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TEST REPORT

DC13540-27-1

REPORT ON TESTING OF AQUAPROOF 110 MEMBRANE TO THE REQUIREMENTS OF AS 4654.1-2012

CLIENT

Pasco Construction Solutions Pty Ltd
241 Ingles St
Port Melbourne
VIC 3207
Australia



BRANZ

PROJECT NUMBER:

DC13540

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TEST SUMMARY

Objective

Testing was completed of the Aquaproof 110 membrane to the requirements of AS 4654.1-2012 *Waterproofing membranes for external above-ground use Part 1: Materials*.

Summary

Passing results were obtained for the 1.2 mm thick Aquaproof 110 membrane where requirements are stated in the AS 4654.1-2012 Standard. The Aquaproof 110 membrane samples supplied met the requirements to be classified as Class III (High Extensibility).

Test sponsor

Pasco Construction Solutions Pty Ltd
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Port Melbourne
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Description of test specimen

The client supplied sheet membrane samples to be tested. The samples were received on 11 October 2021 and assigned the BRANZ sample reference 21/712 (cast sheets) and 21/713 (liquid sample).

LIMITATION

The results reported here relate only to the items 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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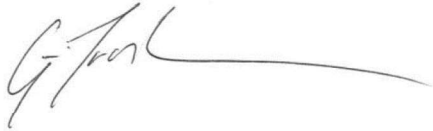
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1. SCOPE

The client requested testing of the Aquaproof 110 waterproofing membrane to the performance specifications of AS 4654.1-2012, *Waterproofing membranes for external and above-ground use, Part 1: Materials*. Testing was completed to AS 4654.1-2012 Appendix A and references the following standards: bond strength (ASTM C794), cyclic movement (CSIRO Moving Joint Test, Appendix B), abrasion resistance (AS 1580.403.2), and water vapour transmission (ASTM E96). An Instron 5569 Universal testing machine and a 10 kN load cell was used to provide a constant rate of elongation.

2. SUMMARY

Table 1: AS 4654.1-2012 Table 2.1 Requirements – Fully Bonded Membranes – Aquaproof 110 .

PROPERTY REQUIRED	METHOD	RESULTS	
Abrasion resistance	AS 1580.403.2	Non-exposed	N/A
Bond strength	ASTM C794	103.1N (plywood) 96.7 N (concrete)	N/A
Cyclic movement	Moving Joint Test	Tested as Class III	Pass
Dimensional stability	ASTM D6207	N/A	N/A
Elongation at break	AS 4654.1-2012 Appendix A	560.1%	N/A
Field seam strength	N/A	N/A	N/A
Heat ageing	AS 4654.1-2012	495.5%	Pass
Temperature resistance	AS 4654.1-2012 Clause 2.6	482.4%	Pass
Ultraviolet resistance	AS 4654.1-2012 Table A4	N/A	N/A
Tensile strength	AS 4654.1-2012 Table A4	2.24 MPa	N/A
Thickness ¹	Various methods	1.05 mm	N/A
Durability ²	AS 4654.1-2012 Table A4	N/A	Pass
Water vapour transmission rate	ASTM E96	6.62 g/m ² /24 hours	Pass

Notes:

1. Thickness measurement – the product is a liquid applied waterproofing membrane. The thickness of the membrane will be determined by application.
2. Durability of membranes is a combined group of assessments as detailed in AS 4654.1-2012 Appendix A, Table A4.



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3. BOND STRENGTH

3.1 Testing

Testing prepared and carried out on Aquaproof 110 in accordance with ASTM C794. Plywood samples were prepared by directly applying Aquaproof 110 to the substrate. The concrete samples were made using Aquaprime PU to prepare the concrete substrate prior to the application of the Aquaproof 110. These materials were applied in accordance with the manufacturer's specification.

3.2 Results

Results are an average of 4 samples.

Table 2: Bond strength results

Substrate	Force, N
Plywood	103.1
Concrete Masonry	96.7

4. CYCLIC MOVEMENT

4.1 Testing

Testing carried out in accordance with AS 4654.1-2012 Appendix B Assessment of resistance of waterproofing membranes to cyclic movement.

Sample	Aquaproof 110
Sample code	21/712
Material class	Class III
Test time	2 hours
Cyclic extension	4 mm
Rate of extension	3.34 mm/min

4.2 Results

The test sample achieved a control elongation at break of 560% as per AS 4654-2012 Appendix A. For a Class III membrane the extension movement used for cycling is 4 mm.

Number of cycles completed:	50
Surface crazing:	Nil
Surface tears:	Nil
Membrane Rupture:	Nil
Results	Pass



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For Class III high extensibility membranes, the minimum bond breaker/tape width to bridge joints opening up by 5 mm is 12 mm as per AS 4654.1-2012 Table A2.

5. ELONGATION AT BREAK

5.1 Testing

Test carried out in accordance with AS 4654.1-2012 Appendix A.

5.2 Results

Results are an average of 6 samples.

Table 3: Control elongation results.

Thickness (mm)	Max Load (N)	Max Stress (MPa)	Elongation at break (%)
1.05	58.7	2.24	560.1

Requirement for Class III: The specimens have an elongation at break of ≥ 300 %.

Classification: Class III (high extensibility)

6. HEAT AGEING

6.1 Testing

Testing carried out in accordance with AS 4654.1-2012 Appendix A.

6.2 Results

Results are an average of 6 samples.

Table 4: Heat ageing results

Thickness (mm)	Max Load (N)	Max Stress (MPa)	Elongation at break (%)
1.15	66.2	2.30	495.5

Requirement: The specimens require an elongation at break greater than 50% of the control sample, 560%. An elongation of less than 280% is a fail.

Result: Pass



7. TEMPERATURE RESISTANCE

7.1 Testing

Testing carried out in accordance with AS 4654.1-2012 Clause 2.6. Samples were exposed for 2 days at -15°C and then exposed for 2 days at 85°C.

7.2 Results

Results are an average of 6 samples.

Table 5: Temperature resistance results

Thickness (mm)	Max Load (N)	Max Stress (MPa)	Elongation at break (%)
1.18	63.8	2.17	482.4

Requirement: The membrane shall remain waterproof when subjected to temperatures likely to be encountered in use: for Australia these would be within the range -15°C to 85°C.

Samples shall exhibit no cracking, fractures or surface defects after exposure.

Result: Pass

8. TENSILE STRENGTH

8.1 Testing

Testing carried out in accordance with AS 4654.1-2012 Appendix A.

8.2 Results

Results are an average of 6 samples.

Table 6: Tensile strength results

Thickness (mm)	Max Load (N)	Max Stress (MPa)	Elongation at break (%)
1.05	58.7	2.24	560.1



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9. DURABILITY

9.1 Testing

Testing carried out in accordance with AS 4654.1-2012 Appendix A

9.2 Results

Table 7: Durability results

Solution	Aged Period	Thickness (mm)	Max Load (N)	Max Stress (MPa)	Elongation at break (%)
De-ionized water	7 Days	1.16	51.0	1.77	554.4
	28 Days	1.19	59.9	2.01	551.3
	56 Days	1.19	54.8	1.83	505.6
Detergent	7 Days	1.21	47.3	1.56	534.5
	28 Days	1.22	51.0	1.67	546.7
	56 Days	1.21	51.5	1.71	554.4

Note: Manufacturing guidelines for bio-resistance to be followed.

10. WATER VAPOUR TRANSMISSION RATE

10.1 Testing

Testing carried out in accordance with ASTM E96 desiccant method.

10.2 Results

Table 9: Water vapour transmission rate results

Thickness (mm)	WVTR (g/m ² /24 hours)	Minimum result (g/m ² /24 hours)	Maximum result (g/m ² /24 hours)
1.05	6.62	6.10	7.13



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