INTERNATIONAL STANDARD

ISO 20957-6

First edition
2005-05-01

Stationary training equipment —

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

Équipement d'entraînement fixe —

Partie 6: Simulateurs de course — Exigences spécifiques de sécurité et méthodes d'essai supplémentaires

Reference number
ISO 20957-6:2005(E)

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Published in Switzerland

Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 20957-6 was prepared by CEN (as EN 957-6) and was adopted, under a special “fast-track procedure”, by Technical Committee ISO/TC 83, *Sports and recreational equipment*, in parallel with its approval by the ISO member bodies.

ISO 20957 consists of the following parts, under the general title *Stationary training equipment*:

— *Part 1: General safety requirements and test methods*

— *Part 2: Strength training equipment, additional specific safety requirements and test methods*

— *Part 4: Strength training benches, additional specific safety requirements and test methods*

— *Part 5: Pedal crank training equipment, additional specific safety requirements and test methods*

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

— *Part 7: Rowing machines, additional specific safety requirements and test methods*

— *Part 8: Steppers, stairclimbers and climbers — Additional specific safety requirements and test methods*

— *Part 9: Elliptical trainers, additional specific safety requirements and test methods*

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 136 "Sports, playground and other recreational equipment", the secretariat of which is held by DIN.

This standard EN 957 "Stationary training equipment" consists of the following parts:

— *Part 1: General safety requirements and test methods*

— *Part 2: Strength training equipment, additional specific safety requirements and test methods*

— *Part 4: Strength training benches, additional specific safety requirements and test methods*

— *Part 5: Pedal crank training equipment, additional specific safety requirements and test methods*

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

— *Part 7: Rowing machines, additional specific safety requirements and test methods*

— *Part 8: Steppers, stairclimbers and climbers, additional specific safety requirements and test methods*

— *Part 9: Elliptical trainers, additional specific safety requirements and test methods.*

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 February 2002, and conflicting national standards shall be withdrawn at the latest by February 2002.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Standard amends and supplements EN 957-1. The requirements of this specific standard take priority over those in EN 957-1.

1 Scope

This European Standard specifies safety requirements for treadmills in addition to the general safety requirements of EN 957-1 and should be read in conjunction with it.

This European Standard is applicable to power driven and manually driven training equipment type treadmills (type 6) (hereafter referred to as treadmills) with the classes S and H and classes A, B and C regarding accuracy.

2 Normative references

This European Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies (including amendments).

EN 292, *Safety of machinery — Basic concepts, general principles for design.*

EN 957-1:1996, *Stationary training equipment — Part 1: General safety requirements and test methods.*

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)*

EN 60335-1, *Safety of household and similar electrical appliances — Part 1: General requirements (IEC 60335-1:1983, modified).*

EN 60601-1, *Medical electrical equipment — Part 1: General requirements for safety (IEC 60601-1:1988).*

ISO 5904, *Gymnastic equipment — Landing mats and surfaces for floor exercises – Determination of resistance to slipping.*

ISO 9838, *Alpine ski-bindings — Test soles for ski-binding tests.*

3 Terms and definitions

For the purposes of this standard, the terms and definitions given EN 957-1:1996 and the following apply.

3.1
treadmill
training equipment with a unidirectional moving surface on which a walking or running activity can take place, where the feet are free to leave the moving surface

3.2
running surface
length of the usable part of the moving surface (see *l* in Figure 1)

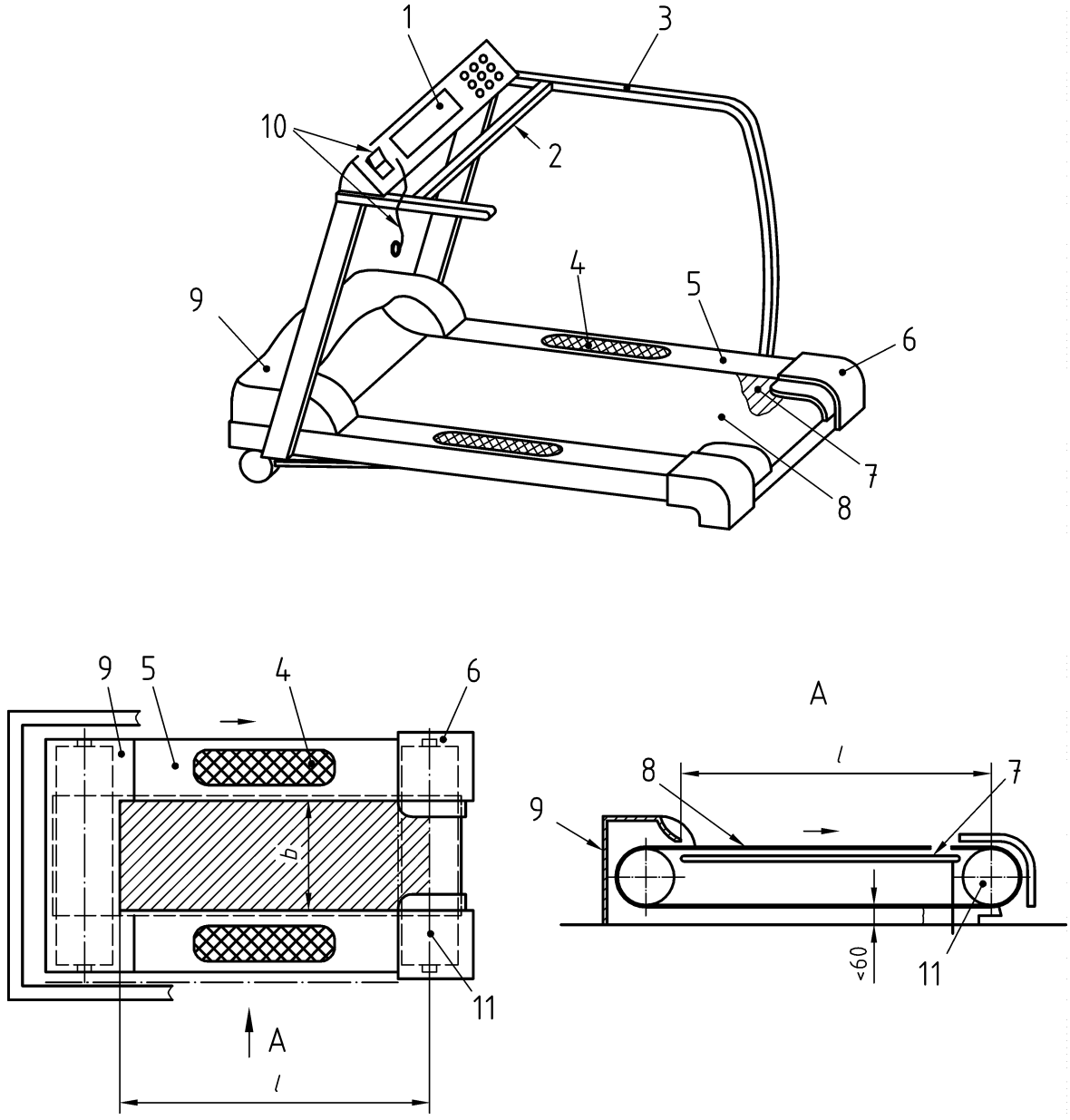
NOTE Figure 1 is intended only to give examples and to illustrate the names of the components.

3.3
width of the running surface
usable width of the running belt excluding rear roller guards, see *b* in Figure 1)

4 Classification

Clause 4 of EN 957-1:1996 applies.

Dimensions in millimetres



Key

1 Display
2 Front handlebar
3 Side handrail
4 Non slip surface
5 Foot platform
6 Rear roller guard (see Figure 2)
7 Running deck
8 Running surface (belt)
9 Front housing
10 Emergency stop
11 Rear roller (see Figure 2)

l length of running surface (belt)
b width of running surface (belt)

NOTE The numbering system in this Figure 1 is retained in Figure 2 of this European Standard.

Figure 1 — Example of a treadmill

EN 957-6:2001 (E)

5 Safety requirements

5.1 General

Depending on the design of the piece of equipment the following requirements shall apply as appropriate.

5.2 External construction

5.2.1 Squeeze and shear points within the accessible area

Where the elevation 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 elevation shall not exceed 1 °/s.

The user shall be able to stop this movement.

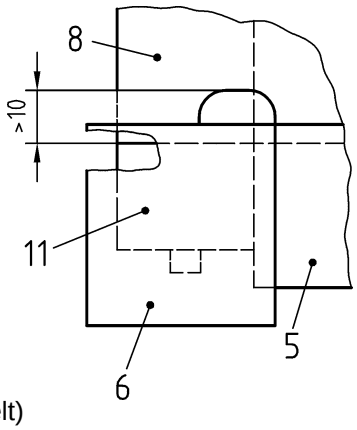
5.2.2 Transmission elements and rotating parts

Pull-in points between the running surface, the rear roller and the frame and the rear roller/belt and the floor shall be avoided. This can be achieved e. g. by a rear roller guard (see Figure 2).

When tested in accordance with 6.1 it shall not be possible that the test finger becomes trapped between the rear roller guard and the running surface. There shall be a minimum distance of 10 mm between the edge of the running surface and the rear roller guard during all operating conditions (see Figure 2).

Elements of the motor drive system shall be in accordance with EN 292.

Dimensions in millimetres



Key
5 Foot platform (can also overlap the belt)
6 Rear roller guard
8 Running surface (belt)
11 Rear roller

Figure 2 — Rear roller guard

5.2.3 Temperature rise

When tested in accordance with 6.2, accessible parts of the treadmill shall not have a temperature greater than 65 °C.

5.3 Emergency stop

5.3.1 General

All power driven mills shall be equipped with an emergency/safety stop switch, which should include, either a push-button operated switch, or a pull-cord operated switch.

6

3

5.3.2 Characteristics

It shall not be possible to restore the circuit until the actuator of the emergency stop device has been manually reset. Where several emergency stop devices are provided, the circuit shall not be restored until all actuators previously operated have been reset.

The contacts of manually operated emergency stop devices shall ensure positive opening, as defined in EN 60947-5-5.

It shall be easily accessible to the user.

When the switch is activated the main power shall be interrupted without utilization of the software and the treadmill shall come to a complete stop.

5.3.3 Actuators

Actuators of emergency stop devices shall be coloured RED. Where a background exists behind the device actuator, it shall be coloured YELLOW. The actuator of a push-button operated switch shall be of the palm or mushroom head type.

5.4 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.

Testing in accordance with 6.4.

5.5 Stability

When tested in accordance with 6.5, the treadmill shall not fall over.

5.6 Static loading

When tested in accordance with 6.6, the treadmill shall withstand a force of

a) 4 times the body mass (100 kg) for class H and

b) 6 times for class S

without breakage.

After the test the treadmill shall be capable to functioning according to the manufacturer's information on the correct use.

The treadmill shall withstand the test in flat, mid and maximum elevation, where elevation is applicable.

5.7 Endurance

When tested in accordance with 6.7, the treadmill shall withstand

a) 12 000 impacts for class H and

b) 100 000 impacts for class S.

After the test the treadmill shall be capable to functioning according to the manufacturer's information on the correct use and shall not show any breakage.

5.8 Side handrails/front handlebar

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

They can be provided in one of the following configurations:

a) one front handlebar

b) two side handrails

c) combination of both.

The front handlebar shall

d) have a minimum width of (width of the running surface + 50 mm) equidistant to the longitudinal axis of the running surface,

e) be at a height from 800 mm to 950 mm above the running surface.

The side handrails shall have a maximum width of 900 mm, measured from centre to centre of the side handrails.

The length of each side handrail shall not be less than 30 % of the length of running surfaces "*l*", see Figure 1 where only side handrails are fitted.

The side handrails/front handlebar shall show no permanent deformation of more than 3 % when tested in accordance with 6.8. In case of treadmills having both the side handrails and the front handlebar both of them shall fulfill this requirement.

5.9 Footplatforms

Treadmills shall be equipped with footplatforms, see Figure 1.

These shall have the same length as the running surface excluding the rear roller guard and have a minimum width of 80 mm.

The footplatforms shall have a non slip surface of at least 400 mm × 70 mm and with a friction factor of more than 0,5, when tested in accordance with ISO 5904.

When tested in accordance with 6.9, the footplatform shall show no permanent deformation of more than 3 %.

The side handrails can be attached to the footplatforms.

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

5.10 Electrical safety

Concerning electrical and electronic aspects the equipment has to meet the requirements of EN 60335-1 for general use and for medical use EN 60601-1.

5.11 Additional classified requirements

Classes A, B and C shall fulfill the requirements of Table 1.

Table 1 — Classified basic requirements

	Class A	Class B	Class C	Testing
Read out (display indicator)	speed, elevation (if fitted) in % (see Figure 3) distance, time in SI units	speed, elevation (if fitted) in %, distance, time in SI units	none	visual test, performance test
Accuracy	time ± 1 % distance ± 5 % up to 2 km/h ± 0,1 km/h speed ± 5 % elevation (if any) ± 10 %	time ± 1 % [a] distance ± 10 % up to 2 km/h ± 0,2 km/h speed ± 10 % elevation (if any) ± 15 %	none [b]	6.10
Minimum length and width of the running surface for motor driven treadmills in mm	≤ 8 km/h: 1 000 × 400 > 8 to 16 km/h: 1 200 × 400 > 16 km/h: 1 300 × 400	≤ 8 km/h: 1 000 × 400 > 8 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 *l* 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	6.10

[a] for mechanical timing devices ± 5 % is allowed.

[b] if included:

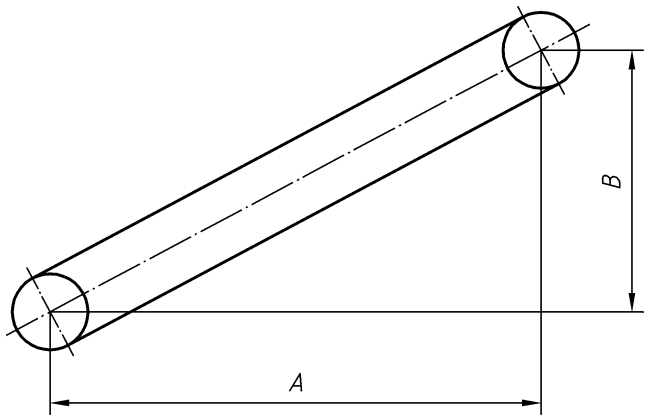
time ± 2 % [a]

distance ± 20 %

up to 3 km/h ± 0,3 km/h

speed ± 20 %

elevation ± 25 %.



% = $B/A \times 100$

Figure 3 — Calculation of percentage of the elevation

6 Test methods

6.1 Testing of transmission elements and rotation parts

Insert the test finger in all pull-in points.

Determine whether the test finger becomes trapped.

6.2 Testing of temperature rise

During the testing in 6.7 check the temperature

a) after 30 min for class H and

b) after 60 min for class S.

6.3 Testing of the emergency stop

Visual and functional test.

6.4 Testing of immobilization method

Visual and functional test.

6.5 Stability test

Carry out the test with a test person (100 ± 5) kg running at a speed from 8 km/h to 10 km/h

a) at + 10° and -10° in the running direction and

b) at 5° in all the other directions

through the maximum and minimum ranges of elevations.

Carry out an emergency dismount test using the front handlebars/foot platforms on flat surface with a maximum inclination of the treadmill at a speed of 8 to 10 km/h or where this is not possible at maximum speed.

6.6 Load testing

Apply the test load over an area of 300 mm × 300 mm in the middle of the running surface the centre of which is 66 % from the rear end of running surface. The running surface may be fixed.

The duration of the test shall be 1 min.

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

6.7 Testing of endurance

Apparatus:

a) A car tyre 155/13, see Figure 4, with a pressure of 1,5 bar, producting 75 kg total mass, including the tyre

b) Falling height: 10 mm

c) Frequency: not less than 30/min.

Procedure:

Drop the tyre on the longitudinal axis of the running surface at 66 % from the rear end of the running surface

d) 12 000 times for class H

e) 100 000 times for class S

with a speed of

f) 8 km/h for class H

g) 12 km/h for class S

(or maximum speed if less than stated).

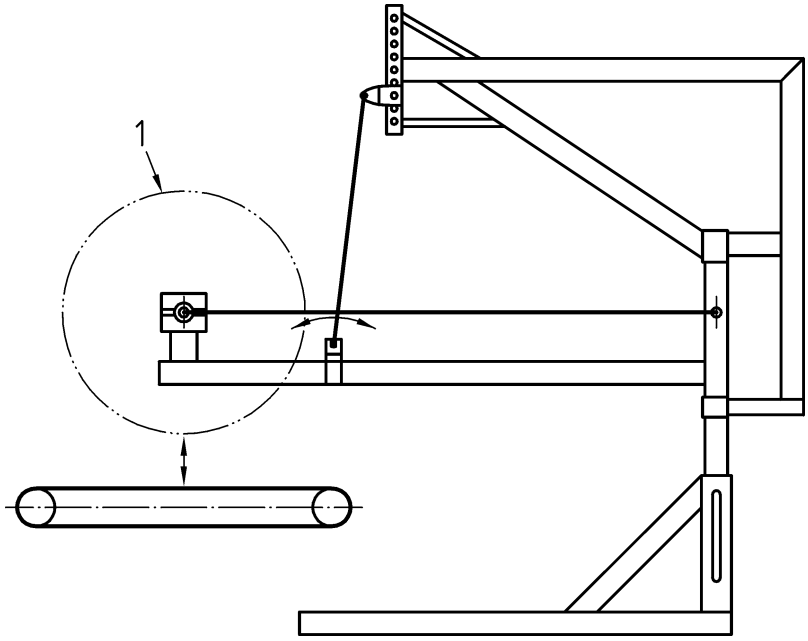
For manually driven treadmills with a resistance system drive the treadmill at 8 km/h according to the class H or S with 50 % of the resistance ± 10 %.

If there is no resistance system perform the test in the mid position of the elevation.

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

Should resonance occur during test procedure the speed may be adjusted within ± 15 % to eliminate resonance.

Check the treadmill is capable of being used as per manufacturer's instructions.



Key
1 car tyre

Figure 4 — Testing of endurance

6.8 Testing of side handrails/front handlebar

Apply a test force of 1 000 N vertically in the most onerous position of the side handrails/front handlebar by means of a belt with a width of (80 ± 5) mm for a period of 5 min.

Then apply a force of 500 N horizontally using the belt in the same position as in the vertical test but in the most onerous horizontal direction of the front handlebar for a period of 5 min.

Then determine the permanent deformation.

6.9 Testing of footplatforms

Apply a force of 2 000 N by means of a test sole in accordance with ISO 9838 in the middle of the non-slip surface of the footplatform for a period of 5 min.

Determine the permanent deformation.

6.10 Testing of the accuracy of time, speed and distance

The determination of the accuracy of speed shall be done unloaded at

a) minimum speed, see Table 1,

b) maximum speed and

c) half speed

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

Manually driven treadmills shall be driven by a wheel with a speed of 8 km/h to indicate the accuracy of the read out.

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

7 Additional instructions for use

In addition to EN 957-1 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 weight;

b) description and function of the immobilization method;

c) emergency dismount;

d) the function of the emergency stop;

e) safety area of 2 000 mm × 1 000 mm behind the equipment.

ICS 97.220.30

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