

## EUROPEAN STANDARD NORME EUROPÉENNE EUROPÄISCHE NORM

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# Gymnastic equipment - Individual and multifunctional vaulting boxes - Safety requirements and test methods

Matériel de gymnastique - Plinths individuels et multifonctions - Exigences de sécurité et méthodes d'essai Turngeräte - Individuelle und multifunktionale Sprungkästen - Sicherheitstechnische Anforderungen und Prüfverfahren

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## **European foreword**

This document (prEN 17461:2019) has been prepared by Technical Committee CEN/TC 136 "Sports, playground and other recreational facilities and equipment", the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

#### 1 Scope

This document specifies functional requirements and specific safety requirements in addition to the general safety standard EN 913 for gymnastic and vaulting boxes for individual or multifunctional use. This document also specifies requirements when multifunctional boxes are used in combination with accessories.

#### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 913:2018, Gymnastic equipment - General safety requirements and test methods

#### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <a href="https://www.iso.org/obp">https://www.iso.org/obp</a>
- IEC Electropedia: available at http://www.electropedia.org/

#### 3.1

#### vaulting boxes

sectioned box that is padded, used in gymnastics

#### 3.2

#### multifunctional vaulting boxes

multi-purpose apparatus with connection points and openings provided to use the vaulting box in combination with other vaulting boxes or accessories

#### **4** Requirements

#### 4.1 Classification

Multifunctional vaulting boxes shall be classified by the design (types) as shown in Table 1. Examples are given in Annex A.

Туре	Description	Example
1	rectangular vaulting box with individual box sections and padded top box	Figure A.1
2	rectangular mini vaulting box with padded top or flat top	Figure A.2
3	pyramidal vaulting box with individual box sections and padded top box	Figure A.3
4	padded vaulting tables with supporting frame	Figure A.4
5	pyramidal to rectangular vaulting box with individual box	Figure A.5
	sections and padded top box	
6	rectangular multifunctional vaulting box with individual box sections and padded top box	Figure A.6
7	pyramidal multifunctional vaulting box with individual box sections and padded top box	Figure A.7
8	vaulting box or table with padded top with any other design which fulfils dimensions and safety requirements of this standard	Table 2

#### Table 1 — Clasification of vaulting boxes

#### 4.2 Dimensions

Top surfaces of the (multifunctional) vaulting boxes shall comply with the dimensions specified in Table 2.

#### Table 2 — Dimensions of top surfaces

Dimensions in millimetres

Range	Length I	Width b	Height h
Maximum	1 605	750	1 500
Minimum	700	500	400

Height of the (multifunctional) vaulting boxes shall comply with the dimensions specified in Table 3.

Туре	Maximum height
	mm
1, 3, 5, 6, 7, 8	1 500
2	400
4	999

#### 4.3 Performance of padded box top

When tested according to EN 913:2018, Annex C, using a drop height of 300 mm, the peak acceleration shall not exceed 500 m/s<sup>2</sup> (50*g*).

#### **4.4 Entrapment**

The connection points or gaps shall be positioned more than 90 mm from the top of the (multifunctional) vaulting box (including padding), see Figure 1.



Figure 1 — Position of connection points or gaps

#### 4.5 Floor projection

There should be no floor projection that could cause tripping,. The maximum size of floor projection shall comply with the dimensions specified in Table 4. See Figure 2 for an example.

Table 4 — Dimensions of maximum size of projection

Туре	<b>Maximum height</b> (lenght x width x height) mm
1, 6	155 × 90 × 50
2, 3, 4, 5, 7, 8	No floor projection allowed





### 5 Materials

Materials shall be selected and protected such that the structural integrity of the equipment manufactured from them is not affected before the next relevant maintenance inspection.

NOTE 1 The provisions relating to certain materials in this document do not imply that other equivalent materials are unsuitable in the manufacture of multi-sports equipment.

The selection of materials and their use should be in accordance with the appropriate European Standards where applicable.

In the choice of a material or substance for equipment, consideration should be given to the eventual disposal of the material or substance having regard to any possible environmental toxic hazard.

NOTE 2 Information on the identification and classification of such substances can be found in the Directive 67/548/EEC (classification, packaging and labelling of dangerous substances) as well as in the Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH).

#### 6 Safety requirements

#### 6.1 General

Vaulting boxes shall comply with the requirements of EN 913, except insofar as they are modified by this document.

#### 6.2 Stability

When tested according to 8.1.3, the vaulting box shall not rotate about the base, nor shall any of the sections separate in normal use when subjected to a horizontal and vertical force representing the theoreticaltest force. The theoretical horizontal test force shall be calculated using the formula given in EN 913:2018, B.1.2.

#### 6.3 Strength

When tested according to 6.2, the vaulting box or any vertical sided individual section shall show no sign of loose bonds, breaking or cracking.

#### 6.4 Durability of construction

When tested according to 6.3, sections shall not show any loose joints, breakage, cracking or change in diagonal dimensions greater than 3 mm.

#### 7 Usage in combination with other equipment

#### 7.1 Gereral

The multifunctional vaulting box could be used in combination with other multifunctional vaulting boxes or equipment within the scope of the EN 913:2018. The intended combination usage is described in this paragraph. In all combinations, keep aware of the safety risks. Perform a safety risk assessment for each combination made with the multifunctional vaulting box.

#### 7.2 Accessories

When accessories are used in combination with multifunctional vaulting boxes the following requirements shall apply.

All accessories shall comply with EN 913 both individually and in each combination used.

The accessories shall be connected to the multifunctional vaulting box is such a way that it does not disconnect during intended usage.

The manufacturer shall provide instructions for use and set-up (e.g. maximum number of users).

Examples of attention points at risk assessment for multifunctional vaulting boxes are given in Annex B.

Examples for typical combination are given in Annex C.

#### 8 Test methods

#### 8.1 Determination of stability

#### 8.1.1 Principle

A horizontal force is applied to the top of the equipment and any movement of the top is noted.

#### 8.1.2 Test temperature

Condition the equipment for a minimum of 3 h at a temperature of  $(23 \pm 2)$  °C.

#### 8.1.3 Procedure

Carry out the test at maximum height according to the manufacturer.

Prevent the vaulting box from sliding, see Figure 3.

For boxes  $\leq$  500 mm in height, apply a horizontal force calculated from 20 % of the self weight of the equipment with a minimum of 70 N to the highest point in the centre of the top (see Figure 3).

For boxes >500 mm in height, apply a horizontal force calculated from 20 % of the self weight of the equipment with a minimum of 140 N to the highest point in the centre of the top (see Figure 3).

After removing the horizontal force, the vaulting box shall return to the start position of the test.



#### Кеу

1 point of rotation

F force



#### 8.1.4 Expression of results

Express the level of stability by noting if rotation has occurred.

#### 8.2 Determination of strength

#### 8.2.1 Principle

Load the equipment with a calculated vertical force and examine for fracture or other damage. Calculated using the formula given in EN 913:2018, B.1.2.

#### 8.2.2 Apparatus

A rigid plate of dimensions (200 mm  $\times$  200 mm  $\times$  10 mm)  $\pm$ 1 mm with a radius of the lower edges of minimum 3 mm.

#### 8.2.3 Test temperature

Condition the equipment for a minimum of 3 h at a test temperature of  $(23 \pm 2)$  °C.

#### 8.2.4 Procedure

#### 8.2.4.1 Vaulting box

Calculate the vertical force using the formula given in EN 913:2018, B.1.2. Apply the vertical force at the centre of the top of the equipment for 1 min (+10 s).

Note any breaking or cracking of the equipment.

#### 8.2.4.2 Accessories

Attach the accessory to the multifunctional vaulting box(es) in accordance with the manufacturer instructions.

Calculate the vertical force using the formula given in EN 913:2018, B.1.2. Apply the vertical force at the centre of the top of the equipment for 1 min (+10s).

Note any breaking or cracking of the equipment. Breaking and cracking is not acceptable.

Examples for typical combination are given in Annex C.

#### 8.3 Determination of durability of construction

#### 8.3.1 Principle

A section is dropped on a concrete floor from a specified height and examined for damage and the pretest and post-test variation of diagonal dimensions is measured and the difference is determined.

#### 8.3.2 Procedure

Before testing, measure the diagonal dimensions of a section. Drop the section onto a concrete floor, from a minimum height of 120 mm perpendicular to the section's diagonal axis. Carry out the test five times for each corner, taking diagonally opposite corners in turn.

#### **8.3.3 Expression of results**

Note any breakage or loose and easily moveable connections. Record the pre-test and post-test variation of diagonal dimensions in millimetres.

### 9 Warning

The manufacturer shall provide written instructions for the safe assembly, installation, transportation, storage and maintenance in the appropriate language(s) of the country in which the gymnastic and sports equipment is to be installed and used.

Further requirements are related to the specific gymnastic and sports equipment and dealt within the appropriate European Standards (where applicable).

#### **10 Marking**

Marking of multifunctional vaulting boxes and accessories shall be in accordance to EN 913:2018, Clause 6.

The following information shall be also provided:

- a) type according to Table 1;
- b) maximum numbers of simultaneous usage;
- c) maximum building height.

## Annex A

## (informative)

### **Examples of vaulting boxes**

Figures A.1 to A.8 show examples of different vaulting boxes.



Figure A.1 — Vaulting box type 1



Figure A.3 — Vaulting box type 3



Figure A.2 — Vaulting box type 2



Figure A.4 — Vaulting box type 4



Figure A.5 — Vaulting box type 5



Figure A.6 — Vaulting box type 6



Figure A.7 — Vaulting box type 7



Figure A.8 — Vaulting box type 8

## Annex B (informative)

# Examples of attention points at risk assessment for multifunctional vaulting boxes

Table B.1 shows examples for vaulting boxes and relevant attention poins at risk assessment.

Accessories	Picture	Attention point risk assessment
Running board		<ul> <li>Connection to multifunctional vaulting box.</li> <li>Maximum number of simultaneous users</li> <li>Always use in combination with an mat according EN 12503-1:2013 types 4, 5, 6, 7, 8</li> </ul>
Sliding board		<ul> <li>Connection to multifunctional vaulting box.</li> <li>Maximum number of simultaneous users</li> <li>Always use in combination with an mat according EN 12503-1:2013 types 4, 5, 6, 7, 8</li> </ul>
Balance beam		<ul> <li>Connection to multifunctional vaulting box.</li> <li>Maximum number of simultaneous users. Mounting height</li> <li>Always use in combination with an mat according EN 12503-1:2013 types 4, 5, 6, 7, 8</li> </ul>
Half Ladder		<ul> <li>Connection to multifunctional vaulting box.</li> <li>Maximum number of simultaneous users</li> <li>Always use in combination with an mat according EN 12503-1:2013 types 4, 5, 6, 7, 8</li> </ul>

Table B.1 — Examples for vaulting boxes and relevant attention poins at risk assessment

Accessories	Picture	Attention point risk assessment
Ladder		<ul> <li>Connection to multifunctional vaulting box.</li> <li>Maximum number of simultaneous users.</li> <li>Entrapment at connection side</li> <li>Always use in combination with an mat according EN 12503-1:2013 types 4, 5, 6, 7, 8</li> </ul>
Climbing frame		<ul> <li>Connection to multifunctional vaulting box.</li> <li>Maximum number of simultaneous users.</li> <li>Entrapment at connection side</li> <li>Can be used in combination with an mat according EN 12503-1:2013 types 4, 5, 6, 7, 8</li> </ul>
Gymnastic roll		<ul> <li>Connection to multifunctional vaulting box.</li> <li>Maximum number of simultaneous users.</li> <li>Entrapment at connection side</li> <li>Can be used in combination with an mat according EN 12503-1:2013 types 4, 5, 6, 7, 8</li> </ul>
Roller slide		<ul> <li>Connection to multifunctional vaulting box.</li> <li>Maximum number of simultaneous users.</li> <li>Entrapment at connection side</li> <li>Rollers rolls smoothly</li> <li>Rollers are intact</li> <li>Can be used in combination with an mat according EN 12503-1:2013 types 4, 5, 6, 7, 8</li> </ul>

Accessories	Picture	Attention point risk assessment
Connecting rod		<ul> <li>Connection to multifunctional vaulting box.</li> <li>When connection opening cause finger entrapment then close connection opening after usage.</li> </ul>
Intermediate deck	· · ·	<ul> <li>Connection to connection rod.</li> <li>Maximum number of simultaneous users.</li> </ul>
Dip bar		<ul> <li>Connection to multifunctional vaulting box.</li> <li>Maximum number of simultaneous users.</li> <li>Maximum mounting height. A grand swing shall not be possible.</li> <li>Can be used in combination with an mat according EN 12503-1:2013 types 4, 5, 6, 7, 8</li> </ul>
Bench	Col	<ul> <li>Connection to multifunctional vaulting box.</li> <li>Maximum number of simultaneous users.</li> <li>Can be used in combination with an mat according EN 12503-1:2013 types 4, 5, 6, 7, 8</li> </ul>

## Annex C

(informative)

## **Examples typical combinations**

Figure C.1 gives an example of a typical comination of multifunction vaulting boxes.



Figure C.1 — Example of a typical comination