BRITISH STANDARD

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957-7:1999

Stationary training equipment —

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

The European Standard EN 957-7:1998 has the status of a British Standard

ICS 97.220.30

National foreword

This British Standard is the English language version of EN 957-7:1998.

The UK participation in its preparation was entrusted by Technical Committee SW/136, Sports, playground and other recreational equipment, to Subcommittee SW/136/4, Stationary training equipment,which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 8, an inside back cover and a back cover.

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Stationary training equipment — Part 7: Rowing machines, additional specific safety requirements and test methods

Appareils d'entraînement fixes — Partie 7: Rameurs, prescriptions spécifiques de sécurité et méthodes d'essai supplémentaires

Stationäre Trainingsgeräte — Teil 7: Rudergeräte, zusätzliche besondere sicherheitstechnische Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 6 June 1998.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Ref. No. EN 957-7:1998 E

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 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of an identical text or by endorsement, at the latest by December 1998, and conflicting national standards shall be withdrawn at the latest by December 1998.

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: *Tread mills, 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*

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.

Contents

Introduction

This part of EN 957 concerns the safety of rowing machines. It amends and supplements EN 957-1. The requirements of this specific standard take priority over those in the general standard.

1 Scope

This part of EN 957 specifies safety requirements for rowing machines in addition to the general safety requirements of EN 957-1 and should be read in conjunction with it.

This part of EN 957 is applicable to stationary training equipment type rowing machines (type 7), hereinafter referred to as rowing machines, within classes S and H, and class A regarding accuracy.

If accessories are provided with the rowing machine for the performance of additional exercises these are subject to the requirements of EN 957-1 and any other specific requirements of the appropriate part of this standard.

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.

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

EN 547-3, *Safety of machinery — Human body measurements — Part 3: Anthropometric data.*

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

3 Definitions

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

3.1

rowing machine

stationary training equipment with a moving seat simulating a motion like rowing (see Figures 1 to 3)

4 Classification

EN 957-1:1996, clause **4**, applies.

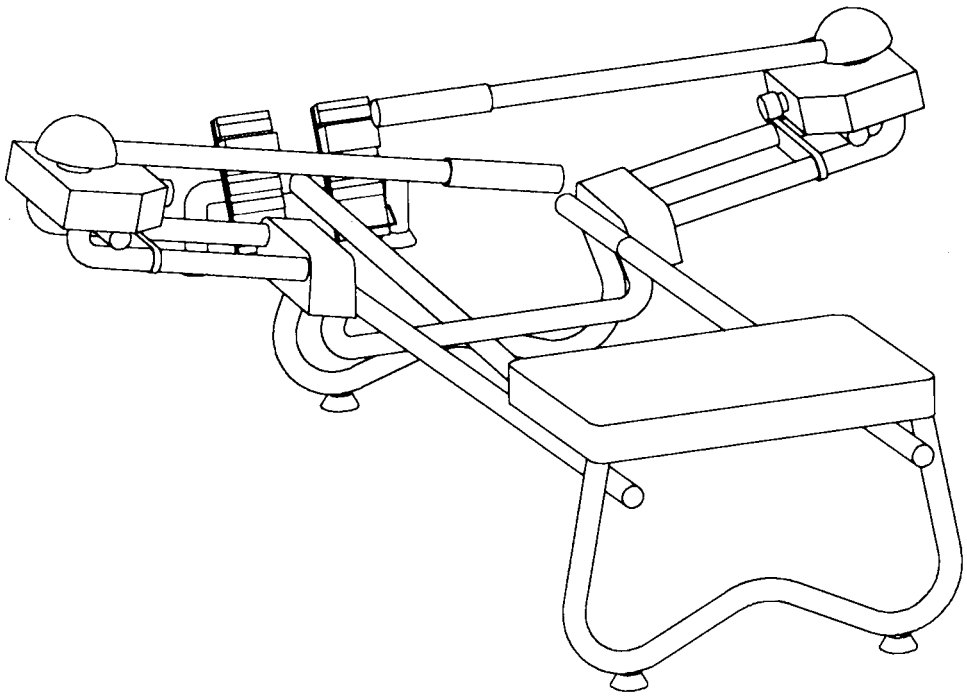
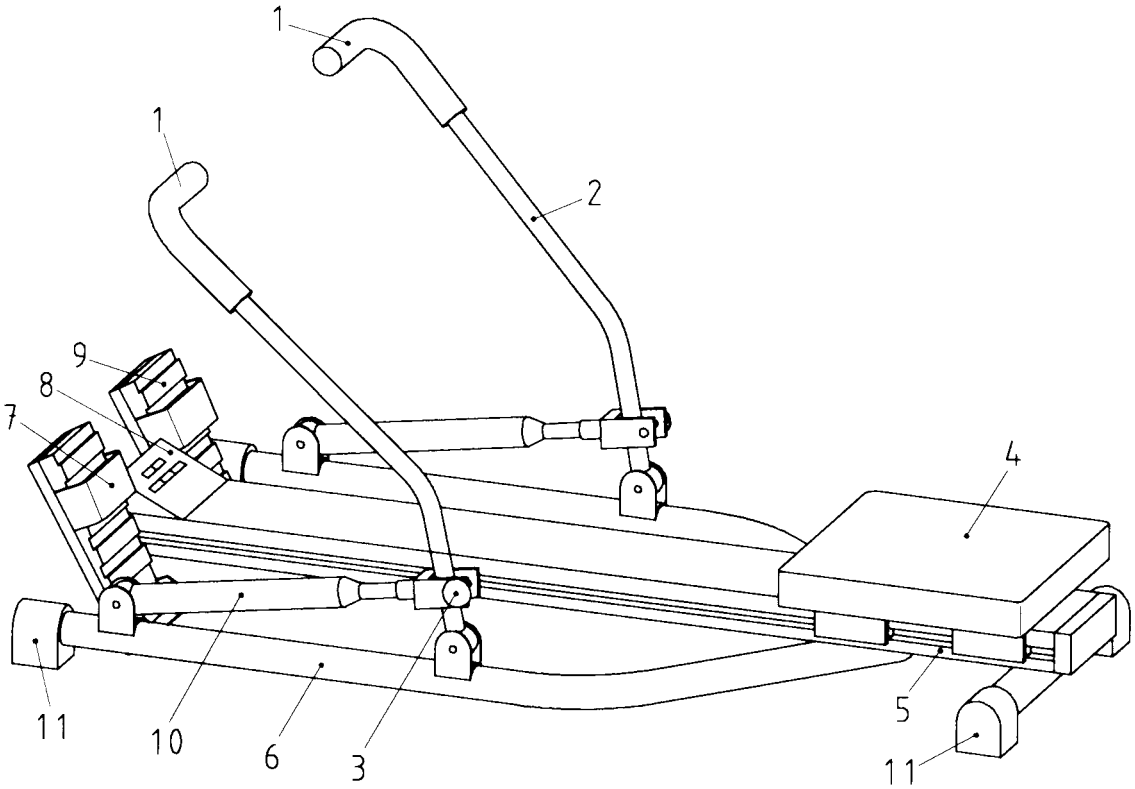
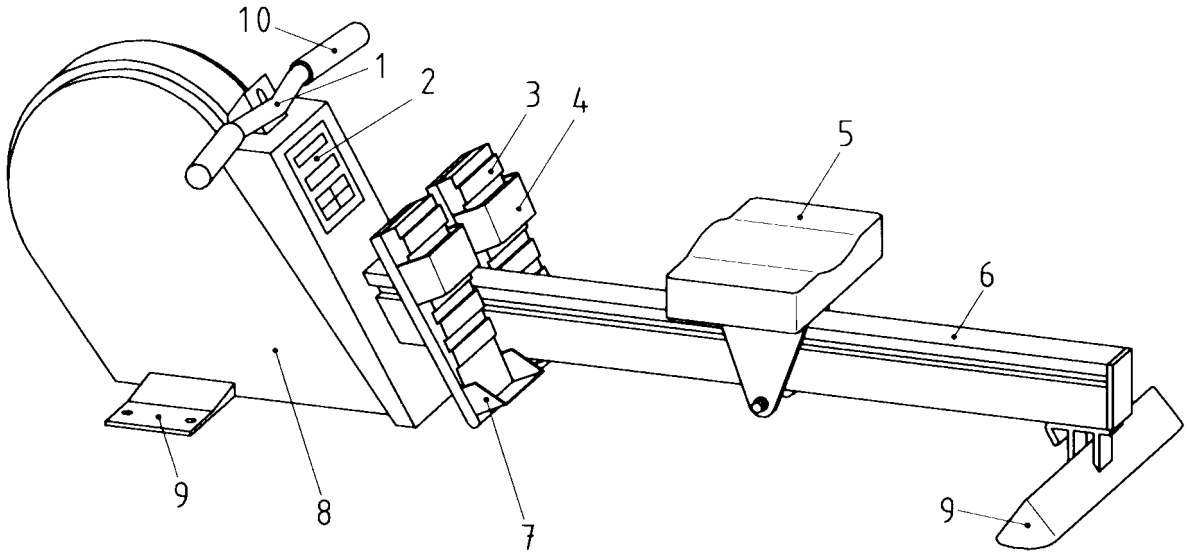


Figure 1 — Example of a rowing machine with sculling system



1 hand grip	7 foot strap
2 rower arm	8 display
3 tension adjustment	9 foot support
4 seat	10 hydraulic/pneumatic piston
5 rail	11 base support
6 frame	

Figure 2 — Example of a rowing machine with hydraulic/pneumatic system



1 handle
2 display
3 foot support
4 foot strap
5 seat
6 rail
7 heel bar
8 housing
9 base support
10 hand grip

Figure 3 — Example of a rowing machine with cable system

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

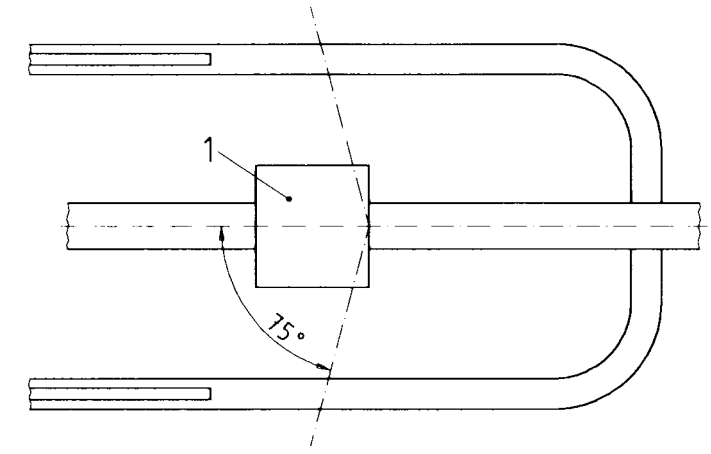
5.2.1 *Squeeze, shear and reciprocating points within the accessible area*

The distance between movable parts and adjacent movable or rigid parts shall be at least 25 mm if relevant for fingers only, otherwise it shall be at least 60 mm.

Required stops are excluded (if the user is not put at risk). Accessible stops shall each have a minimum surface of 400 mm^2. Stops which compress shall each produce a surface of 400 mm^2 when compressed with a pressure of 90 N/cm^2.

The 60 mm does not apply when the squeeze points remain within the user's field of vision over the full range of movement during use (see Figure 4).

If the distance between movable parts and adjacent rigid parts does not change during the movement, the test fingers of **6.2** shall not become trapped.



1 seat

Figure 4 — Field of vision

5.2.2 *Transmission elements and rotating parts*

Transmission elements, fans and flywheels shall be protected so that, when tested in accordance with **6.2**, the test finger cannot be trapped.

5.2.3 *Temperature rise*

When tested in accordance with **6.4**, accessible parts of the rowing machine shall not have a temperature greater than 65 °C.

5.2.4 *Seats*

When tested in accordance with **6.3** and **6.1.4**, the seat shall not derail.

5.3 Intrinsic loading

When tested in accordance with **6.5**:

— with 250 kg for class H; and

— with 300 kg for class S;

each piece of equipment shall withstand the test force without being deformed for more than f = 1/100 for a simply supported beam and f = 1/150 for a cantilever beam (see Figure 5).

After the test all parts of the equipment shall function according to the manufacturer's instructions for use.

The seat wheels or rollers should not have excessive play and shall rotate freely.

5.4 Handles

In rowing machines where the handle is connected to the machine by a flexible member (rope belts or chains), the mass of the handle without a flexible member shall not exceed 600 g.

Test in accordance with **6.1.5**.

5.5 Foot supports and foot straps

For classes S and H, provisions shall be made for fastening the foot (foot straps); for class S, the foot support or foot strap shall be adjustable for different foot sizes. Test in accordance with **6.1.4**.

When tested in accordance with **6.6.1**, each foot strap shall withstand:

— in class H: 500 N;

— in class S: 1 000 N;

without breakage.

When tested in accordance with **6.6.2**, each foot support shall withstand a test load of 1 000 N without breakage.

5.6 Endurance test

When tested in accordance with **6.7**, the rowing machine shall withstand:

— 12 000 cycles for class H; and

— 100 000 cycles for class S.

After the test the rowing machine shall be capable of functioning according to the manufacturer's instructions for correct use and shall not show any signs of damage, e.g. oil leakage.

5.7 Stability

When tested according to **6.8**, the base of the rowing machine shall not lift more than 10 mm.

5.8 Additional requirement for class A

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

Test in accordance with **6.9**.

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*

6.1.5 *Weighing test*

6.2 Testing of squeeze, shear and reciprocating points within the accessible area and transmission elements and rotating parts

Apparatus:

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

— test finger in accordance with EN 957-1:1996, **6.5**, for class S.

Approach the test fingers from all sides to all moving parts.

Determine whether the test finger is trapped.

6.3 Testing of seats

Apply a test force of 100 N for 1 min to all directions of the seat.

Check if the seat always remains attached to the rail.

6.4 Testing of temperature rise

Apparatus: contact thermometer with an accuracy of $\pm$1 °C.

Operate the rowing machine for 20 min at the following values:

a) for speed-independent equipment:

— 25 complete strokes per min;

— 350 N measured at one or both handles combined;

— 60 % of the whole movement;

b) for speed-dependent equipment:

— 350 N over 60 % of the movement at the appropriate stroke rate.

The power of 350 N is the average power produced over one complete stroke.

6.5 Testing of intrinsic loading

Place the rowing machine freely on a flat floor and clamp the seat in the middle position of the frame supports.

Apply a test load F of

— 250 kg (class H); and

— 300 kg (class S);

to the seat for 5 min, see Figure 5.

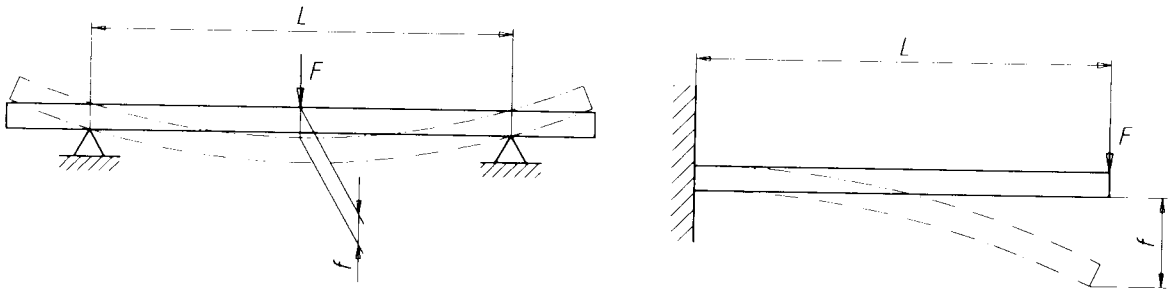
Remove the load and determine the reference dimensions f according to Figure 5.

The feet of the equipment shall not be fixed to the floor during the test.

6.6 Testing of foot supports and foot straps

6.6.1 Apply the test force at the centre of the foot strap at right angles to the foot supports for 1 min.

6.6.2 Apply the test force of 1 000 N to the foot support by using a test device in accordance with Figure 6 for 1 min.

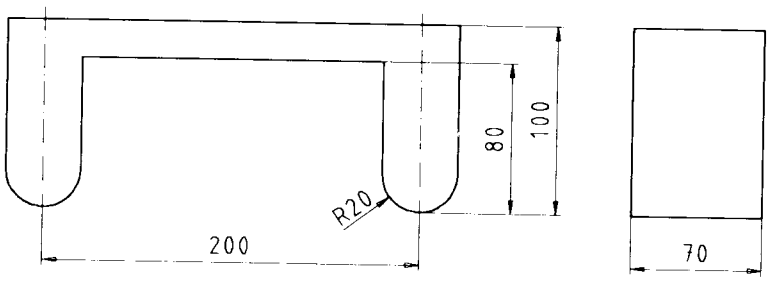


a) simply supported beam

b) cantilever beam

Figure 5 — Permanent deformation test

Dimensions in millimetres



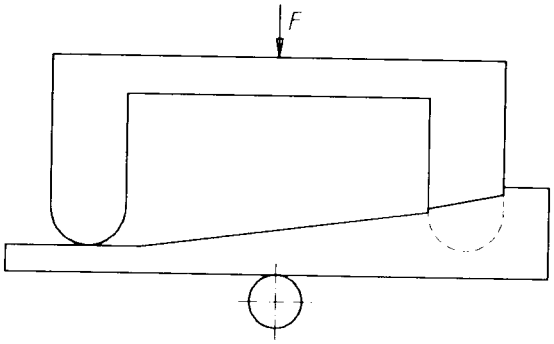


Figure 6 — Test device for testing foot supports

6.7 Endurance testing

For speed-independent machines, carry out the test at 25 cycles/min at a force which produces 200 N at the handles and covers 75 % to 80 % of the full stroke range of a 95 percentile man in accordance with EN 547-3, with a moving load of 60 kg placed on the seat.

For speed-dependent machines carry out the test at a speed which produces a force of 200 N at the handles.

Perform the endurance test as follows:

a) for class H: 12 000 cycles working for 15 min and rest time 15 min and continuing the same pattern until the test is complete;

b) for class S: 100 000 cycles working for 10 h, cool down to room temperature, then continue for a further 10 h and continue until the test is complete.

Check after the test whether the rowing machine is capable of functioning according to the manufacturer's instructions for correct use, or if there are any signs of damage.

6.8 Testing of stability

A test person weighing (100 ± 5) kg, height (1 750 ± 50) mm shall sit on the rowing machine in a normal exercise position and operate the rowing machine as mentioned in the manual:

— at 35 strokes/min at minimum resistance for speed-independent machines; and

— at 35 strokes/min for speed-dependent machines.

Place the rowing machine on a 10° slope in the dynamic direction and on a 5° slope in all other directions.

The duration of test is 1 min.

6.9 Test of the additional requirement for class A

Compare the mechanical power input to the power display.

Determine the mechanical power input by calculating the input force over distance and time, see Figure 7. The displayed power shall be within ±10 % of this measured value in watts using the test parameters of the manufacturer, see **7**c).

The power input shall be the average of a 10 min test period.

The test apparatus for measuring force, distance and time shall be accurate to ±1 % for each of the three variables.

7 Additional instructions for use

In addition to EN 957-1, easy-to-understand instructions for use shall be supplied with each rowing machine.

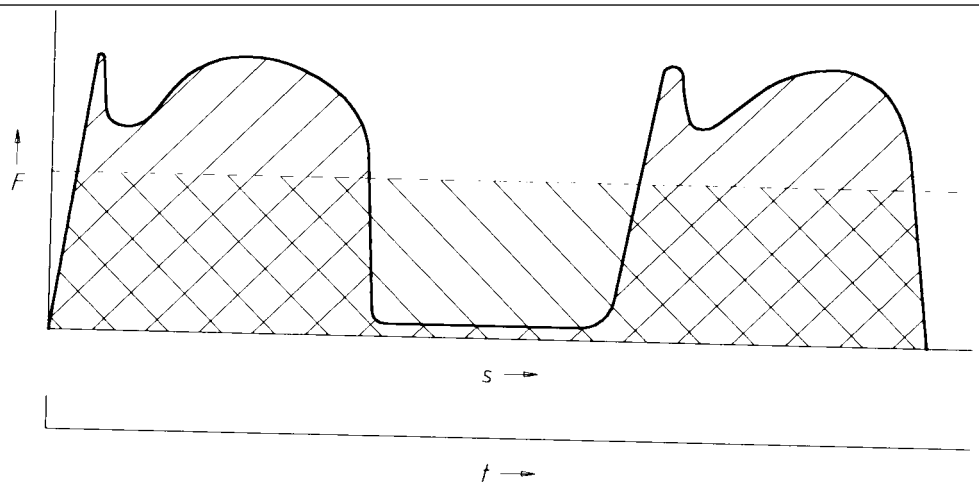
The instructions for use shall include information on at least the following points, depending on the class:

a) determination of the load;

b) information on braking system (speed-dependent or speed-independent);

c) for class A, the testing parameters: training speed, resistance setting and range of movement;

d) safe handling and storage.



1 start of a stroke
2 return
3 start of next stroke

Figure 7 — Example of an input power graph

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