

Personal protective equipment for prevention of falls from a height — Sit harnesses

The European Standard EN 813 : 1997 has the status of a
British Standard

ICS 13.340.99

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PH/5, Industrial safety belts and harnesses, upon which the following bodies were represented:

- Arboricultural Safety Council
- Association of Consulting Scientists
- British Constructional Steelwork Association Ltd.
- British Electrical Systems Association (BEAMA Ltd.)
- British Narrow Fabrics Association
- British Telecommunications plc
- Confederation of British Forgers
- Construction Fixings Association
- Cordage Manufacturers' Institute
- Electricity Association
- Federation of the Electronics Industry
- Health and Safety Executive
- Industrial Rope Access Trade Association
- National Engineering Laboratory
- National Federation of Master Steeplejacks and Lightning Conductor Engineers
- SATRA Footwear Technology Centre
- Safety Equipment Association
- Suspended Access Equipment Manufacturers' Association
- TES – Bretby Limited

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National foreword

This British Standard has been prepared by Technical Committee PH/5, and is the English language version of EN 813 : 1997 *Personal protective equipment for prevention of falls from a height — Sit harnesses*, published by the European Committee for Standardization (CEN).

Cross-references

Publication referred to	Corresponding British Standard
EN 358 : 1992 ¹⁾	BS EN 358 : 1993 <i>Personal protective equipment for work positioning and prevention of falls from a height — Work positioning systems</i>
EN 364 : 1992	BS EN 364 : 1993 <i>Personal protective equipment against falls from a height — Test methods</i>
EN 365 : 1992 ¹⁾	BS EN 365 : 1993 <i>Personal protective equipment against falls from a height — General requirements for use and for marking</i>

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 8, an inside back cover and a back cover.

¹⁾ Undated in the text.

ICS 13.340.20

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English version

Personal protective equipment for prevention of falls from a height — Sit harnesses

Équipement de protection individuelle pour
la prévention contre les chutes de hauteur —
Ceintures à cuissardes

Persönliche Schutzausrüstung zur Verhinderung
von Abstürzen — Sitzgurte

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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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CEN

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

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

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 160, Protection against falls from a height including working belts, 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 August 1997, and conflicting national standards shall be withdrawn at the latest by August 1997.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of the EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

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.

Contents

	Page
Foreword	2
1 Scope	3
2 Normative references	3
3 Definitions	3
3.1 element	3
3.2 component	3
3.3 sit harness fastening and adjustment element	3
3.4 sit harness attachment element	3
3.5 sit harness	3
3.6 load bearing parts	4
3.7 non load bearing parts	4
4 Requirements	4
4.1 Ergonomics	4
4.2 Design, materials and construction	4
4.2.1 Materials	4
4.2.2 Attachment elements	4
4.2.3 Load bearing parts	4
4.2.4 Sit harness fastening and adjustment elements	5
4.2.5 Visual inspection	5
4.2.6 Dynamic performance	5
4.2.7 Static strength	5
5 Test methods	5
5.1 Dynamic performance tests	5
5.1.1 Apparatus	5
5.1.2 Test method	5
5.2 Static strength test	6
5.2.1 Apparatus	6
5.2.2 Test method	6
5.3 Load bearing parts test	6
6 Marking	7
7 Information to be supplied by the manufacturer including instructions for use	7
Annex	
ZA (informative) Clauses of this European Standard addressing essential requirements or other provisions of EU Directives	8

1 Scope

This standard specifies requirements, testing, marking and instructions for use of sit harnesses for use in work positioning and restraint systems, where a low point of attachment is required. Sit harnesses are not suitable to be used for fall arrest purposes.

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 358	<i>Personal equipment for work positioning and prevention of falls from a height — Work positioning systems</i>
EN 364 : 1992	<i>Personal protective equipment against falls from a height — Test methods</i>
EN 365	<i>Personal protective equipment against falls from a height — General requirements for instructions for use and for marking</i>
EN 892	<i>Mountaineering equipment — Dynamic mountaineering ropes — Safety requirements and test methods</i>

3 Definitions

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

3.1 element

A part of a component or a sub-system. Ropes, webbing, attachment elements, fittings and anchorage lines are examples of elements. [EN 363 : 1992]

3.2 component

A part of a system at a point of sale by the manufacturer, supplied with packaging, marking and instructions for use. Body supports and lanyards are examples of components of systems. [EN 363 : 1992]

3.3 sit harness fastening and adjustment element

Any device which enables the sit harness to be fastened and allows adjustment to be made to the sit harness to meet the fitting requirements of the wearer. Examples are buckles.

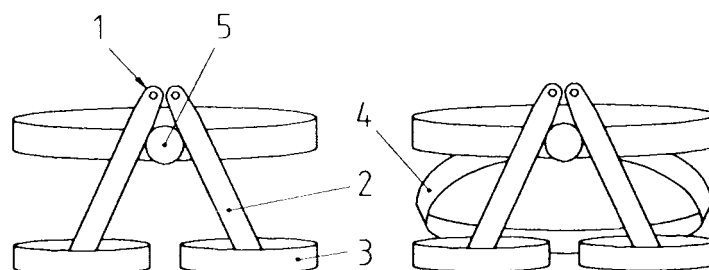
3.4 sit harness attachment element

Those parts of the sit harness intended for the load bearing connection to other components.

3.5 sit harness

An arrangement of straps, fittings and buckles or other elements in the form of a waist belt with a low attachment element and connecting support encircling each leg suitably arranged to support the body of a conscious person in a sitting position. Sit harnesses may be fitted with shoulder straps and/or may be incorporated into a garment. Examples of the arrangements are shown in figure 1.

NOTE. A sit harness may be an element of a full body harness complying with EN 361.



- 1 Attachment element
- 2 Straps connecting leg loops to waist belt
- 3 Leg loop
- 4 Sit strap
- 5 Fastening and adjustment element

Figure 1. Examples of sit harnesses and elements

3.6 load bearing parts

Those parts of the sit harness intended to transmit load; examples are: attachment elements, leg loops, waist belts.

3.7 non load bearing parts

Those parts of the sit harness intended not to transmit load; examples are: shoulder straps, accessory parts and clothing.

4 Requirements

4.1 Ergonomics

The sit harness shall be designed and manufactured so:

- that in the foreseeable conditions of use for which it is intended, the user can perform the risk related activity normally whilst enjoying appropriate protection of the highest level;
- as to preclude risks and other nuisance factors under foreseeable conditions of use;
- as to facilitate correct positioning on the user and to remain in place for the foreseeable period of use, bearing in mind ambient factors, movements to be made and postures to be adopted. For this purpose, it shall be possible to optimize sit harness adaptation to the user morphology by all appropriate means, such as adequate adjustment and attachment systems or the provision of an adequate size range;
- as to be as light as possible without prejudicing design strength and efficiency;
- as not to become incorrectly adjusted without the user's knowledge under the foreseeable conditions of use.

4.2 Design, materials and construction

4.2.1 Materials

4.2.1.1 Webbing and yarns shall be made of continuous filament or multifilament synthetic fibre appropriate to their intended use.

4.2.1.2 Thread used for sewing shall be physically compatible in its mechanical properties with the webbing. The shade of thread shall be such as to contrast with the shade of the webbing to facilitate visual inspection.

4.2.2 Attachment elements

4.2.2.1 The sit harness shall have at least one attachment element. This shall be located at the front of the sit harness and to the centre.

4.2.2.2 If a sit harness is fitted with additional side attachment elements it shall comply with this standard and EN 358.

4.2.2.3 If a sit harness is not an element of a full body harness and is fitted with shoulder straps, attachment elements shall not be positioned on these straps.

4.2.3 Load bearing parts

4.2.3.1 It shall be visually confirmed during the suspension test specified in 5.3 which parts are load bearing parts as defined in 3.6.

4.2.3.2 The width of support, where load bearing parts impact with the body shall be a minimum of 43 mm, except in those areas of the body where this requirement would contradict the ergonomic requirements of 4.1. Typically 150° of the leg loops are load bearing parts (see figure 2).

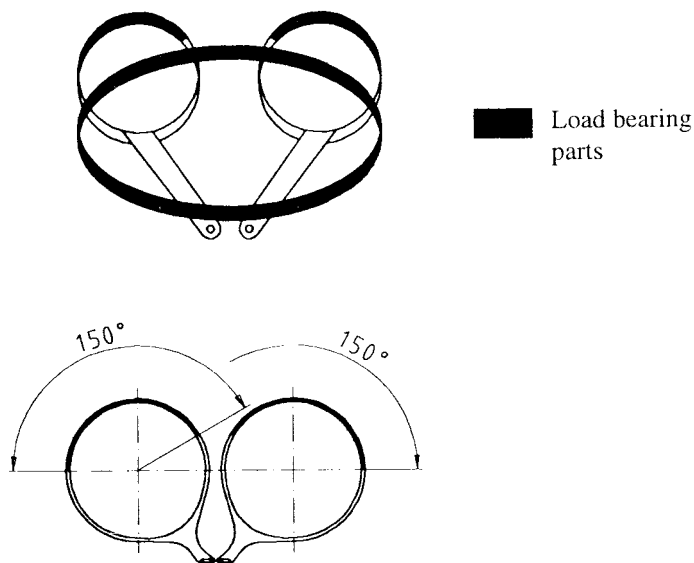


Figure 2. Example of a possible sit harness design with indication of the load bearing parts

4.2.4 Sit harness fastening and adjustment elements

4.2.4.1 Sit harness fastening and adjustment element shall be so designed and constructed that when correctly fastened any involuntary opening is prevented. If the sit harness fastening and adjustment element can be fastened or adjusted in more than one manner, each manner of fastening or adjustment shall comply with the performance requirements.

4.2.4.2 Buckles or other adjustment elements shall not slip more than 20 mm when tested as described in 5.2.

4.2.4.3 Metal parts shall be free from burrs which could cause injury.

4.2.4.4 Metal fittings shall comply with the corrosion protection requirements specified in 4.4 of EN 364 : 1992.

4.2.5 Visual inspection

It shall be possible to carry out a visual inspection of the sit harness including cases where it is incorporated into a garment.

4.2.6 Dynamic performance

When tested at each front attachment element, as described in 5.1 with a test dummy of 100 kg mass according to EN 364, the sit harness shall withstand one drop test with an adjusted free fall distance of 2000 mm (the test dummy feet first) without releasing the test dummy and no load bearing element shall become detached.

4.2.7 Static strength

When tested at each front attachment element as described in 5.2 with a force of 15 kN the dummy shall not be released from the sit harness and no load bearing element shall become detached.

5 Test methods

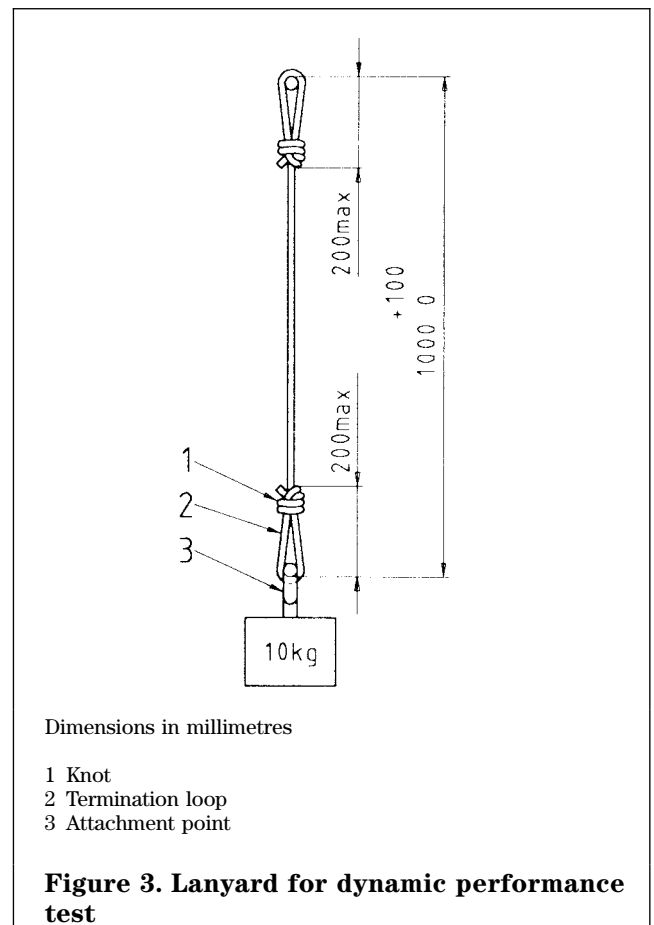
5.1 Dynamic performance tests

5.1.1 Apparatus

The dynamic performance test apparatus shall comply with 4.2, 4.4 and 4.6 of EN 364 : 1992.

5.1.2 Test method

5.1.2.1 Following the manufacturer's instructions, fit the test dummy with a sit harness and attach one end of a lanyard to the attachment element of the sit harness and the other end to the test apparatus. The lanyard shall be made from EN 892 approved single mountaineering rope of 11 mm nominal diameter with a length of (1000^{+100}_0) mm and the length of the termination loops including the knot shall not exceed 200 mm when suspended in a $(10 \pm 0,5)$ kg mass as shown in figure 3.



5.1.2.2 Suspend the test dummy by the upper attachment point and raise this to 1000 mm above the fixed anchorage point and at a maximum of 300 mm horizontally from the centre line. Hold it with a quick release device.

5.1.2.3 Release the test dummy without initial velocity and allow it to fall freely, the feet first fall being about 2000 mm before the lanyard takes up the tension. Observe whether the requirements of 4.2.6 are met.

5.1.2.4 Repeat the test procedures described above for each additional front attachment element of the sit harness. A new rope lanyard shall be used for each fall. A new sit harness may be used for each fall.

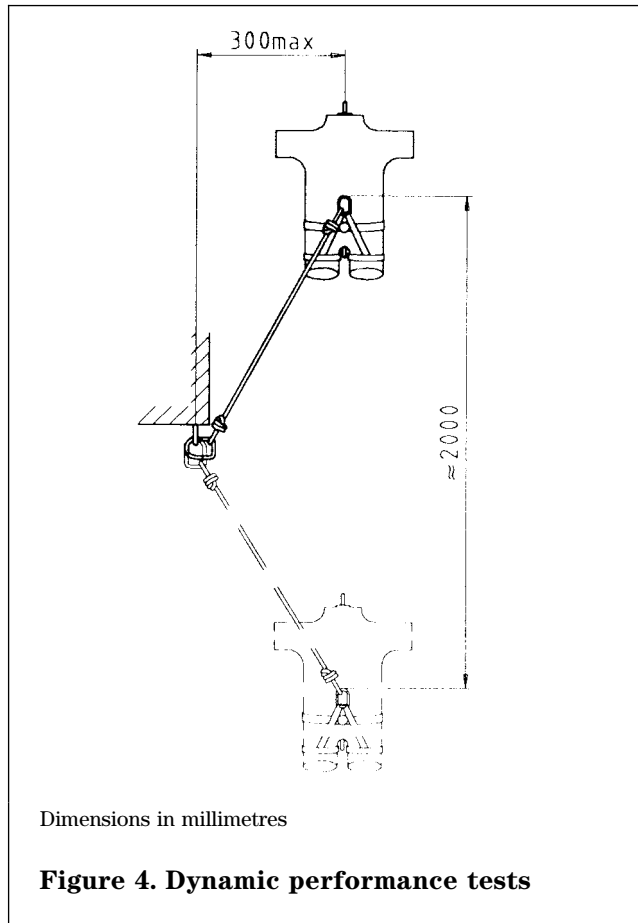


Figure 4. Dynamic performance tests

5.2 Static strength test

5.2.1 Apparatus

The static test apparatus shall comply with 4.1 and 4.2 of EN 364 : 1992.

5.2.2 Test method

5.2.2.1 Following the manufacturer's instructions, fit the sit harness to the test dummy.

5.2.2.2 Install the test dummy and sit harness in the test apparatus and while suspended mark the adjustment strap of any fastening and adjustment element in such a way that any slippage can be measured.

5.2.2.3 Apply a force as specified in 4.2.7, increasing gradually over a period of $(2 \pm 0,25)$ min between the attachment element of the sit harness and the lower ring of the test dummy (see figure 5).

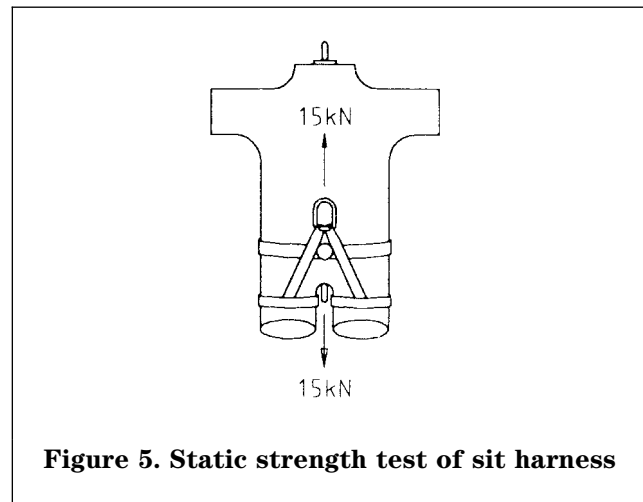


Figure 5. Static strength test of sit harness

5.2.2.4 Maintain the force for a period of 3 min.

5.2.2.5 Observe whether the requirements of 4.2.7 are met.

5.2.2.6 Measure and record any slippage of the adjustment strap(s) through the fastening and adjustment device and observe whether the requirements of 4.2.4.2 are met.

5.2.2.7 Repeat the test procedure for each front attachment element of the sit harness. A new sit harness may be used for each test.

5.3 Load bearing parts test

5.3.1 The test shall be carried out with two persons who shall be within the height range of 160 cm to 190 cm and within a weight range of 60 kg to 85 kg, wearing lightweight clothing and be of suitable size for the sit harness being tested.

5.3.2 Following the manufacturer's instructions, fit the sit harnesses to the test persons.

5.3.3 Suspend the test persons clear of the ground by connecting a suitable lanyard or rope to the attachment element of the sit harness.

5.3.4 Visually confirm which parts are load bearing parts as required in 4.2.3 and defined in 3.6.

5.3.5 Verify that the requirements of 4.2.3.2 are met by measuring the relevant parts.

5.3.6 Repeat the procedure for each front attachment of the sit harness.

6 Marking

6.1 Marking on the sit harness shall comply with EN 365.

6.2 In addition to **6.1** the sit harness shall be clearly, indelibly and permanently marked by any suitable method with the following information:

- a) the number of this European Standard;
- b) the type denomination;
- c) the size;
- d) the correct method of fastening or adjusting any sit harness fastening and adjustment elements (e.g. pictograms).

7 Information to be supplied by the manufacturer including instructions for use

7.1 The instructions for use shall conform to the relevant clauses of EN 365 and in addition shall contain at least advice or information:

- a) giving sizing details and how to obtain the optimum fit;
- b) on the proper way to put on the sit harness;
- c) on the importance of checking any buckles or adjusting devices regularly (fastening and adjustment-elements);
- d) on identification of which are the attachment elements and how to connect into them;
- e) a warning to emphasize that the sit harness is not suitable for use for fall arrest purposes.

7.2 Information supplied by the manufacturer shall include at least advice or information as follows:

- a) that before use the first time the user should carry out a suspension test in a safe place to ensure that the sit harness is the correct size, has sufficient adjustment and is of an acceptable comfort level for the intended use;
- b) that the sit harness and associated equipment should be used only by trained and competent persons or the user should be under the direct supervision of such a person;
- c) that before consideration should be given as to how any rescue could be safely and efficiently carried out;
- d) on temperature limitations of the materials in the sit harness;
- e) on the effects of chemical reagents;
- f) on disinfection of the sit harness;
- g) on the expected lifespan of the sit harness (obsolescence) or how the user can determine the lifespan, if possible;
- h) on how to protect the sit harness during transportation;
- i) on the meaning of any markings on the sit harness;
- j) the importance of checking the sit harness regularly for any damage.

Annex ZA (informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU Directives

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association and supports essential requirements of EU Directive 89/686/EEC.

WARNING : Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this European Standard.

The clauses of this European Standard, as listed in table ZA.1, are likely to support requirements of Directive 89/686/EEC, Annex II.

Table ZA.1		
EU-Directive 89/686/EEC, Annex II		clauses of this European Standard
1.1	Design principles	4.1
1.2	Innocuousness of PPE	clause 4
1.3	Comfort and efficiency	clause 4
1.4	Information supplied by the manufacturer	clause 7
2.1	PPE incorporating adjustment systems	4.2
2.9	PPE incorporating components which can be adjusted or removed by the user	clause 4
2.10	PPE for connection to another, external complementary device	clause 4
3.1.2.2	Prevention of falls from a height	clause 4

Compliance with the clauses of this standard provides one means of conforming with the specific essential requirements of the Directive concerned and associated EFTA regulations.

List of references

See national foreword.

BSI — British Standards Institution

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