

**SLOVENSKI STANDARD**  
**oSIST prEN ISO 18393-1:2022**  
**01-julij-2022**

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**Toplotnoizolacijski proizvodi - Določanje staranja s posedanem - 1. del: Vpihana nevezana izolacija za prezračevana podstrešja, ki simulira nihanje vlažnosti in temperature (ISO/DIS 18393-1:2022)**

Thermal insulation products - Determination of ageing by settlement - Part 1: Blown loose fill insulation for ventilated attics simulating humidity and temperature cycling (ISO/DIS 18393-1:2022)

Wärmedämmprodukte - Bestimmung der Alterung durch Setzung - Teil 1: Eingeblasene lose Wärmedämmstoffe für belüftete Dachgeschosse, zyklische Luftfeuchte- und Temperaturbeanspruchungen (ISO/DIS 18393-1:2022)

Produits isolants thermiques - Détermination du tassement après vieillissement - Partie 1: Isolant en vrac soufflé pour combles ventilés après simulation de cycles de température et d'humidité (ISO/DIS 18393-1:2022)

**Ta slovenski standard je istoveten z: prEN ISO 18393-1**

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**ICS:**

91.120.10	Toplotna izolacija stavb	Thermal insulation of buildings
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**oSIST prEN ISO 18393-1:2022**

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# DRAFT INTERNATIONAL STANDARD

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### Thermal insulation products — Determination of ageing by settlement —

Part 1:

### Blown loose fill insulation for ventilated attics simulating humidity and temperature cycling

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ICS: 91.120.10; 91.120.10 ([standards.iteh.ai](https://standards.iteh.ai))

[oSIST prEN ISO 18393-1:2022](https://standards.iteh.ai/catalog/standards/sist/e53a04e5-42a5-4d5c-8e56-b618ca7ed3fc/osist-pren-iso-18393-1-2022)

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## ISO/DIS 18393-1:2022(E)

### 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.

EN ISO 18393-1 was prepared by Technical Committee ISO/TC 163, *Thermal performance and energy use in the built environment*, Subcommittee SC 1, *Test and measurement methods*.

EN ISO 18393 consists of the following parts, under the general title *Thermal insulation products — Determination of ageing by settlement*:

Part 1: Blown loose-fill insulation for ventilated attics *simulating humidity and temperature cycling*

Part 2: Blown loose fill and injected insulation for cavity walls and timber and steel framed walls, *simulating vibration*

Part 3: Blown or injected insulation for closed cavities, *simulating humidity and temperature cycling*

Part 4: Blown loose-fill insulation for ventilated attics and ceilings *simulating vibration*

# Thermal insulation products — Determination of ageing by settlement —

## Part 1:

# Blown loose fill insulation for ventilated attics simulating humidity and temperature cycling

## 1 Scope

Blown loose-fill insulation can be subject to settlement, which is a reduction of insulation thickness and results in a degradation of the thermal performance of the insulation.

This part of EN ISO 18393-1 specifies a test method for the determination of settlement of blown loose-fill insulation applied horizontally in ventilated attics. This test method measures the effects of humidity and temperature cycling.

## 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 ISO 12570/A1, *Hygrothermal performance of building materials and products — Determination of moisture content by drying at elevated temperature*

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

## 3 Terms and definitions

For the purposes of this document, the following term and definition applies.

### 3.1

#### **ventilated attic**

ventilated\* loft space of a building enclosed between the roof and the ceiling.

Note 1 to entry: this is may also include an unventilated space sealed by a low vapour resistance roof tile underlay

### 3.2

#### **settlement**

decrease of installed insulation thickness in lofts with time, expressed as a percentage of the initial installed thickness or installed height

### 3.3

#### **installed density**

density before settlement, determined by the ratio of the mass and the volume of the specimen

## 4 Principle

A test specimen is made by blowing the product into a box, using a machine as approved by the manufacturer. The box with the blown specimen is subjected to moisture and temperature cycling. At the beginning and during the climate cycling, the thickness is monitored and the change is calculated.

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### 5 Test equipment

#### 5.1 Specimen container

A box with is used to perform the settlement test.

The inside dimensions of the box are:

- length: 600 mm  $\pm$  10 mm;
- width: 600 mm  $\pm$  10 mm;
- height: 300 mm  $+_{-}^{+20}$  mm.

higher thickness can be tested in more higher boxes and larger

The thickness measurement shall be made according to EN ISO 29466 with a load of 20 Pa to the nearest 1 mm at nine positions evenly distributed over the area of the box.

**EXAMPLE** Nine rulers, graduated in mm, of 320 mm long with a maximum diameter of 8 mm, are fixed at the base and are parallel with the vertical sides of the box and evenly distributed across the base.

#### 5.2 Climate chamber

The climate chamber shall be large enough to accommodate the specimen boxes and it shall provide a controlled climate for the whole specimen area in a range from (5  $\pm$  1) °C to (60  $\pm$  1) °C, and (50  $\pm$  5) % RH to (85  $\pm$  5) % RH.

### 6 Test specimens

#### 6.1 Preparations of test specimens

A pre-conditioning of material is possible at (23  $\pm$  2) °C and (50  $\pm$  5) % RH until stabilization at constant weight is achieved according to EN ISO 12570/A1 (preparation of the sample) before blowing.

**NOTE** additional information can be given in product standard.

The insulation material is blown into the specimen box to a thickness of 300 mm in accordance with the manufacturer's recommendations for installation and the product standards. Do not over-fill container more than 6 mm above top edge. Carefully remove (screed) excess material above 300 mm so that surface and the thickness are uniform. Measure the weight and installed thickness and calculate the installed density.

The blown density shall be the lowest density in practices for the intended use as defined by an application standard, product standard or manufacturer's installation guideline. It's possible to use higher thickness in higher and larger boxes. The installed thickness will then be the height of the box.

#### 6.2 Number of test specimens

The number of test specimens shall be as specified in the product standard. If a number is not specified in the standard, at least two specimen shall be used.

#### 6.3 Conditioning of test specimens

The test specimens shall be stored for at least 6 h at (23  $\pm$  2) °C. In case of dispute, it shall be carried out at (23  $\pm$  2) °C and (50  $\pm$  5) % RH until stabilization at constant weight is achieved according to EN ISO 12570/A1. After finishing the conditioning time, the current thickness and density are documented (see § 7). If there is a preconditioning of the material, the conditioning time is not needed.



In tropical climates, different conditioning and testing conditions may be relevant. In this case, the conditions shall be  $(27 \pm 2) ^\circ\text{C}$  and  $(65 \pm 5) \% \text{RH}$  and be stated clearly in the test report.

## 7 Test procedure

To avoid disturbances to the test specimen, e.g. by shock, the test box with the installed insulation shall be carefully placed into the climate chamber. Care shall also be taken to avoid any disturbances during the measurement, e.g. the container being shifted back and forth.

The test is composed of four cycles of two periods.

The chamber shall be controlled to the following conditions:

Cycle 1	Period 1: 14 days at $(23 \pm 1) ^\circ\text{C}$ with $(85 \pm 5) \%$ relative humidity Period 2: 14 days at $(50 \pm 2) ^\circ\text{C}$ with $(15 \pm 5) \%$ relative humidity
Cycle 2	Period 1: 14 days at $(23 \pm 1) ^\circ\text{C}$ with $(85 \pm 5) \%$ relative humidity Period 2: 14 days at $(50 \pm 2) ^\circ\text{C}$ with $(15 \pm 5) \%$ relative humidity
Cycle 3	Period 1: 14 days at $(23 \pm 1) ^\circ\text{C}$ with $(85 \pm 5) \%$ relative humidity Period 2: 14 days at $(50 \pm 2) ^\circ\text{C}$ with $(15 \pm 5) \%$ relative humidity
Cycle 4	Period 1: 14 days at $(23 \pm 1) ^\circ\text{C}$ with $(85 \pm 5) \%$ relative humidity Period 2: 14 days at $(50 \pm 2) ^\circ\text{C}$ with $(15 \pm 5) \%$ relative humidity

Do not allow condensation on the ceiling of the chamber to drip into the test specimen.

Every precaution shall be taken to avoid any movement of the test specimen during the entire duration of the test. If it must be moved this should be mentioned in the test report.

The thickness of the insulation is recorded from each of the nine positions at fixed intervals and at least at the end of each period.

The readings shall be taken to the nearest millimetre.

## 8 Calculations and expression of results

For each specimen the mean value of the readings from the nine positions is one test result, rounded to the nearest mm. This can be used to create a graph of settlement over the time.

$$s_K = \frac{1}{n} \sum_{k=1}^n \frac{e_{i,k} - e_{f,k}}{e_{i,k}}$$

where

$e_{i,k}$  is the initial thickness (mean value of the nine position) of sample k (out of 2 samples), measured just before the cycle 1 at the installation of the boxes in the climatic chamber (beginning of the test).

$e_{f,k}$  is the final thickness (mean value of the nine position) of sample k (out of 2 samples), after cycle no. 4 (end of the test).

The result shall be expressed in a percentage rounded to the nearest unit.

$s_k$  is the settlement test result value for each box.

Final result,  $s$ , is the mean of the two boxes measures (mean of  $s_k$ ).

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### 9 Accuracy of measurement

NOTE It has not been possible to include a statement on the accuracy of the measurement in this edition of the

International Standard, but it is intended to include such a statement when the standard is next revised.

### 10 Test report

The test report shall include the following information:

- a) reference to this part of EN ISO 18393, i.e. EN ISO 18393-1;
- b) product identification,
- c) product name, factory, manufacturer, or supplier,
  - 1) production code number,
  - 2) type of product,
  - 3) packaging,
  - 4) form in which the product arrived at the laboratory,
  - 5) installed thickness and density;
  - 6) other information as appropriate (e.g. nominal thickness, nominal density);
- d) test procedure:
  - 1) pre-test history and sampling (e.g. person taking the sample, place of sampling),
  - 2) conditioning,
  - 3) any deviation from [Clauses 6](#) and [7](#),
  - 4) conditioning and testing conditions in tropical countries, if applicable,
  - 5) date of testing,
  - 6) general information relating to the test (test method used),
  - 7) events that can have affected the results;
- e) results: all individual mean values, ~~mean values of the thicknesses~~ and average settlement after conditioning, at each period and at the end of test.

NOTE It is expected that information about the apparatus and identity of the technician are available in the laboratory, but it is not necessary to be recorded in the report.