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Thermal insulating products for building applications — Determination of freeze-thaw resistance

Produits isolants thermiques destinés aux applications du bâtiment — Détermination de la résistance aux effets du gel-dégel

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Foreword

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This document was prepared by Technical Committee 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 16546:2012), which has been technically revised. The main changes compared to the previous edition are as follows:

— Revision of Clause 4, the test is performed by an automatic process only;

— Revision of Clause 7 with a more detailed procedure.

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Thermal insulating products for building applications — Determination of freeze-thaw resistance

1 Scope

This document specifies the equipment and test method for determining the effects of successive cycling from dry conditions at –20 °C to wet conditions at 20 °C on the mechanical properties and moisture content of thermal insulating products.

This document is intended to simulate the freeze–thaw effects on thermal insulating products which are frequently exposed to water and low temperature conditions, e.g. inverted roofs and unprotected ground insulation.

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 29469, *Thermal insulating products for building applications — Determination of compression behaviour*

ISO 16535, *Thermal insulating products for building applications — Determination of long-term water absorption by immersion*

ISO 16536, *Thermal insulating products for building applications — Determination of long-term water absorption by diffusion*

3 Terms and definitions

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

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

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

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

3.1
freeze-thaw resistance
ability of a product to withstand repeated wetting followed by freezing conditions, quantified by water absorption and change in compression behaviour

4 Principle

The test is performed continuously using an automatic process of cycling between the specified conditions.

The freeze-thaw resistance is determined as the change in the amount of water absorbed and the change in compression strength or stress of a test specimen which has been subjected to 300 successive cycles from dry conditions at –20 °C to wet conditions at 20 °C. Testing shall be performed in conjunction with one of the following long-term water absorption tests:

a) water absorption by diffusion, according to ISO 16536;

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