



BSI Standards Publication

## Stationary training equipment

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Part 6: Treadmills, additional specific safety requirements and test methods

# National foreword

This British Standard is the UK implementation of [ISO 20957-6:2021](#).

The UK participation in its preparation was entrusted to Technical Committee SW/136, Sports, playground and other recreational equipment.

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

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

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2021-02-08

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Stationary training equipment —  
Part 6:  
Treadmills, additional specific safety  
requirements and test methods

*Équipement d'entraînement fixe —  
Partie 6: Tapis de course, exigences spécifiques de sécurité et  
méthodes d'essai supplémentaires*



Reference number  
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CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by the European Committee for Standardization (CEN) (as EN 957-6:2010+A1:2014) and was adopted, without modification other than those given below by Technical Committee ISO/TC 83, *Sports and other recreational facilities and equipment*.

- references to EN documents were replaced with their equivalent ISO standard;
- in [Clause 4](#), the NOTE was changed to body text;
- in [6.1](#), "comply" changed to "conform";
- in [6.11](#), in the NOTE, "may" was changed to "might";
- in [Clause 9](#), the footnote was changed to a NOTE;
- minor editorial changes.

This second edition cancels and replaces the first edition (ISO 20957-6:2005), which has been technically revised.

The main changes compared to the previous edition are as follows:

- specifications and definitions amended;
- list of significant hazards added ([Clause 4](#));
- modification of safety requirements and/ or protective measures ([Clause 6](#));
- deletion of the reference to ISO 5904<sup>1)</sup> in [6.11](#);
- requirements and test methods for the transmission elements and rotating parts amended;
- requirements and test methods for safety stop amended;

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1) Withdrawn.



- requirements for the static loading, especially for class S amended;
- requirement for the endurance testing of class I added;
- requirements and test methods for treadmills with front handlebar and side handrails amended;
- requirements for the footrail amended;
- requirements for the permanent marking and test methods of the running surface added;
- requirements and test methods for the acceleration of power-driven treadmills added;
- requirements and test methods for folding treadmills added;
- requirements and test methods for the heart rate control mode added;
- requirements and test methods for noise added;
- requirements for the marking of the maximum lateral position added;
- modification of the testing of endurance ([7.8](#));
- modification of the testing of the accuracy of time, speed and distance indications ([7.15](#));
- requirements for the test report and marking added;
- additional instructions for use extended;
- modification of [Figure 1](#);
- addition of [Figure 2](#);
- modification of [Figure 3](#);
- editorial changes.

A list of all parts in the ISO 20957 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).



# Introduction

This document is a type C standard as stated in [ISO 12100](#).

The machinery concerned and the extent to which hazards, hazardous situations and hazardous events are covered are indicated in the scope of this document.

When provisions of this type C standard are different from those which are stated in type A or B standards, the provisions of this type C standard take precedence over the provisions of the other standards, for machines that have been designed and built according to the provisions of this type C standard.





# Stationary training equipment —

## Part 6:

# Treadmills, additional specific safety requirements and test methods

## 1 Scope

This document specifies safety requirements and test methods for treadmills in addition to the general safety requirements and test methods of [ISO 20957-1](#). It is intended that this document is applied together with [ISO 20957-1](#).

This document deals with significant hazards, hazardous situations and events relevant to stationary training equipment used as intended and under the conditions of misuse foreseeable by the manufacturer (see [Clause 4](#)).

This document is applicable to power-driven as well as to non-power/manually driven training equipment type treadmills (hereafter referred to as treadmills) with the classes S, H and I and classes A, B and C regarding accuracy.

This document is not applicable to treadmills which are manufactured before its publication.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

[EN 60335-1](#), *Household and similar electrical appliances — Safety — Part 1: General requirements (IEC 60335-1:2010, modified)*

[EN 60601-1](#), *Medical electrical equipment — Part 1: General requirements for basic safety and essential performance (IEC 60601-1:2005)*

[ISO 11201](#), *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions in an essentially free field over a reflecting plane with negligible environmental corrections*

[ISO 11202](#), *Acoustics — Noise emitted by machinery and equipment — Determination of emission sound pressure levels at a work station and at other specified positions applying approximate environmental corrections*

[ISO 12100](#), *Safety of machinery — General principles for design — Risk assessment and risk reduction*

[ISO 12947-1:1998](#), *Textiles — Determination of the abrasion resistance of fabrics by the Martindale method — Part 1: Martindale abrasion testing apparatus*

[ISO 20957-1:2013](#), *Stationary training equipment — Part 1: General safety requirements and test methods*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in [ISO 20957-1](#) and the following apply.



3.11  
folding treadmill

treadmill designed with some components that can be moved to allow a more compact non-useable storage position

4 List of significant hazards

Table 1 shows the significant hazards, hazardous situations and events, as far as they are dealt with in this document, identified by risk assessment as significant for this type of equipment and which require action to eliminate or reduce the risk.

For a particular treadmill, a risk assessment should be carried out by the manufacturer to identify any additional significant hazards so that suitable protective measures can be taken. Additional hazards are outside the scope of this standard.

For identification and evaluation of hazards, ISO 12100 shall apply.

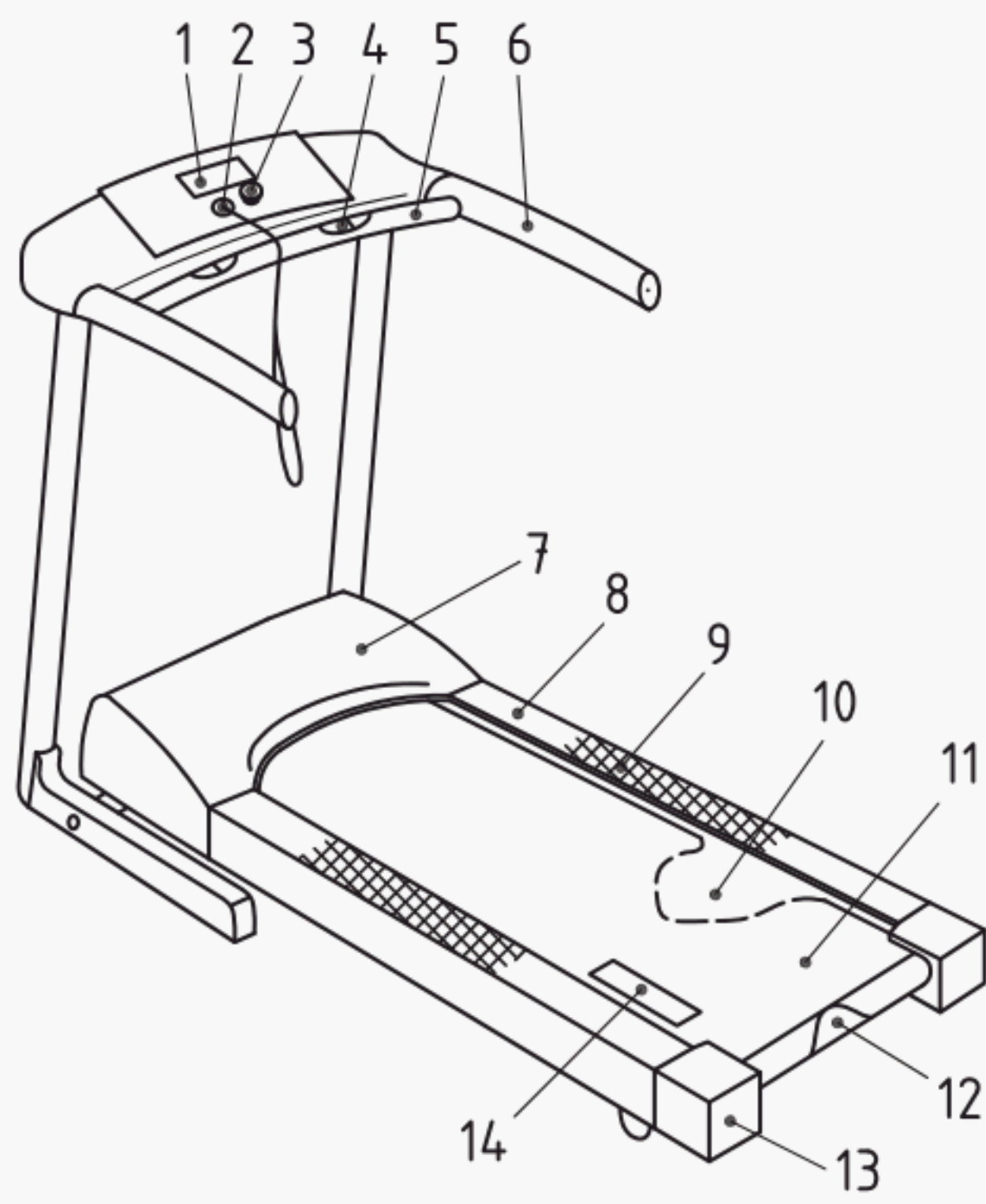
Table 1 — List of significant hazards and major sources of these hazards associated with treadmills

*)	Description	Associated activity/situation
1.	Mechanical hazards	
1.1.	Crushing	Inclining
		Folding
1.2.	Shearing	Inclining
		Folding
1.3.	Drawing-in or Trapping	Rear roller
		Drive system
1.4.	Falling	Sudden starts/stops
		Excessive speed variation
		Support failure
1.5.	Abrasion	Contact with moving running surface
1.6.	Slippery surfaces	Slipping and Falling
1.7.	Stored energy	Folded treadmills falling down
		Springs or elastomeric devices prior to assembly
2.	Electrical hazards	
2.1.	Electrocution	Contact with live components
3.	Thermal Hazards	
3.1	Burns	Contact with hot surfaces
4.	Hazards generated by neglecting ergonomic principles in design process	
4.1.	Ineffective ergonomics	Size or location of support surfaces
		Running surface dimensions
4.2.	Human errors, human behaviour	Reasonably foreseeable misuse
5.	Noise Hazards	
5.1.	Disturbing acoustic communication	Moving treadmill motor and belt

5 Classification

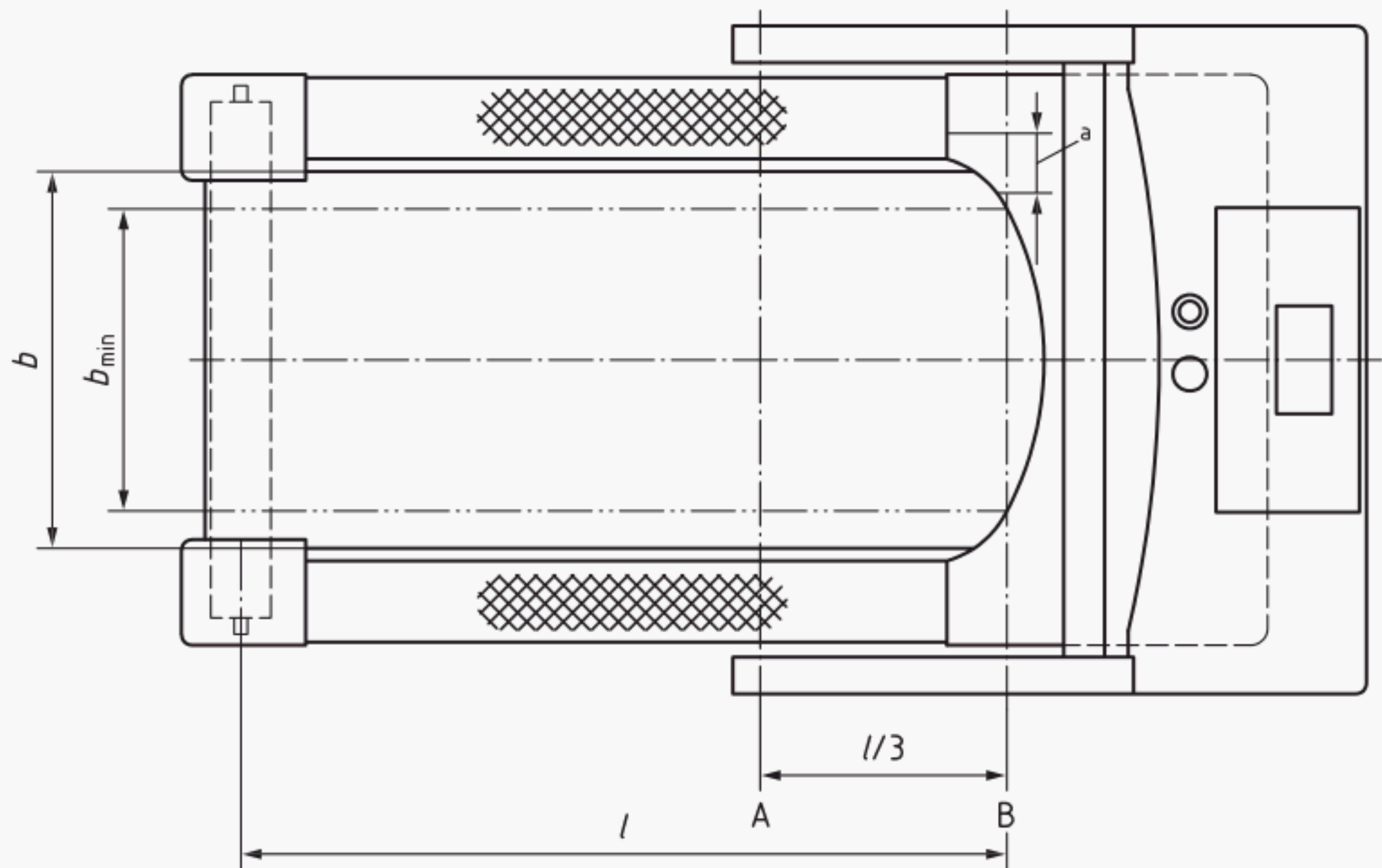
ISO 20957-1:2013, Clause 4 shall apply.





- Key**
- 1 display
  - 2 safety stop (cord type)
  - 3 safety stop (mushroom type)
  - 4 heart rate hand sensor
  - 5 front handlebar
  - 6 side handrail
  - 7 front protective cover
  - 8 foot rail
  - 9 non slip surface
  - 10 running deck
  - 11 running surface
  - 12 rear roller
  - 13 rear roller protective cover
  - 14 marking of the running surface

**Figure 1 — Example of a treadmill**



**Key**

- A line located at 1/3 of the length of the running surface measured from B
- B front end of the running surface
- $a$  identifiable feature according to [6.3](#)
- $b$  width of the running surface
- $b_{min}$  minimum required width of the running surface according to [Table 2](#)
- $l$  length of the running surface

**Figure 2 — Definition of main measures**

## 6 Safety requirements and/or protective measures

### 6.1 General

The equipment shall conform with the safety requirements and/or protective measures of this clause. In addition, the equipment shall be designed according to the principles of [ISO 12100](#) for relevant but not significant hazards, which are not dealt with by this document.

Fixed guards shall be fixed by systems that can be opened or removed only with tools. Fixed guards that have to be removed for maintenance, adjustment or inspection shall be retained by fasteners that are retained in the guard or machine when the guard is removed.

### 6.2 Squeeze and shear points within the accessible area

All parts of treadmills, including any folding mechanism, shall be in accordance with [ISO 20957-1:2013](#), 5.3.3 and 5.3.4 in folded position, during folding and in useable position. For folding treadmills the lock for securing the equipment is excluded.

Where the inclination can be changed during operation thus causing the distance between any part of the equipment and the floor to become smaller than 60 mm, the speed of inclination shall not exceed 1°/s and the user shall be able to stop this movement.



6.3 Transmission elements and rotating parts

Drawing-in shall be prevented at all points between the running surface and fixed or moving parts of the treadmills or the floor.

Identifiable feature(s) indicating the acceptable lateral position(s) of the running surface shall be provided on the treadmill [see footnote <sup>a</sup> in [Figure 2](#) and [Clause 10 g](#)].

When tested in accordance with [7.1](#), it shall not be possible that the test finger becomes trapped between the rear roller guard and the running surface. With the running surface centred, the rear roller guard shall overlap the edges of the running surfaces by min. 10 mm and max. 40 mm (see [Figure 3](#)).

The vertical gap between the running surface and the rear roller guard or overlapping foot rails shall not be more than 9,5 mm.

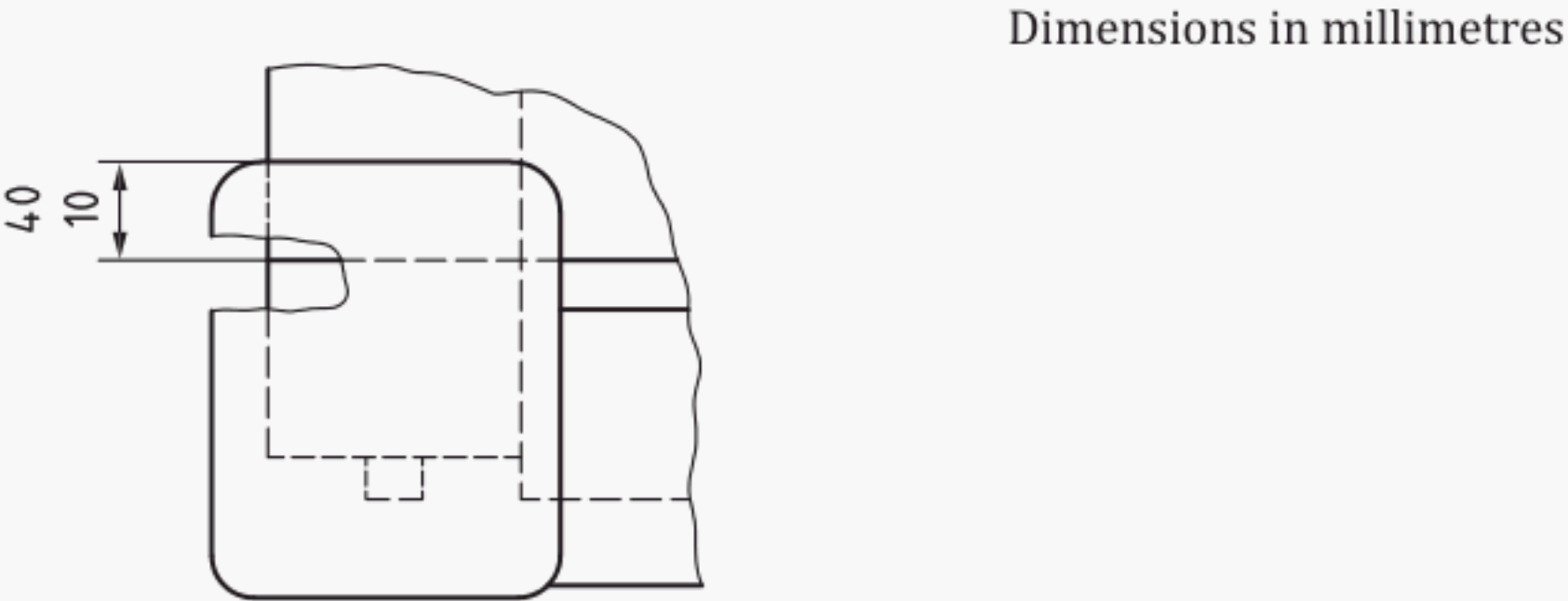


Figure 3 — Example of a rear roller guard (min. 10 mm and max. 40 mm)

6.4 Temperature rise

When tested in accordance with [7.2](#), accessible parts of the treadmill shall not have a temperature greater than 65 °C.

6.5 Safety stop (emergency stop)

6.5.1 General

All power-driven treadmills shall be equipped with a safety stop switch, which shall include a push-button operated switch and/or a pull-cord operated switch.

The push-button type or pull cord safety stop actuator shall be in a reachable position in front of the user and in an area of ±180 mm parallel to the centreline of the running surface.

Test in accordance with [7.3](#).

If the push-button type safety stop actuator is outside this area it shall be duplicated on the opposite side except when a pull-cord actuator is provided.

6.5.2 Characteristics

Operating the safety stop shall result in the machine cutting off the main power of the motor and the inclination system without relying on any software functions.

The contacts of manually operated safety stop devices shall ensure positive opening. The achievement of contacts separation shall be the direct result of a specified movement of the switch actuator through non-resilient members. Emergency stop relays or manually reset fail-safe relays may be used.

It shall not be possible to restore the circuit until the actuator of the safety stop device has been manually reset. After restoring the circuit, the equipment shall restart with standstill and the incline



shall stay the same or reset according to [6.2](#). Where several safety stop devices are provided, the circuit shall not be restored until all actuators previously operated have been reset.

Test in accordance with [7.3](#).

### **6.5.3 Actuator(s)**

Actuators of safety stop devices shall be coloured red. The actuator of a push-button operated switch shall be of the palm or mushroom head type and shall have a yellow background.

The background around the actuator shall be at least 5 mm wider than the actuator itself on all sides.

Pull-cord safety stop actuators shall release with a maximum force of 50 % of the force required to release the attachment device when attached to the user according to the manufacturers' recommendation.

The actuator cord shall have a suitable length so that the actuator releases at a position not more than 70 % of the length of the running surface.

Test in accordance with [7.4](#).

## **6.6 Immobilization method**

For power-driven treadmills there shall be an immobilization method for the treadmill to prevent uncontrolled usage of third parties. This method shall be explained in the instructions for use.

Test in accordance with [7.5](#).

## **6.7 Stability**

The treadmill shall be stable in both training and storage positions when tested in accordance with [7.6](#).

## **6.8 Static strength of the running surface**

Classes H, S and I treadmills shall withstand a load four times the maximum user weight specified by the manufacturer or 4 000 N whichever is greater without fracture, cracking or permanent deformation. Verification shall be by testing in accordance with [7.7](#). The treadmill shall withstand the test in flat, mid and maximum inclination, where inclination is applicable.

When tested in accordance with [7.7](#), the running surface shall show no permanent deformation of more than 3 %.

## **6.9 Endurance**

When tested in accordance with [7.8](#), the treadmill shall withstand

- a) 12 000 impacts for class H, and
- b) 100 000 impacts for classes S and I.

The test shall not cause any fracture, cracking, or permanent deformation to the treadmill. After the test, the treadmill shall be capable of functioning correctly according to the information given in the user's manual.



## 6.10 Handrails

### 6.10.1 General

Treadmills shall be equipped with two side handrails or with two side handrails and a front handlebar for user support and emergency dismount.

### 6.10.2 Treadmills with side handrails only

The top of the side handrails shall be at a height between 800 mm and 950 mm above the running surface measured vertically, which may not be perpendicular to the running surface at all incline positions.

The distance between the side handrails shall not exceed 900 mm (inside to inside).

Each side handrail shall extend beyond line A (see [Figure 2](#)). The side handrails shall show no permanent deformation of more than 3 % when tested in accordance with [7.9](#).

### 6.10.3 Treadmills with front handlebar and side handrails

Either the side handrails shall be in accordance with [6.10.2](#) or the front handlebar shall be at a height between 800 mm and 950 mm above the running surface in any inclination. The front handle bar shall consist of a single grip-able length of minimum 500 mm or two grip-able lengths of minimum 175 mm located symmetrically to the longitudinal axis of the running surface with a minimum distance of 375 mm and a maximum distance of 675 mm from centre to centre.

The side handrails and the front handlebar shall show no permanent deformation of more than 3 % when tested in accordance with [7.9](#). In the case of treadmills having both the side handrails and a front handlebar, both shall fulfil this requirement.

## 6.11 Foot rails

Treadmills shall be equipped with foot rails, see [Figure 1](#).

The foot rails shall be a minimum length of 70 % of the length of the running surface  $l$  (see [Figure 2](#)) and have a minimum width of 80 mm.

The foot rails shall cover at least 25 % of the length of the running surface  $l$  in front of line A and at least 45 % of the length of the running surface  $l$  behind line A, see [Figure 2](#). The upper surface of the foot rails shall have a minimum width of 70 mm. They shall have a slip resistant upper surface over minimum 70 % of the exposed length of the foot rail. The slip resistant surface shall have a coefficient of friction in the most onerous direction of more than 0,5.

Because of the narrow width of the foot rails, this test might be carried out on a shorter test length.

The lowest measured force shall be used for the friction factor calculation. When tested in accordance with [7.10](#), the foot rail shall not break.

The attachment of the side handrails to foot rails shall avoid a trip hazard.

NOTE This subclause does not apply to manual treadmills without incline or flywheel.

## 6.12 Running surface

Permanent marking in a contrasting colour is required on the running surface to determine if the belt is either moving or stationary. At least one marking shall be visible from the top view in any position of the running surface.

The markings on the running surface shall have a length between 150 mm and 450 mm and a width between 50 mm and 100 mm.



## 6.10 Handrails

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Treadmills shall be equipped with two side handrails or with two side handrails and a front handlebar for user support and emergency dismount.

### 6.10.2 Treadmills with side handrails only

The top of the side handrails shall be at a height between 800 mm and 950 mm above the running surface measured vertically, which may not be perpendicular to the running surface at all incline positions.

The distance between the side handrails shall not exceed 900 mm (inside to inside).

Each side handrail shall extend beyond line A (see [Figure 2](#)). The side handrails shall show no permanent deformation of more than 3 % when tested in accordance with [7.9](#).

### 6.10.3 Treadmills with front handlebar and side handrails

Either the side handrails shall be in accordance with [6.10.2](#) or the front handlebar shall be at a height between 800 mm and 950 mm above the running surface in any inclination. The front handle bar shall consist of a single grip-able length of minimum 500 mm or two grip-able lengths of minimum 175 mm located symmetrically to the longitudinal axis of the running surface with a minimum distance of 375 mm and a maximum distance of 675 mm from centre to centre.

The side handrails and the front handlebar shall show no permanent deformation of more than 3 % when tested in accordance with [7.9](#). In the case of treadmills having both the side handrails and a front handlebar, both shall fulfil this requirement.

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Because of the narrow width of the foot rails, this test might be carried out on a shorter test length.

The lowest measured force shall be used for the friction factor calculation. When tested in accordance with [7.10](#), the foot rail shall not break.

The attachment of the side handrails to foot rails shall avoid a trip hazard.

NOTE This subclause does not apply to manual treadmills without incline or flywheel.

## 6.12 Running surface

Permanent marking in a contrasting colour is required on the running surface to determine if the belt is either moving or stationary. At least one marking shall be visible from the top view in any position of the running surface.

The markings on the running surface shall have a length between 150 mm and 450 mm and a width between 50 mm and 100 mm.



Table 2 — Classified basic requirements

	Class A	Class B	Class C	Testing
Read out (display indicator)	speed, inclination (if fitted) in % (see <a href="#">Figure 4</a> ) distance, time in SI units	speed, inclination (if fitted) in %, distance, time in SI units	none	visual test, performance test
Accuracy	time ±1 % distance ±5 % speed ±5 % up to 2 km/h ± 0,1 km/h inclination (if any) ±10 % accuracy above 2 % inclination	time ±1 % <sup>a</sup> distance ±10 % speed ±10 % up to 2 km/h ± 0,2 km/h inclination (if any) ±15 % accuracy above 2 % inclination	none <sup>b</sup>	<a href="#">7.15</a>
Minimum length and width of the running surface for motor driven treadmills in mm	≤8 km/h: 1 000 × 400 >8 km/h to 16 km/h: 1 200 × 400 >16 km/h: 1 300 × 400	≤8 km/h: 1 000 × 400 >8 km/h to 16 km/h: 1 200 × 400 >16 km/h: 1 300 × 400	1 000 × 325 ≤6 km/h (walking) >6 km/h see class B	references to speed measuring test
Minimum length and width of the running surface <i>l</i> for manual driven treadmills in mm	not applicable	1 000 × 400	1 000 × 325	—
Minimum speed	≤0,5 km/h, increments 0,1	≤2 km/h, increments 0,5	≤3 km/h	<a href="#">7.15</a>
<div><div>a</div><div>For mechanical timing devices ±5 % is allowed.</div><div>b</div><div>If included:</div><div><div>– time ±2 %<sup>a</sup>;</div><div>– distance ±20 %;</div><div>– speed ±20 % up to 3 km/h ± 0,3 km/h;</div><div>– inclination ±25 % accuracy above 2 % inclination.</div></div></div>				

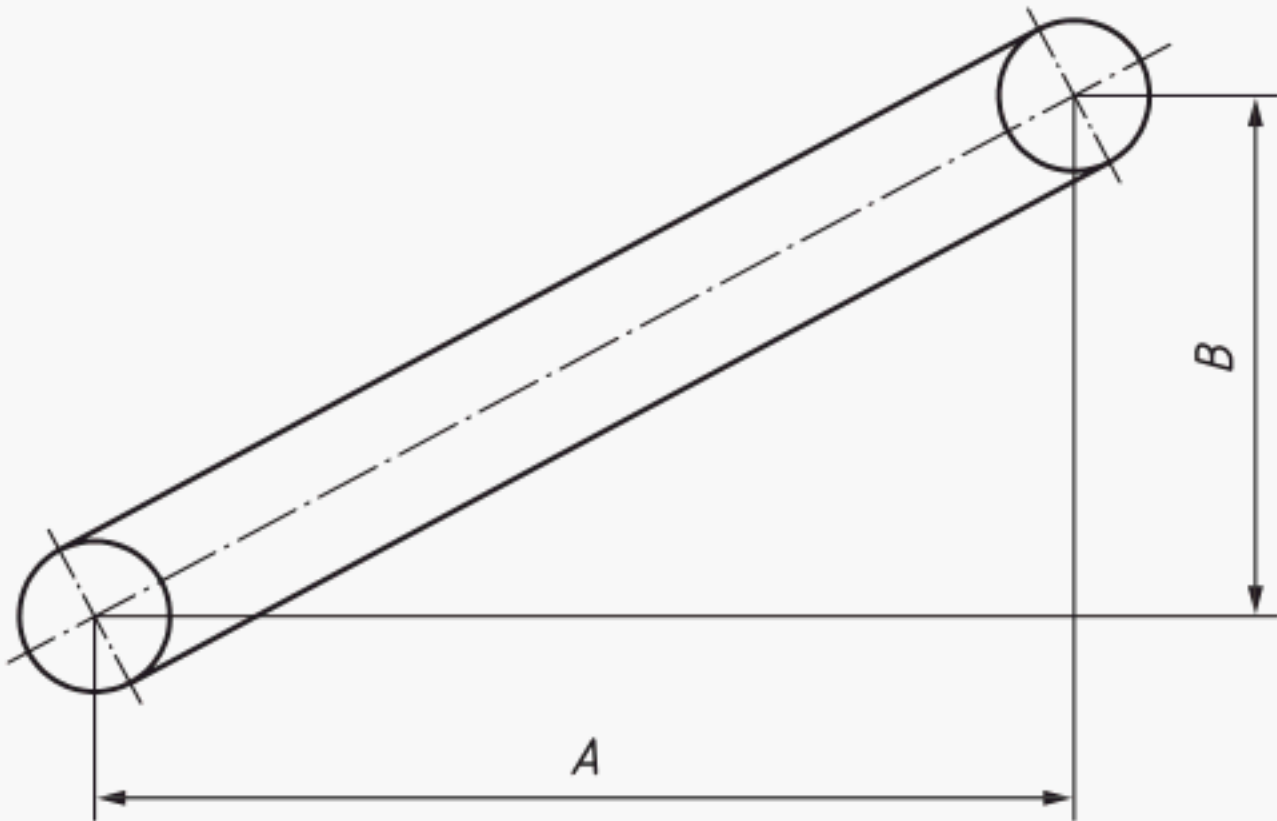


Figure 4 — Calculation of percentage of the inclination

The inclination  $\alpha$  is calculated as follows:

$$\alpha=B/A\times100$$

where



$\alpha$  is the % inclination.

## 6.19 Additional warning label

If a heart rate system exists:

For classes S and I, a warning label with the following content shall be attached: “WARNING! Heart rate monitoring systems may be inaccurate. Over exercising may result in serious injury or death. If you feel faint stop exercising immediately”.

The above label shall be placed in a conspicuous position on the display console.

## 7 Verification of the safety requirements and/or protective measures

### 7.1 Testing of transmission elements and rotating parts

Adjust the running surface in the most onerous position according to the user’s manual.

Set the treadmill speed at  $(3 \pm 0,5)$  km/h.

Try to insert the test finger in all drawing-in points at least between the:

- a) running surface and the rear roller guard;
- b) running surface and the rear roller;
- c) running surface and the running deck.

The test finger shall not be trapped.

### 7.2 Testing of temperature rise

During the testing in [7.8](#), check the temperature

- after 30 min for class H and
- after 60 min for class S.

### 7.3 Testing of the safety stop (emergency stop)

Measure the position of the safety stop according to [6.5.1](#) and perform a visual inspection and a functional test.

### 7.4 Testing of the actuator(s)

Visual inspection, measurement and dimensional test.

Attach the pull-cord safety stop according to the manufacturer’s recommendations.

Measure the release force while pulling the actuator cord progressively in the direction parallel to the running surface and in the normal direction of motion.

If the attachment device clamps to the fabric of the user’s shirt, then simulate the shirt with the test fabric according to [ISO 12947-1:1998](#), Table 1.

### 7.5 Testing of immobilization method

Visual inspection and functional test.

## 7.6 Stability testing

### 7.6.1 Testing in training position

Carry out the test with a test person of  $(100 \pm 5)$  kg with the running surface operating at a speed of  $(9 \pm 1)$  km/h:

- at  $+10^{\circ} \begin{smallmatrix} +1^{\circ} \\ 0^{\circ} \end{smallmatrix}$  and  $-10^{\circ} \begin{smallmatrix} +1^{\circ} \\ 0^{\circ} \end{smallmatrix}$  in the running direction and
- at  $5^{\circ} \begin{smallmatrix} +1^{\circ} \\ 0^{\circ} \end{smallmatrix}$  in all the other directions

through the maximum and minimum ranges of inclinations.

Carry out an emergency dismount test using the front handlebars/foot rails on flat surface with a maximum inclination of the treadmill at a speed of  $(9 \pm 1)$  km/h or where this is not possible at maximum speed.

### 7.6.2 Testing in folded position

Carry out the test at  $10^{\circ} \begin{smallmatrix} +1^{\circ} \\ 0^{\circ} \end{smallmatrix}$  in the most unfavourable direction.

### 7.6.3 Testing of the foot rail support system

Apply the load in the most unfavourable position and measure the distance vertically to the floor where the load is applied before and immediately after the test.

Determine the permanent deformation as a percentage of the length of the running surface (see [Figure 2](#)).

## 7.7 Load testing of the running surface

Apply the test load over an area of  $(300 \pm 5)$  mm  $\times$   $(300 \pm 5)$  mm in the middle of the running surface, the centre of which is lined up with line A in [Figure 2](#). The running surface may be restrained to prevent movement.

The duration of the test shall be  $(60 \pm 5)$  s.

If inclination is applicable, apply the load at the flat, the mid and the highest inclination.

## 7.8 Testing of endurance

### 7.8.1 Requirement for the test apparatus

- a) Car tyre 155/13 inflated to a pressure of  $(1,5 \pm 0,25)$  bar, see [Figure 5](#).
- b) Falling mass (including the tyre) of 0,75 times maximum user weight, as described in the user's manual,  $\pm 5$  % or  $(75 \pm 3,75)$  kg whichever is greater.
- c) Free fall height:  $(10 \begin{smallmatrix} +1 \\ 0 \end{smallmatrix})$  mm.
- d) Impact frequency: not less than 0,5 Hz.
- e) The free fall of the falling mass shall be guaranteed by the machine construction.

### 7.8.2 Test method

Drop the falling mass in the middle of line A (see [Figure 5](#)):

- a) 12 000 times for class H;



b) 100 000 times for class S;

with a running surface speed of:

c)  $(8 \pm 1)$  km/h for class H;

d)  $(12 \pm 1)$  km/h for class S;

(or maximum speed if less than stated).

If a treadmill is equipped with an inclination system, it shall be tested in the lowest possible position where such a system is not resting on the stop device.

For manually driven treadmills with a resistance system, drive the treadmill externally at  $(8 \pm 1)$  km/h with 50 % of the maximum resistance  $\pm 10$  %.

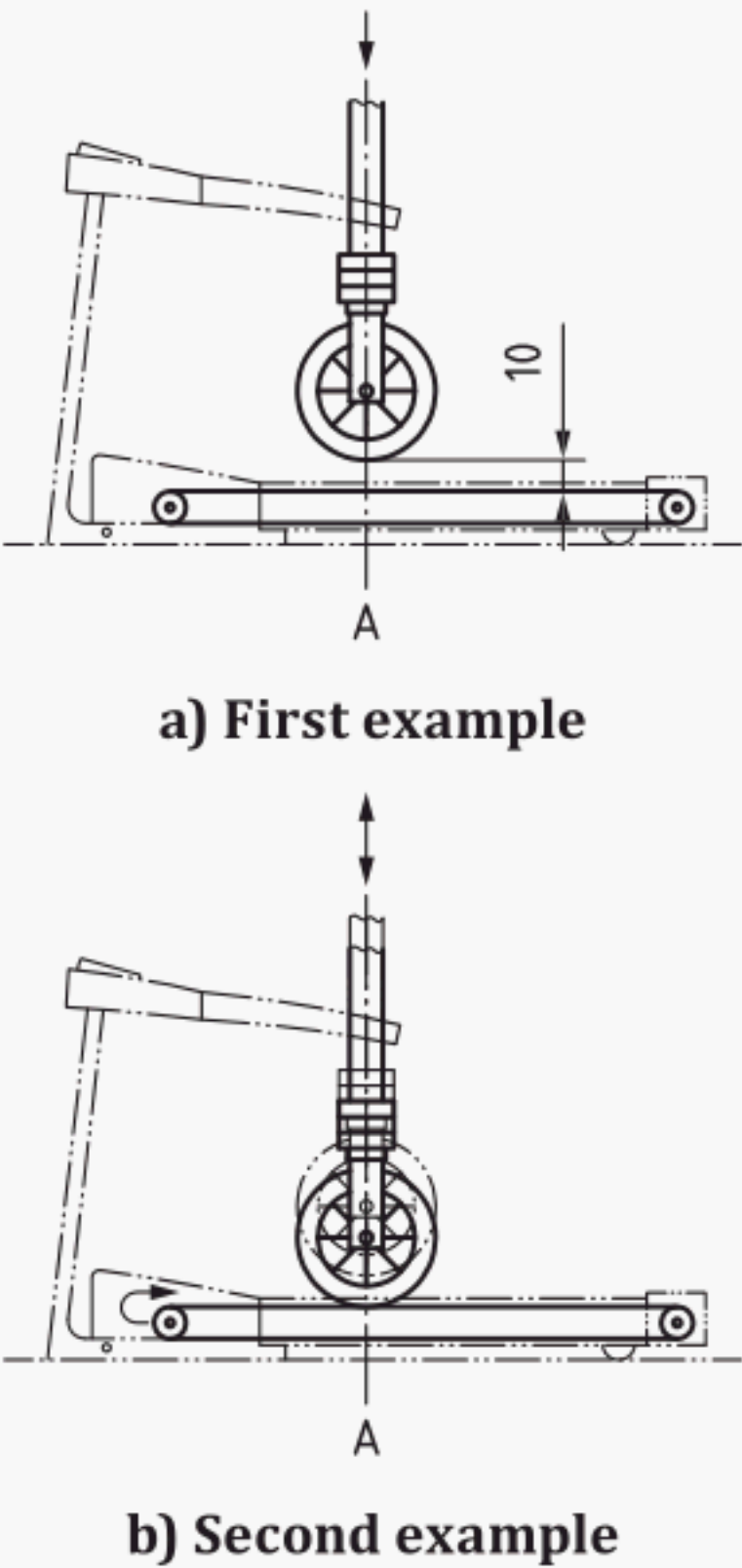
If there is no resistance system, then perform the test at 50 % of the maximum inclination.

Lubrication and preparation shall be done in accordance with the instructions for use.

Should resonance occur during the test procedure, the speed of the treadmill may be adjusted within  $\pm 15$  % to eliminate resonance.

After completion of the required number of load cycles, check that the treadmill is capable of being used as defined in the instructions for use.

Dimensions in millimetres



**Key**

A line located at 1/3 of the length of the running surface measured from the front (see [Figure 2](#))

**Figure 5 — Example of the test apparatus**



## 7.9 Testing of side handrails/front handlebar

The length of the handrails to the rear of the vertical projection of line B or a vertical projection of a line from the edge of any part of the front protection cover overlapping the running surface (see [Figure 2](#)) shall be measured. The measurement shall be made in the non-inclined position.

Apply a test force of  $(1\,000 \pm 50)$  N vertically in the most onerous position of the side handrails/front handlebar by means of a belt with a width of  $(80 \pm 5)$  mm for a period of minimum 5 min. Measure the maximum permanent deformation after removing the load.

Apply a force of  $(500 \pm 25)$  N horizontally using the belt in the same position as in the vertical test but in the most onerous horizontal direction of the side handrail/front handlebar for a period of minimum 5 min. Measure the maximum permanent deformation after removing the load.

Determine the permanent deformation as a percentage of the side handrail length as measured in accordance with the first paragraph of this subclause.

## 7.10 Testing of foot rails

Apply a force of twice the maximum user weight indicated in the user's manual or  $(2\,000 \pm 50)$  N, whichever is greater, by means of a test sole  $(305 \pm 1)$  mm  $\times$   $(80 \pm 1)$  mm in the middle of the non-slip surface of each foot rail for a period of minimum 5 min.

## 7.11 Testing of the running surface

Visual inspection and dimensional test.

## 7.12 Testing of the acceleration

Remove all loads from the treadmill. Provide a means of recording the instantaneous speed of the running surface. Measure the speed in 5 s intervals from the minimum to the maximum speed and calculate the acceleration between measured values.

## 7.13 Testing of the heart rate control mode

Set the treadmill to the heart rate control mode at a speed of 8 km/h and 0 % inclination. Use a heart pulse simulator or a person to activate the control mode. Cut off the signal and then check that the speed reduces according to the requirements shown in [6.14](#). If there are more than one heart rate control system, each system shall be tested.

## 7.14 Testing of the folding treadmills

### 7.14.1 Inadvertent release when packaged

The prevention of inadvertent release of a folded treadmill as packaged by the manufacturer shall be verified by functional test and visual examination.

### 7.14.2 For treadmills where the running surface is designed to be folded up when stored

Place the treadmill in the unfolded position.

Apply the folding procedure as defined in the user's manual.

During the folding operation, ensure the locking system is positively engaged before reaching the position of equilibrium of the folded portion.



#### 7.14.3 For treadmills where the console is designed to be folded down when stored

Place the treadmill in the folded position.

Apply the unfolding procedure as defined in the user's manual.

During the unfolding operation an automatic locking system shall be activated before reaching the position of equilibrium of the unfolded portion.

#### 7.14.4 Testing the maximum handling force

Measure the static vertical force required at the handling position as described in the user's manual to support the deck at  $15^\circ \pm 2^\circ$ ,  $45^\circ \pm 2^\circ$  and  $75^\circ \pm 2^\circ$  as measured with reference to the horizontal plane. If the highest position of the deck is less than  $75^\circ$ , the measurement shall be taken at  $15^\circ \pm 2^\circ$ ,  $45^\circ \pm 2^\circ$  and at the highest unlocked position.

### 7.15 Testing of the accuracy of time, speed and distance indications

The accuracy of speed indications shall be determined in the unloaded condition at

- a) minimum speed, see [Table 2](#),
- b) maximum speed, and
- c) half speed

for class A. For classes B and C, only at maximum speed.

Manually driven treadmills shall be driven by a wheel having a circumferential speed of 8 km/h to measure the accuracy of the speed indication of the running device.

The accuracy of time indicating devices shall be tested over a time of 30 min.

### 7.16 Noise testing

Measure the A-weighted emission sound pressure level at trainer's ears, LpA in accordance with [ISO 11201](#) or [ISO 11202](#) at a speed of the running surface of 8 km/h for class H equipment and 12 km/h for class S and I equipment in an unloaded situation.

## 8 Test report

The test report shall include at least the following information:

- a) name and address of testing facility and location where the test was carried out;
- b) unique identification (such as serial number), page number, and total number of pages of the report on each page;
- c) a reference to this document, i.e. [ISO 20957-6:2021](#);
- d) name and address of client;
- e) description and identification of the test item, e.g. serial number, test number, technical data;
- f) date of receipt of test item and date(s) of performance of test;
- g) identification of the test specification or description of the method or procedure;
- h) description of sampling procedure (where relevant);



- i) any deviations, additions or exclusions from the test specification, and any other information relevant to a specific test;
- j) measurements, examinations and derived results, supported by tables, graphs, sketches and photographs as appropriate, and any failures identified;
- k) a statement on measurement uncertainty (where relevant);
- l) a signature and title or an equivalent marking of person(s) accepting technical responsibility for the test report and date of issue;
- m) a statement to the effect that the test results relate only to the items tested.

## 9 Marking

In addition to the marking requirements of [ISO 20957-1](#), motor driven treadmills shall be marked visibly, legibly and indelibly with the following minimum particulars:

- a) the year of construction, that is the year in which the manufacturing is completed;
- b) the designation of the machinery;
- c) the marking required by legislation

NOTE Within the European Community, legislation requires the CE marking, provided that the machine complies fully with all relevant Directives.

## 10 Additional instructions for use

In addition to [ISO 20957-1](#), easy-to-understand instructions for use shall be supplied with each treadmill.

The instructions for use shall include information on at least the following points, depending on the class:

- a) maximum user's weight;
- b) description and function of the immobilization method;
- c) emergency dismount;
- d) function of the safety stop;
- e) clear safety area of at least 2 000 mm in length and at least as wide as the treadmill shall be provided behind the equipment when in use;
- f) method of adjusting the tension and the lateral position of the running surface;
- g) maximum allowed running surface lateral positions;
- h) additional information for foldable treadmills:
  - 1) instructions for operating the folding mechanism and locking system;
  - 2) warning, that a folded treadmill should not be operated;
  - 3) warning, to allow the running surface to come to a complete stop before folding;
- i) when equipped with a pull-cord safety stop, an instruction on how to use, attach and test the pull-cord safety stop is required;
- j) if the heart rate is displayed a warning with the following content shall be given: "WARNING! Heart rate monitoring systems may be inaccurate. Over exercising may result in serious injury or death. If you feel faint stop exercising immediately";

- k) suitable information about replacement parts that could affect the safe use of the treadmill;
- l) if applicable, the value of the A-weighted emission sound pressure level at the trainer's ear;
- m) the following statement: "Noise emission under load is higher than without load."



## Bibliography

- [1] [EN 957-6:2010+A1:2014](#), *Stationary training equipment — Part 6: Treadmills, additional specific safety requirements and test methods*
- [2] EN 60947-5-5, *Low-voltage switchgear and controlgear — Part 5-5: Control circuit devices and switching elements — Electrical emergency stop device with mechanical latching function (IEC 60947-5-5:1997)*
- [3] ISO 5904<sup>1)</sup>, *Gymnastic equipment — Landing mats and surfaces for floor exercises — Determination of resistance to slipping*





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## BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

