



05 February 2020

Our Ref: EN13/2499

**TEST REPORT No. 8310.3A**

**Requested by:** Wet-seal Management Pty Ltd  
6 Forge Drive  
Coffs Harbour  
NSW 2450

**On (date):** 21 September 2017  
**Product Descriptions:** Enviro-coat Waterproofing Membrane Below Ground GS 220  
**Manufacturer:** UREKA

**Sampling Details**  
**Date:** 21 September 2017  
**How (methods):** Delivered to Clayton

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The results reported herein relate only to the item(s) tested.

This test report consists of 13 pages.

**SUMMARY OF ASSESSMENTS REPORTED**

AS/NZS 4858:2004	Appendix A – Table A1	Pass
AS 4654.1:2012	Appendix A – Table A4	Pass
AS/NZS 4858:2004 & AS 4654.1:2012	Appendix B – Resistance of Waterproofing Membranes to Cyclic Movement	Pass
ASTM E96	Moisture Vapour Transmission	Pass
AS 3558.1 Methods of testing plastics & composite materials sanitary plumbing fixtures:		
Method 1: Determination of water absorption characteristics		1.96%
AS 4654.1:2012	Temperature Resistance	Pass
AS 4347.9:2002	Thickness (Mean of sample provided for assessment)	1.03mm
ASTM C794	Bond Strength - Cement Sheet	86.50N
	- Timber	94.56N
	- Ceramic Tile	99.75N

**TERM OF VALIDITY**

Enviro-coat Waterproofing Membrane Below Ground GS 220 is deemed to meet the requirements of:  
AS/NZS 4858: 2004 - Wet Area Membranes  
AS 4654.1:2012 Waterproofing membranes for external above-ground use, Non-exposed  
This CSIRO wet area membrane report will lapse three years after the initial date of issue and assessment unless revalidation has been requested and granted.

**The validity date for report 8310.3A is 12 July 2021**



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**SUMMARY OF RESULTS**

**AS4858:2004 Wet Area Membranes and AS 4654.1:2012 Waterproofing membranes for external above-ground use, Non-exposed:**

**Appendix A: Assessment of Durability of waterproof membranes**

Test Report No.	7980	8097	
Year of test	2017	2018	
Control	77%		<b>Class II</b>
Water Immersion	69%		PASS
Bleach Immersion	87%		PASS
Detergent Immersion	83%		PASS
Heat Ageing @ 50 °C	60%		PASS
Heat Ageing @ 80 °C	73%		PASS
Temperature Resistance		51%	PASS

Wet-seal Management Pty Ltd test sample, Enviro-coat Waterproofing Membrane Below Ground GS 220 achieves the performance requirements of AS/NZS 4858: 2004 Durability of Membranes for Class II membrane installation and AS 4654.1:2012 Waterproofing membranes for external above-ground use, **Non-exposed**.

**Appendix B: Assessment of resistance of waterproofing membranes to cyclic movement**

Class II type membrane: 2mm gauge length for a 0.39mm extension, repeated 50 cycles.

Result: No fatigue cracking exhibited. PASS

**AS 3558.1 Methods of testing plastics & composite materials sanitary plumbing fixtures:**

**Method 1: Determination of water absorption characteristics**

Result:	Sample 1	0.64%	
	Sample 2	0.44%	
	Sample 3	0.50%	Maximum 0.64%

**ASTM E96: Water Vapour Transmission of Materials** 1.55g/m<sup>2</sup>/24

**AS 4347.9:2002 Thickness** 1.03mm

**AS 4654.1:2012 Tensile strength** 5.50MPa

<b>ASTM C794 Bond Strength</b>	- Cement Sheet	86.65N
	- Timber	94.56N
	- Ceramic Tile	99.75N



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TEST CARRIED OUT IN ACCORDANCE WITH AS4654.1:2012 Wet Area Membranes Test Date: 26 September 2017  
Appendix A: Assessment of Durability of waterproof membranes

RESULTS: Location: Ceramic Tile Laboratory  
Conditions: 7 days at 23°C 50%RH  
Sample Number: 7980 - 1 (Numbered 1 to 5)  
Samples: Average of 5 samples  
Load rate: 50mm/min

### Elongation at Break

#### CONTROL SET

Sample Number	Sample Thickness Mean (mm)	Maximum Load (N)	Maximum Extension (mm)	Maximum Stress MPa	Maximum Strain %
7980 – 1 1 to 5	1.02	33.64	25.46	5.50	77

**Requirement for Class II:** The specimens have an average percentage strain of  $\geq 60\%$  &  $\leq 299\%$

**Classification:** Class II (Medium extensibility)



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TEST CARRIED OUT IN ACCORDANCE WITH AS4654.1:2012 Wet Area Membranes Test Date: 24 November 2017  
Appendix A: Assessment of Durability of waterproof membranes

RESULTS: Location: Ceramic Tile Laboratory  
Conditions: 7 days at 23°C 50%RH  
Sample Number: 7980 - 3 (Numbered 1 to 9)  
Samples: Average of 3 samples  
Load rate: 50mm/min  
Solution: 1L of deionised water

### Elongation at Break

### WATER IMMERSION

Period & Sample Number	Sample Thickness Mean (mm)	Maximum Load (N)	Maximum Extension (mm)	Maximum Stress MPa	Maximum Strain %
<b>7 Days</b> 7980 – 3 1 to 3	0.83	23.06	28.52	4.63	86
<b>28 Days</b> 7980 – 3 4 to 6	0.86	25.52	27.17	4.95	82
<b>56 Days</b> 7980 – 3 7 to 9	0.87	24.63	22.78	4.72	69

**Requirement:** The sample requires an elongation at break strain greater than 39% at 56 days without additional bond relief. Between 39% and 20% additional bond strength is required. Less than 20% - fail.

**Result:** **69%** **PASS**



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TEST CARRIED OUT IN ACCORDANCE WITH AS4654.1:2012 Wet Area Membranes Test Date: 24 November 2017  
Appendix A: Assessment of Durability of waterproof membranes

RESULTS: Location: Ceramic Tile Laboratory  
Conditions: 7 days at 23°C 50%RH  
Sample Number: 7980 - 4 (Numbered 1 to 9)  
Samples: Average of 3 samples  
Load rate: 50mm/min  
Solution: 1L of 2% solution N8 detergent

### Elongation at Break

#### DETERGENT IMMERSION

Period & Sample Number	Sample Thickness Mean (mm)	Maximum Load (N)	Maximum Extension (mm)	Maximum Stress MPa	Maximum Strain %
<b>7 Days</b> 7980 – 4 1 to 3	0.94	22.18	27.85	3.93	84
<b>28 Days</b> 7980 – 4 4 to 6	0.96	34.23	24.82	9.42	75
<b>56 Days</b> 7980 – 4 7 to 9	0.98	27.86	27.51	4.74	83

**Requirement:** The sample requires an elongation at break strain greater than 39% at 56 days without additional bond relief. Between 39% and 20% additional bond strength is required. Less than 20% - fail.

**Result:** **83%** **PASS**



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TEST CARRIED OUT IN ACCORDANCE WITH Test Date: 27 October 2017  
AS4654.1:2012 Wet Area Membranes Appendix B: Assessment of Resistance of  
Waterproofing Membranes to Cyclic Movement

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RESULTS: Location: Laboratory  
Test Rig: Applied Test Systems  
Series 904 Vertical Sealant Tester  
Number of Cycles: 50  
Type of Cycle: Full cycle  
Cycle Time: 2 hours to complete full cycle  
Cycle expansion: 50% of Control elongation at break  
Sample Size: 65mm x 25mm  
Sample Span: 4mm between header plates  
Sample Thickness: 1.03mm

The test sample achieved a control Elongation of Break of 77% as per AS4654.1 Appendix B. For a Class II membrane, the maximum strain used for the cycling shall be 50% the elongation at break.

Number of Cycles completed 50  
Surface Crazeing Nil  
Surface Tears Nil  
Membrane Rupture Nil

**Result: PASS**



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TEST CARRIED OUT IN ACCORDANCE WITH ASTM E96: Moisture Vapour Transmission Rate Test Date: 24 November 2017

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RESULTS: Location: Ceramic Tile Laboratory  
Open mouth dish: Diameter 100mm  
Test Period: 456 hours  
Conditions: 23°C / RH 50%  
Desiccant: Silica gel

### Desiccant Method (Procedure A)

Sample	Thickness (mm)	Water Vapour Tx g/m <sup>2</sup> /24hr	Permeance Perms (in. lbs)
Specimen 1	0.97	1.55	29.77
Specimen 2	1.05	2.04	39.21
Specimen 3	1.14	1.05	20.18
<b>Mean</b>	<b>1.05</b>	<b>1.55</b>	<b>29.72</b>

**Requirement:** Record result according to Table A3 Basic properties of membranes. Results shall determine if material is a moisture suppressant coating.

**Permeance:** 29.72 Perms (in. lbs)

**Water Vapour Tx:** 1.55g/m<sup>2</sup>/24 hours

**Result:** PASS



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Test Date: 15 June 2018

TEST CARRIED OUT IN ACCORDANCE WITH AS 4654.1:2012  
Appendix A: Durability of waterproof membranes

RESULTS: Location: Ceramic Tile Laboratory  
Conditioning: 23°C 65%RH  
Samples: Average of 4 samples  
Load rate: 150mm/min

**Elongation at Break**

**HEAT AGEING @ 80 °C**

Sample Number	Sample Thickness Mean (mm)	Maximum Load (N)	Maximum Extension (mm)	Maximum Stress MPa	Maximum Strain %
8097 1 to 4	0.94	58.69	24.02	10.41	73

**Requirement:** The sample requires an elongation at break strain greater than 86% at 7 days. Less than 86% - fail.

**Result:** 73% PASS





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Test Date: 15 June 2018

TEST CARRIED OUT IN ACCORDANCE WITH AS 4654.1:2012  
Temperature resistance

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RESULTS: Location: Ceramic Tile Laboratory  
Conditioning: 23°C 65%RH  
Temperature: -15°C to +85°C  
Samples: Average of 4 samples  
Load rate: 150mm/min

### Elongation at Break

### TEMPERATURE RESISTANCE

Sample Number	Sample Thickness Mean (mm)	Maximum Load (N)	Maximum Extension (mm)	Maximum Stress MPa	Maximum Strain %
8097 1 to 4	0.87	67.44	16.73	12.92	51

**Requirement:** Samples exhibited no cracking, fractures, or surface defects.

**Result:** **PASS**



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Test Date: 05 July 2018

TEST CARRIED OUT IN ACCORDANCE WITH ASTM C794  
Adhesion-In-Peel of elastomeric joint sealants

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RESULTS: Location: Ceramic Tile Laboratory  
Conditioning: 23°C 65%RH  
Samples: Average of 4 samples  
Load rate: 50mm/min

### BOND STRENGTH

Sample	Substrates					
	Cement Sheet		Timber		Ceramic Tile	
	Peel strength (N)	Adhesion Loss %	Peel strength (N)	Adhesion Loss %	Peel strength (N)	Adhesion Loss %
1	77.81	0	89.48	0	91.38	0
2	93.00	0	122.47	0	125.55	0
3	94.28	0	101.61	0	91.05	0
4	80.92	0	64.66	0	91.04	0
<b>Mean</b>	<b>86.50</b>	<b>0</b>	<b>94.56</b>	<b>0</b>	<b>99.75</b>	<b>0</b>



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Test Date: 26 September 2017

TEST CARRIED OUT IN ACCORDANCE WITH AS 4654.1:2012  
Appendix A: Durability of waterproof membranes

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RESULTS: Location: Ceramic Tile Laboratory  
Conditioning: 23°C 65%RH  
Samples: Average of 5 samples  
Load rate: 150mm/min

### TENSILE STRENGTH

Sample Number	Sample Thickness (mm)	Maximum Load (N)	Maximum Stress (MPa)
7980 – 1 1 to 5	1.02	33.64	5.50

**Result: 5.50MPa**



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Test Date: 15 March 2018

TEST CARRIED OUT IN ACCORDANCE WITH AS/NZ 4347.9  
Thickness

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RESULTS: Location: Ceramic Tile Laboratory  
Conditioning: 23°C 50%RH  
Samples: 3 samples

### SAMPLE THICKNESS

Point	Measurement (mm)
1	1.02
2	1.02
3	1.11
4	1.06
5	1.01
6	0.93
7	1.03
8	0.98
9	1.09
<b>Mean</b>	<b>1.03</b>

**Result: 1.00mm**



## Infrastructure Technologies

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**Prepared on behalf of CSIRO by:**

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Name: Khanh Ho  
Position: Research Project Officer  
Date: 05 February 2020

Signature:

A handwritten signature in black ink, appearing to read 'Khanh Ho', with a horizontal line underneath.