SLOVENSKI STANDARD
SIST EN 1177:2018+AC:2019/oprA1:2022

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Podloge otroških igrišč, ki ublažijo udarce - Ugotavljanje kritične višine padca - Dopolnilo A1

Impact attenuating playground surfacing - Methods of test for determination of impact attenuation

Stoßdämpfende Spielplatzböden - Prüfverfahren zur Bestimmung der Stoßdämpfung

Sols d'aires de jeux absorbant l'impact - Méthodes d'essai pour la détermination de l'atténuation de l'impact

Ta slovenski standard je istoveten z: **EN 1177:2018+AC:2019/prA1:2022**

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Impact attenuating playground surfacing - Methods of test for determination of impact attenuation

Sols d'aires de jeux absorbant l'impact - Méthodes d'essai pour la détermination de l'atténuation de l'impact

Stoßdämpfende Spielplatzböden - Prüfverfahren zur Bestimmung der Stoßdämpfung

This draft amendment is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 136.

This draft amendment A1, if approved, will modify the European Standard EN 1177:2018+AC:2019. If this draft becomes an amendment, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for inclusion of this amendment into the relevant national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 1177:2018+AC:2019/prA1:2022) has been prepared by Technical Committee CEN/TC 136 “Sports, playground and other recreational equipment”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

1 Modification to clause 3

In definition 3.9, replace the note to entry with the following:

"The number of drops and the drop heights of drop tests are specified separately in Method 1 and in Method 2. Particularities exist for some specific types of surfacing material (e.g. for loose fil material the four impacts measurement of the drop test are conduct in a different test position)."

2 Modification to 5.2.1

Change the beginning of the note to read as follows:

"NOTE Requirements for the adequate level of impact attenuation […]."

3 Addition of clause 5.3, "On site testing conditions"

Move the text in 6.3 to become a new clause 5.3.

"**5.3 On site testing conditions**

5.3.1 Testing shall only be carried out when the temperature of the surface is between 5 °C and 55 °C. Temperature as well as all relevant climatic conditions existing throughout the test, e.g. humidity, moisture, etc., shall be measured and recorded.

5.3.2 Testing shall not be carried out on surfaces that are saturated with water.

5.3.3 Tests shall not be conducted on a test zone if it is inclined at an angle of > 10° to the horizontal.

NOTE Guided systems will give invalid results on inclined surfaces and free falling head forms can experience excessive rotation forces.

5.3.4 If different types and/or layer thickness of substrate and/or surfacing are known to exist within the impact area, each variation shall be considered as a separate test zone and tested separately.

For surfacing manufactured on site the drop tests shall be carried out on each test zone identified.

5.3.5 When testing on site, a variety of test positions shall be selected to ensure the worst-case situation is included (e.g. access/exit areas of the equipment) (see also 5.2.1).

NOTE For method 2 see recommendations in Annex D."

4 Modification to 6.1.1

Add the missing reference to 5.2 after "testing in general":

"**6.1.1** Impact measurements shall be carried out according to the testing procedure in 5.1 by conducting a drop test on each selected test position to the procedures as defined for testing in general (5.2), in the laboratory (6.2) and on site (6.3)."

5 Modification to Clause 6.1.2

Move the following from 6.2.3.2 to the end of 6.1.2:

"Whenever it is possible the drop heights should be chosen to obtain the HIC values given in Table 1, subject to the following constraints:

Table 1 — HIC values

Impact number	Targeted HIC value
Impact 1 → m_1	700 to 800
Impact 2 → m_2	850 to 950
Impact 3 → m_3	1050 to 1150
Impact 4 → m_4	1200 to 1300

NOTE An example of correct curves is illustrated in Figure B.2 (HIC and g_{max})."

6 Modification to Clause 6.2.3.3

Move the following from 6.2.3.3 to become 6.1.3:

"**6.1.3** For materials giving HIC values lower than 1 000 and g_{max} lower than 200 g at the maximum test height, the Critical Fall Height shall be quoted as > M (where M is the greatest drop height measured).

NOTE The maximum Free Height of Fall (FHF) on playground equipment conforming with EN 1176-1 is 3 m (see EN 1176-1:2017, 4.2.8.1)."

7 Modifications to 6.2.3.2

Change "HIC and g_{max}" *for* "HIC and/or g_{max}" *in the 3rd line.*

Replace the sentence "The Critical Fall Height is the lower of these two drop heights." *with the following two sentences:* "The Critical Fall Height of the test position is the lower of these two drop heights.

The Critical Fall Height of the specimen is the lowest drop height equivalent to HIC of 1 000 and/or g_{max} of 200 g from any of the drop tests conducted."

8 Modification of 6.2.4.1

Replace the second paragraph and the following list of test positions by the following:

"At least nine drop tests (3.9), each from at least 4 increasing drop heights (3.8) at the same test position (3.7) shall be conducted and reported. Each of the 9 drop test are performed at a different test position on the test specimens as describe here under (see also 5.2)."

9 Modification to 6.2.4.2

Replace the complete clause by the following:

"6.2.4.2 Testing surfacing intended to be manufactured on site

A test specimen prepared without seams or joints with a minimum total dimension of 1 m × 1 m, produced in accordance with the manufacturer's instructions

At least nine drop tests (3.9), each from at least 4 increasing drop heights (3.8) at the same test position (3.7) shall be conducted and reported. Each of the 9 drop test is performed at a different test position on the test specimens, as required in 5.2.2, and if applicable in test positions as required in 6.2.4.1."

10 Modification to 6.2.4.3

Replace the complete clause by the following:

"**6.2.4.3 Testing products consisting of more than one component**

The entire system, surfacing with under layer (e.g. artificial turf on shockpad) with a minimum total dimension of 1 m × 1 m, shall be tested and reported as a composite product which allows reproducibility of the test.

At least nine drop tests (3.9), each from at least 4 increasing drop heights (3.8) at the same test position (3.7) shall be conducted and reported. Each of the 9 drop test are performed at a different test position on the test specimens, if applicable in test positions as required in 6.2.4.1."

11 Modification to 6.2.4.4

Replace the reference from "8.3" *to* "8.2" in the 3rd line.

12 Modification to 6.2.4.5.2

Replace the complete clause by the following:

"**6.2.4.5.2** A drop test shall be conducted after compaction in the test frame according to Annex E. Drop the head form once from 4 increasing drop heights, each at a previously untested position (see also 5.2.2)."

13 Modifications to 6.3

Add this new sentence at the beginning of 6.3:

"For testing on site, carry out the procedure under the conditions described in 5.3 and select the data to determine the CFH according 6.2.3."

Delete all sub clauses under 6.3 except for the content of 6.3.5.

*In 6.3.5 replace the first word "Drop" by "*For loose fil material drop".

Delete the numbering 6.3.5 so that there is no sub level below 6.3.

14 Modification to 7.2

Add the following note at the end of the clause:

"NOTE For loose fil material drop the headform without compaction."

15 Modification to 8.2

In a) change the reference to the latest version of the standard: "EN 1177:2018+AC:2019+A1:2022, Method 1".

In h) delete "and stating an uncertainty of +-7%".

In j) replace the text by the following:

"j) either the time/acceleration curve of one impact with HIC equal to or greater than 1 000 and/or g_{max} equal to or greater than 200 g or, for maximum HIC values below 1 000 and g_{max} below 200 g, the highest value measured."

16 Modification to 8.3

In a) change the reference to the latest version of the standard: "EN 1177:2018+AC:2019+A1:2022, Method 1".

In i) replace the text by the following:

"i) the critical fall height for the surfacing on each test position, expressed in metres to two decimal places, followed by the statement: "An uncertainty of the measurement of critical fall hight under controlled laboratory conditions exist. Under site conditions, the uncertainty may be greater. This could explain the different results that various on-site test may give for the same surfacing"".

In k) replace the text by the following:

"k) either the time/acceleration curve of one impact with HIC equal to or greater than 1 000 and/or g_{max} equal to or greater than 200 g or, for maximum HIC values below 1 000 and g_{max} below 200 g, the highest value measured."

17 Modification to 8.4

In a) change the reference to the latest version of the standard: "EN 1177:2018+AC:2019+A1:2022, Method 2".

18 Modification to Annex B

Modify the key for Figure B.1 as follows:

Key

a	t_{start}	
b	t_{end}	
g	accelleration	
t	time	

See also Figure in 5.1.3.1.

19 Modifications to Annex C

Change "A" to "$A \cdot S$" in Formula (C.1), to read:

$$V = \frac{A \cdot S}{2}\left(1 - \cos\left(\frac{2\pi t}{T}\right)\right)$$

Change the key for Formula (C.1) as follows:

"V	is the output voltage in V from a conditioner to simulate an impact;
A	is the full amplitude (±) of the pulse/impact signal in g;
S	is the data acquisition system channel sensitivity in V/g;
t	is the time in ms;
T	is the reference pulse/bounce period in ms."

20 Modification to Table D1

Change the location and number of test positions for type 4 swings as follows:

"1, 3, 4 and 5: One test position for each seat chosen on the minimum measured thickness of IAS

2: One test position in the central test zone"

21 Addition of new Annex G

Add the following new informative Annex:

Annex G
(Informative)

"History of HIC testing of impact attenuating surfaces for playgrounds and variations in test results"

"When the revision of EN 1177 was initiated the concern of the variation in test results of HIC tests was still a real topic. To evaluate the variations in the correct way it is good to know the evolution of the HIC test and the HIC devices used.

The first round robin test organized resulted in variations of around ± 15 %.

A round robin test in 2011 resulted in lower variations in the results of test. The outcome of that round robin test was that depending on the testing institute a variation ± of 7 % was possible. It is not possible to point out the specific factors creating these variations.

In on-site testing the variations can be bigger due to the influence of e.g. the climatic conditions as laboratory conditions are manageable.

For sure, due to the evolution of several elements like technical components of HIC testing devices such as the accelerometers and calibration procedures the variation has significantly reduced over time.

The revision of EN 1177 of the laboratory and onsite test methods is there to ensure that the uncertainty of measurements are as small as possible."