Schweizer Norm
Norme Suisse
Norma Svizzera

INB **Interdisziplinärer Normenbereich**
Secteur interdisciplinaire de normalisation

EN 1651

EINGETRAGENE NORM DER SCHWEIZERISCHEN NORMEN-VEREINIGUNG SNV NORME ENREGISTRÉE DE L'ASSOCIATION SUISSE DE NORMALISATION

Paragliding equipment - Harnesses - Safety requirements and strength tests

Ausrüstung für das Gleitschirmfliegen - Gurtzeuge - Sicherheitstechnische Anforderungen und Prüfung der Festigkeit

Equipement pour le parapente - Harnais pour parapente - Exigences de sécurité et essais de résistance

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La Norme européenne EN 1651:1999 a le statut d'une Norme suisse.

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En Suisse la présente Norme européenne est de la compétence du INB/TK 131 «Matériel de sport et de loisirs» du Secteur interdisciplinaire de normalisation.

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This European Standard was approved by CEN on 1 April 1999.

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.

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 Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

Ref. No. EN 1651:1999 E

Contents

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 standard is one of a package of standards on equipment for paragliding as follows:

EN 926-1
Paragliding equipment – Paragliders – Part 1: Requirements and test methods for structural strength

prENV 926-2
Paragliding equipment – Paragliders – Part 2: Requirements and flight tests

EN 1651
Paragliding equipment – Harnesses – Safety requirements and strength tests

prEN 12491
Paragliding equipment – Emergency parachute – Safety requirements and test methods

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 March 2000, and conflicting national standards shall be withdrawn at the latest by March 2000.

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.

1 Scope

This standard is applicable only to harnesses for paragliders.

The intermediate attachment system between the harness and the paraglider does not form part of this standard.

This standard specifies safety requirements and test methods.

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 926-1
Paragliding equipment – Paragliders – Part 1: Requirements and test methods for structural strength

prEN 12491
Paragliding equipment – Emergency parachute – Safety requirements and test methods

3 Definitions

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

3.1 paraglider: Ultralight glider with no primary rigid structure, for which take-off and landing are on foot, the pilot is installed in a harness connected to the wing; [EN 926-1]

3.2 harness: An assembly composed of straps and fabric for supporting the pilot in the seated or semi-recumbent or standing position.

NOTE: The harness is attached to the wing via two rings or connectors, it can also be integral with the wing via risers.

4 Safety requirements

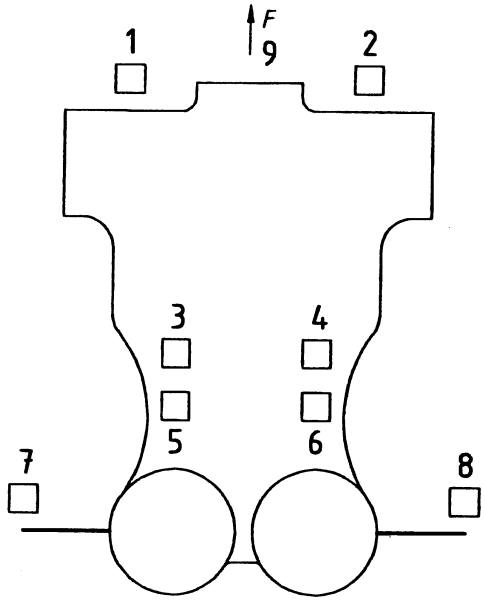
4.1 General

All free ends of the harness straps shall be finished with a folded hem making it impossible for the straps to pass through the adjustable buckles.

The harness shall be made in accordance with accepted practice for textile assemblies.

All attachment points provided on the harness (see figure 1) which are not to be used for attachment of the paraglider or emergency parachute shall be clearly marked in a contrasting colour to the main webbing.

The attachment points for the emergency parachute shall not be in a position lower than the attachment points of the paraglider and shall be positioned symmetrically on the harness.



1 harness attachment for emergency parachute (right)
2 harness attachment for emergency parachute (left)
3 harness attachment for paraglider riser(s) (right)
4 harness attachment for paraglider riser(s) (left)
5 harness attachment for tow release (right)
6 harness attachment for tow release (left)
7 dummy attachment to anchorage (right)
8 dummy attachment to anchorage (left)
9 dummy attachment point for F tension force applied to neck

Figure 1: Attachment points for the tests

NOTE: The numbering system for attachment points in this figure 1 is retained in all the following figures of this European Standard.

4.2 Strength requirements

4.2.1 When tested in accordance with 5.3.2.1 there shall be

a) no rupture of any essential structural part;

b) no rupture of the stitching of any essential structural part;

c) no slipping of the adjustment points,

d) no plastic deformation, and

e) no rupture, slipping or deformation likely to result in the dummy falling out of the harness.

The rupture of the seat board is acceptable.

4.2.2 When tested in accordance with 5.3.2.2, there shall be

a) no rupture of any essential structural part;

b) no rupture of the stitching of any essential structural part;

c) no rupture, slipping or deformation likely to result in the dummy falling out of the harness.

4.2.3 When tested in accordance with 5.3.2.3, there shall be

a) no rupture of any essential structural part;

b) no rupture of the stitching of any essential structural part;

c) no slipping of the adjustment points;

d) no plastic deformation;

e) no rupture, slipping or deformation likely to result in the dummy falling out of the harness.

4.2.4 For harnesses with special emergency parachute attachment points, when tested in accordance with 5.3.2.4, there shall be

a) no rupture of any essential structural part;

b) no rupture of the stitching of any essential structural part;

c) no rupture slipping or deformation likely to result in the dummy falling out of the harness.

4.2.5 For harnesses with tow attachment points, when tested in accordance with 5.3.2.5, there shall be

a) no rupture of any essential structural part;

b) no rupture of the stitching of any essential structural part;

c) no slipping of the adjustment points;

d) no rupture, slipping or deformation likely to result in the dummy falling out of the harness.

4.2.6 When tested in accordance with 5.3.2.6, there shall be

a) no rupture of any essential structural part;

b) no rupture of the stitching of any essential structural part;

c) no rupture, slipping or deformation likely to result in the dummy falling out of the harness.

4.2.7 When tested in accordance with 5.3.2.7, there shall be

a) no rupture of any essential structural part;

b) no rupture of the stitching of any essential structural part;

c) no rupture, slipping or deformation likely to result in the dummy falling out of the harness.

4.3 Emergency parachute

If the harness comprises all or parts of an emergency parachute, this equipment shall comply with prEN 12491.

5 Strength tests

5.1 Principle

The strength of the harness and the safety of its occupant is verified using a dummy and the application of various forces to the attachment points (see figure 1).

The attachment points of the harness (1, 2, 3, 4, 5, 6) are equipped with connectors of a material diameter of 6 mm. If the sample is equipped with connectors recommended by the manufacturer, these will be used to connect it to the test equipment.

The equipment supplied for testing shall be identical in all aspects with the marketed model.

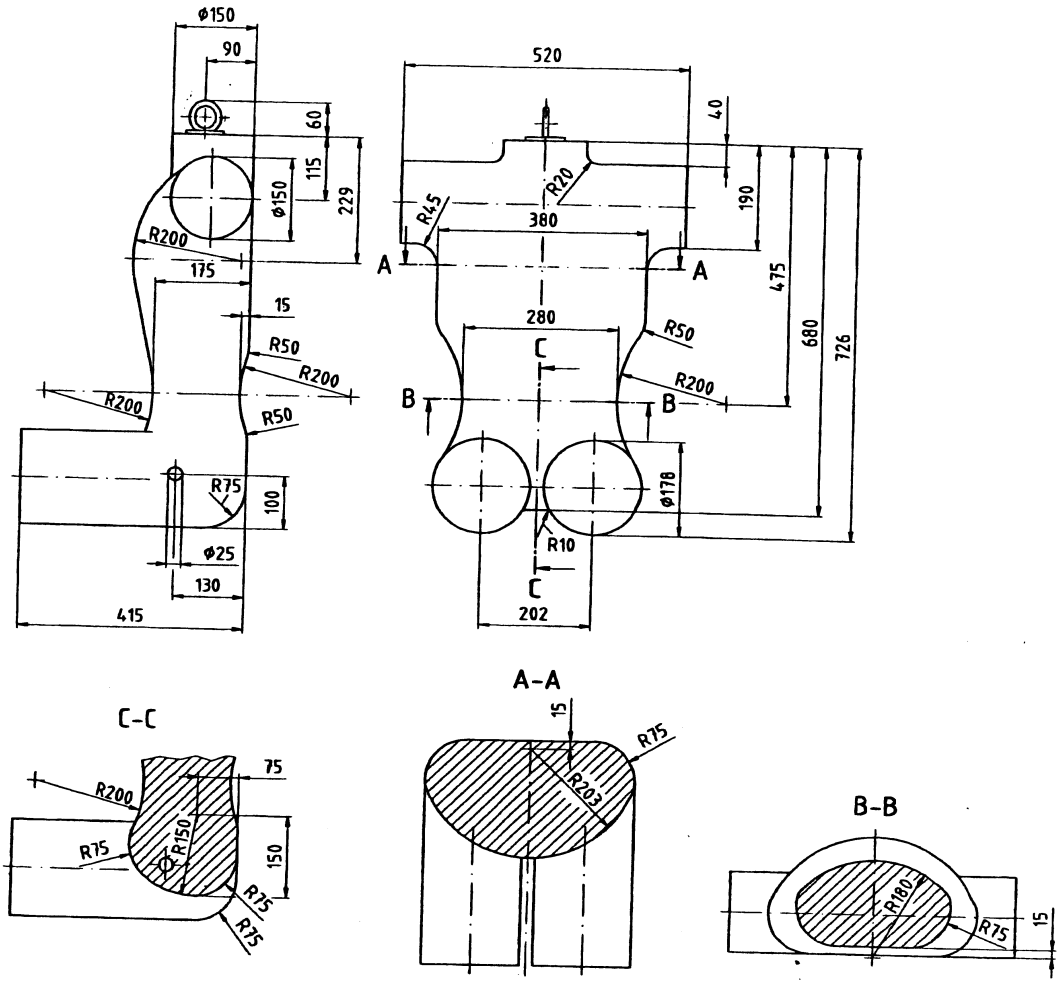
If the manufacturer recommends a maximum pilot mass of more than 100 kg, the specified loads are multiplied by the factor

$$\frac{\text{maximum pilot mass}}{100}.$$

5.2 Apparatus

5.2.1 A dummy in the seated position according to figure 2.

Dimensions in millimetres



Material: hard wood, plastic

Figure 2: Dummy

5.2.2 A measuring system recording the loads as a function of time allowing graphical output.

5.2.3 A video camera for following in close-up the effects on the harness tested.

5.3 Procedure

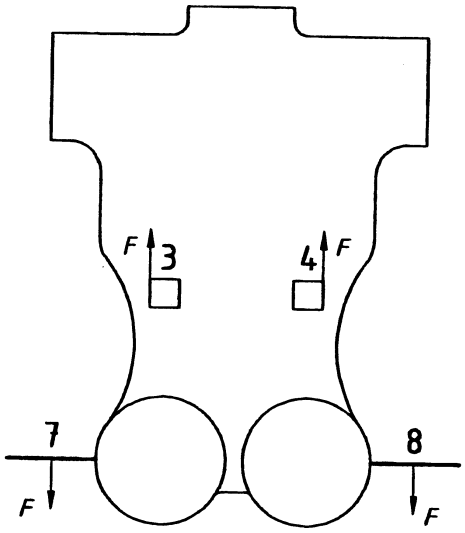
5.3.1 General

All the tests shall be filmed on video[1]) After the testing, a panel composed of three experts, independent of the manufacturer concerned, has the task of examining a copy of the film and of the test report. They decide whether or not to ratify the results, the chief examiner recorded during the tests.

5.3.2 Test

5.3.2.1 First test

With the dummy seated and strapped correctly in the harness anchor it by two points (see 7 and 8 in figure 3) and apply a force of 6 000 N symmetrically for 10 s to the two paraglider riser attachment points (see 3 and 4 in figure 3).



3 harness attachment for paraglider riser(s) (right)
4 harness attachment for paraglider riser(s) (left)
7 dummy attachment to anchorage (right)
8 dummy attachment to anchorage (left)

Figure 3: First and second test

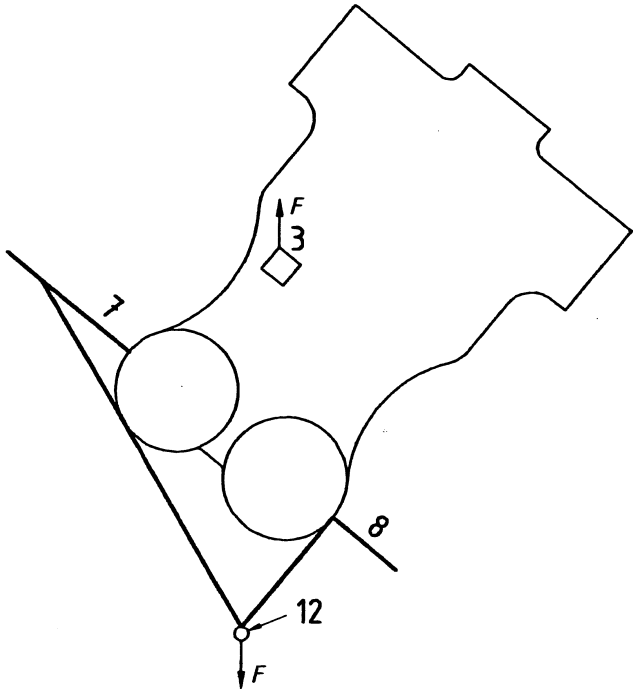
5.3.2.2 Second test

With the dummy seated and strapped correctly in the harness anchor it by two points (see 7 and 8 in figure 3) and apply a force of 15 000 N symmetrically for 5 s to the two paraglider riser attachment points (see 3 and 4 in figure 3).

[1]) The video films are shot in such a way as to show up any ruptures or incipient ruptures.

5.3.2.3 Third test

With the dummy seated and strapped correctly in the harness anchor it to a free running connection between points 7 and 8 and apply a force of 6 000 N for 10 s to one of the paraglider riser attacment points (see figure 4).

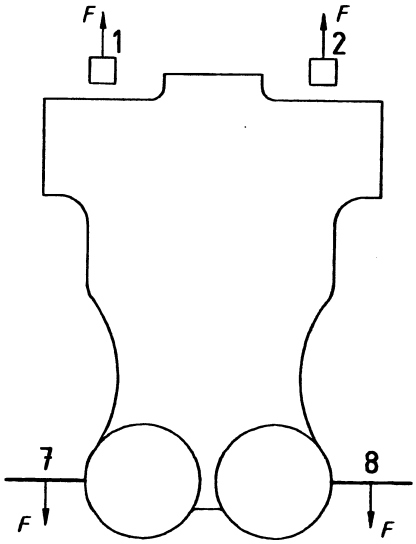


3 harness attachment for paraglider (riser(s) (right)
7 dummy attachment to anchorage (right)
8 dummy attachment to anchorage (left)
12 gliding connection

Figure 4: Third test

5.3.2.4 Fourth test

With the dummy seated and stapprd correctly in the harness anchor it by two points (see 7 and 8 in figure 5) and apply a force of 15 000 N symmetrically for 5 s to the two emergency parachute attachment points (see 1 and 2 in figure 5).

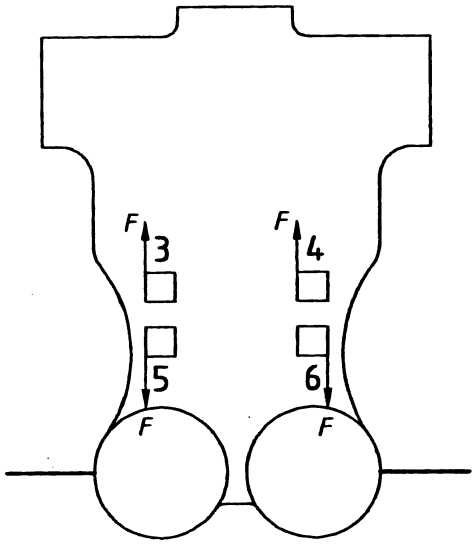


1 harness attachment for emergency parachute (right)
2 harness attachment for emergency parachute (left)
7 dummy attachment to anchorage (right
8 dummy attachment to anchorage (left)

Figure 5: Fourth test

5.3.2.5 Fifth test

With the dummy seated and strapped correctly in the harness anchor the harness by the two paraglider riser attachment points (see 3 and 4 in figure 6) and apply a force of 5 000 N symmetrically for 10 s to the two tow release points (see 5 and 6 in
figure 6).

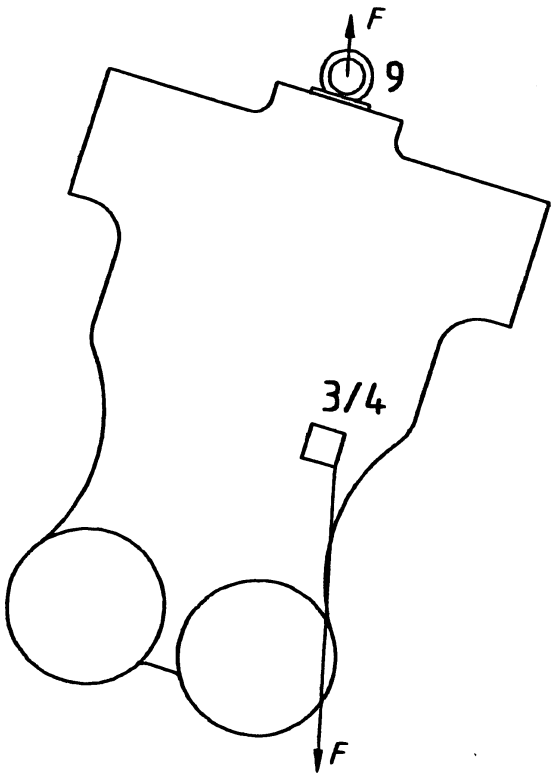


3 harness attachment for paraglider riser(s) (right)
4 harness attachment for paraglider riser(s) (left)
5 harness attachment for tow release (right)
6 harness attachment for tow release (left)

Figure 6: Fifth test

5.3.2.6 Sixth test

With the dummy seated and strapped correctly in the harness anchor it at the head position (see 9 in figure 7) and apply a load of 4 500 N for 10 s to one of the paraglider attachment points (see 3 or 4 in figure 7).

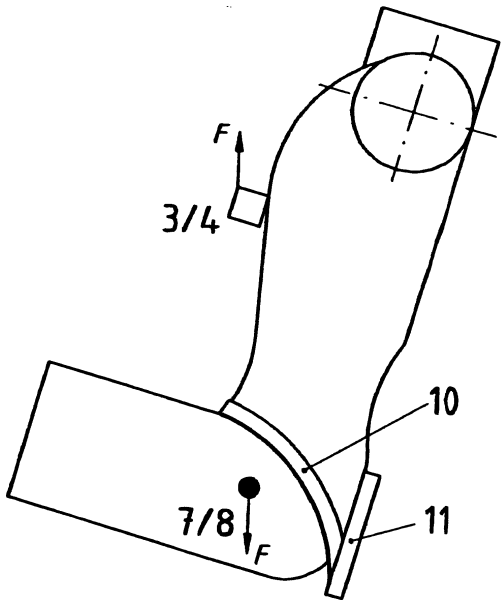


3/4 harness attachment for paraglider riser(s) (right and left)
9 dummy attachment point for force F applied to neck

Figure 7: Sixth test

5.3.2.7 Seventh test

With the dummy upright and strapped in the harness (so the leg straps are taking the load) anchor it by two points (see 7 and 8 in figure 8) and apply a load of 15 000 N symmetrically for 5 s to the two paraglider riser attachment points (see 3 and 4 in figure 8).



3 and 4 harness attachment for paraglider riser(s) (right and left)
7 dummy attachment to anchorage (right)
8 dummy attachment to anchorage (left)
10 leg strap
11 seat board

Figure 8: Seventh test

6 Test report

6.1 The test report shall include:

a) the manufacturer's name;

b) type and reference of the harness tested;

c) composition of the panel of experts; and

d) details of the tests.

6.2 The following items shall accompany the test report and be filed:

a) the video cassette of the tests;

b) the manufacturing record;

c) the harness that has been tested; and

d) the user's manual.

7 Manufacturing record

The manufacturing record supplied by the manufacturer shall contain the following information:

a) name and address of manufacturer;

b) name of model;

c) year in 4 figures and month of manufacture of the sample tested;

d) maximum pilot weight (mass) in kg;

e) user's manual;

f) description of materials.

All the materials used shall be listed with:

– name of the material;

– name and references of manufacturer;

– use in the harness;

– characteristics and tests carried out on this material by the supplier or manufacturer.

8 User's manual

Each harness shall be supplied with a user's manual which shall contain at least the following instructions:

a) attachment to the wing;

b) connection of the emergency parachute;

c) how to install the emergency parachute;

d) connection of towing equipment;

e) attachment of accessories (accelerator, ballast, etc);

f) details regarding the purpose and functioning of any other attachment points provided by the manufacturer;

g) how to adjust and fit the harness before takeoff, after takeoff and before landing;

h) recommended frequency of manufacturer's inspections;

i) maximum pilot weight (mass);

j) maintenance instructions.

9 Marking

The conformity of the harness to the requirements of this standard shall be stated on a stamp/label fixed to the harness, which shall include the following indications:

a) manufacturer's name;

b) harness model name;

c) serial number;

d) year and month of manufacture;

e) harness size (e.g. small, medium, large);

f) maximum pilot weight; and

g) the number of this European Standard, i.e. EN 1651.