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Australian Water Quality Centre

TEST REPORT

REPORT NUMBER	14844 BS
SAMPLE REFERENCE	PT-225
DATE	13/12/2006
PRODUCT DESIGNATION	CEMENT MORTAR LINING FOR DUCTILE IRON PIPE, DN100 AND ABOVE.
COMPOSITION OF PRODUCT	GENERAL PURPOSE CEMENT SUPPLIED BY BLUE CIRCLE SOUTHERN CEMENT, BERRIMA AND MEDIUM WASHED SAND SUPPLIED BY ROCLA, KURNELL, NSW.
PRODUCT MANUFACTURER	TYCO WATER PTY LTD, YENNORA, NSW.
SUBMITTING ORGANISATION	TYCO WATER PTY LTD, PIPELINES RESEARCH, HAIG STREET, SOUTHBANK, VICTORIA. Samples were selected by SAI Global Ltd and numbered 215430 to 215438.
USE OF PRODUCT	CEMENT MORTAR PIPE LINING.
TESTING REQUESTED	**BS 6920:2000** ***SUITABILITY OF NON-METALLIC PRODUCTS FOR USE IN CONTACT WITH WATER INTENDED FOR HUMAN CONSUMPTION WITH REGARD TO THEIR EFFECT ON THE QUALITY OF THE WATER***
STATEMENT OF COMPLIANCE	THE RESULTS PRESENTED HEREIN DEMONSTRATE COMPLIANCE TO BS6920 FOR CEMENT MORTAR LINED FOR ALL COLD AND HOT WATER APPLICATIONS UP TO 60°C.

M. GLASSON
SENIOR TECHNICAL OFFICER

NATA

Corporate Accreditation No. 1115
Chemical and Biological Testing
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ABN 69336525019

TEST REPORT FOR BS 6920:2000

SECTION 2.2: - ODOUR AND FLAVOUR OF WATER

TESTING LABORATORY	AUSTRALIAN WATER QUALITY CENTRE HODGSON ROAD, BOLIVAR, SOUTH AUSTRALIA (NATA Accreditation No. 1115)
REPORT NUMBER	14844 BS
SAMPLE REFERENCE	PT-225
DATE	13/12/2006
PRODUCT DESIGNATION	CEMENT MORTAR LINING FOR DUCTILE IRON PIPE, DN100 AND ABOVE.
COMPOSITION OF PRODUCT	GENERAL PURPOSE CEMENT SUPPLIED BY BLUE CIRCLE SOUTHERN CEMENT, BERRIMA AND MEDIUM WASHED SAND SUPPLIED BY ROCLA, KURNELL, NSW.
PRODUCT MANUFACTURER	TYCO WATER PTY LTD, YENNORA, NSW.
SUBMITTING ORGANISATION	TYCO WATER PTY LTD, PIPELINES RESEARCH, HAIG STREET, SOUTHBANK, VICTORIA.
USE OF PRODUCT	CEMENT MORTAR PIPE LINING.
DESCRIPTION OF SAMPLE	The sample consisted of a cement lined length of pipe (114 OD) providing an in-product exposure of approximately 44,444 mm^2 per Litre. Extracts were prepared using 300 mL volumes of pre-conditioning water.
CEMENTITIOUS PRODUCTS	A standard moist-curing of 28 days at 22^0C was performed. After curing the samples were pre-conditioned with water with an aggressivity index of 12.6. Twelve sequential soakings were performed to obtain a pH < 9.0.
EXTRACTION TEMPERATURE	60 ± 2^0C.
TEST METHOD	BS 6920:2000 ODOUR AND FLAVOUR OF WATER (SECTION 2.2.)
RESULTS	No tastes or odours were detected in the controls or in the test extracts prepared at the in-product exposure with chlorinated and chlorine-free water (44,444 mm^2 per Litre).
EVALUATION	The product passed the requirements of BS 6920:2000 Part 1 Clause 4 when tested at the in-product exposure (44,444 mm^2 per Litre).
NUMBER OF SAMPLES	Two samples tested.

M Warn.

APPROVED SIGNATORY

TEST REPORT FOR BS 6920:2000

SECTION 2.3 - APPEARANCE OF WATER

TESTING LABORATORY	AUSTRALIAN WATER QUALITY CENTRE HODGSON ROAD, BOLIVAR, SOUTH AUSTRALIA. (NATA Accreditation No. 1115)
REPORT NUMBER	14844 BS
SAMPLE REFERENCE	PT-225
DATE	13/12/2006
PRODUCT DESIGNATION	CEMENT MORTAR LINING FOR DUCTILE IRON PIPE, DN100 AND ABOVE.
COMPOSITION OF PRODUCT	GENERAL PURPOSE CEMENT SUPPLIED BY BLUE CIRCLE SOUTHERN CEMENT, BERRIMA AND MEDIUM WASHED SAND SUPPLIED BY ROCLA, KURNELL, NSW.
PRODUCT MANUFACTURER	TYCO WATER PTY LTD, YENNORA, NSW.
SUBMITTING ORGANISATION	TYCO WATER PTY LTD, PIPELINES RESEARCH, HAIG STREET, SOUTHBANK, VICTORIA.
USE OF PRODUCT	CEMENT MORTAR PIPE LINING.
DESCRIPTION OF SAMPLE	The sample consisted of a cement lined length of pipe (114 OD) providing an in-product exposure of approximately 44,444 mm^2 per Litre. Extracts were prepared using 300 mL volumes of pre-conditioning water.
CEMENTITIOUS PRODUCTS	A standard moist-curing of 28 days at 22^0C was performed. After curing the samples were pre-conditioned with water with an aggressivity index of 12.6. Twelve sequential soakings were performed to obtain a pH < 9.0.
EXTRACTION TEMPERATURE	60 ± 2^oC.
TEST METHOD	BS 6920:2000 APPEARANCE OF WATER (SECTION 2.3)

RESULTS

Final Extract	Test (- Blank)	Maximum Allowed	
Colour	< 1	5.0	HU
Turbidity	0.20	0.5	NTU

EVALUATION	The product passed the requirements of BS 6920:2000 Part 1 Clause 5 when tested at the in-product exposure (44,444 mm^2 per Litre).
NUMBER OF SAMPLES	One sample tested.

M Thomas

APPROVED SIGNATORY

TEST REPORT FOR BS 6920:2000

SECTION 2.4 - GROWTH OF AQUATIC MICROORGANISMS TEST

TESTING LABORATORY	AUSTRALIAN WATER QUALITY CENTRE HODGSON ROAD, BOLIVAR, SOUTH AUSTRALIA. (NATA Accreditation No. 1115)
REPORT NUMBER	14844 BS
SAMPLE REFERENCE	PT-225
DATE	13/12/2006
PRODUCT DESIGNATION	CEMENT MORTAR LINING FOR DUCTILE IRON PIPE, DN100 AND ABOVE.
COMPOSITION OF PRODUCT	GENERAL PURPOSE CEMENT SUPPLIED BY BLUE CIRCLE SOUTHERN CEMENT, BERRIMA AND MEDIUM WASHED SAND SUPPLIED BY ROCLA, KURNELL, NSW.
PRODUCT MANUFACTURER	TYCO WATER PTY LTD, YENNORA, NSW.
SUBMITTING ORGANISATION	TYCO WATER PTY LTD, PIPELINES RESEARCH, HAIG STREET, SOUTHBANK, VICTORIA.
USE OF PRODUCT	CEMENT MORTAR PIPE LINING.
DESCRIPTION OF SAMPLE	The sample consisted of two coupons of cementitious material providing a surface area of approximately 15000 mm^2 per Litre. Extracts were prepared using 700 mL volumes of test water.
CEMENTITIOUS PRODUCTS	A standard moist-curing of 28 days at 22^0C was performed. After curing the samples were pre-conditioned with water with an aggressivity index of 12.6. Twelve sequential soakings were performed to obtain a pH < 9.0.
EXTRACTION TEMPERATURE	30 ± 1^0C.
TEST METHOD	BS 6920:2000 GROWTH OF AQUATIC MICROORGANISMS TEST (SECTION 2.4)
INOCULUM	The volume of inoculum was 70 mL.

TEST REPORT FOR BS 6920:2000

REPORT NUMBER	14844 BS	
SAMPLE REFERENCE	PT-225	
DATE	13/12/2006	
TEST METHOD	BS 6920:2000	GROWTH OF AQUATIC MICROORGANISMS TEST (SECTION 2.4)

RESULTS

Mean Dissolved Oxygen	Control	7.5	mg/L
Mean Dissolved Oxygen Difference	Positive Reference	5.9	mg/L
	Negative Reference	0.1	mg/L
	Test	1.20	mg/L

EVALUATION The Mean Dissolved Oxygen Difference in the extracts did not exceed the maximum allowed, and accordingly the product passed the requirements of BS 6920:2000 Part 1 Clause 6 when tested at an exposure of 15000 mm^2 per Litre.

NUMBER OF SAMPLES One sample tested.

Thomas

APPROVED SIGNATORY

TEST REPORT FOR BS 6920:2000

SECTION 2.5 – THE EXTRACTION OF SUBSTANCES THAT MAY BE OF CONCERN TO PUBLIC HEALTH.

TESTING LABORATORY	AUSTRALIAN WATER QUALITY CENTRE HODGSON ROAD, BOLIVAR, SOUTH AUSTRALIA (NATA Accreditation No. 1115)
REPORT NUMBER	14844 BS
SAMPLE REFERENCE	PT-225
DATE	13/12/2006
PRODUCT DESIGNATION	CEMENT MORTAR LINING FOR DUCTILE IRON PIPE, DN100 AND ABOVE.
COMPOSITION OF PRODUCT	GENERAL PURPOSE CEMENT SUPPLIED BY BLUE CIRCLE SOUTHERN CEMENT, BERRIMA AND MEDIUM WASHED SAND SUPPLIED BY ROCLA, KURNELL, NSW.
PRODUCT MANUFACTURER	TYCO WATER PTY LTD, YENNORA, NSW.
SUBMITTING ORGANISATION	TYCO WATER PTY LTD, PIPELINES RESEARCH, HAIG STREET, SOUTHBANK, VICTORIA.
USE OF PRODUCT	CEMENT MORTAR PIPE LINING.
DESCRIPTION OF SAMPLE	The sample consisted of a cement lined length of pipe (114 OD) providing an in-product exposure of approximately 44,444 mm^2 per Litre. Extracts were prepared using 300 mL volumes of pre-conditioning water.
CEMENTITIOUS PRODUCTS	A standard moist-curing of 28 days at 22^{0}C was performed. After curing the samples were pre-conditioned with water with an aggressivity index of 12.6. Twelve sequential soakings were performed to obtain a pH < 9.0.
EXTRACTION TEMPERATURE	60 ± 2^{0}C.
TEST METHOD	BS 6920:2000 THE EXTRACTION OF SUBSTANCES THAT MAY BE OF CONCERN TO PUBLIC HEALTH (SECTION 2.5)
RESULTS	Confluent growth of regularly-shaped cells was observed in the containers with the negative control and the test extract. Cell death was observed in the positive control.
EVALUATION	No cytotoxic response was detected; accordingly the product passed the requirements of BS 6920:2000 Part 1 Clause 7 relating to cytotoxic activity when tested at the in-product exposure (44,444 mm^2 per Litre).
NUMBER OF SAMPLES	One sample tested.

APPROVED SIGNATORY

TEST REPORT FOR BS 6920:2000

SECTION 2.6 – THE EXTRACTION OF METALS

TESTING LABORATORY	AUSTRALIAN WATER QUALITY CENTRE HODGSON ROAD, BOLIVAR, SOUTH AUSTRALIA. (NATA Accreditation No. 1115)
REPORT NUMBER	14844 BS
SAMPLE REFERENCE	PT-225
DATE	13/12/2006
PRODUCT DESIGNATION	CEMENT MORTAR LINING FOR DUCTILE IRON PIPE, DN100 AND ABOVE.
COMPOSITION OF PRODUCT	GENERAL PURPOSE CEMENT SUPPLIED BY BLUE CIRCLE SOUTHERN CEMENT, BERRIMA AND MEDIUM WASHED SAND SUPPLIED BY ROCLA, KURNELL, NSW.
PRODUCT MANUFACTURER	TYCO WATER PTY LTD, YENNORA, NSW.
SUBMITTING ORGANISATION	TYCO WATER PTY LTD, PIPELINES RESEARCH, HAIG STREET, SOUTHBANK, VICTORIA.
USE OF PRODUCT	CEMENT MORTAR PIPE LINING.
DESCRIPTION OF SAMPLE	The sample consisted of a cement lined length of pipe (114 OD) providing an in-product exposure of approximately 44,444 mm^2 per Litre. Extracts were prepared using 300 mL volumes of pre-conditioning water.
CEMENTITIOUS PRODUCTS	A standard moist-curing of 28 days at 22^0C was performed. After curing the samples were pre-conditioned with water with an aggressivity index of 12.6. Twelve sequential soakings were performed to obtain a pH < 9.0.
EXTRACTION TEMPERATURE	60 ± 2^oC.
TEST METHOD	BS 6920:2000 THE EXTRACTION OF METALS (SECTION 2.6)

METHODS OF ANALYSIS-

All methods used to determine concentrations of metals are based on those described in the 20th edition of *Standard Methods for the Examination of Water and Wastewater* published by the American Public Health Association (1999). The methods have been adapted for the instrumentation in use at the Australian Water Quality Centre.

Concentrations of the metals described in Table 1 of the BS6920:2000 are determined as follows:

Antimony, Arsenic, Barium, Cadmium, Chromium, Lead, Nickel and Selenium by inductively coupled plasma mass spectrometry

Aluminium, Iron, Manganese, by inductively coupled plasma atomic emission spectrometry.

Silver by graphite furnace atomic absorption spectrophotometry (Varian).

Mercury by vapour generator atomic absorption spectrophotometry.

TEST REPORT FOR BS 6920:2000

SECTION 2.6 – THE EXTRACTION OF METALS

REPORT NUMBER 14844 BS

SAMPLE REFERENCE PT-225

DATE 13/12/2006

TEST METHOD BS 6920:2000 THE EXTRACTION OF METALS (SECTION 2.6)

RESULTS

	Reporting Limit µg/L	Blank µg/L	Sample 1 µg/L	Sample 2 µg/L	Max. Allowed µg/L
Final Extract					
Aluminium	20.0	< 20.0	31.0	23.0	200
Antimony	0.5	< 0.5	<0.5	< 0.5	10
Arsenic	1.0	<1.0	<1.0	< 1.0	50
Barium	0.5	31.7	34.6	34.3	1000
Cadmium	0.5	< 0.5	< 0.5	< 0.5	5
Chromium	3.0	< 3.0	< 3.0	< 3.0	50
Iron	30.0	< 30.0	49.0	44.0	200
Lead	0.5	1.0	0.9	0.8	50
Manganese	5.0	< 5.0	< 5.0	< 5.0	50
Mercury	0.3	< 0.3	< 0.3	< 0.3	1
Nickel	0.5	0.5	< 0.5	< 0.5	50
Selenium	3.0	< 3.0	< 3.0	< 3.0	10
Silver	2.0	< 2.0	< 2.0	< 2.0	10

EVALUATION The results from the final extractions complied with the requirements of BS 6920:2000 Part 1 Clause 8 when tested at the in-product exposure (44,444 mm^2 per Litre).

NUMBER OF SAMPLES Two samples tested - one extract prepared from each.

G.O'Neill

APPROVED SIGNATORY

END OF REPORT