



**SLOVENSKI STANDARD**  
**SIST EN 13583:2001**

**01-december-2001**

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**Hidroizolacijski trakovi - Bitumenski, polimerni in elastomerni trakovi za tesnjenje streh - Določevanje odpornosti proti toči**

Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of hail resistance

Abdichtungsbahnen - Bitumen-, Kunststoff- und Elastomerbahnen für Dachabdichtungen - Bestimmung des Widerstandes gegen Hagelschlag

Feuilles souples d'étanchéité - Feuilles bitumineuses, plastiques et élastomériques d'étanchéité de toiture - Détermination de la résistance à l'impact de la grele

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**Ta slovenski standard je istoveten z: EN 13583:2001**

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**ICS:**

91.060.20	Strehe	Roofs
91.100.50	Veziva. Tesnilni materiali	Binders. Sealing materials

**SIST EN 13583:2001** en

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EUROPEAN STANDARD

EN 13583

NORME EUROPÉENNE

EUROPÄISCHE NORM

June 2001

ICS 91.100.50

English version

## Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of hail resistance

Feuilles souples d'étanchéité - Feuilles bitumineuses, plastiques et élastomériques d'étanchéité de toiture - Détermination de la résistance à l'impact de la grêle

Abdichtungsbahnen - Bitumen-, Kunststoff- und Elastomerbahnen für Dachabdichtungen - Bestimmung des Widerstandes gegen Hagelschlag

This European Standard was approved by CEN on 3 May 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 254 "Flexible sheets for waterproofing", the secretariat of which is held by BSI.

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 December 2001, and conflicting national standards shall be withdrawn at the latest by July 2002.

No existing European Standard is superseded.

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.

## 1 Scope

This European Standard specifies the determination of the resistance of flexible sheets for roofing to hail using a test for puncture by simulated hail.

This European Standard may also be applied for waterproofing.

## 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 (including amendments).

EN 13416

Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Rules for sampling.

## 3 Terms and definitions

For the purposes of this standard, the terms and definitions indicated in 3.1 to 3.2 apply:

### 3.1

#### surface

the upper side of the sheet, as used in situ; it is usually the inside of the roll

### 3.2

#### damaging velocity $v_s$

lowest determined velocity of the ball to cause perforation with loss of tightness rounded off to the next integer in m/s

## 4 Principle

The test specimen is shot on the surface by a plastic ball of defined material and size. The support is made of steel or expanded polystyrene. The velocity of the ball before impact can be varied. The ball can be shot downwards in a vertical direction or in horizontal direction.

## 5 Apparatus

The apparatus (see Figure 1) consists of parts indicated in 5.1 to 5.7.

**5.1 Pneumatic drive** by which the velocity of the ball is controlled by the loading pressure which is recorded by a manometer.

**5.2 Photo cells** with time measuring device to measure the effective velocity of the ball within  $\pm 0,5\%$  (see Figure 1) at a distance of  $(300 \pm 5)$  mm from the surface of the test specimen.

**5.3 Plastic ball** made of polyamide (PA 6.6) with a mass of  $(38,5 \pm 0,5)$  g, a diameter of  $(40 \pm 0,5)$  mm and with a smooth and defect free surface.

**5.4 Mounting device** for the test specimen (see Figure 2) to allow hard or soft support.

**5.5 Hard support** which consists of a steel plate of  $(500 \pm 2)$  mm x  $(300 \pm 2)$  mm x  $(20 \pm 0,5)$  mm as ground plate on which sand paper (grain 120 [1]) is laid (see Figure 2a)). The steel plate shall have a temperature of  $(10 \pm 2)$  °C.

**5.6 Soft support** which consists of a steel plate as described in 5.5 but without cooling on which an expanded polystyrene panel of density  $(20 \pm 2)$  kg/m<sup>3</sup> and size of  $(500 \pm 2)$  mm x  $(250 \pm 2)$  mm x  $(20 \pm 0,5)$  mm is laid (see Figure 2b)).

**5.7 Ballast steel plate** of  $(500 \pm 2)$  mm x  $(300 \pm 2)$  mm x  $(20 \pm 0,5)$  mm with a circular opening of  $(200 \pm 2)$  mm diameter in the centre (see Figure 2).

**5.8 Device for the verification of a possible perforation** (see Figure 3) with a testing area of at least 30 mm in diameter.

## 6 Sampling and preparation of test specimens

### 6.1 Sampling

Samples shall be taken in accordance with EN 13416.

### 6.2 Preparation of test specimens

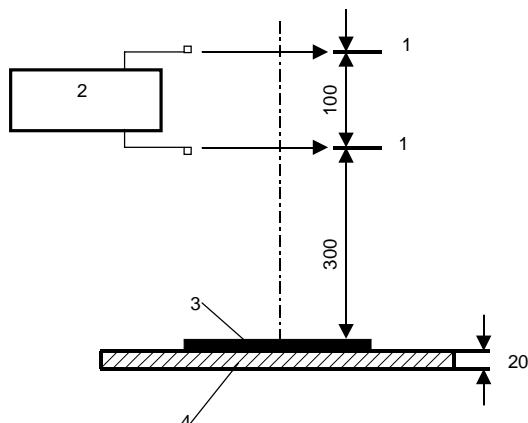
At least 10 test specimens of  $(250 \pm 2)$  mm x width of the sheet shall be taken from the whole width of the roll.

The test specimens are conditioned at least 24 h at  $(23 \pm 2)$  °C and  $(50 \pm 10)$  % relative humidity before the test.

## 7 Procedure

After the test specimen is placed with the surface up on the support and the ballast plate is put into place the area of the test specimen within the  $(200 \pm 2)$  mm diameter opening of the ballast plate is evenly covered with  $(200 \pm 20)$  g crushed ice. After  $3 \text{ min} \pm 30 \text{ s}$  the ice is removed from the centre of the opening and within  $(5 \pm 2)$  s the test is conducted. The polyamide ball has to hit the surface of the test specimen in the centre of the opening of the ballast plate.

Dimensions in millimetres

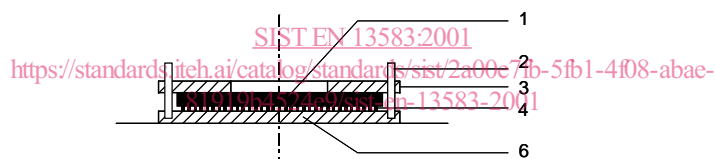


**Key**

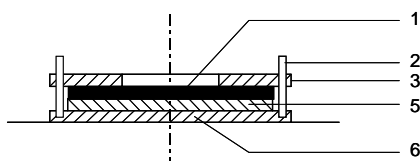
- 1 Light beam
- 2 Timing chronometry
- 3 Test specimen
- 4 Steel plate

Figure 1 - Testing device (example)

**iTeh STANDARD PREVIEW** Dimensions in millimetres  
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a) hard support



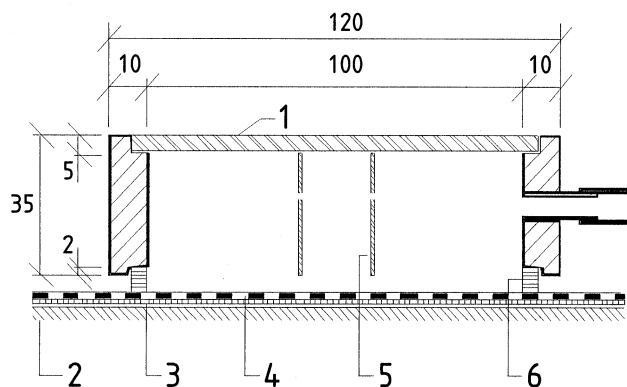
b) soft support

**Key**

- 1 Test specimen
- 2 Guide pin
- 3 Ballast steel plate
- 4 Sand paper
- 5 Expanded polystyrene plate
- 6 Steel plate

Figure 2 - Support with test specimen

Dimensions in millimetres

**Key**

- 1 Glass plate
- 2 Support
- 3 Air permeable layer
- 4 Test specimen
- 5 Transparent plastic tube
- 6 Gasket

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**Figure 3. Vacuum device (example)**

The test starts with a velocity of the ball smaller than the expected damaging velocity  $v_s$  (e.g. 16 m/s). For the following test, the test specimen is shifted in lengthwise direction together with the sand paper (hard support) or the polystyrene panel (soft support) for about 10 cm. If the test specimen is not perforated, the test is repeated with a velocity increased by approximately 1 m/s. If the test specimen is perforated, the test is repeated with a velocity decreased by approximately 2 m/s.

The testing is continued until the damaging velocity  $v_s$  is determined at 5 test specimens for hard or soft support.

If by visual examination no perforation is found the test specimen is examined for a possible puncture by coating the surface of the impact area with a soap solution between  $(6 \pm 1)$  min after the test. A pressure difference of about 15 kPa (0,15 bar) is applied to the zone of impact by means of a vacuum or pressure device with the lower pressure at the surface of the sheet. If after 60 s no air bubbles are visible, the test specimen is considered not perforated.

## 8 Expression of results

The hail resistance is expressed as the damaging velocity  $v_s$  which has caused perforation of at least five test specimens on hard or soft support.



## 9 Test report

The test report shall include at least the following information:

- a) all details necessary to identify the product tested;
- b) a reference to this European Standard (EN 13583) and any deviation from it;
- c) information about sampling with details of preparation of the test specimens in accordance with clause 6;
- d) information about the test procedure in accordance with clause 7;
- e) the test results in accordance with clause 8;
- f) the date of the test.

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