



National Standards Authority of Ireland

IRISH STANDARD

I.S. EN 12939:2000

ICS 91.100.60

**THERMAL PERFORMANCE OF BUILDING
MATERIALS AND PRODUCTS -
DETERMINATION OF THERMAL
RESISTANCE BY MEANS OF GUARDED HOT
PLATE AND HEAT FLOW METER METHODS -
THICK PRODUCTS OF HIGH AND MEDIUM
THERMAL RESISTANCE**

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12939

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English version

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

Performance thermique des matériaux et produits pour le
bâtiment - Détermination de la résistance thermique par la
méthode de la plaque chaude gardée et la méthode
fluxmétrique - Produits épais de haute et moyenne
résistance thermique

Wärmetechnisches Verhalten von Baustoffen und
Bauprodukten - Bestimmung des
Wärmedurchlasswiderstandes nach dem Verfahren mit
dem Plattengerät und dem Wärmestrommessplatten-Gerät
- Dicke Produkte mit hohem und mittlerem
Wärmedurchlasswiderstand

This European Standard was approved by CEN on 18 October 2000.

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 Management Centre 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 Management Centre has the same status as the official versions.

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Foreword

This European Standard 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of an identical text or by endorsement, at the latest by May 2001, and conflicting national standards shall be withdrawn at the latest by May 2001.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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

The annexes A and B are normative. The annexes C and D are informative.

Introduction

This standard is intended to complement EN 12667. It addresses specific problems when testing, according to European product standards, thick high and medium thermal resistance specimens with a heat flow meter or guarded hot plate.

In this standard the references to ISO 8301:1991 and ISO 8302:1991 are limited to some experimental procedures and to the error analysis. The guarded hot plate and heat flow meter methods are described in EN 12667; assessment procedures are described in EN 1946-2:1999 and EN 1946-3:1999.

A CEN Report CR xxx, The use of interpolating equations in relation to measurements on thick specimens, (under preparation) supplies additional information on the use of interpolating functions to predict the thickness effect.

Among existing apparatus for steady state thermal testing, guarded hot plate apparatus and heat flow meter apparatus can be operated up to specimen thicknesses of 100 mm to 150 mm if the accuracy has to be kept within 2 % (and possibly 1 %), while the accuracy of guarded and calibrated hot box apparatus, which can test thicker specimens, is not as good as that of the previously mentioned two test apparatus.

As the thickness of many insulating products exceeds 100 mm to 150 mm, there is a need for a testing procedure that will supply enough information to predict the thermal performance of insulation products at their actual thicknesses. Different options are offered in this standard; the most appropriate one may be indicated in product standards.

When the thickness effect is relevant, i.e. when the thermal resistance of a thick product cannot be calculated as the sum of the thermal resistances of slices cut from the product, some material parameters are determined for use in interpolating equations. The procedure to determine these parameters is split into preliminary and routine measurements and evaluations, see C.1.

Background information and additional information on the use of interpolating equations is to be found in CR xxx.

1 Scope

This standard gives the procedures to determine the thermal resistance of products the thicknesses of which exceed the maximum thickness for guarded hot plate or heat flow meter apparatus. In any case most of the procedures described in this standard require apparatus that allows tests on specimens up to 100 mm thick.

This standard gives guidelines to assess the relevance of the thickness effect, i.e. to establish whether the thermal resistance of a thick product can or cannot be calculated as the sum of the thermal resistances of slices cut from the product, these guidelines complement the indications given in ISO 8302:1991 on the guarded hot plate apparatus.

This standard describes testing conditions which prevent the onset of convection, which could take place in some products under the considered temperature differences and thicknesses.

2 Normative references

This standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 1946-2:1999	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 1946-3:1999	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 12667: ¹⁾	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 7345	Thermal insulation - Physical quantities and definitions (ISO 7345:1987)
EN ISO 9288	Thermal insulation - Heat transfer by radiation - Physical quantities and definitions (ISO 9288:1989)
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

¹ To be published

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