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All Industry Services
Attn: Justin Hurcom
26 Glen Nathan Court
Mount Nathan
QLD 4211
AUSTRALIA

22/01/2018

Dear Justin,

Please find the attached report to AS/NZS 4020:2005 for Liquid Rubber 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,

A handwritten signature in black ink, appearing to read "M Glasson", is written over a light blue horizontal line.

Michael Glasson
Supervisor Product Testing



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Chemical and Biological Testing
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FINAL REPORT

Report ID : 218863

Report Information

Submitting Organization : 00121985 : All Industry Services
Account : 143089 : All Industry Services
AWQC Reference : 143089-2017-CSR-1 :
Project Reference : PT-3218
Product Designation : Liquid Rubber
Composition of Product : Recipe Number AIS-LR4631.
Product Manufacturer : All Industry Services, Mount Nathan, QLD, AUSTRALIA.
Use of Product : In-Line/Waterproofing and Corrosion Protection.
Sample Selection: As provided by the submitting organization.
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 : 06-Dec-2017
Project Comment : The results presented herein demonstrate compliance of Liquid Rubber to AS /NZS 4020 when exposed at area to volume ratios up to 5850 mm²/ L 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
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Summary of Results

APPENDIX	RESULTS
C – Taste of Water Extract	Passed at an exposure of 5850 mm ² per Liter.
D – Appearance of Water Extract	Passed at an exposure of 15000 mm ² per Liter.
E – Growth of Aquatic Micro-organisms	Passed at an exposure of 5850 mm ² per Liter (scaling factor of 0.39 applied).
F – Cytotoxic Activity of Water Extract	Passed at an exposure of 15000 mm ² per Liter.
G – Mutagenic Activity of Water Extract	Passed at an exposure of 15000 mm ² per Liter.
H – Extraction of Metals	Passed at an exposure of 15000 mm ² per Liter.

Test Methods

Test(s) in Appendix	AWQC Test Method	Reference Method
C	T0320-01	AS/NZS 4020:2005
D	TO029-01 & TO018-01	APHA 2130b
E	TO014-03	APHA 4500 O C
F	TM-001	AS/NZS 4020:2005
G	TM-002	AS/NZS 4020:2005
H	TIC-006	EPA 200.8

Summary Comment : Not applicable.

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CLAUSE 6.2 Taste of Water Extract

Sample Description	The sample consisted of a single panel with dimensions 39 mm x 75 mm providing a total surface area of approximately 5850 mm ² per Liter. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.
Extraction Temperature	20°C ± 2°C.
Test Method	Taste of Water Extract (Appendix C)
Test Information	
Scaling Factor	Not applied.
Results	Not detected (sample and controls)
Evaluation	The product passed the requirements of clause 6.2 when tested at an exposure of 5850 mm ² per Litre.
Number of Samples	2.
Test Comment	Not applicable.



Peter Christopoulos
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CLAUSE 6.3 Appearance of Water Extract

Sample Description The sample consisted of a single panel with dimensions 75 mm x 100 mm providing a total surface area of approximately 15000 mm² per Liter. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 20°C ± 2°C.

Test Method Appearance of Water Extract (Appendix D)

Scaling Factor Not applied.

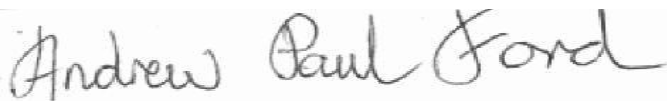
Results

	<u>Test (- Blank)</u>	<u>Maximum Allowed</u>	<u>Units</u>
Color	<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 15000 mm² per Liter.

Number of Samples 1.

Test Comment Not applicable.



Andrew Ford

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CLAUSE 6.4 Growth of Aquatic Micro-organisms

Sample Description The sample consisted of a single panel with dimensions 75mm x 100mm providing a total surface area of approximately 15000 mm² per Liter. 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 A scaling factor of 0.39 was applied.

Results			
Mean Dissolved Oxygen	Control		8.0 mg/L
Mean Dissolved Oxygen Difference	Positive Reference		6.1 mg/L
	Negative Reference		0.3 mg/L
	Test		1.60 mg/L

Evaluation The product passed the requirements of clause 6.4 when tested at an exposure of 5850 mm² per Liter with a 0.39 scaling factor applied.

Number of Samples 1.

Test Comment The Mean Dissolved Oxygen Difference in the extracts exceeded the maximum allowable concentration. A scaling factor of 0.39 applied.



Thuy Diep
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CLAUSE 6.5 Cytotoxic Activity of Water Extract

Sample Description	The sample consisted of a single panel with dimensions 75 mm x 100 mm providing a total surface area of approximately 15000 mm ² per Liter. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.
Extraction Temperature	20°C ± 2°C.
Test Method	Cytotoxic Activity of Water Extract (Appendix F)
Scaling Factor	Not applied.
Results	Non cytotoxic.
Evaluation	The product passed the requirements of clause 6.5 when tested at an exposure of 15000 mm ² per Liter.
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.



Brendon King
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CLAUSE 6.6 Mutagenic Activity of Water Extract

Sample Description The sample consisted of a single panel with dimensions 75 mm x 100 mm providing a total surface area of approximately 15000 mm² per Liter. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 20°C ± 2°C.

Test Method Mutagenic Activity of Water Extract (Appendix G)

Scaling Factor Not applied.

Results

Bacteria Strain	Number of Revertant per Plate				
	S9	Blank	Sample Extract	Positive Controls	
<i>Salmonella typhimurium</i> TA98	-	39, 32, 38	34, 39, 29	3637, 3539, 3475	<u>NPD</u> (20µg)
Mean ± Standard deviation		36.3 ± 3.8	34.0 ± 5.0	3550.3 ± 81.6	
	+	21, 16, 14	21, 25, 22	2878, 3094, 3563	<u>2-AF</u> (20µg)
Mean ± Standard deviation		17.0 ± 3.6	22.7 ± 2.1	3178.3 ± 350.2	
<i>Salmonella typhimurium</i> TA100	-	525, 564, 574	552, 449, 539	1054, 1209, 1139	<u>Azide</u> (1.0µg)
Mean ± Standard deviation		554.3 ± 25.9	513.3 ± 56.1	1134.0 ± 77.6	
	+	271, 306, 312	296, 270, 300	2031, 2024, 1926	<u>2-AF</u> (20µg)
Mean ± Standard deviation		296.3 ± 22.1	288.7 ± 16.3	1993.7 ± 58.7	
<i>Salmonella typhimurium</i> TA102	-	850, 923, 852	944, 953, 972	3104, 3197, 3016	<u>Mitomycin C</u> (10µg)
Mean ± Standard deviation		875.0 ± 41.6	956.3 ± 14.3	3105.7 ± 90.5	
	+	919, 870, 725	893, 821, 934	2410, 3147, 3077	
Mean ± Standard deviation		838.0 ± 100.9	882.7 ± 57.2	2878.0 ± 406.8	

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 15000 mm² per Liter.

Number of Samples 1.

Test Comment Not applicable.



Peter Christopoulos

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CLAUSE 6.7 Extraction of Metals

Sample Description The sample consisted of a single panel with dimensions 75 mm x 100 mm providing a total surface area of approximately 15000 mm² per Liter. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 20°C ± 2°C.

Test Method Extraction of Metals (Appendix H)

Scaling Factor Not applied.

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	0.0010	0.003
Arsenic	0.0003	0.0005	<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	0.0011	0.0013	0.0005	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 15000 mm² per Liter.

Number of Samples 1.

Test Comment Not applicable.



Dzung Bui
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