

FINAL REPORT

Report ID : 210566

Report Information

Submitting Organisation : 00109214 : Mueller Europe Ltd
Account : 130200 : Mueller Europe Ltd - AS/NZS 4020 Testing
AWQC Reference : 130200-2017-CSR-1 : Prod Test: Copper Tube
Project Reference : PT-3185
Product Designation : Copper Tube 15 + 0.1 R250 EN1057
Composition of Product : Cu 99.95% and P 0.015 - 0.040%.
Product Manufacturer : Mueller Europe Ltd, Oxford St, Bilston, West Midlands, UK.
Use of Product : In-Line/Copper Tube for Domestic Water Systems.
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 : Wholly Metallic
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, H.
Project Completion Date : 31-Aug-2017
Project Comment : The results presented herein demonstrate compliance of Copper Tube 15 + 0.1 R250 EN1057 to AS/NZS 4020 when tested at the "In-the-Product" exposure (296,300 mm² per Litre) at 80°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



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

FINAL REPORT

Report ID : 210566

Summary of Results

APPENDIX	RESULTS
C – Taste of Water Extract	Passed at in-the-product exposure (269,300 mm ² /L).
D – Appearance of Water Extract	Passed at in-the-product exposure (269,300 mm ² /L).
F – Cytotoxic Activity of Water Extract	Passed at in-the-product exposure (269,300 mm ² /L).
H – Extraction of Metals	Passed at in-the-product exposure (269,300 mm ² /L).

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
H	TIC-006	EPA 200.8

Summary Comment : Not applicable.

FINAL REPORT

Report ID : 210566

CLAUSE 6.2 Taste of Water Extract

Sample Description	The sample consisted of a 1000 mm length of pipe with an internal diameter of 13.5 mm providing a test exposure of approximately 296,300 mm ² per Litre. Extracts were prepared using 200 mL volumes of 50 mg/L hardness water.
Extraction Temperature	80°C ± 2°C.
Test Method	Taste of Water Extract (Appendix C)
Test Information	
Scaling Factor	Not applied.
Results	Not detected.
Evaluation	The product passed the requirements of clause 6.2 when tested at the in-the-product exposure (296,300 mm ² per Litre).
Number of Samples	2.
Test Comment	Not applicable.



Michael Glasson
APPROVED SIGNATORY



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

FINAL REPORT

Report ID : 210566

CLAUSE 6.3 Appearance of Water Extract

Sample Description The sample consisted of a 1000 mm length of pipe with an internal diameter of 13.5 mm providing a test exposure of approximately 296,300 mm² per Litre. Extracts were prepared using 200 mL volumes of 50 mg/L hardness water.

Extraction Temperatur 80°C ± 2°C.

Test Method Appearance of Water Extract (Appendix D)

Scaling Factor Not applied.

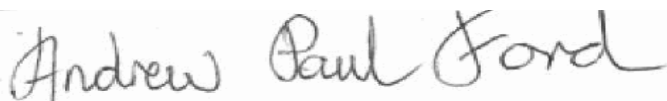
Results

	<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 the in-the-product exposure (296,300 mm² per Litre).

Number of Samples 1.

Test Comment Not applicable.



Andrew Ford
APPROVED SIGNATORY



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

FINAL REPORT

Report ID : 210566

CLAUSE 6.5 Cytotoxic Activity of Water Extract

Sample Description	The sample consisted of a 1000 mm length of pipe with an internal diameter of 13.5 mm providing a test exposure of approximately 296,300 mm ² per Litre. Extracts were prepared using 200 mL volumes of 50 mg/L hardness water.
Extraction Temperature	80°C ± 2°C.
Test Method	Cytotoxic Activity of Water Extract (Appendix F)
Scaling Factor	Not applied.
Results	Non-cytotoxic.
Evaluation	The product passed the requirements of clause 6.5 when tested at the in-the-product exposure (296,300 mm ² per Litre).
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.



Stella Fanok
APPROVED SIGNATORY



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

FINAL REPORT

Report ID : 210566

CLAUSE 6.7 Extraction of Metals

Sample Description The sample consisted of a 1000 mm length of pipe with an internal diameter of 13.5 mm providing a test exposure of approximately 296,300 mm² per Litre. Extracts were prepared using 200 mL volumes of 50 mg/L hardness water.

Extraction Temperature 80°C ± 2°C.

Test Method Extraction of Metals (Appendix H)

Scaling Factor Not 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	0.0006	0.0006	0.003
Arsenic	0.0003	0.0003	<0.0003	<0.0003	0.007
Barium	0.0005	0.0009	<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	0.0014	0.0123	0.0121	2.0
Lead	0.0001	<0.0001	0.0002	0.0002	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	0.0001	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 (296,300 mm² per Litre).

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