

# ams Laboratories Pty Ltd

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**AS/NZS 4020:2005 Compliance Testing**  
**Certificate of Analysis**  
**(Supersedes all interim reporting)**  
**Dated: 04/10/07**

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<b>CUSTOMER:</b> Era Polymers Pty. Ltd. 25-27 Green St, Banksmeadow, NSW, 2019	<b>OUR REF:</b> 0708396
<b>ATTN:</b> Vanessa Swift	<b>ORDER NO:</b> Not Provided
<b>INTERIM REPORTING:</b> 29/08/07 (email) 04/10/07	<b>DATE RECEIVED:</b> 06/08/07
	<b>DATE COMMENCED:</b> 07/08/07
	<b>DATE COMPLETED:</b> 04/10/07

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## 1. SAMPLES FOR TESTING:

**\* Description:**

**Eraspray ES900PW;**  
Non-solvented polyurethane spray elastomer;  
Component A- Eraspray ES900PW Part A;  
Component B- Eraspray ES900PW Part B.

**Testing Procedure / Background  
Information:**

Test panels comprising of the two component Eraspray ES900PW Polyurethane Elastomer Coating were prepared on site by the submitting organisation. The coating was applied to one side of sand-blasted glass plates provided by the laboratory with dimensions of 125mm x 83mm x 2mm.

Testing is based on a 'total immersion' exposure of ~11,045mm<sup>2</sup> of polyurethane elastomer coating/L at (20 ± 2)°C, to cover a cold water application up to <40°C.

Refer to **Attachment A** for Technical data sheet on Eraspray ES900PW and **Attachment B** for Material safety data sheets (MSDS) for Components A & B.

**\* Product Use:**

Elastomeric coating and linings in contact with potable water

ams Laboratories Final Report for the testing of a product to AS/NZS 4020, Products for use in contact with Drinking Water	AMS Report No.: 0708396
Submitting Organisation: Era Polymers Pty. Ltd.	
Product: Eraspray ES900PW; Non-solvented Polyurethane Spray Elastomer	Date of Report: 04/10/07

- \* **General Composition:** - Refer to **Attachments A & B**  
(including type of wetted materials and supplier/manufacturers)
- \* **Trade Name and Reference of Product:** Eraspray ES900PW;  
Non-solvented polyurethane spray elastomer
- \* **Product Manufacturer:** Era Polymers Pty. Ltd.
- \* **Place of Manufacture:** St. Mary, NSW, Australia
- \* **Submitting Organisation:** Era Polymers Pty. Ltd.
- \* **Sampling Organisation:** Era Polymers Pty. Ltd.
- \* **Temperature range:** <40°C

\* Based on product submission information supplied by customer.

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## 2. **TESTS REQUIRED:**

- Taste of Water Extract, *Appendix C*
- Appearance of Water Extract, *Appendix D*
- Growth of Aquatic Micro-organisms, *Appendix E*
- Cytotoxic Activity of Water Extract, *Appendix F*
- Mutagenic Activity of Water Extract, *Appendix G*
- Extraction of Metals, *Appendix H*

**Method:** TMP-191100

Reference: AS/NZS 4020:2005, Testing of products for use in contact with drinking water

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### 3. TASTE OF WATER EXTRACT:

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

**Extraction temperature:** ~20°C

**Exposure:** 'total immersion'; 1 x ~11,045mm<sup>2</sup> polyurethane elastomer coating / L test water.

**No. of samples tested:** 2 x coated test panels: 1 for chlorine-free test extract & 1 for chlorinated test extract

Following test extractions, the final 9 day test extracts were used to prepare taste test dilutions: 1/8, 1/4, 1/2, with 1/2 as the first dilution.

TEST EXTRACT	TEST WATER TYPE	NO. OF TASTERS	TASTE +/-	TASTE DESCRIPTION (No. of tasters)	TEST DILUTION *(taste intensity)
TEST BLANK Final 9-day:	Chlorine-free	8	-	NA	NA
SAMPLE EXTRACT Final 9-day:	Chlorine-free	8	-	NA	NA
TEST BLANK Final 9-day:	Chlorinated	8	-	NA	NA
SAMPLE EXTRACT Final 9-day:	Chlorinated	8	-	NA	NA

+ 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.**

**Note:** \* 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.

### EVALUATION:

On the basis of these results, the product complies with test requirements of AS/NZS 4020:2005, Taste of Water Extract; *Appendix C*, at the recommended 'total immersion' exposure of ~11,045mm<sup>2</sup> polyurethane elastomer coating / L test water for a cold water application up to <40°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.

**Extraction temperature:** ~20°C

**Exposure:** 'total immersion'; 1 x ~11,045mm<sup>2</sup> polyurethane elastomer coating /L test water

**No. of samples tested:** 2 x coated test panels (designated I & II)

Following test extractions, a composite test extract (1:1 by volume of duplicate samples, designated I & II) was prepared & used for assaying.

	a) <b>TRUE COLOUR:</b> Hazen Units (HU)	b) <b>TURBIDITY:</b> Nephelometric Turbidity Units (NTU)
	First 24h Extract	First 24h Extract
<b>Sample Extract</b> pH = 7.99	<2	0.07
<b>Test Blank</b> pH = 7.83	<2	0.07
<b>FINAL RESULT</b>	<2	<0.01
<b>AS/NZS 4020 Test sample requirements</b>	≤5	≤0.5

< = less than

≤ = less than or equal to

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. RN632796.

#### EVALUATION:

On the basis of these results, the product complies with the test requirements of AS/NZS 4020:2005, Appearance of Water Extract; *Appendix D*, at the recommended 'total immersion' exposure of ~11,045mm<sup>2</sup> polyurethane elastomer coating / L test water for a cold water application up to <40°C.

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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'; 1 x ~11,045mm<sup>2</sup> polyurethane elastomer coating /L test water

**No. of samples tested:** 1 x coated test panel

**Inoculum:** 100mL for 1L

**Jar Size:** Calibrated for 1L

GLASS JAR	* MEAN DISSOLVED OXYGEN DIFFERENCE (MDOD) in mg/L
TEST PRODUCT (Sample)	<0.01
NEGATIVE REFERENCE CONTROL (~15,000mm <sup>2</sup> glass plate)	0.10
POSITIVE REFERENCE CONTROL (~15,000mm <sup>2</sup> paraffin waxed glass plate)	4.77
TEST BLANK	7.02 in mg/L as mean dissolved oxygen

\* 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 product complies with the test requirements of AS/NZS 4020:2005 Growth of Aquatic Micro-organisms; *Appendix E*, at the recommended 'total immersion' exposure of ~11,045mm<sup>2</sup> polyurethane elastomer coating / L test water for a cold water application up to <40°C.

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## 6. CYTOTOXIC ACTIVITY OF WATER EXTRACT:

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

**Extraction temperature:** ~20°C

**Exposure:** 'total immersion'; 1 x ~11,045mm<sup>2</sup> polyurethane elastomer coating /L test water

**No. of samples tested:** 1 x coated test panel

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, Reverse Osmosis Water, and Phosphate Buffer Solution were included with the test blank as negative controls.

### EVALUATION:

On the basis of these results, the test extracts of this product have shown a non-cytotoxic response, and the product therefore complies with the test requirements of AS/NZS 4020:2005, Cytotoxic Activity of Water Extract; *Appendix F*, at the recommended 'total immersion' exposure of ~11,045mm<sup>2</sup> polyurethane elastomer coating / L test water for a cold water application up to <40°C.

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## 7. MUTAGENIC ACTIVITY OF WATER EXTRACT:

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

**Extraction temperature:** ~20°C

**Exposure:** 'total immersion'; 1 x ~11,045mm<sup>2</sup> polyurethane elastomer coating /L test water

**No. of samples tested:** 1 x coated test panel

The results for the first 24h test extract are given below:

BACTERIAL STRAIN: <i>Salmonella typhimurium</i>	* S9 -No +With	a) TRIPPLICATES (REVERTANTS/PLATES) b) MEAN + STANDARD DEVIATION			
		TEST BLANK (Extractant Water)	SAMPLE EXTRACT (Leachate)	Negative Control (Test culture only)	Positive Control (Standard diagnostic mutagen)
TA 98	-	a)  36 40 35	a)  42 31 31	a)  27 36 27	a)  I 3,584 3,664 3,648
		b)  37 ± 3	b)  35 ± 6	b)  30 ± 5	b)  3,632 ± 42
TA 98	+	a)  35 43 33	a)  47 33 49	a)  50 42 30	a)  IV 2,272 2,000 2,608
		b)  37 ± 5	b)  43 ± 9	b)  41 ± 10	b)  2,293 ± 305
TA 100	-	a)  147 122 100	a)  111 115 120	a)  102 103 118	a)  II 8,608 4,704 6,048
		b)  123 ± 24	b)  115 ± 5	b)  108 ± 9	b)  6,453 ± 1,983

\* Metabolic Activator  
II = sodium azide

NA=Not applicable  
III = Benzo(a)pyrene

>=greater than  
IV = 2-aminoanthracene

I 2, 4-dinitrophenylhydrazine

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BACTERIAL STRAIN: <i>Salmonella typhimurium</i>	* S9 -No +With	a) TRIPLICATES (REVERTANTS/PLATES) b) MEAN + STANDARD DEVIATION			
		TEST BLANK (Extractant Water)	SAMPLE EXTRACT (Leachate)	Negative Control (Test culture only)	Positive Control (Standard diagnostic mutagen)
TA 100	+	a)  105 100 99	a)  101 110 105	a)  95 112 77	a)  IV 1,384 1,400 1,152
		b)  101 ± 3	b)  105 ± 5	b)  95 ± 18	b)  1,312 ± 139
TA 102	-	a)  206 266 281	a)  292 280 210	a)  282 215 220	a)  I 832 928 896
		b)  251 ± 40	b)  261 ± 44	b)  239 ± 37	b)  885 ± 49
TA 102	+	a)  375 282 322	a)  389 384 360	a)  293 317 360	a)  IV 660 550 690
		b)  326 ± 47	b)  378 ± 16	b)  323 ± 34	b)  633 ± 74

\* Metabolic Activator

NA=Not applicable

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 test extract has shown a non-mutagenic response and the product therefore meets the test requirements of AS/NZS 4020:2005, Mutagenic Activity of Water Extract; *Appendix G*, at the recommended 'total immersion' exposure of ~11,045mm<sup>2</sup> polyurethane elastomer coating / L test water for a cold water application up to <40°C.

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## 8. EXTRACTION OF METALS:

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

**Extraction temperature:** ~20°C

**Exposure:** 'total immersion'; 1 x ~11,045mm<sup>2</sup> polyurethane elastomer coating /L test water

**No. of samples tested:** 2 x coated test panels (designated I & II)

Following test extractions, a composite test extract (1:1 by volume of duplicate samples, designated I & II) was prepared and used for assaying.

The results obtained for the first 24h composite test extract are given below:

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

< = less than mg/L = milligram per litre <sup>1</sup> = ICPMS <sup>2</sup> = ICPMS (hydride generation) <sup>3</sup> = 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 No. RN632797.

## EVALUATION:

On the basis of these results, the product complies with the test requirements of AS/NZS 4020:2005, Extraction of Metals; *Appendix H*, at the recommended 'total immersion' exposure of ~11,045mm<sup>2</sup> polyurethane elastomer coating / L test water for a cold water application up to <40°C.

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9. **SUMMARY: Eraspray ES900PW; Non-Solvented Polyurethane Spray Elastomer**

AS/NZS 4020:2005 TESTS	RESULTS
a) TASTE - Appendix C	PASS at a 'total immersion' exposure of ~11,045mm <sup>2</sup> polyurethane elastomer coating / L test water
b) APPEARANCE - Appendix D i) Colour                      ii) Turbidity	i) PASS at a 'total immersion' exposure of ~11,045mm <sup>2</sup> polyurethane elastomer coating / L test water ii) PASS at a 'total immersion' exposure of ~11,045mm <sup>2</sup> polyurethane elastomer coating / L test water
c) GROWTH OF AQUATIC MICRO-ORGANISMS - Appendix E	PASS at a 'total immersion' exposure of ~11,045mm <sup>2</sup> polyurethane elastomer coating / L test water
d) CYTOTOXIC ACTIVITY - Appendix F	PASS at a 'total immersion' exposure of ~11,045mm <sup>2</sup> polyurethane elastomer coating / L test water
e) MUTAGENIC ACTIVITY - Appendix G	PASS at a 'total immersion' exposure of ~11,045mm <sup>2</sup> polyurethane elastomer coating / L test water
f) EXTRACTION OF METALS - Appendix H	PASS at a 'total immersion' exposure of ~11,045mm <sup>2</sup> polyurethane elastomer coating / L test water

**Note:** All tests are based on a cold and hot water application up to <40°C with testing at a 'total immersion' exposure of ~11,045mm<sup>2</sup> polyurethane elastomer coating / L test water except Test c). Test c) Growth of Aquatic Micro-organisms, is based on a 'total immersion' exposure of ~11,045mm<sup>2</sup> polyurethane elastomer coating / L test water at (30 ± 1)°C.

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## 10. CONCLUSIONS:

The product, **Eraspray ES900PW; Non-Solvented Polyurethane Spray Elastomer**, referred to in this report, has been tested in accordance to AS/NZS 4020:2005, Testing of products for use in contact with drinking water for:

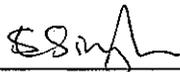
- Taste of Water Extract, *Appendix C*
- Appearance of Water Extract, *Appendix D*
- Growth of Aquatic Micro-organisms, *Appendix E*
- Cytotoxic Activity of Water Extract, *Appendix F*
- Mutagenic Activity of Water Extract, *Appendix G*
- Extraction of Metals, *Appendix H*

Based on completion and evaluation of all tests on 04/10/07, the product, **Eraspray ES900PW; Non Solvented Polyurethane Spray Elastomer**; **fully complies with the test requirements of AS/NZS 4020:2005 to cover a cold water application up to <math>40^{\circ}\text{C}</math>, at the recommended 'total immersion' exposure of  $\sim 11,045\text{mm}^2$  polyurethane elastomer coating / L test water.**

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.

Our reports are recognised by regulatory bodies such as SAI Global Assurance Services and Global Mark, qualified for product certification to AS/NZS 4020 compliance testing, as well as for the purpose of WELS registration by WELS Product Registrations, Standards and Compliance.

Signed: \_\_\_\_\_



Date: \_\_\_\_\_

04/10/07

SANDHYA L. SINGH B. Tech, Postgrad. Dip. (Chem)  
Analytical Product Testing Laboratory Manager; Approved Signatory