

TEST REPORT



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20678

TEST SUMMARY

Objective

Assessment of Supplied Sample AS 4654.1-2012

Project

Assessment of Assessment of ACTFLEX 988 CWP to AS/NZS 4654.1-2012

Report Number

250-3 AS 4654.1-2012

Customer

NAME	FORSPEC Protective Coatings
ADDRESS	22/872 Canterbury Road Roselands, NSW, 2196 Sydney
CONTACT PERSON	James Gilto
EMAIL	admin@actechpc.com.au
TELEPHONE	0424424178

Name of test material

ACTFLEX 988 CWP

Description of test material

2-part cementitious acrylic polymer waterproofing

Date of receipt of test material

18/07/2023

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Report number	Issue Date	Expiry Date
250-3 AS 4654.1-2012	27/10/2023	27/10/2026

TEST REPORT



WORLD RECOGNISED
ACCREDITATION

Accredited for compliance with ISO/IEC 17025 – Testing
20678

Testing Facility and Location

NAME	XTec Gen Pty Ltd
ADDRESS	30-32 Park Avenue Woodville North 5012
ABN	22634729294

LIMITATION

The test results reported here relate only to the items tested.

CUSTOMER SUPPLIED INFORMATION & DATA

2 coats @ 1.15mm. expected dry film 1.5mm

Dry Film Supplied

TERMS AND CONDITIONS

This report is issued in accordance with the Terms and Conditions as detailed and agreed in the *XTecGen Test Request and Sample Submission Form*.

SIGNATORIES

Author

Michael Bakanyozo

Head Laboratory Technician

Reviewer

Eric Scardigno

Laboratory Manager

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Report number	Issue Date	Expiry Date
250-3 AS 4654.1-2012	27/10/2023	27/10/2026

TEST REPORT



Accredited for compliance with ISO/IEC 17025 – Testing
20678

SUMMARY OF TESTS

AS4654.1 Requirements:

PROPERTY	METHOD	RESULT	ASSESSMENT CRITERIA	ASSESSMENT
Bond Strength	ASTM C794	42.86 N	State result	
Acceptance of Cyclic movement	AS 4654.1 Appendix B	No failure observed	AS 4654.1 Appendix B, Paragraph B4	PASS
Durability: Control Elongation at Break	AS1145.3	220%	AS 4654.1 Appendix A, Table A1	CLASS II
Durability: Control Tensile Strength		1.74MPa	State result	
Durability: Water Immersion Elongation at Break	AS 4654.1 Appendix A	62%	AS 4654.1 Appendix A, Table A4	PASS
Durability: Water Immersion Tensile Strength		1.39MPa	State result	
Durability: Detergent Immersion Elongation at Break		82%	AS 4654.1 Appendix A, Table A4	PASS
Durability: Detergent Immersion Tensile Strength		1.32MPa	State result	
Durability: Heat Aging Elongation at Break	N/A	163%	AS 4654.1 Appendix A, Table A4	PASS
Durability: Heat Aging Tensile Strength		2.02MPa	State result	
Temperature Resistance	AMTM004	1.99g/m ² /24 hours	State result	
Water Vapour Transmission	ASTM E96	1.99g/m ² /24 hours	State result	

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Report number
250-3 AS 4654.1-2012

Issue Date
27/10/2023

Expiry Date
27/10/2026

TEST REPORT



Accredited for compliance with ISO/IEC 17025 – Testing
20678

BOND STRENGTH

Date of test: 25/09/2023

Testing

Testing carried out in accordance with ASTM C794.

Additions, deviations and/or exclusions from ASTM C794:

Nil

Specimen Preparation:

PARAMETER	VALUE
Substrate	Concrete block
Substrate preparation	Wiped with damp cloth
Substrate primer	No primer required
Mesh preparation	Wiped with damp cloth
Mesh primer	N/A

Test Results:

READING	PEAK PEEL FORCE (N)	MODE OF FAILURE			
		SUBSTRATE FAILURE (%)	ADHESIVE FAILURE (%)	COHESIVE FAILURE (%)	SCREEN DELAMINATION (%)
Specimen 1 Reading 1	26.88	5	95	0	0
Specimen 1 Reading 2	51.79	5	65	0	30
Specimen 1 Reading 3	48.55	0	10	0	90
Specimen 1 Reading 4	39.63	0	5	0	95
Specimen 2 Reading 1	35.82	0	95	0	5

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Report number
250-3 AS 4654.1-2012

Issue Date
27/10/2023

Expiry Date
27/10/2026

TEST REPORT



WORLD RECOGNISED
ACCREDITATION

Accredited for compliance with ISO/IEC 17025 – Testing
20678

Specimen 2 Reading 2	54.74	0	80	0	20
Specimen 2 Reading 3	45.07	0	0	0	100
Specimen 2 Reading 4	31.88	0	0	0	100
Specimen 3 Reading 1	22.45	0	100	0	0
Specimen 3 Reading 2	54.00	0	95	0	5
Specimen 3 Reading 3	58.55	0	40	0	60
Specimen 3 Reading 4	44.98	0	30	0	70
Average	42.86				
Std Dev	11.62				

Result: 42.86N

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Report number
250-3 AS 4654.1-2012

Issue Date
27/10/2023

Expiry Date
27/10/2026

TEST REPORT



Accredited for compliance with ISO/IEC 17025 – Testing
20678

CYCLIC MOVEMENT

Date of test: 07/08/2023-11/08/2023

Testing:

Testing carried out in accordance with AS 4654.1 Appendix B “Assessment of resistance of waterproofing membranes to cyclic movement”

Additions, deviations and/or exclusions from AS 4654.1 Appendix B:

Nil

Test Parameters:

PARAMETER	VALUE
Membrane class	II
Number of cycles	50
Cycle time	2 Hours
Cycle expansion	4.39 mm
Sample Size	65 mm x 25 mm
Sample span	2 mm between plates
Sample thickness	1.208mm

Test Results:

TEST RESULT	VALUE
Number of cycles completed	50
Surface crazing	Nil
Surface tears	Nil
Membrane rupture	Nil

Test Observations:

DAY	DATE	NUMBER OF CYCLES	Failure Observed	
			RUPTURE/HOLING	OTHER
1	7/08/2023	0	☐ Yes ☒ No	
2	8/08/2023	12	☐ Yes ☒ No	
3	9/08/2023	24	☐ Yes ☒ No	
4	10/08/2023	36	☐ Yes ☒ No	
5	11/08/2023	50	☐ Yes ☒ No	

Passing requirement: “Any rupture holing the specimen or extending through the thickness for more than 1mm in from the edge of the specimen shall be taken as a failure and the number of cycles to failure shall be reported. If failure does not occur after 50 cycles it shall be reported together with the

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Report number
250-3 AS 4654.1-2012

Issue Date
27/10/2023

Expiry Date
27/10/2026

TEST REPORT



Accredited for compliance with ISO/IEC 17025 – Testing
20678

types of any surface defects that have been induced and the number of cycles at which onset of the defect occurred”

Result: Pass. Meets the requirement for CSIRO moving joint test as per AS 4654.1 Appendix B.

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Report number	Issue Date	Expiry Date
250-3 AS 4654.1-2012	27/10/2023	27/10/2026

TEST REPORT



WORLD RECOGNISED
ACCREDITATION

Accredited for compliance with ISO/IEC 17025 – Testing
20678

DURABILITY OF MEMBRANE

CONTROL SET

Date of test: 26/07/2023

Testing: Test carried out in accordance with AS 1145.3.

Additions, deviations and/or exclusions from AS 1145.3: Nil

Test Parameters:

PARAMETER	VALUE
Ambient temperature (conditioning)	24.0-25.8°C
Ambient humidity (conditioning)	47.3-49.0% RH
Ambient temperature (testing)	25.4°C
Ambient humidity (testing)	30.9% RH
Accuracy grading of test machine	A
Specimen type	Type 2
Elongation measurement type:	Electronic internal measurement
Method of preparation of specimens	Dry Film supplied
Orientation of specimens to direction of cast	Parallel to direction of casting blade
Clamping device:	Pneumatic jaws
Testing speed:	50mm/min

Test Results:

Replicate	Sample thickness (mm)	Maximum Extension (mm)	Tensile Strength (MPa)	Elongation at Break (%)
1	1.32	102.6	1.72	205
2	1.31	116.7	1.75	233
3	1.30	113.3	1.74	226
4	1.34	111.2	1.76	222
5	1.34	107.0	1.74	214
Mean	1.32	110.1	1.74	220
Std Deviation	0.02	5.5	0.02	11

Requirement for Class III (high extensibility): $\geq 300\%$ elongation at break

Requirement for Class II (medium extensibility) 60-299% elongation at break

Requirement for Class I (low extensibility) $< 60\%$ elongation at break.

Classification: Class II

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Laboratories"*

Report number
250-3 AS 4654.1-2012

Issue Date
27/10/2023

Expiry Date
27/10/2026

TEST REPORT



Accredited for compliance with ISO/IEC 17025 – Testing
20678

DURABILITY OF MEMBRANE

WATER IMMERSION

Date of test: 16/08-04/10-2023

Testing:

Test carried out in accordance with AS 4654.1 Appendix A.

Additions, deviations and/or exclusions from AS 4654.1 Appendix A:

Nil

Test Parameters:

PARAMETER	VALUE
Ambient temperature (conditioning)	24.0-25.8°C
Ambient humidity (conditioning)	47.3-49.0% RH
Ambient temperature (testing)	21.0-25.4°C
Ambient humidity (testing)	29.2-51.3% RH
Minimum accuracy grading of test machine	A
Specimen type	Type 2
Elongation measurement type:	Electronic internal measurement
Method of preparation of specimens	Dry film supplied
Orientation of specimens to direction of cast	Parallel to direction of casting blade
Clamping device:	Pneumatic jaws
Testing speed:	50mm/min

Test Results:

Sample Number	Sample thickness (mm)	Maximum Extension (mm)	Tensile strength (MPa)	Elongation at break (%)
1	1.27	33.5	2.26	67
2	1.32	29.8	2.22	59
3	1.25	37.2	2.24	74
7 Day Means	1.28	33.5	2.24	67
7 Day Std Devs	0.04	3.7	0.02	7
4	1.49	34.5	1.27	69
5	1.49	33.6	1.27	67
6	1.49	32.3	1.27	64
28 Day Means	1.49	33.5	1.27	67
28 Day Std Devs	0.00	1.1	0.00	2
7	1.32	30.4	1.36	61

"This report shall not be reproduced except in full without prior approval of XTec Gen Laboratories"

Report number
250-3 AS 4654.1-2012

Issue Date
27/10/2023

Expiry Date
27/10/2026

TEST REPORT



Accredited for compliance with ISO/IEC 17025 – Testing
20678

8	1.28	30.1	1.40	60
9	1.28	32.8	1.40	65
56 Day Means	1.29	31.1	1.39	62
56 Day Std Devs	0.03	1.5	0.02	3

Passing Requirement: "Elongation at break shall not be less than 25% retention of elongation at break of the controls"58] Table 6.1. A failure is for less than 25% retention of elongation at break of the controls".

To pass this condition an elongation at break value of 56% or greater is required.

Result: 62% PASS

"This report shall not be reproduced except in full without prior approval of XTec Gen Laboratories"

Report number	Issue Date	Expiry Date
250-3 AS 4654.1-2012	27/10/2023	27/10/2026

TEST REPORT



WORLD RECOGNISED
ACCREDITATION

Accredited for compliance with ISO/IEC 17025 – Testing
20678

DURABILITY OF MEMBRANE

DETERGENT IMMERSION

Date of test: 16/08-04/10-2023

Testing:

Test carried out in accordance with AS 4654.1 Appendix A.

Additions, deviations and/or exclusions from AS 4654.1 Appendix A:

Nil

Test Parameters:

PARAMETER	VALUE
Ambient temperature (conditioning)	24.0-25.8°C
Ambient humidity (conditioning)	47.3-49.0% RH
Ambient temperature (testing)	21.0-25.4°C
Ambient humidity (testing)	29.2-51.3% RH
Minimum accuracy grading of test machine	A
Specimen type	Type 2
Elongation measurement type:	Electronic internal measurement
Method of preparation of specimens	Dry film supplied
Orientation of specimens to direction of cast	Parallel to direction of casting blade
Clamping device:	Pneumatic jaws
Testing speed:	50mm/min

Test Results: Detergent Immersion

Sample Number	Sample thickness (mm)	Maximum Extension (mm)	Tensile strength (MPa)	Elongation at break (%)
1	1.19	40.3	2.24	80
2	1.19	30.4	2.25	61
3	1.21	40.7	2.23	81
7 Day Means	1.20	37.1	2.24	74
7 Day Std Devs	0.01	5.8	0.01	12
4	1.24	23.1	1.37	46
5	1.25	29.0	1.36	58
6	1.24	28.5	1.39	57
28 Day Means	1.24	26.9	1.37	54
28 Day Std Devs	0.01	3.3	0.01	7
7	1.43	41.5	1.33	83

"This report shall not be reproduced except in full without prior approval of XTec Gen Laboratories"

Report number
250-3 AS 4654.1-2012

Issue Date
27/10/2023

Expiry Date
27/10/2026

TEST REPORT



WORLD RECOGNISED
ACCREDITATION

Accredited for compliance with ISO/IEC 17025 – Testing
20678

8	1.45	40.5	1.32	81
9	1.48	41.3	1.30	82
56 Day Means	1.45	41.1	1.32	82
56 Day Std Devs	0.02	0.5	0.02	1

Passing Requirement: *“Elongation at break shall not be less than 25% retention of elongation at break of the controls”.*

To pass this condition an elongation at break value of 56% or greater is required.

Result: 82% PASS

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Report number
250-3 AS 4654.1-2012

Issue Date
27/10/2023

Expiry Date
27/10/2026

TEST REPORT



WORLD RECOGNISED
ACCREDITATION

Accredited for compliance with ISO/IEC 17025 – Testing
20678

DURABILITY OF MEMBRANE

HEAT AGING

Date of test: 30/08/2023

Testing:

Test carried out in accordance with AS 4654.1 Table A4.

Additions, deviations and/or exclusions from AS 4654.1 Table A4:

Nil

Test Parameters:

PARAMETER	VALUE
Ambient temperature (conditioning)	24.0-25.8°C
Ambient humidity (conditioning)	47.3-49.0% RH
Ambient temperature (testing)	22.8°C
Ambient humidity (testing)	46.0% RH
Accuracy grading of test machine	A
Specimen type	Type 2
Elongation measurement type:	Electronic internal measurement
Method of preparation of specimens	Dry film supplied
Orientation of specimens to direction of cast	Parallel to direction of casting blade
Clamping device:	Pneumatic jaws
Testing speed:	50mm/min

Test Results:

Number of replicates	Sample thickness (mm)	Maximum Extension (mm)	Tensile strength (MPa)	Elongation at break (%)
1	1.42	85.1	2.05	170
2	1.31	79.7	2.01	159
3	1.35	79.8	2.00	159
Mean	1.36	81.5	2.02	163
Std Deviation	0.06	3.1	0.03	6

Passing Requirement: "Elongation at break shall be not less than 50% of the result recorded for the controls".

To pass this condition an elongation at break value of 111% or greater is required.

Result: 163% PASS

"This report shall not be reproduced except in full without prior approval of XTec Gen Laboratories"

Report number	Issue Date	Expiry Date
250-3 AS 4654.1-2012	27/10/2023	27/10/2026

TEST REPORT



WORLD RECOGNISED
ACCREDITATION

Accredited for compliance with ISO/IEC 17025 – Testing
20678

TEMPERATURE RESISTANCE

Date of test: 14-28/08/2023

Testing:

Test carried out in accordance with AS 4654.1 Clause 2.6.

Additions, deviations and/or exclusions from with AS 4654.1 Clause 2.6.

WVT rate carried out in accordance with ASTM E96 Desiccant Method after exposure.

Test Parameters:

PARAMETER	VALUE
Cold exposure: Immersion date	7/08/2023 09:00Hrs
Cold exposure: Removal date	9/08/2023 09:00Hrs
Cold exposure: Temperature range	-15.2 - -16.2°C
Heat exposure: Immersion date	9/08/2023 10:00Hrs
Heat exposure: Removal date	11/08/2023 10:00Hrs
Heat exposure: temperature range	85°C
WVT: Date of test	14-28/08/2023
WVT: Test temperature	23.6-25.4°C
WVT: Test humidity	45.4-51.6% RH
WVT: Cup design	Round, anodised aluminium cup with threaded sealing ring and gasket
WVT: Cup sealant	Sealing ring and gasket
WVT: Desiccant	Anhydrous Calcium Chloride

Test Results- Temperature Resistance

SAMPLE	THICKNESS (mm)	SIDE OF SPECIMEN HIGHER VAPOUR PRESSURE WAS APPLIED TO	REGRESSION		WATER VAPOUR TRANSMISSION RATE (g/m ² /24 hours)
			EQUATION	r ² VALUE	
1	1.26	Side A, top of cast film	Mass _(g) =0.0003x(Time _{hr})+167.36	0.9988	2.16
2	1.24	Side A, top of cast film	Mass _(g) = 0.0002x(Time _{hr})+164.24	0.9990	1.44

"This report shall not be reproduced except in full without prior approval of XTec Gen Laboratories"

Report number
250-3 AS 4654.1-2012

Issue Date
27/10/2023

Expiry Date
27/10/2026

TEST REPORT



WORLD RECOGNISED
ACCREDITATION

Accredited for compliance with ISO/IEC 17025 – Testing
20678

3	1.21	Side B, bottom of cast film	$\text{Mass}_{(g)} = 0.0003 \times (\text{Time}_{\text{hr}}) + 193.71$	0.9989	2.17
4	1.31	Side B, bottom of cast film	$\text{Mass}_{(g)} = 0.0003 \times (\text{Time}_{\text{hr}}) + 168.84$	0.9994	2.17
Mean					1.99
Std Deviation					0.36

Result 1.99g/m²/24 hours.

*"This report shall not be reproduced except in full without prior approval of XTec Gen
Laboratories"*

Report number
250-3 AS 4654.1-2012

Issue Date
27/10/2023

Expiry Date
27/10/2026

TEST REPORT



WORLD RECOGNISED
ACCREDITATION

Accredited for compliance with ISO/IEC 17025 – Testing
20678

WATER VAPOUR TRANSMISSION RATE

Date of test: 13-27/09/2023

Testing:

Test carried out in accordance with ASTM E96 Desiccant Method.

Additions, deviations and/or exclusions from ASTM E96 Desiccant Method:

Nil

Test Parameters:

PARAMETER	VALUE
Test temperature:	22.6-23.8°C
Test humidity:	47.8-53.4% RH
Cup design:	Round, anodised aluminium cup with threaded sealing ring and gasket
Sealant:	Sealing ring and gasket
Desiccant:	Anhydrous Calcium Chloride

Test Results

SAMPLE	THICKNESS (mm)	SIDE OF SPECIMEN HIGHER VAPOUR PRESSURE WAS APPLIED TO	REGRESSION		WATER VAPOUR TRANSMISS ON RATE (g/m ² /24 hours)
			EQUATION	r ² VALUE	
1	1.23	Side A, top of cast film	Mass _(g) = 0.0003x (Time _{hr})+170.11	0.9972	2.16
2	1.24	Side A, top of cast film	Mass _(g) = 0.0002x (Time _{hr})+194.47	0.9971	1.45
3	1.33	Side B, bottom of cast film	Mass _(g) = 0.0004x (Time _{hr})+193.43	0.9990	2.89
4	1.29	Side B, bottom of cast film	Mass _(g) = 0.0002x (Time _{hr})+169.23	0.9984	1.44
Mean	1.27				1.99
Std Deviation	0.05				0.69

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Laboratories"*

Report number
250-3 AS 4654.1-2012

Issue Date
27/10/2023

Expiry Date
27/10/2026

TEST REPORT



WORLD RECOGNISED
ACCREDITATION

Accredited for compliance with ISO/IEC 17025 – Testing
20678

Result: 1.99g/m²/24 hours.

END OF REPORT

*"This report shall not be reproduced except in full without prior approval of XTec Gen
Laboratories"*

Report number	Issue Date	Expiry Date
250-3 AS 4654.1-2012	27/10/2023	27/10/2026