Industrial Research Services

Materials Science & Engineering, 37 Graham Road (PO Box 56), Highett, Victoria 3190, Australia
Telephone: 61 3 9252 6000 Facsimile: 61 3 9252 6244 Web: http://www.cmse.csiro.au
ABN 41 687 119 230

4 December 2009 Our Ref: EN13 / 1529 03/0211

TEST REPORT No. 5103.1

Requested by: Equus Industries Ltd
Client: Dean Barr

on (date):
Product Descriptions: Aquafin 2K/M waterproofing membrane
Manufacturer: Equus Industries Ltd

Sampling Details
Date:
How (methods): Delivered to Highett

This test report consists of 11 pages.

SUMMARY OF ASSESSMENTS REPORTED

AS/NZS 4858:2004	Appendix A, Durability of waterproof membranes
AS/NZS 4858:2004	Appendix B, Resistance of Waterproofing Membranes to Cyclic Movement
AS 3558.-1999	Water Absorption
ASTM E96	Moisture Vapour Transmission

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 5103.1 is 4 December 2012

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SUMMARY OF RESULTS

AS4858:2004 Wet Area Membranes

Appendix A: Assessment of Durability of waterproof membranes
The sample requires an elongation at break strain percentage greater than 45% at 56 days.
Note: (45% equates to 50% of control elongation at break strain percentage).

Durability of membranes: Elongation to break	Strain %	
Control	90%	**Class II**
Water Immersion	108%	PASS
Detergent Immersion	97%	PASS
Bleach Immersion	99%	PASS
Heat Ageing	83%	PASS

Equus Industries Ltd test sample, Aquafin 2K/M waterproofing membrane achieves the performance requirements of AS/NZS 4858: 2004 Durability of Membranes for Class II membrane installation.

Appendix B: Assessment of resistance of waterproofing membranes to cyclic movement
Class II type membrane: 2mm gauge length for a 0.45 mm extension, repeated 50 cycles.

Requirement: No Fatigue cracking exhibited.
Result: PASS

The Water Vapour Transmission (WVT) in accordance to ASTM E96: 1.44 g/m²/24h

Appendix C: Suitability of waterproofing membranes when used over particle board
Appendix C will not be required as the Aquafin 2K/M waterproofing membrane has a water vapour transmission below 8g/m²/24h.

AS 3558.1 Methods of testing plastics & composite materials sanitary plumbing fixtures:
Method 1: Determination of water absorption characteristics

Water absorption:	Sample 1	0.64%	
	Sample 2	0.82%	
	Sample 3	0.61%	Maximum 0.82%

Conclusion: Aquafin 2K/M waterproofing membrane does not require a 'Suitability over particleboard' to pass the requirements of AS/NZS 4858 Wet area membranes.

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TEST CARRIED OUT IN ACCORDANCE WITH Test Date: 7 October 2009
AS4858:2004 Wet Area Membranes
Appendix A: Assessment of Durability of waterproof membranes

RESULTS:

Location:	Ceramic Tile Laboratory
Conditions:	7 days at 23ºC 55%RH
Sample Number:	5103.1 - 1 (Numbered 1 to 5)
Samples:	Average of 5 samples
Load rate:	150mm/min

Elongation at Break

CONTROL SET

Sample Number	Sample Thickness Mean (mm)	Maximum Load (N)	Maximum Extension (mm)	Maximum Stress MPa	Maximum Strain %
5103.1 – 1 1 to 5	1.5	14.02	29.78	2.12	90

Requirement for Class II: The specimens have an average percentage strain of ≥60% & ≤299%.

Classification: Class II (Medium Extensibility)

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TEST CARRIED OUT IN ACCORDANCE WITH Test Date: 30 November 2009

AS4858:2004 Wet Area Membranes
Appendix A: Assessment of Durability of waterproof membranes

RESULTS:

Location:	Ceramic Tile Laboratory
Conditions:	7 days at 23ºC 55%RH
Sample Number:	5103.1 - 3 (Numbered 1 to 9)
Samples:	Average of 3 samples
Load rate:	150mm/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 5103.1 – 3 1 to 3	1.5	3.19	49.27	0.44	149
28 Days 5103.1 – 3 4 to 6	1.5	3.81	30.74	0.54	93
56 Days 5103.1 – 3 7 to 9	1.5	4.80	35.76	0.61	108

Requirement: The sample requires an elongation at break strain greater than 45% at 56 days without additional bond relief. Between 45% and 23% additional bond strength is required. Less than 23% - fail.

Result: **108%** **PASS**

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TEST CARRIED OUT IN ACCORDANCE WITH Test Date: 30 November 2009

AS4858:2004 Wet Area Membranes
Appendix A: Assessment of Durability of waterproof membranes

RESULTS:

Location:	Ceramic Tile Laboratory
Conditions:	7 days at 23ºC 55%RH
Sample Number:	5103.1 - 5 (Numbered 1 to 9)
Samples:	Average of 3 samples
Load rate:	150mm/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 5103.1 – 5 1 to 3	1.5	3.19	89.14	0.44	270
28 Days 5103.1– 5 4 to 6	1.5	3.84	35.07	0.55	106
56 Days 5103.1 – 5 7 to 9	1.5	4.89	32.73	0.63	99

Requirement: The sample requires an elongation at break strain greater than 45% at 56 days without additional bond relief. Between 45% and 23% additional bond strength is required. Less than 23% - fail.

Result: **99%** **PASS**

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REPORT NO: 5103.1
ISSUE DATE: 4 December 2009
MANUFACTURER: Equus Industries Ltd
PRODUCT DESC: Aquafin 2K/M waterproofing membrane

TEST CARRIED OUT IN ACCORDANCE WITH

Test Date: 30 November 2009

AS4858:2004 Wet Area Membranes
Appendix A: Assessment of Durability of waterproof membranes

RESULTS:

Location:	Ceramic Tile Laboratory
Conditions:	7 days at 23ºC 55%RH
Sample Number:	5103.1 - 4 (Numbered 1 to 9)
Samples:	Average of 3 samples
Load rate:	150mm/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 5103.1 – 4 1 to 3	1.2	1.62	33.60	0.22	102
28 Days 5103.1 – 4 4 to 6	1.2	1.30	17.70	0.18	54
56 Days 5103.1 – 4 7 to 9	1.2	1.18	31.86	0.15	97

Requirement: The sample requires an elongation at break strain greater than 45% at 56 days without additional bond relief. Between 45% and 23% additional bond strength is required. Less than 23% - fail.

Result: **97%** **PASS**

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TEST CARRIED OUT IN ACCORDANCE WITH Test Date: 20 October 2009
AS4858:2004 Wet Area Membranes
Appendix A: Assessment of Durability of waterproof membranes

RESULTS:
Location: Ceramic Tile Laboratory
Conditioning: 23ºC 55%RH
Sample Number: 5103.1 - 2 (Numbered 1 to 4)
Samples: Average of 3 samples
Load rate: 150mm/min

Elongation at Break

HEAT AGEING

Sample Number	Sample Thickness Mean (mm)	Maximum Load (N)	Maximum Extension (mm)	Maximum Stress MPa	Maximum Strain %
5103.1 – 2 1 to 4	1.5	14.02	27.52	1.95	83

Requirement: The sample requires an elongation at break strain greater than 45% at 7 days. Less than 45% - fail.

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

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TEST CARRIED OUT IN ACCORDANCE WITH Test Date: 30 November 2009

AS4858:2004 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:	1.5 mm

The test sample achieved a control Elongation of Break of 90% as per AS4858 Appendix A. For a Class II membrane type the extension movement used for cycling is 0.45 mm extension.

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

Result: Meets the requirement for Moving Joint Test

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TEST CARRIED OUT IN ACCORDANCE WITH
ASTM E96: Moisture Vapour Transmission Rate

Test Date: 29 October 2009

RESULTS:

Location:	Ceramic Tile Laboratory
Open mouth dish:	Diameter 100mm
Test Period:	528 hours
Conditions:	23ºC / RH 50%
Membrane to dish sealant:	wax
Desiccant:	Silica gel

Desiccant Method (Procedure A)

Sample	Thickness mm	Water VapourTx g/m^2/24hr	Permeance µg/N.s
Specimen 1	2.0	1.592	0.0131
Specimen 2	2.0	1.381	0.0114
Specimen 3	2.0	1.347	0.0111
Mean	2.0	**1.44**	0.0119

Requirement: If > 8g/m^2/24 hours, additional testing referred to in (e) of Table A1 will be required to establish suitability for use over particleboard.

Result:

Water vapour transmission **1.44 g/m^2/24 hours** **PASS**

Permeance **0.0119 µg/N.s**

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REPORT NO: 5103.1
ISSUE DATE: 4 December 2009
MANUFACTURER: Equus Industries Ltd
PRODUCT DESC: Aquafin 2K/M waterproofing membrane

TEST CARRIED OUT IN ACCORDANCE WITH
AS 3558.-1999: Water Absorption

Test Date: 30 October 2009

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

Sample	Thickness (mm)	Water Absorption		
		Mass (m1)	Mass (m2)	% Mass Difference
Specimen 1	1.5	31.07	31.27	0.64
Specimen 2	1.5	25.57	25.78	0.82
Specimen 3	1.5	31.14	31.33	0.61
Maximum				**0.69**

Requirement: Determine maximum water absorption as mean difference %

Result: **0.82%**

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Date and Place 4 December 2009 Highett, Vic

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