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Australian Water Quality Centre

LiquiMix Pty Ltd
Attn: Ben Bahrami
24 Rosa Place
Richlands
QLD 4077
AUSTRALIA

4/06/2019

Dear Ben,

Please find the attached report to AS/NZS 4020:2005 for Civilox 18(Light Grey)/Tufflon P80 (White) Primer/Topcoat system submitted for testing.

Should you have any enquiries about the report or any other matters pertaining to the Standard please contact the laboratory on 61 8 7424 1512

Yours sincerely,

Michael Glasson
Supervisor Product Testing

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FINAL REPORT

Report ID : 252846

Report Information

Submitting Organisation	00120664 : LiquiMix Pty Ltd
Account :	141294 : LiquiMix Pty Ltd
AWQC Reference :	141294-2018-CSR-1 : Prod Test: Civilox 18/Tufflon P80 White
Project Reference :	PT-3719
Product Designation :	Civilox 18(Light Grey)/Tufflon P80 (White) Primer/Topcoat system
Composition of Product :	Phenalkamine/Polyurea
Product Manufacturer :	Liquimix, Richlands, Queensland.
Use of Product :	In-line/Potable Water lining
Sample Selection:	As provided by the submitting organisation.
Testing Requested :	**AS/NZS 4020:2005 TESTING OF PRODUCTS FOR USE IN CONTACT WITH DRINKING WATER**
Product Type :	Composite
Samples :	Samples were prepared and controlled as described in Appendix A of AS/NZS 4020: 2005
Extracts :	Extracts were prepared as described in Appendix C, D, E, F, G, H.
Project Completion Date	04-Jun-2019
Project Comment :	The results presented herein demonstrate compliance of Civilox 18(Light Grey)/ Tufflon P80 (White) Primer/Topcoat system to AS/NZS 4020 when exposed at area to volume ratios up to 1000mm²/L and 5,000 mm²/L respectively at 20°C ± 2°C.

PLEASE NOTE THAT THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL

THE RESULTS STATED IN THIS REPORT RELATE TO THE SAMPLE OF THE PRODUCT SUBMITTED FOR TESTING. ANY CHANGES IN THE MATERIAL FORMULATION, PROCESS OF MANUFACTURE, THE METHOD OF APPLICATION, OR THE SURFACE AREA-TO-VOLUME RATIO IN THE END USE, COULD AFFECT THE SUITABILITY OF THE PRODUCT FOR USE IN CONTACT WITH DRINKING WATER

Michael Glasson
APPROVED SIGNATORY

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Summary of Results

APPENDIX	RESULTS
C – Taste of Water Extract	Passed at an exposure of of 5,000 mm² per Litre (topcoat) and 1,000 mm² per Litre (primer).
D – Appearance of Water Extract	Passed at an exposure of of 15,000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer).
E – Growth of Aquatic Micro-organisms	Passed at an exposure of of 15,000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer).
F – Cytotoxic Activity of Water Extract	Passed at an exposure of of 15,000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer).
G – Mutagenic Activity of Water Extract	Passed at an exposure of of 15,000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer).
H – Extraction of Metals	Passed at an exposure of of 15,000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer).

Test Methods

Test(s) in Appendix	AWQC Test Method	Reference Method
C	T0320-01	AS/NZS 4020:2018
D	TO029-01 & TO018-01	APHA 2130b
E	TO014-03	APHA 4500 O C
F	TM-001	AS/NZS 4020:2018
G	TM-002	AS/NZS 4020:2018
H	TIC-006	EPA 200.8

Summary Comment : The coated samples were applied and cured by the submitting organisation prior to submission.

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CLAUSE 6.2 Taste of Water Extract

Sample Description	The sample consisted of a primer/topcoat system consisting of panels to provide an exposure of 5,000 mm² per Litre (topcoat) and 1,000 mm² per Litre (primer). Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.
Extraction Temperatur	20°C ± 2°C
Test Method	Taste of Water Extract (Appendix C)
Test Information	
Scaling Factor	Not applicable.
Results	Not detected (sample and controls).
Evaluation	The product passed the requirements of clause 6.2 when tested at an exposure of 5, 000 mm² per Litre (topcoat) and 1,000 mm² per Litre (primer).
Number of Samples	2.
Test Comment	Iodine, Metallic and Rubber tastes were detected when tested at 15000 & 5000 mm² per Litre. The test was repeated at a lower exposure, 5000 & 1000 mm² per Litre and and no tastes were detected.

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CLAUSE 6.3 Appearance of Water Extract

Sample Description The sample consisted of a primer/topcoat system consisting of panels to provide an exposure of 15,000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer). Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperatur 20°C ± 2°C

Test Method Appearance of Water Extract (Appendix D)

Scaling Factor Not applicable.

Results

	Test (- Blank)	Maximum Allowed	Units
Colour	<1	5	HU
Turbidity	<0.1	0.5	NTU

Evaluation The product passed the requirements of clause 6.3 when tested at an exposure of 15, 000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer).

Number of Samples 1.

Test Comment Not applicable.

Andrew Paul Ford

Andrew Ford
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CLAUSE 6.4 Growth of Aquatic Micro-organisms

Sample Description The sample consisted of a primer/topcoat system consisting of panels to provide an exposure of 15,000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer). Extracts were prepared using 1000 mL volumes of test water.

Test Method Growth of Aquatic Micro-organisms (Appendix E)

Inoculum The volume of the inoculum was 100 mL

Scaling Factor Not applicable.

Results

Mean Dissolved Oxygen	Control	7.3	mg/L
Mean Dissolved Oxygen Differenc	Positive Reference	5.1	mg/L
	Negative Reference	<0.1	mg/L
	Test	1.10	mg/L

Evaluation The product passed the requirements of clause 6.4 when tested at an exposure of 15, 000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer).

Number of Samples 1.

Test Comment Not applicable.

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CLAUSE 6.5 Cytotoxic Activity of Water Extract

Sample Description	The sample consisted of a primer/topcoat system consisting of panels to provide an exposure of 15,000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer). Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.
Extraction Temperatur	20°C ± 2°C
Test Method	Cytotoxic Activity of Water Extract (Appendix F)
Scaling Factor	Not applicable.
Results	Non-cytotoxic.
Evaluation	The product passed the requirements of clause 6.5 when tested at an exposure of 15, 000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer).
Number of Samples	1.
Test Comment	The test extracts and blank extracts were used to prepare nutrient growth medium and subsequently used to grow a cell line (ATCC Number CCL 81) in the analysis. In addition zinc sulphate (0.4 mmol) was used for the positive control in the analysis.

Stella Fanok
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CLAUSE 6.6 Mutagenic Activity of Water Extract

Sample Description The sample consisted of a primer/topcoat system consisting of panels to provide an exposure of 15,000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer). Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperatur 20°C ± 2°C

Test Method Mutagenic Activity of Water Extract (Appendix G)

Scaling Factor Not applicable.

Results

Bacteria Strain	S9	Blank	Sample Extract	Positive Controls	
		Number of Revertants per Plate			
Salmonella typhimurium TA98	-	27, 25, 30	37, 29, 23	3999, 4357, 3912	NPD (20µg)
Mean ± Standard deviation		27.3 ± 2.5	29.7 ± 7.0	4089.3 ± 235.9	
	+	36, 42, 41	28, 31, 28	3768, 4000, 3854	2-AF (20µg)
Mean ± Standard deviation		39.7 ± 3.2	29.0 ± 1.7	3874.0 ± 117.3	
Salmonella typhimurium TA100	-	193, 173, 168	195, 170, 186	997, 917, 1028	Azide (1.0µg)
Mean ± Standard deviation		178.0 ± 13.2	183.7 ± 12.7	980.7 ± 57.3	
	+	204, 216, 245	246, 191, 177	2584, 2595, 2567	2-AF (20µg)
Mean ± Standard deviation		221.7 ± 21.1	204.7 ± 36.5	2582.0 ± 14.1	
Salmonella typhimurium TA102	-	424, 408, 415	409, 430, 469	3409, 2299, 3531	Mitomycin C(10µg)
Mean ± Standard deviation		415.7 ± 8.0	436.0 ± 30.4	3079.7 ± 678.8	
	+	441, 498, 510	452, 502, 510	2744, 2951, 2937	
Mean ± Standard deviation		483.0 ± 36.9	488.0 ± 31.4	2877.3 ± 115.7	

Comments S9 was used as a metabolic activator. NPD (4-nitro-o-phenylenediamine), Azide, and Mitomycin C are specific positive controls for strains TA98, TA100 and TA102 respectively while 2 - AF (2-aminofluorene) when used in conjunction with S9 is a positive control for both TA98 and TA100

Evaluation The product passed the requirements of clause 6.6 when tested at an exposure of 15, 000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer).

Number of Samples 1.

Test Comment Not applicable.

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CLAUSE 6.7 Extraction of Metals

Sample Description The sample consisted of a primer/topcoat system consisting of panels to provide an exposure of 15,000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer). Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperatur 20°C ± 2°C

Test Method Extraction of Metals (Appendix H)

Scaling Factor Not applicable.

Method of Analysis All methods used to determine concentrations of metals are based on those described in the 21st edition of Standard Methods for the Examination of Water and Wastewater published by the APHA, AWWA and WEF (2005). The methods have been adapted for the instrumentation in use at the Australian Water Quality Centre . Concentration of the metals described in Table 2 of the AS/NZS 4020:2005 are determined as follows:
Antimony, Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium and Silver by Inductively Coupled Plasma Mass

Results	Limit of Reporting mg/L	Blank mg/L	Test 1 mg/L	Test 2 mg/L	Max Allowed mg/L
Final Extract					
Antimony	0.0005	<0.0005	<0.0005	<0.0005	0.003
Arsenic	0.0003	<0.0003	<0.0003	<0.0003	0.007
Barium	0.0005	<0.0005	<0.0005	<0.0005	0.7
Cadmium	0.0001	<0.0001	<0.0001	<0.0001	0.002
Chromium	0.0001	0.0001	<0.0001	<0.0001	0.05
Copper	0.0001	<0.0001	<0.0001	<0.0001	2.0
Lead	0.0001	<0.0001	<0.0001	<0.0001	0.01
Mercury	0.00003	<0.00003	<0.00003	<0.00003	0.001
Molybdenum	0.0001	<0.0001	<0.0001	<0.0001	0.05
Nickel	0.0001	<0.0001	<0.0001	<0.0001	0.02
Selenium	0.0001	<0.0001	<0.0001	<0.0001	0.01
Silver	0.00003	<0.00003	<0.00003	<0.00003	0.1

Evaluation The product passed the requirements of clause 6.7 when tested at an exposure of 15, 000 mm² per Litre (topcoat) and 5,000 mm² per Litre (primer).

Number of Samples 1.

Test Comment Not applicable.

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