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Ardex Australia Pty Ltd  
Attn: Charles Smith  
7/20 Powers Road  
Seven Hills  
NSW 2147  
AUSTRALIA

8/06/2018

Dear Charles,

Please find the attached report to AS/NZS 4020:2005 for ARDEX RA 88 PLUS Multi-Purpose Epoxy Repair Adhesive 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,

A handwritten signature in black ink, appearing to read "M Glasson".

Michael Glasson  
Supervisor Product Testing



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

## FINAL REPORT

This report supersedes the following issued reports: 225620.

Report ID : 227491

### Report Information

**Submitting Organisation** : 00109252 : Ardex Australia Pty Ltd  
**Account :** 130232 : Ardex Australia Pty Ltd  
**AWQC Reference :** 130232-2017-CSR-2 :  
**Project Reference :** PT-3318  
**Product Designation :** ARDEX RA 88 PLUS Multi-Purpose Epoxy Repair Adhesive  
**Composition of Product :** Two Component Ceramic Blend Epoxy.  
**Product Manufacturer :** ARDEX Australia Pty Ltd., Powers Road, Seven Hills, NSW, AUSTRALIA.  
**Use of Product :** In-Line/Repair Adhesive System.  
**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 ARDEX RA 88 PLUS Multi-Purpose Epoxy Repair Adhesive to AS/NZS 4020 when exposed at area to volume ratios up to 4950 mm<sup>2</sup>/L at 20°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  
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**Summary of Results**

APPENDIX	RESULTS
C – Taste of Water Extract	Passed when tested at an exposure of 4950 mm <sup>2</sup> per Litre.
D – Appearance of Water Extract	Passed when tested at an exposure of 15,000 mm <sup>2</sup> per Litre.
E – Growth of Aquatic Micro-organisms	Passed when tested at an exposure of 4950 mm <sup>2</sup> per Litre with a 0.33 scaling factor applied.
F – Cytotoxic Activity of Water Extract	Passed when tested at an exposure of 15,000 mm <sup>2</sup> per Litre.
G – Mutagenic Activity of Water Extract	Passed when tested at an exposure of 15,000 mm <sup>2</sup> per Litre.
H – Extraction of Metals	Passed when tested at an exposure of 15,000 mm <sup>2</sup> per Litre.

**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 :** The coating system was applied and cured by the submitting organisation.

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**CLAUSE 6.2 Taste of Water Extract**

**Sample Description** The sample consisted of one panel, coated to one side with dimensions 75 mm x 100 mm providing a surface area of approximately 4950 mm<sup>2</sup> per Litre. Extracts were prepared using 1515 mL volumes of 50 mg/L hardness water.

**Extraction Temperatur** 20°C ± 2°C.

**Test Method** Taste of Water Extract (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 exposure of 4950 mm<sup>2</sup> per Litre.

**Number of Samples** 2.

**Test Comment** Not applicable.



Peter Christopoulos  
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**CLAUSE 6.3 Appearance of Water Extract**

**Sample Description** The sample consisted of two panels, each coated to one side with dimensions 75 mm x 100 mm providing a surface area of approximately 15000 mm<sup>2</sup> per Litre. Extracts were prepared using 1000 mL volumes of 50 mg/L hardness water.

**Extraction Temperatur** 20°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 an exposure of 15,000 mm<sup>2</sup> 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 panels, each coated to one side with dimensions 75 mm x 100 mm providing a surface area of approximately 15000 mm<sup>2</sup> 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** A scaling factor of 0.33 was applied.

**Results**

Mean Dissolved Oxygen	Control	7.8 mg/L
Mean Dissolved Oxygen Differenc	Positive Reference	4.4 mg/L
	Negative Reference	<0.1 mg/L
	Test	1.60 mg/L

**Evaluation** The product passed the requirements of clause 6.4 when tested at an exposure of 4950 mm<sup>2</sup> per Litre with a 0.33 scaling factor applied.

**Number of Samples** 1.

**Test Comment** The Mean Dissolved Oxygen Difference in the extracts exceeded the maximum allowable concentration. A scaling factor of 0.33 was applied.



Thuy Diep  
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**CLAUSE 6.5 Cytotoxic Activity of Water Extract**

**Sample Description** The sample consisted of two panels, each coated to one side with dimensions 75 mm x 100 mm providing a surface area of approximately 15000 mm<sup>2</sup> 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 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 an exposure of 15,000 mm<sup>2</sup> 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.



Brendon King  
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**CLAUSE 6.6 Mutagenic Activity of Water Extract**

**Sample Description** The sample consisted of two panels, each coated to one side with dimensions 75 mm x 100 mm providing a surface area of approximately 15000 mm<sup>2</sup> per Litre. 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** Not applied.

**Results**

Bacteria Strain	Number of Revertants per Plate				
	S9	Blank	Sample Extract	Positive Controls	
<i>Salmonella typhimurium</i> TA98	-	28, 31, 32	22, 34, 27	2850, 2748, 2547	<u>NPD</u> (20µg)
Mean ± Standard deviation		30.3 ± 2.1	27.7 ± 6.0	2715.0 ± 154.2	
	+	26, 24, 25	25, 18, 19	3172, 3316, 3066	<u>2-AF</u> (20µg)
Mean ± Standard deviation		25.0 ± 1.0	20.7 ± 3.8	3184.7 ± 125.5	
<i>Salmonella typhimurium</i> TA100	-	111, 96, 91	117, 97, 118	530, 614, 608	<u>Azide</u> (1.0µg)
Mean ± Standard deviation		99.3 ± 10.4	110.7 ± 11.8	584.0 ± 46.9	
	+	93, 77, 91	85, 96, 104	1676, 1578, 1567	<u>2-AF</u> (20µg)
Mean ± Standard deviation		87.0 ± 8.7	95.0 ± 9.5	1607.0 ± 60.0	
<i>Salmonella typhimurium</i> TA102	-	455, 482, 456	434, 450, 385	1164, 1360, 1285	<u>Mitomycin C</u> (10µg)
Mean ± Standard deviation		464.3 ± 15.3	423.0 ± 33.9	1269.7 ± 98.9	
	+	382, 380, 307	430, 468, 419	1360, 1379, 1703	
Mean ± Standard deviation		356.3 ± 42.7	439.0 ± 25.7	1480.7 ± 192.8	

**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 an exposure of 15,000 mm<sup>2</sup> per Litre.

**Number of Samples** 1.

**Test Comment** Not applicable.



Peter Christopoulos  
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**CLAUSE 6.7 Extraction of Metals**

**Sample Description** The sample consisted of two panels, each coated to one side with dimensions 75 mm x 100 mm providing a surface area of approximately 15000 mm<sup>2</sup> per Litre. 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** 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
<b>Final Extract</b>					
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	<0.0001	<0.0001	2.0
Lead	0.0001	<0.0001	<0.0001	<0.0001	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 an exposure of 15,000 mm<sup>2</sup> per Litre.

**Number of Samples** 1.

**Test Comment** Not applicable.



Dzung Bui  
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