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THERMAL PERFORMANCE OF BUILDING MATERIALS - THE USE OF INTERPOLATING EQUATIONS IN RELATION TO THERMAL MEASUREMENT ON THICK SPECIMENS - GUARDED HOT PLATE AND HEAT FLOW METER APPARATUS

National Standards
Authority of Ireland
Glasnevin, Dublin 9
Ireland

Tel: +353 1 807 3800
Fax: +353 1 807 3838
http://www.nsai.ie

Sales
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English Version

Thermal performance of building materials - The use of interpolating equations in relation to thermal measurement on thick specimens - Guarded hot plate and heat flow meter apparatus

Performance thermique des matériaux pour le bâtiment - Utilisation des équations d'interpolation dans le cadre des mesurages thermiques sur éprouvette épaisse - Plaque chaude gardée et appareil à fluxmètre

Die Anwendung von Interpolationsgleichungen für wärmetechnische Messungen und dicken Probekörpern - Heizplatten und Wärmestrom-Messapparate

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

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Foreword

This Technical Report (CEN/TR 15131:2006) has been prepared by Technical Committee CEN/TC 89 “Thermal performance of buildings and building components”, the secretariat of which is held by SIS.

1 Scope

This Technical Report supplements technical information on modelling of heat transfer in products of high and medium thermal resistance when the thickness effect may be relevant; by doing this it supplies minimum background information on the interpolating equations to be used in the procedures described in EN 12939 to test thick products of high and medium thermal resistance.

All testing procedures to evaluate the thermal performance of thick specimens require utilities, which are essentially based on interpolating functions containing a number of material parameters and testing conditions. Interpolating functions and material parameters are not the same for all materials.

Essential phenomena and common interpolating functions are presented in Clause 4, which is followed by separate equations for each material family.

This Technical Report also gives diagrams derived from the above interpolating equations to assess the relevance of the thickness effect for some insulating materials.

2 Normative references

The following referenced documents are indispensable for the application of this Technical Report. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12939:2000, *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*

EN ISO 7345:1995, *Thermal insulation – Physical quantities and definitions (ISO 7345:1987)*

EN ISO 9288:1996, *Thermal insulation – Heat transfer by radiation – Physical quantities and definitions (ISO 9288:1989)*

3 Terms, definitions and symbols

For the purposes of this Technical Report, the terms and definitions given in EN ISO 7345:1995, EN ISO 9288:1996 and EN 12939:2000 apply.

NOTE EN ISO 9288 defines spectral directional extinction, absorption and scattering coefficients and the spectral directional albedo only, while this Technical Report makes use of total hemispherical coefficients, which can be obtained from the previous ones by appropriate integrations. To avoid confusion with the monochromatic directional coefficients, they are referenced here as related to the "two flux model", see Clause 4.

Symbol	Quantity	Unit
d	thickness	m
h	surface coefficient of heat transfer	
J	transfer factor	W/(m·K)
R	thermal resistance	m^2·K/W
T	thermodynamic temperature	K
ε	total hemispherical emissivity	
λ	thermal conductivity	W/(m·K)
λ_r	radiativity	
ρ	density	kg/m^3