

Certificate of Testing



Certificate Number: 2015/61
Date: January 2015
System: **AMS Interlocking Plank Rainscreen**
System supplier: Architectural Metal Solutions Ltd Bentalls
House
Bentalls
Basildon
Essex, SS14 3BS

Tests performed:

Watertightness – dynamic	✓
Wind resistance – serviceability	✓
Wind resistance – safety	✓
Soft body impact	✓
Hard body impact	✓

In accordance with 'Standard for Systemised building envelopes CWCT, 2006

Signed:  Test Witness

Signed  Director

Description of components tested

Rainscreen system: AMS Interlocking Plank Rainscreen supported by Nvelope support rail system

Panel description: Tested planks were formed in widths from 254 to 570mm from sheet metal. The planks are formed with closed interlocking joints along the long edges.

Tested planks varied in length from 1393 to 3750 mm and were supported on rails at 400 or 600 mm centres. The joints at the ends of the planks were left open.

The planks can be laid both horizontally and vertically. Both orientations were included in the test sample.

Tested planks were formed from the following materials:

- 2.0mm aluminium
- 1.5mm aluminium
- 1.5mm pre painted aluminium
- 1.0mm zinc
- 1.0mm stainless steel
- 0.9mm stainless steel
- 1.2 and 1.0mm copper
- 1.0mm brass

Details of the test wall given on the drawings.

Support rails: Nvelope support rails. Horizontal rails at 400mm centres were used to support vertical planks and vertical rails at 600 centres were used to support horizontal planks. Rails were fixed back to the support wall by brackets at 600mm centres.

The tests were carried out to assess the performance of the planks. For any use of the planks, structural calculations should be provided for the rails.

Fixings: Planks were fixed to the rails with JT3-LT3-5.5x25 stainless steel low profile self-drilling screws along one edge of the plank. The other edge of the plank is retained by interlock with the adjacent plank.

Drainage and ventilation: The rainscreen cavity was drained by a flashing at the bottom of the sample. Open joints at the ends of the panels provided sufficient openings to allow drainage and ventilation of the cavity.

Backing wall: The backing wall consisted of steel studs at 600mm centres with plywood sheathing. The studs were aligned with the brackets for the rainscreen support rails.

Testing laboratory Technology Centre
VINCI Construction UK Ltd
Stanbridge Road
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Witness: Alan Keiller
CWCT
University of Bath
Claverton Down
Bath BA2 7AY

Date of test: 5 to 30 November 2014

SUMMARY OF RESULTS

Watertightness - dynamic: PASS

Note: During the test some water entered the rainscreen cavity, primarily through the open joints at the ends of panels. This was sufficient to cause wetting of the face of the back wall but insufficient to cause streaming of water.

The amount of water reaching the back wall was small however it is recommended that any surfaces that would be adversely affected by the presence of water should be protected by waterproof membrane.

Flashings are also required to drain water from the bottom of the cavity.

Wind resistance: PASS

Serviceability test pressure: 2000Pa (max)

Although all the planks were subject to a serviceability wind load of 2000Pa not all panels gave acceptable deflections at this level. Full details of acceptable wind loads for the panels tested are given below.

Safety test pressure: 3000Pa

All planks remained secure after loading to +/- 3000Pa.

Soft body impact test to CWCT
Technical Note 76

Planks suffered some damage which varied in severity under a serviceability impact of 120Nm. In the most severe cases this would require replacement of the planks.

All planks remained secure after a safety impact test of 500Nm. This is classified as negligible risk.

Hard body impact test to
CWCT Technical Note 76

Planks suffered dents under hard body impacts which would be visually unacceptable in some cases.

Impact performance for different panel materials and sizes is given below.

Wind resistance – Serviceability test

Plank details			Deflection limit (diagonal span/90) (mm)	Measured deflection at acceptable serviceability wind load		Acceptable serviceability wind load (Pa)
Material	Width (mm)	Span between rails (mm)		positive	negative	
2.0 mm Aluminium	344	400	5.9	2.5	5.7	1600
1.5 mm aluminium	344	600	7.7	4.0	6.8	1200
2.0 mm aluminium	570	600	9.2	6.6	8.1	1600
2.0 mm Aluminium	344	600	7.7	2.9	6.2	2000
1.5 mm Aluminium	487	600	8.5	7.7	6.5	1600
1.0 mm zinc	325	600	7.6	5.9	6.6	800
0.9 mm Stainless steel	412	600	8.1	4.1	6.9	1600
1.5 mm Aluminium	344	600	7.7	4.2	6.9	1600
1.2 mm Copper	309	600	7.5	5.7	7.2	2000

Note:

The measured deflection has not been corrected for movement of the supports. The true deflection may therefore be slightly less than that recorded.

Plank sizes that are not listed above were not monitored for deflection and cannot be shown to have passed the serviceability test.

The criteria for serviceability are maximum deflection under load and recovery of deflection on unloading.

The limit on deflection under load is subjective and higher deflection may be acceptable in some cases.

Failure to recover from deflection on unloading may indicate plastic deformation which could lead to fatigue failure after a number of load cycles.

Impact Results

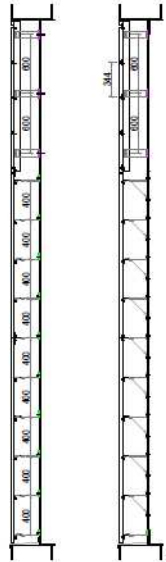
Plank details			Hard body impact			Soft body impact	
Material	Width	Span between rails	3Nm	6Nm	10Nm	120Nm	500Nm
2mm aluminium	344	400	1	1	2	1	NR
2mm aluminium	344	600	-	-	-	-	NR
2mm aluminium with stiffener	570	600	-	-	-	-	NR
1.5mm aluminium	344	600	1	2	2	1	NR
1.5mm aluminium with stiffener	487	600	-	-	-	-	NR
1.0mm zinc	254	600	1	2	2	3	-
1.0mm zinc	325	600	-	-	-	-	NR
1.0mm stainless steel	254	600	1	2	2	1	-
0.9mm stainless steel with stiffener	412	600	-	-	-	-	NR
1.0mm copper	254	600	3	3	3	3	-
1.2mm copper	309	600	-	-	-	-	NR
1.0mm brass	254	600	3	3	3	3	-

Notes:

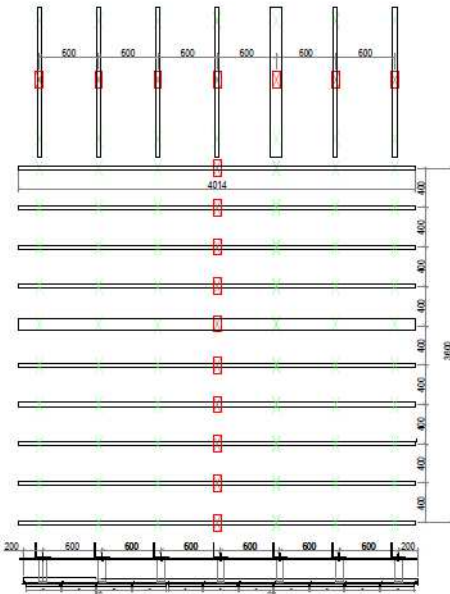
Hard body impacts and 120Nm soft body impacts were carried out to assess the effect on serviceability of the cladding. Results are classified on a scale of 1 to 5. Class 1 indicates no damage visible from 1m, class 2 indicates no damage visible from 5m. Class 3 indicates greater level of damage than class 2 which may require remedial action to restore appearance but immediate action not required.

Soft body impacts were carried out at 500Nm to assess the effect on safety of the cladding. The results are classified at 4 levels of risk to people in and around the building. NR signifies negligible risk which is the highest level of performance and indicates that there was no damage likely to lead to cladding components falling from the building and no sharp edges were created.

Sliding Point Section
Fixed Point Section



Nvelope Vertical and horizontal rail layout



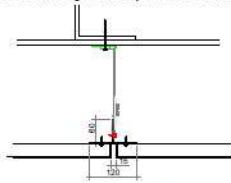
Nvelope Horizontal Brackets fixed at 600mm centres into Primary steel angles supplied by Vinci using heavy Duty self drilling fasteners HS-5.5 x 65 A15
Nvelope Horizontal Rails set 250mm from substraigt

Section through vertical joint in Vertical planks



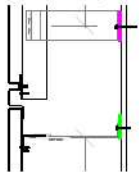
AMS Vertical 2mm Aluminium Inter locking Plank
34mm face and 15mm Vertical joints fixed at 400mm centres with 3mm Horizontal joint fixed using stainless steel low profile self drilling screws JTS-LT3- 5.5 x 25

Section through vertical joint in Horizontal planks

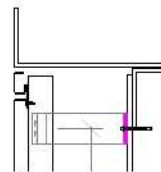


Nvelope Vertical 120 x 60 T Rail located behind 15mm Vertical joint ONLY

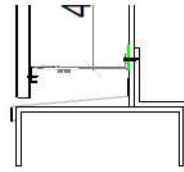
Section through Base flashing below Horizontal planks



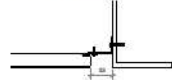
Section through Top flashing Above Horizontal planks



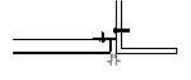
Section through Base flashing Below Vertical planks



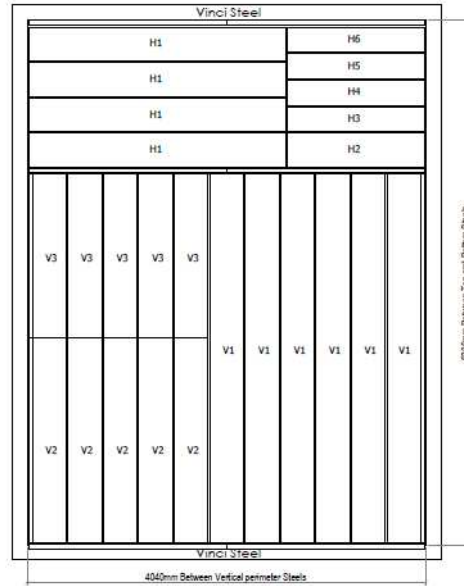
Section through Side abutment in Vertical planks



Section through side abutment in Horizontal planks



Elevation Test wall
With planks laid Vertically and Horizontal



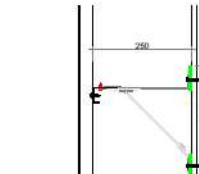
PANEL	MATERIAL	PANEL SIZES
V1	2.0mm aluminium	3750 x 344
V2	2.0mm aluminium	2076 x 344
V3	2.0mm aluminium	1668 x 344
H1	1.5mm aluminium	2600 x 344
H2	1.5mm pre-painted aluminium	1393 x 344
H3	1.0mm zinc	1393 x 254
H4	1.0mm stainless steel	1393 x 254
H5	1.0mm copper	1393 x 254
H6	1.0mm brass	1393 x 254

NOTE:
Shadow gap 15mm maximum.

Spacing of brackets and rails of NVELOPE System depends on project location, story height, panel weight and length.
As shown is the spacing to comply with extreme CWCT 1.5 times maximum serviceable pressure.

Fixed point Bracket with additional support

Sliding Point Bracket



Nvelope Horizontal Rail and Bracket supports to be fixed in accordance with the Nvelope project check list. Additional support bracket located at the fixed point bracket position ONLY

Revision B: 24.10.14
Horizontal plank details added
Revision A: 23.10.14
more information added

AMS
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BENTALLS HOUSE
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Job Title:
Vinci Test Rig

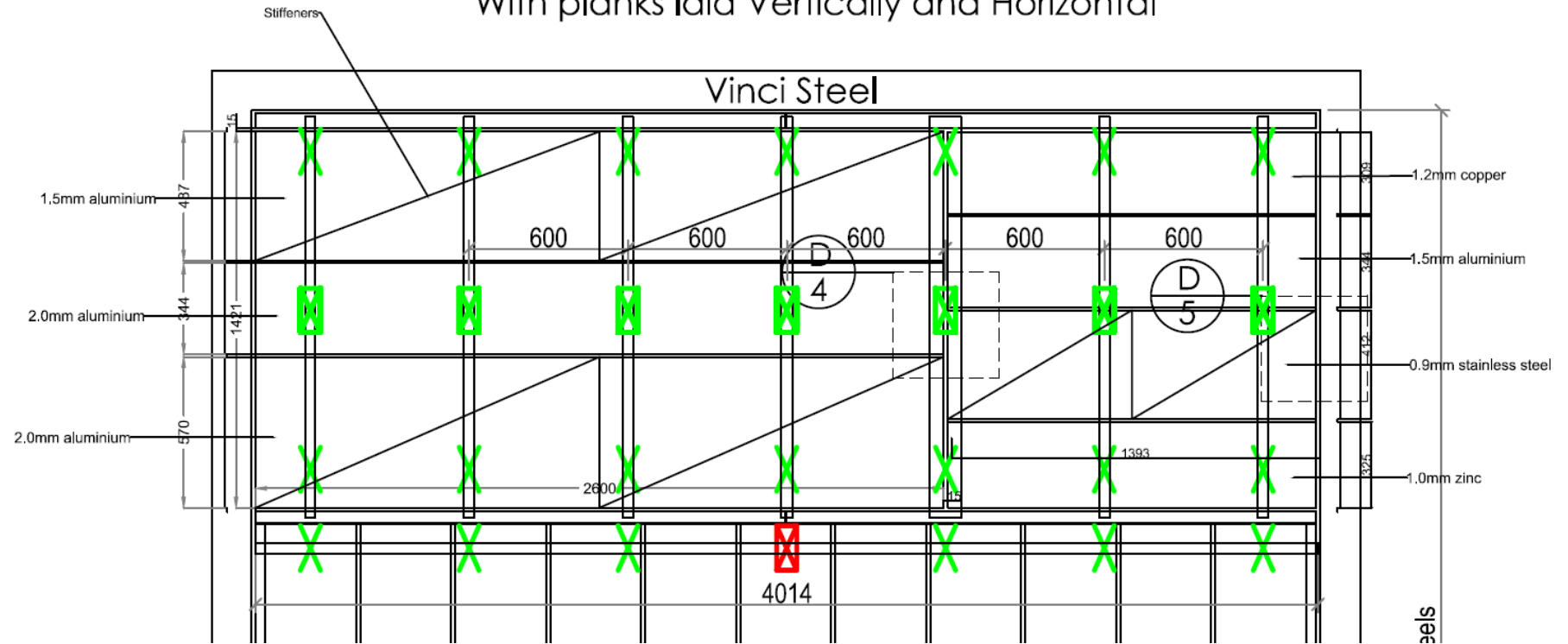
Client:
CWCT

Drawing Title: CWCT Test Rig layout for Vertical and Horizontal interlocking planks

Scale: 1:100@A1
Date: 21.10.14
Drawn By: NC
Dwg. No.: CWCT-01
Rev.: B

Drawing of main test wall for full test sequence

Elevation Test wall With planks laid Vertically and Horizontal



Drawing of test wall with additional test panels for wind load tests only

Fabricator: Architectural Metal Solutions Ltd Bentalls House
Bentalls
Basildon
Essex, SS14 3BS

Installer: Architectural Metal Solutions Ltd
Bentalls House
Bentalls
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