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Thermal insulation of building elements — In-situ measurement of thermal resistance and thermal transmittance —

Part 3: Probe insertion method

Isolation thermique des éléments de construction — Mesurage in situ de la résistance thermique et du coefficient de transmission thermique —

Partie 3: Méthode par insertion d'une sonde



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Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols and units	2
5 Principle	2
5.1 General.....	2
5.2 Method without heat flow measurement.....	2
5.3 Method with heat flow measurement.....	2
6 Apparatus	3
6.1 Temperature measuring devices.....	3
6.1.1 Type of sensors and accuracy.....	3
6.1.2 Sensor for measuring temperature distribution in walls.....	3
6.1.3 Sensors for measuring surface and air temperatures.....	4
6.2 Borescope.....	4
6.3 Heat flow meter (HFM).....	5
7 Locations of the measured area and sensor installation	5
8 Measurement conditions and period	7
8.1 General.....	7
8.2 Method without heat flow measurement.....	7
8.3 Method with heat flow measurement.....	7
9 Measurement procedure	7
9.1 General.....	7
9.2 Method without heat flow measurement.....	7
9.3 Method with heat flow measurement.....	8
10 Calculations	9
10.1 Thickness of wall components.....	9
10.2 Temperature distribution.....	9
10.3 Thermal resistance.....	9
11 Test report	10
Annex A (normative) Evaluation of the effect of thermal bridges on the sensor for measuring the temperature distribution in the wall	12
Annex B (informative) Uncertainty analysis	18
Bibliography	21

Foreword

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A list of all parts in the ISO 9869 series can be found on the ISO website.

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Introduction

The ISO 9869 series describes the in-situ measurement of the thermal transmission properties of plane building components, primarily consisting of opaque layers perpendicular to the heat flow and having no significant lateral heat flow. The thermal transmittance of a building element (U-value) is defined in ISO 7345 as the heat flux per unit area and unit temperature difference in the steady state condition. Since steady state conditions are never encountered on a site in practice, such a simple measurement is not possible. Although various statistical methods have been introduced to address this problem, one of the simplest is the use of the mean values over a sufficiently long period of time. The required time for observation for reliable measurements depends on the thermal properties of the building components and the nature of the temperature difference between the surroundings on each of the sides thereof.

ISO 9869-1 describes the method used to estimate the thermal steady state properties of a building element from heat flow meter (HFM) measurements through plane building components. [Annex B](#) describes the statistical methods of the simple mean and the sophisticated method of dynamic analysis for steady state properties. This document describes a screening test of the insulation condition and thermal resistance of existing building elements by visual observation with a borescope and by measurement of the temperature gradient and heat flow with a temperature sensing rod and HFM. Although the method used in this document is not a non-destructive inspection method, the diameter of the borehole drilled through the building element is approximately less than 2 mm. The method described in this document is intended for use as a practical diagnostic procedure of the thermal transmission properties of plane building components with light heat capacity such as those in frame structure dwelling.

The thermal performance of a part of the building element is evaluated by obtaining the temperature gradient through the building element and the heat flow rate. The thermal transmittance (thermal resistance) of the insulation layer of the building components for the steady state condition can be obtained by using the averages of the observed values over a certain period of time.