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Thermal insulation — Mineral wool loose-fill for ventilated roof spaces —

Part 1:
Material product specification

Isolation thermique — Fibres minérales en vrac pour les combles ventilées —

Partie 1: Caractéristiques des matériaux et méthodes d'essai

Reference number
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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The committee responsible for this document is ISO/TC 163, *Thermal performance and energy use in the built environment*, Subcommittee SC 3, *Thermal insulation products*.

ISO 9076 consists of the following parts, under the general title *Thermal insulation — Mineral wool loose-fill for ventilated roof spaces*:

— *Part 1: Material specification and test methods*
— *Part 2: Principal responsibilities of installers*

Introduction

The specification in this part of ISO 9076 deals primarily with the labelling of packages containing loose-fill mineral wool, the declaration of settlement and the measurements on a blown material, which relates the settled thickness to the declared thermal resistance. This part of ISO 9076 indicates how air permeability is to be measured and makes suggestions for the performance characteristics for the material (suggested properties). The user might have to request information on the air permeability and the other characteristics from the manufacturer.

Thermal insulation — Mineral wool loose-fill for ventilated roof spaces —

Part 1:
Material product specification

1 Scope

This part of ISO 9076 specifies the labelling for packages of loose-fill thermal insulation for horizontal applications in ventilated attic, loft or roof spaces of buildings installed by blowing machines, and the related test methods and requirements.

This part of ISO 9076 is not applicable to the methods of installing loose-fill mineral wool thermal insulation. The necessary installation instructions for satisfactory performance of the material are intended to be given by the manufacturer. Typical locations for loose-fill are detailed in ISO 9774. The installer’s responsibilities are covered in ISO 9076-2.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable to its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7345, *Thermal insulation — Physical quantities and definitions*

ISO 8301, *Thermal insulation — Determination of steady-state thermal resistance and related properties — Heat flow meter apparatus*

ISO 8302, *Thermal insulation — Determination of steady-state thermal resistance and related properties — Guarded hot plate apparatus*

ISO 8990, *Thermal insulation — Determination of steady-state thermal transmission properties — Calibrated and guarded hot box*

ISO 9053, *Acoustics — Materials for acoustical applications — Determination of airflow resistance*

ISO 9229, *Thermal insulation — Vocabulary*

ISO 12576-2, *Thermal insulation products — Conformity control systems — Part 2: In-situ products*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7345 and ISO 9229 and the following apply.

3.1
attic space
loft space
roof space
enclosed space between roof and ceiling

Note 1 to entry: Figures 2 a) and b) show examples of the application for two types of construction.

3.2
coverage
area provided by a package of loose-fill insulation when applied according to the manufacturer's instructions to achieve a declared thermal performance

[SOURCE: ISO 9229:2007, 2.6.12, modified — The following have been replaced: "area or yield" with "area"; "in accordance with" with "according to the"; "claimed" with "declared".]

3.3
declared settled thickness
thickness declared by the manufacturer as that meeting the specified requirements

Note 1 to entry: The declared settled thickness may be determined by extrapolating observations of applications three to five years after installation to the thickness 25 years after installation.

[SOURCE: ISO 9229:2007, 2.6.4.1, modified — The definition has been modified and Note 1 to entry has been added.]

3.4
declared thermal resistance
thermal resistance of the material or insulation declared by the manufacturer for specific thickness, density, and mean temperatures

3.5
horizontal application
insulation applied to a surface with a slope of not more than 18,4° (having a rise to run of less than 4 in 12 or 33,3 in 100)

3.6
installed thickness
initial thickness at the time of installation necessary to provide the declared thickness after settlement

Note 1 to entry: The installed thickness is equal to or greater than the declared thickness, and it is necessary to take into account any settling after installation. The term "as blown thickness" is also used.

3.7
loose-fill insulation
fibres, granules, nodules, powder or similar forms of insulation material designed to be installed by manual pouring or blowing using pneumatic equipment

[SOURCE: ISO 9229:2007, 2.6.4.1, modified — The definition has been modified.]

3.8
mineral wool
wool made of vitreous fibres having a woolly consistency, and manufactured from molten rock (stone), slag or glass

[SOURCE: ISO 9229:2007, 2.1.16, modified — The definition has been modified and the accompanying abbreviated term "MW" has been omitted.]

3.9
minimum required thickness
thickness required by a manufacturer as that which provides the declared thermal properties

Note 1 to entry: The minimum required thickness does not include space occupied by the roof framing.

Note 2 to entry: See ISO 9229:2007, 2.6.4.1 and 2.6.6.1.

3.10
pneumatic application
method of using air to mechanically install loose-fill (insulation) materials

[SOURCE: ISO 9229:2007, 2.4.12, modified — The adverb “mechanically” has been added.]

3.11
reference mean temperature
mean temperature selected for use as the basis for physical property measurement and expression of data for those materials whose physical properties change with temperature

[SOURCE: ISO 9229:2007, 2.6.10, modified — The definition has been altered.]

3.12
sample
one or more unit(s) of a product or material from an inspection lot

Note 1 to entry: The units of the sample are selected at random without regard to their quality.

3.13
settled density
density of the product observed at least 10 years after installation, or where no data are available, determined from the blown density and a given class of settlement

Note 1 to entry: 6.2.2 allows a graphical extrapolation of data taken after three years to 10 years and graphically extrapolated to 25 years.

3.14
test specimen
single insulating material unit or part of a unit used for a test

3.15
R-value
R
thermal resistance of the insulation expressed for a given settled thickness at a given mean temperature

Note 1 to entry: It is expressed in square metre kelvins per watt $(m^2 \cdot K)/W$.

Note 2 to entry: This definition is given for the convenience of the installers and designers.

3.16
water vapour sorption
laboratory measurement of a gain in mass of a material due to the combined mechanisms of moisture sorption under specified laboratory test conditions

4 Symbols

R_{D10}	Thermal resistance of the insulation expressed for a given settled thickness at 10 °C
R_{D23}	Thermal resistance of the insulation expressed for a given settled thickness at 23 °C
R_{D27}	Thermal resistance of the insulation expressed for a given settled thickness at 27 °C

5 Sampling and conformity control

Manufacturers shall examine the variations in their processes and primary controlling variables to ensure the ongoing quality of their materials.

For the purposes of sampling and conformity control, the procedures described in Annex B shall be applied.

6 Required general properties

6.1 Composition

The loose-fill mineral wool insulating materials are composed of mineral wool manufactured from glass, rock, or slag and air.

6.2 Determination or declaration of settlement

6.2.1 Declaration of settlement

Settlement shall be declared in accordance with the labelling requirements of Table 2 and coverage calculated accordingly.

6.2.2 Observation period

The declaration shall be based on a set of observations of the thickness and settlement of insulation installed in attic roof spaces in several constructions, in several buildings, in several climates for periods of from three years to 10 years, which is extrapolated graphically to predict the settled thickness 25 years after installation.

6.2.3 Types of construction to be observed

The observations on settlement shall be made in types of construction similar to those described in the manufacturer's installation handbook and at the range of thickness declared by the manufacturer in the performance chart (see Table 4) described in Clause 10.

6.2.4 Default values for settlement

If no relevant measurements have been carried out, the class shall be declared in accordance with column 4 of Table 2.

Table 1 — Classes from settlement

Class	Requirement
S1	No measurable settlement
S2	5 %
S3	10 %
S4	15 %
S5	20 %
S6	25 %

Table 2 — Class for use in marking and labelling of packages/bags and calculating coverage

Material	Manufacturing process	Long-term data available Class to be used	No long-term data available Class to be used
Mineral wool	Chopped	Table 1	S3
	Spun or otherwise formed	Table 1	S4
Long-term data spans the period of three years to 10 years.			

6.3 Test specimen density

For the purposes of this part of ISO 9076, all testing shall be done on specimens that have the manufacturer's declared settled density at that specimen thickness for the product in the typical attic roof space installation (±10 %), where relevant.

6.4 Thermal resistance (R-value)

The thermal resistance is determined as the average of four measurements carried out in accordance with A.3, provided no individual measurement deviates from the average of the other three by more than 10 %.

The mean temperature of the tests shall be 27 °C, 23 °C or 10 °C, or all three, as decided by the manufacturer and according to normal practice in the location of installation. The user and the manufacturer may agree on other temperatures.

Settlement of the product after installation has an effect on the thermal transmission properties of the insulation. The manufacturer shall give the minimum installed thickness that corresponds to the declared thickness.

6.5 Fire behaviour related to material characteristics

Loose-fill insulating materials are intended to meet the requirements of local codes and regulations.

6.6 Air flow permeability

The airflow permeability shall be determined in accordance with ISO 9053 method A. The manufacturer shall test as an initial type test or in the case of a dispute. The manufacturer shall provide this information upon request.

Note Air flow permeability is a characteristic of the material and its significance to the performance of the product after installation are intended to be evaluated by the user.

6.7 Hazards

The manufacturer shall supply the information required in 10 c) and mark the material in accordance with 10 d).

7 Tolerances on declared properties

Table 3 lists the requirements for tolerances on the properties that are declared by the manufacturer and used for developing the values to be listed on the package (bag).