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Thermal insulating products for building equipment and industrial installations — Determination of water vapour transmission properties of preformed pipe insulation

Produits isolants thermiques pour les équipements de bâtiments et les installations industrielles — Détermination des propriétés de transmission de la vapeur d'eau des coquilles isolantes préformées

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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Foreword

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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 12629:2011), which has been technically revised.

The main changes are as follows:

— EN 13469:2012 and ISO 12629:2011 have been merged into one document;

— technical revision of Clause 3, Terms, definitions, symbols and subscripts, 6.3, Number of test specimens, Clause 7, Procedure and Clause 8, Calculation and expression of results;

— Annex A has been deleted;

— 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.

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Thermal insulating products for building equipment and industrial installations — Determination of water vapour transmission properties of preformed pipe insulation

1 Scope

This document specifies the equipment and procedure for determining the water vapour transmission properties in the steady state under specified test conditions for test specimens of preformed pipe insulation. It is applicable to thermal insulating products.

It is intended to be used for homogeneous materials (see NOTE below) and for products which can have integral skins or adhered facings of some different material.

NOTE A material is considered to be homogeneous in terms of mass distribution if its density is approximately the same throughout, i.e. if the measured density values are close to its mean density.

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 9346, *Hygrothermal performance of buildings and building materials — Physical quantities for mass transfer — Vocabulary*

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

ISO 29768, *Thermal insulating products for building applications — Determination of linear dimensions of test specimens*

3 Terms, definitions, symbols, units and subscripts

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9346 and the following 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/

3.1.1
water vapour flow rate
G
quantity of water vapour transmitted through the surface of the test specimen in mass divided by time

3.1.2
density of water vapour flow rate
g
mass of water vapour transferred through the specimen per area and per time under specified conditions of temperature, humidity and thickness

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3.1.3
water vapour permeance
W
quotient of water vapour transmission rate of the test specimen and the water vapour pressure difference per area between the test specimen faces during the test

3.1.4
water vapour resistance
Z
inverse of *water vapour permeance* (3.1.3) ($1/W$)

3.1.5
water vapour permeability
δ
product of the permeance and the thickness of the test specimen ($\delta = W \cdot d$)

Note 1 to entry: The water vapour permeability of a homogeneous product is a property of the material. It is the quantity of water vapour transmitted per unit of time through a unit area of the product per unit of vapour pressure difference between its faces for a unit thickness.

3.1.6
water vapour resistance factor
μ
quotient of the *water vapour permeability* (3.1.5) of air and the water vapour permeability of the material or the homogeneous product concerned

Note 1 to entry: It indicates the relative magnitude of the *water vapour resistance* (3.1.4) of the product and that of an equally thick layer of stationary air at the same temperature.

3.2 Symbols and units

The symbols and units are given in Table 1.

Table 1 — Symbols and units

Symbol	Quantity	Unit
A	area of specimen	m^2
G	water vapour flow rate through specimen	kg/s
R_v	gas constant for water vapour = 462	N·m/(kg·K)
T	thermodynamic temperature	K
W	water vapour permeance with respect to partial vapour pressure	$kg/(m^2 \cdot s \cdot Pa)$
Z	water vapour resistance with respect to partial vapour pressure	$m^2 \cdot s \cdot Pa/kg$
d	mean thickness of specimen	m
g	density of water vapour flow rate	$kg/(m^2 \cdot s)$
l	length of the test specimen	m
m	mass of specimen	kg
p	barometric pressure	hPa
p_0	standard barometric pressure = 1 013,25	hPa
p_s	water vapour saturation pressure	hPa
t	time	s
Δp	water vapour pressure difference across specimen	Pa
δ	water vapour permeability of the specimen	kg/(m·s·Pa)
δ_a	water vapour permeability of air	kg/(m·s·Pa)

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