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Australian Water Quality Centre

FINAL REPORT

Report ID : 250560

Report Information

Submitting Organisation	00121312 : Arad Ltd
Account :	142320 : Arad Ltd
AWQC Reference :	142320-2018-CSR-8 : Prod Test: Octave Iron Body 2"-12" Water Meter
Project Reference :	PT-3833
Product Designation :	Octave Iron Body Water Meter (2" representative model)
Composition of Product :	Epoxy Coated Cast Ductile Iron (see attachment 1 for further information).
Product Manufacturer :	Arad Ltd., Kibbutz Dalia, ISRAEL.
Use of Product :	In-Line/Metal Body Water Meter.
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	02-May-2019
Project Comment :	The results presented herein demonstrate compliance of Octave Iron Body Water Meter (2" representative model) to AS/NZS 4020 when tested at the 'in-the-product' exposure with a 0.1 scaling factor at 20°C ± 2°C.

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 the in-the-product exposure with a scaling factor of 0.1 applied.
D – Appearance of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.1 applied.
E – Growth of Aquatic Micro-organisms	Passed when tested at the in-use exposure.
F – Cytotoxic Activity of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.1 applied.
G – Mutagenic Activity of Water Extract	Passed at the in-the-product exposure with a scaling factor of 0.1 applied.
H – Extraction of Metals	Passed at the in-the-product exposure with a scaling factor of 0.1 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 : Product range to include 2" to 12" models.

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CLAUSE 6.2 Taste of Water Extract

Sample Description	The meter was tested at the in-the-product exposure. Each meter held approximately 200 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.
Extraction Temperatur	20°C ± 2°C.
Test Method	Taste of Water Extract (Appendix C)
Test Information	
Scaling Factor	A scaling factor of 0.1 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 0.1 applied.
Number of Samples	2.
Test Comment	Not applicable.

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CLAUSE 6.3 Appearance of Water Extract

Sample Description The meter was tested at the in-the-product exposure. Each meter held approximately 200 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperatur 20°C ± 2°C.

Test Method Appearance of Water Extract (Appendix D)

Scaling Factor A scaling factor of 0.1 was applied.

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 the in-the-product exposure with a scaling factor of 0.1 applied.

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 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 1000 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 applicable.

Results

Mean Dissolved Oxygen	Control	7.4	mg/L
Mean Dissolved Oxygen Differenc	Positive Reference	3.9	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 the in-use exposure.

Number of Samples 1.

Test Comment Not applicable.

Thuy Diep
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CLAUSE 6.5 Cytotoxic Activity of Water Extract

Sample Description	The meter was tested at the in-the-product exposure. Each meter held approximately 200 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.
Extraction Temperatur	20°C ± 2°C.
Test Method	Cytotoxic Activity of Water Extract (Appendix F)
Scaling Factor	A scaling factor of 0.1 was applied.
Results	Non-cytotoxic.
Evaluation	The product passed the requirements of clause 6.5 when tested at the in-the-product exposure with a scaling factor of 0.1 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 meter was tested at the in-the-product exposure. Each meter held approximately 200 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperatur 20°C ± 2°C.

Test Method Mutagenic Activity of Water Extract (Appendix G)

Scaling Factor A scaling factor of 0.1 was applied.

Results

Bacteria Strain	S9	Number of Revertants per Plate: Blank	Sample Extract	Positive Controls	
Salmonella typhimurium TA98	-	21, 32, 22	18, 31, 22	4131, 4026, 4234	NPD (20µg)
Mean ± Standard deviation		25.0 ± 6.1	23.7 ± 6.7	4130.3 ± 104.0	
	+	18, 16, 19	23, 13, 13	3784, 4022, 3846	2-AF (20µg)
Mean ± Standard deviation		17.7 ± 1.5	16.3 ± 5.8	3884.0 ± 123.5	
Salmonella typhimurium TA100	-	147, 115, 119	112, 122, 123	900, 917, 912	Azide (1.0µg)
Mean ± Standard deviation		127.0 ± 17.4	119.0 ± 6.1	909.7 ± 8.7	
	+	126, 116, 140	148, 120, 153	2408, 2344, 2187	2-AF (20µg)
Mean ± Standard deviation		127.3 ± 12.1	140.3 ± 17.8	2313.0 ± 113.7	
Salmonella typhimurium TA102	-	407, 448, 525	401, 415, 468	3408, 3692, 3046	Mitomycin C(10µg)
Mean ± Standard deviation		460.0 ± 59.9	428.0 ± 35.3	3382.0 ± 323.8	
	+	445, 518, 466	399, 431, 452	2204, 2471, 2285	
Mean ± Standard deviation		476.3 ± 37.6	427.3 ± 26.7	2320.0 ± 136.9	

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 the in-the-product exposure with a scaling factor of 0.1 applied.

Number of Samples 1.

Test Comment Not applicable.

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CLAUSE 6.7 Extraction of Metals

Sample Description The meter was tested at the in-the-product exposure. Each meter held approximately 200 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperatur 20°C ± 2°C.

Test Method Extraction of Metals (Appendix H)

Scaling Factor A scaling factor of 0.1 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	<0.0005	0.0147	0.0146	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	0.0003	0.0002	0.0003	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	0.0010	<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 0.1 applied.

Number of Samples 1.

Test Comment Not applicable.

Dzung Bui
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Attachment 1

REPORT NUMBER 250560

SAMPLE REFERENCE PT-3833

DATE 23/04/2019

PRODUCT DESCRIPTION Octave Iron Body Water Meter (2" representative model)

A. MATERIAL of each product submitted		**B. COMPONENTS** Which are manufactured from each wetted material		**C. FITTINGS/ASSEMBLED PRODUCT** in which components will be used	
Name & Code	Manufacturer/ Supplier	Name & Code	Manufacturer/ Supplier	Name & Code	Manufacturer/ Supplier
VICTREX PEEK 450G BEIGE	VICTREX	96210209 D-FLOW SENSOR WIRE L=260mm	D-FLOW	Octave 2"-12"	ARAD Ltd.
VICTREX PEEK 450G BEIGE	VICTREX	96210230 D-Flow sensor WIRE L=360mm	D-FLOW		ARAD Ltd.
VICTREX PEEK 450G BEIGE	VICTREX	96210240 D-Flow sensor WIRE L=460mm	D-FLOW		ARAD Ltd.
POWDER EPOXY COATING (COAT R4-ES RAL 5017GL HJF10R-K20)	AKZO NOBEL POWDER COATING	29908056 Body OCTAVE from 2" up to 12" coating blue			ARAD Ltd.