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Australian Water Quality Centre

Bermad Water Technologies
Attn: Michael Harrison
7 Inglewood Drive
Thomastown
VIC 3074
AUSTRALIA

26/04/2013

Dear Michael,

Please find the attached report to AS/NZS 4020:2005 for Meistream Plus Water Meters (DN40 representative sample) 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,

Michael Glasson
Product Testing Team Leader

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Australian Water Quality Centre

FINAL REPORT

Report ID : 119050

Report Information

Submitting Organisation :	00121202 : Bermad Water Technologies
Account :	142174 : Bermad Water Technologies
AWQC Reference :	142174-2013-CSR-1 : Prod Test: Meistream Plus Water Meters (DN40 representative
Project Reference :	PT-2071
Product Designation :	Meistream Plus Water Meters (DN40 representative sample)
Composition of Product :	Cast Iron, Stainless Steel and Fusion Bonded Epoxy (see attachment for further information).
Product Manufacturer :	Bermad Water Technologies, Inglewood Drive, Thomastown, VICTORIA.
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, F, G, H.
Project Completion Date :	26-Apr-2013
Project Comment :	The results presented herein demonstrate compliance of Meistream Plus Water Meters (DN40 representative sample) 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 at 40mm - 150mm.

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.
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
F	TM-001	AS/NZS 4020:2005
G	TM-002	AS/NZS 4020:2005
H	TIC-006	EPA 200.8

Summary Comment : Appendix E - Growth of Aquatic Micro-organisms covered under WRAS Certificate No. 0807300.

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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 775 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 valve was tested at the in-the-product exposure. Each valve held approximately 775 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 6.5 Cytotoxic Activity of Water Extract

Sample Description	The valve was tested at the in-the-product exposure. Each valve held approximately 775 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 valve was tested at the in-the-product exposure. Each valve held approximately 775 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	Blank	Sample Extract	Positive Controls	Number of Revertants per Plate
Salmonella typhimurium TA98	-	25, 26, 27	50, 57, 40	2968, 2415, 2653	NPD (20µg)
Mean ± Standard deviation		26.0 ± 1.0	49.0 ± 8.5	2678.7 ± 277.4	
	+	58, 77, 59	64, 16, 49	2916, 2679, 3369	2-AF (20µg)
Mean ± Standard deviation		64.7 ± 10.7	43.0 ± 24.6	2988.0 ± 350.6	
Salmonella typhimurium TA100	-	466, 462, 500	482, 501, 423	1259, 1349, 1161	Azide (1.0µg)
Mean ± Standard deviation		476.0 ± 20.9	468.7 ± 40.7	1256.3 ± 94.0	
	+	236, 269, 240	218, 192, 193	2113, 2198, 2271	2-AF (20µg)
Mean ± Standard deviation		248.3 ± 18.0	201.0 ± 14.7	2194.0 ± 79.1	
Salmonella typhimurium TA102	-	580, 604, 565	582, 529, 511	2174, 2037, 1944	Mitomycin C(10µg)
Mean ± Standard deviation		583.0 ± 19.7	540.7 ± 36.9	2051.7 ± 115.7	
	+	704, 648, 616	708, 721, 657		
Mean ± Standard deviation		656.0 ± 44.5	695.3 ± 33.8		

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 0.1 applied.

Number of Samples 1.

Test Comment Not applicable.

Peter Christopoulos
APPROVED SIGNATORY

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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 775 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	0.0312	0.0307	0.7
Cadmium	0.0001	<0.0001	<0.0001	<0.0001	0.002
Chromium	0.0001	<0.0001	0.0002	<0.0001	0.05
Copper	0.0001	<0.0001	0.0002	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	0.0002	<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
APPROVED SIGNATORY

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