
**Thermal insulating products for
building equipment and industrial
installations — Determination of
maximum service temperature for
preformed pipe insulation**

*Produits isolants thermiques pour l'équipement du bâtiment et
les installations industrielles — Détermination de la température
maximale de service des coquilles isolantes préformées*





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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 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical 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 18096:2013), which has been technically revised.

The main changes are as follows:

- EN 14707:2012 and ISO 18096:2013 have been merged into one document;
- editorial revisions.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Thermal insulating products for building equipment and industrial installations — Determination of maximum service temperature for preformed pipe insulation

1 Scope

This document specifies the equipment and procedures for determining the maximum service temperature for preformed pipe insulation. It is applicable to thermal insulating products.

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 5725-2:2019, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

ISO 12628, *Thermal insulating products for building equipment and industrial installations — Determination of dimensions, squareness and linearity of preformed pipe insulation*

ISO 16544, *Thermal insulating products for building applications — Conditioning to moisture equilibrium under specified temperature and humidity conditions*

3 Terms and definitions

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

maximum service temperature

highest temperature at which the thermal insulation product, when installed at the recommended thickness in a given application, continues to function within specified limits of performance

Note 1 to entry: The required performance may be in the areas of dimensional stability, thermal properties, and mechanical properties, as well as changes in appearance and resistance against creation of hazards such as internal self-heating (see annexes and requirements in the relevant product standard).

Note 2 to entry: The test procedure in this document, which is used as a reference, the test specimen is exposed to a temperature difference going from ambient to the maximum service temperature. This may not reflect the actual application conditions when products are exposed to different temperatures on the two main faces, e.g. in multi-layer systems or for faced products where the facing may limit the maximum service temperature.

[SOURCE: ISO 9229:2020, 3.6.9.1, modified — Notes 1 and 2 to entry have been added.]

4 Principle

The thickness and length shall be measured after one sided heat treatment for a specified time period, at the maximum service temperature, achieved using a specified rate of temperature increase. The

thickness of the test specimen is measured during heat treatment and the length only after cooling to ambient temperature.

NOTE The procedure can be an iterative process.

Additional requirements for assessing the maximum service temperature of specific materials are described in [Annexes A](#) to [C](#) or the relevant product standard or any other international technical specification.

5 Apparatus

A general arrangement of the apparatus is indicated in [Figures 1](#) and [2](#) and is comprised of:

5.1 Hot pipe, with a uniform temperature distribution in the measuring zone on the hot surface and a heat flux perpendicular to the surface of the pipe within the measuring zone (two pipes are required, with diameters that fulfil the requirements of [6.1](#)). The hot pipe shall be linear to within ± 1 mm in the measuring zone at ambient temperature.

The hot pipe shall be capable of being controlled to within ± 2 % of a predetermined temperature or ± 10 °C whichever is smaller over the central 60 % of the total pipe length.

The hot pipe shall be capable of being heated at 50 °C/h and/or 300 °C/h.

5.2 End insulation, with a gap as small as possible between end insulation and guard piece of the test specimen (e.g. ≤ 3 mm) which permits free movement during the test of the test specimen.

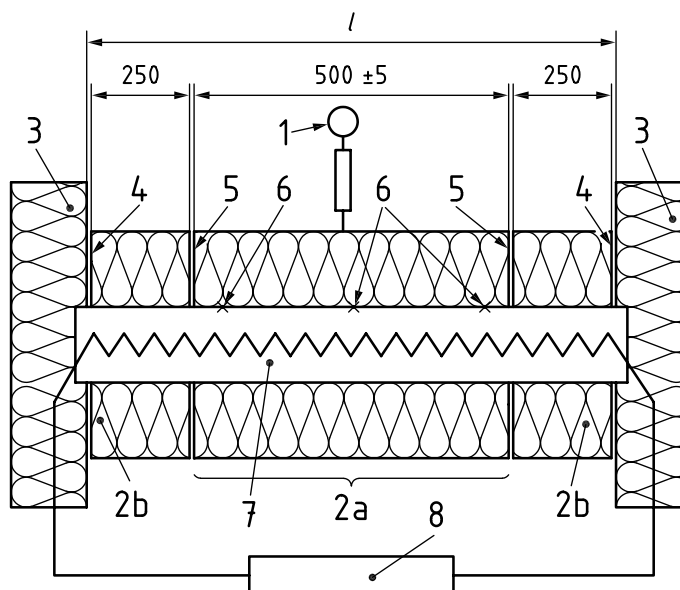
5.3 Temperature sensors (e.g. thermocouples), capable of recording the hot surface temperature of the test pipe to the nearest ± 1 % in centigrade but not less than ± 1 °C, which are placed within grooves on the hot pipe.

5.4 Flexible metal foil, three pieces (e.g. brass), capable of exerting a uniform pressure of 500 Pa on the upper surface of the test specimen along its testing length of (500 ± 5) mm and the two end guards, length (250 ± 5) mm. The pressure shall be calculated using the area, e.g. the test length of 500 mm times the diameter of the hot pipe.

5.5 Device (e.g. electromechanical), for measuring the thickness of the test specimen during the test to the nearest 0,1 mm.

When determining the thickness of the test specimen, the thermal movement of the apparatus (e.g. quartz rod) shall be taken into account up to the maximum service temperature.

Dimensions in millimetres



Key

- | | | | |
|----|---|----------|---|
| 1 | device for measuring thickness,
e. g. electromechanical device | 5 | circumferential joints |
| 2a | test length of the test specimen | 6 | thermocouples |
| 2b | test specimen end guard | 7 | hot pipe |
| 3 | end insulation | 8 | power supply and temperature control |
| 4 | small gap | <i>l</i> | length of the hot pipe between the end insulation |

Figure 1 — Example of an apparatus for determining maximum service temperature — General arrangement