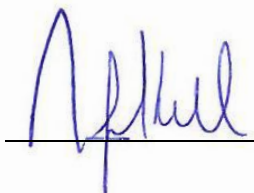



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Testing of NRG Building Systems Pty Ltd EPS Specimens

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BRANZ's agreement with its Client in relation to this report contains the following terms and conditions in relation to ***Liability and Indemnification***

- a. Limitation and Liability
- i. BRANZ undertakes to exercise due care and skill in the performance of the Services and accepts liability to the Client only in cases of proven negligence.
 - ii. Nothing in this Agreement shall exclude or limit BRANZ's liability to a Client for death or personal injury or for fraud or any other matter resulting from BRANZ's negligence for which it would be illegal to exclude or limit its liability.
 - iii. BRANZ is neither an insurer nor a guarantor and disclaims all liability in such capacity. Clients seeking a guarantee against loss or damage should obtain appropriate insurance.
 - iv. Neither BRANZ nor any of its officers, employees, agents or subcontractors shall be liable to the Client nor any third party for any actions taken or not taken on the basis of any Output nor for any incorrect results arising from unclear, erroneous, incomplete, misleading or false information provided to BRANZ.
 - v. BRANZ shall not be liable for any delayed, partial or total non-performance of the Services arising directly or indirectly from any event outside BRANZ's control including failure by the Client to comply with any of its obligations hereunder.
 - vi. The liability of BRANZ in respect of any claim for loss, damage or expense of any nature and howsoever arising shall in no circumstances exceed a total aggregate sum equal to 10 times the amount of the fee paid in respect of the specific service which gives rise to such claim or NZD\$50,000 (or its equivalent in local currency), whichever is the lesser.
 - vii. BRANZ shall have no liability for any indirect or consequential loss (including loss of profits).
 - viii. In the event of any claim the Client must give written notice to BRANZ within 30 days of discovery of the facts alleged to justify such claim and, in any case, BRANZ shall be discharged from all liability for all claims for loss, damage or expense unless legal proceedings are commenced in respect of the claim within one year from:
 - The date of performance by BRANZ of the service which gives rise to the claim;
 - or
 - The date when the service should have been completed in the event of any alleged non-performance.
- b. Indemnification: The Client shall guarantee, hold harmless and indemnify BRANZ and its officers, employees, agents or subcontractors against all claims (actual or threatened) by any third party for loss, damage or expense of whatsoever nature including all legal expenses and related costs and howsoever arising relating to the performance, purported performance or non-performance, of any Services.
- c. Without limiting clause b above, the Client shall guarantee, hold harmless and indemnify BRANZ and its officers, employees, agents or subcontractors against all claims (actual or threatened) by any party for loss, damage or expense of whatsoever nature including all legal expenses and related costs arising out of:
- i. any failure by the Client to provide accurate and sufficient information to BRANZ to perform the Services;
 - ii. any misstatement or misrepresentation of the Outputs, including Public Outputs;
 - iii. any defects in the Products the subject of the Services; or
 - iv. any changes, modifications or alterations to the Products the subject of the Services.



Testing of NRG Building Systems Pty Ltd EPS Specimens

1. CLIENT

NRG Building Systems Pty Ltd
PO Box 6342
Yatala DC
Queensland QLD 4207
Australia

2. MATERIALS

The client supplied EPS specimens as follows:

- Nine specimens 50 x 50 x 50mm (nominal)
- Six specimens 200 x 50 x 50mm (nominal)
- Six specimens 100 x 100 x 25mm (nominal)
- Ten specimens 25 x 67mm diameter (nominal)

BRANZ was not involved in the selection of these specimens and as-such is unable to comment upon how representative they are of normal production material.

3. DESCRIPTION OF TEST PROCEDURES

The test methods used can be found in Table 1 below.

Table 1 : Description of Test Methods

Test Type	Test Method	Title
Compressive Stress	AS 2498.3 – 1993	Methods of testing rigid cellular plastics – Method 3: Determination of compressive stress
Flexural strength	AS 2498.4 – 1993	Methods of testing rigid cellular plastics – Method 4: Determination of cross-breaking strength
Water Vapour Transmission	AS2498.5 – 1993	Methods of testing rigid cellular plastics – Method 5: Determination of dimensional stability
Dimensional Stability	AS2498.6 – 1993	Methods of testing rigid cellular plastics – Method 6: Determination of dimensional stability


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4. RESULTS

The results reported here relate only to the items tested.

4.1 AS 2498.3 Determination of Compressive Strength

Five specimens 50 x 50 x 50mm (nominal), supplied by the client, were tested. The surfaces of the specimens parallel with the faces of the sample were marked to ensure that they were the load bearing surfaces and that the load was applied perpendicular to these faces. The specimens were tested at a crosshead speed of 5 mm/minute. The results are recorded in Table 1.

Table 1 : Compressive Stress at 10% relative deformation results

Specimen No	Compressive Strength (kPa)
1	144.9
2	108.6
3	132.5
4	116.6
5	133.4
Average	127.2

4.2 AS 2498.4 Determination of Cross-Breaking (Flexural) Strength

Five specimens 50 x 50 x 200mm (nominal), supplied by the client, were tested. The specimens were tested at a span of 152 mm and a crosshead speed of 25 mm/minute. The results are recorded in Table 2.

Table 2 : Cross Breaking Strength results

Specimen No	Cross-Breaking Strength (kPa)
1	267.7
2	280.1
3	267.7
4	311.4
5	315.0
Average	288.4


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4.3 AS 2498.5 Determination of water vapour transmission

Five specimens 67mm dia. x 25mm (nominal), supplied by the client, were tested. Testing was conducted from 15-Feb-10 to 22-Feb-10 using an environmental chamber set to produce conditions of 23.0°C and 85.0%RH. The test was terminated after 6 data points were obtained for each of the 5 specimens under test. The results are recorded in Table 3.

Table 3 : Water Vapour transmission results

Specimen No	WVT ₂₃ (µg/m ² .s)
1	280
2	320
3	290
4	340
5	280
Average	300

4.4 AS 2498.6 Determination of dimensional stability

Three specimens 100mm x 100mm x 25mm (nominal), supplied by the client, were tested. The length (L) and width (W) of each test specimen were measured at three positions. Two length and width measurements were made 10mm from each edge and the third measured at the centre of each edge. Thickness (T) was measured at five positions, 10mm from each corner and at the centre of each specimen. The specimens were conditioned in an oven set at 70°C (dry), measurements were taken after 20 ± 1 h, 48 ± 2 h, 7 days. The results are recorded in Table 4.


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Table 4 : Dimensional Stability results

Percentage change		$\Delta\%$		
Exposure period		20 hrs	48 hrs	7 days
Specimen 1	T1	0.1	0.1	0.0
	T2	0.0	0.0	0.0
	T3	0.0	0.0	0.0
	T4	0.0	0.0	0.0
	T5	0.0	0.0	0.0
	Average	0.0	0.0	0.0
Thickness (mm)	L1	-0.1	-0.1	-0.1
	L2	-0.1	-0.1	-0.1
	L3	0.0	0.0	0.0
	Average	-0.1	-0.1	-0.1
Length (mm)	W1	-0.1	-0.1	-0.1
	W2	-0.1	-0.1	-0.1
	W3	0.0	0.0	0.0
	Average	-0.1	-0.1	-0.1
Specimen 2	T1	-0.1	-0.1	-0.1
	T2	0.0	0.0	0.0
	T3	0.0	0.0	0.0
	T4	-0.1	-0.1	-0.1
	T5	0.0	0.0	0.0
	Average	0.0	0.0	0.0
Thickness (mm)	L1	-0.1	-0.1	-0.1
	L2	-0.1	-0.1	-0.1
	L3	-0.1	-0.1	-0.1
	Average	-0.1	-0.1	-0.1
Length (mm)	W1	-0.1	-0.1	-0.1
	W2	-0.1	-0.1	-0.1
	W3	-0.1	-0.1	-0.1
	Average	-0.1	-0.1	-0.1
Width (mm)	W1	-0.1	-0.1	-0.1
	W2	-0.1	-0.1	-0.1
	W3	-0.1	-0.1	-0.1
	Average	-0.1	-0.1	-0.1

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Table 4 : Dimensional Stability results

Percentage change		$\Delta\%$		
Exposure period		20 hrs	48 hrs	7 days
Specimen 3 Thickness (mm)	T1	0.0	-0.1	-0.1
	T2	0.0	0.0	0.0
	T3	0.0	0.0	0.0
	T4	0.0	0.0	0.0
	T5	0.0	0.0	0.0
	Average	0.0	0.0	0.0
Length (mm)	L1	0.0	0.0	0.0
	L2	0.0	0.0	0.0
	L3	-0.1	-0.1	-0.1
	Average	-0.1	-0.1	-0.1
Width (mm)	W1	-0.1	-0.1	-0.1
	W2	0.0	0.0	0.0
	W3	0.0	0.0	0.0
	Average	0.0	0.0	0.0

No visual distortion was detected at any of the exposure periods.

5. REFERENCES

AS 2498.3 – 1993. Methods of testing rigid cellular plastics – Method 3: Determination of compressive stress.

AS 2498.4 – 1993. Methods of testing rigid cellular plastics – Method 4: Determination of cross-breaking strength.

AS 2498.5 – 1993. Methods of testing rigid cellular plastics – Method 5: Determination of water vapour transmission rate.

AS 2498.6 – 1993. Methods of testing rigid cellular plastics – Method 6: Determination of dimensional stability.


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