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BRITISH BOARD OF AGRÉMENT TEST REPORT No 45806A

Determination of the thermal transmittance (U-value) of a Kerb Section for Naturalight

Contents

Summary

This report describes the determination of the thermal transmittance (U value) of an NLS L2 Advance rooflight kerb. The sample was tested with an EPS panel of known value fixed to the top and the whole assembly mounted in a known surround panel. The testing was carried out generally in accordance with BS EN ISO 12567-1:2000.

The Kerb section is nominally 1480 mm high, 1230 mm wide, 300mm deep and 70 mm thick.

The standardised thermal transmittance (U value) of the Kerb section is 0.76 W/(m^2·K).

Tested by:

Date: 27 October 2010

Authorised by:

Date: 28 October 2010

On behalf of the British Board of Agrément

Client:	NaturaLight Systems Ltd Accessory House Barrington Industrial Estate Bedlington NE22 7QD
Job No:	T145806
Work period:	October 2010

1 TEST SPECIMEN

The Client supplied a sample described as an NLS L2 Advance Rooflight kerb.
Specimen was assigned the BBA reference T145806/1

2 APPARATUS

The test was carried out in the British Board of Agrément Thermal Transmittance Facility designated U Rig 2 which is designed to satisfy the relevant criteria of BS EN ISO 8990 : 1996 *Thermal Insulation – Determination of steady-state thermal transmission properties – Calibrated and guarded hot box.*

The apparatus is a Guarded hot box with metering box aperture dimensions of 1.9 m high by 2.4 m wide. The guard chamber and cold box apertures are 2.8 m high by 3.3 m wide. All surfaces 'seen' by the test specimen are matt black.

3 TEST PROCEDURE

3.1 Calibration measurements

In establishing the operating parameters of the facility, a series of tests were conducted on calibration panels (infill panels of known thermal performance) mounted in the same surround panel used for the window test in accordance with section 6.2 of BS EN ISO 12567-1: 2000 *Thermal performance of windows and doors - Determination of thermal transmittance by hot box method – Complete windows and doors*. A 20 mm thick calibration panel was used to establish the air velocity on the cold side for which, at a heat flux density of 35 W/m^2, the sum of the hot and cold side surfaces resistances for the calibration panel is 0.17m^2/KW. The measured air velocity on the cold side was 2.8 ± 0.3 m/s.

Further tests were conducted with the same calibration panel and 60 mm calibration panel at the same air velocity for heat flux densities (q_{sp}) of 17, 26, and 44W/m^2 in order to establish the following relationships:

- total surface resistance: $R_{s,t} = 0.1871 \cdot q_{sp}^{-0.02330}$
- hot side convective fraction $F_{c,i} = 0.3549+0.00162 \cdot q_{sp}$
- cold side convective fraction $F_{c,e} = 0.7783+0.000337 \cdot q_{sp}$

In order to ensure that the heat flow through the surround panel is fully accounted for the variation of its thermal resistance with mean temperature was established. Tests were conducted using a second calibration panel at panel heat flux densities of 5, 9, 12 and 16 W/m^2 in accordance with section 6.2.3 of BS EN ISO 12567-1: 2000. The resistance of the surround panel was determined as:

- $R_{sur} = 2.502+0.016600 \cdot \theta_{me,sur}$

4 TEST RESULTS

The test started on 24-Oct-10 and ended at 08:21 on 25-Oct-10 after a 23.9 hour period of stability. The laboratory temperature during the period of stability was between 21.1°C and 24.1ºC.

4.1 Measured values

Kerb dimensions:		
-	height	1480 mm
-	width	1230 mm
-	depth	300mm
-	thickness	70 mm
Warm side temperatures:		
-	mean air	20.9°C
-	mean enclosure	20.6°C
Cold side temperatures		
-	mean air	0.1°C
-	mean enclosure	0.1°C
Air speed in cold box (up the panel)		1.5 ms^{-1}
Air speed in hot box (down the panel)		<0.3 ms^{-1}

4.2 Calculated values

Total mean power to metering box	66.6 W
Heat flux through the whole sample	46.0 W
Soffit Loss	0.08 W
Heat flux through EPS known panel	17.9 W
Heat flux through sample	28.1 W
Warm side convective fraction	0.395
Cold side convective fraction	0.787
Mean warm side environmental temperature	20.7°C
Mean cold side environmental temperature	0.1°C
Thermal transmittance (measured)	0.76 W/(m^2·K)

* The overall measurement uncertainty is estimated to be within ± 5.5% based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%.

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