



TGA Licence No:
MI-15112007-LI-002191-11

APVMA Licence No:
6139

AS/NZS 4020:2005 Compliance Testing

Certificate of Analysis
(Supersedes all interim reporting)
Dated: 20/12/2016

1. CERTIFICATE OF ANALYSIS AND SAMPLE INFORMATION:

Methodology: AS/NZS 4020, Appendix A and in-house method TMP-191100 & TMP-191101

Eurofins | ams Report Reference No.: 1624479

Cross Reference No.: NA

Submitting Organisation: TPO Logistics NZ LTD.

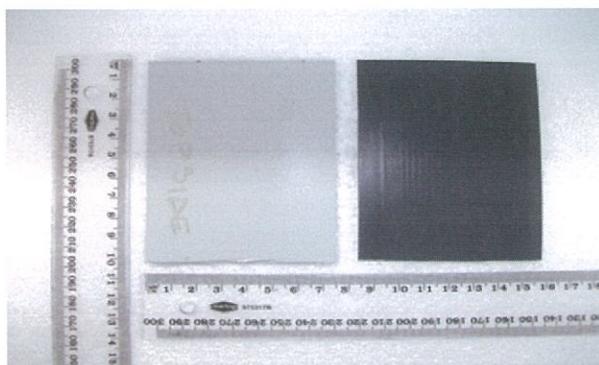
Contact: Jeremy Probett

Address: 64 Kath Hopper Drive, Orewa, Auckland 0931, New Zealand

Interim Reporting: NA

Project Completion Date: 20/12/2016

Product Designation: Everguard & Everguard Extreme, Grey 345, Roof and Deck Membrane



Batch No./ Manufacturing Date: GA0104160949 / 04/01/2016

Product Manufacturer: GAF
1 Campus Drive, New Jersey 07054, USA

Sampling Organisation: TPO Logistics NZ LTD.

THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL

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Eurofins ams Laboratory Final Report for the testing of a product to AS/NZS 4020, Products for use in contact with Drinking Water	Eurofins ams Report No.: 1624479
Submitting Organisation: TPO Logistics NZ LTD.	
Product: Everguard & Everguard Extreme, Grey 345, Roof and Deck Membrane	Date of Report: 20/12/2016

General Composition:	Thermal Plastic Polyolefin (TPO), refer to Attachments
Product Use:	In-Line
Temperature Range:	(0 – 30)°C
Previous Testing:	NA
Date of receipt of samples:	07/10/2016
Sample selection for tests:	As provided by the Submitting Organisation
Sample storage conditions:	Prepared and controlled as per AS/NZS 4020, <i>Appendix A</i>
Extracts:	Prepared as per AS/NZS 4020, <i>Appendices C, D, E, F, G & H</i>
Testing procedure:	<p>The Everguard & Everguard Extreme, Grey 345 material was cut into panels (by Eurofins ams), where each panel had a dimension of ~100 x ~75 x ~1mm and total surface area of ~7,500mm².</p> <p>Testing is based on the recommended “total immersion” exposure of 1 x set (1 set = 4 x panels / 1L test water) providing a total surface area of ~30,000mm² TPO / 1L test water at (20 ± 2)°C to cover a cold water application up to <40°C.</p> <p>For Taste testing only, testing is based on a “total immersion” exposure of 2 x panel / 0.5L test water (≅30,000mm² TPO / 1L) at ~20°C.</p> <p>Refer to Attachment A for Photo of test sample & Data Sheet and Attachment B for Material Safety Data Sheet (MSDS).</p>
Volume retention:	NA

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2. SUMMARY OF RESULTS:

APPENDIX	RESULTS
C - TASTE	PASS at testing exposure
D - APPEARANCE	PASS at testing exposure
E - GROWTH OF AQUATIC MICRO-ORGANISMS	PASS at testing exposure
F - CYTOTOXIC ACTIVITY	PASS at testing exposure
G - MUTAGENIC ACTIVITY	PASS at testing exposure
H - EXTRACTION OF METALS	PASS at testing exposure

Based on completion and evaluation of all tests on 20/12/2016, the product, Everguard & Everguard Extreme, Grey 345, Roof and Deck Membrane; fully complied with the test requirements of AS/NZS 4020:2005 to cover a cold water application up to <40°C, at the recommended "total immersion" exposure of ~30,000mm² TPO / 1L test water at (20 ± 2)°C.

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/manufacture 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.

Signed: _____



SANDHYA L. SINGH B. Tech, Postgrad. Dip. (Chem)
Manager, Chemistry and Toxicology; Approved Signatory

Date: _____

20/12/2016

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3. TASTE OF WATER EXTRACT:

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

Exposure: 'total immersion'; ~15,000mm² TPO / 0.5L test water (≡ ~30,000mm² TPO / 1L test water)

Extraction temperature: (20 ± 2)°C **Scaling factor:** NA **Number of Panellists:** 4

No. of samples for Chlorine-free extract: 2

No. of samples for Chlorinated extract: 2

Description	Extract	Test Water	Taste (+ / -)	Taste Description (No. of tasters)	Test Dilution *(Taste intensity)
Test Blank	First 24h	Chlorine-free	—	—	—
	Final 9-day	Chlorine-free	NA	NA	NA
Sample	First 24h	Chlorine-free	—	—	—
	Final 9-day	Chlorine-free	NA	NA	NA
Test Blank	First 24h	Chlorinated	—	—	—
	Final 9-day	Chlorinated	NA	NA	NA
Sample	First 24h	Chlorinated	—	—	—
	Final 9-day	Chlorinated	NA	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.

Figure in brackets is the number of panellists detecting a taste at this dilution.

Note:

1. 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.
2. First extract becomes final extract.

EVALUATION:

On the basis of these results the samples of this product referred to in this report have complied with the test requirements of AS/NZS 4020:2005, Taste of Water Extract; Appendix 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.

Exposure: 'total immersion'; ~30,000mm² TPO / 1L test water

Extraction temperature: (20 ± 2)°C

Scaling factor: NA

No. of samples tested: 1 x set

	a) TRUE COLOUR: Hazen Units (HU)		b) TURBIDITY: Nephelometric Turbidity Units (NTU)	
	First 24h	Final 9-day	First 24h	Final 9-day
Sample Extract pH = 7.04	2.5	NA	0.48	NA
Test Blank pH = 7.09	2.5	NA	0.38	NA
FINAL RESULT	<2	NA	0.10	NA
AS/NZS 4020 Test sample requirements	≤5		≤0.5	

< = less than

First extract becomes final extract

≤ = less than or equal to

NA Not applicable

For test a), test extractions were performed by Eurofins ams Laboratories Pty. Ltd. The test extracts were subsequently subcontracted to Eurofins | mgt for assessment (NATA Accreditation No. 1261), Report No. 519846-W.

EVALUATION:

On the basis of these results the samples of this product referred to in this report have complied with the test requirements of AS/NZS 4020:2005, Appearance of Water Extract; *Appendix D*.

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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'

Component Name	Testing Exposure	Inoculum (mL)	* MEAN DISSOLVED OXYGEN DIFFERENCE (MDOD) in mg/L
Everguard & Everguard Extreme, Grey 345, Roof and Deck Membrane	~30,000mm ² / 1L (2 x panels / 0.5L)	50	0.52
Negative Reference Control (glass plate)	~15,000mm ² / 1L	100	0.11
Positive Reference Control (paraffin waxed glass plate)	~15,000mm ² / 1L	100	7.17
Test Blank	Blank / 1L	100	6.88 in mg/L as mean dissolved oxygen

NA Not applicable

* 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 samples of this product referred to in this report have complied with the test requirements of AS/NZS 4020:2005, Growth of Aquatic Micro-organisms; *Appendix E*.

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6. CYTOTOXIC ACTIVITY OF WATER EXTRACT:

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

Exposure: 'total immersion'; ~30,000mm² TPO / 1L test water

Extraction temperature: (20 ± 2)°C

Scaling factor: NA

Extracts: 24h, 48h & 72h

No. of samples tested: 1 x set

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, Synthetic Water for Irrigation, and Phosphate Buffer Solution were included with the test blank as negative controls.

AS/NZS 4020 test sample requirements: 1) Non-cytotoxic response- confluent monolayer similar to test blank.
2) Cytotoxic response- irregularly shaped cells & cell death similar to positive controls of 8µg/g & 16µg/g zinc sulphate.

EVALUATION:

On the basis of these results the samples of this product referred to in this report have complied with the test requirements of AS/NZS 4020:2005, Cytotoxic Activity of Water Extract; *Appendix F*.

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7. MUTAGENIC ACTIVITY OF WATER EXTRACT:

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

Exposure: 'total immersion'; ~30,000mm² TPO / 1L test water

Extraction temperature: (20 ± 2)°C

Scaling factor: NA

Extract: 24h

No. of samples tested: 1 x set

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 98	-	a) 38 17 40	a) 32 37 24	a) 453 436 276	a) IV 5,720 5,470 4,160
		b) 32 ± 13	b) 31 ± 7	b) 388 ± 98	b) 5,117 ± 838
TA 98	+	a) 61 46 41	a) 188 39 38	a) 416 323 368	a) IV 18,660 25,480 10,830
		b) 49 ± 10	b) 88 ± 86	b) 369 ± 47	b) 18,323 ± 7,331
TA 100	-	a) 116 149 152	a) 133 151 144	a) 124 144 133	a) II 28,400 31,730 23,460
		b) 139 ± 20	b) 143 ± 9	b) 134 ± 10	b) 27,863 ± 4,161

* 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	a) TRIPLICATES (REVERTANTS/PLATES) b) MEAN \pm STANDARD DEVIATION			
		TEST BLANK (Extractant Water)	SAMPLE EXTRACT (Leachate)	NEGATIVE CONTROL (Test culture only)	POSITIVE CONTROL (Standard diagnostic mutagen)
TA 100	-No	a)	a)	a)	a)
	+With	136 141 129	159 141 125	129 172 130	III 2,530 2,430 2,160
TA 102	-	b)	b)	b)	b)
	+	135 \pm 6	142 \pm 17	144 \pm 25	2,373 \pm 191
TA 102	-	a)	a)	a)	a)
	+	977 1,003 934	693 552 597	712 964 740	I 6,970 6,400 6,180
TA 102	-	b)	b)	b)	b)
	+	971 \pm 35	614 \pm 72	805 \pm 138	6,517 \pm 408
TA 102	-	a)	a)	a)	a)
	+	1,342 1,382 1,258	1,340 1,328 986	1,433 1,296 1,190	IV 11,750 11,040 20,010
TA 102	-	b)	b)	b)	b)
	+	1,327 \pm 63	1,218 \pm 201	1,306 \pm 122	14,267 \pm 4,987

* Metabolic Activator NA = Not applicable > = greater than 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 samples of this product referred to in this report have complied with the test requirements of AS/NZS 4020:2005, Mutagenic Activity of Water Extract; *Appendix G*.

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8. EXTRACTION OF METALS:

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

Exposure: 'total immersion'; ~30,000mm² TPO / 1L test water

Extraction temperature: (20 ± 2)°C

Scaling factor: NA

Extracts: 24h

No. of samples for I: 1 x set

No. of samples for II: 1 x set

Element	AS/NZS 4020: Maximum Allowable Concentration mg/L (ppm)	Limit of Reporting mg/L (ppm)	Test Blank mg/L (ppm)	Sample Extract I mg/L (ppm)	Sample Extract II mg/L (ppm)	FINAL RESULT I mg/L (ppm)	FINAL RESULT II mg/L (ppm)
Antimony ¹ (Sb)	0.003	0.0001	0.0002	0.0003	0.0002	0.0001	<0.0001
Arsenic ¹ (As)	0.007	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Barium ¹ (Ba)	0.7	0.0001	0.0005	0.0007	0.0013	0.0002	0.0008
Cadmium ¹ (Cd)	0.002	0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Chromium ¹ (Cr)	0.05	0.0002	0.0002	0.0007	<0.0002	0.0005	<0.0002
Copper ¹ (Cu)	2	0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004
Lead ¹ (Pb)	0.01	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Mercury ¹ (Hg)	0.001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum ¹ (Mo)	0.05	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel ¹ (Ni)	0.02	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Selenium ¹ (Se)	0.01	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Silver ¹ (Ag)	0.1	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

< = less than mg/L = milligram per litre ¹ = ICPMS – In-house Method Code: LTM-MET 3040
First extract becomes final extract.

Test extractions were performed by Eurofins ams Laboratories Pty. Ltd. The test extracts were subsequently subcontracted to Eurofins | mgt for assessment (NATA Accreditation No. 1261), Report No. 519846-W.

EVALUATION:

On the basis of these results the samples of this product referred to in this report have complied with the test requirements of AS/NZS 4020:2005, Extraction of Metals; *Appendix H*.