BRITISH STANDARD

BS EN
1176-4:2008

Playground equipment and surfacing —

Part 4: Additional specific safety requirements and test methods for cableways

ICS 97.200.40

BSI
British Standards

National foreword

This British Standard is the UK implementation of EN 1176-4:2008. It supersedes 1176-4:1998 which will be withdrawn on 31 May 2009.

It was prepared by Technical Committee SW/65, Children's playground equipment.

Operators and providers are advised that equipment conforming to EN 1176 require regular maintenance. Guidance on this and appropriate inspection, maintenance and operation schedules are contained within BS EN 1176-7:2008.

National standards have been published by BSI on children's playground equipment since BS 3178 was first issued in 1959, this standard concentrated on specifications for specific types of equipment. It was replaced in 1979 by BS 5696 which switched focus to a design and safety approach.

With the increasing introduction of overseas equipment BSI led the way by calling for a European Standard to address the conflicting safety advice and standards from other countries. This was published in 1999 as BS EN 1176 and further focused on the safety of playground equipment.

All standards published by BSI are regularly assessed and this revision is part of the process, it takes into account new design concepts and the operating experience available to the standards committees.

It is advised that the previous version of BS EN 1176 will not be withdrawn until 31 May 2009 to give manufacturers time to amend their product lines.

Playground equipment not complying with this revision should not automatically be considered as being unsafe or to require replacement. A risk assessment by competent persons should be used to determine what action, if any, is necessary. Manufacturers and Inspectors of the Register of Play Inspectors International (RPII) are amongst those that will be able to assist in this.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2008

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Date	Comments

EUROPEAN STANDARD

NORME EUROPÉENNE

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English Version

Playground equipment and surfacing - Part 4: Additional specific safety requirements and test methods for cableways

Équipements et sols d'aires de jeux - Partie 4 : Exigences de sécurité et méthodes d'essai complémentaires spécifiques aux téléphériques

Spielplatzgeräte und Spielplatzböden - Teil 4: Zusätzliche besondere sicherheitstechnische Anforderungen und Prüfverfahren für Seilbahnen

This European Standard was approved by CEN on 25 April 2008.

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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 Management Centre has the same status as the official versions.

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Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (EN 1176-4:2008) 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 November 2008, and conflicting national standards shall be withdrawn at the latest by May 2009.

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 supersedes EN 1176-4:1998.

This European Standard consists of a number of parts as follows:

EN 1176-1, *Playground equipment and surfacing — Part 1: General safety requirements and test methods*

EN 1176-2, *Playground equipment and surfacing — Part 2: Additional specific safety requirements and test methods for swings*

EN 1176-3, *Playground equipment and surfacing — Part 3: Additional specific safety requirements and test methods for slides*

EN 1176-4, *Playground equipment and surfacing — Part 4: Additional specific safety requirements and test methods for cableways*

EN 1176-5, *Playground equipment and surfacing — Part 5: Additional specific safety requirements and test methods for carousels*

EN 1176-6, *Playground equipment and surfacing — Part 6: Additional specific safety requirements and test methods for rocking equipment*

EN 1176-7, *Playground equipment and surfacing — Part 7: Guidance on installation, inspection, maintenance and operation*

EN 1176-10, *Playground equipment and surfacing — Part 10: Additional specific safety requirements and test methods for fully enclosed play equipment*

EN 1176-11, *Playground equipment and surfacing — Part 11: Additional specific safety requirements and test methods for spatial network*

This part of EN 1176 should not be used in isolation, but in conjunction with EN 1176-1, EN 1176-7 and EN 1177.

For inflatable play equipment see:

EN 14960, *Inflatable play equipment — Safety requirements and test methods*

The principal changes from the previous edition of this part of EN 1176 are as follows:

a) Revised requirements for the different types of grips and seats.

b) Revised requirements for seated and hanging types of equipment.

c) Test methods have been improved in the light of experience.

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

1 Scope

This document is applicable to cableways whereby children travel on or along a cable by the use of gravity.

This standard specifies additional safety requirements for cableways intended for permanent installation for use by children.

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.

EN 1176-1:2008, *Playground equipment and surfacing — Part 1: General safety requirements and test methods*

EN 1176-2:2008, *Playground equipment and surfacing — Part 2: Additional specific safety requirements and test methods for swings*

EN 1176-6:2008, *Playground equipment and surfacing — Part 6: Additional specific safety requirements and test methods for rocking equipment*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 1176-1:2008 and the following apply.

3.1
cableway
item of children's playground equipment whereby children can travel on or along a cable under the force of gravity (see Figure 1)

3.2
hanging type cableway
cableway equipped with a suspension assembly which includes a grip for hanging

3.3
seating type cableway
cableway equipped with a suspension assembly which includes a seat

3.4
starting point
area in which the user can reach the grip or seat and set the equipment in motion

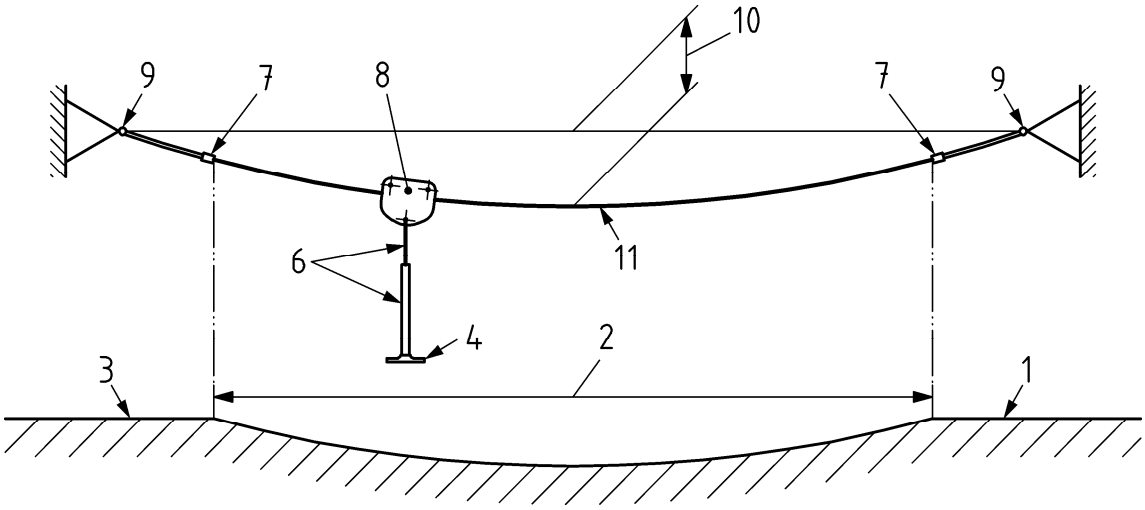
3.5
area of travel
area in which the user can travel freely

3.6
terminus
area furthest away from the starting point that the user can reach by travelling across the area of travel

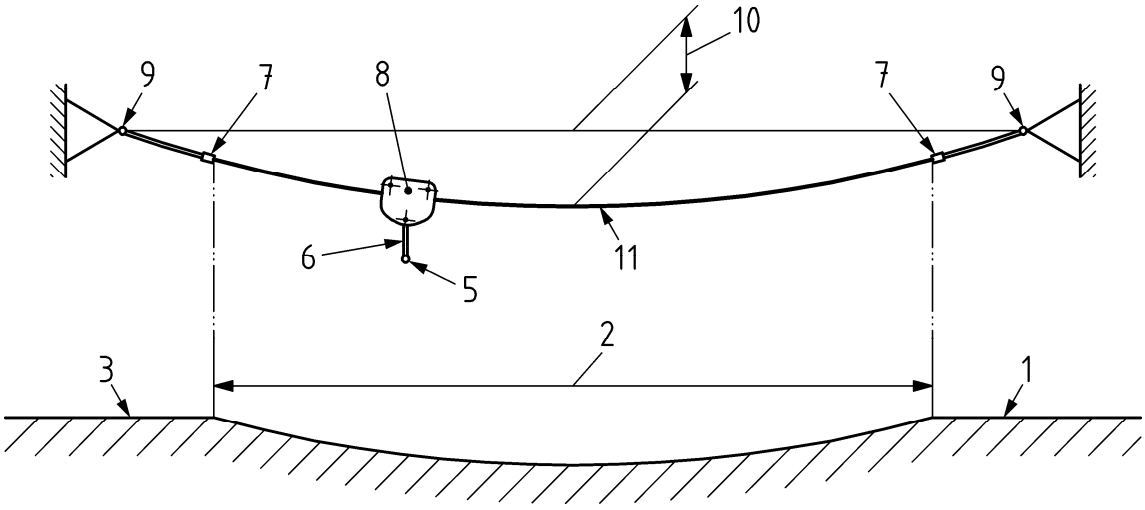
3.7
traveller
moving part that, by influence of gravity, moves the user along the cable (see Figure 1)

3.8
suspension element
part of the structure between the traveller and the seat or grip

3.9
suspension assembly
assembly of components hanging beneath the traveller, e.g. suspension elements, grips and/or seats



a) Cableway terms (seated)



b) Cableway terms (hanging)

Key

1	terminus/starting point	7	stop
2	area of travel	8	traveller
3	terminus/starting point	9	cable fixing points
4	seat	10	sag
5	grip	11	cable
6	suspension element		

Figure 1 — Cableway terms

4 Safety requirements

4.1 General

Cableways shall conform to EN 1176-1 unless otherwise specified in this part of EN 1176.

4.2 Framework and fixing points for the cable

Framework and fixing points for the cable shall be designed to withstand the computed loads (static and dynamic) transmitted by the cable, in accordance with EN 1176-1.

There shall be an adjusting device so that the correct sag can be maintained for the life of the cable.

4.3 Calculation of forces acting on the cable of a cableway

The cable shall be designed so that it can withstand the forces acting upon it according to EN 1176-1:2008, Annex A.

4.4 Stops

When tested in accordance with Annex A, the stop at the terminus shall progressively slow down the traveller until it stops and the suspension element shall not swing through an angle of more than 45°, as shown in Figure 4.

NOTE This test includes an allowance for starting speed.

4.5 Traveller

The traveller shall be constructed so that it cannot slip out of place. Travellers shall be provided with means to prevent accidental access to the sheaves (e.g. by cladding them).

There shall be only one traveller on the same cable.

The traveller and suspension element shall be designed such that it does not cause damage to the cable during use.

4.6 Suspension assembly

For seating type cableways rigid suspension elements shall not be used.

If a flexible suspension element is used it shall be designed to prevent risk of strangulation.

If a pulling device for the traveller is provided it shall be designed to prevent risk of strangulation.

4.7 Cableways arranged in parallel

For cableways arranged in parallel, the distance between the cables shall be at least 2 000 mm.

4.8 Grips

For hanging type cableways the grip shall be constructed to ensure that the user can easily release their hold at all times. If the grip is an enclosed loop, it shall not be made from flexible material that could tighten around the user's arm or hand thus preventing the user from releasing their grip quickly. Enclosed loops shall conform to the entrapment requirements in EN 1176-1:2008, 4.2.7.

It shall not be possible to climb on the grip.

If the grip is rigid and does not form a loop, the ends of the grip shall conform to EN 1176-6:2008, Annex E.

NOTE This is to reduce the risk of eye injury from the ends of projecting hand supports.

Suspension type cableways from which users will hang by the hands shall conform to EN 1176-1:2008, 4.2.4.6.

4.9 Seats

Seats shall be designed so that the user can leave the cableway quickly and at all times. Seats which form loops or circular rings shall not be used.

When tested in accordance with EN 1176-2:2008, Annex C, peak values of acceleration shall be not greater than 50g and the average surface compression shall not exceed 90 N/cm^2.

4.10 Speed

When tested in accordance with Annex B the maximum speed of the traveller shall not exceed 7 m/s.

4.11 Free height of fall

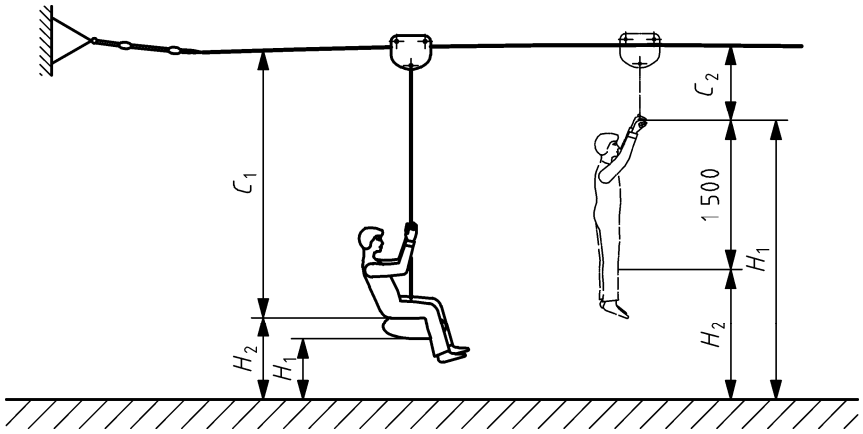
The free height of fall, for all cableway types, shall be measured unloaded.

In the sitting position the free height of fall, H_2, shall not exceed 2 000 mm.

In the hanging position the free height of fall shall be measured from the grip position minus 1 500 mm to the surface below, as the user should not be able to access the cable (see Figure 2). In the hanging position, the free height of fall, H_2, shall not exceed 1 500 mm (see Figure 2).

NOTE The sagging of the cable and thus the distance ground/cable, ground/grip and ground/seat are dependent on temperature. The minimum and maximum dimensions specified apply to a reference temperature of 15 °C.

Dimensions in millimetres



Key

C_1 cable height — seating type H_1 ground clearance
C_2 cable height — hanging type H_2 free height of fall

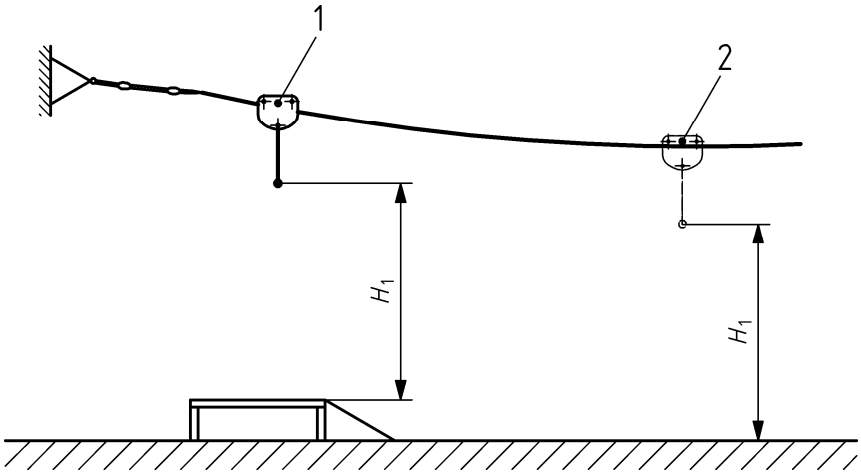
Figure 2 — Determination of cable height, ground clearance and free height of fall

4.12 Ground clearance

The ground clearance is the distance between the underside of the seat or the lowest point on the grip and the surface beneath (see Table 1).

Table 1 — Ground clearance

For seating type (see Figure 2)	400 mm minimum — measured loaded with 130 kg
For all hanging types, except rigid types (see Figure 3)	1 500 mm minimum at the starting point — measured unloaded 2 000 mm minimum in the running position — measured loaded with 69,5 kg
For rigid hanging types	2 000 mm minimum at the starting point and in the running position — measured loaded with 69,5 kg
NOTE For hanging type cableways where the traveller, suspension element and grip are all rigidly fixed together, a greater ground clearance is necessary to reduce the risk of head injury.	



Key
1 starting position
2 running position
H_1 ground clearance

Figure 3 — Hanging type cableway, determination of ground clearance

4.13 Cable height

The cable height of seating type cableways, C_1, shall be 2 100 mm minimum, when measured as shown in Figure 2, except that it may be reduced to 1 800 mm minimum if the moving parts of the traveller are enclosed, are not accessible by the user and there is no possibility of finger entrapment.

The cable height of hanging type cableways, C_2, shall be 300 mm minimum, when measured as shown in Figure 2.

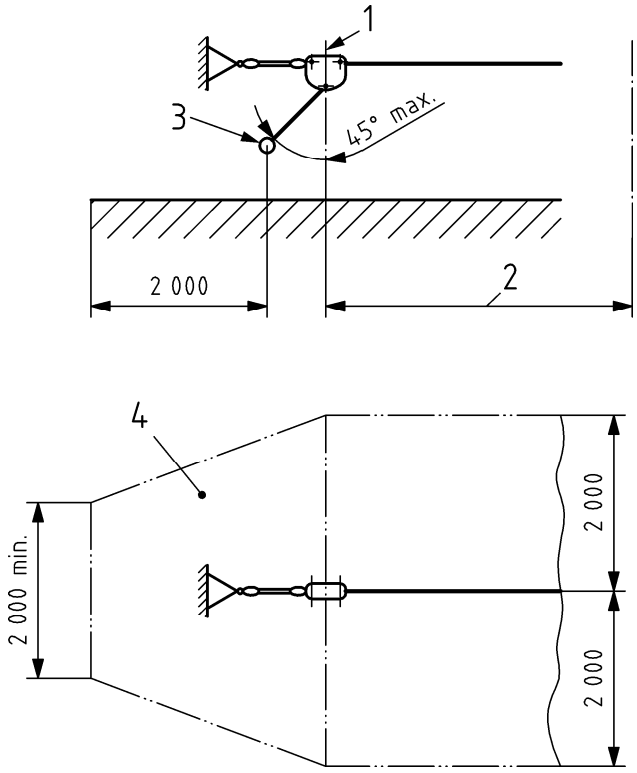
4.14 Falling space and impact area

The falling space and impact area shall be free from obstacles that could cause injury and shall be as shown in Figure 4 and Figure 5. In addition to the requirements given in EN 1176-1, the falling space and impact area shall be provided to a distance of at least 2 000 mm to each side of the cableway and to a distance of at least 2 000 mm beyond the end of the swinging position, (max 45°, end stop compressed) of the grip or seat. The impact area may reduce in width symmetrically from the end of travel to a minimum overall width of 2 000 mm (see Figure 4). The impact attenuating surface within the impact area shall at least conform to the minimum values for a critical fall height of 1 000 mm. For fall heights greater than 1 000 mm, the attenuating properties of the impact area shall be increased proportionately.

NOTE An example of the falling space is given in Figure 6.

Where starting platforms, together with their access ramps, are constructed of materials that yield, including timber and metal, they may be provided without an impact attenuating surface up to a maximum free height of fall of 1 000 mm.

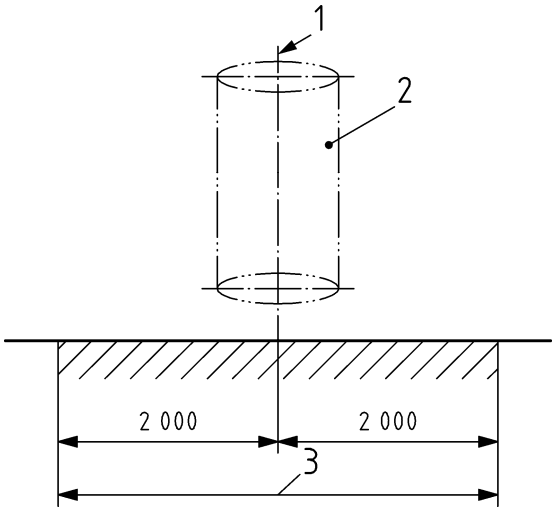
Dimensions in millimetres



Key
1 end of travel
2 area of travel
3 maximum swinging position of seat or grip (see 4.14)
4 impact area (see 4.14)

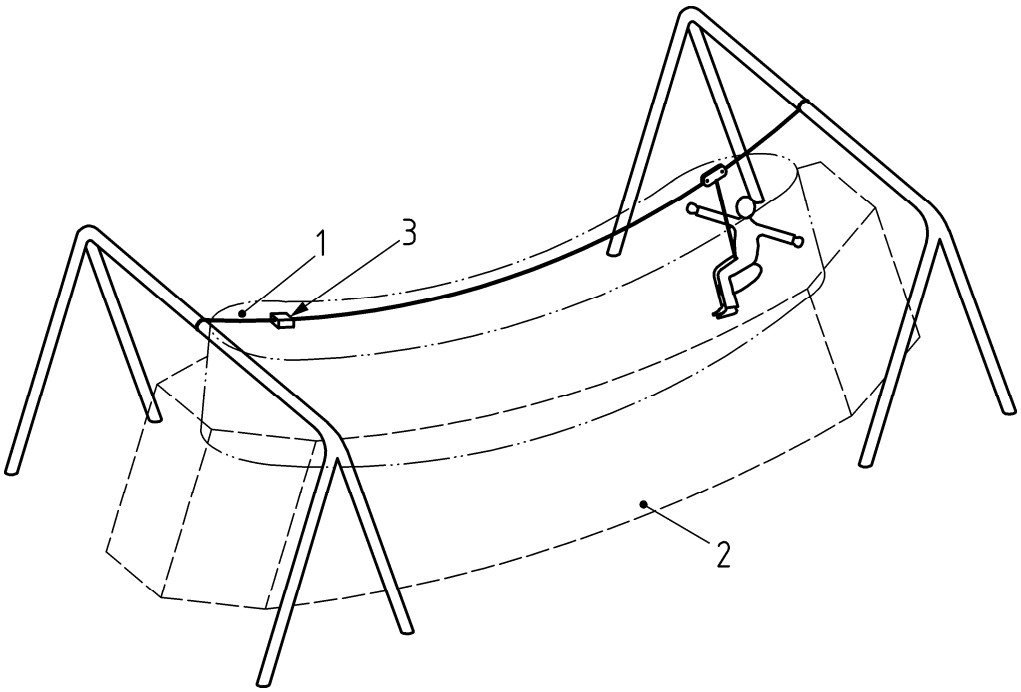
Figure 4 — Impact area when the traveller comes to a halt against a stop

Dimensions in millimetres



Key
1 centreline of suspension element
2 free space (see EN 1176-1:2008, 4.2.8.2.3)
3 impact area width (see 4.14)

Figure 5 — Free space and impact area viewed along direction of the cable



Key
1 free space
2 falling space
3 end of travel

Figure 6 — Example of the free space and falling space of a cableway

5 Test report

Test reports shall be in accordance with EN 1176-1:2008, Clause 5, in addition to the following:

a) test report regarding compliance with EN 1176-4;

b) certification of conformity with the relevant requirements of EN 1176-1 and EN 1176-4;

c) the number and date of this European Standard, i.e. EN 1176-4:2008.

6 Information to be provided by the supplier/manufacturer

In addition to the requirements in EN 1176-1:2008, Clause 6, the manufacturer shall provide the following information with each cableway:

a) special tools required to adjust the cable sag;

b) instructions on how to install the equipment correctly and on base construction;

c) values of the required gradients;

d) values of the minimum and maximum cable sag;

e) instructions on setting and adjusting the cable (depending on the temperature, see note to 4.11);

f) instructions on fitting the cable correctly (deflection radii);

g) instructions on maintaining and looking after the structural components, including critical gradients;

h) intervals at which the entire structure should be inspected.

7 Marking

Cableways shall be marked in accordance with EN 1176-1:2008, Clause 7.

Marking shall be positioned on the cableway in a location that will be visible when erected on site.

Annex A
(normative)

Method for the determination of performance of stops

A.1 Principle

When using cableways, different speeds have an effect at the end of the travelling distance, i.e. the stop at the terminus. High speeds cause the user to swing outwards at the terminus, as illustrated in Figure 4. To test the effectiveness of the impact attenuation and the outward swing, the seat or grip is loaded with a mass of 130 kg (see EN 1176-1:2008, Annex A) and set in motion from the starting point to the terminus. The seat or grip is monitored to ascertain whether the traveller stops in an impact attenuating manner and the angle of swing is recorded.

A.2 Apparatus

Mass, of 130 kg.

A.3 Procedure

Load the seat or grip with the mass (A.2). Start the traveller in motion at the starting point by pulling the suspension element to an angle of 30° against the direction of travel and releasing.

Visually assess whether the traveller is progressively slowed down and stopped and measure and record the angle of swing.

Annex B
(normative)

Method for the determination of the maximum speed of the traveller

B.1 Principle

The seat or grip is loaded with a mass of 130 kg (see EN 1176-1:2008, Annex A) and set in motion at the starting point. The speed of the traveller is measured.

B.2 Apparatus

Mass, of 130 kg.

B.3 Procedure

Load the seat or grip with the mass (B.2). Start the traveller in motion by pulling the suspension cable to an angle of 30° against the direction of travel and releasing.

Calculate the speed of the traveller in metres per second.

Annex C
(informative)

A–deviations

A-deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CEN/CENELEC national member.

This European Standard does not fall under any Directive of the EU. In the relevant CEN/ CENELEC countries these A-deviations are valid instead of the provisions of the European Standard until they have been removed.

Deviation	
Country France	National Regulation Decree no. 96-1136 of 18 December 1996 specifying the safety requirements for community playgrounds
Sub-clause 4.14 The exemption of impact-attenuating surfacing for the starting platform (and their access ramps) up to 1 000 mm free height of fall, permitted by the last sentence of sub-clause 4.14, cannot be applicable in France.	Annex II, 3, a) This part of the decree indicates that “The surfaces onto which children are liable to fall when using the equipment must be covered in suitable impact-absorbing materials”.

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BSI Group Headquarters
389 Chiswick High Road,
London W4 4AL, UK
Tel +44 (0)20 8996 9001
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