

INTERNATIONAL STANDARD

**ISO
8142**

First edition
1990-03-15

Thermal insulation — Bonded preformed man-made mineral fibre pipe sections — Specification

*Isolation thermique — Isolations de tuyaux en fibres minérales manufacturées
préformées encollées — Spécification*



Reference number
ISO 8142 : 1990 (E)



Documents
Document Sharing Hub

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 approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8142 was prepared by Technical Committee ISO/TC 163, *Thermal insulation*.

Annexes A and B form an integral part of this International Standard. Annex C is for information only.

© ISO 1990

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Organization for Standardization

Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Thermal insulation — Bonded preformed man-made mineral fibre pipe sections — Specification

1 Scope

This International Standard specifies the properties of bonded preformed man-made mineral fibre pipe insulation. It also gives test methods.

NOTES

1 For use at temperatures below ambient, attention is drawn to the need for an adequate water vapour retarder, either factory- or site-applied; this need is not covered by this International Standard.

2 No tests for compressive strength have been included since end results are achieved in service by the insulation system including the outer covering.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard 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 8302 : 1989, *Thermal insulation — Determination of steady state areal thermal resistance and related properties — Guarded hot-plate apparatus*.

ISO 8497 : —¹⁾, *Thermal insulation — Determination of steady state thermal transmission properties of thermal insulation for circular pipes*.

3 Definitions

For the purposes of this International Standard, the definitions given in ISO 7345 and the following definitions apply.

3.1 man-made mineral fibre: Fibre manufactured from glass, rock or other minerals, or from readily melted slags.

3.2 maximum service temperature: Temperature at which the thermal insulation installed at the maximum recommended thickness will continue to perform without degradation of necessary properties or creation of hazards.

3.3 pipe section: Complete cylinder of preformed pipe insulation comprising one or more pieces.

4 Composition and form

4.1 The preformed pipe sections shall be made from man-made mineral fibre manufactured by processing glass, rock or slag from a molten state into a fibrous form and bonded with a suitable binder.

4.2 The bonded fibre shall be formed by the manufacturer into annular sections to fit standard sizes of pipe.

4.3 Each section shall be supplied in a single piece or not more than four pieces.

NOTE — The preformed pipe insulation may be provided either with or without a factory-applied finish, but these finishes are not described in this International Standard.

5 Requirements

5.1 Dimensions

5.1.1 The manufacturer shall declare the nominal length and wall thickness of the product. He shall also declare the nominal external diameter of the pipe for which the section is designated.

NOTE — In some countries it is the practice to designate pipe size by quoting nominal internal diameter instead of external diameter. This is permissible as long as it is made explicit and means of relating internal to external diameter are available.

1) To be published.

5.1.2 These dimensions shall be measured by the method given in annex B and shall be subject to the following tolerances :

- | | |
|-------------------------------|--|
| a) average length: | ± 5 mm on declared nominal length; |
| b) squareness: | The deviation of the ends from 90° shall not exceed 2 % of outside diameter or 4 mm, whichever is the greater; |
| c) average wall thickness: | ± 3 mm or ± 6 % of declared nominal wall thickness, whichever is the greater; |
| uniformity of wall thickness: | The local thickness at any point shall not differ from the mean thickness by more than 3 mm; |
| d) average inside diameter: | $+4$ mm or $+2$ %, whichever is the greater on declared nominal internal diameter. |

NOTE — Where it is intended to nest layers of pipe sections, different tolerances may be needed; the manufacturer's recommendations should be sought.

5.2 Density

The manufacturer shall declare the density of the product. The declared value shall be subject to a tolerance of ± 15 %.

NOTE — This factor is required for design purposes, so that, for example, pipe hangers are adequate. It is also required for shipping purposes.

Density shall be determined as the quotient of mass and volume calculated from the nominal dimensions.

The sample shall consist of the number of pieces indicated in annex C.

5.3 Physical properties

Owing to the narrow range of test pipe sizes available in most countries and to the length of time required to perform the following tests, it will rarely be practicable or economic to adopt the requirements of clause 6 and annex C for purposes of conformity control. Therefore "representative product tests" may be performed on appropriate specimens corresponding in composition and density to the material supplied. These tests should be repeated once per year or whenever a significant process or product change occurs to ensure that conformity with the requirements of this specification is maintained.

However, this shall not preclude the use of the conformity control system of annex C for some or all of the following tests if the manufacturer and user agree to do so, for example if a delivered lot is to be tested (Type I testing). In this case the number of specimens for each test shall be as specified in annex C. The test result for each specimen shall be compared with the manufacturer's declared value for that property, and the acceptance criteria of annex C applied.

When representative product tests are used, three specimens shall be tested for each property; the acceptance criteria are specified in 5.3.1 to 5.3.4. These also specify the test procedures to be used for representative product tests and for tests in the conformity control system.

5.3.1 Thermal conductivity

The manufacturer shall declare values of thermal conductivity at a minimum of three mean temperatures covering the useful service temperature range of the product. These values shall be quoted in the form of a graph or table.

To demonstrate compliance in each representative product test, three specimens shall be tested in accordance with ISO 8497 with the specimens mounted tightly on the pipe. The measured average value of the thermal conductivity at each mean temperature shall not exceed the manufacturer's declared value for that mean temperature. Individual values shall not exceed the manufacturer's declared value by more than 15 %. The density of the samples tested shall be included in the test report.

NOTES

1 The guarded hot-plate method of ISO 8302 may be used when the sections supplied have an internal diameter exceeding 500 mm. Flat slabs shall be prepared having the same thickness and density as the sections. If the guarded hot-plate method is used, the fact should be stated clearly in the test report.

2 The thermal conductivity of pipe insulation may be affected by the diameter, thickness and density of the sections tested.

5.3.2 Maximum service temperature

The manufacturer shall declare the maximum service temperature of the product and the maximum thickness that may be used at this temperature.

To demonstrate compliance in each representative product test, when tested in accordance with annex A at the maximum service temperature recommended by the manufacturer and at the maximum thickness recommended for that temperature, each specimen shall satisfy the criteria of clause A.5.

5.3.3 Fire behaviour

It is recommended that fire properties be assessed according to the regulations and codes pertaining to the locality in which the product is to be used.

NOTE — The basic mineral fibres used in moulded preformed pipe sections are inherently non-combustible. Although the organic binder normally used is a combustible component, it is present only as a small percentage by weight.

5.3.4 Corrosive attack

The product shall not include significant quantities of substances which will promote corrosive attack on the surfaces with which it is to be in contact, particularly steel, copper and aluminium.

NOTE — Water-soluble chlorides and other halides are normally present in trace quantities in most commercial thermal insulating

materials. In the presence of moisture and oxygen and in certain service conditions, chloride ions are capable of initiating stress-corrosion cracking in susceptible metal alloys such as austenitic stainless steels.

It is not practicable to indicate a safe upper limit for chloride content since water can leach out soluble chlorides from substantial volumes of insulating materials or from the environment and allow them to be concentrated at the metal-insulation interface.

In conditions potentially conducive to stress-corrosion cracking, appropriate safeguards should be adopted such as coating the pipe with a protective or sacrificial membrane.

6 Sampling and conformity control

Sampling and conformity control procedures are recommended in annex C.

7 Marking

Packages containing pipe insulation complying with this International Standard shall be clearly marked with the following:

- a) manufacturer's name, mark or symbol;
- b) manufacturer's type designation and maximum service temperature;
- c) nominal dimensions (length, thickness of the sections and diameter of the pipe for which it is intended);
- d) number of pieces of insulation in the package;
- e) reference to this International Standard.