

Halifax Vogel Group
Attn: John Wood
24-26 Drynan St
Bayswater
WA 6053
AUSTRALIA

26/09/2008

Dear John,

Please find the attached report to AS/NZS 4020:2005 for Hydroliner Tarpee Metallocene 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 08 8259 0332

Yours sincerely,



Michael Glasson
Product Testing Team Leader

FINAL REPORT

Report Information

Report ID : 41704

Submitting Organisation : 00109430 : Halifax Vogel Group

Account : 130400 : HALIFAX VOGEL GROUP - AS/NZS 4020 TESTING

AWQC Reference : 130400-2008-CSR-1 : Prod Test: Tarpee Metallocene Hydroliner

Project Reference : PT-711

Product Designation : Hydroliner Tarpee Metallocene

Composition of Product : P.E and Metallocene.

Product Manufacturer : Hagihara Industries, Japan.

Use of Product : Tank Liner.

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 : 12-Sep-2008

Project Comment : The results presented herein demonstrate compliance of the the Hydroliner Tarpee Metallocene tank liner to AS/NZS 4020 when exposed at area to volume ratios up to 15000 mm²/L.

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 exposure of 15000 mm2 per Litre.
D – Appearance of Water Extract	Passed at exposure of 15000 mm2 per Litre.
E – Growth of Aquatic Micro-organisms	Passed at exposure of 15000 mm2 per Litre.
F – Cytotoxic Activity of Water Extract	Passed at exposure of 15000 mm2 per Litre.
G – Mutagenic Activity of Water Extract	Passed at exposure of 15000 mm2 per Litre.
H – Extraction of Metals	Passed at exposure of 15000 mm2 per Litre.

Summary Comment : Not applicable.

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CLAUSE 6.2 Taste of Water Extract

Sample Description	The sample consisted of a panel with dimensions 75 mm x 200 mm providing a surface area of 15000 mm ² per Litre for each side. 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)
Scaling Factor	Not applied.
Results	Not detected.
Evaluation	The product passed the requirements of clause 6.2 when tested at an exposure of 15000 mm ² per Litre.
Number of Samples	2.
Test Comment	Not applicable.



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CLAUSE 6.3 Appearance of Water Extract

Sample Description The sample consisted of a panel with dimensions 75 mm x 200 mm providing a surface area of 15000 mm² per Litre for each side. 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>
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 15000 mm² per Litre.

Number of Samples 1.

Test Comment Not applicable.



Roger Kennedy
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CLAUSE 6.4 Growth of Aquatic Micro-organisms

Sample Description The sample consisted of a panel with dimensions 75 mm x 200 mm providing a surface area of 15000 mm² per Litre for each side. 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 applied.

Results

Mean Dissolved Oxygen	Control	7.5 mg/L
Mean Dissolved Oxygen Difference	Positive Reference	4.9 mg/L
	Negative Reference	<0.1 mg/L
	Test	0.10 mg/L

Evaluation The product passed the requirements of clause 6.4 when tested at an exposure of 15000 mm² per Litre.

Number of Samples 1.

Test Comment Not applicable.



Stephanie Semczuk
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CLAUSE 6.5 Cytotoxic Activity of Water Extract

Sample Description	The sample consisted of a panel with dimensions 75 mm x 200 mm providing a surface area of 15000 mm ² per Litre for each side. 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 Litre.
Number of Samples	1.
Test Comment	Not applicable.



Stella Fanok
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CLAUSE 6.6 Mutagenic Activity of Water Extract

Sample Description The sample consisted of a panel with dimensions 75 mm x 200 mm providing a surface area of 15000 mm² per Litre for each side. 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

<u>Bacteria Strain</u>	<u>Number of Revertants per Plate</u>				
	S9	Blank	Sample Extract	Positive Controls	
<i>Salmonella typhimurium</i> TA98	-	39, 37, 37	38, 36, 47	2082, 2035, 1897	<u>NPD</u> (20µg)
Mean ± Standard deviation		37.7 ± 1.2	40.3 ± 5.9	2004.7 ± 96.2	
	+	30, 38, 52	54, 21, 36	2221, 1876, 1748	<u>2-AF</u> (20µg)
Mean ± Standard deviation		40.0 ± 11.1	37.0 ± 16.5	1948.3 ± 244.7	
<i>Salmonella typhimurium</i> TA100	-	129, 137, 132	117, 125, 131	661, 637, 830	<u>Azide</u> (1.0µg)
Mean ± Standard deviation		132.7 ± 4.0	124.3 ± 7.0	709.3 ± 105.2	
	+	127, 181, 146	174, 121, 156	1031, 1092, 1209	<u>2-AF</u> (20µg)
Mean ± Standard deviation		151.3 ± 27.4	150.3 ± 27.0	1110.7 ± 90.5	
<i>Salmonella typhimurium</i> TA102	-	423, 469, 421	449, 423, 528	954, 1888, 1675	<u>Mitomycin C</u> (2µg)
Mean ± Standard deviation		437.7 ± 27.2	466.7 ± 54.7	1505.7 ± 489.5	
	+	361, 282, 355	306, 259, 425		
Mean ± Standard deviation		332.7 ± 44.0	330.0 ± 85.6		

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 Litre.

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 panel with dimensions 75 mm x 200 mm providing a surface area of 15000 mm² per Litre for each side. 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 and Selenium by inductively coupled plasma mass spectrometry.
Silver by graphite furnace absorption spectrophotometry (Varian).

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	0.001	<0.001	<0.001	<0.001	0.007
Barium	0.0005	<0.0005	<0.0005	<0.0005	0.7
Cadmium	0.0005	<0.0005	<0.0005	<0.0005	0.002
Chromium	0.003	<0.003	<0.003	<0.003	0.05
Copper	0.0010	<0.0010	0.0010	0.0013	2.0
Lead	0.0005	<0.0005	<0.0005	<0.0005	0.01
Mercury	0.0003	<0.0003	<0.0003	<0.0003	0.001
Molybdenum	0.0005	<0.0005	<0.0005	<0.0005	0.05
Nickel	0.0005	<0.0005	<0.0005	<0.0005	0.02
Selenium	0.003	<0.003	<0.003	<0.003	0.01
Silver	0.002	<0.0002	<0.0002	<0.0002	0.1

Evaluation The product passed the requirements of clause 6.7 when tested at an exposure of 15000 mm² per Litre.

Number of Samples 1.

Test Comment Not applicable.



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