SLOVENSKI STANDARD
oSIST prEN 13496:2021

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Toplotnoizolacijski proizvodi za uporabo v gradbeništvu - Ugotavljanje mehanskih lastnosti mrežice iz steklenih vlaken kot armature za kontaktne fasadne toplotnoizolacijske sisteme z ometi (ETICS)

Thermal insulation products for building applications - Determination of the mechanical properties of glass fibre meshes as reinforcement for External Thermal Insulation Composite Systems with renders (ETICS)

Wärmedämmstoffe für das Bauwesen - Bestimmung der mechanischen Eigenschaften von Glasfasergewebe als Armierung für außenseitige Wärmedämm-Verbundsysteme mit Putz (WDVS)

Produits isolants thermiques pour le bâtiment - Détermination des caractéristiques mécaniques des treillis de fibres de verre servant à renforcer les systèmes composites disolation thermique par lextérieur (ETICS) avec des enduits

Ta slovenski standard je istoveten z: **prEN 13496**

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91.100.60	Materiali za toplotno in zvočno izolacijo	Thermal and sound insulating materials

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Thermal insulation products for building applications - Determination of the mechanical properties of glass fibre meshes as reinforcement for External Thermal Insulation Composite Systems with renders (ETICS)

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 88.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European Foreword

This document (prEN 13496:2021) has been prepared by Technical Committee CEN/TC 88 “Thermal insulating materials and products”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13496:2013.

The main changes with respect to the previous edition are listed below:

— addition of triaxial meshes;

— addition of 28-day conditioning in alkali solution;

— amended accuracy of expression of results.

1 Scope

This document specifies equipment and procedures for determining the tensile strength and elongation of rectangular and triaxial glass fibre meshes which are used for the reinforcement of the base coat in External Thermal Insulation Composite Systems (ETICS).

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 1607:2013, *Thermal insulating products for building applications - Determination of tensile strength perpendicular to faces*

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

ISO 1887:2014, *Textile glass — Determination of combustible-matter content*

3 Terms and definitions

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

3.1
tensile strength of glass fibre mesh
strength of the test specimen at failure relative to the width of the test specimen

3.2
elongation of glass fibre mesh
elongation of the test specimen 9512999 relative to the initial length

4 Principle

The maximum tensile strength and corresponding elongation of glass fibre meshes is determined using a tensile testing machine. The tensile strength of the meshes shall be tested in both test directions, the warp and the weft direction. For triaxial meshes, two weft directions are recognized and both shall be tested. Three types of conditioning can be carried out before the test:

– A, no conditioning, testing as-delivered

– B, rapid, 24 h warm alkali conditioning

– C, standard, 28 day alkali conditioning

5 Apparatus

5.1 Tensile testing machine, appropriate for the range of force and displacement involved, capable of having a constant crosshead speed adjusted to (100 ± 5) mm/min.

It shall be capable of measuring the force with an accuracy of at least 10 N in accordance with EN 1607:2013.

5.2 Clamps of the tensile testing machine, which shall be coated with a material to ensure attachment without slippage of the test specimen, for example rubber, and shall fasten the test specimen across its whole width.

The clamps shall be sufficiently rigid to resist deformation during the test.

5.3 Container, which shall be wide and deep enough so that the test specimens can be immersed completely in an alkaline test solution.

The material of the container shall be resistant to the alkaline test solution (e.g. plastics or stainless steel).

5.4 Test specimen holder, which ensures a correct position of immersed test specimens. Its design shall minimize the contact with the test specimens.

NOTE 1: A basket rack or a hanger are suitable tools for placement of the test specimens in the alkaline solution.

NOTE 2: The design of the holder can assist in avoiding skin and eye contact with the alkaline solution while working with the test specimens.

6 Test specimens

6.1 Number of test specimens

For each test direction and each conditioning, 10 test specimens are required.

6.2 Dimensions of the test specimens

The length of the test specimens shall be at least 300 mm. For the width of the test specimens, see Clause 6.3.4.

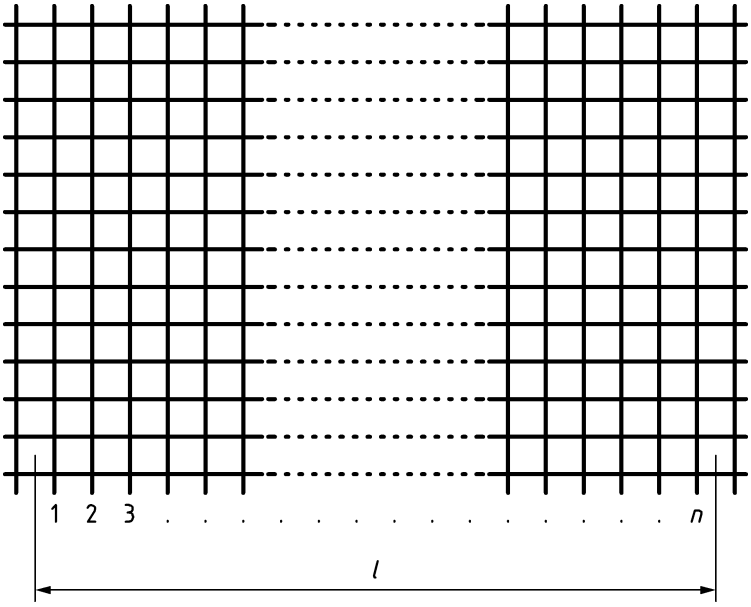
6.3 Preparation of the test specimens

6.3.1 Sampling

If the sample is a roll, the first meter of the roll shall be discarded. In any case, the edge area of 100 mm shall be discarded. The test pieces shall be taken randomly from the sample for representative sampling.

6.3.2 Determination of the number of threads per mm of the sample

The determination of the number of threads per unit width shall be measured over the distance *l* from the middle of a mesh opening to the middle of a distant mesh opening. The distance *l* in warp direction shall be at least 1 m. The distance *l* in weft direction shall be at least 1 m or the full width of the sample, if smaller than 1 m.



Key

l measured distance from the middle of the mesh opening to the middle of the distant mesh opening

Figure 1 — Determination of the number of threads

Within this measuring distance, *l*, as shown in Figure 1, the threads are counted, and the calculated number of threads per unit width *N* of the sample is calculated in accordance with Formula (1):

$$N = \frac{n}{l} \quad (1)$$

where

N is the calculated number of threads in 1/mm, rounded to 1/mm;

n is the number of counted threads within the measured distance *l*;

l is the measured distance in mm, rounded to 1 mm.

6.3.3 Determination of the mesh size and mesh opening in warp and weft direction

The mesh size for each direction is

$$mesh\ size = \frac{1}{N}$$

The mesh opening shall be determined in both directions by measuring the width of the threads with an accuracy of 0,05 mm, using 5 representative test specimen, calculated using the average for each direction:

$$mesh\ opening = \frac{1}{N} - \overline{thread\ width}$$

6.3.4 Determination of the mass per unit area

The determination of the mass per unit area shall be done according to EN 12127 in ambient conditions.

6.3.5 Preparation of test specimens

The test specimens shall be taken at a distance of at least 100 mm from the edges along the warp direction. The cut must always be made at a mesh opening. The number of threads in the warp and in the weft direction shall be the same for all 10 test specimens. The number of the threads shall be indicated in the test report. Test specimens shall not be bent or folded and shall be handled carefully during the whole test procedure.

6.3.6 Determination of the number of threads of test specimen in test direction

6.3.6.1 Meshes with 5 or more threads within a width of 50 mm

The number of threads per test specimen n_{tested} is:

$$n_{tested} = N \times 50\,mm$$

where

N is the calculated number of threads;

n_{tested} is the number of threads per test specimen in test direction, rounded down to 1.

NOTE The total width of the test specimens can differ from the nominal width 50 mm, because of cutting at mesh openings.

6.3.6.2 Meshes with less than 5 threads within a width of 50 mm

The width of the test specimen is adjusted so that only two threads are tested, $n_{\text{tested}} = 2$.

6.4 Conditioning of the test specimens

6.4.1 General

6.4.1.1 Specimen storage

For all the conditioning procedures, the test specimens shall be stored at (23 ± 2) °C and (50 ± 5) % relative humidity for at least 24 h before the tensile test.

6.4.1.2 Alkali solution

To prepare the alkali solution, add given amounts of substances to one litre of deionised water:

$Ca(OH)_2$	0,5 g	at minimum purity of 96 % by mass;
NaOH	1 g	at minimum purity of 97 % by mass;
KOH	4 g	at minimum purity of 85 % by mass.

For the preparation of the alkali solution, the reagents shall be completely dissolved in deionised water in the given order above. For the storage of 30 g to 35 g glass fibre mesh, 1 l of the alkali solution is necessary.

6.4.1.3 Placement of test specimens in the alkaline solution

The specimens shall be placed into the alkaline solution using an appropriate holder to ensure the maximum area of the contact between the specimen and the alkaline solution. The specimens must not be in contact with each other and must not be bent or folded.

After the specimens are placed in the alkaline solution, the container shall be covered to prevent the evaporation of water of the alkaline solution to obtain the desired concentrations.

6.4.1.4 Wash and drying procedure after conditioning in alkali solution

After conditioning in the alkali solution, the test specimens shall be gently rinsed by immersion for 5 min in acid solution 5 ml HCl (35 % diluted) to 4 l water. Then placed successively in 3 baths of water, 4 l each. The samples shall be left for 5 min in each bath, then dried at (23 ± 2)°C and (50 ± 5) % RH for 48 h.

6.4.2 Conditioning procedures

Three conditioning procedures are possible according to this standard.

6.4.2.1 A, no conditioning, testing as-delivered

No other conditioning is carried out in addition to the specimen storage specified in 6.4.1.1.

6.4.2.2 B, rapid, 24 h warm alkali conditioning

The test specimens shall be stored in the alkali solution for 24 h at (60 ± 2) °C. The solution shall be preheated to the specified temperature prior to the placement of the specimens into it.

6.4.2.3 C, standard, 28 day alkali conditioning

The test specimens shall be stored in the alkali solution for 28 days at (23 ± 2) °C.

7 Procedure

7.1 Test conditions

The test shall be carried out at (23 ± 2) °C.

7.2 Attachment of the test specimens in the tensile testing machine

The test specimens shall be attached between the two clamps, which are fastened in the tensile testing machine. A self-aligning attachment on the top clamp avoids uneven distribution of tensile stress during the test. The test specimen shall be located perpendicular to the clamps of the tensile testing machine.

The distance between the clamps shall be ≥ 200 mm.

7.3 Test procedure

The test shall be carried out after a conditioning procedure A, B or C, as described in 6.4.

Preload the test specimens at 5 mm/min until the load of 10 N is reached. Measure the resulting length, l_0, of the test specimen. Increase the load with a constant crosshead speed of (100 ± 5) mm/min until failure occurs. Record the force, F, in Newton and the corresponding length, l, in millimetres.

Discard the result of the test of any test specimen where the specimen is displaced within the clamp, or where the failure occurred at the clamp (majority of the threads break directly at the clamps).

8 Calculation and expression of results

The tensile strength per unit width of a test specimen is calculated in accordance with Formula (2) for each test direction and each conditioning.