

Impact absorbing playground surfacing — Safety requirements and test methods

TO BE USED IN CONJUNCTION WITH BS 7188

The European Standard EN 1177 : 1997 has the status of a
British Standard

ICS 97.200.40

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National foreword

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Annex D of EN 1177 applies solely within Germany as a result of their existing national laws and is not to be considered outside that country.

It is imperative that BS EN 1177 be used in conjunction with BS 7188 so that other properties of abrasive wear, resistance to indentation and ease of ignition are still measured.

The UK participation in its preparation was entrusted to Technical Committee SW/65, Children's playground equipment, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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Summary of pages

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Impact absorbing playground surfacing — Safety requirements and test methods

Revêtements de surfaces d'aires de jeux absorbant l'impact — Exigences de sécurité et méthodes d'essai

Stoßdämpfende Spielplatzböden — Sicherheitstechnische Anforderungen und Prüfverfahren

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CEN

European Committee for Standardization
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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.

BT has decided to package EN 1176-1, EN 1176-7 and EN 1177. In accordance with the CEN/CENELEC Internal Regulations, the latest date by which national standards conflicting with this European Standard have to be withdrawn is 1998-12-31.

In the field of playground equipment the following drafts exist, which should be read in conjunction with this standard.

prEN 1176-1	<i>Playground equipment — Part 1: General safety requirements and test methods</i>
prEN 1176-2	<i>Playground equipment — Part 2: Additional specific safety requirements and test methods for swings</i>
prEN 1176-3	<i>Playground equipment — Part 3: Additional specific safety requirements and tests methods for slides</i>
prEN 1176-4	<i>Playground equipment — Part 4: Additional specific safety requirements and tests methods for runways</i>
prEN 1176-5	<i>Playground equipment — Part 5: Additional specific safety requirements and tests methods for carousels</i>
prEN 1176-6	<i>Playground equipment — Part 6: Additional specific safety requirements and tests methods for rocking equipment</i>
EN 1176-7	<i>Playground equipment — Part 7: Guidance on installation, inspection, maintenance and operation</i>

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 1998, and conflicting national standards shall be withdrawn at the latest by December 1998.

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.

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Introduction

Injuries in playgrounds occur from a variety of reasons but it is considered that the most severe injuries are likely to be injuries to the head. Consequently, priority has been given to developing a criterion for surfacing materials intended to assess their ability to reduce the likelihood of head injuries.

On the basis of statistical analysis of available data the Head Injury Criterion (HIC) at a tolerance level of 1000 has been used as the upper limit for the injury severity unlikely to have fatal consequences. Using HIC considers only the kinetic energy of the head when it impacts the playground surfacing. This is considered to be the best model available to predict the likelihood of injuries from falls.

There is a variety of materials available providing impact attenuation, including rubber tiles, mats, slabs, continuous synthetic surfacing, either prefabricated or formed 'in-situ', loose particulate material, such as gravel, sand, wood chips, bark, etc. The test method in this standard can be used to assess any of these surfaces.

1 Scope

This standard specifies requirements for surfacing to be used in children's playgrounds and specific requirements for areas where impact attenuation is necessary. It suggests the factors to be considered when selecting playground surfacing and gives a method of test by which the impact attenuation can be determined; this test gives a critical fall height (see 3.5) for surfacing, that represents the upper limit of its effectiveness in reducing head injury when using playground equipment conforming to EN 1176.

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.

prEN 1176-1: 1996	<i>Playground equipment — Part 1: General safety requirements and test methods</i>
EN 45001	<i>General criteria for the operation of testing laboratories</i>
ISO 1302	<i>Technical drawings — Method of indicating surface texture</i>
ISO 6487	<i>Road vehicles — Measurement techniques in impact tests — Instrumentation</i>

3 Definitions

For the purposes of this standard, the definitions given in prEN 1176-1 apply together with the following:

3.1 surfacing

Area of a playground from which the use of the equipment commences and which comprises at least the impact area (see 3.4).

3.2 impact attenuation

Property of a surface, which dissipates the kinetic energy of an impact by localized deformation or displacement such that the acceleration is reduced.

3.3 free height of fall

Greatest vertical distance from the clearly intended body support to the impact area below. [prEN 1176-1]

NOTE. The intended body support includes those standing surfaces to which access is provided.

3.4 impact area

Area that can be hit by a user after falling through the falling space. [prEN 1176-1]

3.5 critical fall height

Lowest test result obtained in accordance with 6.4.3.

NOTE. The critical fall height represents the upper limit of all free heights of fall, for which the surfacing provides an acceptable level of impact attenuation.

3.6 head injury criterion (HIC) value

Criterion for head injuries caused from falls as calculated in accordance with the formula given in 6.5.1.

3.7 test position

Position on the material to be tested located vertically below the centre of the headform.

3.8 drop height

Distance between the test position on the surfacing and the lowest point of the free falling headform prior to release.

NOTE. In the case of a guided headform this value is calculated from measurement of velocity (see 6.2.4).

3.9 impact measurement

HIC value from the recorded acceleration of the headform falling from one fall height onto one test position of the test specimen.

3.10 drop test

Series of impact measurements carried out from at least four increasing fall heights.

3.11 loose particulate material

Material which absorbs the energy of an impact usually through its displacement.