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Australian Water Quality Centre

FINAL REPORT

Report ID : 184925

Report Information

Submitting Organisation	00121017 : Equus Armac
Account :	141815 : Equus Armac
AWQC Reference :	141815-2016-CSR-1 : Prod Test: Velosit - WP101/RM205/WP120
Project Reference :	PT-2804
Product Designation :	VELOSIT WP 101, VELOSIT RM 205 and VELOSIT WP 120
Composition of Product :	Cementitious - 2mm VELOSIT WP 101 (surface), 10mm VELOSIT RM 205 (core) and 2mm VELOSIT WP 120.
Product Manufacturer :	VELOSIT GmbH & Co. KG, Horn-Bad Meinberg, GERMANY.
Use of Product :	In-Line/Cementitious Repair and Waterproofing System.
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	28-Jun-2016
Project Comment :	The results presented herein demonstrate compliance to AS/NZS 4020 for VELOSIT WP 101, VELOSIT RM 205 and VELOSIT WP 120 at 20°C ± 2°C, exposed at an area to volume ratio up to 15,000 mm²/L.

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

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Summary of Results

APPENDIX	RESULTS
C – Taste of Water Extract	Passed at an exposure of 15000 mm²/L (outer side) and 4300mm²/L (core).
D – Appearance of Water Extract	Passed at an exposure of 15000 mm²/L (outer side) and 4300mm²/L (core).
E – Growth of Aquatic Micro-organisms	Passed at an exposure of 15000 mm²/L (outer side) and 4300mm²/L (core).
F – Cytotoxic Activity of Water Extract	Passed at an exposure of 15000 mm²/L (outer side) and 4300mm²/L (core).
G – Mutagenic Activity of Water Extract	Passed at an exposure of 15000 mm²/L (outer side) and 4300mm²/L (core).
H – Extraction of Metals	Passed at an exposure of 15000 mm²/L (outer side) and 4300mm²/L (core).

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 : Thirty five sequential soakings were performed to obtain a pH < 9.0. In accordance with section A8 (Cementitious Products).

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CLAUSE 6.2 Taste of Water Extract

Sample Description	The sample consisted of a cementitious panel containing three layers (2 outer surfaces at 15,000mm²/L and 1 central core layer at 4300mm²/L). Extracts were prepared using 500 mL volumes of pre-conditoning water(AI 12.6).
Extraction Temperatur	20°C ± 2°C.
Test Method	Taste of Water Extract (Appendix C)
Test Information	
Scaling Factor	Not applicable.
Results	Not detected.
Evaluation	The product passed the requirements of clause 6.2 when tested at an exposure of 15000 mm²/L (outer side) and 4300mm²/L (core).
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 cementitious panel containing three layers (2 outer surfaces at 15,000mm²/L and 1 central core layer at 4300mm²/L). Extracts were prepared using 500 mL volumes of pre-conditoning water(AI 12.6).

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 15000 mm²/L (outer side) and 4300mm²/L (core).

Number of Samples 1.

Test Comment Not applicable.

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Andrew Ford
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CLAUSE 6.4 Growth of Aquatic Micro-organisms

Sample Description The sample consisted of a cementitious panel containing three layers (2 outer surfaces at 15,000mm²/L and 1 central core layer at 4300mm²/L). Extracts were prepared using 500 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	7.2	mg/L
Mean Dissolved Oxygen Differenc	Positive Reference	5.4	mg/L
	Negative Reference	<0.1	mg/L
	Test	0.80	mg/L

Evaluation The product passed the requirements of clause 6.4 when tested at an exposure of 15000 mm²/L (outer side) and 4300mm²/L (core).

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 cementitious panel containing three layers (2 outer surfaces at 15,000mm²/L and 1 central core layer at 4300mm²/L). Extracts were prepared using 500 mL volumes of pre-conditoning water(AI 12.6).
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 15000 mm²/L (outer side) and 4300mm²/L (core).
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.

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CLAUSE 6.6 Mutagenic Activity of Water Extract

Sample Description The sample consisted of a cementitious panel containing three layers (2 outer surfaces at 15,000mm²/L and 1 central core layer at 4300mm²/L). Extracts were prepared using 500 mL volumes of pre-conditoning water(Al 12.6).

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	-	36, 30, 24	35, 31, 20	2125, 2343, 2180	NPD (20µg)
Mean ± Standard deviation		30.0 ± 6.0	28.7 ± 7.8	2216.0 ± 113.4	
	+	36, 38, 38	34, 32, 33	1577, 1658, 1399	2-AF (20µg)
Mean ± Standard deviation		37.3 ± 1.2	33.0 ± 1.0	1544.7 ± 132.5	
Salmonella typhimurium TA100	-	761, 731, 854	670, 673, 715	1563, 1710, 1624	Azide (1.0µg)
Mean ± Standard deviation		782.0 ± 64.1	686.0 ± 25.2	1632.3 ± 73.9	
	+	250, 262, 282	243, 211, 269	1234, 928, 686	2-AF (20µg)
Mean ± Standard deviation		264.7 ± 16.2	241.0 ± 29.1	949.3 ± 274.6	
Salmonella typhimurium TA102	-	473, 610, 459	481, 495, 518	2754, 2617, 2754	Mitomycin C(10µg)
Mean ± Standard deviation		514.0 ± 83.4	498.0 ± 18.7	2708.3 ± 79.1	
	+	452, 460, 534	524, 476, 470	2272, 1795, 1822	
Mean ± Standard deviation		482.0 ± 45.2	490.0 ± 29.6	1963.0 ± 267.9	

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/L (outer side) and 4300mm²/L (core).

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 cementitious panel containing three layers (2 outer surfaces at 15,000mm²/L and 1 central core layer at 4300mm²/L). Extracts were prepared using 500 mL volumes of pre-conditoning water(AI 12.6).

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	0.0264	0.0274	0.0269	0.7
Cadmium	0.0001	<0.0001	<0.0001	<0.0001	0.002
Chromium	0.0001	0.0002	0.0003	0.0002	0.05
Copper	0.0001	0.1803	0.1868	0.1859	2.0
Lead	0.0001	0.0007	0.0009	0.0009	0.01
Mercury	0.00003	<0.00003	<0.00003	0.00020	0.001
Molybdenum	0.0001	0.0002	0.0002	0.0002	0.05
Nickel	0.0001	0.0026	0.0029	0.0029	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/L (outer side) and 4300mm²/L (core).

Number of Samples 1.

Test Comment Not applicable.

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