SLOVENSKI STANDARD
SIST EN 13495:2003

01-december-2003

Toplotnoizolacijski proizvodi za uporabo v gradbeništvu – Ugotavljanje oprijema kontaktnega fasadnega toplotnoizolacijskega sistema (ETICS) na podlago (preskus z blokom trde pene)

Thermal insulation products for building applications - Determination of the pull-off resistance of external thermal insulation composite systems (ETICS)(foam block test)

Wärmedämmstoffe für das Bauwesen - Bestimmung der Abreißfestigkeit von außenseitigen Wärmedämm-Verbundsystemen (WDVS)(Schaumblock-Verfahren)

Produits isolants thermiques destinés aux applications du bâtiment - Détermination de la résistance a l'arrachement des systemes composites d'isolation thermique par l'extérieur (systemes I.T.E) (essai au bloc de mousse)

Ta slovenski standard je istoveten z: **EN 13495:2002**

ICS:

91.100.60	Materiali za toplotno in zvoļ no izolacijo	Thermal and sound insulating materials

SIST EN 13495:2003 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13495

October 2002

ICS 91.100.60

English version

Thermal insulation products for building applications - Determination of the pull-off resistance of external thermal insulation composite systems (ETICS)(foam block test)

Produits isolants thermiques destinés aux applications du bâtiment - Détermination de la résistance à l'arrachement des systèmes composites d'isolation thermique par l'extérieur (systèmes I.T.E) (essai au bloc de mousse)

Wärmedämmstoffe für das Bauwesen - Bestimmung der Abreißfestigkeit von außenseitigen Wärmedämm-Verbundsystemen (WDVS)(Schaumblock-Verfahren)

This European Standard was approved by CEN on 19 August 2002.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Foreword

This document (EN 13495:2002) has been prepared by Technical Committee CEN /TC 88, "Thermal insulating materials and products", the secretariat of which is held by DIN.

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 April 2003, and conflicting national standards shall be withdrawn at the latest by April 2003.

This European Standard is one of a series of standards which specify test methods for determining dimensions and properties of thermal insulating materials and products. It supports a series of product standards for thermal insulating materials and products which derive from the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products (Directive 89/106/EEC) through the consideration of the essential requirements.

This European Standard has been drafted for applications in buildings but may also be used in other areas where it is relevant.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies equipment and a procedure for determining of the pull-off resistance of external thermal insulation composite systems (ETICS) which are mechanical fixed or mechanical fixed and bonded. The method described is known as "foam block test".

NOTE This test is not intended to measure the pull-off resistance of the ETICS to the substrate.

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 206-1, *Concrete — Part 1:Specification, performance, production and conformity*.

EN 822, *Thermal insulating products for building applications — Determination of length and width*.

EN 823, *Thermal insulating products for building applications — Determination of thickness*.

EN 1015-1, *Methods of test for mortar for masonry — Part 1: Determination of particle size distribution (by sieve analysis)*.

EN 1602, *Thermal insulating products for building applications — Determination of the apparent density*.

EN 1607, *Thermal insulating products for building applications — Determination of tensile strength perpendicular to faces*.

prEN 13499:1999, *Thermal insulation products for buildings — External Thermal Insulation Composite Systems (ETICS) based on expanded polystyrene — Specification*.

prEN ISO 3251, *Paints, varnishes and plastics — Determination of non-volatile matter content (ISO/DIS 3251:2000)*.

EN ISO 3386-1, *Polymeric materials, cellular flexible — Determination of stress-strain characteristics in compression — Part 1: Low-density materials (ISO 3386-1:1986)*

EN ISO 3451-1, *Plastics — Determination of ash — Part 1: General methods (ISO 3451-1:1997).*

prEN ISO 9229:1997, *Thermal insulation — Definitions of terms (ISO 9229:1997)*

3 Terms and definitions, symbols and units

3.1 Terms and definitions

For the purposes of this European Standard the terms and definitions given in prEN ISO 9229:1997 and prEN 13499:1999 apply.

3.2 Symbols and units

Symbols used in this standard:

σ is the pull-off resistance, in kPa;

F is the maximum tensile load, in kN;

A is the cross-sectional area of the test specimen, in m^2.

4 Principle

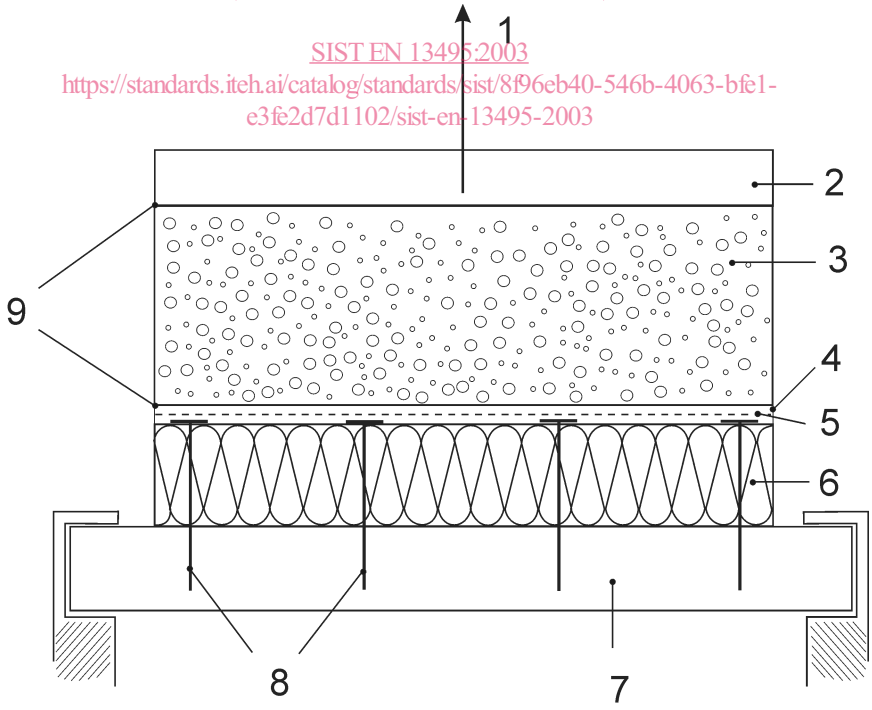
The pull-off resistance of external thermal insulation composite systems is determined by conducting the static foam block test. The pull-off resistance is calculated from the maximum tensile load.

5 Apparatus

5.1 Test apparatus

Apparatus with which the testing load is generated by a hydraulic jack and transferred via a load cell to crossed steel joists. The joists are fixed with timber screws to the plywood panel in such a way, that the load application is in the middle of the plywood panel.

An example of test apparatus and test specimen is given in Figure 1.



Key

1 Tension force F
2 Timber panel
3 Foam block
4 Base coat
5 Reinforcement
6 Thermal insulation material
7 Reinforced concrete slab
8 Anchors
9 Glue

Figure 1 — Example of a test apparatus and test specimen for the static foam block test

5.2 Concrete slab

The concrete slab dimensions shall be at least the dimensions of the ETICS specimen. The thickness of the concrete slab shall take account of the lengths of the fixing devices have a minimum thickness of 100 mm. The concrete slab shall have a minimum strength class of C 20/25 according to EN 206-1.

5.3 Foam blocks

Foam blocks of dimension between 200 mm × 200 mm and 333 mm × 333 mm. The thickness of the foam blocks shall be 300 mm to 500 mm. The foam block shall be weak enough to follow all deformations of the finishing coat without affecting the bending stiffness of the system. The tensile strength of the foam block, consisting e.g. of polyether foam, should be in the range of 80 kPa to 150 kPa, the rupture strain should exceed 160 %. The compression stress value according to EN ISO 3386-1 should be in the order of 1,5 kPa to 7,0 kPa.

NOTE A suitable initial thickness of the block elements is 500 mm. After the determination is finished, the blocks can be cut off with a hot wire. They may be re-used for at least 20 times until the remaining length is still about 300 mm.

5.4 Glue

The glue shall be suitable for rough surfaces (render surface), for timber and for the foam block used (e.g. solvent free epoxy adhesive or polyurethane adhesive). The glue shall not damage the thermal insulation material, the base coat or the adhesive and not influence the results.

5.5 Timber panel

The timber panel shall have the same dimensions as the test specimen. The mechanical stability of the timber panels shall not influence the test results.

5.6 Tensile testing machine

The tensile testing machine, appropriate for the range of force and displacement involved, capable of having a constant crosshead speed adjusted to (10 ± 1) mm/min. It shall be capable of measuring the force with an error limit of 1 % (see EN 1607).

6 Test specimens

6.1 Preparation of test specimens

Apply the ETICS to be tested to a concrete slab by using the mechanical fixing devices in accordance with the specifications of the manufacturer of the ETICS. When using solely fixing anchors, these may be uniformly distributed over the test specimen area. Coat the surface of the specimen with the base coat, containing the embedded reinforcement, in accordance with the manufacturers instructions. The test specimen shall reflect a realistic area of the whole system including, if necessary, several boards.

The pull-of resistance is dependent on the thickness of the thermal insulation material. For this reason the thermal insulation material at the test shall have the minimum thickness which is supplied by the manufacturer of the system and fulfils the requirement of ETICS with a declared thermal resistance equal to or greater than 1 $m^2 \cdot K/W$.

After a time period which is specified by the manufacturer glue foam blocks over the whole render surface of the test specimen (5.4). Then glue a timber panel (5.5) to the foam blocks, using the same glue. The determination can be performed after the glue has completely hardened.

6.2 Number of test specimens

At least 3 test specimens are required for the determination.

6.3 Conditioning of test specimens

The conditioning of the test specimens shall be carried out as specified in the relevant ETICS product standard.

NOTE In the absence of a product standard for ETICS or any other European technical specification, the conditioning procedure may be agreed between parties.

7 Procedure

7.1 Test conditions

The test shall be carried out at (23 ± 5) °C.

7.2 Test procedure

Carry out the pull-off resistance measurement as described in accordance with EN 1607 until failure occurs. Apply the tensile load perpendicular to the test area (see figure 1). Unless otherwise specified or agreed, increase the load with a constant crosshead speed adjusted to (10 ± 1) mm/min.

Record the tensile force at the maximum load achieved. Reject any test where the mode of failure is a fracture at the glue layer between the test specimen and the foam block or between foam block and timber panel.

7.3 Calculation and expression of results

Calculate the pull-off resistance σ, in kilopascals using the equation:

$$\sigma = \frac{F}{A} \qquad (1)$$

where

F is the maximum tensile load, in kilonewton;

A is the cross-sectional area of the test specimen, in square metre;

σ is the pull-off resistance, in kilopascal.

The results shall be rounded to the nearest 1 kPa.

8 Accuracy of measurement

NOTE It has not been possible to include a statement on the accuracy of the measurement in this edition of the standard. But it is intended to include such a statement when the standard is next revised.

9 Test report

The test report shall include the following information:

a) a reference to this European Standard;

b) product identification given by the system manufacturer;

1) ETICS;

i) product name, factory, manufacturer or supplier;

ii) batch numbers of the components;