University of Salford MANCHESTER

THERMAL MEASUREMENT LABORATORY

School of Science, Engineering and Environment
Newton Building, The University of Salford
Salford, M5 4WT
Tel: 0161 295 5172 / 3114

Technical Report

Point thermal transmittance of Swifix fitting solution with Rawplug FF1

SWIFIX LTD

Project: 00216

Your Order No.: PO353

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Signed:

Dr. A Simpson
Head of Laboratory
a.simpson@salford.ac.uk

Approved:

Mr. I G Rattigan
Quality Manager
i.g.rattigan@salford.ac.uk

1. Introduction

The University of Salford Thermal Measurement Laboratory was commissioned to measure the Point thermal transmittance of the Swifix fitting solution with Rawplug FF1. A point thermal bridge is a localised thermal bridge whose influence can be represented by a point thermal transmittance. The point thermal transmittance χ is the heat flow in the steady state divided by the temperature difference between the environments on either side of a thermal bridge (W/K)[1].

The point thermal transmittance has been determined experimentally by measuring the thermal resistance two near identical EWI samples, one with and one without the Swifix fitting solution (Rawplug FF1 frame fixing). The results are given in Reports 2780 and 2781 and summarised in Table 1.

2. Test Setup

The external surface of the EWI samples has a rendered surface. The sample was assembled in the test apparatus such that there was a 26mm airspace between the rendered surface and the cold plate of the apparatus. The presence of the airspace was intended to simulate a typical surface resistance R_{se} on the

[1] EN ISO 14683: 2017 *Thermal bridges in building construction -Linear thermal transmittance – Simplified methods and default values*.

external surface, lying in the practical range of values between exposed and design situations (Table 2). The cap of the fixing protruded approximately 16mm into the airspace, leaving a 10mm space for air movement immediately above the fixing. Within the limits of measurement accuracy the surface resistance was calculated to be 0.03 m²K/W for both samples, with and without the fixing.

The heat flow has been derived from the test data giving the additional heat flow introduced by the fixing in the EWI sample during the tests as 0.11 W (Table 3). This equates to a point thermal transmittance of 0.009 W/K.

3. Results

Table 1: Summary of Test Results

	EWI ample without fixings + 26mm airspace	EWI sample with Swifix fitting solution with rawplug FF1 frame fixing + 26mm airspace
Report Reference	00216 REPORT 2781	00216 REPORT 2780
Thermal Resistance [m²K/W]	3.25	2.99
Airspace Thermal Resistance [m²K/W]	0.03	0.03
Area [m²]	0.3630	0.3611
Thickness [m]	0.1590	0.1599
Density of Heat Flux [W/m²]	3.178	4.044
Temperature Difference [K]	12.09	12.10

Table 2: Standard External surface resistances R_{se} (m²K/W)

Building element	Direction of heat flow	Exposed	BS EN ISO 6946 (normal design value)	Sheltered
Wall	Horizontal	0.02	0.04	0.06
Roof	Upward	0.02	0.04	0.06
Floor	Downward	0.02	0.04	0.06

Table 3: Derived Point Thermal Transmittance

	EWI ample without fixings + 26mm airspace	EWI sample with Swifix fitting solution with rawplug FF1 frame fixing + 26mm airspace
Heat Flow [W]	1.35	1.46
Heat Flow / Temp. Difference [K/W]	0.112	0.121
Point Thermal Transmittance, χ [W/K]	**-.-**	**0.009**

The additional heat flow introduced by the fixing in the EWI sample during the tests was found to be 0.11 W for a 12.1 K temperature difference. This equates to a point thermal transmittance of 0.009 W/K.