

RTi ASIA - PACIFIC PTY LTD
Attn: Edmund Luksch
Level 1/29 Rundle Street
Kent Town
SA 5067
AUSTRALIA

03/05/2023

Dear Edmund,

Please find the attached report to AS/NZS 4020:2018 (Incorporating Amendment No.1) for IH Liner W (DN 150 Representative Size). 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



Internet: www.awqc.com.au

Email: producttesting@awqc.com.au

FINAL REPORT

This report supersedes the following issued reports:

357041.

Report ID : 361390

Report Information

Submitting Organisation : 00100113 : RTi ASIA - PACIFIC PTY LTD
Account : 143242 : RTi ASIA - PACIFIC PTY LTD
AWQC Reference : 143242-2022-CSR-1 : Prod Test: IH Liner
Project Reference : PT-4996
Product Designation : IH Liner W (DN150 Representative Size).
Composition of Product : 3 Layer Composition, Elastomer plus Polyester and Kevlar.
Product Manufacturer : NordiTube Pipeline Technology (Shanghai) Co., Ltd, Shanghai, Guiping Rd, Xuhui Dist. CHINA.
Use of Product : In-Line/Pull-In Pipe Rehabilitation Liner for Water Pipes.
Sample Selection: As provided by the submitting organisation.
Testing Requested : **AS/NZS 4020:2018 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 4020:2018 (Incorporating Amendment No.1)
Extracts : Extracts were prepared as described in Appendix/Clause C, D, E, F, H, 6.8.
Project Completion Date : 23-Dec-2022
Project Comment : Sample received 01-Aug-2022, testing commenced 08-Aug-2022. The concentration of Antimony in the first samples for metals (Appendix H), may have been due to external factors (the device use for cutting the product).

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 TO AS/NZS 4020:2018. 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



Corporate Accreditation No.1115
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with ISO/IEC 17025 - Testing



Notes

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Summary of Results

APPENDIX/CLAUSE	RESULTS
C – Taste	Passed at the in-the-product exposure (26,670 mm ² per Litre).
D – Appearance	Passed at an exposure of 80,000 mm ² per Litre.
E – Growth of Aquatic Micro-organisms	Passed at an exposure of 15000 mm ² per Litre.
F – Cytotoxic Activity	Passed at an exposure of 80,000 mm ² per Litre.
H – Metals	Passed at the in-the-product exposure (26,670 mm ² per Litre).
6.8 – Organic Compounds	Passed at an exposure of 80,000 mm ² per Litre.

Test Methods

Test(s) in Appendix	AWQC Test Method	NATA Accredited
C	T0320-01	Y
D	TO029-01 & TO018-01	Y
E	TO014-03	Y
F	TM-001	Y
H	TIC-006	Y

Organic Test Methods

Test(s) in Clause	Test Method	NATA Accredited
Clause 6.8	TMZ-M36	Y
	EP239	Y
	EP132-LL	Y
	EP075C	Y
	EP075ASIM	Y

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Laboratory Information

Laboratory	NATA accreditation ID
Product Testing	1115
Australian Laboratory Services Pty Ltd - New South Wales	825,992
Inorganic Chemistry - Physical	1115
Protozoology	1115
Organic Chemistry	1115
Inorganic Chemistry - Metals	1115
Inorganic Chemistry - Waste Water	1115

Summary Comment : Not applicable.



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CLAUSE 6.2

Taste

Sample Description

The sample consisted of a one metre length of pipe giving an approximate in-the-product surface area of 26,670 mm² per Litre. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature

20°C ± 2°C.

Test Method

Taste (Appendix C)

Test Information

Scaling Factor

Not applied.

Results

Not Detected (sample and controls).

Evaluation

The product passed the requirements of clause 6.2 when tested at an in-the-product exposure of 26670 mm² per Litre.

Number of Samples

2.

Test Comment

Not applicable.

Peter Christopoulos
APPROVED SIGNATORY



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CLAUSE 6.3

Appearance

Sample Description

The sample consisted of eight swatches each with an inner and outer surface measuring 100 mm x 100 mm giving an approximate surface area of 80000 mm² per Litre. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature

20°C ± 2°C.

Test Method

Appearance (Appendix D)

Scaling Factor

Not 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 an exposure of 80000 mm² per Litre.

Number of Samples

1.

Test Comment

Not applicable.

Andrew Ford

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CLAUSE 6.4 Growth of Aquatic Micro-organisms

Sample Description The sample consisted of two swatches with an inner and outer surface measuring 75 mm x 100 mm giving an approximate surface area of 15000 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 applied.

Results

Mean Dissolved Oxygen	Control	7.6 mg/L
Mean Dissolved Oxygen Difference	Positive Reference	4.8 mg/L
	Negative Reference	<0.1 mg/L
	Test	0.90 mg/L

Evaluation The product passed the requirements of clause 6.4 when tested at an exposure of 15000 mm² per Litre.

Number of Samples 1.

Test Comment Not applicable.

Thuy Diep
APPROVED SIGNATORY



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CLAUSE 6.5

Cytotoxic Activity

Sample Description

The sample consisted of eight swatches each with an inner and outer surface measuring 100 mm x 100 mm giving an approximate surface area of 80000 mm² per Litre. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature

20°C ± 2°C.

Test Method

Cytotoxic Activity (Appendix F)

Scaling Factor

Not applied.

Results

24 HR	Non-cytotoxic response, healthy cell morphology with <30% cell death
48 HR	Non-cytotoxic response, healthy cell morphology with <30% cell death
72 HR	Non-cytotoxic response, healthy cell morphology with <30% cell death

Blank Control Results

Blank; non-cytotoxic response, healthy cell morphology with <30% cell death

Positive Control Results

Positive control; Cytotoxic response, unhealthy cell morphology with >70% cell death

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.

Evaluation

The product passed the requirements of clause 6.5 when tested at an exposure of 80000 mm² per Litre.

Number of Samples

1.

Test Comment

Not applicable.

Mira Maric
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CLAUSE 6.7

Metals

Sample Description

The sample consisted of a one metre length of pipe giving an approximate in-the-product surface area of 26,670 mm² per Litre. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature

20°C ± 2°C.

Test Method

Metals (Appendix H)

Scaling Factor

Not applied.

Method of Analysis

Concentration of the metals described in Table 2 of the AS/NZS 4020:2018 are determined as follows:

Aluminium, Antimony, Arsenic, Barium, Boron, Cadmium, Chromium, Copper, Iron, Lead, Manganese, 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					
Aluminium	0.001	0.006	0.005	0.007	0.2
Antimony	0.0003	<0.0005	0.0086	<0.0005	0.003
Arsenic	0.00006	<0.0003	<0.0003	<0.0003	0.01
Barium	0.0003	<0.0005	0.0007	<0.0005	0.7
Boron	0.020	<0.020	<0.020	<0.020	1.4
Cadmium	0.0001	<0.0001	<0.0001	<0.0001	0.002
Chromium	0.0001	0.0002	<0.0001	0.0001	0.05
Copper	0.0001	0.0001	0.0004	<0.0001	2.0
Iron	0.0005	0.0008	0.0009	<0.0005	0.3
Lead	0.0001	<0.0001	<0.0001	<0.0001	0.01
Manganese	0.0001	<0.0001	0.0002	<0.0001	0.1
Mercury	0.00003	<0.00003	<0.00003	<0.00003	0.001
Molybdenum	0.0001	<0.0001	<0.0001	<0.0001	0.05
Nickel	0.0002	0.0001	0.0002	0.0002	0.02
Selenium	0.0001	<0.0001	<0.0001	<0.0001	0.01
Silver	0.00002	<0.00003	<0.00003	<0.00003	0.1

Evaluation

The product passed the requirements of clause 6.7 when tested at an in-the-product exposure of 26670 mm² per Litre.

Number of Samples

2.

Test Comment

The final (7th) extract exceeded the maximum allowable concentration for Antimony when tested via an immersion exposure at 80,000mm²/L. Test repeated at an in-the-product exposure (26,670 mm²/L) to meet the requirements of Clause 6.7.

Dzung Bui

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CLAUSE 6.8 Organic Compounds

Sample Description The sample consisted of eight swatches each with an inner and outer surface measuring 100 mm x 100 mm giving an approximate surface area of 80000 mm² per Litre. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

Extraction Temperature 20°C ± 2°C.

Test Method Organic Compounds (Clause 6.8). The maximum allowed (Max Allowed) values are taken from the Australian Drinking Water Guidelines and Drinking-water Standards for New Zealand. Please note, some reported compounds have no guideline value.

Scaling Factor Not applied.

Results

Organic Compound

Nitrosamines

	Blank µg/L	Test µg/L	Max Allowed
!External Lab Report No.	ES2229648	ES2229648	
1-Nitrosopiperidine (NPip)	<0.003	<0.003	
1-Nitrosopyrrolidine (NPyr)	<0.01	<0.01	
Nitrosomorpholine (NMor)	<0.003	<0.003	
N-Nitrosodiethylamine (NDEA)	<0.01	<0.01	
N-Nitrosodimethylamine (NDMA)	<0.003	<0.003	0.1 µg/L
N-Nitrosodi-n-propylamine (NDPA)	<0.003	<0.003	
N-Nitrosomethylethylamine (NMEA)	<0.003	<0.003	

Organic Compound

Phenols

	Blank µg/L	Test µg/L	Max Allowed
!External Lab Report No.	ES2229648	ES2229648	
2 4 5-trichlorophenol	<1.0	<1.0	
2 4 6-trichlorophenol	<1.0	<1.0	20 µg/L
2 4-dichlorophenol	<1.0	<1.0	200 µg/L
2 4-dimethylphenol	<1.0	<1.0	
2 6-dichlorophenol	<1.0	<1.0	
2-chlorophenol	<1.0	<1.0	300 µg/L
2-nitrophenol	<1.0	<1.0	
4-chloro-3-methylphenol	<1.0	<1.0	
m+p cresol	<2.0	<2.0	
o-cresol	<1.0	<1.0	
pentachlorophenol	<2.0	<2.0	9 µg/L
phenol	<1.0	<1.0	

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Organic Compound

Phthalate Esters

	Blank µg/L	Test µg/L	Max Allowed
!External Lab Report No.	ES2229648	ES2229648	
Bis(2-ethylhexyl) phthalate	<10	<10	10 µg/L
Butyl benzyl phthalate	<2	<2	
Di(2-ethylhexyl) adipate	<2	<2	
Diethyl phthalate	<2	<2	
Dimethyl phthalate	<2	<2	
Di-n-butyl phthalate	<2	<2	
Di-n-octyl phthalate	<2	<2	

Organic Compound

Polycyclic Aromatic Hydrocarbons

	Blank µg/L	Test µg/L	Max Allowed
!External Lab Report No.	ES2229648	ES2229648	
Acenaphthene	<0.02	<0.02	
Acenaphthylene	<0.02	<0.02	
Anthracene	<0.02	<0.02	
Benzo(a)anthracene	<0.02	<0.02	
Benzo(a)pyrene	<0.005	<0.005	0.01 µg/L
Benzo(a)pyrene TEQ	<0.005	<0.005	
Benzo(b+j)fluoranthene	<0.02	<0.02	
Benzo(ghi)perylene	<0.02	<0.02	
Benzo(k)fluoranthene	<0.02	<0.02	
Chrysene	<0.02	<0.02	
Dibenzo(a-h)anthracene	<0.02	<0.02	
Fluoranthene	<0.02	<0.02	
Fluorene	<0.02	<0.02	
Indeno(123-cd)pyrene	<0.02	<0.02	
Naphthalene	<0.02	<0.02	
PAH - Total	<0.005	<0.005	
Phenanthrene	<0.02	<0.02	
Pyrene	<0.02	<0.02	

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Organic Compound

Volatile Organic Compounds GCMS	Blank µg/L	Test µg/L	Max Allowed
1 1 1 2-Tetrachloroethane	<1	<1	
1 1 1-Trichloroethane	<1	<1	
1 1 2 2-Tetrachloroethane	<1	<1	
1 1 2-Trichloroethane	<1	<1	
1 1-Dichloropropene	<1	<1	
1 2 3-Trichlorobenzene	<1	<1	
1 2 3-Trichloropropane	<1	<1	
1 2 4-Trichlorobenzene	<1	<1	
1 2 4-Trimethylbenzene	<1	<1	
1 2-Dibromo-3-chloropropane	<1	<1	1 µg/L
1 2-Dibromoethane	<1	<1	1 µg/L
1 2-Dichlorobenzene	<1	<1	1500 µg/L
1 2-Dichloroethane	<1	<1	3 µg/L
1 2-Dichloropropane	<1	<1	
1 3 5-Trimethylbenzene	<1	<1	
1 3-Dichlorobenzene	<1	<1	
1 3-Dichloropropane	<1	<1	
1 4-Dichlorobenzene	<1	<1	40 µg/L
1,1-Dichloroethane	<1	<1	
1,1-Dichloroethene	<1	<1	30 µg/L
2,2-Dichloropropane	<1	<1	
2-Chlorotoluene	<1	<1	
4-Chlorotoluene	<1	<1	
4-Isopropyltoluene	<1	<1	
Benzene	<1	<1	1 µg/L
Bromobenzene	<1	<1	
Bromochloromethane	<1	<1	
Bromodichloromethane	<1	<1	60 µg/L
Bromoform	<1	<1	100 µg/L
Bromomethane	<4	<4	
Carbon tetrachloride	<1	<1	3 µg/L
Chlorobenzene	<1	<1	300 µg/L
Chloroethane	<4	<4	
Chloroform	<1	<1	400 µg/L
Chloromethane	<4	<4	
cis-1 3-Dichloropropene	<1	<1	
cis-1,2-Dichloroethene	<1	<1	
Dibromochloromethane	<1	<1	150 µg/L
Dibromomethane	<1	<1	
Dichlorodifluoromethane	<1	<1	
Dichloromethane	<4	<4	4 µg/L
Ethylbenzene	<1	<1	300 µg/L
Hexachlorobutadiene	<0.7	<0.7	0.7 µg/L
Isopropylbenzene	<1	<1	
m+p-Xylenes - Total	<2	<2	

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Volatile Organic Compounds GCMS	Blank µg/L	Test µg/L	Max Allowed
Naphthalene	<1	<1	
n-Butylbenzene	<1	<1	
n-Propylbenzene	<1	<1	
o-Xylene	<1	<1	
sec-Butylbenzene	<1	<1	
Styrene	<1	<1	30 µg/L
tert-Butylbenzene	<1	<1	
Tetrachloroethene	<1	<1	50 µg/L
Toluene	<1	<1	800 µg/L
Total 1,2-dichloroethene	<2	<2	60 µg/L
Total 1,3-dichloropropene	<2	<2	20 µg/L
Total Trichlorobenzene	<2	<2	30 µg/L
Total Xylene	<3	<3	600 µg/L
trans-1,3-Dichloropropene	<1	<1	
trans-1,2-Dichloroethene	<1	<1	
Trichloroethene	<1	<1	
Trichlorofluoromethane	<1	<1	
Trihalomethanes - Total	<4	<4	250 µg/L
Vinyl chloride	<0.3	<0.3	0.3 µg/L

Evaluation The product passed the requirements of clause 6.8 when tested at an exposure of 80000 mm² per Litre.

Number of Samples 1.

Test Comment Not applicable.

Qiong Huang

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