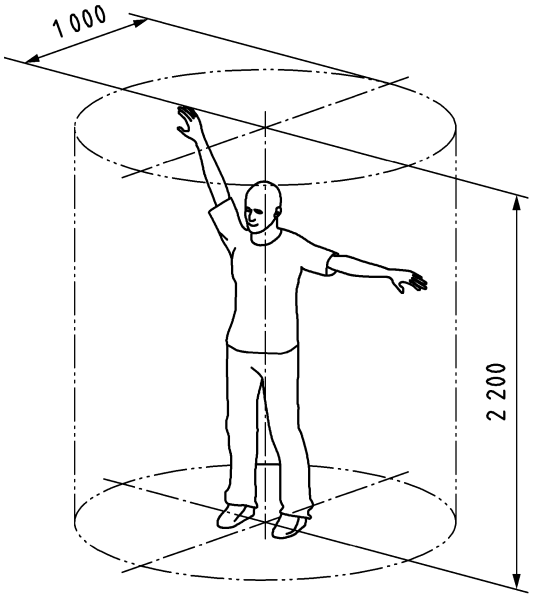
Dimensions of the cylinder are given in Table 2 for specification of the training space.

NOTE Where the exercise combines these positions (see Figure 10) the larger dimension applies in each direction.

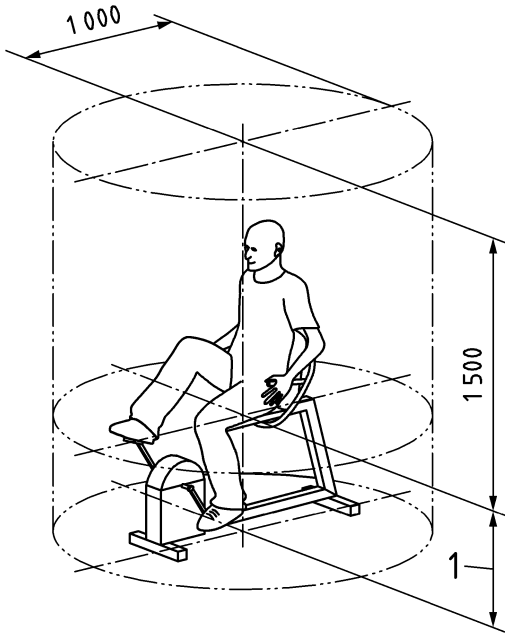
In determining the training space, the movements of the equipment and user shall be taken into account.

Training spaces shall not overlap with the exception of fitness equipment with multiple user stations as long as no dangerous situations result (see Figure 1).

Dimensions in millimetres



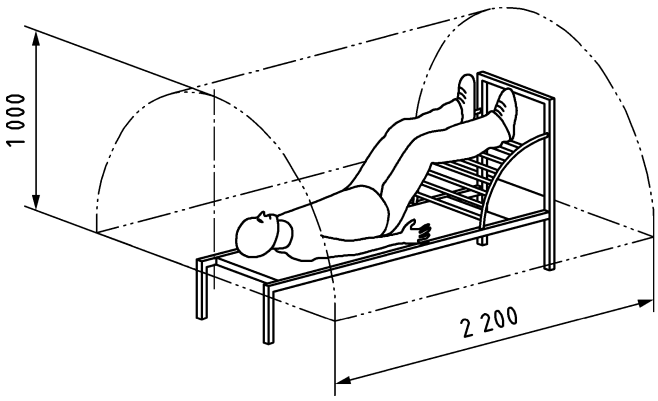

a) Training space, standing user



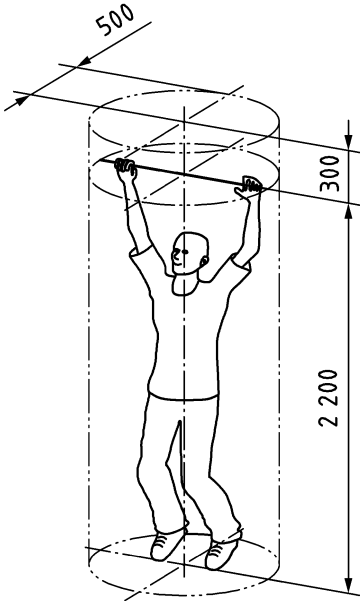

**Key**

1 seat height

b) Training space, sitting user




c) Training space, lying user




d) Training space, hanging user

**Figure 10 — Training spaces for different types of equipment use**

**Table 2 — Minimum dimensions of the cylinder for the determination of the training space**

| Type of use | Radius<br>mm | Height<br>mm |
|---|---|---|
| Standing | 1 000 | 2 200 |
| Sitting | 1 000 | 1 500 (from seat height) |
| Hanging | 500 | 300 above and 2 200 below hanging grip position |
| Lying [a] | 1 000 | 2 200 |
| NOTE In the case of 'hanging', $h$ = 300 mm because of the possibility for users to pull themselves up (see Figure 10 d)). | | |
| [a] In the case of lying, height shall be understood as length. | | |

Within the training space, no hard or sharp-edged equipment parts upon which the user could fall from a free height of fall of more than 600 mm are permitted (here, standing surfaces are not considered equipment parts).

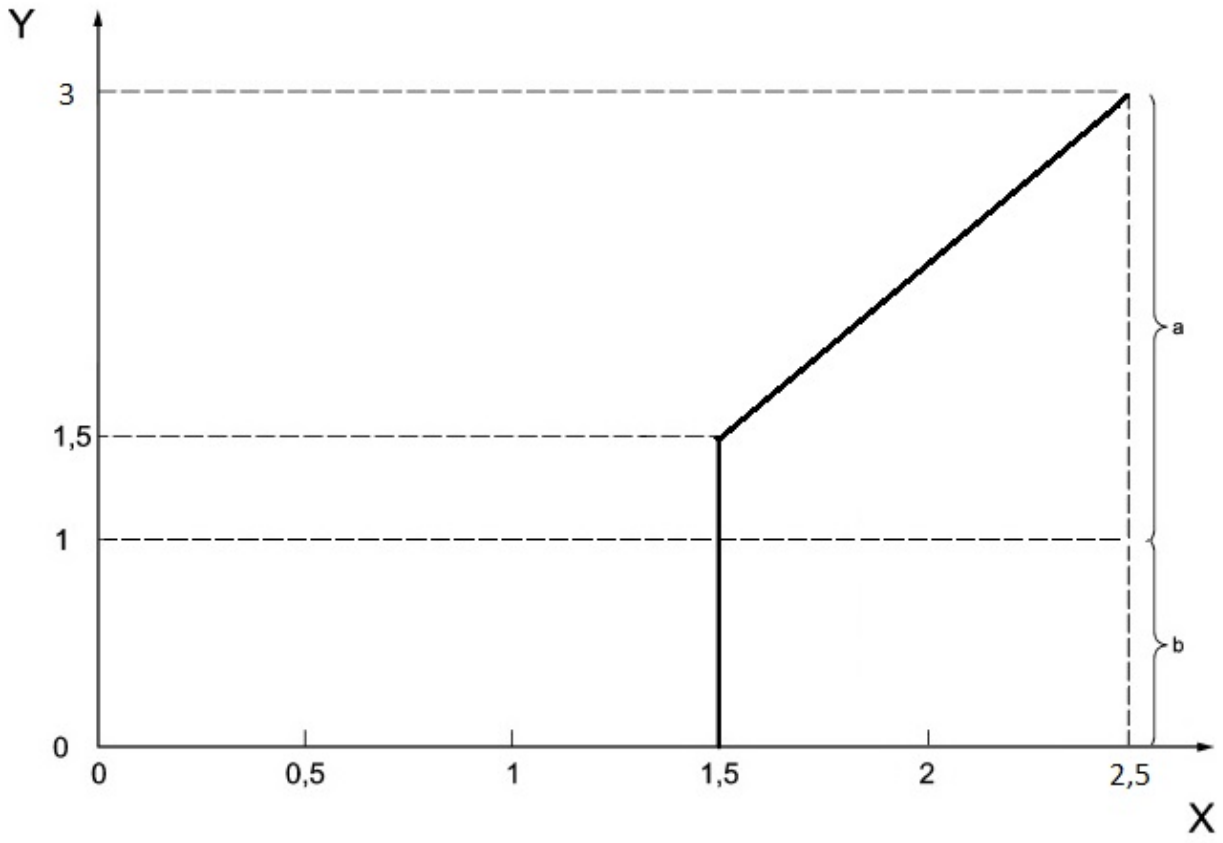
For equipment with a seated training position where, as a result of sufficient simultaneous foot and hand support, a fall during access, training and egress is not to be assumed, hard equipment parts with a free height of fall of more than 600 mm are permitted. This is only applicable if access to higher training positions is not encouraged.

EXAMPLE A bicycle ergometer. (See Figure 10 b)).

#### 4.3.14.3 Area of movement

##### 4.3.14.3.1 Dimensions

Dimensions of the area of movement (see 3.2) of fitness equipment shall be determined in accordance with Figure 11. The possible movements of the equipment and the user shall be taken into account.




**Key**

if Y ≤ 1,5, then X = 1,5 (in metres)

if Y > 1,5, then X = 2/3 · Y + 0,5 (in metres)

a impact attenuation surface with requirements

b surface with no requirements, unless there is a forced movement

X minimum dimensions of the area of movement

Y free height of fall

**Figure 11 — Dimensions of the area of movement**

#### 4.3.14.3.2 Ground composition

Examples of commonly used ground materials, depending on the free height of fall (see 4.3.14.5) are listed in Table 3.

**Table 3 — Types of ground, depending on the permissible free height of fall**

| | Ground material[a] | Description | Minimum layer depth[a] mm | max. height of fall mm |
|---|---|---|---|---|
| 01 | Concrete/stone | — | — | ≤ 1 000 |
| 02 | Bitumen-bonded surfaces | — | — | ≤ 1 000 |
| 03 | Topsoil | — | — | ≤ 1 200 |
| 04 | Lawn | — | — | ≤ 1 500 |
| 05 | Bark mulch | Crushed bark from conifers, 20 mm to 80 mm grain size | 200 | ≤ 2 000 |
| | | | 300 | ≤ 3 000 |
| 06 | Woodchip | Mechanically crushed wood (no wood-based materials), without bark or foliage, 5 mm to 30 mm grain size | 200 | ≤ 2 000 |
| | | | 300 | ≤ 3 000 |
| 07 | Sand [b, c] | 0,2 mm to 2 mm grain size | 200 | ≤ 2 000 |
| | | | 300 | ≤ 3 000 |
| 08 | Gravel [b, c] | 2 mm to 8 mm grain size | 200 | ≤ 2 000 |
| | | | 300 | ≤ 3 000 |
| 09 | Other materials and other layer depths | In correspondence with HIC test (see EN 1177) | | Critical height of fall as tested |

[a] For loose fill material, add 100 mm to the minimum layer depth.

[b] No silty or clayey particles, grain size may be identified by use of a sieve test in accordance with EN 933–1.

[c] Not suitable for equipment which requires firm footing positioning of the user.

The area of movement for fitness equipment with a free height of fall of more than 1 000 mm and/or equipment which causes forced movement of the user shall be equipped with an impact damping ground surface.

Impact damping materials should be suitably maintained. Failure to maintain such surfaces causes significant reduction in impact damping.

#### 4.3.14.4 Movement space

The height of the movement space shall be at least 2,2 m above the area of movement (see 4.3.14.3). The movement space shall be free of obstacles and is not intended for viewers. In this space, no objects shall be found upon which users could fall and cause injury to themselves, e.g. posts which are not flush with adjacent parts or projecting foundations.

In the instance of a forced movement, the movement space shall be expanded by at least 0,5 m. In the instance of equipment which is set-up on or against a wall with a minimum height which is the same as that of the training space, the movement space is permitted to be reduced.

Movement spaces including areas of movement may overlap. Exceptions to this are movement spaces around equipment with forced movement.

#### 4.3.14.5 Free height of fall

The requirements for free height of fall are specified in Table 4.

In determining the free height of fall, the possible movements of the fitness equipment and of the user shall be taken into account. Thereby, the maximum movement of the equipment or the user shall be authoritative.

In case of fitting elements which are not designated for the intended use of the fitness equipment, it is not required for them to be included in the free height of fall unless access has been encouraged.

NOTE 1 Examples for fitting elements are huts, bridges, pavilions, benches, railings, roof overs, lamps and waste containers.

NOTE 2 Examples of features that encourage access are hand and foot holds for climbing.

**Table 4 — Free height of fall for different types of use**

| Type of use | Vertical distance | Max. free height of fall<br>m |
|---|---|---|
| Standing | From foot support to surface below | 2 |
| Sitting | From seat to surface below | 1 |
| Hanging<br>(when full body support is provided by the hands only and the whole body can be lifted up to the hand support.) | From hand support height minus 1 m to surface below | 3 |

Within the training space, no hard or sharp-edged equipment parts are permitted which a user could strike when falling from a free height of fall of more than 600 mm (standing surfaces are not considered equipment parts).

#### 4.3.15 Foundations

Foundations shall be designed such that they do not present a hazard (e.g. tripping, impact).

In the case of loose fill material (e.g. sand), foundations shall be installed or laid in accordance with one of the following:

a) foundations of the equipment to which the pedestals, footings and fixings are attached shall be at least 400 mm below the ground surface or the installed depth of surfacing; or

NOTE This does not include the socket of post shoes or similar which a continuation of the attached post.

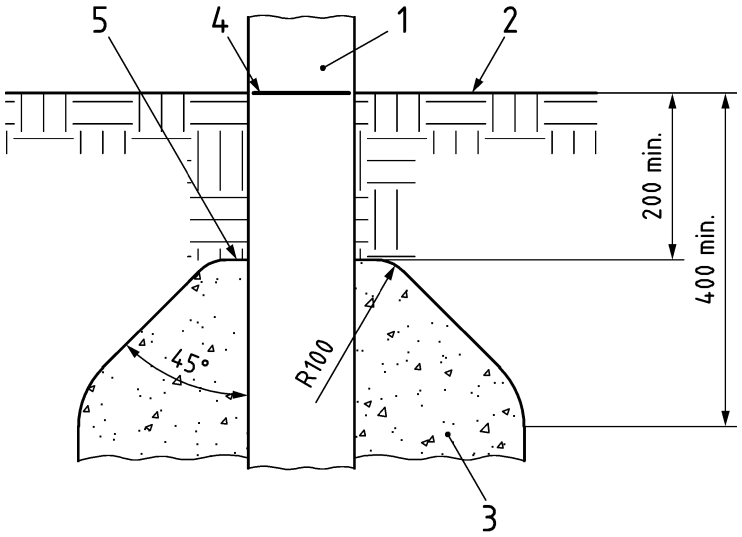
b) the top of the foundations shall be at least 200 mm below the ground surface, as shown in Figure 12; or

c) foundations shall be covered by pieces of equipment or equipment parts; or

d) foundations shall be formed by above ground support shoes.

Any parts protruding from the foundations (e.g. ends of screws) shall be at least 400 mm below the ground surface, unless they are effectively covered.

Dimensions in millimetres




**Key**

1 post
2 ground surface
3 foundation
4 basic level mark
5 top of foundation

**Figure 12 — Example of foundations**

# 5 Test methods

## 5.1 General

Unless specified otherwise, the requirements of Clause 4 shall be verified by measurement, visual examination or practical tests.

## 5.2 Test methods for entrapment

### 5.2.1 General

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

a) ± 1 mm for dimensions; and

b) ± 1° for angles.

In situations of doubt relating to the tolerances when using the probes, 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 worst case position.

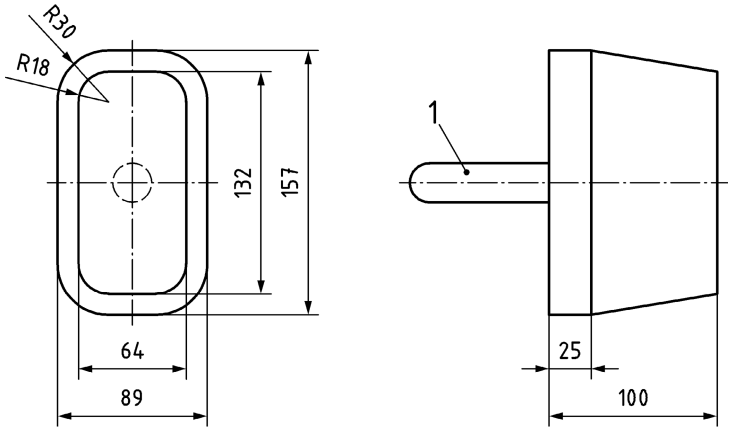
### 5.2.2 Test method for head and neck entrapment

#### 5.2.2.1 Completely bound openings

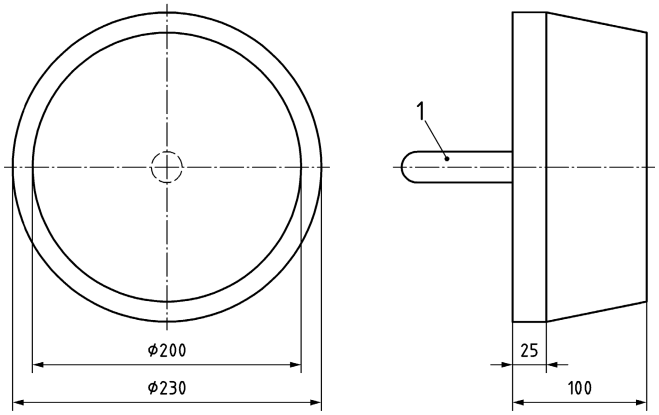
##### 5.2.2.1.1 Apparatus

Template, as demonstrated in Figure 13.

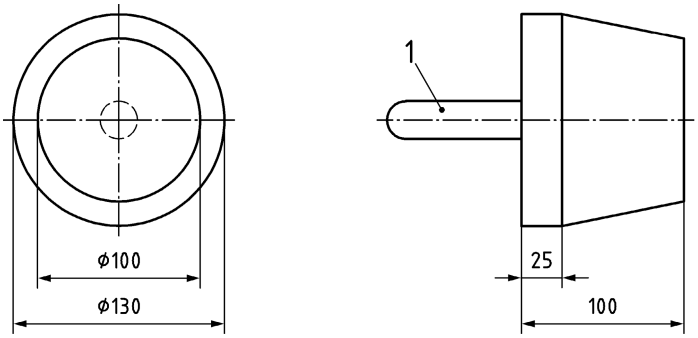
Dimensions in millimetres




**a) Probe C**




**b) Probe D**




**c) Probe E**

**Key**

1 handle

**Figure 13 — Probes for determination of head and neck entrapment in completely bound openings**

#### 5.2.2.1.2 Procedure

The probes are applied successively to each relevant opening in accordance with Figure 13.

It is established and reported which probes fit through the opening. If any of the probes do not freely fit through the opening, a force of (222 ± 5) N is applied to the probe.

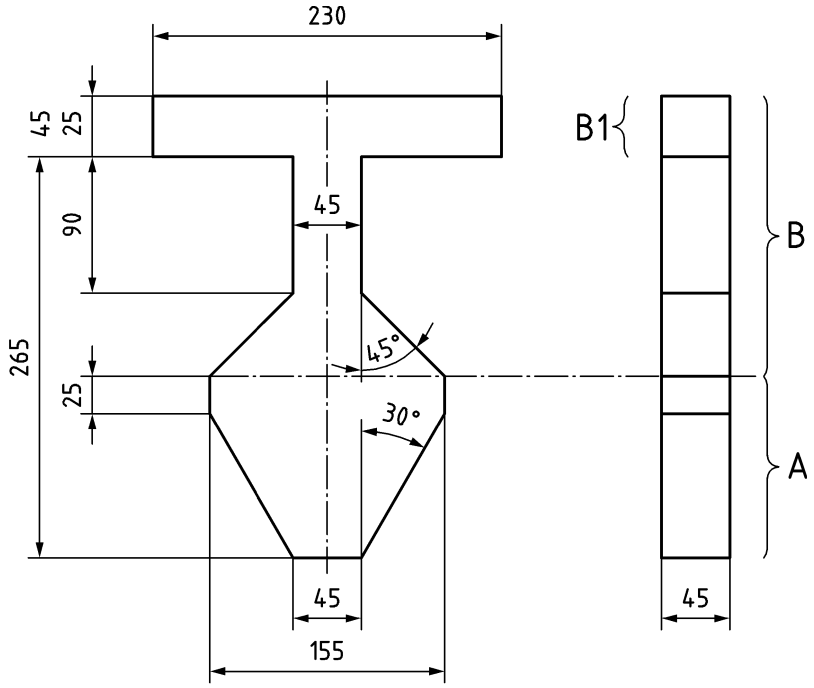
The probe shall be used with the axis perpendicular to the plane of the opening.

### 5.2.2.2 Partially bound and V-shaped openings

#### 5.2.2.2.1 Apparatus

Test template, as illustrated in Figure 14.

Dimensions in millimetres




**Key**

A ‘A’ portion of the probe

B ‘B’ portion of the probe

B1 shoulder section

**Figure 14 — Test template for determination of head and neck entrapment in partially bound and V shaped openings**

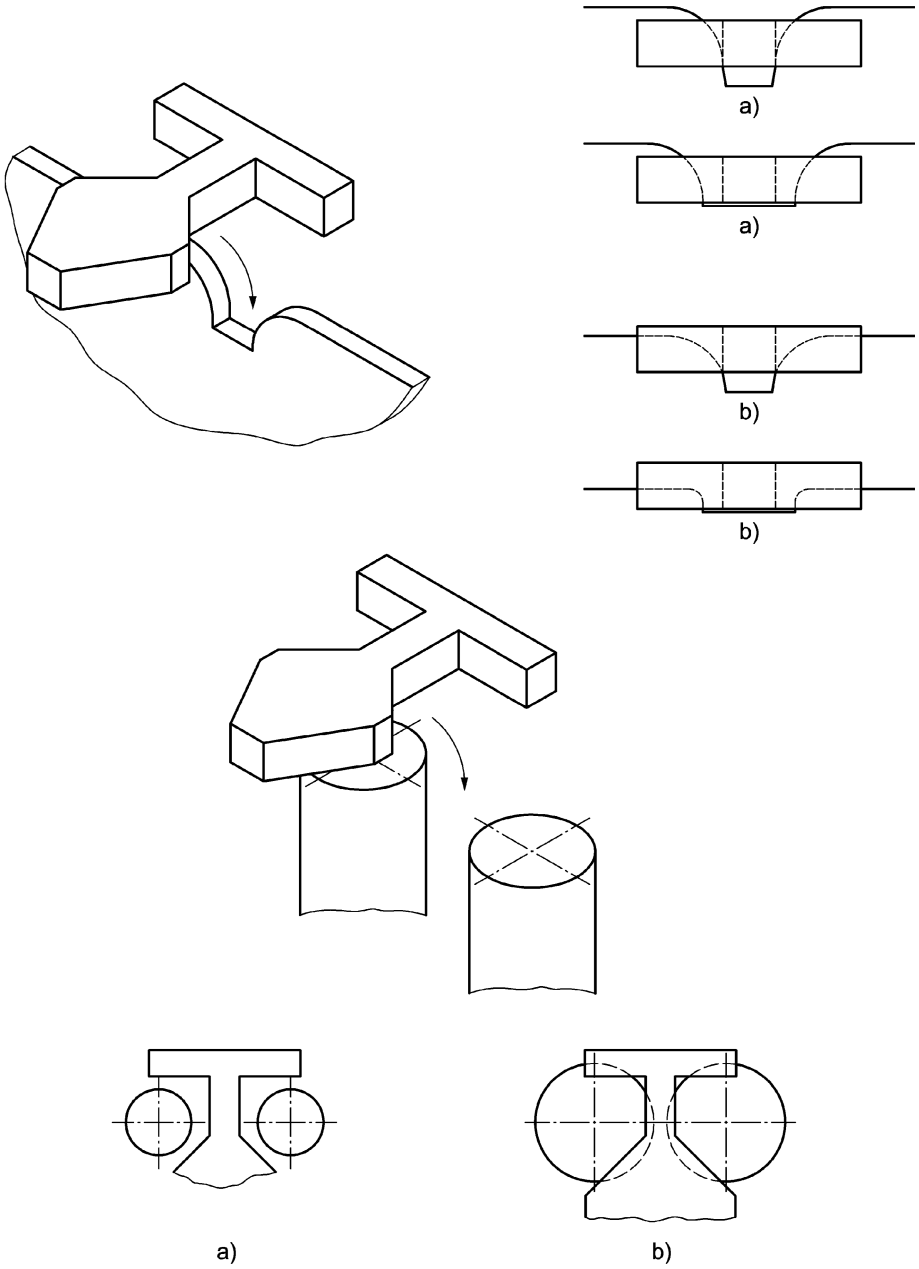
#### 5.2.2.2.2 Procedure

The ‘B’ portion of the test template is positioned between and perpendicular to the boundaries of the opening, as shown in Figure 15. It is determined and reported whether the template fits within the boundaries of the opening or whether 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), the ‘A’ portion of the test template is applied, so that its centre line is orientated to check the extremities of the opening as well as the centre line.

Ensure that the plane of the test template is parallel and applied in line with the opening, as shown in Figure 15.

The test template is inserted along the opening until its motion is arrested by contact with the boundaries of the opening. The results including the angle of the template centre line relative to the vertical and horizontal axes (see Figure 15) are determined and reported as this will determine the pass/fail requirements given in 4.3.6.1. See Figures 17 and 18 for examples of the evaluation of the different angular ranges.

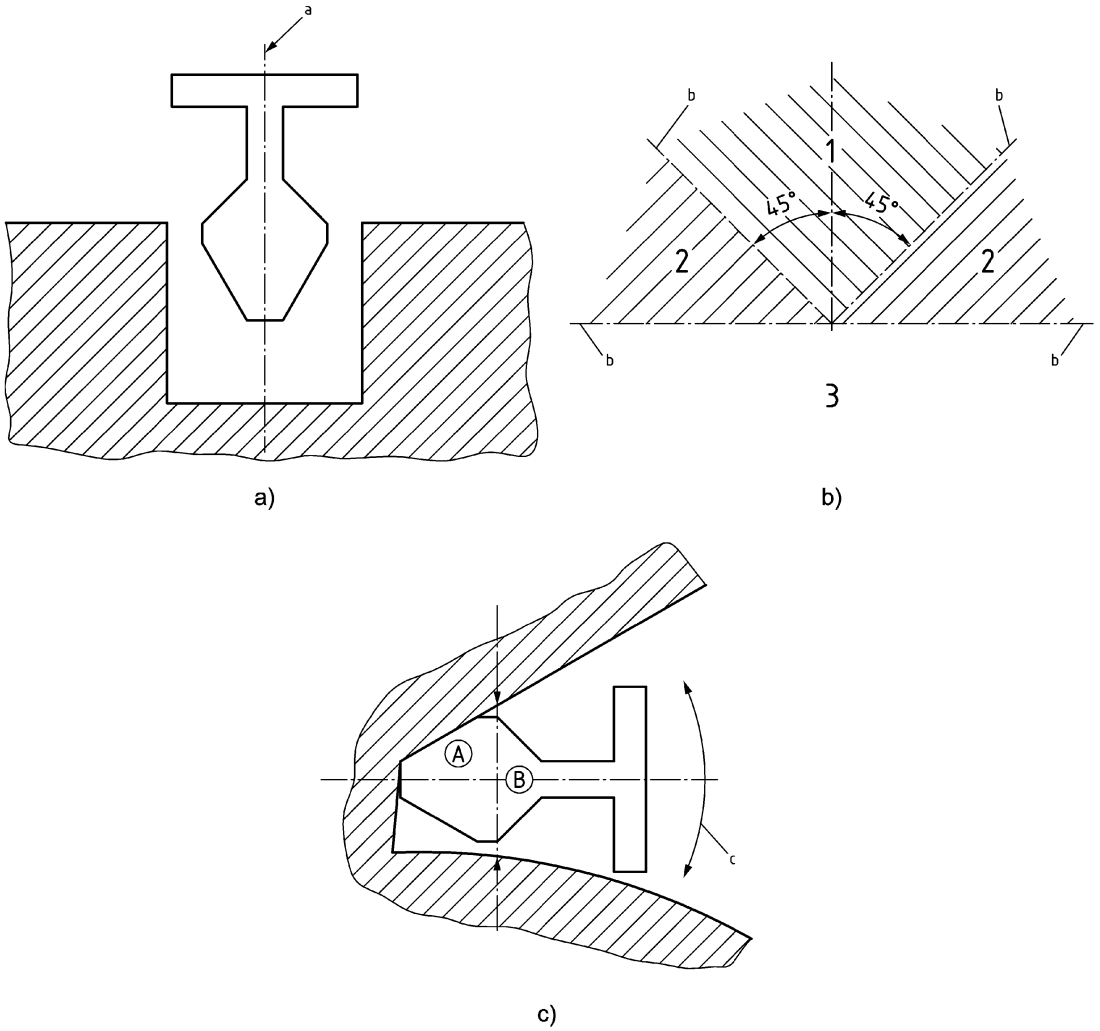



**Key**

a accessible

b not accessible

**Figure 15 — Method 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

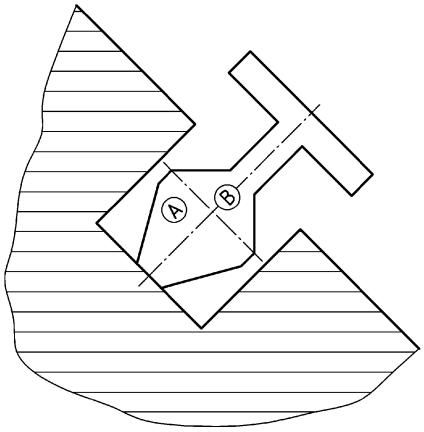
b) template centre line

c) check all insertion angles

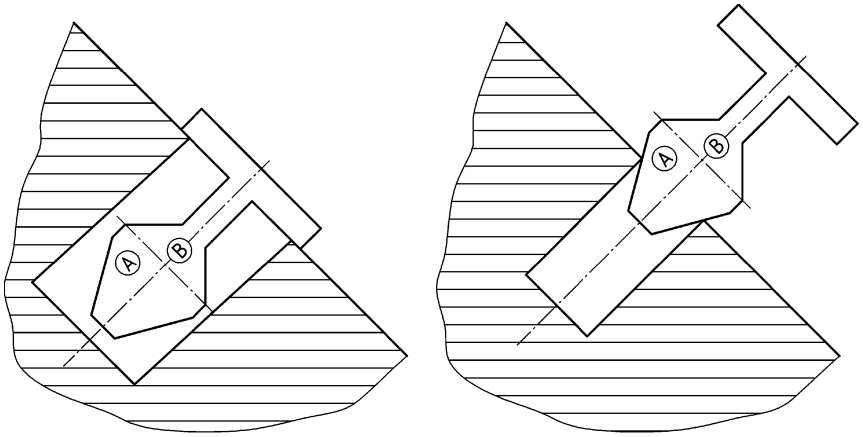
A Part 'A' of the template

B Part 'B' of the template

**Figure 16 — Checking of all insertion angles to determine the ranges**

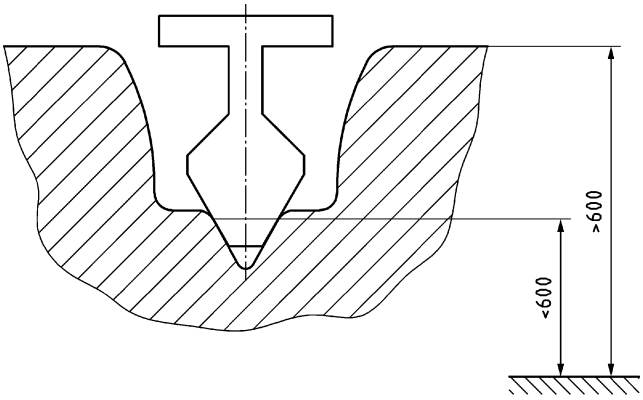



**a) Pass if front section fully enters opening to a maximum depth of 265 mm (template shoulder depth)**




**b) Fail**

Dimensions in millimetres




**c) Pass**

**Key**

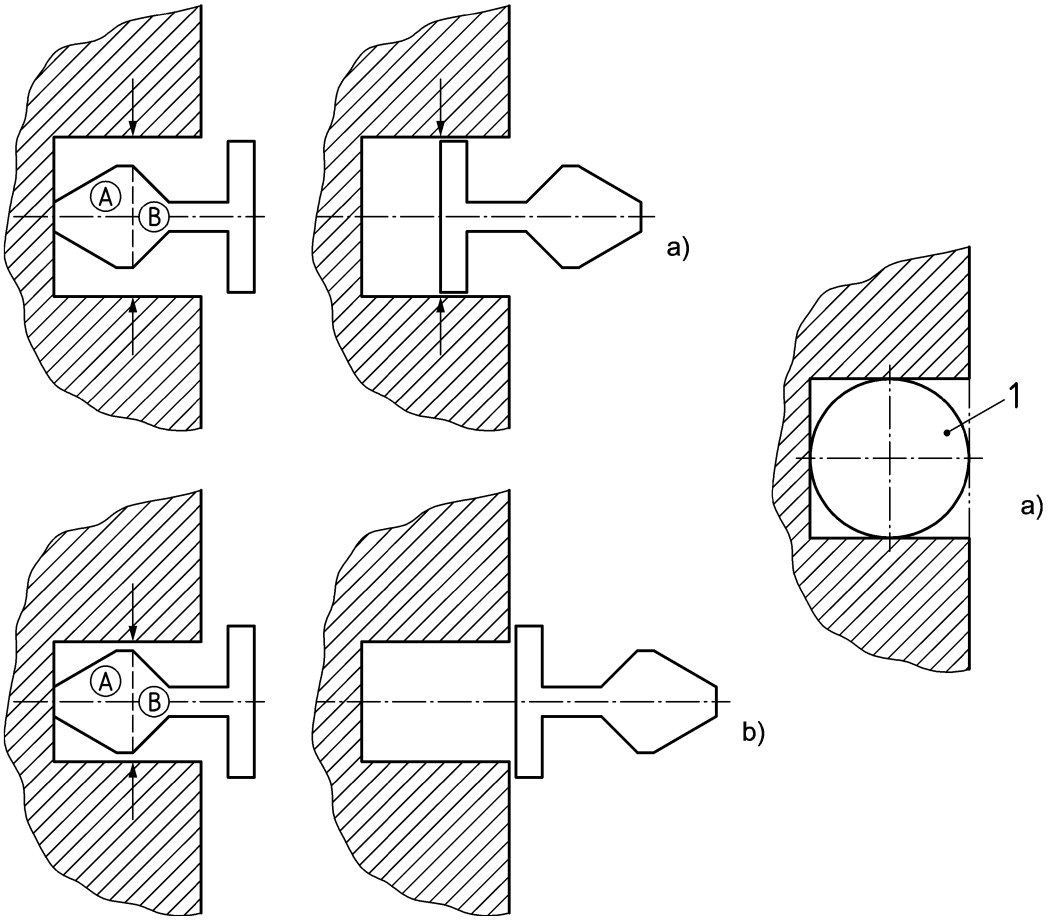
> 600 mm = more than 600 mm above the ground surface

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

A Part 'A' of the template

B Part 'B' of the template

**Figure 17 — Range 1 — Method of insertion of the ‘A’ portion of the test template**




**Key**

a) pass

b) fail

1 probe D

A Part 'A' of the template

B Part 'B' of the template

**Figure 18 — 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**

NOTE By the use of the right hand a) with one large head probe (230 mm), if the opening allows full insertion no further test is required.

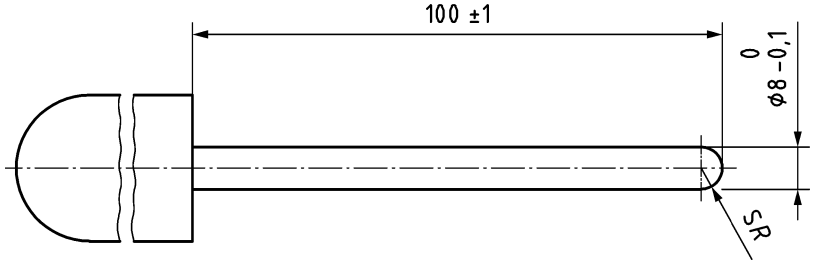
### 5.2.3 Test method for finger entrapment

#### 5.2.3.1 Apparatus

Finger probe and finger rod as illustrated in Figures 19 and 20.

It shall be investigated whether the probe gets caught.

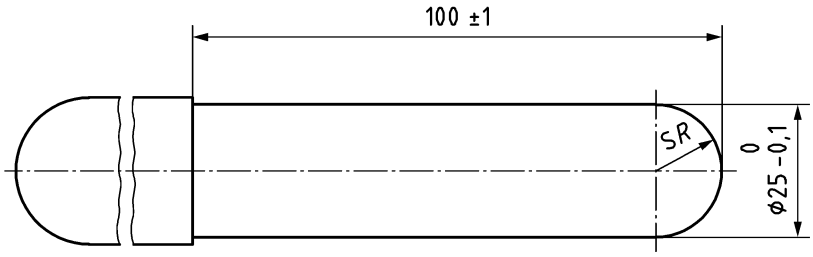
Dimensions in millimetres




**Key**

SR spherical radius

**Figure 19 — Finger probe**




**Key**

SR spherical radius

**Figure 20 — Finger rod**

#### 5.2.3.2 Procedure

The 8 mm diameter finger probe is applied to the minimum cross section of the opening and, if the probe does not fit through, it is moved as illustrated in Figure 21.

It is determined and reported whether the probe fits through the opening and if it locks in any position when moved through the conical arc shown in Figure 21.

If the 8 mm diameter finger probe fits through the opening, the 25 mm diameter finger rod is applied.

It is determined and reported whether the 25 mm diameter finger rod fits through the opening and, if it does so, whether access is then given to another finger entrapment site.

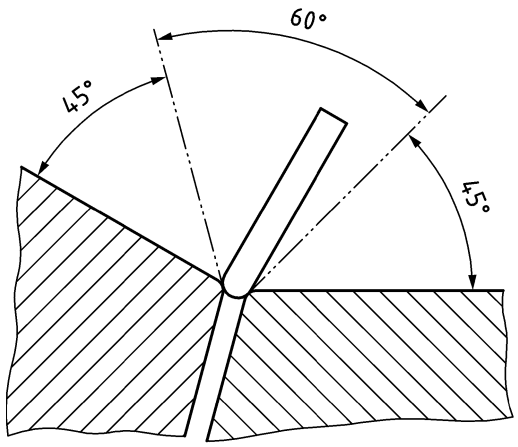



**Figure 21 — Movement of the 8 mm diameter finger probe**

## 6 Test report

If a test report is provided it shall include, as a minimum, the following information:

a) name and address of the organization conducting the test and the location where the test was carried out, when different from their address;

b) unique identification of report (e.g. serial number) and of each page, and the total number of pages of the report;

c) reference to this European Standard (EN 16630);

d) name and address of client;

e) description and identification of the test item;

f) date of receipt of test item and date of test performance;

g) information on the test requirements or description of the method or procedure;

h) description of selection of samples (where relevant);

i) any deviations from, additions to or exclusions from the test requirements, and any other information relevant to the specific test;

j) measurements, examinations and derived results, supported by tables, graphs, sketches and photographs as appropriate, and any failures detected;

k) establishment of measurement uncertainties (where relevant);

l) signature and title or an equivalent identification of person(s) accepting technical responsibility for the test report and the date of issue;

m) statement to the effect that the test results relate only to the items tested.

# 7 Information for use

## 7.1 Facilities

An information sign with the following minimum information shall be provided at fitness equipment facilities in an easily conspicuous form:

**Fitness equipment facilities:**

— equipment use for youth and adults or having an overall height greater than 1 400 mm only;

— read and follow the exercise instructions on the equipment;

— assurance about own medical safety before use;

— avoid over-exertion when using the equipment;

— general emergency telephone number;

— telephone number and internet URL to contact maintenance personnel;

— address of the facility.

## 7.2 Fitness equipment

On or adjacent to each piece of fitness equipment, the following information shall be attached in a durable and clearly conspicuous form:

a) exercise instructions with the corresponding pictogrammes;

b) main functions of the equipment;

c) safety information, if necessary;

d) highest permissible user weight, if necessary.

# 8 Marking

The equipment shall be marked clearly and durably with at least the following information visibly positioned:

a) name and address of manufacturer or person placing it on the market;

b) equipment marking and year of manufacture;

c) number and date of this European standard (EN 16630).

When loose fill material is used, fitness equipment shall be marked clearly and durably with the basic level mark. See also Figure 12.

# 9 Information to be provided by the manufacturer

## 9.1 General

The manufacturer or supplier shall provide instructions in accordance with 9.2 to 9.4 in the respective language(s) of the country in which the fitness equipment is to be installed and used.

The instructions shall be printed legibly and in an easily comprehensible form and shall include, as a minimum, details of the assembly/set-up, use, inspection and maintenance of the fitness equipment.

Illustrations shall be included in the instructions wherever possible.

## 9.2 Assembly/set-up

Instructions for assembly/set-up of the fitness equipment shall include at least the following information, if required:

a) dimensions, minimum spaces (4.3.14.1) and free height of fall of the fitness equipment;

b) requirements for the ground material;

c) list of parts and components of the equipment, in the instance that the equipment is required to be assembled by the operator;

d) list of replacement parts;

e) information for assembly and for functional set-up of the fitness equipment;

f) list of any special tools required;

g) details about the foundation and anchorage.

## 9.3 Use

In addition to the information for use as given in Clause 7, the following information shall be made available to the operator:

a) the maximum permissible user body weight, if required;

b) short and easy to comprehend description of the function of the fitness equipment;

c) description of the handling of possible adjustment devices;

d) any additional measures to be taken during the run-in period of the equipment (e.g. tightening of fastening elements).

## 9.4 Inspection and maintenance

**9.4.1** The intended safety shall be maintained and ensured through inspection and maintenance of the fitness equipment. An orientation regarding the frequency of inspections by the operator or by an institution or person contracted by the operator shall be provided by the manufacturer. In particular, the design of the fitness equipment, the materials used and the age of the equipment shall be taken into account.

The following levels apply for inspections:

a) routine visual inspection:

    1) inspection intended to identify obvious hazards that can result, e.g. from normal use, vandalism or weather conditions;

NOTE 1 For fitness equipment facilities subject to heavy use or vandalism, daily inspection of this type can be necessary.

NOTE 2 Examples of aspects to be subjected to visual and operational inspection are: cleanliness, equipment ground clearances, ground surface finishes, exposed foundations, sharp edges, missing parts, excessive wear (of moving parts) and structural integrity.

b) operational inspection:

   1) inspection, more detailed than routine visual inspection, to check the operation and stability of the fitness equipment;

   2) this should be carried out every one to three months, or as indicated in the manufacturer's/distributor's instructions;

c) annual main inspection:

   1) inspection intended to establish the overall state of the equipment with regard to operational safety (annual main inspection).

Special attention should be given to 'sealed-for life' parts and equipment where stability relies on one post.

NOTE 3 The annual main inspection could require excavation or dismantling of certain parts.

**9.4.2** For each piece of fitness equipment, the manufacturer/supplier is required to supply maintenance instructions which contain the following minimum information:

a) information regarding any design details requiring care (e.g. lubrication, tightening of bolts, re-tensioning of chains and ropes);

b) immediate replacement or repair of missing, damaged or worn fitness equipment components;

c) securing of proper surface finishes beneath the equipment;

d) installation of replacement parts in accordance with the manufacturer's specifications only;

e) indication of materials which require special disposal, if such materials have been used.

**9.4.3** If, by maintenance, it is difficult to determine at what point a material becomes brittle, manufacturers shall give an indication of the time period after which the part or the equipment should be replaced.

# Bibliography

[1] EN 957 (all parts), *Stationary training equipment*

[2] EN 1176-6:2008, *Playground equipment and surfacing — Part 6: Additional specific safety requirements and test methods for rocking equipment*

[3] EN 1176 (all parts), *Playground equipment and surfacing*

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

[5] EN ISO 6508-1, *Metallic materials - Rockwell hardness test — Part 1: Test method (ISO 6508-1)*

[6] 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