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Bermad Water Technologies
Attn: Colin Kirkland
PO Box 506
Thomastown
VIC 3074
AUSTRALIA

21/03/2019

Dear Colin,

Please find the attached report to AS/NZS 4020:2005 for FOX3-RFP-M Air Release Valve (25mm Representative Model) 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 grey rectangular background.

Michael Glasson
Supervisor Product Testing



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FINAL REPORT

Report ID : 247742

Report Information

Submitting Organisation : 00121202 : Bermad Water Technologies
Account : 142174 : Bermad Water Technologies
AWQC Reference : 142174-2018-CSR-1 : Prod Test: Fox-RFP Air Valves
Project Reference : PT-3362
Product Designation : FOX3-RFP-M Air Release Valve (25mm Representative Model)
Composition of Product : Epoxy (FBE) Coated Ductile Iron, C/W 316SS, PP, NBR and Silicone.
Product Manufacturer : CSA, S.r.L., Località Ponteghiara - 43039 Salsomaggiore Terme (PR), ITALY.
Use of Product : In-Line/Air Release Valve.
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 : 21-Mar-2019
Project Comment : The results presented herein demonstrate compliance of FOX3-RFP-M Air Release Valve (25mm Representative Model) to AS/NZS 4020 when tested at the 'In-the-Product' exposure with a 0.05 scaling factor at 60°C ± 2°C. Product range to include 25mm to 250mm.

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



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Summary of Results

APPENDIX	RESULTS
C – Taste of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.05 applied.
D – Appearance of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.05 applied.
E – Growth of Aquatic Micro-organisms	Passed at the in-use exposure.
F – Cytotoxic Activity of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.05 applied.
G – Mutagenic Activity of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.05 applied.
H – Extraction of Metals	Passed at the in-the-product exposure with a scaling factor of 0.05 applied.

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 : Not applicable.

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CLAUSE 6.2 Taste of Water Extract

Sample Description	The valve was tested at the in-the-product exposure. Each valve held approximately 500 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.
Extraction Temperature	60°C ± 2°C.
Test Method	Taste of Water Extract (Appendix C)
Test Information	
Scaling Factor	A scaling factor of 0.05 was applied.
Results	Not detected (sample and controls).
Evaluation	The product passed the requirements of clause 6.2 when tested at the in-the-product exposure with a scaling factor of 0.05 applied.
Number of Samples	2.
Test Comment	Not applicable.



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CLAUSE 6.3 Appearance of Water Extract

Sample Description The valve was tested at the in-the-product exposure. Each valve held approximately 500 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 60°C ± 2°C.

Test Method Appearance of Water Extract (Appendix D)

Scaling Factor A scaling factor of 0.05 was applied.

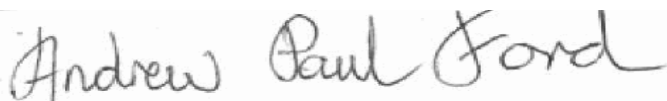
Results

	<u>Test (- Blank)</u>	<u>Maximum Allowed</u>	<u>Units</u>
Colour	<1	5	HU
Turbidity	0.3	0.5	NTU

Evaluation The product passed the requirements of clause 6.3 when tested at the in-the-product exposure with a scaling factor of 0.05 applied.

Number of Samples 4.

Test Comment Sample exceeded maximum allowable concentration for turbidity in final extracts with 0.05 scaling factor at 60°C. Test repeated with new sample with coating applied in the threaded area; met requirements under same test conditions.



Andrew Ford
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CLAUSE 6.4 Growth of Aquatic Micro-organisms

Sample Description The non-metallic components were immersed at the in-use exposure. The surface area was in the range 1000 mm² per Litre and 15,000 mm² per Litre. 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 75 mL

Scaling Factor Not applied.

Results

Mean Dissolved Oxygen	Control	7.2 mg/L
Mean Dissolved Oxygen Differenc	Positive Reference	5.2 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 the in-the-product exposure.

Number of Samples 1.

Test Comment Not applicable.



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CLAUSE 6.5 Cytotoxic Activity of Water Extract

Sample Description	The valve was tested at the in-the-product exposure. Each valve held approximately 500 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.
Extraction Temperature	60°C ± 2°C.
Test Method	Cytotoxic Activity of Water Extract (Appendix F)
Scaling Factor	A scaling factor of 0.05 was applied.
Results	Non-cytotoxic (sample and controls).
Evaluation	The product passed the requirements of clause 6.5 when tested at the in-the-product exposure with a scaling factor of 0.05 applied.
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 valve was tested at the in-the-product exposure. Each valve held approximately 500 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 60°C ± 2°C.

Test Method Mutagenic Activity of Water Extract (Appendix G)

Scaling Factor A scaling factor of 0.05 was applied.

Results

Bacteria Strain	Number of Revertants per Plate				
	S9	Blank	Sample Extract	Positive Controls	
<i>Salmonella typhimurium</i> TA98	-	28, 32, 37	37, 33, 35	2187, 2341, 2134	<u>NPD</u> (20µg)
Mean ± Standard deviation		32.3 ± 4.5	35.0 ± 2.0	2220.7 ± 107.5	
	+	44, 47, 49	40, 31, 39	4029, 3680, 3203	<u>2-AF</u> (20µg)
Mean ± Standard deviation		46.7 ± 2.5	36.7 ± 4.9	3637.3 ± 414.6	
<i>Salmonella typhimurium</i> TA100	-	97, 104, 115	84, 92, 89	610, 681, 595	<u>Azide</u> (1.0µg)
Mean ± Standard deviation		105.3 ± 9.1	88.3 ± 4.0	628.7 ± 45.9	
	+	88, 106, 92	83, 92, 108	1796, 1767, 1601	<u>2-AF</u> (20µg)
Mean ± Standard deviation		95.3 ± 9.5	94.3 ± 12.7	1721.3 ± 105.2	
<i>Salmonella typhimurium</i> TA102	-	402, 327, 372	375, 406, 387	1526, 1771, 1280	<u>Mitomycin C</u> (10µg)
Mean ± Standard deviation		367.0 ± 37.7	389.3 ± 15.6	1525.7 ± 245.5	
	+	506, 415, 431	518, 477, 493	2388, 2583, 2473	
Mean ± Standard deviation		450.7 ± 48.6	496.0 ± 20.7	2481.3 ± 97.8	

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 the in-the-product exposure with a scaling factor of 0.05 applied.

Number of Samples 1.

Test Comment Not applicable.



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CLAUSE 6.7 Extraction of Metals

Sample Description The valve was tested at the in-the-product exposure. Each valve held approximately 500 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 60°C ± 2°C.

Test Method Extraction of Metals (Appendix H)

Scaling Factor A scaling factor of 0.05 was 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	<0.0005	0.003
Arsenic	0.0003	<0.0003	<0.0003	<0.0003	0.007
Barium	0.0005	0.0013	0.0042	0.0044	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 the in-the-product exposure with a scaling factor of 0.05 applied.

Number of Samples 1.

Test Comment Not applicable.



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