INSTITUT FÜR SPORTBODENTECHNIK

I S T CONSULTING GmbH

Accredited by
IAAF and DIN CERTCO
ISO/IEC 17025 (STS 411)

Standard EN 12235:2004
Surfaces for Sports Areas
Determination of Vertical Ball Behaviour

Impact on Test Results compared with DIN 18032-2 "Sports Hall Surfaces"

A few days ago the final version of EN 12235 was published. According to CEN agreements, the appropriate national test procedures must now be abandoned. For Germany this means that the Ball Rebound Test (Ballreflexions-Versuch) of DIN 18032-2 has to be replaced by EN 12235. This has a major two-fold impact on the test results.

Both standards specify the release of a Basketball which is inflated so that the resultant rebound height achieved from a drop height of 1.80m (measured from bottom of ball to surface) is 1.300 +/- 0.025 m.

1. In DIN 18032-2 the rebound height is measured as the highest point of the **top** of the ball after rebound from the surface. In EN 12235 however, the rebound height is defined as the highest point of the **bottom** of the ball. With reference to the acoustic method this can be seen from the evaluation formula of Rebound Height (RH):

   $RH_{EN} = 1.23 * (T - K)^2$ [cm]

   $RH_{DIN} = 1.23 * (T - K)^2 + 25$ [cm]

   where

   T = Rebound Time (up + down) [sec] and
   K = Surface Contact Time of Ball during Impact [sec]
   25 = Diameter of Ball [cm]

2. The different evaluation methods lead to different results although the physical/real ball rebound is the same. If the ball does not rebound at all, DIN delivers a BR of 19% whereas EN delivers 0%. At the critical ball rebound of 90% (DIN 18032-2) the DIN result is still 2% (absolute) higher than the EN-result. The higher the Ball Rebound the smaller the difference. The situation becomes even worse for area-elastic surfaces when tested according to the new EN 12235 standard. The reference rebound height on concrete is specified in EN 12235 as 1.300 +/- 0.025 m in reference to the **bottom** of the ball whereas DIN refers to the **top** of the ball. This means that the ball needs to be inflated to a higher pressure since ~~now~~ the bottom of the ball is required to reach the height that the top of the ball was previously required to reach (i.e. acc. to DIN 18032-2). This is a difference of + 25 cm. Experience shows that area-elastic sports hall surfaces exhibit lower BR results at higher reference rebound height (i.e. the more the ball is inflated). According to IST's experience the BR results will be up to 10% lower than with the DIN specification. In terms of the EN evaluation the results are further impacted by an additional reduction of 2% (see above).

It is unclear why the German delegates of the TC 217 committee did not realize this effect.

Furthermore, the compelling reason to change the reference rebound height from that of 1.30 m (with reference to the **top** of the ball) as defined by the sports governing body of Basketball FIBA, has not been made known. -

September 6, 2004

Hans J. Kolitzus

CH 8264 Eschenz
Hauptstr. 34, Switzerland
www.isss.de/ist-ch

Phone +41-52-740 3005
Fax +41-52-740 3009
Email ist-mailbox@bluewin.ch

Testing - Failure Analysis
Sports Hall Surfaces, Synthetic Turf,
Synthetic and Playground Surfaces