

Thermal insulation for buildings - Reflective insulation products - Determination of the declared thermal performance

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 16012:2012+A1:2015 sisaldab Euroopa standardi EN 16012:2012+A1:2015 ingliskeelset teksti.	This Estonian standard EVS-EN 16012:2012+A1:2015 consists of the English text of the European standard EN 16012:2012+A1:2015.
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English Version

**Thermal insulation for buildings - Reflective insulation products -
Determination of the declared thermal performance**

Isolation thermique des bâtiments - Produits d'isolation
réfléchissants - Détermination de la performance thermique
déclarée

Wärmedämmstoffe für Gebäude - Reflektierende
Wärmedämm-Produkte - Bestimmung der Nennwerte der
wärmetechnischen Eigenschaften

This European Standard was approved by CEN on 23 December 2011 and includes Amendment 1 approved by CEN on 29 November 2014.

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Foreword

This document (EN 16012:2012+A1:2015) has been prepared by Technical Committee CEN/TC 89 “Thermal performance of buildings and building components”, the secretariat of which is held by SIS.

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of an identical text or by endorsement, at the latest by August 2015, and conflicting national standards shall be withdrawn at the latest by August 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1, approved by CEN on 2014-11-29.

This document supersedes EN 16012:2012.

The start and finish of text introduced or altered by amendment is indicated in the text by tags **A1** **A1**.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

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

Introduction

Reflective (low emissivity at the appropriate wavelength) surfaces are utilized in a number of ways to enhance the thermal performance of insulating products. Their role is to reduce the heat transfer by thermal radiation in some parts of the system. This is achieved because low emissivity surfaces reduce the radiant heat transferred through a product that is wholly or partially transparent to infra-red radiation (e.g. very low density fibrous insulation). They will also reduce the radiant heat transfer across any air gap or gaps that are present in the system. In some cases, air gaps can be an intrinsic part of the structure and in other cases the insulation can be installed in such a way as to deliberately create an air gap between the reflective surfaces and the structure.

Unless otherwise stipulated by the manufacturer, the declared thermal performance should include an adjacent vertical air space on either side of the product, and the declared thermal performance should also include a statement of the thickness of these airspaces included as part of the declared value. The declared value can, alternatively, be given as the combination of the thermal resistance of the “core” of the product together with the measured value of the emissivity of the surfaces.

Since all conventional thermal insulation products declare their thermal performance on the basis of the value to be expected over a reasonable working life, this is also addressed in a limited manner in this standard in the assessment of emissivity of the surface(s) of reflective insulation. In the absence of any quantified and certified data on the aged performance of a facing over a normal lifetime for a building material, the ageing of the low emissivity surface is assessed by use of an accelerated ageing procedure.

How the thermal properties of insulation materials that utilize reflective surfaces are determined will depend on the form in which they are sold and how they are intended to be used. This standard describes a number of different approaches which can be utilized and specifies which approach to use for the different types of product. Where a product is already subject to a product specification that describes procedures for the measurement of the aged 90/90 fractile thermal conductivity or thermal resistance of the core insulation material, the following guidance should only be used to determine the component of its thermal performance that depends on the emissivity of its external faces. However, it should be remembered that the declared value is only the first step, giving comparative performance values under specified conditions, and the design value can give more information for use by the designer in specific applications, especially under different climatic conditions.

1 Scope

This European Standard describes a set of procedures for using existing standardized CEN or ISO test and calculation methods to determine the declared thermal performance of reflective insulation products. This European Standard supports and does not replace existing CEN or ISO test methods.

This European Standard applies to any thermal insulation product that derives a proportion of its claimed thermal properties from the presence of one or more reflective or low emissivity surfaces together with any associated airspace(s). It does not replace the existing procedures for the determination of the thermal performance of products already covered by an existing harmonized product standard where the declared value of these products does not specifically include any claims attributable to the emissivity of the facing.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 823:1994, *Thermal insulating products for building applications — Determination of thickness*

EN 1946-1, *Thermal performance of building products and components — Specific criteria for the assessment of laboratories measuring heat transfer properties — Part 1: Common criteria*

EN 1946-2, *Thermal performance of building products and components - Specific criteria for the assessment of laboratories measuring heat transfer properties - Part 2: Measurements by guarded hot plate method*

EN 1946-3, *Thermal performance of building products and components - Specific criteria for the assessment of laboratories measuring heat transfer properties - Part 3: Measurements by heat flow meter method*

EN 1946-4, *Thermal performance of building products and components - Specific criteria for the assessment of laboratories measuring heat transfer properties - Part 4: Measurements by hot box methods*

EN 12664, *Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Dry and moist products of medium and low thermal resistance*

EN 12667, *Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Products of high and medium thermal resistance*

EN ISO 6946, *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method (ISO 6946)*

EN ISO 7345, *Thermal insulation — Physical quantities and definitions (ISO 7345)*

EN ISO 8990, *Thermal insulation — Determination of steady-state thermal transmission properties — Calibrated and guarded hot box (ISO 8990)*

EN ISO 9229, *Thermal Insulation — Vocabulary (ISO 9229)*

EN ISO 9288, *Thermal insulation — Heat transfer by radiation — Physical quantities and definitions (ISO 9288)*

EN ISO 10456, *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values (ISO 10456)*

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*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms, definitions, symbols and units

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 7345, EN ISO 9288, EN ISO 9229 and the following apply.

3.1.1

declared thermal performance

value of thermal performance, declared by a manufacturer, which is derived from measured values under the specified conditions and rules given in this standard

3.1.2

indentation

concave depression in the surface of the facing (foil) such that shallow air pockets are created when the surface is in contact with a smooth flat plate

3.1.3

core thermal resistance

thermal resistance of the product from face to face at the tested thickness, excluding the contribution of any low emissivity outer surface or any air space(s) adjacent to the product

3.1.4

emissivity

ratio of the energy radiated by a surface relative to the energy radiated by a blackbody at the same temperature

3.1.5

reflective surface

low emissivity surface

surface which has a low emissivity at the appropriate wavelength within the temperature range found in building elements

3.1.6

reflective insulation

insulation product which has one or both external face(s) comprising a reflective surface

Note 1 to entry It is a measure of a material's ability to radiate heat.

3.2 Symbols and units

For the purposes of this standard, the following symbols and units apply.