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STN	**Povrchy pre športové areály Skúšobná metóda na stanovenie hodnoty kritéria zranenia hlavy (HIC) a kritickej výšky pádu (CFH)**	**STN EN 17435** 73 5919

Surfaces for sports areas - Test method for the determination of Head Injury Criterion (HIC) and Critical Fall Height (CFH)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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English Version

Surfaces for sports areas - Test method for the determination of Head Injury Criterion (HIC) and Critical Fall Height (CFH)

Sols sportifs - Méthode d'essai pour la détermination du Critère de blessure à la tête (HIC) et de la Hauteur de Chute Critique (HCC)

Sportböden - Prüfverfahren für die Bestimmung des Kopf-Verletzungs-Faktors (HIC) und der kritischen Fallhöhe (CFH)

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 17435:2021) has been prepared by Technical Committee CEN/TC 217 “Surfaces for sports areas”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by June 2022, and conflicting national standards shall be withdrawn at the latest by June 2022.

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

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Introduction

Sports injuries occur for a variety of reasons; in many contact sports they are as a result of athlete on athlete collisions. Injuries also occur when athletes fall onto the surface on which they are playing. Of these the most severe are likely to be injuries to the head, which can be life changing or even life threatening. Consequently, a test method has been developed to measure the ability of sports surfacing materials to reduce the likelihood of severe head injuries occurring. It is intended that this test method will be specified in standards for sports surfaces used for activities where head impacts with the surface are likely.

The test method is based on work undertaken by CEN committee CEN/TC 136 "Sports, playground and other recreational facilities and equipment". The Head Injury Criterion (HIC) at a tolerance level of 1 000 has been adopted as it is considered to be the upper limit for the brain injury severity unlikely to have disabling or fatal consequences.

By choosing the measurement of HIC as one criterion of sports surfacing athlete protection, the method considers only the kinetic energy of the head when it impacts the surface. This is considered to be the best model available to predict the likelihood of head injury from falls.

The HIC value of 1 000 is merely one data point on a risk severity curve where an HIC of 1 000 is equivalent to a 3 % chance of a critical injury (MAIS[1] 5), a 18 % probability of a severe (MAIS 4) head injury, a 55 % probability of a serious (MAIS 3) head injury, a 89 % probability of a moderate injury (MAIS 2), and a 99,5 % chance of a minor head injury (MAIS 1), to an average male adult.

This method of test and HIC and Critical Fall Height (CFH) performance requirements are specified in product and facility specifications published by CEN and a number of sports governing bodies.

[1] Maximum Abbreviated Injury Scale, first developed by the Association for the Advancement of Automotive Medicine and used extensively in the automotive industry as an indicator of the severity of head-related injuries.

1 Scope

This document specifies test methods for measuring the impact attenuation of sports surfaces. Three different methods are specified. In Procedure A, a series of tests are undertaken from differing drop heights and the HIC values are plotted, and the Critical Fall Height determined. In Procedure B, a single test is undertaken from differing drop heights and the HIC values are plotted, and the Critical Fall Height determined. In Procedure C a series of tests are made at a fixed drop height and the maximum value of HIC is calculated.

This test method is primarily intended for use on both natural and synthetic turf sport surfaces. It may be carried out in a laboratory on test specimens or *in situ* on installed sports surfaces. This test method may not be suitable for sports surfaces covered by EN 14904.

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 12229, *Surfaces for sports areas - Procedure for the preparation of synthetic turf and needle-punch test pieces*

EN 12504-2, *Testing concrete in structures - Part 2: Non-destructive testing - Determination of rebound number*