

PO Box 1751
Adelaide SA 5001

250 Victoria Square
Adelaide SA 5000

Tel: 1300 653 366
Fax: 1300 883 171

Internet: www.awqc.com
Email: awqc@sawater.cc



Bermad Water Technologies
Attn: Michael Harrison
PO Box 506
Thomastown
VIC 3074
AUSTRALIA

8/05/2018

Dear Michael,

Please find the attached report to AS/NZS 4020:2005 for iPerl Water Meter DN20 (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
Supervisor Product Testing



Corporate Accreditation No.1115
Chemical and Biological Testing
Accredited for compliance with ISO/IEC 17025

FINAL REPORT

Report ID : 225635

Report Information

Submitting Organisation 00121202 : Bermad Water Technologies
Account : 142174 : Bermad Water Technologies
AWQC Reference : 142174-2017-CSR-1 : Prod Test: iPerl Water Meter DN15
Project Reference : PT-3331
Product Designation : iPerl Water Meter DN20 (Representative Sample)
Composition of Product : Plastic (no other information provided by submitting organisation).
Product Manufacturer : Sensus GmbH Ludwigshafen, GERMANY.
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 08-May-2018
Project Comment : The results presented herein demonstrate compliance of iPerl Water Meter DN20 (Representative Sample) to AS/NZS 4020 when tested at the 'in-the-product' exposure with a 0.05 scaling factor at 20°C ± 2°C. Product range to include DN20 to DN50.

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



Peter Christopoulos
APPROVED SIGNATORY



Corporate Accreditation No.1115
Chemical and Biological Testing
Accredited for compliance with ISO/IEC 17025

FINAL REPORT

Report ID : 225635

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 4020:2005
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.

FINAL REPORT

Report ID : 225635

CLAUSE 6.2 Taste of Water Extract

Sample Description	The meter was tested at the in-the-product exposure. Each meter held approximately 70 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 0.05 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.



Peter Christopoulos
APPROVED SIGNATORY



Corporate Accreditation No.1115
Chemical and Biological Testing
Accredited for compliance with ISO/IEC 17025

FINAL REPORT

Report ID : 225635

CLAUSE 6.3 Appearance of Water Extract

Sample Description The meter was tested at the in-the-product exposure. Each meter held approximately 70 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 0.05 was applied.

Results

	<u>Test (- Blank)</u>	<u>Maximum Allowed</u>	<u>Units</u>
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 0.05 applied.

Number of Samples 1.

Test Comment Not applicable.



Kerrie Davey
APPROVED SIGNATORY



Corporate Accreditation No.1115
Chemical and Biological Testing
Accredited for compliance with ISO/IEC 17025

FINAL REPORT

Report ID : 225635

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	8.2 mg/L
	Mean Dissolved Oxygen Differenc	Positive Reference	5.3 mg/L
		Negative Reference	<0.1 mg/L
		Test	0.20 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



Corporate Accreditation No.1115
Chemical and Biological Testing
Accredited for compliance with ISO/IEC 17025

FINAL REPORT

Report ID : 225635

CLAUSE 6.5 Cytotoxic Activity of Water Extract

Sample Description	The meter was tested at the in-the-product exposure. Each meter held approximately 70 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 0.05 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 0.05 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
APPROVED SIGNATORY



Corporate Accreditation No.1115
Chemical and Biological Testing
Accredited for compliance with ISO/IEC 17025

FINAL REPORT

Report ID : 225635

CLAUSE 6.6 Mutagenic Activity of Water Extract

Sample Description The meter was tested at the in-the-product exposure. Each meter held approximately 70 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 0.05 was applied.

Results

<u>Bacteria Strain</u>		<u>Number of Revertants per Plate</u>			
	S9	Blank	Sample Extract	Positive Controls	
<i>Salmonella typhimurium</i> TA98	-	29, 33, 26	31, 19, 22	2559, 2158, 2402	<u>NPD</u> (20µg)
Mean ± Standard deviation		29.3 ± 3.5	24.0 ± 6.2	2373.0 ± 202.1	
	+	24, 31, 34	27, 26, 33	2974, 3173, 3277	<u>2-AF</u> (20µg)
Mean ± Standard deviation		29.7 ± 5.1	28.7 ± 3.8	3141.3 ± 154.0	
<i>Salmonella typhimurium</i> TA100	-	105, 134, 115	140, 116, 114	668, 682, 629	<u>Azide</u> (1.0µg)
Mean ± Standard deviation		118.0 ± 14.7	123.3 ± 14.5	659.7 ± 27.5	
	+	106, 84, 104	80, 91, 91	1715, 2006, 1594	<u>2-AF</u> (20µg)
Mean ± Standard deviation		98.0 ± 12.2	87.3 ± 6.4	1771.7 ± 211.8	
<i>Salmonella typhimurium</i> TA102	-	419, 432, 435	373, 366, 393	931, 1568, 1198	<u>Mitomycin C</u> (10µg)
Mean ± Standard deviation		428.7 ± 8.5	377.3 ± 14.0	1232.3 ± 319.9	
	+	519, 538, 499	480, 495, 476	2038, 1956, 2245	
Mean ± Standard deviation		518.7 ± 19.5	483.7 ± 10.0	2079.7 ± 148.9	

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 0.05 applied.

Number of Samples 1.

Test Comment Not applicable.



Peter Christopoulos
APPROVED SIGNATORY



Corporate Accreditation No.1115
Chemical and Biological Testing
Accredited for compliance with ISO/IEC 17025

FINAL REPORT

Report ID : 225635

CLAUSE 6.7 Extraction of Metals

Sample Description The meter was tested at the in-the-product exposure. Each meter held approximately 70 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 0.05 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	<0.0005	<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	0.0033	0.0035	2.0
Lead	0.0001	<0.0001	0.0020	0.0022	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	0.0003	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.



Dzung Bui
APPROVED SIGNATORY



Corporate Accreditation No.1115
Chemical and Biological Testing
Accredited for compliance with ISO/IEC 17025