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Thermal insulation products — Determination of settlement —

Part 1: Loose-fill insulation for ventilated attics simulating humidity and temperature cycling

Produits isolants thermiques — Détermination du tassement —

Partie 1: Isolant en vrac pour combles ventilés après simulation de cycles de température et d'humidité

Reference number
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Foreword

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This document was prepared by Technical Committee ISO/TC 163, *Thermal performance and energy use in the built environment*, Subcommittee SC 1, *Test and measurement methods,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 88, *Thermal insulating materials and products,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 18393-1:2012), which has been technically revised.

The main changes are as follows:

— Clause 5.1: change of the size of specimen container;

— Clause 7: change of the condition of the test temperature, moisture and duration;

— Clause 8: change of calculation of test results.

A list of all parts in the ISO 18393 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Thermal insulation products — Determination of settlement —

Part 1: Loose-fill insulation for ventilated attics simulating humidity and temperature cycling

1 Scope

This document specifies a test method for the determination of settlement of loose-fill insulation applied horizontally in ventilated attics. This test method measures the effects of humidity and temperature cycling.

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.

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
ventilated attic
ventilated loft space of a building enclosed between the roof and the ceiling

Note 1 to entry: A ventilated attic may also include an unventilated space sealed by a low vapour resistance roof tile underlay.

3.2
settlement
decrease, with time, of installed insulation thickness in lofts

Note 1 to entry: Blown loose-fill insulation can be subject to settlement.

Note 2 to entry: Settlement is expressed as a percentage of the initial installed thickness or installed height.

3.3
installed density
density of the specimen just after blowing before conditioning

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3.4
initial density
density of the specimen when the product is put in the climatic chamber at beginning of the first cycle

3.5
installed thickness
thickness of the specimen just after blowing before conditioning

3.6
initial thickness
thickness of the specimen when the product is put in the climatic chamber at beginning of the first cycle

3.7
blown loose-fill insulation
loose-fill insulation material applied or installed by pneumatic application

3.8
loose-fill insulation
granules, nodules, beads, powder, fibre or similar forms of thermal insulation material designed to be installed manually or with pneumatic equipment

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.

5 Test equipment

5.1 Specimen container

A box is used to perform the settlement test.

The inside dimensions of the box are:

— length: 600 mm ± 10 mm;

— width: 600 mm ± 10 mm;

— height: 300 mm $^{+20}_{0}$ mm.

Higher thickness can be tested in higher and larger boxes.

The thickness measurement shall be made visually without any load to the nearest 1 mm at nine positions evenly distributed over the area of the box.

Nine rulers, graduated in millimetres, 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 at least 100 mm from the vertical walls.

Alternative optical methods of thickness measurement are possible, but should be made at nine positions at nearest 1 mm without any load.

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 ± 1) °C to (60 ± 1) °C, and (15 ± 5) % relative humidity (RH) to (85 ± 5) % RH.

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