



CSIRO

17 January 2019

Our Ref: EN13 / 2588 03/0211

TEST REPORT No. 8164

Requested by: Inseal Polymers Ltd
PO Box 314156
Orewa 0946
New Zealand

On (date): 8 October 2018

Product Descriptions: Poly-Flex - Pure Polyurea Waterproofing & Protective Coating

Manufacturer: Inseal Polymers Ltd

Sampling Details

Date: 8 October 2018

How (methods): Delivered to Clayton

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This test report consists of 11 pages.

SUMMARY OF ASSESSMENTS REPORTED

AS/NZS 4858:2004	Appendix A, Durability of waterproof membranes	Pass
AS/NZS 4858:2004	Appendix B, Resistance of Waterproofing Membranes to Cyclic Movement	Pass
AS 3558.1-1999	Water Absorption	0.82%
ASTM E96	Moisture Vapour Transmission	Pass

TERM OF VALIDITY

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 8164 is 17 January 2022



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SUMMARY OF RESULTS

AS/NZS 4858:2004 Wet Area Membranes

Appendix A: Assessment of Durability of waterproof membranes

The sample requires an elongation at break strain percentage greater than 374% at 56 days.

Note: (374% equates to 50% of control elongation at break strain percentage).

Durability of membranes: Elongation to break (Strain %)

Control	748%	Class III
Heat Ageing @ 50 °C	676%	PASS
Water Immersion	782%	PASS
Bleach Immersion	769%	PASS
Detergent Immersion	729%	PASS

Inseal Polymers Ltd test sample, Poly-Flex - Pure Polyurea Waterproofing & Protective Coating achieves the performance requirements of AS/NZS 4858: 2004 Durability of Membranes for Class III membrane installation.

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

Class III type membrane: 2mm gauge length for a 4.00mm 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 0.81%
 Sample 2 0.82%
 Sample 3 0.77% Maximum 0.82%

ASTM E96: Water Vapour Transmission of Materials

Result: 4.44g/m²/24 hours PASS

Appendix C: Suitability of waterproofing membranes when used over particle board

Not required by the AS/NZS 4858: 2004.



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TEST CARRIED OUT IN ACCORDANCE WITH AS/NZS 4858:2004 Wet Area Membranes Test Date: 17 October 2018
Appendix A: Assessment of Durability of waterproof membranes

RESULTS: Location: Ceramic Tile Laboratory
Conditions: 7 days at 23°C 50%RH
Sample Number: 8164 - 1 (Numbered 1 to 5)
Samples: Average of 5 samples
Load rate: 200mm/min

Elongation at Break

CONTROL SET

Sample Number	Sample Thickness Mean (mm)	Maximum Load (N)	Maximum Extension (mm)	Maximum Stress MPa	Maximum Strain %
8164 – 1 1 to 5	2.13	279.07	246.92	21.84	748

Requirement for Class III: The specimens have an average percentage strain of $\geq 300\%$

Classification: Class III (High extensibility)



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TEST CARRIED OUT IN ACCORDANCE WITH AS/NZS 4654.1:2012 Wet Area Membranes Test Date: 24 October 2018
Appendix A: Assessment of Durability of waterproof membranes

RESULTS: Location: Ceramic Tile Laboratory
Conditioning: 23°C 50%RH
Sample Number: 8164 - 2 (Numbered 1 to 4)
Samples: Average of 4 samples
Load rate: 200mm/min

Elongation at Break

HEAT AGEING @ 50 °C

Sample Number	Sample Thickness Mean (mm)	Maximum Load (N)	Maximum Extension (mm)	Maximum Stress MPa	Maximum Strain %
8164- 2 1 to 4	2.31	280.49	222.92	21.95	676

Requirement: The sample requires an elongation at break strain greater than 374% at 7 days. Less than 374% - fail.

Result: **676%** **PASS**



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TEST CARRIED OUT IN ACCORDANCE WITH

Test Start Date: 02 November 2018
Test Finish Date: 21 December 2018

AS/NZS 4858:2004 Wet Area Membranes
Appendix A: Assessment of Durability of waterproof membranes

RESULTS: Location: Ceramic Tile Laboratory
Conditions: 7 days at 23°C 50%RH
Sample Number: 8164 - 3 (Numbered 1 to 9)
Samples: Average of 3 samples
Load rate: 200mm/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 %
7 Days 8164 – 3 1 to 3	1.47	143.56	255.90	15.63	775
28 Days 8164 – 3 4 to 6	1.61	154.55	255.92	16.00	776
56 Days 8164 – 3 7 to 9	1.70	171.15	258.01	15.9	782

Requirement: The sample requires an elongation at break strain greater than 374% at 56 days without additional bond relief. Between 374% and 187% additional bond strength is required. Less than 187% - fail.

Result: **782%** **PASS**



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TEST CARRIED OUT IN ACCORDANCE WITH

Test Start Date: 02 November 2018
Test Finish Date: 21 December 2018

AS/NZS 4858:2004 Wet Area Membranes
Appendix A: Assessment of Durability of waterproof membranes

RESULTS: Location: Ceramic Tile Laboratory
Conditions: 7 days at 23°C 50%RH
Sample Number: 8164 - 4 (Numbered 1 to 9)
Samples: Average of 3 samples
Load rate: 200mm/min
Solution: 1L of 10.5 g/L sodium hypochlorite & 2.25 g/L of sodium hydroxide

Elongation at Break

BLEACH IMMERSION

Period & Sample Number	Sample Thickness Mean (mm)	Maximum Load (N)	Maximum Extension (mm)	Maximum Stress MPa	Maximum Strain %
7 Days 8164 – 4 1 to 3	1.85	200.55	241.51	15.69	732
28 Days 8164– 4 4 to 6	1.89	186.87	261.34	16.48	792
56 Days 8164 – 4 7 to 9	1.90	175.39	253.90	15.20	769

Requirement: The sample requires an elongation at break strain greater than 374% at 56 days without additional bond relief. Between 374% and 187% additional bond strength is required. Less than 187% - fail.

Result: **769%** **PASS**



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TEST CARRIED OUT IN ACCORDANCE WITH

Test Start Date: 02 November 2018
Test Finish Date: 21 December 2018

AS/NZS 4858:2004 Wet Area Membranes
Appendix A: Assessment of Durability of waterproof membranes

RESULTS: Location: Ceramic Tile Laboratory
Conditions: 7 days at 23°C 50%RH
Sample Number: 8164 - 5 (Numbered 1 to 9)
Samples: Average of 3 samples
Load rate: 200mm/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 %
7 Days 8164 – 5 1 to 3	1.99	175.4	243.85	14.69	739
28 Days 8164 – 5 4 to 6	2.02	175.03	245.72	14.44	745
56 Days 8164 – 5 7 to 9	2.05	164.33	240.42	12.6	729

Requirement: The sample requires an elongation at break strain greater than 374% at 56 days without additional bond relief. Between 374% and 187% additional bond strength is required. Less than 187% - fail.

Result: **729%** **PASS**



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TEST CARRIED OUT IN ACCORDANCE WITH Test Date: 15 November 2018
AS/NSZ 4858:2004 Wet Area Membranes
Appendix B: Assessment of Resistance of
Waterproofing Membranes to Cyclic Movement

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: 2mm between header plates
Sample Thickness: 2.5mm

The test sample achieved a control Elongation of Break of 374% as per AS4858 Appendix A. For a Class III membrane type the extension movement used for cycling is 4.00mm extension.

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

Result: PASS



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TEST CARRIED OUT IN ACCORDANCE WITH Test Date: 20 November 2018
ASTM E96: Water Vapour Transmission of Materials

RESULTS: Location: Ceramic Tile Laboratory
Open mouth dish: Diameter 100mm
Test Period: 576 hours
Conditions: 23°C / RH 50%
Desiccant: Silica gel

Desiccant Method (Procedure A)

Samples	Thickness (mm)	Water Vapour Tx g/m ² /24hr	Permeance Perms (in. lbs)
Specimen 1	2.02	5.04	87.94
Specimen 2	2.02	4.21	73.54
Specimen 3	2.18	4.07	71.08
Mean	2.07	4.44	77.52

Requirement: If > 8g/m²/24 hours, additional testing referred to in (e) of Table A1 will be required to establish suitability for use over particleboard.

Permeance: 77.52 Perms (in. lbs)

Water Vapour Tx: 4.44g/m²/24 hours

Result: PASS



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TEST CARRIED OUT IN ACCORDANCE WITH AS 3558.1-1999: Water Absorption Test Date: 15 January 2019

RESULTS: Location: Ceramic Tile Laboratory
Test Period: 24 hours
Conditions: 23°C / RH 50%

Samples	Thickness (mm)	Sample weight after conditioning mass (m_1) = grams	Sample weight after exposure mass (m_2) = grams	Water absorption percentage (%)
Specimen 1	2.05	6.4231	6.4754	0.81
Specimen 2	1.98	6.2996	6.3511	0.82
Specimen 3	2.37	7.1256	7.1802	0.77
Average	2.13			0.80

Requirement: The performance criteria set out in AS/NZS 4858 – 2004, Table 8.1 (b), does not specify a limit. The maximum water absorption measured on the waterproofing membrane samples was 0.82%.



Infrastructure Technologies

Gate 5, 2 Normanby Road Clayton VIC 3168, Australia
Telephone: 61 3 9545 2777 Web: <http://www.csiro.au>

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Date and Place : 17 January 2019, Clayton, Vic



Name, Title and Digital Signature:



KHANH HO
Technical Officer
Tel: 61 3 95452777 Email: Khanh.Ho@csiro.au