



# TEST REPORT

## DC18217-01-1

**REPORT ON TENSILE TESTING OF CLICKBRICK PRODUCTS BEFORE AND AFTER EM4 THERMAL AGING.**

### CLIENT

Clickbrick Ltd  
PO Box 125029  
St Heliers  
Auckland 1740

All tests and procedures reported herein, unless indicated, have been performed in accordance with BRANZ ISO9001:2015 Certification



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## LIMITATION

The results reported here relate only to the item/s tested.

## TERMS AND CONDITIONS

This report is issued in accordance with the Terms and Conditions as detailed and agreed in the BRANZ Services Agreement for this work.



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# SCOPE

Tensile (bond strength) testing was completed before and after cyclic thermal aging on the provided samples.

## 1. PRODUCT

The client provided a set of precut samples for testing, the sample description and BRANZ sample number is given in the table below.

Table 1. Sample description.

BRANZ sample number	Sample description	Sample image
24/106	Precut with a nominal size of 50 mm x 50 mm. The sample consisted of a red brick face bond to a light grey substrate	

## 2. METHOD

The as received samples were submitted for aging using the following cycle, each cycle consists of the temperature and humidity steps given below. The aged specimens were exposed for a total of 30 cycles.

- 6 hours at 30°C / 90 ± 5% RH;
- 6 hours at 60°C / 75 ± 5% RH;
- 6 hours at 10°C / 50 ± 5% RH; and
- 6 hours at -10°C / low RH.

Prior to tensile testing (for both aged and control samples) the samples were reconditioned under standard laboratory conditions for a minimum of 3 days. The test samples were nominal 50 mm x 50 mm and the test set up was aligned to ASTM C297 where possible. Test dollies were bonded specimens surface using an epoxy adhesive (with fumed silica filler). The filler was used to void fill as the brick surface was not a uniform continuous surface. The bond strength was determined using an Instron 5599 equipped with a 10 kN load cell. Testing was conducted at a crosshead rate of 0.5 mm/min perpendicular to the plaster brick surface.

### 3. RESULTS

The test results are given in Tables 2 and 3 and images of the failure mechanism are given in Figures 2 and 3.

**Table 2. Control tensile results.**

Sample No.	Peak force (N)	Width <sup>1</sup> (mm)	Length <sup>1</sup> (mm)	Strength (MPa)	Failure Mode
1	3778	50.4	52.7	1.42	Mixed cohesive failure of the brick and substrate
2	4359	51.4	50.3	1.69	Adhesive failure
3	4980	51.8	54.4	1.77	Cohesive failure of the substrate
4	2568	51.4	50.3	0.99	Adhesive failure
5	4784	50.4	52.7	1.80	Cohesive failure of the brick
6	2913	50.4	52.7	1.10	Cohesive failure of the brick
7	4553	50.4	52.7	1.72	Cohesive failure of the brick
8	6364	51.4	50.3	2.46	Adhesive failure
<b>Average</b>	<b>4287</b>	<b>50.9</b>	<b>52.0</b>	<b>1.62</b>	

<sup>1</sup>A single measurement was taken at the midpoint of the sample.

**Table 3. Aged tensile results.**

Sample No.	Peak force (N)	Width <sup>1</sup> (mm)	Length <sup>1</sup> (mm)	Strength (MPa)	Failure Mode
1	4111	50.9	51.8	1.56	Cohesive failure of the substrate
2	4282	50.9	51.7	1.63	Cohesive failure of the substrate
3	4498	50.9	52.5	1.68	Adhesive failure
4	2558	52.0	50.8	0.97	Mixed cohesive of the brick and adhesive failure
5	3950	51.0	51.3	1.51	Mixed cohesive of the substrate and adhesive failure
6	2698	52.3	51.3	1.01	Cohesive failure of the brick
7	2629	52.1	52.0	0.97	Mixed cohesive of the substrate and adhesive failure
<b>Average</b>	<b>3532</b>	<b>51.4</b>	<b>51.6</b>	<b>1.33</b>	

<sup>1</sup>A single measurement was taken at the midpoint of the sample.



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Figure 2. Images of the tested control samples showing the failure mode. Samples 1-4 bottom row (left to right), samples 5-8 top row (left to right)



Figure 2. Images of the tested aged samples showing the failure mode. Samples 1-4 bottom row (left to right), samples 5-7 top row (left to right)



## 4. REFERENCES

BRANZ (2004). Evaluation Method No. 4, Test Procedure for Coating and Jointing Systems for Flush-finished Fibre Cement Sheet Cladding.

ASTM C297 / C297M-16. Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions.