

Title: Determination of the Adhesion Strength of Aluminium Backing to a Glass/Aluminium Composite Rainscreen Cladding after Thermal Cycling

Certificate of Test Number: 13169

Client's Name & Address:

Cladding UK Ltd
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Our Ref: N950/V016

TW Job No: 3NF1 – C3442

Your Ref: Order No. D113/VIN01/TOB

Date: 20 May 2010

Date sample(s) received: w/c 08 March 2010

Sample(s) received from: Cladding UK Ltd

Sample No: 145729 - 145736

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TECHNOLOGY CENTRE 

1. INTRODUCTION

This certificate of test describes the pull-off adhesion testing after a thermal cycling regime, carried out at the request of Cladding UK Ltd on 16 April 2010 at Technology Centre (TC), Leighton Buzzard.

The test was carried out in accordance with BS EN 1542:1999.

2. SAMPLE DESCRIPTION

Technology Centre received nine panels of Glass/Aluminium Composite rainscreen panels (TC Ref 145729 - 145737) of approx. dimensions 500x500x composite thickness (mm). The composite panels were given unique TC sample numbers for reference purposes only.

3. TEST PROCEDURE

3.1 Thermal Cycling

The thermal cycling regime undertaken on the six glass composite panels is fully described in Technology Centre Report No. N950/10/16177 dated 07 May 2010.

3.2 Pull-off Testing

Due to no material specific test method for adhesion testing of glass/aluminium composite, testing was undertaken in accordance with BS EN 1542:1999 – Products and systems for the protection and repair of concrete structures. Test methods – Measurement of bond strength by pull-off. A 50mm diameter aluminium dollie was adhered to the aluminium backing of a glass/aluminium composite using a quick setting epoxy resin, which was allowed to cure for at least 24 hours.

A 200mm long threaded stud was screwed into the top surface of the dollie. A direct uni-axial tensile load was applied to the dollie via the use of a manually operated hydraulic jack reacting against a load cell, leading to a read-out box, and load reaction frame placed around the dollie. The tensile load was applied uniformly until failure occurred to the dollie/resin/aluminium/glass system.

4. TEST RESULTS

The results of the testing are shown in Table 1 overleaf.

Adhesion Pull-off Testing Results BS EN 1542:1999

Table 1

TC Reference	Test Position	Load Surface Area (mm)	Load at Break (N)	Adhesive Strength (MPa)	Failure Mode*
145729	Corner Position 1	1963	738	0.38	Y/Z
145730	Corner Position 2	1963	857	0.45	Y/Z
145731	Corner Position 3	1963	858	0.45	Y/Z
145732	Corner Position 4	1963	678	0.35	Y/Z
145733	Centre 1	1963	632	0.32	Z/D
145734	Centre 2	1963	498	0.25	Y/Z
145735	Centre 3	1963	808	0.41	Y/Z
145736	Centre 4	1963	756	0.39	Y/Z
145737	Centre 5	1963	789	0.40	Y/Z
	Mean			0.37	

Date of test 16/04/2010

*Description of failure mode taken from BS EN 13892-8:2003

- X : Failure within glass substrate.
- X/Y : Bond failure between glass substrate and aluminium.
- Y : Failure within aluminium backing
- Y/Z : Bond failure between aluminium backing and resin.
- Z/D : Bond failure between resin and dollie.
- Mixed : e.g. X:X/Y:Y = 40%:10%:50%

END OF CERTIFICATE