



SLOVENSKI STANDARD

SIST EN 14707:2006

01-maj-2006

Toplotnoizolacijski proizvodi za opremo stavb in industrijske inštalacije – Ugotavljanje najvišje temperature servisiranja predoblikovanih cevnih izolacij

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

Wärmedämmstoffe für die Haustechnik und für betriebstechnische Anlagen -
Bestimmung der oberen Anwendungsgrenztemperatur von vorgeformten
Rohrdämmstoffen

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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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Ta slovenski standard je istoveten z: EN 14707:2005

ICS:

91.100.60

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en

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ICS 91.100.60

English Version

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

Wärmedämmstoffe für die Haustechnik und für betriebstechnische Anlagen - Bestimmung der oberen Anwendungsgrenztemperatur von vorgeformten Rohrdämmstoffen

This European Standard was approved by CEN on 19 October 2005.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This European Standard (EN 14707:2005) has been prepared by Technical Committee CEN/TC 88 “Thermal insulating materials and products”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2006, and conflicting national standards shall be withdrawn at the latest by May 2006.

This European Standard is one of a series of European Standards which specify test methods for determining dimensions and properties of thermal insulating materials and products. It supports a series of product standards for thermal insulating materials and products which derive from the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to construction products (Directive 89/106/EEC) through the consideration of the essential requirements.

This European Standard contains the following two normative annexes:

- Annex A — Modifications of and additions to the general test method for mineral wool products;
- Annex B — Modifications of and additions to the general test method for polyethylene foam and flexible elastomeric foam products.

This European Standard has been prepared for products used to insulate building equipment and industrial installations, but it may also be applied to products used in other areas.

A similar standard is available for testing of flat products EN 14706 *Thermal insulating products for building equipment and industrial installations — Determination of maximum service temperature*.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This European Standard 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 referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13467, *Thermal insulating products for building equipment and industrial installations — Determination of dimensions, squareness and linearity of preformed pipe insulation.*

EN 14706, *Thermal insulating products for building equipment and industrial installations — Determination of maximum service temperature.*

3 Terms and definitions

For the purposes of this European Standard, the following definition applies.

3.1

Maximum service temperature

highest temperature to which a thermal insulation product may be exposed at a given thickness and at which it will continue to function within specified limits of performance
[prEN ISO 9229]

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NOTE 1 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 In the present test procedure, 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.

4 Principle

Measure thickness and length 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 may be an iterative process.

Additional requirements for assessing the maximum service temperature of specific materials are described in normative annexes to this European Standard or the relevant product standard or any other European technical specification.

5 Apparatus

A general arrangement of the apparatus is indicated in Figure 1 and comprises 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 ± 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 will permit 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.

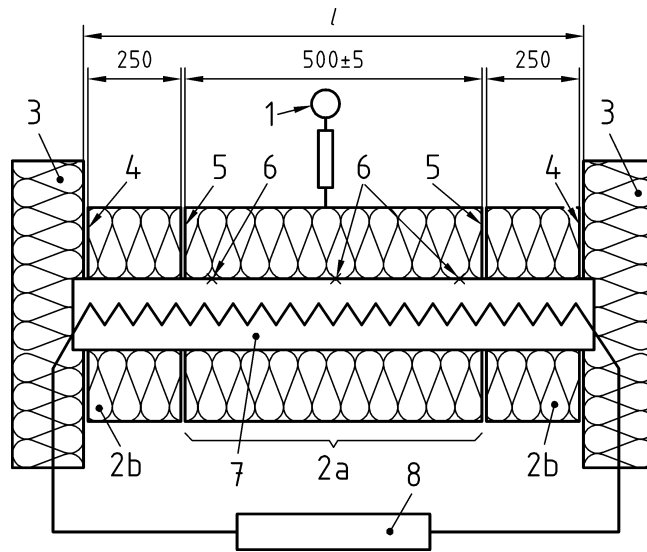
5.4 Flexible metal foil, 3 pieces, (e.g. brass) capable of exerting a uniform pressure of 500 Pa on the upper surface of the test specimen along its testing length of (500 ± 5) mm and the two end guards, length (250 ± 5) mm. The pressure shall be calculated using the area: e.g. the test length of 500 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.

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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.

All dimensions in millimetres



Key

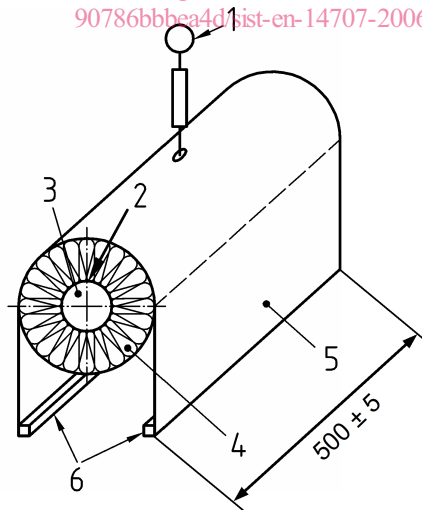
- | | |
|--|--|
| 1 Device for measuring thickness, e. g. electromechanical device | 5 Circumferential joints |
| 2a Test length of the test specimen | 6 Thermocouples |
| 2b Test specimen end guard | 7 Hot pipe |
| 3 End insulation | 8 Power supply and temperature control |
| 4 Small gap | |

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a) General arrangement

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All dimensions in millimetres

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Key

- | | |
|---|-----------------------|
| 1 Device for measuring thickness, e.g. electromechanical device | 4 Test specimen |
| 2 Thermocouple | 5 Flexible metal foil |
| 3 Hot pipe | 6 Weights for loading |

b) Test specimen loading arrangement

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

6 Test specimens

6.1 Dimensions of test specimens

Length: The test specimen, length $(1\,000 \pm 10)$ mm, shall be cut at right angles to its length to give two end guards, length each (250 ± 5) mm, and a test length of (500 ± 5) mm.

Thickness: The thickness shall be 100 mm or the largest thickness below 100 mm available.

Inside diameter: Two sizes shall be tested, one between 25 mm and 65 mm and the other between 85 mm and 220 mm.

The dimensions shall be as specified in the relevant product standard or annex to this European Standard.

NOTE 1 In the absence of a product standard or any other European Technical Specification, the dimensions may be agreed between parties.

NOTE 2 Testing may be performed on multi-layer systems to simulate the conditions existing in the application.

If the pipe insulation is cut from a homogeneous, isotropic flat product, then the maximum service temperature can be obtained from tests carried out on the flat product with similar properties in accordance with EN 14706.

6.2 Number of test specimens

The number of test specimens shall be as specified in the relevant product standard. If the number is not specified, then at least one test specimen for each size shall be used.

NOTE In the absence of a product standard or any other European technical specification the number of test specimens may be agreed between parties.

6.3 Conditioning of test specimens

The test specimens shall be stored for at least 6 h at (23 ± 5) °C. In case of dispute they shall be stored at (23 ± 2) °C and (50 ± 5) % relative humidity for the time specified in the relevant product standard or at least 24 h.

7 Procedure

7.1 Test conditions

The initial temperature of test specimen and the hot pipe shall be (23 ± 5) °C.

7.2 Test procedure

Measure the length, the inside diameter and the thickness of the test specimen, l_0 , D_1 , d_0 , in accordance with EN 13467 to the nearest 0,5 mm.

Install the test specimen (the two guards and the test length of the test specimen) on the hot pipe and ensure contact on the upper part of the hot pipe between the test specimen and the hot surface. Avoid any longitudinal gaps and any gaps between the end guards and the test length of the test specimen. The installation practice shall duplicate the practice, if required in the product standard.

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Place the two pieces of flexible metal foil over the two end guards, length (250 ± 5) mm, and exert a pressure of 500 Pa (see 5.4).

Place the third flexible metal foil, (length (500 ± 5) mm, over the test specimen test length and exert a pressure of 500 Pa (see 5.4).

NOTE For polyethylene foam and flexible elastomeric foam products see Annex B.

Measure the thickness of the test specimen, d_1 , to the nearest 0,1 mm.

Heat the test specimen using a temperature rate of increase between 50 °C/h and 300 °C/h, as specified in the relevant product standard or annex of this European Standard.

Maintain the temperature of the hot side, at the expected maximum service temperature, for 72 hours within ± 2 % of this temperature or ± 10 °C, whichever is smaller.

Record the thickness continuously during the test and at the end of the 72 hour period, d_2 , to the nearest 0,1 mm.

Cool the test specimen in the equipment, to a temperature of < 35 °C and re-measure the thickness, d_3 , to the nearest 0,1 mm, unless otherwise specified in the relevant product standard or annex of this European Standard.

Observe the presence of any longitudinal gaps and any gaps between the end guards and the test length of the test specimen and measure their width to the nearest 0,1 mm.

Examine the test specimen visually and note any changes caused by the test.

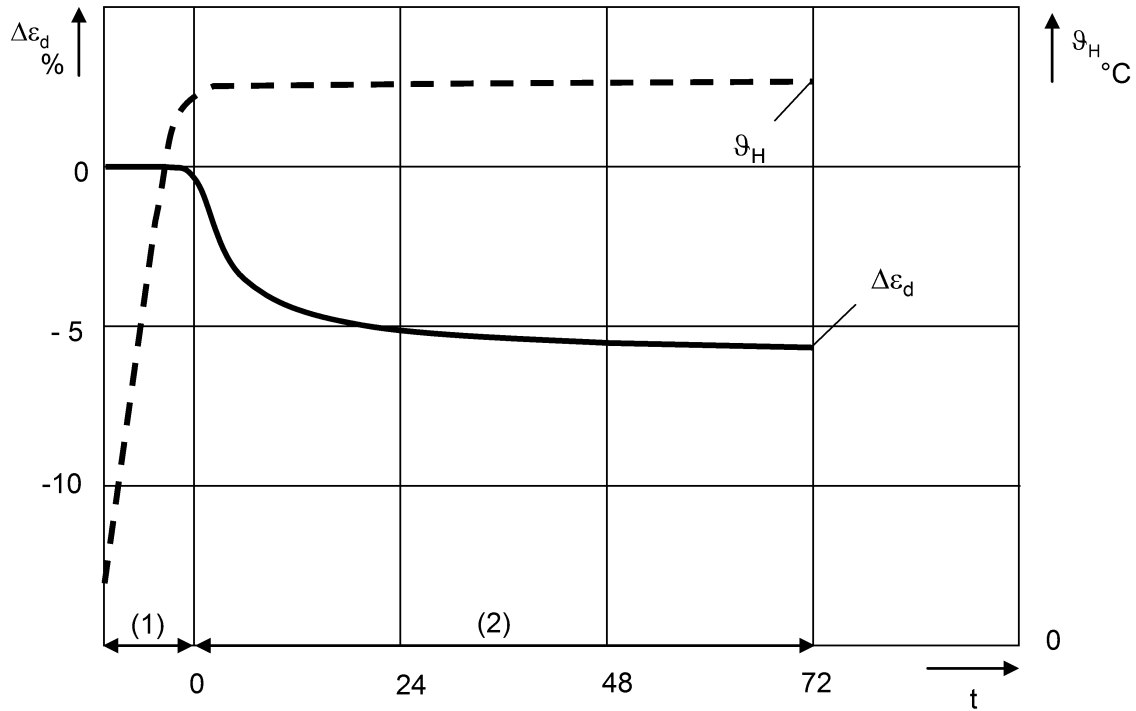
If the relevant product standard or annex of this European Standard specifies additional requirements the observations and/or tests shall be performed accordingly.

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8 Calculation and expression of results

8.1 Thickness deformation versus time

The curves thickness deformation versus time and temperature versus time recorded during testing shall be given. An example is shown in Figure 2.

**Key**

(1) Period of heating

(2) Period of testing

 $\Delta\varepsilon_d$ Change in thickness in percentage θ_H

Temperature of the hot plate in

t Time in hours

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Figure 2 — Example of hot plate temperature and thickness change versus time curves