

# **SLOVENSKI STANDARD**

## **SIST EN 957-1:1998**

**01-september-1998**

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### **Stationary training equipment - Part 1: General safety requirements and test methods**

Stationary training equipment - Part 1: General safety requirements and test methods

Stationäre Trainingsgeräte - Teil 1: Allgemeine sicherheitstechnische Anforderungen und Prüfverfahren

Appareils d'entraînement fixes - (Partie 1: Exigences générales de sécurité et méthodes d'essai)

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**Ta slovenski standard je istoveten z:**

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#### **ICS:**

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EUROPEAN STANDARD

EN 957-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 1996

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Descriptors: sport equipment, gymnastic equipment, fixed equipment, safety, designation, tests, maintenance, assembling, utilization, marking

English version

## Stationary training equipment - Part 1: General safety requirements and test methods

Appareils d'entraînement fixes - Partie 1:  
Exigences générales de sécurité et méthodes  
d'essai

Stationäre Trainingsgeräte - Teil 1: Allgemeine  
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This European Standard was approved by CEN on 1996-04-19. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

The European Standards exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

# CEN

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

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

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**Foreword**

This European Standard has been prepared by the Technical Committee CEN/TC 136 "Sports, playground and other recreational equipment", of which the secretariat 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 November 1996, and conflicting national standards shall be withdrawn at the latest by November 1996.

This standard consists of the following parts:

- EN 957-1: General safety requirements and test methods
  - EN 957-2: Strength training equipment, additional specific safety requirements and test methods
  - EN 957-4: Strength training benches, additional specific safety requirements and test methods
  - EN 957-5: Pedal crank training equipment, additional specific safety requirements and test methods
  - prEN 957-6: Tread mills, additional specific safety requirements and test methods
  - prEN 957-7: Rowing machines, additional specific safety requirements and test methods
  - prEN 957-8: Stair climbers and steppers, additional specific safety requirements and test methods
- Part 3 has been amalgamated with part 2 after CEN Enquiry.

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



## Introduction

This part of EN 957 (hereinafter called the General Standard) specifies safety requirements that are generally applicable to stationary training equipment. For specific types of equipment these requirements are supplemented or modified by the requirements of specific standards which have been issued as additional parts of this standard.

Where specific standards exist, this general standard should not be used alone. Special care is required in applying this general standard alone to equipment for which no specific standard has yet been published.

## 1 Scope

This standard specifies general safety requirements for stationary training equipment during use unless modified in the other parts of this European standard.

It also specifies a classification system (see clause 4).

This standard is applicable to all stationary training equipment as defined in 3.1. This includes equipment for use in training areas of organizations such as sport associations, educational establishments, hotels, sport halls, clubs and studios (class S) where access and control is specifically regulated by the owner (person who has the legal responsibility), equipment for domestic use (class H) and other types of equipment including motor driven equipment.

The requirements of a specific standard takes priority over the corresponding requirements of this general standard.

This standard does not apply to stationary training equipment intended for use by children.

NOTE: In the event that the stationary training equipment is used for medical purposes, it may be covered by the provisions of the Council Directive for medical devices in addition to the requirements of this standard.

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## 2 Normative references

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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 292     | Safety of machinery – Basic concepts – General principles for design                  |
| ISO 4287-2 | Surface roughness – Terminology – Part 2: Measurement of surface roughness parameters |
| ISO 6508   | Metallic materials – Hardness test – Rockwell test (scales A–B–C–D–E–F–G–H–K)         |
| ISO 8793   | Steel wire ropes – Ferrule-secured eye terminations                                   |
| IEC 335-1  | Safety of household and similar electrical appliances – Part 1: General requirements  |
| IEC 601-1  | Medical electrical equipment – Part 1: General requirements for safety                |

## 3 Definitions

For the purposes of this standard, the following definitions apply:

**3.1 stationary training equipment** (hereinafter referred to as training equipment): Equipment that is not moved as a unit during use which either stands on the floor or is attached to a wall, ceiling or other fixed structure.

NOTE: Training equipment can be used for the following:

- a) physical culture, body building or body styling;
- b) health fitness training;

- c) physical education; and
- d) training specific to competition and related sports activities.

**3.2 training area:** Area in which the user and equipment can move when the equipment is used.

NOTE: The training area can be utilized to deny third party access to dangerous parts of the equipment.

**3.3 accessible hand and foot area** (hereinafter referred to as **accessible area**): Area accessible to user or third party when the equipment is in normal use, during setting up, grasping, correcting pieces of equipment or position of the body.

**3.4 reverse force:** Yielding force (eccentric force) when lowering load.

**3.5 range of movement:** Space in which the user or part of the user is moving according to the instructions.

**3.6 dynamic direction:** Direction in which the tilting force is applied during a normal exercise.

**3.7 intrinsic loading:** Loading due to user's bodymass.

**3.8 extrinsic loading:** Loads additional to the user's bodymass.

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**3.9 maximum specified load:** The maximum load specified by the manufacturer.

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**3.10 ergometer:** Any piece of training equipment that measures the input of power in watts with a specific accuracy as defined in the specific part of the standard.

NOTE: This term can only be used for training equipment, which fulfills this condition.

**3.11 speed dependent training equipment:** Training equipment which has a braking torque directly proportional to the operation speed.

**3.12 speed independent training equipment:** Training equipment where braking torque and speed are independent variables.

**3.13 power driven training equipment:** Training equipment which is driven by external power.

## 4 Classification

### 4.1 General

Equipment shall be classified in accordance with accuracy and usage class as described in 4.2 to 4.4.

### 4.2 Types

The type numbers used in the specific parts are taken from the part numbers.

NOTE: For example:

Type 2: strength training equipment as defined in EN 957-2.

### 4.3 Accuracy classes

4.3.1 Class A: high accuracy and additional endurance requirements.

4.3.2 Class B: medium accuracy and additional endurance requirements.

NOTE: Class B training equipment has a defined level of reproducibility of the load stages.

4.3.3 Class C: minimum accuracy.

NOTE: Class C training equipment has no performance indicator or braking specified.

### 4.4 Usage classes

4.4.1 Class S (Studio): professional and/or commercial use.

NOTE: Such training equipment is for use in training areas of organizations such as sport associations, educational establishments, hotels, clubs and studios, where access and control is specifically regulated by the owner (person who has the legal responsibility).

4.4.2 Class H (Home): domestic use.

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## 5 Safety requirements

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NOTE: Concerning flammability there may be regulations with which the products should comply.

### 5.1 Stability of free-standing equipment

When tested in accordance with 6.3, the training equipment shall not fall over.

### 5.2 External construction

#### 5.2.1 Edges

All edges and corners of surfaces supporting bodies shall have a radius  $r > 2,5$  mm.

All other edges of components which are accessible to the user or third party shall be free of burrs, rounded or protected in some other way.

Test in accordance with 6.1.1.

#### 5.2.2 Tube ends

When tested in accordance with 6.1.2, accessible tube ends shall be closed off either by parts of the equipment or by plugs.

The plugs shall remain in position at the end of the endurance load test (as specified in specific parts of the standard).

### 5.2.3 Squeeze, shear, rotating and reciprocating points within the accessible area

For accessible areas up to a height of 1 800 mm, when tested in accordance with 6.1.1 and 6.1.2, the distance between movable parts and adjacent movable or rigid parts shall be not less than 60 mm except as follows:

- a) if the fingers only are put at risk the distance shall be not less than 25 mm;
- b) if the distance between moving part and rigid part does not change during movement the distance shall be not less than 9,5 mm;
- c) if appropriate stops and safety devices are provided in the training area;
- d) if uncontrolled access by third party is prevented by the user's body position and where the user is able to immediately stop the movement.

NOTE: This specification is designed to protect the hand and fingers from injury. Injury to other body parts is considered unlikely.

### 5.2.4 Weights

When tested in accordance with 6.1.2 and 6.1.4, the movement of all weights attached to training equipment shall be limited to that required for the performance of the exercise.

NOTE 1: This may be achieved by appropriate design.

NOTE 2: An example of an undesirable characteristic is uncontrolled pendulum swing.

Stacked weights shall move freely and return to the resting point except when displaced intentionally.

### 5.3 Safety mechanisms

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When tested in accordance with 6.1.2 and 6.1.4, training equipment not primarily designed to prevent the user getting into or to allow the user to escape from an overstressed situation shall be fitted with means of allowing the user to escape.

NOTE: This can be achieved by inclusion of stop devices, prestretch lever and weight relief mechanisms.

### 5.4 Adjustment and locking mechanisms

When tested in accordance with 6.1.2 and 6.1.4, adjustment facilities on the training equipment shall function securely, be conspicuous and safely accessible to the user. The possibility of inadvertent alteration shall be eliminated.

Adjustment components such as knobs and levers shall not interfere with the user's range of movement.

Weight selection pins shall be fitted with a failsafe locking mechanism.

The proper function of any locking mechanism shall be clearly self-evident.

### 5.5 Ropes, belts and chains

#### 5.5.1 General

Ropes, belts and chains shall have a safety factor against breakage of 6 times the maximum possible tension that can be developed.

NOTE 1: Attachment devices include snap links and shackles.



When the tension developed is lower than the limit value specified in this standard, the equipment shall be tested at that limit.

When tested in accordance with 6.4, the ropes shall not break and be capable of normal function.

NOTE 2: Normal function means no disconnection and no obvious damage.

## 5.5.2 Wire ropes and pulleys

5.5.2.1 Wire ropes shall be made of galvanized or corrosion-resistant wires. Test in accordance with 6.1.5.

When tested in accordance with 6.1.1, the rope nominal diameter ( $d$ ) shall be related to the groove radius ( $r$ ) of the pulley as follows:

the groove radius,  $r$ , shall lie within the range:

$$\frac{d}{2} + 5 \% \text{ to } \frac{d}{2} + 15 \%$$

with  $\frac{d}{2} + 10 \%$  as the optimum value.

5.5.2.2 The depth of the profile of the groove shall not be less than 1,5 times the nominal diameter of the rope (see figure 1). The profiles at the bottom of the groove shall be circular over an angle of approximately  $120^\circ$ .

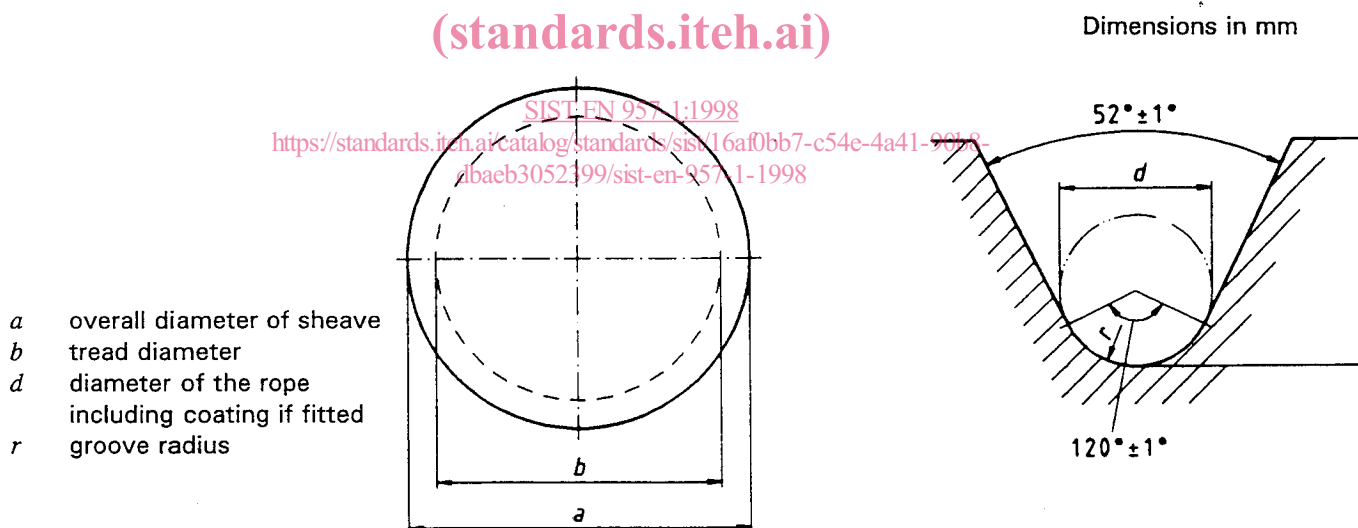


Figure 1: Pulley design

For wire ropes the pulley diameter shall be at least 18 times that of the nominal rope diameter.

Test in accordance with 6.1.1.

5.5.2.3 Ferrules of wrought aluminium alloys shall be made in accordance with ISO 8793.

The rope ends shall be clamped flush with the clamping edge to  $(+2_0)$  mm.

On inspection the rope ends shall be clearly visible.

Pressed connections shall not be subjected to bending.

Wire rope grips shall only be used behind casings or similar protective devices.

Test in accordance with 6.1.2.