

**Soojaisolatsioon. Ringlustorude
soojaisolatsiooni statsionaarse
soojaülekande omaduste määramine**

Thermal insulation - Determination of steady-state thermal transmission properties of thermal insulation for circular pipes

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 8497:1999 sisaldab Euroopa standardi EN ISO 8497:1996 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 23.11.1999 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 8497:1999 consists of the English text of the European standard EN ISO 8497:1996.</p> <p>This document is endorsed on 23.11.1999 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala: See standard määrab kindlaks meetodi soojaisolatsiooni statsionaarse soojaülekande omaduste määramiseks ringlustorudel, mis tavaliselt töötavad keskkonna temperatuurist kõrgemal temperatuuril. Standard esitab seadmete talitlusnõuded, kuid ei täpsusta seadmete konstruktsiooni.</p>	<p>Scope:</p>
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ICS 27.220

Võtmesõnad: määramine, soojaisolatsioon, soojajuhtivus, soojatakistus, soojuslik mõõtmine, soojuslikud omadused, teimid, torud

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Descriptors: Thermal insulation, testing, pipe lagging.

English version

Thermal insulation

**Determination of steady-state thermal transmission
properties of thermal insulation for circular pipes
(ISO 8497:1994)**

Isolation thermique – Détermination des propriétés relatives au transfert de chaleur en régime stationnaire dans les isolants thermiques pour conduites (ISO 8497:1994)

Wärmeschutz – Bestimmung der Wärmetransporteigenschaften im stationären Zustand von Wärmedämmungen für Rohrleitungen (ISO 8497:1994)

This European Standard was approved by CEN on 1995-11-11 and is identical to the ISO Standard as referred to.

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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Foreword

International Standard

ISO 8497:1994 Thermal insulation – Determination of steady-state thermal transmission properties of thermal insulation for circular pipes,

which was prepared by ISO/TC 163 ‘Thermal insulation’ of the International Organization for Standardization, has been adopted by Technical Committee CEN/TC 89 ‘Thermal performance of buildings components’ as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by February 1997 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and United Kingdom.

Endorsement notice

The text of the International Standard ISO 8497:1994 was approved by CEN as a European Standard without any modification.

NOTE: Normative references to international publications are listed in Annex ZA (normative).

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Introduction

The thermal transmission properties of pipe insulation generally have to be determined using pipe test apparatus rather than flat specimen apparatus such as the guarded hot plate or the heat flow meter apparatus, if results are to be representative of end-use performance. Insulation material formed into flat sheets often has different internal geometry from that of the same material formed into cylindrical shapes. Furthermore, properties often depend significantly upon the direction of heat flow in relation to inherent characteristics such as fibre planes or elongated cells: thus flat specimen one-dimensional heat flow measurements may not necessarily be representative of the two-dimensional radial heat flow encountered in pipe insulation.

Another consideration is that commercial insulations for pipes are often made with the inside diameter slightly larger than the outside diameter of the pipe, otherwise manufacturing tolerances may result in an imperfect fit on the pipe, thus creating an air gap of variable thickness. In those cases where end-use performance data rather than material properties are to be determined, the insulation is mounted on the test pipe in the same loose manner so that the effect of the air gap will be included in the measurements. This would not be the case if properties were determined in a flat plate apparatus where good plate contact is required.

Still another consideration is that natural convection currents around insulation installed on a pipe will cause non-uniform surface temperatures. Such conditions will not be duplicated in a flat plate apparatus with uniform plate temperatures.

NOTE 1 Comparison tests on apparently similar material using both pipe apparatus and flat plate apparatus have shown varying degrees of agreement of measured thermal transmission properties. It appears that better agreement is often obtained for heavier density products which tend to be more uniform, homogeneous and sometimes more isotropic. For those materials which have repeatedly shown acceptable agreement in such comparisons, the use of data from flat plate apparatus to characterize pipe insulation may be justified. As a general rule, when such agreement has not been shown, the pipe test apparatus shall be used to obtain thermal transmission data for pipe insulations.

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1 Scope

This International Standard specifies a method for the determination of steady-state thermal transmission properties of thermal insulations for circular pipes generally operating at temperatures above ambient. It specifies apparatus performance requirements, but it does not specify apparatus design.

The type of specimen, temperatures and test conditions to which this International Standard applies are specified in clauses 5 and 6.

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 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*.

3 Definitions

NOTE 2 The geometry of pipe insulation requires special terms not applicable to flat specimens. The word "linear" is used to denote properties based upon a unit length (in the pipe axis direction) of a specified insulation size. These linear properties, identified by the subscript "l", are convenient since the total heat loss can then be calculated knowing the pipe length and the applicable temperature.

"Linear" does not denote heat flow in the axial direction. In this International Standard, the direction of heat flow is predominantly radial.

For the purposes of this International Standard, the following definitions apply. The definitions and symbols given in the following clauses are based upon those in ISO 7345 except for the linear thermal transference (3.1).

3.1 linear thermal transference, K_l : Linear density of heat flow rate divided by the temperature difference between the pipe surface and the ambient air in the steady-state condition. It relates to a specific in-