
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 d'isolation thermique par l'extérieur (systèmes ITE) (essai au bloc de mousse)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 12968:2010

<https://standards.iteh.ai/catalog/standards/sist/a9cb04e3-a934-4f63-af16-eeb236a1bc1e/iso-12968-2010>



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 12968:2010

<https://standards.iteh.ai/catalog/standards/sist/a9cb04e3-a934-4f63-af16-eeb236a1bc1e/iso-12968-2010>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2010

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 12968 was prepared by Technical Committee ISO/TC 163, *Thermal performance and energy use in the built environment*, Subcommittee SC 1, *Test and measurement methods*.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 12968:2010](https://standards.iteh.ai/catalog/standards/sist/a9cb04e3-a934-4f63-af16-eeb236a1bc1e/iso-12968-2010)

<https://standards.iteh.ai/catalog/standards/sist/a9cb04e3-a934-4f63-af16-eeb236a1bc1e/iso-12968-2010>

Introduction

This International Standard is based on EN 13495:2002 prepared by Technical Committee CEN/TC 88, *Thermal insulating materials and products*, which has been amended by ISO/TC 163/SC 1 with reference to conditioning and testing conditions in tropical countries.

This International Standard is one of a series of documents specifying test methods, based on existing European Standards that are being adopted by ISO/TC 163/SC 1. This “package” of standards includes the following group of interrelated documents:

International Standard	Title	Respective EN standard
12968	<i>Thermal insulation products for building applications — Determination of the pull-off resistance of external thermal insulation composite systems (ETICS) (foam block test)</i>	EN 13495
29465	<i>Thermal insulating products for building applications — Determination of length and width</i>	EN 822
29466	<i>Thermal insulating products for building applications — Determination of thickness</i>	EN 823
29467	<i>Thermal insulating products for building applications — Determination of squareness</i>	EN 824
29468	<i>Thermal insulating products for building applications — Determination of flatness</i>	EN 825
29469	<i>Thermal insulating products for building applications — Determination of compression behaviour</i>	EN 826
29470	<i>Thermal insulating products for building applications — Determination of the apparent density</i>	EN 1602
29471	<i>Thermal insulating products for building applications — Determination of dimensional stability under constant normal laboratory conditions (23°C/50 % relative humidity)</i>	EN 1603
29472	<i>Thermal insulating products for building applications — Determination of dimensional stability under specified temperature and humidity conditions</i>	EN 1604
29764	<i>Thermal insulating products for building applications — Determination of deformation under specified compressive load and temperature conditions</i>	EN 1605
29765	<i>Thermal insulating products for building applications — Determination of tensile strength perpendicular to faces</i>	EN 1607
29766	<i>Thermal insulating products for building applications — Determination of tensile strength parallel to faces</i>	EN 1608

International Standard	Title	Respective EN standard
29767	<i>Thermal insulating products for building applications — Determination of short-term water absorption by partial immersion</i>	EN 1609
29768	<i>Thermal insulating products for building applications — Determination of linear dimensions of test specimens</i>	EN 12085
29769	<i>Thermal insulating products for building applications — Determination of behaviour under point load</i>	EN 12430
29770	<i>Thermal insulating products for building applications — Determination of thickness for floating-floor insulating products</i>	EN 12431
29771	<i>Thermal insulating materials for building applications — Determination of organic content</i>	EN 13820
29803	<i>Thermal insulation products for building applications — Determination of the resistance to impact of external thermal insulation composite systems (ETICS)</i>	EN 13497
29804	<i>Thermal insulation products for building applications — Determination of the tensile bond strength of the adhesive and of the base coat to the thermal insulation material</i>	EN 13494
29805	<i>Thermal insulation products for building applications — Determination of the mechanical properties of glass fibre meshes</i>	EN 13496

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ISO 12968:2010](https://standards.iteh.ai/catalog/standards/sist/a9cb04e3-a934-4f63-af16-eeb236a1bc1e/iso-12968-2010)

<https://standards.iteh.ai/catalog/standards/sist/a9cb04e3-a934-4f63-af16-eeb236a1bc1e/iso-12968-2010>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO 12968:2010

<https://standards.iteh.ai/catalog/standards/sist/a9cb04e3-a934-4f63-af16-eeb236a1bc1e/iso-12968-2010>

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

1 Scope

This International Standard specifies equipment and a procedure for determining 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 the “foam block test”.

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

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.

ISO 3251, *Paints, varnishes and plastics — Determination of non-volatile-matter content*
ISO 12968:2010

ISO 3386-1, *Polymeric materials, cellular flexible — Determination of stress-strain characteristics in compression — Part 1: Low-density materials*
bcl/iso-12968-2010

ISO 3451-1, *Plastics — Determination of ash — Part 1: General methods*

ISO 9229, *Thermal insulation — Vocabulary*

ISO 29465, *Thermal insulating products for building applications — Determination of length and width*

ISO 29466, *Thermal insulating products for building applications — Determination of thickness*

ISO 29470, *Thermal insulating products for building applications — Determination of the apparent density*

ISO 29765, *Thermal insulating products for building applications — Determination of tensile strength perpendicular to faces*

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

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

EN 13499, *Thermal insulation products for buildings — External thermal insulation composite systems (ETICS) based on expanded polystyrene — Specification*

3 Terms and definitions, symbols and units

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9229 and EN 13499 apply.

3.2 Symbols and units

The symbols used in this International Standard are the following.

- σ pull-off resistance, in kPa;
- F maximum tensile load, in kN;
- A cross-sectional area of the test specimen, in m².

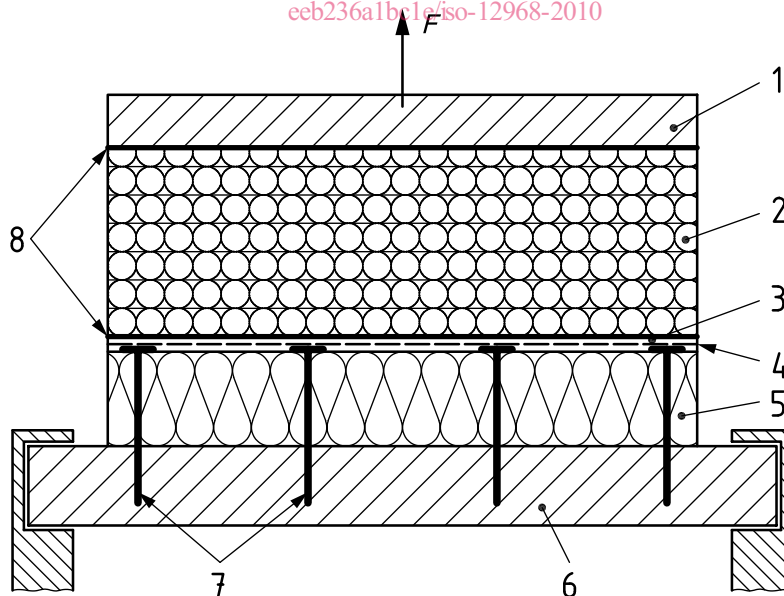
4 Principle

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, 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 timber panel | 4 reinforcement | 7 anchors |
| 2 foam block | 5 thermal insulation material | 8 glue |
| 3 base coat | 6 reinforced concrete slab | |
- F tension force

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

5.2 Concrete slab, the dimensions of which 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 having a minimum thickness of 100 mm. The concrete slab shall have a minimum strength class of C 20/25 in accordance with EN 206-1.

5.3 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 and the rupture strain should exceed 160 %. The compression stress value conforming to 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 can be re-used at least 20 times until the remaining length is still about 300 mm.

5.4 Glue, 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 shall not influence the results.

5.5 Timber panel, having 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, appropriate for the range of force and displacement involved, and 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 ISO 29765).

iTeh STANDARD PREVIEW

6 Test specimens (standards.iteh.ai)

6.1 Preparation of test specimens ISO 12968:2010

<https://standards.iteh.ai/catalog/standards/sist/a9cb04e3-a934-4f63-af16->

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 manufacturer's instructions. The test specimen shall reflect a realistic area of the whole system including, if necessary, several boards.

The pull-off 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 which fulfils the requirement of ETICS with a declared thermal resistance equal to or greater than $1 \text{ m}^2 \cdot \text{K/W}$.

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 three 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 can be agreed on between the parties.