INTERNATIONAL STANDARD

ISO 12574-2

First edition
2008-09-15

Thermal insulation — Cellulose-fibre loose-fill for horizontal applications in ventilated roof spaces —

Part 2: Principal responsibilities of installers

Isolation thermique — Fibres de cellulose en vrac pour applications horizontales dans les combles ventilées —

Partie 2: Principales responsabilités des installateurs

Reference number
ISO 12574-2:2008(E)

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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.

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.

ISO 12574-2 was prepared by Technical Committee ISO/TC 163, *Thermal performance and energy use in the built environment*, Subcommittee SC 3, *Thermal insulation products*.

ISO 12574 consists of the following parts, under the general title *Thermal insulation — Cellulose-fibre loose-fill for horizontal applications in ventilated roof spaces*:

— *Part 1: Material specification*

— *Part 2: Principal responsibilities of installers*

— *Part 3: Test methods*

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Introduction

This part of ISO 12574 specifies the principal responsibilities of installers, as these are common in all countries. It does not specify the application procedures or requirements of the installation, which can vary greatly from one construction to another, from one country to another, or from one jurisdiction in a country to another. This part of ISO 12574 does not conflict with local building codes or labour practices. It serves to clearly delineate the principal responsibilities of the manufacturer of the thermal insulation, which are specified in the material specification, from the principal responsibilities of the installer listed in this part of ISO 12574. Because of the uniqueness of the concept of principal responsibilities for the installer, the following general definitions in more than one form are given to assist in translation of the term to other languages. Specific definitions are given in Clause 3.

a) Principal requirements include the following:

   1) procedures that are common to all installations regardless of the construction of the building or the country in which the installation occurs; principal requirements can include instructions to carry out a policy statement (meet an objective) but it is not necessarily required to provide a linear progression of steps or actions to be taken;

   2) document that provides methods used and that are necessary to accomplish the objective of producing a functional installation.

b) Responsibility includes the following:

   1) condition of being accountable for one's actions; accepting responsibility for one's actions means that the individual who commits an act is the one who is required to explain the act and accept any consequences;

   2) condition of being obliged to answer, for one's actions, to an authority that can impose a penalty for failure.

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Thermal insulation — Cellulose-fibre loose-fill for horizontal applications in ventilated roof spaces —

Part 2:
Principal responsibilities of installers

1 Scope

This part of ISO 12574 gives the principal responsibilities of the installers of cellulose-fibre loose-fill thermal insulation products for buildings. If a product is manufactured and packaged according to ISO 12574-1 and then installed in ventilated roof spaces as described in ISO 9774, it is expected to provide the properties declared by the manufacturer.

This part of ISO 12574 gives the principal responsibilities of the installer in the installation of the product, in the documentation of the installation and in the declaration that all requirements of this part of ISO 12574 have been met.

This part of ISO 12574 does not specify fitness of the product for the intended use beyond those aspects relating to installation. Many aspects relating to the fitness for use are specified in government regulations. It is necessary that the installer ensure, when installing the product, that the product installed is suitable for the application, based on the government regulations and the manufacturer's recommendations.

The installer can be required to meet ancillary (additional) requirements that are specified in local regulations or the customer's requirements.

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.

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

ISO 9229, *Thermal insulation — Vocabulary*

ISO 12574-1, *Thermal insulation — Cellulose-fibre loose-fill for horizontal applications in ventilated roof spaces — Part 1: Material specification*

3 Terms and definitions

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

3.1

application training

training provided by a manufacturer or by a training institute for which certification is provided

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3.2
roof space
loft space
attic space
enclosed space between the roof and the ceiling

3.3
authority having jurisdiction
agency of the government or trade having responsibility for the safe and proper installation of thermal insulation

3.4
blowing wool
fibrous insulation material sub-divided into granules or pellets for application or installation by pneumatic equipment

[ISO 9229]

3.5
coverage
area provided by a package of loose-fill insulation when applied as per the manufacturer's instructions to achieve a declared thermal performance

[ISO 9229]

3.6
designation code
shift, production and/or date code used by the manufacturer to identify a particular product lot

3.7
declared thermal resistance
thermal resistance of the insulation declared by the manufacturer for a specific settled thickness, density, and mean temperature

NOTE The declared thermal resistance is expressed in units of square metre-kelvin per watt.

3.8
equipment manufacturer
organization that manufactures or markets equipment designed to apply cellulose-fibre loose-fill thermal insulation

3.9
inspection authority
authority that has regulatory responsibility for enforcement

3.10
installed thickness
as-blown thickness
initial thickness at the time of installation necessary to provide the declared thickness after settlement

NOTE 1 See **settled thickness**, 3.18.

NOTE 2 The initial thickness is equal to or greater than the declared thickness and it is necessary to take into account any settling after installation.

3.11
installer
individual who has application training to install cellulose-fibre loose-fill thermal insulation in roof spaces, such that it conforms to the labelling on the package and other applicable requirements and regulations

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3.12
loose-fill system
blowing machine and blowing hose required to install cellulose-fibre loose-fill insulation to the specifications given on the performance chart

3.13
manufacturer
organization that manufactures or markets cellulose-fibre loose-fill thermal insulation products and that is responsible for packaging and labelling of the material and specifying the system for application

3.14
performance chart
table specifying the installed and settled thickness of insulation required to give tabulated values of thermal resistance and maximum area of attic surface covered by each bag

3.15
principal requirement
essential procedures that are common to all installations regardless of the construction of the building or the country in which the installation occurs

NOTE Principal requirements may include instructions to carry out a policy statement (meet an objective) but it is not necessarily required to provide a linear progression of steps or actions to be taken. Methods used and methods that are necessary to accomplish the objective of a functional installation are normally included.

3.16
R-value
thermal resistance of the insulation for a given settled thickness and density

NOTE The R-value is expressed in units of square metre-kelvin per watt.

3.17
responsibility
condition of being accountable for one's actions, accepting responsibility for one's actions, explaining the act, and answering to an authority and accepting any consequences or penalties

3.18
settled thickness
thickness declared by the manufacturer such that it meets the requirements of the governing standard

3.19
settlement
decrease in the thickness of installed insulation thickness with time

NOTE The settlement is expressed as a percentage of the initially installed thickness.

4 General responsibilities of the installer

4.1 Installer training

The installer shall ensure that someone present at the site is trained in the following:

a) site inspection and preparation;

b) physical properties of the insulation materials;

c) use and maintenance of equipment;

d) manufacturer's installation requirements;

e) verification of the specific requirements in Clause 5;

f) material storage and handling;

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g) installation procedures;

h) consumer (site) safety issues;

i) local applicable codes and regulations;

j) limitations of use;

k) related building science;

l) record keeping;

m) disposal of material waste;

n) installer safety.

4.2 Documentation obtained from the manufacturer

The installer shall obtain from the manufacturer of cellulose-fibre loose-fill thermal insulation, the following information, which shall be printed on the package:

a) brand name, name of the manufacturer or supplier and identification of the manufacturing facility location;

b) type of insulation and its intended use;

c) instructions for installation of the product;

d) limitations for use of the product;

e) coverage chart for the product or the specified maximum area to be covered per package;

f) material safety data sheet;

g) transportation and storage requirements.

4.3 Responsibility for health and safety

The installer shall review related health and safety requirements of the local authority having jurisdiction, requirements of the appropriate regulatory bodies and related application-related recommendations of the manufacturer, and shall conform to the requirements and recommendations.

4.4 Transportation and storage

The installer shall verify that the transport and storage of insulation products was in accordance with the recommendations of the manufacturer.

4.5 Verification of material compliance

The installer shall ensure that the package labels state that the material is in compliance with ISO 12574-1.

4.6 Suitability for installation

4.6.1 The installer shall verify that the areas of the building where the product is installed are suitable for the application of the product. The suitability of these areas for the installation is determined from the manufacturer's guidelines, the building code, other governmental regulations and the installer's training. The installer shall develop a checklist for the installation similar to the example given in Annex C.

4.6.2 If any item on this checklist is identified as inadequate, the installer shall ensure that the situations are resolved before the product is installed. The installer shall ensure that, if any items on the checklist require attention before the loose-fill cellulose-fibre is installed, and more expertise is required in resolving the situation, the appropriate persons are contacted and their advice sought.

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4.7 Defects prior to installation

The installer shall ensure that the material is inspected before installation and that it is free from defects that can significantly affect its serviceability, including empty packaging. The installer shall not install any material that has an objectionable odour.

4.8 Authority having jurisdiction

The installer shall ensure that the labelling on the packages of material for installation indicates that the material meets the requirements of the authority having jurisdiction and that the installation is in accordance with applicable building codes and all local regulations.

4.9 Installer qualifications on-site

The installer shall ensure that the on-site supervisor carries proof of training in accordance with this part of ISO 12574 and with instructions given by the product manufacturer.

4.10 Equipment requirements

The installer shall ensure that the equipment used for the installation is that specified by the material manufacturer and that the equipment is maintained in accordance with the equipment manufacturer's instructions.

The installer shall ensure that the operating parameters used are those specified by the equipment manufacturer and that the equipment is adjusted in accordance with the equipment manufacturer's instructions using a recommended method for adjustment. The installer shall insure that equipment used has been approved for use in the installation of cellulose-fibre loose-fill thermal insulation.

4.11 Defects in installation

The installer shall ensure that the installation is inspected after installation and that it is free from defects that can significantly affect its serviceability, including empty packaging.

4.12 Documentation by the installer

The installer shall ensure that a job-site certificate is installed at the site and that the certificate states the following:

a) job-site address;

b) environmental conditions (temperature and relative humidity);

c) date(s) product was installed;

d) name of the installer (license number or other designation, if applicable);

e) manufacturer's name and product name;

f) conformance of the product to ISO 12574-1;

g) evidence of any third-party assessment, where applicable;

h) actual number of bags installed;

i) net area insulated;

j) average installed thickness;

k) thermal resistance listed on the package that corresponds to the installed thickness;

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l) conformance with this part of ISO 12574;

m) other information as indicated in the example in Annex B.

4.13 Maintenance of records

The installer shall ensure that the job-site certificate is signed and attached in a clearly visible location in the attic. The installer shall ensure that there is a completed copy of the job-site certificate (Annex B) filed in the office for future reference. The installer shall ensure that there is a record of the installation details for the installation. The installer shall ensure that the information is available for a period of seven years or according to local regulations, whichever is longer.

5 Specific responsibilities related to performance

5.1 Thickness — Control of installed thickness

The installer shall ensure that insulation installed has the minimum thickness required by the manufacturer on the coverage chart to provide the thermal resistance specified for the installation or that it exceeds that thickness.

The installer shall ensure that the thickness of the installed insulation has been measured with the depth (thickness) gauge (as shown in Figure 1). The installer shall ensure that measurements are done in at least four different places (at least 4 m apart) for each 100 m^2 area.

The installer shall ensure that measurements are done in the visually low (or thin) areas. The installer shall ensure that measured thickness is greater than the minimum installed thickness listed on the coverage chart for the specified thermal resistance.

Alternatively, the installer shall ensure that pre-marked “attic rulers” are installed or marks at the level of the surface of the insulation have been made on the structure in the attic at the appropriate heights. The installer shall install the insulation so that the thickness meets or exceeds the marks.

In case of dispute, the installer shall ensure that measurements of thickness are made as described in A.1 with the pin gauge shown in Figure 1.

5.2 Coverage — Calculation of coverage

The installer shall ensure that the number of bags of insulation specified by the manufacturer on the coverage chart for the desired the thermal resistance is applied. The installer shall ensure that the coverage per bag is not greater than that declared by the manufacturer.

The installer shall ensure that the coverage of the packages of insulation has been calculated by dividing the total net area covered by the number of bags installed, thus yielding the number of square metres per bag. The installer shall ensure that sufficient material has been installed so that the calculated coverage per package is not greater that the maximum coverage per bag declared by the manufacturer for the required thermal resistance.

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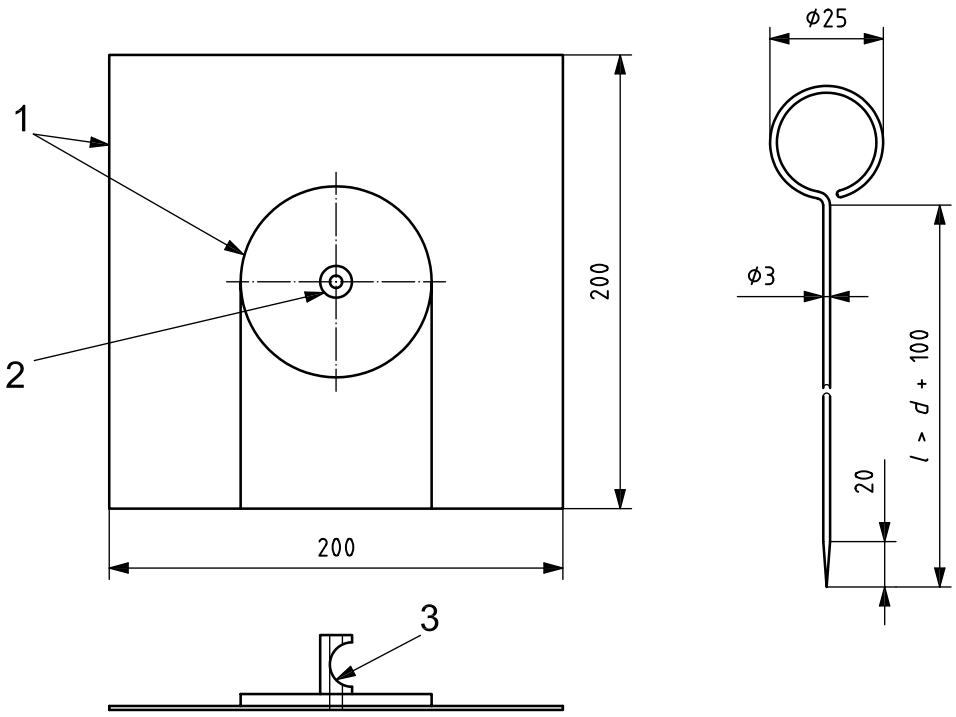
Dimensions in millimetres



Key

1 rigid plate

2 hole with diameter suitable for sliding pin perpendicular to plate

3 thumb grip

Figure 1 — Depth gauge

5.3 Installed number of bags — Calculation

The installer shall ensure that the number of bags of insulation installed meets or exceeds the number required by the manufacturer's coverage chart for the area to be covered and the required thermal resistance.

The installer shall ensure compliance with the manufacturer's thermal resistance tables by

a) counting the number of bags of insulation product installed,

b) measuring the area and calculating the net area of attic insulated,

c) calculating the required number of bags of insulation from the performance chart for the desired thermal resistance,

d) confirming that the number of bags installed in the attic is equal to or greater than the required number.

5.4 Surface density — Calculation

5.4.1 The installer shall ensure that the surface density of the product equals or exceeds that declared by the manufacturer.

NOTE Surface density is equivalent to the deprecated term “mass per unit area”.

In order that the required surface density is achieved the installer shall ensure that, on average, a bag of insulation does not cover more area than that specified by the manufacturer.

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The installer shall further ensure that

a) the surface density is calculated by dividing the total mass of product installed by the net area covered by the installation,

b) the total mass of the product is obtained by multiplying the number of bags used by the bag mass.

5.4.2 In case of dispute, the installer shall ensure that

a) the insulation thickness is measured using a depth gauge,

b) a circular duct with a serrated edge (cookie cutter) enclosing an area of at least 0,10 m^2 is pressed through the insulation at the measured location,

c) the insulation inside the circular duct is collected and weighed,

d) the coverage is calculated by dividing the mass of the specimen by the area of the circular duct,

e) the surface density is calculated by dividing the mass by the enclosed area, and

f) the installed thickness and surface density are equal to or greater than the values specified by the manufacturer in the coverage chart.

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Annex A
(normative)

Dispute resolution measurements — Measurements for field audits

A.1 Determination of installed thickness using pin gauge (depth gauge) and plate

A.1.1 Apparatus

A.1.1.1 Depth gauge, consisting of a pressure plate, a pin and a metal rule.

A.1.1.2 Pressure plate, made from a rigid plastic or other suitable material, 200 mm^2 and fitted with a suitable thumb grip.

The total mass of the plate and the grip shall be within the range of 75 g to 88 g so that it exerts a pressure of $(20 \pm 1{,}5)$ Pa.

NOTE In countries where a circular-plate depth gauge has been standard practice, that particular method is acceptable if the above depth gauge is not available.

A.1.1.3 Pin, made from 3 mm diameter of steel rod and sufficient length to penetrate the full thickness of the insulation layer with one end sharpened to a point.

A.1.1.4 Metal ruler, graduated in millimetres to permit readings to 1,0 mm.

A.1.2 Procedure

Place the pressure plate on the designated measuring point, lowering it slowly.

Force the pin with a rotary motion vertically downward through the insulation layer to the surface below.

Grasp the pin firmly at the thumb grip and remove the pin and the plate. Measure the distance from the point of the pin to the plate. The distance is the thickness of the insulation layer at this point.

A.2 Determination of surface density using the cutter method

In case of dispute, the surface density calculation shall be used.

Measure the installation thickness (depth) using a depth gauge and record the thickness

At the measured location, press through the insulation a circular duct with a serrated edge (cookie cutter) enclosing an area of at least 0,10 m^2.

Collect and weigh the insulation inside the circular duct.

Calculate the surface density by dividing the mass of the specimen by the area of the circular duct.

Calculate the density by dividing the coverage by the thickness.

Repeat the measurement at one location for every 10 m^2 of applied insulation.

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Annex B
(informative)

Job-site certificate

In 4.12 the information that should be declared by the installer for a job site is detailed. The form below can be useful in declaring that information.

Contractor: Name Address Contact Person Telephone Fax	**Installer:** Name Certification (if applicable)
Site: Address Type of building	**Product:** Insulation type Trade name Shift production code
Installation: Existing insulation (type and thickness in millimetres) R-value required Settled thickness (millimetres) Installed thickness — additional (millimetres) Net area insulated (square millimetres) Installed number of bags	**Date of installation:** Date **Affirmation:** I declare that this information is correct. **Installer's signature:**

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Annex C
(informative)

Suitability of the building to receive the insulation product — Example of installer's checklist

In accordance with 4.6.1, it is the responsibility of the installer to ensure that a checklist with at least the following items is used for inspection prior to installation of the insulation:

a) determine whether any electrical wiring and fixtures are unsuitable for covering with insulation;

b) determine whether there is evidence of moisture or water damage;

c) determine whether there is evidence of air leakage from the living space to the attic;

d) determine whether there is evidence of vermin inhabiting the space;

e) determine whether the roof and ceiling construction is at a stage that is unsuitable for application of the product, e.g. there is a risk of rain or snow coming through the roof construction into the insulation;

f) determine whether any measures are required to prevent ventilation air from entering the insulation;

g) determine whether there is inadequate air sealing of the attic from the living space;

h) determine whether there are any restrictions in the existing ventilation and provisions in case measures are required to ensure continued flow of attic ventilation;

i) determine whether the attic or loft area will have inadequate ventilation according to local codes and good practice once the insulation is installed;

j) determine whether any parts of the attic or loft are inaccessible for installation of the product;

k) determine whether there are inadequate arrangements to exclude the insulation from parts of the attic not intended for insulation, e.g. chimneys, flues, recessed light fixtures and soffits;

l) determine whether water pipes, ventilation ducts and storage tanks require additional measures to prevent condensation and freezing;

m) determine whether any existing thermal insulation is incompatible and in non-functional condition.

If any item on this checklist is identified as inadequate, it is the responsibility of the installer to ensure that the situations are resolved before the product is installed, in accordance with the requirements of 4.6.2.

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