IAN BENNIE AND ASSOCIATES

TEST REPORT NO. 20218S2

TERRACADE 150 MM TILE CLADDING PROTOTYPE TEST to AS/NZS4284-1995

for
Austral Brick Company

October 2002

Registered Laboratory No. 2371

IAN BENNIE & ASSOCIATES PTY. LTD.
Building Performance Testing
ACN : 007 133 253

Registered Laboratory No. 2371

TEST NUMBER 20218S2

Client: **Austral Brick Company**

Sample Identification: A Terracade 150 mm tile cladding sample, spanning 3 tiles (1800 mm) in width by 3 tiles (450 mm) in height. Tiles were hung on horizontal aluminium rails (Type A-01) fixed to vertical steel top hat sections. The sample is detailed in the Fitzpatrick & Partners drawings D.sk-101, B30A, B31 and B41B, attached to this report.

Test Method: Structural and Proof testing to the requirements of Australian Standard AS/NZS4284-1995, was carried out to determine the stiffness and strength of the aluminium rail over a bay width of 1800 mm and to verify that the sample could sustain the specified pressure and suction loads without collapse.

Test Location: Austral plant, Sydney **Test Date(s):** 18 July 2002.

TEST RESULTS

Structural and Proof testing were carried out using an open-faced chamber. In order to apply the loads, the faces of the tiles were covered with plastic sheeting to reduce leakage and pressures were applied in sequence. No allowance was made for load sharing by a backing wall, all load being borne by the tiles.

Structural Tests

Method

Tests were carried out in accordance with Section 7.3 of Australian Standard AS/NZS4284:1995 to pressures nominated by Hyder Consulting. Measurements were taken on the aluminium rail at the fixing points (locations 2 & 4) to the top hat and at midspan (location 3) to determine its deflection. Measurements were also taken on the top hats (locations 1 & 5) to check if there was any differential movement at the fixing. All displacement measurements were referenced to the chamber frames. Before testing, each displacement transducer was calibrated with the measuring system against NATA certified gauge blocks. Measurement accuracy for subsequent displacement data may be taken as ±0.2 mm. All pressure transducers were calibrated against NATA certified manometers and may be taken to have a measurement accuracy of 1%.

Requirements (default values specified)

Maximum deflection of rail: Span/290
Maximum successive member residual displacement : 3.0 mm
Maximum total member displacement limit: ± 20 mm

Nominated test pressures: ± 2.5 kPa

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Test Readings and Observations

Positive and negative structural test data for the three modes of this test, referenced to the readings taken at zero pressure after the settling periods, are given in Tables 1 to 3. Table 4 lists successive displacements of the test sample under no load measured at the zero pressure readings throughout the entire test. In this table, all readings are referenced to the initial zero after settling in for Mode 1 (Z1), and are keyed to the other tables by identification numbers in the column headed "Reading".

Results

Table 5 gives deflection/span ratios for each span measured at each test pressure. The greatest deflections recorded at serviceability limit pressures were:

Aluminium rail	Deflection/Span:	@ 2.52 kPa =	**1 : 301**
		@ -2.51 kPa =	**1 : 338**

Maximum successive member residual displacement: -0.5 mm at the centre of the rail
Maximum total member displacement: 6.6 mm at the centre of the glass

Proof Tests

Method

Tests were carried out in accordance with Section 7.7 of Australian Standard AS/NZS4284:1995. The test loads were applied for 10 seconds and the sample examined for signs of failure.

Nominated test pressures: ± 3.75 kPa

Requirements (default values specified)

No sign of collapse as defined in Para 8.5 of the Standard

Test Observations

No sign of collapse was observed at ±3.75 kPa.

CONCLUSION

The Terracade 150 mm tile cladding sample passed the test requirements of Australian Standard AS/NZS4284:1995 when tested for Structural and Proof.

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Austral Tiles Company 3

Ian Bennie 16 October 2002
Authorised NATA Signatory

Table 1

TEST NUMBER 1 - MODE 1
DISPLACEMENTS (mm) - POSITIVE PRESSURE

DATAFILE 713		TEST NUMBER 1						DATE : 18/07/2002	
Reading	Pressure	MEASUREMENT LOCATION NUMBER							
	(kPa)	1	2	3	4	5			
Takeup	2.50								
Z1	0.00	0.0	0.0	0.0	0.0	0.0			
		Subsequent displacements are referenced to Z1							
P1	0.51	0.2	0.2	1.5	0.2	0.1			
P2	0.95	0.3	0.5	2.8	0.4	0.3			
P3	1.49	0.5	0.7	4.3	0.5	0.4			
P4	1.97	0.6	0.9	5.3	0.6	0.6			
P5	2.49	0.8	1.1	6.5	0.8	0.7			
Z2	0.00	0.0	0.0	0.2	-0.1	0.0			
P6	2.52	0.8	1.1	6.6	0.8	0.7			
P7	2.07	0.7	1.0	5.8	0.7	0.6			
P8	1.49	0.5	0.8	4.4	0.5	0.5			
P9	1.02	0.4	0.6	3.2	0.3	0.3			
P10	0.49	0.2	0.3	1.6	0.1	0.2			
Z3	-0.00	-0.0	0.0	0.2	-0.1	0.0			

Table 2

TEST NUMBER 1 - MODE 2
DISPLACEMENTS (mm) - NEGATIVE PRESSURE

DATAFILE 713		TEST NUMBER 1						DATE : 18/07/2002	
Reading	Pressure	MEASUREMENT LOCATION NUMBER							
	(kPa)	1	2	3	4	5			
Takeup	-2.52								
Z4	0.00	-0.1	-0.1	-0.5	-0.2	-0.1			
Shift during takeup		-0.1	-0.1	-0.6	-0.1	-0.1			
		Subsequent displacements are referenced to Z4							
N1	-0.49	-0.1	-0.2	-1.3	-0.1	-0.1			
N2	-1.00	-0.2	-0.5	-2.7	-0.3	-0.2			
N3	-1.52	-0.3	-0.8	-3.9	-0.6	-0.3			
N4	-1.99	-0.5	-1.0	-5.0	-0.7	-0.4			
N5	-2.51	-0.5	-1.3	-6.1	-0.9	-0.5			
Z5	0.00	-0.0	-0.0	0.1	0.0	-0.0			
N6	-2.48	-0.5	-1.3	-6.1	-0.9	-0.5			
N7	-2.04	-0.5	-1.1	-5.4	-0.8	-0.4			
N8	-1.48	-0.4	-0.9	-4.3	-0.6	-0.4			
N9	-1.02	-0.3	-0.7	-3.1	-0.4	-0.3			
N10	-0.50	-0.2	-0.3	-1.6	-0.1	-0.1			
Z6	0.00	-0.0	-0.1	0.0	0.0	-0.0			

Table 3

TEST NUMBER 1 - MODE 3
DISPLACEMENTS (mm) - POSITIVE PRESSURE

DATAFILE 713		TEST NUMBER 1							DATE : 18/07/2002
Reading	Pressure	MEASUREMENT LOCATION NUMBER							
	(kPa)	1	2	3	4	5			
Takeup	2.49								
Z7	0.00	-0.0	0.0	0.1	-0.3	-0.1			
Shift during takeup		0.1	0.2	0.5	-0.1	-0.0			

Table 4

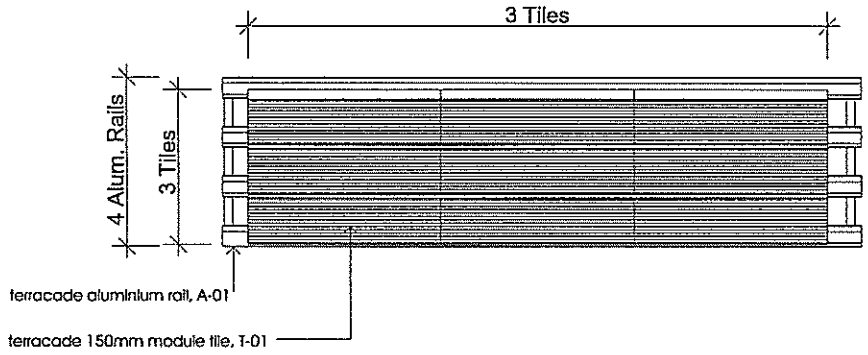
SUCCESSIVE ZERO-PRESSURE DISPLACEMENTS (mm) REFERENCED TO THE ZERO AFTER TAKEUP IN MODE 1

DATAFILE 713	TEST NUMBER 1							DATE : 18/07/2002
Reading	MEASUREMENT LOCATION NUMBER							
(Referenced to Z1)	1	2	3	4	5			
Z1 - Takeup - Mode 1	0.0	0.0	0.0	0.0	0.0			
Z2 - Middle - Mode 1	0.0	0.0	0.2	-0.1	0.0			
Z3 - End - Mode 1	-0.0	0.0	0.2	-0.1	0.0			
Z4 - Takeup - Mode 2	-0.1	-0.1	-0.5	-0.2	-0.1			
Z5 - Middle - Mode 2	-0.1	-0.1	-0.4	-0.2	-0.1			
Z6 - End - Mode 2	-0.1	-0.1	-0.4	-0.2	-0.1			
Z7 - Takeup - Mode 3	-0.0	0.0	0.1	-0.3	-0.1			

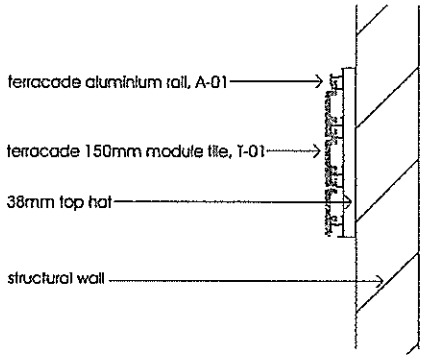
Table 5

STRUCTURAL PERFORMANCE

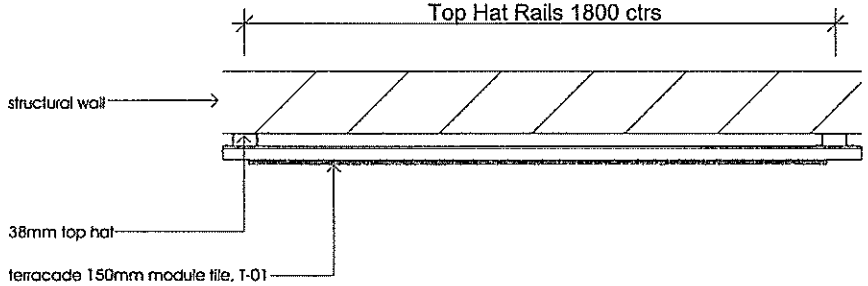
DATAFILE 713		TEST NUMBER 1			DATE : 18/07/2002		
MEMBER	PRESSURE	DISPLACEMENTS (rounded to 0.1 mm)			BENDING DEFLECTION (rounded to 0.01 mm)	SPAN	SDR
		LEFT OR TOP	CENTRE	RIGHT OR BOTTOM	$DC - \frac{D1+D2}{2}$		
	(kPa)	D1 (mm)	DC (mm)	D2 (mm)	DEF (mm)	L (mm)	L/DEF
2,3,4	ALUMINIUM EXTRUSION						
	0.51	0.2	1.5	0.2	1.28	1695	1328
	0.95	0.5	2.8	0.4	2.33		728
	1.49	0.7	4.3	0.5	3.69		459
	1.97	0.9	5.3	0.6	4.55		373
	2.49	1.1	6.5	0.8	5.51		308
	2.52	1.1	6.6	0.8	5.62		301
	2.07	1.0	5.8	0.7	4.94		343
	1.49	0.8	4.4	0.5	3.78		448
	1.02	0.6	3.2	0.3	2.79		608
	0.49	0.3	1.6	0.1	1.42		1195
	-0.49	-0.2	-1.3	-0.1	-1.09		-1552
	-1.00	-0.5	-2.7	-0.3	-2.28		-744
	-1.52	-0.8	-3.9	-0.6	-3.27		-519
	-1.99	-1.0	-5.0	-0.7	-4.10		-413
	-2.51	-1.3	-6.1	-0.9	-5.01		-338
	-2.48	-1.3	-6.1	-0.9	-5.05		-335
	-2.04	-1.1	-5.4	-0.8	-4.47		-379
	-1.48	-0.9	-4.3	-0.6	-3.56		-476
	-1.02	-0.7	-3.1	-0.4	-2.60		-652
	-0.50	-0.3	-1.6	-0.1	-1.35		-1255



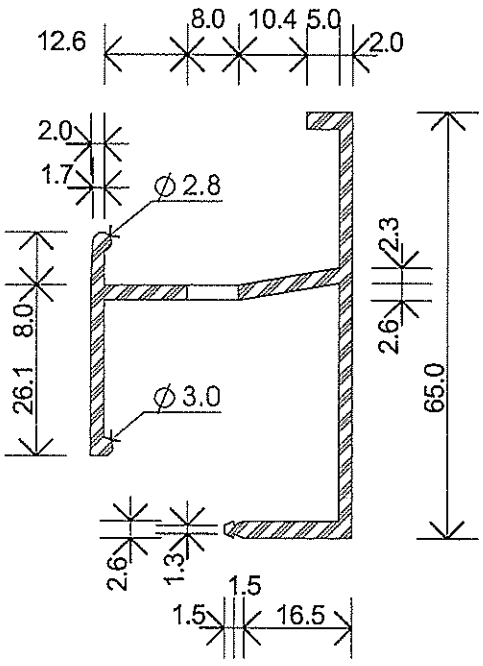
elevation



section

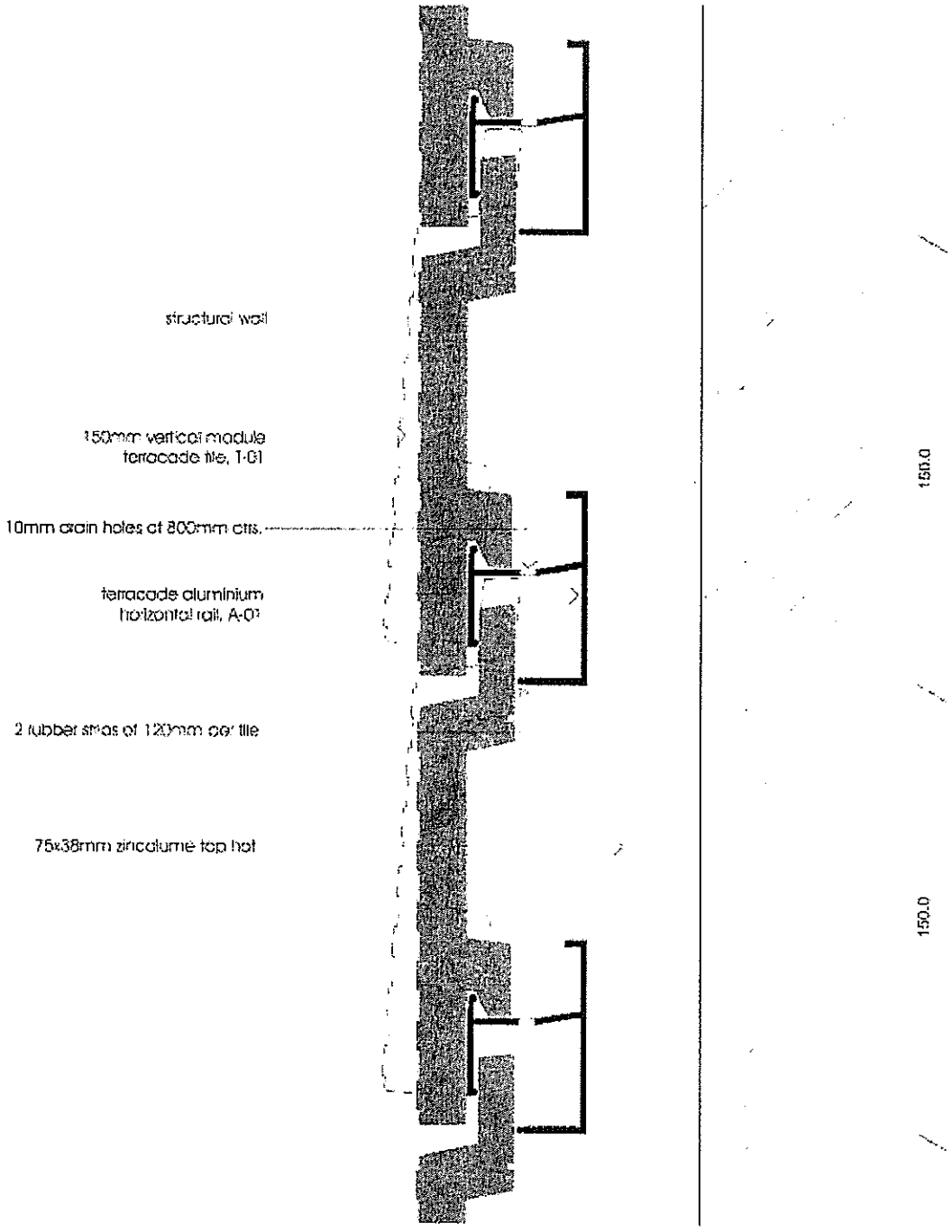


horizontal section



Austral
TERRACOTTA WALL CLADDING SYSTEM

fitzpatrick + partners

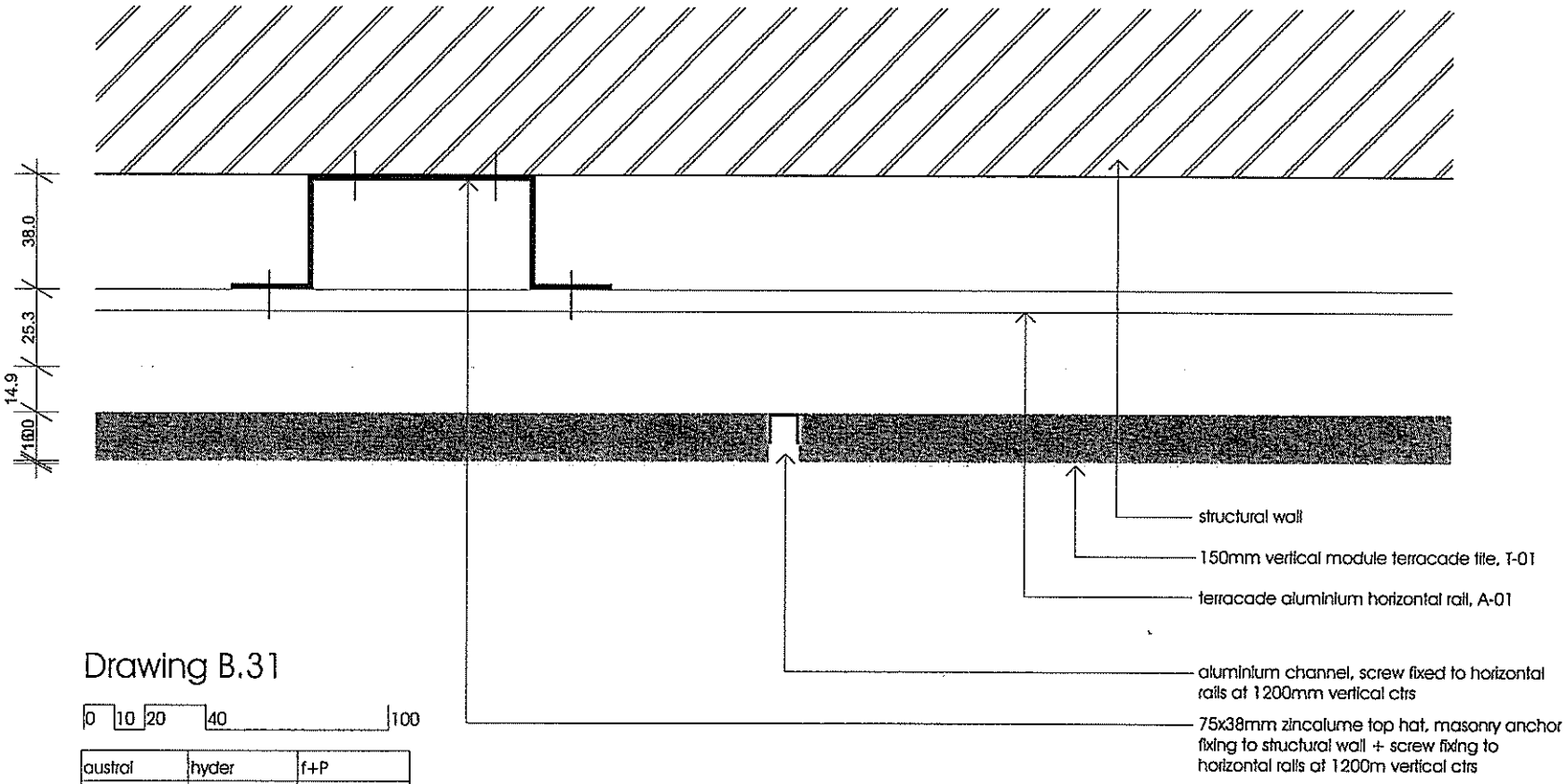


Drawing B.30A

0 10 20 40 100

austral hyder f+P

testing panel: typical vertical section



Drawing B.31

0 10 20 40 100

austral	hyder	f+P

testing panel: typical horizontal section