BRITISH STANDARD

BS 8405:2003
+A1:2009

Personal protective equipment against falls from a height — Descender devices — Single-hand operated descender devices for self or assisted rescue

ICS 13.340.60

BSI
British Standards

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

BSIF Test and Certification Association

British Telecommunications plc

Confederation of British Metalforming

Construction Fixings Association

Electricity Association

Health and Safety Executive

Industrial Rope Access Trade Association

Institution of Mechanical Engineers

Made-up Textiles Association

Ministry of Defence (UK Defence Standardization)

National Engineering Laboratory

National Federation of Master Steeplejacks and Lightning Conductor Engineers

North West Construction Safety Group

Personal Safety Manufacturers' Association

SATRA Technology Centre

Co-opted members

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Amendments issued since publication

Amd. No.	Date	Comments
A1	February 2009	See foreword

Contents

Foreword

This British Standard has been prepared by Technical Committee PH/5. BS 8405:2003+A1:2009 supersedes BS 8405:2003, which is withdrawn.

The start and finish of text introduced or altered by Amendment No. 1 is indicated in the text by tags ▌A1⟩ ⟨A1▌.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 13 and a back cover.

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1 Scope

This British Standard specifies performance requirements for descender devices that are controllable by one person using one hand only, to be used for self-rescue, rescue assisted by a second person, or where the rescuer and rescuee descend in tandem.

This British Standard is applicable to descender devices for use in conjunction with personal protective equipment against falls from a height e.g. full body harnesses conforming to BS EN 361, and rescue equipment e.g. rescue harnesses conforming to BS EN 1497.

NOTE Other types of descender devices for self rescue are specified in BS EN 341.

2 Normative references

The following referenced documents are indispensable for the application 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.

BS 7479, *Method for salt spray corrosion tests in artificial atmospheres.*

BS EN 364:1993, *Personal protective equipment against falls from a height — Test methods.*

BS EN 365, *Personal protective equipment against falls from a height — General requirements for instructions for use and for marking.*

BS EN 892:1997, *Mountaineering equipment — Dynamic mountaineering ropes — Safety requirements and test methods.*

BS EN 1891:1998, *Personal protective equipment for prevention of falls from a height — Low stretch kernmantel ropes.*

BS EN ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force measuring system.*

ISO 1140, *Ropes — Polyamide — Specification.*

ISO 1141, *Ropes — Polyester — Specification.*

3 Terms and definitions

For the purposes of this British Standard the following terms and definitions apply.

3.1
descender device
device used in conjunction with a descent line, that employs an integral hand-operated control element to control descent velocity

NOTE A descender device enables descent from a higher to a lower position at a controllable velocity.

3.2
maximum rated load
maximum load that a descender device is designated to carry as stated by the manufacturer

NOTE This load includes persons and tools and equipment.

3.3
minimum rated load
minimum load that a descender device is designated to carry as stated by the manufacturer

4 Requirements

4.1 Innocuousness

A1 **4.1.1** Materials used in the descender device that might come into contact with the skin of the user shall not be known to cause irritating or sensitizing effects during intended use. Conformity to this requirement shall be verified in accordance with **5.4**.

NOTE Attention is drawn to the Dangerous Substances and Preparations (Nickel)(Safety) Regulations 2005 [1].

4.1.2 When examined in accordance with **5.4**, the descender device shall have no sharp edges or burrs which could cause injury to the user. 〈A1〉

4.2 Ropes, webbing and terminations

4.2.1 *General*

If the manufacturer of the descender device supplies a descent line with the device, the descent line shall conform to **4.2.2** or **4.2.3**, as applicable, and shall be fitted with terminations made exclusively by the manufacturer of the descender device or by a manufacturer authorized by him.

The manufacturer shall ensure that the instructions for use (see Clause **7**) include a warning that the descender device should only be used with the descent line with which it has been supplied, and that if the descent line is replaced it is essential that it be replaced by one with exactly the same specification.

4.2.2 *Synthetic fibre ropes*

Synthetic fibre ropes of a non-sheathed core construction shall conform to ISO 1140 or ISO 1141. Sheathed core ropes shall be either single mountaineering ropes conforming to BS EN 892:1997 or low stretch kernmantel ropes, type A, conforming to BS EN 1891:1998.

4.2.3 *Textile webbing*

Textile webbing shall be made from virgin filament or multifilament synthetic fibres that have a minimum breaking strength of 0.6 N/tex.

4.3 Static performance

4.3.1 *Operating force*

When tested in accordance with **5.1.2.1**, with a force applied to the descender device equal to the maximum rated load, the force needed to release and operate the integral hand-operated control element of the descender device (i.e. to cause the device to move down the descent line) shall not exceed 450 N.

4.3.2 *Static strength*

When tested in accordance with **5.1.2.2** the descender device shall withstand a force of 8 times the maximum rated load for 3 min without failure of the descent line or the descender device.

4.3.3 *Emergency locking and slippage*

4.3.3.1 *Locking with control element in the hand-on position*

When tested in accordance with **5.1.2.3**, with a force of $450^{\ 0}_{-45}$ N applied to the integral hand-operated control element, the descender device shall withstand a force of 1.5 times the maximum rated load without moving down the descent line.

NOTE This requirement is intended to ensure that the descender device will support 1.5 times the maximum rated load, which might be applied to it in an emergency if the operator of the descender device is pulling or holding onto the integral hand-operated control element for support.

4.3.3.2 *Slippage*

When tested in accordance with **5.1.2.4**, slippage of the descender device on the descent line shall occur at a force of no greater than 4 times the maximum rated load.

4.4 Dynamic performance

4.4.1 *Descent velocity*

〈A1〉 When tested in accordance with **5.2.1**, **5.2.2** or **5.2.3**, the descender device shall maintain a descent velocity not exceeding 2 m/s and it shall be possible for the descent rate of the descender device to be controlled by one person using one hand only in the following test situations:

a) with a mass, or force, equivalent to the maximum rated load (two person condition);

b) with a mass, or force, equivalent to the minimum rated load (low load test). 〈A1〉

4.4.2 *Temperature increase*

〈A1〉 When tested in accordance with **5.2.1**, **5.2.2** or **5.2.3**, with a mass, or force, equivalent to the maximum rated load, after a descent at a velocity of $2^{0}_{-0.2}$ m/s no part of the descender device that would normally be touched during a descent shall have reached a temperature higher than 50 °C, or 30 °C above ambient temperature, whichever is the lower. 〈A1〉

4.4.3 *Descent velocity on wet descent line*

When tested in accordance with **5.2.4** the descender device shall maintain a descent velocity not exceeding 2 m/s.

NOTE This requirement is intended to ensure that the descender device will operate with the maximum rated load on a wet descent line.

4.4.4 *Fall arrest*

When the descender device is tested in accordance with **5.2.5** the following requirements shall be met:

a) the descender device shall not release the weight;

b) if the descent line is a kernmantel rope, the sheathing shall not rupture;

c) the free fall distance, h, shall not exceed 4 m (see Figure 3);

d) the peak force shall not exceed 6 times the maximum rated load.

After this test, the descender device shall be retested in accordance with **5.1.2.1** and shall conform to **4.3.1**.

4.5 Corrosion resistance

When tested in accordance with **5.3**, the metal parts of the descender device shall show no visible evidence of corrosion.

NOTE 1 White scaling or tarnishing is acceptable.

NOTE 2 Even though the descender device is required to be resistant to corrosion when subjected to a neutral salt spray test, this should not be taken to mean that the devices are suitable for use in a marine environment.

5 Test methods

5.1 Static tests

5.1.1 *Apparatus*

5.1.1.1 *Tensile testing machine*, calibrated in accordance with BS EN ISO 7500-1, set to operate at a crosshead velocity of 100 mm/min to 150 mm/min.

The calibration of the tensile testing machine shall be traceable to national or international standards of measurement which, in the UK, are the responsibility of the National Physical Laboratory (NPL).

5.1.1.2 *Descent line*, comprising the rope or webbing, and terminations, with which the descender device under test is to be used, as specified by the manufacturer (see Clause **7**).

5.1.1.3 *Spring balance*, calibrated to measure force in newtons.

5.1.2 *Procedures*

5.1.2.1 *Operating force test*

Install the descender device, fitted to the descent line (**5.1.1.2**), in the tensile testing machine (**5.1.1.1**).

Withdraw 1 000 mm ± 50 mm of the descent line up-line from the descender device.

Arrange the integral hand-operated control element in the hand-off position. Operate the crosshead of the tensile testing machine until it is applying to the descender device a force equal to the maximum rated load.

Attach the spring balance (**5.1.1.3**) to the integral hand-operated control element and use it to apply a force to the control element, in the direction in which force would be applied when the descender device is being operated. Record the force at which slippage of the descender device down the descent line occurs.

5.1.2.2 *Static strength test*

Install the descender device, fitted to the descent line (**5.1.1.2**), in the tensile testing machine (**5.1.1.1**).

Withdraw 1 000 mm ± 50 mm of the descent line up-line from the descender device.

Hold the down-line end of the descent line in such a manner that it does not interfere with the application of the test force across the up-line descent line termination and descender device attachment point (e.g. by insertion of a suitable knot).

Arrange the integral hand-operated control element in the hand-off position. Operate the crosshead of the tensile testing machine until it is applying to the descender device a force equal to 8 times the maximum rated load.

Maintain the force for 3 min.

5.1.2.3 *Hand-on locking test*

Install the descender device, fitted to the descent line (**5.1.1.2**), in the tensile testing machine (**5.1.1.1**).

Withdraw 1 000 mm ± 50 mm of the descent line up-line from the descender device.

Operate the crosshead of the tensile testing machine until it is applying to the descender device a force equal to 1.5 times the maximum rated load.

Arrange the integral hand-operated control element in the hand-on position. Attach the spring balance (**5.1.1.3**) to the control element and use it to apply a force of 450^{0}_{-45} N to the control element, in the direction in which force would be applied when the descender device is being operated.

5.1.2.4 *Slippage test*

Install the descender device, fitted to the descent line (**5.1.1.2**), in the tensile testing machine (**5.1.1.1**).

Withdraw 1 000 mm ± 50 mm of the descent line up-line from the descender device.

Arrange the integral hand-operated control element in the hand-off position. Operate the crosshead of the tensile testing machine and record the test force at which the descender device slips down the descent line.

5.2 Dynamic tests

5.2.1 ***Descent velocity and temperature increase test. Method 1***

5.2.1.1 *Apparatus*

5.2.1.1.1 *Rigid anchorage point*, ⟩A1⟨ at a height corresponding to the length of the descent line with which the descender device is to be tested, so constructed that the application of a force of 20 kN does not cause a a deflection greater than 2.0 mm.⟩A1⟨

5.2.1.1.2 *Rigid steel weights*, 200 mm in diameter, one with a mass equivalent to the maximum rated load and one with a mass equivalent to the minimum rated load, of the descender device under test. Each weight shall have an eyebolt rigidly fixed to one end in a central position.

5.2.1.1.3 *Quick release device*, compatible with the eyebolts on the rigid steel weights.

5.2.1.1.4 *Descent line*, ⟩A1⟨ conforming to **5.1.1.2**, of a length corresponding to the maximum length with which the descender device is to be used, as specified by the manufacturer (see Clause **7**).⟩A1⟨

5.2.1.1.5 *Thermometer*, thermocouple type, with electronic read-out.

5.2.1.2 *Procedure*

Fit the descender device to the descent line (**5.2.1.1.4**). Attach the descender device, upside down, by the descender device attachment point, to the rigid anchorage point (**5.2.1.1.1**). At the descent line up-line termination attach the weight (**5.2.1.1.2**) with a mass equivalent to the maximum rated load of the descender device and hold the weight with the quick release device (**5.2.1.1.3**). With the integral hand-operated control means for the descender device in the hand-on position, suspend the weight by means of the descender device and release the quick release device. ⟩A1⟨ Using the integral hand-operated

control element, allow the weight to descend at a velocity of $2^{0}_{-0.2}$ m/s until all but the end of the descent line has passed through the descender device. ⟨A1⟩ At the end of the descent measure the temperature of the surfaces of the descender device that would normally be touched during a descent, using the thermometer (**5.2.1.1.5**).

NOTE The operator should wear gloves to protect against heat from the descender device.

Repeat the procedure using the weight with a mass equivalent to the minimum rated load of the descender device.

5.2.2 ***Descent velocity and temperature increase test. Method 2***

5.2.2.1 *Apparatus*

5.2.2.1.1 *Powered capstan or winch*.

5.2.2.1.2 *Pulley*, ⟨A1⟩ attached to a rigid anchorage point so constructed that the application of a force of 20 kN does not cause a deflection greater than 2.0 mm.⟨A1⟩

5.2.2.1.3 *Descent line*, ⟨A1⟩ conforming to **5.1.1.2**, of a length corresponding to the maximum length with which the descender device is to be used, as specified by the manufacturer (see Clause **7**) plus sufficient extra length to allow for the distance between the winch and the descender device (see Figure 1).

NOTE The extra length of descent line to allow for the distance between the winch and the descender device should be agreed between the test house and the manufacturer.⟨A1⟩

5.2.2.1.4 *Rigid steel weights*, conforming to **5.2.1.1.2**.

5.2.2.1.5 *Safety line*, (optional) to hold the weight in position as shown in Figure 1.

5.2.2.1.6 *Thermometer*, conforming to **5.2.1.1.5**.

5.2.2.2 *Procedure*

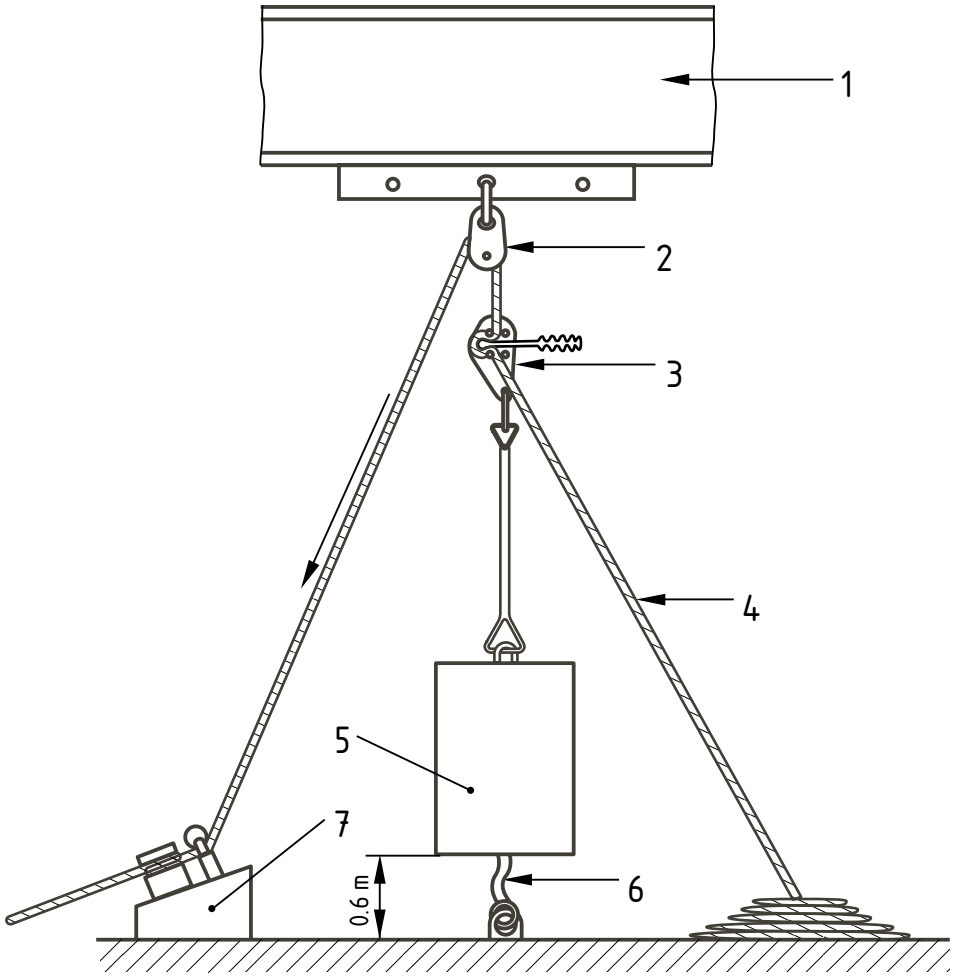
Fit the descender device to the descent line (**5.2.2.1.3**) and reeve the up-line end of the descent line over the pulley (**5.2.2.1.2**) and round the powered capstan or winch (**5.2.2.1.1**) as shown in Figure 1. Suspend the weight with a mass equivalent to the maximum rated load from the descender device.

NOTE 1 The weight may be held in position by means of the safety line (**5.2.2.1.5**).

⟨A1⟩ Start the powered capstan or winch and, using the integral hand-operated control element, allow all but the end of the descent line to pass through the descender device at a rate of $2^{0}_{-0.2}$ m/s, while keeping the weight off the floor and without tension in the safety line (if fitted).⟨A1⟩ Then stop the capstan or winch and measure the temperature of the surfaces of the descender device that would normally be touched during a descent, using the thermometer (**5.2.2.1.6**).

NOTE 2 The operator should wear gloves to protect against heat from the descender device.

Repeat the procedure using the weight with a mass equivalent to the minimum rated load of the descender device.



Key

1 Anchorage structure
2 Pulley
3 Descender device
4 Descent line
5 Weight
6 Safety line (optional)
7 Capstan or winch
Direction of movement of descent line

Figure 1 — Apparatus for descent velocity and temperature increase test. Method 2

[A1] 5.2.3 *Descent velocity and temperature increase test. Method 3*

5.2.3.1 *Apparatus*

5.2.3.1.1 *Block and tackle system*, with two or more falls, attached to a rigid anchorage point so constructed that the application of a force of 20 kN does not cause a deflection greater than 2.0 mm. The number of falls in the block and tackle system and the height of the anchorage point shall be such that when the test system is set up as shown in Figure 2 and the test procedure carried out in accordance with **5.2.3.2**, it is possible for all but the end of the descent line to pass through the descender device under test without the drop weight touching the floor.

NOTE 1 As a guide, for tests on a 20 m rope; using an anchorage point at a height of approximately 12 m, a two falls block and tackle system would be needed; for an anchorage point at a height of approximately 9 m, a three falls system would be needed; for an anchorage point at a height of approximately 7 m, a four falls system would be needed; and so on.

NOTE 2 It is recommended that the pulleys used on such a "reverse" block and tackle system be fitted with roller bearings, or similar devices, to reduce frictional losses in the system.

5.2.3.1.2 *Descent line*, conforming to **5.1.1.2**, of a length corresponding to the maximum length with which the descender device is to be used, as specified by the manufacturer (see Clause **7**) plus sufficient extra length to allow for the distance between the block and tackle system and the descender device (see Figure 2).

NOTE The extra length of descent line to allow for the distance between the block and tackle system and the descender device should be agreed between the test house and the manufacturer.

5.2.3.1.3 *Rigid steel weights*, that can be combined to produce drop weights of the necessary masses for the test (see **5.2.3.2**). The masses of the drop weights required to exert a force on the descent line equivalent to the maximum rated load, and the minimum rated load, of the descender device under test should be calculated, taking into account the number of falls in the block and tackle system.

5.2.3.1.4 *Hoist or crane*, for suspending the drop weight.

5.2.3.1.5 *Thermometer,* conforming to **5.2.1.1.5**.

5.2.3.1.6 *Quick release device.*

5.2.3.1.7 *Load cell.*

5.2.3.2 *Procedure*

Attach the descent line (**5.2.3.1.2**) to the block and tackle system (**5.2.3.1.1**) as shown in Figure 2.

Fit a drop weight with a mass calculated to exert a force on the descent line equivalent to the maximum rated load of the descender device under test (see **5.2.3.1.3**) to the lower pulley of the block and tackle system and suspend the weight by means of the hoist or crane (**5.2.3.1.4**).

Attach the descender device under test to the free end of the descent line and secure the device to the floor via the load cell (**5.2.3.1.7**).

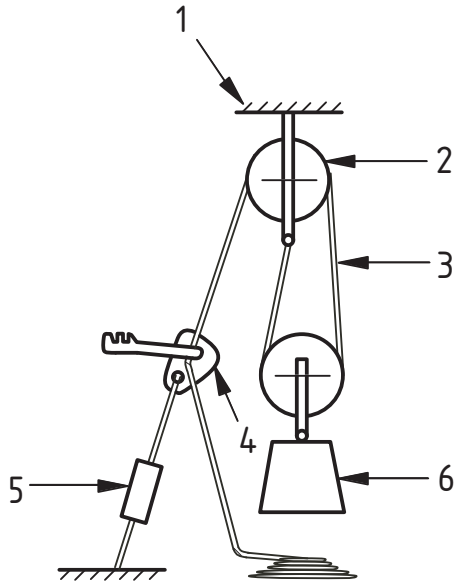
Lock the descender device onto the descent line. Lower the drop weight until it is just suspended by the test system. Measure the force exerted by the drop weight on the descent line by means of the load cell and adjust the mass of the drop weight until the force exerted on the descent line is equivalent to the maximum rated load of the descender device. Secure the drop weight with the quick release device (**5.2.3.1.6**) and lower it until it is fully suspended by the test system.

Release the drop weight and, using the hand-operated control element of the descender device, allow the descent line to pass through the descender device at a velocity of $2^{\ 0}_{-0.2}$ m/s until all but the end of the descent line has passed through the descender device. At the end of the descent measure the temperature of the surfaces of the descender device that would normally be touched during a descent, using the thermometer (**5.2.3.1.5**).

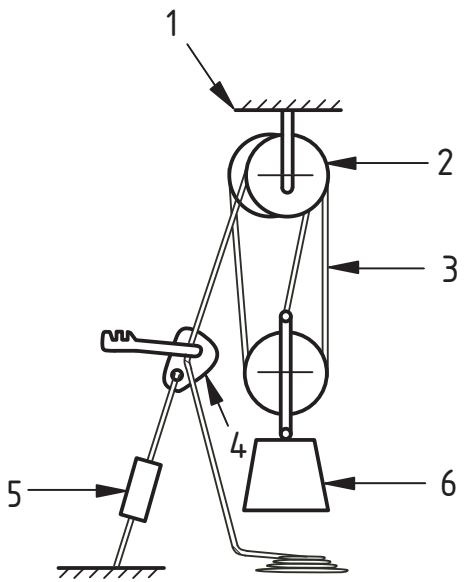
NOTE The operator should wear gloves to protect against heat from the descender device.

Repeat the test using a drop weight with a mass calculated to exert a force on the descent line equivalent to the minimum rated load of the descender device under test. [A1]

A1



a) Test arrangement using a block and tackle system with two falls



b) Test arrangement using a block and tackle system with three falls

Key

1 Anchorage structure
2 Block and tackle system
3 Descent line
4 Descender device
5 Load cell
6 Drop weight

NOTE Quick release device not shown for clarity.

Figure 2 — Apparatus for descent velocity and temperature increase test. Method 3 A1

5.2.4 ***Descent velocity on wet descent line test***

[A1] On completion of the test described in **5.2.1**, **5.2.2** or **5.2.3**, as applicable, take the descent line out of the test apparatus and immerse it in water at ambient temperature for 15 min. Reassemble the test apparatus, using the weight with a mass equivalent to the maximum rated load in the case of the test described in **5.2.1** or **5.2.2**, or the drop weight which exerts a force on the descent line equivalent to the maximum rated load in the case of the test described in **5.2.3**. Repeat the test procedure described in **5.2.1**, **5.2.2** or **5.2.3**, as applicable.[A1]

5.2.5 ***Fall arrest test***

5.2.5.1 *Apparatus*

5.2.5.1.1 *Rigid anchorage structure*, conforming to BS EN 364:1993, **4.4.1**, with three rigid attachment points.

5.2.5.1.2 *Force measurement device*, conforming to BS EN 364:1993, **4.4.2**.

5.2.5.1.3 *Rigid steel weight*, conforming to **5.2.1.1.2** with a mass equal to the maximum rated load of the descender device under test.

5.2.5.1.4 *Quick release device*, conforming to **5.2.1.1.3**.

5.2.5.1.5 *Descent line*, conforming to **5.1.1.2**.

5.2.5.1.6 *Stay*, able to hold the descender device, which has been approved by the manufacturer of the descender device.

5.2.5.1.7 *Wire rope or chain*, of 3 mm diameter and of sufficient length to ensure release of the integral hand-operated control element after a 2 m free fall of the descender device in the fall arrest test [A1] (see Figure 3).[A1]

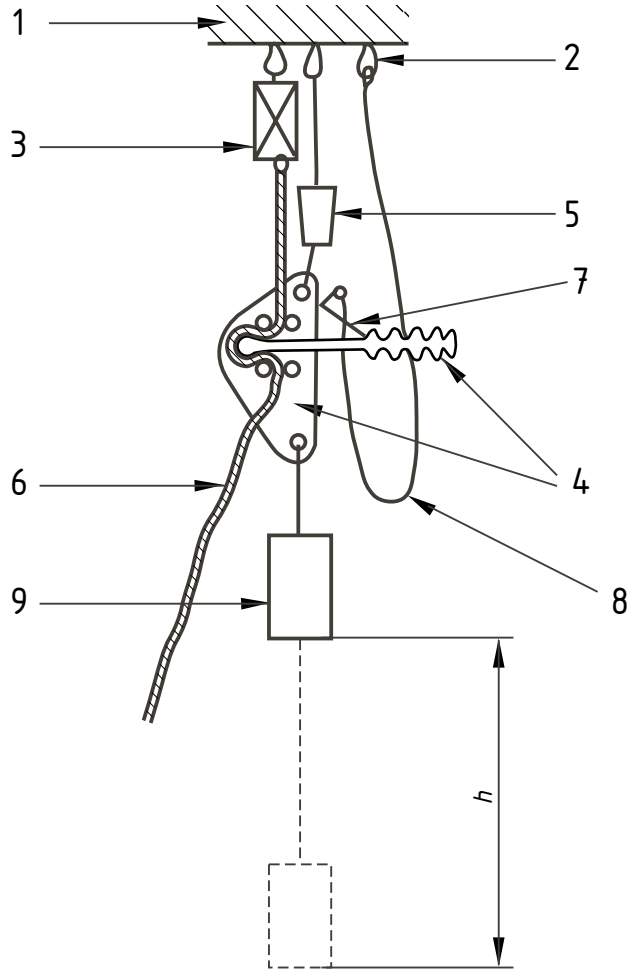
5.2.5.2 *Procedure*

Fit the descender device to the descent line (**5.2.5.1.5**). Attach the descent line up-line termination to the force measurement device (**5.2.5.1.2**) and attach this to the rigid anchorage structure (**5.2.5.1.1**). Locate the descender device 0.3 m to 0.5 m below the up-line termination of the descent line as shown in [A1]Figure 3.[A1] Secure the descender device with the quick-release device (**5.2.5.1.4**) and attach the quick release device to the rigid anchorage structure.

Secure the integral hand-operated control element of the descender device in the free running position by means of the stay (**5.2.5.1.6**), such that a simple pull will release the integral hand-operated control element. Attach one end of the wire rope or chain (**5.2.5.1.7**) to the stay and attach the other end to the rigid anchorage structure, and arrange the length of the wire rope or chain between these two points so as to ensure release of the integral hand-operated control element after a 2 m free fall of the descender device.

Attach the weight (**5.2.5.1.3**) to the attachment point of the descender device.

Release the descender device by operating the quick-release device. Measure the distance, h, that the weight falls [A1] (see Figure 3).[A1] Record the peak force measured by the force measurement device. After the test, examine the descent line and record any damage.



Key

1 Rigid anchorage structure
2 Rigid attachment point
3 Force measurement device
4 Descender device
5 Quick release device
6 Descent line
7 Stay
8 Wire rope or chain
9 Weight

〉A1〈 Figure 3 〉A1〈 — Apparatus for fall arrest test

5.3 Corrosion test

Subject the descender device to a neutral salt spray corrosion test in accordance with BS 7479. Use an exposure time of 24^{+1}_{0} h followed by a 1 h drying period.

Examine the descender device visually, with normal or corrected vision without magnification, and by hand. If necessary in order to examine internal components, dismantle the descender device.

〚A1〛 5.4 Examination of documentation and materials

Examine the documentation accompanying the descender device to determine whether or not the materials conform to **4.1.1**.

Examine the descender device with normal or corrected vision, without magnification, and by hand, to determine whether or not the descender device conforms to **4.1.2**. If necessary to examine internal components, dismantle the descender device. 〚A1〛

6 Marking

The descender devices shall be clearly, indelibly and permanently marked with at least the following information:

a) the number and date of this British Standard, i.e. BS 8405:2003[1)];

b) the manufacturer's name or trade mark or other means of identification;

c) an instruction to refer to the instructions for use provided with the item, such as the pictogram indicating the user should see the information supplied by the manufacturer (a letter "i" in an open book; see ISO 7000, symbol 1641);

d) marks to identify the model and/or class of the descender device;

e) an indication of the correct orientation of the descender device for use;

f) the maximum and minimum rated loads of the descender device, in kilograms;

g) 〚A1〛 the specification for the descent line to be used with the descender device, including the diameter of the rope or type of webbing of which it is to be comprised;〚A1〛

NOTE The type of webbing or rope may be indicated by a pictogram.

〚A1〛 h) the maximum length of the descent line with which the descender device is to be used; 〚A1〛

i) the last two digits of the year of manufacture, (e.g. 03 for 2003);

j) the manufacturer's batch or serial number.

7 Instructions for use

The manufacturer shall provide instructions for use with each descender device.

The information given in the instructions for use shall conform to BS EN 365, as applicable.

In addition, the instructions for use shall contain at least the following information:

a) model designation and class designation of the descender device;

b) the correct way of operating the descender device;

c) the maximum and minimum rated loads, in kilograms;

〚A1〛 d) the maximum length of descent line with which the descender device is to be used; 〚A1〛

[1)] Marking BS 8405:2003 on or in relation to a product represents a manufacturer's declaration of conformity, i.e. a claim by or on behalf of a manufacturer that the product meets the requirements of the standard. The accuracy of the claim is solely the claimant's responsibility. Such a declaration is not to be confused with third party certification of conformity.

e) if a descent line is supplied with the descender device:

1) [A1] the specification for the descent line, including the diameter of the rope or the type of webbing of which it is comprised, details of the terminations fitted and details of how to make any additional terminations;[A1]

2) a warning that the descender device is to be used only with the descent line supplied;

3) a warning that if the descent line is replaced, it is to be replaced by a rope or webbing of an identical specification fitted with identical terminations;

f) [A1] if a descent line is not supplied with the descender device, the specification for the descent line to be used with the descender device, including the diameter of the rope or the type of webbing of which it is to be comprised, and details of the terminations to be fitted;[A1]

g) how to insert the descent line into, and remove it from, the descender device;

h) information regarding types of harnesses, ropes, webbing, lanyards, and connectors to be used with the descender device;

i) the characteristics of a reliable anchor point for attachment of the descent line;

j) advice to avoid slack in the descent line when descending;

k) a warning that the descender device should only be used by trained and competent persons;

l) advice that before use of the descender device, a rescue plan should be in place, so that any rescue can be safely and efficiently carried out;

m) a statement of the purpose and limitations of the descender device, in particular any climatic conditions in which it should not be used, e.g. extremes of temperature and aggressive atmospheres;

n) instructions on how to disinfect the descender device without adverse effects, if it should become contaminated;

o) a warning of any chemical substances that could cause damage to the descender device;

p) the expected lifespan of the descender device under normal conditions of use, or how this can be determined, including advice on the factors to be taken into account in the determination;

q) the meanings of any markings on the descender device, and on the descent line if supplied with the descender device;

r) if applicable, advice to wear gloves to protect against the effects of heat build-up in the descender device on long descents;

s) if the descender device is not suitable for use in a marine environment, a warning to this effect.

Bibliography

Standards publications

BS EN 341:1993, *Personal protective equipment against falls from a height — Descender devices.*

BS EN 353-1:2002, *Personal protective equipment against falls from a height — Part 1: Guided type fall arresters including a rigid anchorage line.*

BS EN 353-2:2002, *Personal protective equipment against falls from a height — Part 2: Guided type fall arresters including a flexible anchorage line.*

BS EN 354:2002, *Personal protective equipment against falls from a height — Lanyards.*

BS EN 355:2002, *Personal protective equipment against fall from a height — Energy absorbers.*

BS EN 358:2000, *Personal protective equipment for work positioning and prevention of falls from a height — Belts for work positioning and restraint and work positioning lanyards.*

BS EN 360:2002, *Personal protective equipment against falls from a height — Retractable type fall arresters.*

BS EN 361:2002, *Personal protective equipment against falls from a height — Full body harnesses.*

BS EN 362:1993, *Personal protective equipment against falls from a height — Connectors.*

BS EN 363:2002, *Personal protective equipment against falls from a height — Fall arrest systems.*

BS EN 813:1997, *Personal protective equipment for prevention of falls from a height — Sit harnesses.*

BS EN 1497:1996, *Rescue equipment — Rescue harnesses.*

ISO 7000, *Graphical symbols for use on equipment — Index and synopsis.*

⟨A1⟩ Other publications

[1] GREAT BRITAIN. Dangerous Substances and Preparations (Nickel)(Safety) Regulations 2005. London: The Stationery Office. ⟨A1⟩

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