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Stationary training equipment —

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

Équipement d'entraînement fixe —

Partie 9: Appareils d'entraînement elliptiques — Exigences spécifiques de sécurité et méthodes d'essai supplémentaires

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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 20957-9 was prepared by CEN (as EN 957-9) 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 document (EN 957-9:2003) has been prepared by the Technical Committee CEN/TC 136 “Sports, playground and other recreational 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 December 2003, and conflicting national standards shall be withdrawn at the latest by December 2003.

This European Standard is one of the series EN 957 “Stationary training equipment” which 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 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

— Part 10: Exercise bicycles with a fixed wheel or without freewheel, additional specific safety requirements and test methods

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, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

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

1 Scope

This Part of EN 957 specifies safety requirements for elliptical trainers also described as cross training machines in addition to the general safety requirements of EN 957-1 and should be read in conjunction with it.

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 71-1, *Safety of toys — Part 1: Mechanical and physical properties.*

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

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

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 957-1:1996 and the following apply:

3.1
elliptical trainer
manually operated training equipment which can produce a continuous reciprocating elliptical foot action which can include upper body training devices. Elliptical training functions as a continuous and reciprocating closed loop cycle

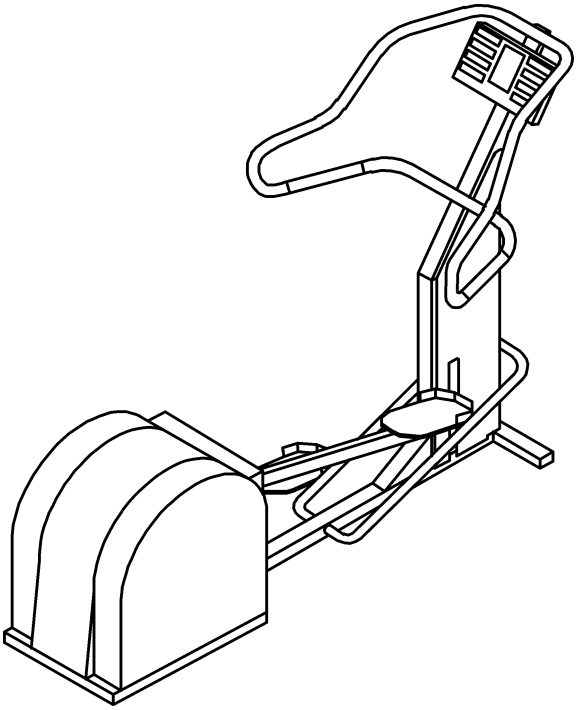
3.2
footplatform
pedal
device designed to support the foot whilst correctly performing the exercise procedure determined by the manufacturer

3.3
footplatform guard
pedal guard
fence
rigid part of the footplatform structure which is designed to prevent the foot moving off the footplatform whilst correctly performing the exercise procedure determined by the manufacturer

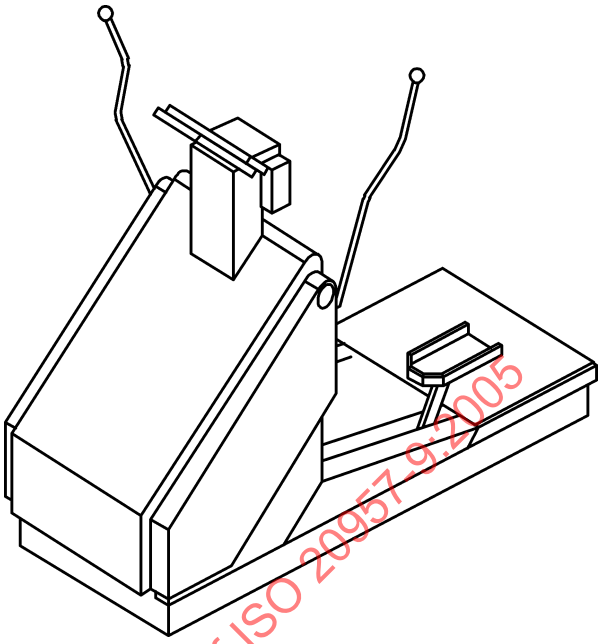
3.4
cycle
one cycle of an elliptical trainer equals from start to start through the full range of motion (360°)

4 Classification

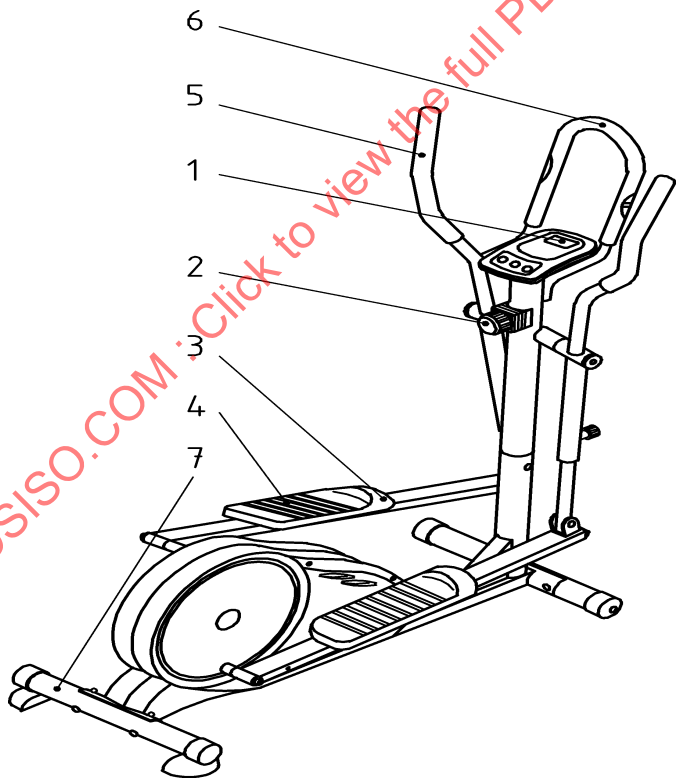
The classification as defined in clause 4 of EN 957-1:1996 applies.



a) Elliptical trainer without movable handlebars



b) Elliptical trainer with movable handlebar



c) Elliptical trainer with movable and fixed handlebar

Key
1 Display
2 Resistance
3 Footplatform guard
4 Footplatform (pedal)
5 Movable handlebar
6 Fixed handlebar
7 Frame

Figure 1 — Examples of elliptical trainers

5 Safety requirements

5.1 General

Depending on the design of the piece of equipment the following additional requirements to EN 957-1 shall apply as appropriate.

5.2 External construction

5.2.1 Squeeze and shear points within the accessible area

Elliptical trainers shall be free of squeeze and shear points.

Test in accordance with 6.2.

5.2.2 Temperature rise

When tested in accordance with 6.3, accessible parts of the elliptical trainer shall not have a temperature greater than 65 °C.

5.3 Intrinsic loading

5.3.1 Class H

Each piece of equipment of class H loaded with the user's body mass shall withstand 2,5 times the body mass (100 kg) without breakage.

Test in accordance with 6.4.

5.3.2 Class S

The training equipment shall withstand four times the body mass (100 kg) without breakage.

Each piece of equipment of class S loaded with the user's body mass shall withstand two times the body mass (100 kg).

When tested according to 6.4, supports (e.g. load-bearing surfaces) shall not be deformed by more than f = 1/100, cantilever supports (cantilever surfaces) by more than f = 1/150 and other dimensions by more than 1 %.

A body mass of 100 kg is taken as the nominal load.

After the test

— supports (e.g. load-bearing surfaces) shall not be deformed by more than f = 1/100;

— cantilever supports (cantilever surfaces) by more than f = 1/150;

— other dimensions by more than 1/100.

5.4 Handlebars

The handlebars shall show no permanent deformation of more than 3 % when tested in accordance with 6.5.

To reduce the danger of penetration the section of the tip of the handlebar shall have a minimum diameter of 50 mm. Test in accordance with 6.1.1.

5.5 Footplatforms

The footplatforms shall have a non slip surface of at least 300 mm × 100 mm and with a friction factor of more than 0,5, when tested in accordance with ISO 5904.

The footplatform shall have a guard with at least 30 mm height along the inside edge and the front edge.

5.6 Stability

When tested in accordance with 6.6, the training equipment shall not fall over.

5.7 Endurance

When tested in accordance with 6.7, the training equipment shall withstand

12 000 cycles for class H and

100 000 cycles for class S.

After the test the training equipment shall be capable of functioning according to the manufacturer's instructions for the correct use and shall not show any signs of damage.

5.8 Additional requirements for class A

The variation of the indicated or determined power P from the power input shall not exceed ± 5 W up to 50 W and ± 10 % over 50 W.

Test in accordance with the manufacturer's power measurement description.

5.9 Additional requirements for class B and class C

See EN 957-1.

The power shall not be given in watts.

6 Test methods

6.1 General

6.1.1 Dimensional check.

6.1.2 Visual examination.

6.1.3 Tactile examination.

6.1.4 Performance test.

6.2 Testing of squeeze and shear points

Apparatus:

— test finger probe B in accordance with EN 71-1 for class H;

— test finger in accordance with 6.5 of EN 957-1:1996 for class S;

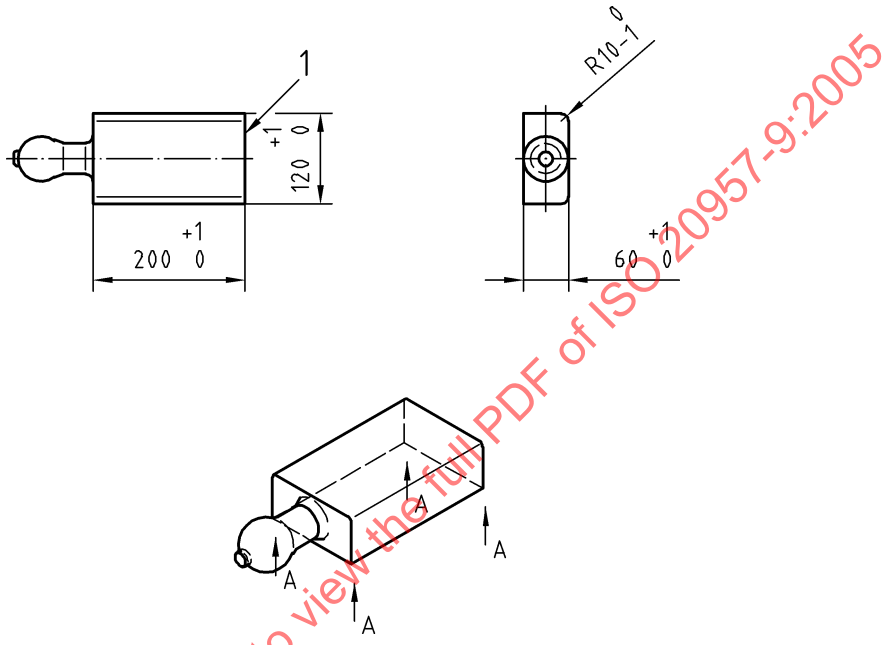
— test foot in accordance with Figure 2.

Approach all moving parts from all sides with the test finger probes to determine whether the fingers can become trapped.

The test foot probe in accordance with figure 2 shall be placed below a height of 600 mm measured from the floor in such a way that at least 3 points A rest upon the floor and/or upon the equipment. In this position the test foot probe shall not be trapped by moving parts.

Determine whether the test finger and/or the test foot probes are trapped.

Dimensions in millimetres



Key
1 Front

Figure 2 — Test foot

6.3 Testing of temperature rise

Apparatus: contact thermometer, with an accuracy of ± 1 °C.

Test room temperature: between 18 °C and 25 °C.

Carry out these tests using (100 ± 5) kg test subjects.

Operate the elliptical trainer at 60 cycles min^{-1} ± 10 % for 20 min.

The resistance shall be set at the maximum resistance or reduced until 60 cycles min^{-1} can be maintained without a pause between cycles.

Note whether the temperature of accessible parts of the elliptical trainer has exceeded 65 °C.

For speed dependent training machines carry out the test using a 100 kg load and a paddling speed producing a mechanical power of 180 W ± 10 %.

See also EN 563.

6.4 Testing of intrinsic loading

Apply the required test load F for classes H or S without shock for 5 min in the balance position to one footplatform (pedal). The load should be applied over a surface area of $\left(90\ {}^{0}_{-1}\right)$ mm × $\left(90\ {}^{0}_{-1}\right)$ mm in the most onerous position (see Figure 3).

Remove the applied load and measure the deformation or check for breakage.

Repeat for the other footplatform (pedal).

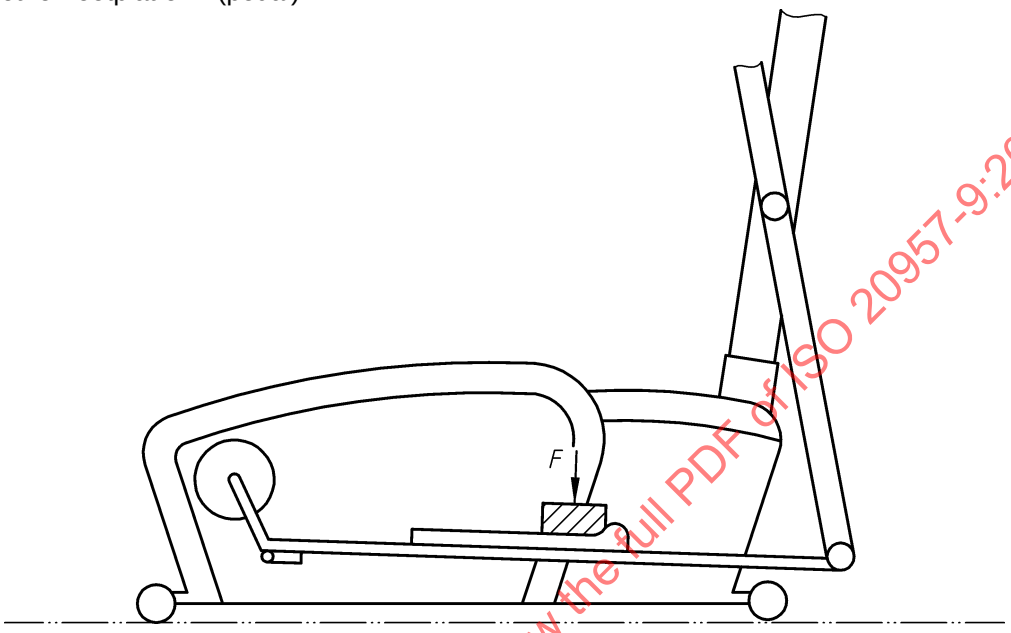


Figure 3 — Test of intrinsic loading

The frame of the training equipment shall not be fixed to the floor during the test unless instructed otherwise in the instructions for use.

6.5 Testing of handlebars

For non-movable handlebars, apply a test force of 1 000 N vertically in the most onerous position of the handlebar for a period of 5 min.

Then apply a force of 500 N using a belt with a width of (80 ± 5) mm in the same position as in the vertical test but in the most onerous horizontal direction of the handlebar for a period of 5 min.

For movable handlebars load the footplatform with a nominal load on the same side as the movable handlebar being tested. Apply a test force of 1 000 N in a dynamic direction in the most onerous position for a period of 5 min.

Then test the movable handlebar at 90° to the training direction. Apply a test force of 200 N in the most onerous position for a period of 5 min.

6.6 Testing of stability

Carry out the test in the most onerous position.

A test person weighing (100 ± 5) kg, height (1 750 ± 50) mm shall train on the training equipment in a normal exercise position and operate the equipment at 60 cycles min^{-1} for 1 min.

Tilt the training equipment 10° in both dynamic directions (forwards and backwards) and 5° in all other directions.

NOTE The dynamic direction is that direction in which the body parts of the user are moving.