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FINAL REPORT

Report ID : 326487

Report Information

Submitting Organisation :	00109358 : Parchem Construction Supplies Pty Ltd
Account :	130335 : Parchem Construction Supplies Pty Ltd
AWQC Reference :	130335-2020-CSR-14 : Prod Test: Vandex Plug
Project Reference :	PT-4748
Product Designation :	Vandex Plug
Composition of Product :	Cementitious (one-component).
Product Manufacturer :	Vamdex, Schwarzenbek, GERMANY.
Use of Product :	In-Line/Fast Setting Cement Based Mortar to Plug Running Leaks.
Sample Selection:	As provided by the submitting organisation.
Testing Requested :	**AS/NZS 4020 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 4020:2018
Extracts :	Extracts were prepared as described in Appendix/Clause C, D, E, F, G, H, 6.8.
Project Completion Date :	07-Dec-2021
Project Comment :	Product sample received on the 16-Aug-2021 and testing commenced 20-Sep-2021.

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/CLAUSE	RESULTS
C – Taste	Passed at an exposure of 5000 mm² per Litre.
D – Appearance	Passed at an exposure of 5000 mm² per Litre.
E – Growth of Aquatic Micro-organisms	Passed at an exposure of 5000 mm² per Litre.
F – Cytotoxic Activity	Passed at an exposure of 5000 mm² per Litre.
G – Mutagenic Activity	Passed at an exposure of 5000 mm² per Litre.
H – Metals	Passed at an exposure of 5000 mm² per Litre.
6.8 – Organic Compounds	Passed at an exposure of 5000 mm² per Litre.

Test Methods

Test(s) in Appendix	AWQC Test Method	Reference Method
C	T0320-01	AS/NZS 4020:2018
D	TO029-01 & TO018-01	APHA 2120c & APHA 2130b
E	TO014-03	APHA 4500 O G
F	TM-001	AS/NZS 4020:2018
G	TM-002	AS/NZS 4020:2018
H	TIC-006	EPA 200.8

Organic Test Methods

Test(s) in Clause	Test Method	Reference Method
Clause 6.8	TMZ-M36	USEPA524.2
	EP239	USEPA521
	EP132-LL	USEPA_SW846-8270D
	EP075C	USEPA_SW846-8270D
	EP075ASIM	USEPA_SW846-8270D

Summary Comment : The compound was cast into plastic cube moulds and cured for 7 days at 20°C prior to testing (ratio of 500g to 125g of drinking water). Nine 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

Sample Description	The sample consisted of a cementitious cube with dimensions 30 mm x 30 mm x 6 mm and providing a total surface area of approximately 5000 mm²/L. Extracts were prepared using 500 mL volumes of pre-conditoning water (AI 12.6).
Extraction Temperature	20°C ± 2°C.
Test Method	Taste (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 5000 mm² per Litre.
Number of Samples	2.
Test Comment	The 24 hour extracts were not analysed in this test.

Peter Christopoulos
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CLAUSE 6.3 Appearance

Sample Description The sample consisted of a cementitious cube with dimensions 30 mm x 30 mm x 6 mm and providing a total surface area of approximately 5000 mm²/L. Extracts were prepared using 500 mL volumes of pre-conditoning water (AI 12.6).

Extraction Temperature 20°C ± 2°C.

Test Method Appearance (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 5000 mm² per Litre.

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 cementitious cube with dimensions 30 mm x 30 mm x 6 mm and providing a total surface area of approximately 5000 mm²/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 200 mL

Scaling Factor

Not applicable.

Results

Mean Dissolved Oxygen	Control	7.7	mg/L
Mean Dissolved Oxygen Difference	Positive Reference	5.6	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 5000 mm² per Litre.

Number of Samples

1.

Test Comment

Not applicable.

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CLAUSE 6.5 Cytotoxic Activity

Sample Description	The sample consisted of a cementitious cube with dimensions 30 mm x 30 mm x 6 mm and providing a total surface area of approximately 5000 mm²/L. Extracts were prepared using 500 mL volumes of pre-conditoning water (AI 12.6).
Extraction Temperature	20°C ± 2°C.
Test Method	Cytotoxic Activity (Appendix F)
Scaling Factor	Not applicable.
Results	Non-Cytotoxic (sample and controls).
Evaluation	The product passed the requirements of clause 6.5 when tested at an exposure of 5000 mm² per Litre.
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

Sample Description The sample consisted of a cementitious cube with dimensions 30 mm x 30 mm x 6 mm and providing a total surface area of approximately 5000 mm²/L. Extracts were prepared using 500 mL volumes of pre-conditoning water (AI 12.6).

Extraction Temperature 20°C ± 2°C.

Test Method Mutagenic Activity (Appendix G)

Scaling Factor Not applicable.

Results

Bacteria Strain	S9	Blank	Sample Extract	Positive Controls	Number of Revertants per Plate
Salmonella typhimurium TA98	-	25, 30, 15	18, 22, 24	3021, 3241, 3525	NPD (20μg)
Mean ± Standard deviation		23.3 ± 7.6	21.3 ± 3.1	3262.3 ± 252.7	
	+	28, 25, 31	26, 32, 34	2908, 2825, 3312	2-AF (20μg)
Mean ± Standard deviation		28.0 ± 3.0	30.7 ± 4.2	3015.0 ± 260.5	
Salmonella typhimurium TA102	-	243, 288, 321	273, 308, 337	1121, 2736, 1397	Mitomycin C(10μg)
Mean ± Standard deviation		284.0 ± 39.2	306.0 ± 32.0	1751.3 ± 863.8	
	+	336, 283, 267	382, 337, 309	1700, 1435, 1369	
Mean ± Standard deviation		295.3 ± 36.1	342.7 ± 36.8	1501.3 ± 175.2	

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

Evaluation The product passed the requirements of clause 6.6 when tested at an exposure of 5000 mm² per Litre.

Number of Samples 1.

Test Comment The differences in the mean number of revertants between the blank and test extracts do not exceed two standard deviations; accordingly there is no evidence of a mutagenic response.

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CLAUSE 6.7 Metals

Sample Description The sample consisted of a cementitious cube with dimensions 30 mm x 30 mm x 6 mm and providing a total surface area of approximately 5000 mm²/L. Extracts were prepared using 500 mL volumes of pre-conditoning water (AI 12.6).

Extraction Temperature 20°C ± 2°C.

Test Method 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 US EPA method 200.8 Determination of Trace elements in Waters and Wastes by Inductively Coupled Plasma - Mass Spectrometry. 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 4020:2018 are determined as follows:
Aluminium, Antimony, Arsenic, Barium, Boron, Cadmium, Chromium, Copper, Iron, Lead, Manganese, Mercury, Molybdenum, Nickel, Selenium and Silver by Inductively Coupled Plasma Mass Spectrometry.

Results

	Limit of Reporting mg/L	Blank mg/L	Test 1 mg/L	Test 2 mg/L	Max Allowed mg/L
Final Extract					
Aluminium	0.001	0.033	0.053	0.055	0.2
Antimony	0.0005	<0.0005	<0.0005	<0.0005	0.003
Arsenic	0.0003	<0.0003	<0.0003	<0.0003	0.01
Barium	0.0005	0.0256	0.0255	0.0253	0.7
Boron	0.020	0.057	0.070	0.060	1.4
Cadmium	0.0001	<0.0001	<0.0001	<0.0001	0.002
Chromium	0.0001	0.0002	0.0002	0.0002	0.05
Copper	0.0001	0.1107	0.1109	0.1105	2.0
Iron	0.0005	0.0062	0.0051	0.0049	0.3
Lead	0.0001	0.0003	0.0004	0.0004	0.01
Manganese	0.0001	0.0005	0.0005	0.0005	0.1
Mercury	0.00003	<0.00003	<0.00003	<0.00003	0.001
Molybdenum	0.0001	0.0002	0.0002	0.0002	0.05
Nickel	0.0001	0.0010	0.0010	0.0010	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 5000 mm² per Litre.

Number of Samples 1.

Test Comment Not applicable.

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CLAUSE 6.8 Organic Compounds

Sample Description The sample consisted of a cementitious cube with dimensions 30 mm x 30 mm x 6 mm and providing a total surface area of approximately 5000 mm²/L. Extracts were prepared using 500 mL volumes of pre-conditoning water (AI 12.6).

Extraction Temperature 20°C ± 2°C.

Test Method Organic Compounds (Clause 6.8). Max Allowed values are taken from the Australian Drinking Water Guidelines and Drinking-water Standards for New Zealand. Please note, some reported compounds have no guideline value.

Scaling Factor Not applicable.

Results

Organic Compound Nitrosamines	Blank µg/L	Test µg/L	Max Allowed
!External Lab Report No.	ES2134547	ES2134547	
1-Nitrosopiperidine (NPip)	<0.003	<0.003	
1-Nitrosopyrrolidine (NPyr)	<0.01	<0.01	
Nitrosomorpholine (NMor)	<0.003	<0.003	
N-Nitrosodiethylamine (NDEA)	<0.01	<0.01	
N-Nitrosodimethylamine (NDMA)	<0.003	<0.003	0.1 µg/L
N-Nitrosodi-n-propylamine (NDPA)	<0.003	<0.003	
N-Nitrosomethylethylamine (NMEA)	<0.003	<0.003	

Organic Compound Phenols	Blank µg/L	Test µg/L	Max Allowed
!External Lab Report No.	ES2134547	ES2134547	
2 4 5-trichlorophenol	<1.0	<1.0	
2 4 6-trichlorophenol	<1.0	<1.0	20 µg/L
2 4-dichlorophenol	<1.0	<1.0	200 µg/L
2 4-dimethylphenol	<1.0	<1.0	
2 6-dichlorophenol	<1.0	<1.0	
2-chlorophenol	<1.0	<1.0	300 µg/L
2-nitrophenol	<1.0	<1.0	
4-chloro-3-methylphenol	<1.0	<1.0	
m+p cresol	<2.0	<2.0	
o-cresol	<1.0	<1.0	
pentachlorophenol	<2.0	<2.0	9 µg/L
phenol	<1.0	<1.0	

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Organic Compound **Phthalate Esters**	Blank µg/L	Test µg/L	Max Allowed
!External Lab Report No.	ES2134547	ES2134547	
Bis(2-ethylhexyl) phthalate	<10	<10	10 µg/L
Butyl benzyl phthalate	<2	<2	
Di(2-ethylhexyl) adipate	<2	<2	
Diethyl phthalate	<2	<2	
Dimethyl phthalate	<2	<2	
Di-n-butyl phthalate	<2	<2	
Di-n-octyl phthalate	<2	<2	

Organic Compound **Polycyclic Aromatic Hydrocarbons**	Blank µg/L	Test µg/L	Max Allowed
!External Lab Report No.	ES2134547	ES2134547	
Acenaphthene	<0.02	<0.02	
Acenaphthylene	<0.02	<0.02	
Anthracene	<0.02	<0.02	
Benzo(a)anthracene	<0.02	<0.02	
Benzo(a)pyrene	<0.005	<0.005	0.01 µg/L
Benzo(a)pyrene TEQ	<0.005	<0.005	
Benzo(b+j)fluoranthene	<0.02	<0.02	
Benzo(ghi)perylene	<0.02	<0.02	
Benzo(k)fluoranthene	<0.02	<0.02	
Chrysene	<0.02	<0.02	
Dibenzo(a-h)anthracene	<0.02	<0.02	
Fluoranthene	<0.02	<0.02	
Fluorene	<0.02	<0.02	
Indeno(123-cd)pyrene	<0.02	<0.02	
Naphthalene	<0.02	<0.02	
PAH - Total	<0.005	<0.005	
Phenanthrene	<0.02	<0.02	
Pyrene	<0.02	<0.02	

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Organic Compound **Volatile Organic Compounds GCMS**	Blank µg/L	Test µg/L	Max Allowed
1 1 1 2-Tetrachloroethane	<1	<1	
1 1 1-Trichloroethane	<1	<1	
1 1 2 2-Tetrachloroethane	<1	<1	
1 1 2-Trichloroethane	<1	<1	
1 1-Dichloropropene	<1	<1	
1 2 3-Trichlorobenzene	<1	<1	
1 2 3-Trichloropropane	<1	<1	
1 2 4-Trichlorobenzene	<1	<1	
1 2 4-Trimethylbenzene	<1	<1	
1 2-Dibromo-3-chloropropane	<1	<1	1 µg/L
1 2-Dibromoethane	<1	<1	1 µg/L
1 2-Dichlorobenzene	<1	<1	1500 µg/L
1 2-Dichloroethane	<1	<1	3 µg/L
1 2-Dichloropropane	<1	<1	
1 3 5-Trimethylbenzene	<1	<1	
1 3-Dichlorobenzene	<1	<1	
1 3-Dichloropropane	<1	<1	
1 4-Dichlorobenzene	<1	<1	40 µg/L
1,1-Dichloroethane	<1	<1	
1,1-Dichloroethene	<1	<1	30 µg/L
2,2-Dichloropropane	<1	<1	
2-Chlorotoluene	<1	<1	
4-Chlorotoluene	<1	<1	
4-Isopropyltoluene	<1	<1	
Benzene	<1	<1	1 µg/L
Bromobenzene	<1	<1	
Bromochloromethane	<1	<1	
Bromodichloromethane	21	28	60 µg/L
Bromoform	6	7	100 µg/L
Bromomethane	<4	<4	
Carbon tetrachloride	<1	<1	3 µg/L
Chlorobenzene	<1	<1	300 µg/L
Chloroethane	<4	<4	
Chloroform	14	20	400 µg/L
Chloromethane	<4	<4	
cis-1 3-Dichloropropene	<1	<1	
cis-1,2-Dichloroethene	<1	<1	
Dibromochloromethane	24	31	150 µg/L
Dibromomethane	<1	<1	
Dichlorodifluoromethane	<1	<1	
Dichloromethane	<4	<4	4 µg/L
Ethylbenzene	<1	<1	300 µg/L
Hexachlorobutadiene	<0.7	<0.7	0.7 µg/L
Isopropylbenzene	<1	<1	
m+p-Xylenes - Total	<2	<2	

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Organic Compound **Volatile Organic Compounds GCMS**	Blank µg/L	Test µg/L	Max Allowed
Naphthalene	<1	<1	
n-Butylbenzene	<1	<1	
n-Propylbenzene	<1	<1	
o-Xylene	<1	<1	
sec-Butylbenzene	<1	<1	
Styrene	<1	<1	30 µg/L
tert-Butylbenzene	<1	<1	
Tetrachloroethene	<1	<1	50 µg/L
Toluene	<1	<1	800 µg/L
Total 1 2-dichloroethene	<2	<2	60 µg/L
Total 1 3-dichloropropene	<2	<2	20 µg/L
Total Trichlorobenzene	<2	<2	30 µg/L
Total Xylene	<3	<3	600 µg/L
trans-1 3-Dichloropropene	<1	<1	
trans-1,2-Dichloroethene	<1	<1	
Trichloroethene	<1	<1	
Trichlorofluoromethane	<1	<1	
Trihalomethanes - Total	65	86	250 µg/L
Vinyl chloride	<0.3	<0.3	0.3 µg/L

Evaluation The product passed the requirements of clause 6.8 when tested at an exposure of 5000 mm² per Litre.

Number of Samples 1.

Test Comment Subcontracted testing conducted by ALS, Environmental Division, NATA accreditation no. 825 site no. 10911 and ALS Scoresby, NATA accreditation no. 992, site no. 989

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