



**SLOVENSKI STANDARD**  
**SIST EN 539-1:2006**

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**SIST EN 539-1:1998**

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Clay roofing tiles for discontinuous laying - Determination of physical characteristics -  
Part 1: Impermeability test

Dachziegel für überlappende Verlegung - Bestimmung der physikalischen Eigenschaften  
- Teil 1: Prüfung der Wasserundurchlässigkeit

Tuiles de terre cuite pour pose en discontinu - Détermination des caractéristiques  
physiques - Partie 1: Essai d'imperméabilité

**Ta slovenski standard je istoveten z: EN 539-1:2005**

**ICS:**

91.100.25 S^!æ ã} ã^!æà^} ãå å^| ã Ceramic building products

**SIST EN 539-1:2006**

**en**

**ITeH STANDARD PREVIEW**  
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Full standard:  
<https://standards.iteh.ai/catalog/standard/sist/en-539-1-2006>  
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English Version

Clay roofing tiles for discontinuous laying - Determination of  
physical characteristics - Part 1: Impermeability test

Tuiles en terre cuite pour pose en discontinu -  
Détermination des caractéristiques physiques - Partie 1:  
Essai d'imperméabilité

Tondachziegel für überlappende Verlegung - Bestimmung  
der physischen Charaktere - Teil 1: Prüfung der  
Wasserundurchlässigkeit

This European Standard was approved by CEN on 1 April 2005.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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## Foreword

This European Standard (EN 539-1:2005) has been prepared by Technical Committee CEN/TC 128 "Roof covering products for discontinuous laying and products for wall cladding", the secretariat of which is held by IBN.

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 2006, and conflicting national standards shall be withdrawn at the latest by March 2006.

This document supersedes EN 539-1:1994.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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**EN 539-1:2005 (E)****1 Scope**

This European Standard describes two test methods for testing the impermeability to water of clay roof tiles and fittings which can be considered as equivalent.

NOTE The methods are not applicable to all fittings, because of their different shapes.

**2 Normative references**

The following referenced documents are indispensable for the application 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 1304, *Clay roofing tiles and fittings - Product definitions and specifications.*

**3 Symbols and abbreviations**

$X_i$  length of time in hours, before the first drop of water falls

$\bar{X}_i$  average length of time, in hours before the first drop of water falls

$V_1$  volume of water passing through in 48 h

$V_2$  volume of water evaporated in 48 h

$A$  projected area of test piece in  $\text{cm}^2$

$d$  day

$h$  hour

$IF$  impermeability factor (method 1)

$IC$  impermeability coefficient (method 2)

$HR$  relative humidity

**4 Samples**

If the tiles or fittings are supplied with a surface coating or treatment then the test shall be carried out on samples which include the surface coating or treatment.

When the tiles or fittings are taken from a site or building, they shall be tested in the state in which they are found, but the interpretation of the test results shall take into account the stresses to which these installed products have been subjected.

**5 Test methods 1****5.1 Principe**

The amount of water passing in 48 h through the ceramic body of the tile or fitting per  $\text{cm}^2$  of surface area, under a load of 10 cm of water kept constant throughout the test is determined.

## 5.2 Apparatus (see Figure 1)

**5.2.1** A glass tube (or other rigid transparent material) with an inside diameter of  $(38 \pm 1)$  mm, and a height of  $(150 \pm 2)$  mm for each test piece and one for the measurement of the evaporation level.

**5.2.2** A container to hold the test pieces after preparation.

**5.2.3** A device at a constant level consisting of a graduated test tube or measuring cylinder with a capacity of at least  $100 \text{ cm}^3$  graduated in steps not greater than  $2 \text{ cm}^3$ .

## 5.3 Size of sample<sup>1)</sup>

Ten tiles or fittings shall be tested. For routine testing, the size of the sample can be different.

## 5.4 Preliminary treatment

Preliminary treatment consists of the following operations.

The tiles shall be immersed in tap water at room temperature for  $(48 \pm 4)$  h.

The tiles shall then be dried at a temperature of  $(110 \pm 5)$  °C until the difference between two successive weighings at 24 h intervals is less than 0,5 % of the reading before last.

The tiles shall then be cooled at room temperature for at least 4 h.

If the test is carried out on kiln fresh tiles they shall be held at room temperature for a period of time after their immersion in water for 48 h<sup>2)</sup>.

## 5.5 Test pieces

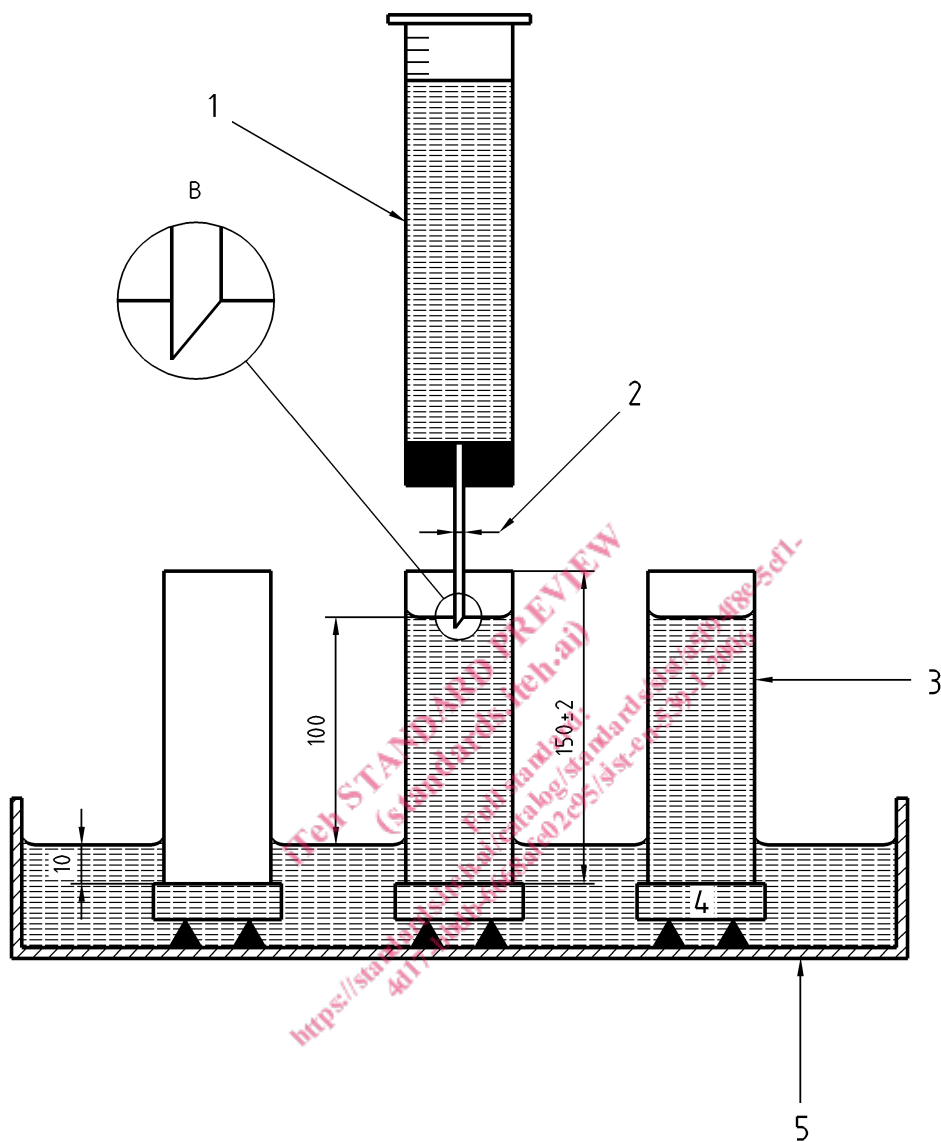
Cut from the thinnest part of each tile or fitting, a square test piece  $(45 \pm 2)$  mm  $\times$   $(45 \pm 2)$  mm or a round test piece with a diameter of  $(50 \pm 2)$  mm.

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1) The rules for sampling are described in the standard EN 1304.

2) There is nothing to be gained from holding tiles at room temperature for longer than 14 days.

Dimensions in millimetres

**Key**

- 1 Graduated test tube/measuring cylinder
- 2 Bevelled tube inside diameter 6 mm
- 3 Reference tube for evaporation
- 4 Glass plate
- 5 Water container

**Figure 1 — Equipment for test method 1****5.6 Procedure**

Measure the dimensions (length and width) of the test pieces and calculate their projected area. Place the tube on the surface of the test pieces normally exposed to the weather.



Smear the cut surfaces of the test piece and the joint, between the tube and the test piece with paraffin wax or a watertight sealant.

Leave the tube and test piece for 48 h in a vessel containing sufficient water for the exposed surface to be 1 cm below the water level. The surface opposite the exposed surface rests on two thin non-porous supports placed at the bottom of the container. When this period has been completed, pour water into the glass tube so that the water is 10 cm higher than that in the container.

The water level in the tube is kept constant using a glass gauge with a bevelled tube (see Figure 1).

At the beginning of the test, record the level of the water in the graduated test tube. After 48 h, place 4 to 5 drops of ether or any other surface active product on the tube surface to bring the water level back as near as possible to point B as shown in Figure 1 and measure the water level in the graduated test tube. Calculate from this the volume of water having passed through the test piece in 48 h ( $V_1$ ).

In order to determine the volume of water evaporated in 48 h, place in the test container a glass tube fixed on to a glass plate with a watertight joint. Pour a volume of water into the tube to achieve a height of 10 cm. Weigh the filled tube. Place this device next to the graduated test tubes and weigh again after 48 h. The difference in weight between the first and second readings is the volume of water evaporated in 48 h ( $V_2$ ).

### 5.7 Calculation of impermeability factor

The impermeability factor ( $IF$ ) expressed in  $\text{cm}^3/\text{cm}^2$  per day is calculated from the following formula:

$$IF = \frac{V_1 - V_2}{A \times 2d}$$

where

$V_1$  is the volume of water passing in 2 d (48 h), in cubic centimetres;

$V_2$  is the volume of water passing in 2 d (48 h), in cubic centimetres;

$A$  is the projected area of test piece, in square centimetres;

$d$  day (24 h).

### 5.8 Test report

The test report shall contain the following information:

- a) designation of tested sample:
  - European Standard EN 539-1;
  - the name of the test laboratory;
  - the date on which the laboratory received the sample;
  - test date;
  - a description and identification of the tiles or fittings including the type, dimensions, manufacturer's name and, where possible, the production date;
- b) the volume of water that passed through each test piece in 48 h;
- c) the volume of water evaporated in 48 h;