

SVENSK STANDARD

SS-EN 13495:2019

Fastställt/Approved: 2019-09-09
Utgåva/Edition: 2
Språk/Language: engelska/English
ICS: 91.100.60

Värmeisoleringsprodukter för byggnader – Bestämning av draghållfastheten hos system av puts på utvändig värmeisolering för ytterväggar

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

This preview is downloaded from www.sis.se. Buy the entire standard via <https://www.sis.se/std-80015470>

Standarder får världen att fungera

SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.

Delta och påverka

Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

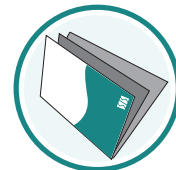
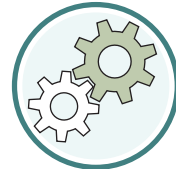
Ta del av det färdiga arbetet

Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standardpaket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

Utveckla din kompetens och lyckas bättre i ditt arbete

Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på www.sis.se eller ta kontakt med oss på tel 08-555 523 00.



Standards make the world go round

SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.

Take part and have influence

As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

Get to know the finished work

We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

Increase understanding and improve perception

With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

If you want to know more about SIS, or how standards can streamline your organisation, please visit www.sis.se or contact us on phone +46 (0)8-555 523 00



Europastandarden EN 13495:2019 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 13495:2019.

Denna standard ersätter SS-EN 13495, utgåva 1.

The European Standard EN 13495:2019 has the status of a Swedish Standard. This document contains the official version of EN 13495:2019.

This standard supersedes the SS-EN 13495, edition 1.

© Copyright/Upphovsrätten till denna produkt tillhör SIS, Swedish Standards Institute, Stockholm, Sverige. Användningen av denna produkt regleras av slutanvändarlicensen som återfinns i denna produkt, se standardens sista sidor.

© Copyright SIS, Swedish Standards Institute, Stockholm, Sweden. All rights reserved. The use of this product is governed by the end-user licence for this product. You will find the licence in the end of this document.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Material och konstruktioner, SIS/TK 189/AG 01.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD

EN 13495

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2019

ICS 91.100.60

Supersedes EN 13495:2002

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 (ETICS) (essai au bloc de
mousse)

Wärmedämmstoffe für das Bauwesen - Bestimmung
der Abreifestigkeit von auenseitigen Wrmedmm-
Verbundsystemen (WDVS) (Schaumblock-Verfahren)

This European Standard was approved by CEN on 19 May 2019.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

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



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

SS-EN 13495:2019 (E)

Contents	Page
European foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions, symbols and units	4
3.1 Terms and definition	4
3.2 Symbols and units	4
4 Principles	5
5 Test equipment/apparatus	5
5.1 Substrates	5
5.1.1 General.....	5
5.1.2 Concrete substrate.....	5
5.1.3 Timber substrate.....	5
5.2 Foil.....	5
5.3 Foam blocks	6
5.4 Glue.....	6
5.5 Tension plate and rigid construction for load distribution.....	6
5.6 Tensile testing machine.....	6
6 Test specimen.....	12
6.1 Dimensions of the test specimen.....	12
6.2 Number of test specimens.....	12
7 Test preparation.....	13
7.1 Preparation of test specimens.....	13
7.2 Conditioning of test specimens	13
8 Procedure.....	13
8.1 Test conditions.....	13
8.2 Test procedure	13
8.2.1 General.....	13
8.2.2 Specific test procedures.....	13
9 Calculation and expression of results.....	15
9.1 Failure load	15
9.2 Load-bearing capability F_5 %.....	15
10 Test report.....	16
Annex A (normative) Mechanical pre-conditioning	18
Bibliography.....	19

European foreword

This document (EN 13495:2019) 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 March 2020, and conflicting national standards shall be withdrawn at the latest by March 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13495:2002.

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

EN 13495:2019 includes the following significant technical changes with respect to EN 13495:2002:

	2002	2019
Scope	Pull-off resistance	Load-bearing capacity
Principle	Only static foam block test	Static foam block test A and four other methods B to E
Concrete substrate	Minimum thickness 100mm	Minimum thickness 70 mm
Concrete substrate	Minimum strength class of C 20/25	Minimum strength class of C 12/15
Timber substrate	Absent	Present
Foil	Absent	Present
Foam block dimensions	Between 200 mm x 200 mm and 333 mm x 333 mm	Length and width between (200 +-2) mm and (400 +- 2) mm
Foam block compression stress	1,5 kPa to 7,5 kPa	No limits or thresholds
Glue	Solvent free epoxy or polyurethane	Solvent free epoxy or polyurethane or polyurethane foam
Conditioning of test specimen	As specified in the relevant product standard	Curing at (20 +- 10) °C for at least 7 days and (23 +- 5) °C and (50 +- 10) % RHD for at least 24 h prior testing
Calculation of load bearing capability $F_{5\%}$	Absent	Present

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

SS-EN 13495:2019 (E)

1 Scope

This document specifies equipment and procedures for determining the load-bearing capability ("pull-off") of kits out of external thermal insulation composite systems (ETICS) to tension and/or shear forces.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 206, *Concrete — Specification, performance, production and conformity*

EN 1990:2002, *Eurocode — Basis of structural design*

EN 17237,¹ *Thermal insulation products for buildings — External thermal insulation composite systems with renders (ETICS) — Specification*

EN ISO 4287, *Geometrical product specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters (ISO 4287)*

EN ISO 9229:2007, *Thermal insulation — Vocabulary (ISO 9229:2007)*

ISO 12491:1997, *Statistical methods for quality control of building materials and components*

3 Terms and definitions, symbols and units

3.1 Terms and definition

For the purposes of this document, the terms and definitions given in EN ISO 9229:2007 and EN 17237 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.2 Symbols and units

For the purposes of this document, the following symbols apply.

- F_{\max} is the maximum load, in kN;
- F_0 is the dead load of the test apparatus, in kN;
- F_T is the tension load perpendicular to the surface, in kN;
- F_L is the lateral shear load in the plane of the reinforcement, in kN;
- U_T is the displacement perpendicular to the surface, in mm;

¹ Under preparation. Stage at time of publication: prEN 17237:2018.

u_L is the lateral displacement, in mm.

4 Principles

The load-bearing capability ("pull off") of a kit is determined by subjecting a test specimen to tensional force, applied evenly to its face through an elastic foam block and/or a lateral force, applied through the reinforcement into the basecoat. Five combinations of tension and lateral shear loads can be tested using the following methods:

- method A assesses the load-bearing capability with an increasing tension load (F_T) only. No lateral shear load is applied;
- method B assesses the load-bearing capability with an increasing tension load (F_T) and a constant lateral shear load (F_L) in the plane of the reinforcement;
- method C assesses the load-bearing capability with an increasing tension load (F_T) and a constant lateral shear displacement (u_L) in the plane of the reinforcement;
- method D assesses the load-bearing capability with an increasing lateral shear load (F_L) in the plane of the reinforcement and a constant tension load (F_T);
- method E assesses the load-bearing capability with an increasing lateral shear load (F_L) in the plane of the reinforcement. No tension load is applied.

5 Test equipment/apparatus

5.1 Substrates

5.1.1 General

The length and width of the substrate shall be equal or greater than the length and width of the test specimen. The substrate shall be big enough to support the kit in case of lateral shear displacement.

5.1.2 Concrete substrate

The concrete shall have a minimum strength class of C12/15 according to EN 206 and a minimum thickness of 70 mm.

For "mechanically fixed only" test specimens where a foil layer is omitted between the substrate and thermal insulation in the test – see 5.2 – the roughness of the concrete substrate shall be determined according to EN ISO 4287.

5.1.3 Timber substrate

The timber substrate may consist of more than one piece and may support only the setting positions.

NOTE A suitable material for the substrate is plywood of at least 20 mm thickness.

5.2 Foil

In the case of "mechanically fixed only" test specimens where no adhesive is used between the thermal insulation product and substrate, a polyethylene or polypropylene foil layer may be placed on top of the substrate to minimize the possibility of friction between the substrate and thermal insulation product surfaces influencing the test result.

SS-EN 13495:2019 (E)

5.3 Foam blocks

The thickness shall be in the range of 300 mm to 500 mm. The thickness tolerance of every foam block shall be ± 3 mm. The nominal length and width of the foam blocks shall be (200 ± 2) mm to (400 ± 2) mm. The declared tensile strength of a foam block product shall be in the range of 80 kPa to 150 kPa. The declared rupture strain shall exceed 160 %.

NOTE Foam blocks manufactured from polyether foam have been found to be suitable.

Foam blocks may be re-used for subsequent testing providing their thickness is at least 300 mm. In such cases, the surfaces can be prepared by cutting a thicker block with a hot wire in order to meet the required thickness tolerance of ± 3 mm.

5.4 Glue

The glue shall be suitable for fixing the foam blocks to the test specimen and to the tension plate. The glue shall not influence the results by damaging the test specimen and/or the foam blocks. It is permissible to use different glues between the foam blocks and the test specimen/tension plate if necessary.

NOTE Suitable glues are e.g. solvent free epoxy or polyurethane based adhesives or polyurethane adhesive foams.

5.5 Tension plate and rigid construction for load distribution

The tension plate shall have dimensions equal to or greater than the dimensions of the test specimen – see 6.1. The rigidity of the tension plate shall not influence the test results. If the tension plate itself is not rigid enough without additional strengthening, this can be achieved by using an additional frame fixed to the tension plate.

A suitable material for the tension plates is plywood with a minimum thickness of 20 mm. The rigid construction may be a steel cross.

5.6 Tensile testing machine

For method A

The tension load is applied to the reinforced base coat of the test specimen through the foam blocks without any lateral load, see Figure 1.

For methods B, C and D

The tension load is applied to the reinforced base coat of the test specimen through the foam blocks whilst the lateral shear load and/or displacement is applied simultaneously to the test specimen through the protruding reinforcement – see Figure 2.

For method E

The lateral shear load is applied to the side of the test specimen through the protruding reinforcement, without any tension load, see Figure 3.

For methods A, B, C and D

A tensile testing machine for applying a force perpendicular to the face of test specimen at a displacement rate of (10 ± 1) mm/min is required.

For method B

The testing machine shall have the ability to apply a constant lateral shear load F_L in the plane of the reinforcement.

For method C

The testing machine shall have the ability to apply a constant lateral displacement u_L in the plane of the reinforcement.

For methods D and E

The testing machine shall have the ability to apply a lateral force parallel to the face of test specimen at an induced displacement rate of (3 ± 1) mm/min.

For all methods

The testing machine shall be capable of measuring the force to an accuracy of ± 1 % and of measuring the induced displacement to an accuracy of $\pm 0,1$ mm.

The machine shall also be capable of measuring the displacement of the test specimen's surface using a calliper (see Figures 4 and 5) with an accuracy of $\pm 0,5$ mm. The forces and the related induced displacements shall be continuously recorded for all methods.

NOTE The records are intended to provide additional information on the behaviour of the test specimen product during the application of the imposed forces.

Mechanical pre-conditioning

If mechanical pre-conditioning is required in accordance with Annex A, the apparatus shall be capable of applying a periodic lateral shear displacement at a frequency of $1/60$ Hz ± 10 % to the reinforced base coat of the test specimen, through the protruding reinforcement.