SLOVENSKI STANDARD
SIST EN 1651:2018+A1:2020

01-julij-2020

Nadomešča:
SIST EN 1651:2018

Oprema za jadralno padalstvo - Pasovi - Varnostne zahteve in trdnostni preskusi

Paragliding equipment - Harnesses - Safety requirements and strength tests

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

Équipement pour le parapente - Sellettes pour parapente - Exigences de sécurité et essais de résistance

Ta slovenski standard je istoveten z: **EN 1651:2018+A1:2020**

ICS:

97.220.40	Oprema za športe na prostem in vodne športe	Outdoor and water sports equipment

SIST EN 1651:2018+A1:2020 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1651:2018+A1

April 2020

ICS 97.220.40

English Version

Paragliding equipment - Harnesses - Safety requirements and strength tests

Équipement pour le parapente - Sellettes pour parapente - Éxigences de sécurité et essais de résistance

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

This European Standard was approved by CEN on 13 November 2017 and includes Amendment 1 approved by CEN on 22 November 2019.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword

This document (EN 1651:2018+A1:2020) 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 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 October 2020, and conflicting national standards shall be withdrawn at the latest by October 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1 approved by CEN on 2019-11-22.

The start and finish of text introduced or altered by amendment is indicated in the text by tags ⟨A1⟩ ⟨A1⟩.

This document supersedes ⟨A1⟩ EN 1651:2018 ⟨A1⟩.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European 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

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 12491, *Paragliding equipment - Emergency parachutes - 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:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
paraglider
ultra-light glider with no primary rigid structure, for which take-off and landing are on foot, with the pilot (and potentially one passenger) carried in a harness (or harnesses) connected to the wing

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

Note 1 to entry: The harness is attached to the wing via two rings or connectors, it can also be integral with the wing via risers.

3.3
emergency parachute
emergency device intended to slow the descent of a paraglider pilot in the event of an incident in flight, which is deployed by the pilot by an intentional manual action

3.4
emergency parachute connecting element
element not supplied as an integral part of either a harness or emergency parachute, provided to connect an emergency parachute to a harness

3.5
spreaders
additional parts provided to connect a paraglider to two or more harnesses, and in some cases also to one or more emergency parachutes

3.6
clip-in weight
total weight in flight excluding the paraglider

3.7
special emergency parachute attachment points
symmetrical locations on the harness structure provided by the manufacturer specifically for the attachment of an emergency parachute

Note 1 to entry: See Figure 1 locations 1 and 2.

3.8
integrated Y-bridle
load distributing component integrated into the harness structure used to connect the harness to a single parachute bridle

3.9
crotch strap
harness structural element passing between the legs intended to restrain the pilot

3.10
inner container - deployment system
inner container and the extraction handle system, being either a handle fixed to the inner container, or a free handle and handle attachment point(s) on the inner container

3.11
emergency parachute system
emergency parachute combined with its deployment system

3.12
anti falling-out system
system preventing unintentional slipping from a harness when the crotch straps are not closed

3.13
durable medium
information given to the user in an unchangeable format that does not allow for unilateral editing or altering by the information provider, and enables the recipient to store the information in a way that is accessible for future reference for as long as the user might reasonably need it

3.14
impact pad
pad fitted to a paraglider harness to reduce compression damage to the spine of the pilot

4 Safety requirements

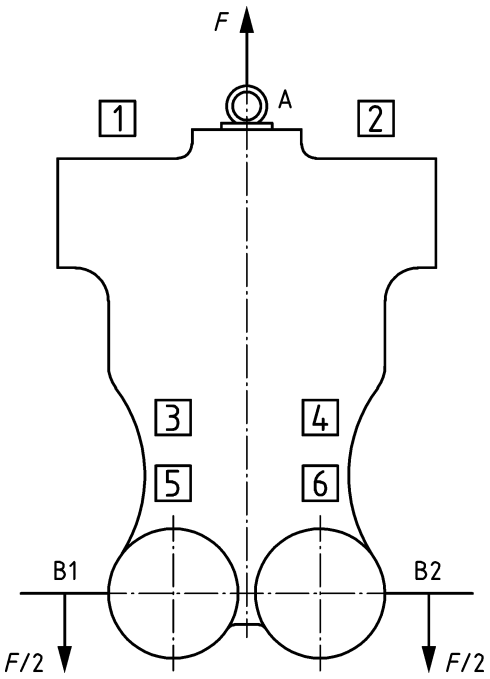
4.1 General

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) that may be used for attachment of the paraglider or emergency parachute shall be clearly marked in a contrasting colour to the other 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.



Key

1 special harness attachment for emergency parachute (right)
2 special 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)
B1 dummy attachment to anchorage (right)
B2 dummy attachment to anchorage (left)
A dummy attachment point
F pulling force

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 Positive symmetric load applied to the paraglider riser attachment points

When tested in accordance with 5.5.1.1, there shall be:

a) during the adjustable component slipping test, no slippage of any adjustable element exceeding 10mm;

b) no rupture of any essential structural part;

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

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

4.2.2 Positive asymmetric load applied to the paraglider riser attachment points

When tested in accordance with 5.5.1.2, 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 that makes it possible for the dummy to fall out of the harness.

4.2.3 Positive symmetric load applied to the emergency parachute attachment points

For harnesses with special emergency parachute attachment points, and / or an integrated Y bridle, when tested in accordance with 5.5.1.3, there shall be:

a) during the adjustable component slipping test, no slippage of any adjustable element exceeding 10mm;

b) no rupture of any essential structural part;

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

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

4.2.4 Negative symmetric load applied to the emergency parachute attachment points

For harnesses with special emergency parachute attachment points, and / or an integrated Y-bridle, which are formed by a separate attached construction which appears to be asymmetric, when tested in accordance with 5.5.1.4, there shall be:

a) during the adjustable component slipping test, no slippage of any adjustable element exceeding 10mm;

b) no rupture of any essential structural part;

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

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

4.2.5 Negative symmetric load applied to the tow attachment points

For harnesses with tow attachment points, when tested in accordance with 5.5.1.5, there shall be:

a) no rupture of any essential structural part;

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

c) no rupture, slipping or deformation that makes it possible for the dummy to fall out of the harness.

4.2.6 Negative symmetric load applied to the paraglider riser attachment points

When tested in accordance with 5.5.1.6, 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 Upright position load

When tested in accordance with 5.5.1.7, there shall be:

a) during the adjustable component slipping test, no slippage of any adjustable element exceeding 10mm;

b) no rupture of any essential structural part;

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

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

4.2.8 Emergency parachute connecting element

When tested in accordance with 5.5.1.8, there shall be no rupture of any essential structural part.

4.2.9 Anti falling-out system

When tested in accordance with 5.5.1.9, 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.

4.2.10 [A1⟩ Static parachute extraction test for harnesses with integrated emergency parachute container(s)

For harnesses with integrated emergency parachute container(s), the extraction of the emergency parachute in its inner container shall be tested in accordance with 5.5.1.11. ⟨A1]

4.3 Vertical impact pad test requirements

Where the manufacturer claims the harness is equipped with an impact pad, the pad shall be tested in accordance with the test procedure 5.5.2.

Stiff or rigid parts on the harness or impact pad shall only be permitted if no injuries to the back, neck or head of the user are likely from these parts. The design and materials of the impact pad shall ensure as far as possible that no bending or point loads to the back, neck or head of the user may occur on impact or deformation.

The impact pad shall not depend on manual activation prior to impact.

4.4 Emergency parachute deployment test requirements

The requirements of this clause apply to integrated container(s) designed for an emergency parachute(s) according to EN 12491.

If the harness comprises all or parts of an emergency parachute, these parts shall comply with EN 12491.

For harnesses with integrated outer containers, test deployments shall be made from all integrated outer container locations.

The test is to be undertaken by the harness manufacturer according to 5.5.3. The manufacturer shall provide an attestation of completion of the test.

5 Test methods

5.1 Principles

Unless otherwise specified, times are minimum cumulative duration and load requirements are minimum values.

5.2 Strength tests

The strength of the harness and the safety of its occupant are 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) shall be connected to the test equipment by metallic connectors of a minimum of 6 mm diameter. If the sample is equipped with connectors recommended by the manufacturer, these shall 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 clip-in weight of more than 100 kg, unless otherwise specifically defined, all of the specified loads shall be increased by multiplying by the factor K. K is calculated as:

$$K = \frac{m_{\mathrm{C}}}{m_{\mathrm{ref}}} \tag{1}$$

where

K is the factor for the specified load;

m_c is the clip-in weight, in kg

m_{ref} is the reference weight of 100 kg

5.3 Vertical impact test

Where the manufacturer claims the harness is equipped with an impact pad, the damping of the impact pad is verified using apparatus consisting of a vertical impact dummy and various measurement tools.

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

The test shall be performed with a dummy installed in an apparatus to ensure a vertical guided fall (see Figure 3).

The impact pad test shall be conducted at an ambient temperature of (20° ± 5)°C. The impact pad itself shall be at ambient temperature prior to testing.

Although this test is limited to a vertical impact, manufacturers should extend the impact pad more widely over the back area.

5.4 Apparatus

5.4.1 Apparatus for strength tests

5.4.1.1 Seated dummy

A dummy in the seated position according to Figure 2 is to be used.

A tolerance of ± 5 % is allowed to the test dummy dimensions in Figure 2.

The ring indicated at the neck of the dummy in Figure 2 is an optional force application point.

Dimensions in millimetres

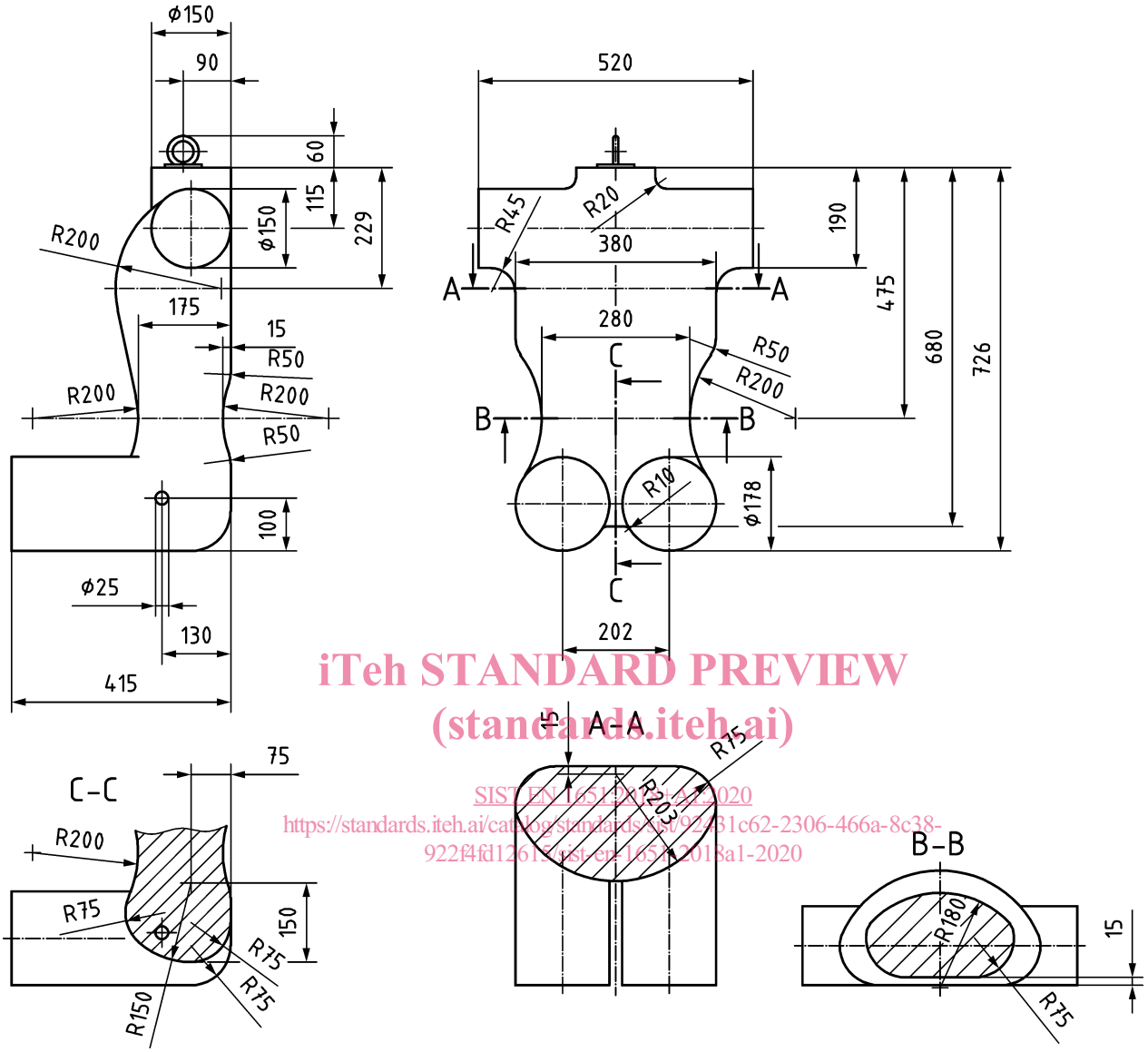


Figure 2 — Seated dummy

5.4.1.2 Electronic sensor for force measurement

A calibrated electronic sensor equipped with an electronic strain gauge for measuring the force (sampling a minimum of 10 times per second) is required.

5.4.1.3 Measurement circuit

A measurement circuit with a graph clearly showing the force (N) against time (s) is required.

5.4.2 Apparatus for vertical impact test

5.4.2.1 Harness impact pad test dummy leaning position

The dummy shall be installed in a rearwards leaning position at an angle alpha "α" between 20° and 25° as illustrated in Figure 3.