SLOVENSKI STANDARD

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Nepremiļ na oprema za vadbo ï 2. del: Oprema za vadbo moļ i, dodatne posebne varnostne zahteve in preskusne metode

Stationary training equipment - Part 2: Strength training equipment, additional specific safety requirements and test methods

Stationäre Trainingsgeräte - Teil 2: Kraft-Trainingsgeräte, zusätzliche besondere sicherheitstechnische Anforderungen und Prüfverfahren

Appareils d'entraînement fixes - Partie 2 : Appareils d'entraînement de force, exigences spécifiques de sécurité et méthodes d'essai supplémentaires

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This European Standard was approved by CEN on 11 March 2003.

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 Management Centre or to any CEN member.

This European Standard exists 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 Management Centre has the same status as the official versions.

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

EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

Foreword

This document (EN 957-2:2003) 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of an identical text or by endorsement, at the latest by November 2003, and conflicting national standards shall be withdrawn at the latest by November 2003.

This document will supersede EN 957-2:1996.

This standard 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, stair climbers 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*

This part of EN 957 is an amalgamation of EN 957-2 and prEN 957-3.

This part of EN 957 should be read in conjunction with EN 957-1.

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 this European Standard concerns the safety of strength training equipment.

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 this European Standard specifies additional safety requirements for strength training equipment in addition to the general safety requirements of EN 957-1.

This part of this European Standard is applicable to stationary training equipment type strength training equipment with stack weight resistance or other means of resistance like weight disks, elastic cords, hydraulic, pneumatic and magnetic systems and springs (type 2) (hereinafter referred to as training equipment) with the classes S and H.

Any attachment provided with the training equipment for the performance of additional exercises are subject to the requirements of EN 957-1.

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 294, *Safety of machinery – Safety distance to prevent danger zones being reached by the upper limbs.*

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

3 Terms and definitions

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

4 Classification

Clause 4 of EN 957-1:1996 applies.

5 Safety requirements

5.1 General

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

5.2 Loading

5.2.1 Intrinsic loading

Each piece of equipment loaded with the user's bodymass shall withstand a force F

for class H 2,5 times the bodymass (100 kg) without breakage,

for class S 2 times the bodymass (100 kg) without permanent deformation.

When tested according to 6.2, 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 %. The training equipment shall not break when a static load of 4 times the bodymass is applied.

5.2.2 Extrinsic loading

5.2.2.1 Class H

When tested according to 6.3 and loaded with the user's bodymass and/or reaction forces or moments of the user, each piece of equipment shall withstand without breakage a load F according to equation (1):

$$F(\text{N}) = [G_k\ (\text{kg}) + 1{,}5\ G\ (\text{kg})] \cdot 2{,}5 \cdot 9{,}81\text{m/s}^2 \quad (1)$$

where

G is the maximum load in kilograms indicated by the manufacturer (see clause 10 of EN 957-1:1996);

G_k is the force in kilograms determined by the proportional bodymass (100 kg);

1,5 is the dynamic coefficient;

2,5 is the safety coefficient.

5.2.2.2 Class S

When tested according to 6.3 and loaded with the user's bodymass and/or reaction forces or moments of the user, each piece of equipment shall withstand a load F according to equation (2):

$$F\ (\text{N}) = [G_k\ (\text{kg}) + 1{,}5\ G\ (\text{kg})] \cdot 2 \cdot 9{,}81\text{m/s}^2 \quad (2)$$

where

G is the maximum load in kilograms indicated by the manufacturer (see clause 10 of EN 957-1996). The torques as specified in Table 1 are to be taken as basis for the calculation of G, if greater than the manufacturer's stated maximum load;

G_k is the force in kilograms determined by the proportional bodymass (100 kg);

1,5 is the dynamic coefficient;

2 is the safety coefficient.

After the test, supports (load bearing surfaces) shall not be deformed by more than f = 1/100,

cantilever supports (cantilever surfaces) by not more than f = 1/150

and other dimensions by not more than 1 %.

If greater than manufacturer's maximum stated load, the equipment shall be capable of accepting a minimal torque load as specified in Table 1, throughout the range of movement of each exercise for which the equipment is designed. The training equipment shall not break when a static load according to equation (2) with a safety coefficient of 4 is applied.

5.3 Endurance load

When tested according to 6.4, the training equipment shall be capable of normal function.

When the training equipment consists of two or more separate functional units, each shall withstand the endurance load test.

When more than one function is tested, which involve use of common components e.g.: ropes, pulleys and bearings, these can be replaced before each separate test.

5.4 Stacked weights

5.4.1 Access to squeeze and/or shear points

5.4.1.1 General

The uncontrolled access by third parties to squeeze and/or shear points of stacked weights shall be prevented.

Weights that can only be lifted as a whole block shall not come closer than 60 mm during movement to any part of the equipment or the ground.

5.4.1.2 Class H

This can be achieved by either:

a) surrounding by a casing in conformance with EN 294 with the exception of a maximum 75 mm wide gap for setting of the weights; or

b) by locking the machine to prevent moving of the stacked weights when the equipment is not in use and by utilizing the training area to deny access to third parties [see 3.2 and clause 9 c) of EN 957-1:1996].

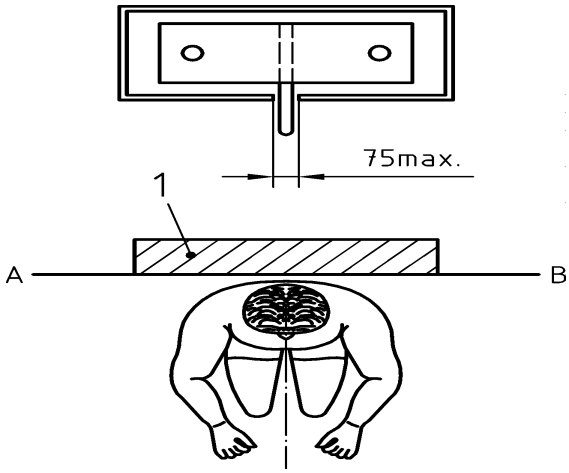
5.4.1.3 Class S

5.4.1.3.1 Encasing

Where stacked weights are behind the user in the normal exercise position as described in the user's manual (see Figure 1, vertical plane AB) they shall be encased on all sides except one side where a gap of 75 mm max. is allowed for selection of the weights. Stacked weights that are encased shall fulfill the following requirement:

— up to 1 800 mm the encasing shall be at least 60 mm higher than the upper edge of the block of weights in its highest position.

Dimensions in millimetres

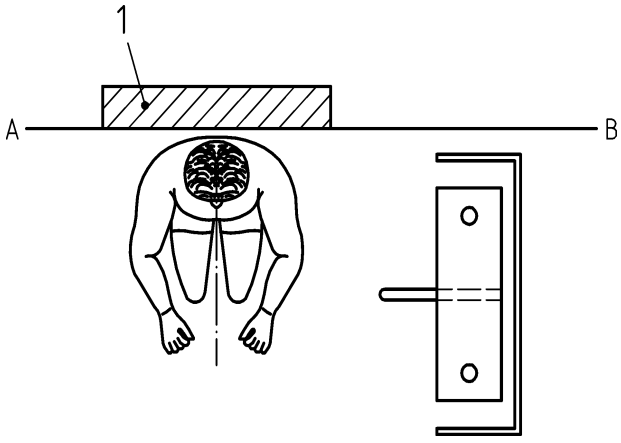


Key
1 Head, chest or back support

Figure 1 — Weight stack behind the user

Where the whole of the stacked weights are at the side of the user and in front of AB (see Figure 2) they shall be encased on the 3 sides furthest from the user. Test in accordance with 6.1.1. Selection of the weights shall be from the open side.

If any part of the weight stack projects behind AB (see Figure 3) it shall be encased on all sides. AB is the line drawn laterally from the head, chest or back support in its most onerous position. If there is no support the line is drawn laterally from the most onerous user position.



Key
1 Head, chest or back support

Figure 2 — Weight stack in front of AB