
**Thermal insulation — Mineral wool mats
for ventilated roof spaces —**

Part 2:

Specification for horizontal applications with
unrestricted ventilation

ISO 8144-2:1995

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*Isolation thermique — Feutres en laine minérale pour sous-toitures
ventilées —*

Partie 2: Spécifications pour application horizontale avec ventilation libre



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.

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.

International Standard ISO 8144-2 was prepared by Technical Committee ISO/TC 163, *Thermal insulation*, Subcommittee SC 3, *Insulation products for building applications*.

ISO 8144 consists of the following parts, under the general title *Thermal insulation — Mineral wool mats for ventilated roof spaces*:

- Part 1: *Specification for applications with restricted ventilation*
- Part 2: *Specification for horizontal applications with unrestricted ventilation*

Annexes A, B and C form an integral part of this part of ISO 8144. Annexes D, E and F are for information only.

Thermal insulation — Mineral wool mats for ventilated roof spaces —

Part 2:

Specification for horizontal applications with unrestricted ventilation

1 Scope

This part of ISO 8144 specifies the properties and acceptance tolerances for bonded man-made mineral wool thermal insulating mats (batts and rolls). The mats specified in this part of ISO 8144 are only intended to be used for horizontal applications with unrestricted ventilation, where any excess of thickness recovery of the insulation mat will not restrict the essential ventilation space [see annex E and ISO/TR 9774:1990 (figure 1, sketch 23, right-hand drawing) for examples of the application].

Insulation in ventilated roof spaces requires that the ventilation to the air space is guaranteed. Depending upon the location of the insulation, the product thickness may interfere with this requirement.

The mineral wool mats which are specified in ISO 8144-1:1995 are primarily intended for use in applications where any excess of thickness has to be limited.

This part of ISO 8144 provides limiting values for most of the properties. These limiting values are for specification purposes only; design values may be derived from these by taking into account the environmental factors affecting the thermal performance of the product, the influence of the product properties on installation, and the effect of workmanship on the thermal performance. For converting declared R -values to design values, see, for example, ISO 10456.

Mats may be supplied with a factory-applied facing, but facings are not covered by this part of ISO 8144.

In general, mats are not designed to support any applied load. For this reason, only the mechanical properties required for adequate handling during application are specified.

The sampling and conformity control procedures described in annex D, and the certification procedure described in annex F, are recommendations only.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8144. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8144 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7345:1987, *Thermal insulation — Physical quantities and definitions*.

ISO 8144-1:1995, *Thermal insulation — Mineral wool mats for ventilated roof spaces — Part 1: Specification for applications with restricted ventilation*.

ISO 8301:1991, *Thermal insulation — Determination of steady-state thermal resistance and related properties — Heat flow meter apparatus*.

ISO 8302:1991, *Thermal insulation — Determination of steady-state thermal resistance and related properties — Guarded hot plate apparatus.*

ISO/TR 9774:1990, *Thermal-insulation materials — Application categories and basic requirements — Guidelines for the harmonization of International Standards and other specifications.*

ISO 10456:—¹⁾, *Thermal insulation — Building materials and products — Determination of declared and design thermal values.*

3 Definitions

See clause 3 of ISO 8144-1:1995.

4 Sampling and conformity control

See clause 4 of ISO 8144-1:1995.

5 Required properties

5.1 Dimensions

The manufacturer shall declare the nominal length, width and thickness of the mats.

These dimensions shall be measured in accordance with annex A and shall be subject to the tolerances detailed in table 1.

5.2 Fire behaviour

See 5.2 of ISO 8144-1:1995.

5.3 Thermal resistance

The thermal resistance, R , of a product shall be declared by the manufacturer (see ISO 7345). The mean test temperature shall also be declared.

For each product, the R -value shall be determined in accordance with annex C (see also ISO 8301 or ISO 8302).

The measured thermal resistance shall be equal to or greater than 95 % of the manufacturer's declared values.

NOTES

1 The permitted negative tolerance on the R -value arises from the negative tolerance on thickness permitted in table 1.

2 Because of the differences in manufacturing processes, two manufacturers may have the same thermal resistance but at slightly different thicknesses and/or densities.

5.4 Handling properties

See 5.4 of ISO 8144-1:1995.

5.5 General properties

See 5.5 of ISO 8144-1:1995.

Table 1 — Dimensional tolerances

Dimension	Permissible deviations of measured values from nominal dimensions	Test method
Length, l	− 2 % + excess permitted on average of measured values for each single specimen	Clause A.1
Width, b	± 2 % or ± 10 mm, whichever is less, on average of measured values for each single specimen	Clause A.1
Thickness, d	− 5 %, + 25 % on average of all specimens tested For any single specimen, the measured thickness at each individual measuring point shall not deviate by more than 15 mm from the mean of measurements on that specimen	Clause A.2
Squareness of batts (rolls need not be tested)	For each 100 mm along the shortest face dimension, the maximum deviation shall be more than 1 mm	Clause A.3

1) To be published.

6 Marking

Mineral wool insulation shall be delivered with the following information marked on the product or the package:

- a) manufacturer's name and product designation;
- b) manufacturer's origin (location);
- c) type of facing (if any);
- d) production code;
- e) nominal length, width, thickness and area of insulation in the package;
- f) declared R -value and corresponding mean temperature;
- g) additional markings as requested by the national regulations of countries where the product is to be used, such as design values for R , reaction to fire, and safety and health information;
- h) statement that the labelled properties are those corresponding to applications with unrestricted ventilation in the roof space;
- i) reference to this part of ISO 8144.

7 Test report

The test report shall be prepared by the laboratory that carried out the tests and shall include the following information:

- a) manufacturer's name and product designation;
- b) type of product and other details concerning facing and type;
- c) nominal dimensions;
- d) production code;
- e) information about sampling;
- f) manufacturer's declared R -value and corresponding mean temperature;
- g) report of all test results, including maximum and minimum values;
- h) comparison of test results and assessment with the manufacturer's claim and the requirements of this part of ISO 8144;
- i) statement of conformity with this part of ISO 8144;
- j) name and location of laboratory carrying out the tests.

Annex A
(normative)

Determination of dimensions of mats (batts or rolls)

See annex A of ISO 8144-1:1995.

Annex B
(normative)

Determination of handling properties of mats (batts or rolls)

See annex B of ISO 8144-1:1995.

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Annex C (normative)

Determination of thermal resistance

C.1 General

Thermal resistance shall be determined according to ISO 8301 (heat flow meter) or ISO 8302 (guarded hot plate). In case of dispute, the guarded hot-plate method shall be used.

The heat flow meter and guarded hot plate are used to measure the areal density of heat flow rate and temperature difference. The thermal resistance, R , of the test specimen is derived directly from them.

The R -value is dependent, amongst other things, on the thickness of the specimen. The R -value should thus be determined for each product with a different declared R -value.

C.2 Specimens

From each sample, two specimens shall be cut out of the mat or test piece on which the thickness measurements have been made and which, in the case of compressed material, have been conditioned (see A.2.3). If, during specimen preparation (e.g. cutting of the specimen), the material has been compressed, this conditioning shall be repeated before thermal measurements are made.

Before testing, the specimens shall be

- oven-dried to constant mass, or
- conditioned in a room at $23\text{ °C} \pm 2\text{ °C}$ and a humidity less than 50 % R.H. to constant mass.

When the sample is very thick and its thermal properties cannot be measured directly by a guarded hot plate or heat flow meter, one of the following procedures may be adopted.

- a) The specimens may be split carefully using a bandsaw to provide thinner specimens, provided that the fibre structure is not changed and it can be demonstrated that the thermal transmission

properties of each of the thinner specimens will not be influenced by the “thickness effect” associated with materials of low density and/or low thickness. The R -value may then be determined from the sum of the R -values of the individual layers.

- b) Where the thickness effect is unknown, or as an alternative to the above procedure, the specimens may be tested by compressing them to a range of known (and testable) thicknesses to construct a R -value versus thickness graph. The specimen shall not be compressed by more than 50 % of the measured thickness. The R -value at the specimen's measured thickness may then be obtained by compressed extrapolation from this graph.

The thermal resistance of faced material may be measured including the facing, unless that facing affects the test results appreciably.

C.3 Procedure

The following procedure shall be used:

- a) measure the thickness of the specimens in accordance with A.2.4; if this is less than the average sample thickness, the conditioning procedure described in A.2.3 should be repeated;
- b) measure the thermal resistance, R , according to ISO 8301 or ISO 8302 using the average sample thickness, ensuring that the specimens are in contact with the surface of the measuring equipment;
- c) conduct the tests at a mean temperature of either 23 °C or 10 °C (in tropical countries a mean temperature of 40 °C may be agreed upon), and a temperature difference of at least 20 °C ;
- d) calculate the average R -value of the two specimens.

C.4 Test report

The test report shall include the following information:

- a) test thickness of the specimens;
- b) R -value of each specimen;
- c) average R -value;
- d) mean temperature at which the thermal resistance was determined.

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Annex D
(informative)

Sampling and conformity control

See annex D of ISO 8144-1:1995.

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