

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

**Certificate of Test Number: 12244**

**Client's Name & Address:**

The Glass Wall Company  
Unit N, Haydock Cross Industrial Estate  
Kilbuck Lane  
Haydock  
St. Helens  
WA11 9UX

Our Ref: N950/T591

TW Job No: 3LK6 – 1.304.01

Your Ref: Order No. SPM00778/JL

Date: 20 August 2009

Date sample(s) received: w/c 03 August 2009

Sample(s) received from: The Glass Wall Company

Sample No: 145480 - 145481

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Tested by:   
D J Thompson (position: Engineer)

Authorised by:   
S R Moxon (position: Manager)

**Taylor Woodrow Technology**

Stanbridge Road, Leighton Buzzard, Bedfordshire, LU7 4QH

Tel No. 01525 859111

Registered Office, Watford

Fax No. 01525 859112

Registered No. 2295904 England

**TAYLOR  
WOODROW** 

## 1. INTRODUCTION

This certificate of test describes the pull-off adhesion testing carried out at the request of The Glass Wall Company on 14 August 2009 at Technology Centre (TC), Leighton Buzzard.

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

## 2. SAMPLE DESCRIPTION

Technology Centre received two panels of Glass/Aluminium Composite rainscreen panels (TC Ref 145480 - 145481) of approx. dimensions 500x500x composite thickness (mm). The composite panels were given unique TC sample numbers for reference purposes only.

## 3. TEST PROCEDURE

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. Five 50mm diameter aluminium dollies were adhered to the as received aluminium backing of the 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 dolly. A direct uni-axial tensile load was applied to the dolly 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 dolly. The tensile load was applied uniformly until failure occurred to the dolly/resin/aluminium/glass system.

## 4. TEST RESULTS

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

**Adhesion Pull-off Testing Results BS EN 1542:1999**

**Table 1**

TC Reference	Load Area (mm)	Load at Break (N)	Adhesive Strength (MPa)	Failure Mode
145480A	1963	649	0.33	Z
145480B	1963	543	0.28	Z
145480C	1963	573	0.29	Z
145480D	1963	498	0.25	Y/Z:Z (40:60)
145480E	1963	498	0.25	Z
Mean			0.28	

Date of test: 14 August 2009

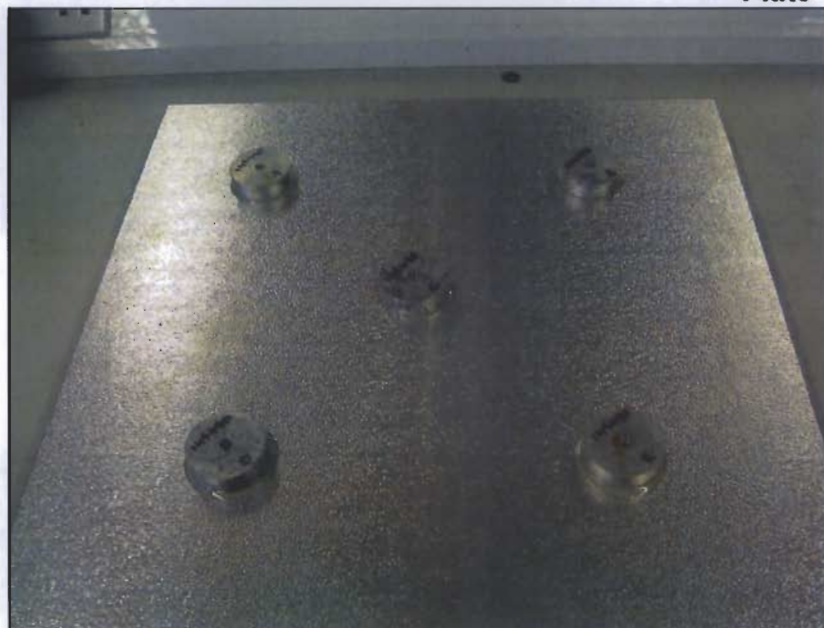
Description of failure mode: Taken from BS EN 1542:1999

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

## 5. PHOTOGRAPHS OF TEST AREAS

The following photos show the glass/aluminium composite prior to test and the failure type of each determination after test.

Plate 1



Glass/Aluminium composite panel prior to test

Plate 2



145480A Exhibiting Type Z Failure



Plate 3



145480B Exhibiting Type Z Failure

Plate 4



145480C Exhibiting Type Z Failure

Plate 5



145480D Exhibiting Mixed Y/Z:Z (40:60) Failure

Plate 6



145480E Exhibiting Type Z Failure

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END OF CERTIFICATE