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Australian Water Quality Centre

FINAL REPORT

Report ID : 252225

Report Information

Submitting Organisation	00121312 : Arad Ltd
Account :	142320 : Arad Ltd
AWQC Reference :	142320-2018-CSR-1 : Prod Test: ARAD: PD DN25 Polymeric Water Meter
Project Reference :	PT-3820
Product Designation :	PD DN25 Q3=6.3 Polymeric Water Meter
Composition of Product :	Polymeric (see attachement)
Product Manufacturer :	ARAD LTD (Israel)
Use of Product :	In-Line
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	27-May-2019
Project Comment :	The results presented herein demonstrate compliance of PD DN25 Polymeric Water Meter to AS/NZS 4020 when tested at the 'in-the-product' exposure with a 0.1 scaling factor at 50°C ± 2°C.

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	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 :

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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 265 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.
Extraction Temperatur	50°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 265 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperatur 50°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
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 4000 mL volumes of test water.

Test Method

Growth of Aquatic Micro-organisms (Appendix E)

Inoculum

The volume of the inoculum was 400 mL

Scaling Factor

Not applicable.

Results

Mean Dissolved Oxygen	Control	7.3	mg/L
Mean Dissolved Oxygen Differenc	Positive Reference	5.4	mg/L
	Negative Reference	<0.1	mg/L
	Test	0.40	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
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 265 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.
Extraction Temperatur	50°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 265 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperatur 50°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	-	18, 18, 24	20, 17, 16	2810, 2858, 3095	NPD (20µg)
Mean ± Standard deviation		20.0 ± 3.5	17.7 ± 2.1	2921.0 ± 152.6	
	+	18, 14, 17	17, 13, 22	3069, 3205, 3161	2-AF (20µg)
Mean ± Standard deviation		16.3 ± 2.1	17.3 ± 4.5	3145.0 ± 69.4	
Salmonella typhimurium TA100	-	145, 163, 148	171, 145, 155	890, 846, 873	Azide (1.0µg)
Mean ± Standard deviation		152.0 ± 9.6	157.0 ± 13.1	869.7 ± 22.2	
	+	177, 197, 199	243, 201, 232	2072, 2271, 2231	2-AF (20µg)
Mean ± Standard deviation		191.0 ± 12.2	225.3 ± 21.8	2191.3 ± 105.3	
Salmonella typhimurium TA102	-	383, 376, 387	383, 376, 387	2806, 2905, 3004	Mitomycin C(10µg)
Mean ± Standard deviation		382.0 ± 5.6	382.0 ± 5.6	2905.0 ± 99.0	
	+	495, 471, 519	495, 471, 519	3406, 3211, 3374	
Mean ± Standard deviation		495.0 ± 24.0	495.0 ± 24.0	3330.3 ± 104.6	

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 265 mL of water. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperatur 50°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	0.0009	0.0018	0.0017	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	0.0012	0.0002	0.0007	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	0.0002	<0.0001	0.0020	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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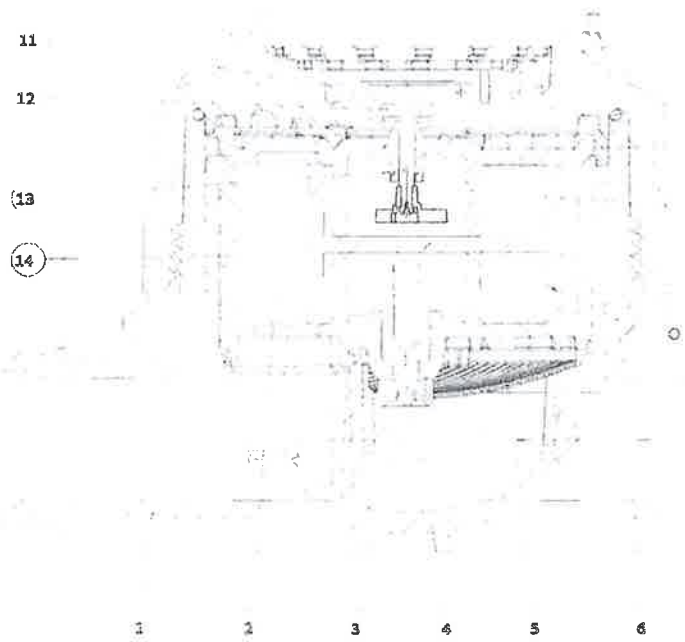

Pos.	Designation	Material
1	Meter Body	Composite
2	Shutter	POM
3	Sealing Joint	Silicone
4	Piston Bearing	POM+PTFE
5	Strainer	POM
6	Oscillant Piston	PS
7	Chamber Cover	PS+Graphite
8	Spacer Ring	ABS+GF
9	O-Ring	EPDM
10	Pressure Plate	Composite
11	Magnetic Shield	Soft Steel (ST37)
12	Drowned Ring Magnet	Hard Ferrite
13	Drowned Magnet Holder	POM
14	Volumetric Chamber	PS+Graphite

COLD JANZ
JV600 Q3=6,3 - ARAD
ASSEMBLY)

Australian Water Quality Centre

Report Number 252225

Date 27/5/2019

Document reviewed by MICHAEL GLASSON

Signature M Glasson