



TGA Licence No:
MI-15112007-LI-002191-11

APVMA Licence No:
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AS/NZS 4020:2005 Compliance Testing
Certificate of Analysis
(Supersedes all interim reporting)
Dated: 11/11/2014

1. CERTIFICATE OF ANALYSIS AND SAMPLE INFORMATION:

Methodology: AS/NZS 4020, *Appendix A* and in-house method TMP-191100 & TMP-191101

AMS Report Reference No.: 1415604
Cross Reference No.: NA
Submitting Organisation: Aquatherm Australia Pty. Ltd.
Contact: Bryce Christain
Address: PO BOX 785, Revesby, NSW 2212, Australia
Interim Reporting: 08/09/2014
Project Completion Date: 11/11/2014

Product Designation: Aquatherm PPR Pipe 32mm SDR 9 MF RP & PPR Fitting 32mm x 3/4" transition art # 21213
Print on green Pipe: 'aquatherm green pipe SDR9 MF RP 32x3,6mm Art.:0370712 fusiolen PP-RP/PP-RP-GF/PP-RP SKZ A 632 ISO 21003 Class 1/8bar2/ 8bar opaque ('32x3,6", 0370712) 21.06.2014 22:37 M-48351 GP MB1616K27 Made in Germany'

Batch No./ Manufacturing Date: Not Provided
Product Manufacturer: Aquatherm GmbH
Biggen 5 – D-57439 Attendorn, Germany
Sampling Organisation: Aquatherm Australia Pty. Ltd.

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General Composition: Polypropylene Random Co –Polymer, Refer to Attachment A

Product Use: In-Line

Temperature Range: 70°C

Previous Testing: NA

Date of receipt of samples: 13/08/2014 & 24/09/2014

Sample selection for tests: As provided by the Submitting Organisation

Sample storage conditions: Prepared and controlled as per AS/NZS 4020, *Appendix A*

Extracts: Prepared as per AS/NZS 4020, *Appendices C, D, E, F, G & H*

Testing procedure: Testing is based on the recommended ‘in-the-product’ exposure of pipe and fitting system (1 system = 1 x ~1m 32mm pipe + 1 x 32mm PP-R/brass fitting) at (70 ± 2)°C to cover a cold and hot water application up to ~70°C.

Refer to Attachment A for Product Composition Details.

Volume retention: ~500mL per system

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2. SUMMARY OF RESULTS:

APPENDIX	RESULTS
C - TASTE	PASS at testing exposure
D - APPEARANCE	PASS at testing exposure
E - GROWTH OF AQUATIC MICRO-ORGANISMS	PASS at testing exposure
F - CYTOTOXIC ACTIVITY	PASS at testing exposure
G - MUTAGENIC ACTIVITY	PASS at testing exposure
H - EXTRACTION OF METALS	PASS at testing exposure

Based on completion and evaluation of all tests on 11/11/2014, the product, **Aquatherm PPR Pipe 32mm SDR 9 MF RP & PPR Fitting 32mm x 3/4" transition art # 21213; fully complied** with the test requirements of AS/NZS 4020:2005 to cover a cold and hot water application up to ~70°C, at the recommended 'in-the-product' exposure of pipe and fitting system (1 system = 1 x ~1m 32mm pipe + 1 x 32mm PP-R/brass fitting) at (70 ± 2)°C.

Testing although determined by the relevant product Standard, is generally recognised for up to 5 years by the certifying body, providing the testing procedures remain the same, and the background information on all wetted parts and the product are adequately documented. Also, the results stated in the report relate to the samples of the product submitted for testing. Any changes in the material formulation and supplier/manufacturer of all wetted items, the 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, and re-testing may be required before this actual time frame, governed by the completion and evaluation date.

Signed:



SANDHYA L. SINGH B. Tech, Postgrad. Dip. (Chem)
Manager, Chemistry and Toxicology; Approved Signatory

Date: 11/11/2014

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3. TASTE OF WATER EXTRACT:

Methodology: AS/NZS 4020, *Appendix C* and in-house method TMP-191130.

Exposure: 'in-the-product'

Extraction temperature: (70 ± 2)°C

Scaling factor: NA

Number of Panellists: 4

No. of samples for Chlorine-free extract: 1 x system

No. of samples for Chlorinated extract: 1 x system

Description	Extract	Test Water	Taste (+ / -)	Taste Description (No. of tasters)	Test Dilution *(taste intensity)
Test Blank	First 24h	Chlorine-free	NA	NA	NA
	Final 9-day	Chlorine-free	-	-	-
Sample	First 24h	Chlorine-free	NA	NA	NA
	Final 9-day	Chlorine-free	-	-	-
Test Blank	First 24h	Chlorinated	NA	NA	NA
	Final 9-day	Chlorinated	-	-	-
Sample	First 24h	Chlorinated	NA	NA	NA
	Final 9-day	Chlorinated	-	-	-

+ Taste detected - No taste detected NA Not applicable

AS/NZS 4020 test requirement: Minimum of 4 tasters with no discernible taste at the first 1/2 dilution.

Figure in brackets is the number of panellists detecting a taste at this dilution

Note:

1. Tasters are given a 14-point scale to describe its intensity, with minimum of 1 as extremely weak, and maximum of >14 as extremely strong. An average of all tasters represents taste intensity.
2. First extract becomes final extract.

EVALUATION:

On the basis of these results the samples of this product referred to in this report have complied with the test requirements of AS/NZS 4020:2005, Taste of Water Extract; *Appendix C*.

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4. APPEARANCE OF WATER EXTRACT:

Methodology: AS/NZS 4020, *Appendix D* and in-house methods TMP-191140 and TMP-191106.

Exposure: 'in-the-product'

Extraction temperature: (70 ± 2)°C

Scaling factor: NA

No. of samples tested: 1 x system

	a) TRUE COLOUR: Hazen Units (HU)		b) TURBIDITY: Nephelometric Turbidity Units (NTU)	
	First 24h	Final 9-day	First 24h	Final 9-day
Sample Extract pH = 7.98	<2	NA	0.84	NA
Test Blank pH = 7.46	<2	NA	0.34	NA
FINAL RESULT	<2	NA	0.50	NA
AS/NZS 4020 Test sample requirements	≤5		≤0.5	

< = less than

≤ = less than or equal to

NA Not applicable

First extract becomes final extract

For test a), test extractions were performed by AMS Laboratories Pty. Ltd. The test extracts were subsequently subcontracted to National Measurement Institute for assessment (NATA Accreditation No. 198), Report No. RN1034293.

EVALUATION:

On the basis of these results the samples of this product referred to in this report have complied with the test requirements of AS/NZS 4020:2005, Appearance of Water Extract; *Appendix D*.

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5. GROWTH OF AQUATIC MICRO-ORGANISMS:

Methodology: AS/NZS 4020, *Appendix E* and in-house method TMP-191150.

Incubation temperature: (30 ± 1)°C

Exposure: 'total immersion'

Component Name	Testing Exposure	Inoculum (mL)	* MEAN DISSOLVED OXYGEN DIFFERENCE (MDOD) in mg/L
Aquatherm PPR Pipe 32mm SDR 9 MF RP	~15,000mm ² / 1L	100	0.51
Negative Reference Control (glass plate)	~15,000mm ² / 1L	100	<0.01
Positive Reference Control (paraffin waxed glass plate)	~15,000mm ² / 1L	100	7.59
Test Blank	Blank / 1L	100	6.79 in mg/L as mean dissolved oxygen

NA Not applicable

* Difference from test blank and represents mean of triplicate readings (weeks 5, 6, 7)

AS/NZS 4020 test sample requirements: Less than or equal to 2.4 for MDOD

EVALUATION:

On the basis of these results the samples of this product referred to in this report have complied with the test requirements of AS/NZS 4020:2005, Growth of Aquatic Micro-organisms; *Appendix E*.

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6. CYTOTOXIC ACTIVITY OF WATER EXTRACT:

Methodology: AS/NZS 4020, *Appendix F* and in-house method TMP-191160.

Exposure: 'in-the-product'

Extraction temperature: (70 ± 2)°C **Scaling factor:** NA **Extracts:** 24h, 48h & 72h

No. of samples tested: 1 x system

The test sample extracts from the product, as well as the test blank (test water) were used to prepare a nutrient growth medium, subsequently utilised to grow a monkey kidney cell line (VERO ATCC CCL 81).

Microscopic Examination	Test Sample Extract (24h, 48h and 72h)	Test Blank (24h, 48h and 72h)
Cell Morphology:	Satisfactory	Satisfactory
Monolayer: Confluence/Healthy Growth as ~%	100%	100%

Cytotoxicity was detected with zinc sulphate, used as a positive control and analysed at 4µg/g, 8µg/g and 16µg/g of zinc. Water for Irrigation, Synthetic Water for Irrigation, and Phosphate Buffer Solution were included with the test blank as negative controls.

AS/NZS 4020 test sample requirements: 1) Non-cytotoxic response- confluent monolayer similar to test blank.
2) Cytotoxic response- irregularly shaped cells & cell death similar to positive controls of 8µg/g & 16µg/g zinc sulphate.

EVALUATION:

On the basis of these results the samples of this product referred to in this report have complied with the test requirements of AS/NZS 4020:2005, Cytotoxic Activity of Water Extract; *Appendix F*.

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7. MUTAGENIC ACTIVITY OF WATER EXTRACT:

Methodology: AS/NZS 4020, *Appendix G* and in-house method TMP-191170.

Exposure: 'in-the-product'

Extraction temperature: (70 ± 2)°C

Scaling factor: NA

Extract: 24h

No. of samples tested: 1 x system

BACTERIAL STRAIN: <i>Salmonella typhimurium</i>	* S9	a) TRIPLICATES (REVERTANTS/PLATES) DEVIATION		b) MEAN ± STANDARD	
	-No	TEST BLANK (Extractant Water)	SAMPLE EXTRACT (Leachate)	NEGATIVE CONTROL (Test culture only)	POSITIVE CONTROL (Standard diagnostic mutagen)
	+With				
TA 98	-	a)	a)	a)	a)
		52 67 57	78 52 75	93 90 78	IV 980 870 910
		b)	b)	b)	b)
		59 ± 8	68 ± 14	87 ± 8	920 ± 56
TA 98	+	a)	a)	a)	a)
		49 51 43	49 34 37	103 72 64	IV 4,710 4,910 4,290
		b)	b)	b)	b)
		48 ± 4	40 ± 8	80 ± 21	4,637 ± 316
TA 100	-	a)	a)	a)	a)
		363 409 384	378 404 391	312 361 390	II 16,050 15,200 14,110
		b)	b)	b)	b)
		385 ± 23	391 ± 13	354 ± 39	15,120 ± 972

* Metabolic Activator

NA = Not applicable

> = greater than

I = 2, 4-dinitrophenylhydrazine

II = sodium azide

III = Benzo(a)pyrene

IV = 2-aminoanthracene

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BACTERIAL STRAIN: <i>Salmonella typhimurium</i>	* S9	a) TRIPLICATES (REVERTANTS/PLATES)		b) MEAN \pm STANDARD DEVIATION	
	-No	TEST BLANK	SAMPLE EXTRACT	NEGATIVE CONTROL	POSITIVE CONTROL
	+With	(Extractant Water)	(Leachate)	(Test culture only)	(Standard diagnostic mutagen)
TA 100	+	a)	a)	a)	a)
		500 466 472	388 421 429	505 480 539	III 4,870 5,030 5,800
TA 102	-	b)	b)	b)	b)
		479 \pm 18	413 \pm 22	508 \pm 30	5,233 \pm 497
TA 102	-	a)	a)	a)	a)
		399 376 399	412 349 343	516 570 590	I 4,890 4,150 4,470
TA 102	+	b)	b)	b)	b)
		391 \pm 13	368 \pm 38	559 \pm 38	4,503 \pm 371
TA 102	+	a)	a)	a)	a)
		521 619 553	504 562 559	470 534 535	IV 15,270 16,990 13,500
TA 102	+	b)	b)	b)	b)
		564 \pm 50	542 \pm 33	513 \pm 37	15,253 \pm 1,745

* Metabolic Activator

NA = Not applicable

> = greater than

I = 2, 4-dinitrophenylhydrazine

II = sodium azide

III = Benzo(a)pyrene

IV = 2-aminoanthracene

AS/NZS 4020 test sample requirements: (The differences in the mean number of revertants between either of the negative controls and test sample extracts should not exceed two standard deviations (for triplicate analysis)).

Positive response: If mean revertants for sample extract outside the range of spontaneous revertants for test strain.

EVALUATION:

On the basis of these results the samples of this product referred to in this report have complied with the test requirements of AS/NZS 4020:2005, Mutagenic Activity of Water Extract; *Appendix G*.

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8.I. EXTRACTION OF METALS: Initial testing on samples received on 13/08/2014

Methodology: AS/NZS 4020, *Appendix H* and in-house methods TMP-191180 and TMP-191230.

Exposure: 'in-the-product'

Extraction temperature: (70 ± 2)°C

Scaling factor: NA

Extracts: 24h & 9-day

No. of samples for I: 1 x system

No. of samples for II: 1 x system

Element	In-House Method	AS/NZS 4020: Maximum Allowable Concentration mg/L (ppm)	Limit of Reporting mg/L (ppm)	Test Blank mg/L (ppm)	Sample Extract I mg/L (ppm)	Sample Extract II mg/L (ppm)	FINAL RESULT I mg/L (ppm)	FINAL RESULT II mg/L (ppm)
antimony ¹ (Sb)	NT2_47	0.003	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
arsenic ² (As)	NT247_251	0.007	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
barium ¹ (Ba)	NT2_47	0.7	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
cadmium ¹ (Cd)	NT2_47	0.002	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
chromium ¹ (Cr)	NT2_47	0.05	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
copper ¹ (Cu)	NT2_47	2	0.001	<0.001	0.007	0.007	0.007	0.007
lead ¹ (Pb) a) First 24h: b) Final 9-day:	NT2_47	0.01	0.001	a) <0.001 b) <0.001	a) 0.190 b) 0.032	a) 0.260 b) 0.047	a) 0.190 b) 0.032	a) 0.260 b) 0.047
mercury ³ (Hg)	NT2_47_244	0.001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
molybdenum ¹ (Mo)	NT2_47	0.05	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
nickel ¹ (Ni)	NT2_47	0.02	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
selenium ² (Se)	NT247_251	0.01	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
silver ¹ (Ag)	NT2_47	0.1	0.001	<0.001	<0.001	<0.001	<0.001	<0.001

< = less than mg/L = milligram per litre ¹ = ICPMS ² = ICPMS (hydride generation) ³ = CVAAS

Test extractions were performed by AMS Laboratories Pty. Ltd. The test extracts were subsequently subcontracted to National Measurement Institute for assessment (NATA Accreditation No. 198), Report Nos. RN1034294 & RN1035342.

EVALUATION:

On the basis of these results the samples of this product referred to in this report have not complied with the test requirements of AS/NZS 4020:2005, Extraction of Metals; *Appendix H*.

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8.II. EXTRACTION OF METALS: Repeat testing on samples received on 24/09/2014 (R1)

Methodology: AS/NZS 4020, *Appendix H* and in-house methods TMP-191180 and TMP-191230.

Exposure: 'in-the-product'

Extraction temperature: (70 ± 2)°C

Scaling factor: NA

Extract: 9-day

No. of samples for I: 1 x system

No. of samples for II: 1 x system

No. of samples for III: 1 x system

Element	In-House Method	AS/NZS 4020: Maximum Allowable Concentration mg/L (ppm)	Limit of Reporting mg/L (ppm)	Test Blank mg/L (ppm)	Sample Extract mg/L (ppm)	FINAL RESULT mg/L (ppm)
lead ¹ (Pb) Sample I	NT2_47	0.01	0.001	<0.001	0.003	0.003
lead ¹ (Pb) Sample II	NT2_47	0.01	0.001	<0.001	0.002	0.002
lead ¹ (Pb) Sample III	NT2_47	0.01	0.001	<0.001	0.002	0.002
lead ¹ (Pb) Average results of Sample I, II & III	NT2_47	0.01	0.001	<0.001	0.003	0.003

< = less than mg/L = milligram per litre ¹ = ICPMS

Test extractions were performed by AMS Laboratories Pty. Ltd. The test extracts were subsequently subcontracted to National Measurement Institute for assessment (NATA Accreditation No. 198), Report No. RN1039772.

EVALUATION:

On the basis of these results the samples of this product referred to in this report have complied with the test requirements of AS/NZS 4020:2005, Extraction of Metals; *Appendix H*.