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Australian Water Quality Centre

Arad Ltd
Attn: Michaela Avraham
Kibbutz Dalia

19239
ISRAEL

11/04/2014

Dear Michaela,

Please find the attached report to AS/NZS 4020:2005 for Water Meter - Plastic Body OCTAVE (1"½ Representative) 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,

Peter Christopoulos
Snr Technical Officer Micro

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Australian Water Quality Centre

FINAL REPORT

Report ID : 136008

Report Information

Submitting Organisation :	00121312 : Arad Ltd
Account :	142320 : Arad Ltd
AWQC Reference :	142320-2013-CSR-2 : Prod Test: Plastic Body Water Meter
Project Reference :	PT-2277
Product Designation :	Water Meter - Plastic Body OCTAVE (1"½ Representative)
Composition of Product :	Polyamide Polymer Body (see attachment 1 for further information).
Product Manufacturer :	Arad Ltd., Kibbutz Dalia, ISRAEL.
Use of Product :	In-Line/ 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 :	11-Apr-2014
Project Comment :	The results presented herein demonstrate compliance of Water Meter - Plastic Body OCTAVE (1"½ 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. Product range to include 1"½ to 12".

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	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 4020:2005
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 : Not applicable.

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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 220 mL of water. 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)
Test Information	
Scaling Factor	A scaling factor of 0.1 was applied.
Results	Not detected.
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.

Peter Christopoulos
APPROVED SIGNATORY

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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 220 mL of water. 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 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.

Joanne Clark
APPROVED SIGNATORY

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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 100 mL

Scaling Factor Not applicable.

Results

Mean Dissolved Oxygen	Control	7.2	mg/L
Mean Dissolved Oxygen Difference	Positive Reference	5.4	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.

Stephanie Semczuk
APPROVED SIGNATORY

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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 220 mL of water. 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	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
APPROVED SIGNATORY

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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 220 mL of water. 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 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	-	22, 34, 18	11, 18, 17	2069, 2287, 1975	NPD (20µg)
Mean ± Standard deviation		24.7 ± 8.3	15.3 ± 3.8	2110.3 ± 160.1	
	+	24, 29, 30	16, 15, 13	2528, 2303, 2962	2-AF (20µg)
Mean ± Standard deviation		27.7 ± 3.2	14.7 ± 1.5	2597.7 ± 335.0	
Salmonella typhimurium TA100	-	495, 499, 558	575, 511, 506	803, 897, 995	Azide (1.0µg)
Mean ± Standard deviation		517.3 ± 35.3	530.7 ± 38.5	898.3 ± 96.0	
	+	221, 257, 255	235, 189, 215	2582, 2532, 2495	2-AF (20µg)
Mean ± Standard deviation		244.3 ± 20.2	213.0 ± 23.1	2536.3 ± 43.7	
Salmonella typhimurium TA102	-	634, 633, 641	556, 601, 651	2769, 2875, 2745	Mitomycin C(10µg)
Mean ± Standard deviation		636.0 ± 4.4	602.7 ± 47.5	2796.3 ± 69.2	
	+	582, 616, 711	630, 551, 551		
Mean ± Standard deviation		636.3 ± 66.9	577.3 ± 45.6		

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 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 220 mL of water. 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 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 Spectrometry.

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	<0.0005	<0.0005	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	0.0002	0.0002	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	0.00004	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
APPROVED SIGNATORY

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AS/NZS 4020:2005

Attachment 1

REPORT NUMBER 136008

SAMPLE REFERENCE PT-2277

DATE 11/04/2014

A. MATERIAL		**B. COMPONENTS**		**C. FITTINGS/ASSEMBLED PRODUCT**	
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 1 1/2"-2"	ARAD Ltd.
29403603 PPO +30% GF (GFN 1630V-73701(BLACK))	SUKEET (SABIC)	26353109 (exist only in 2" w/m) INLET FLOW TUBE OCTAVE 2	ARAD Ltd.		
29403603 PPO +30% GF (GFN 1630V-73701(BLACK))	SUKEET (SABIC)	26353309 (exist only in 3" w/m) INLET FLOW TUBE OCTAVE 2	ARAD Ltd.		
29403603 PPO +30% GF (GFN 1630V-73701(BLACK))	SUKEET (SABIC)	24630009 (exist only in 4" w/m) FLOW STRAIGHTNER OCTAVE 4	ARAD Ltd.		
29813006 SILICONE SEALANT (DC CLEAR 781,CLEAR SILICONE SEALANT)	DOW CORNING EUROPE SA				
29100013EM PPA+40%GF (GRIVORY XE 4101 BLACK 9225)	EMS CHEMIE AG	31535009 (exist only in 1 1/2" w/m) BODY OCTAVE 1 1/2" PLASTIC THREADED	ARAD Ltd.		
29100013EM PPA+40%GF (GRIVORY XE 4101 BLACK 9225)	EMS CHEMIE AG	31540009(exist only in 2" w/m) BODY OCTAVE 2" PLASTIC THREADED	ARAD Ltd.		