TEST REPORT

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TEST SUMMARY

Objective

Assessment of Supplied Sample AS 4654.1-2012

Project

Assessment of ACTFLEX 929 SL to AS/NZS 4858:2004

Report Number

429-3 AS 4654.1-2012

Customer

NAME	**Forspec Protective Coatings**
ADDRESS	**22/872 Canterbury Rd, Roselands**
CONTACT PERSON	**James Gilto**
EMAIL	**info@forspec.com.au**
TELEPHONE	**02 8021 3517**

Name of test material

ACTFLEX 929 SL

Description of test material

Self-Levelling Polyurethane Membrane

Date of receipt of test material

24/02/2025

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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

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	Reviewer
Michael Bakanyozo	*Eric Scardigno*
Head Laboratory Technician	*Laboratory Manager*

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SUMMARY OF TESTS

AS4654.1 Requirements:

PROPERTY	METHOD	RESULT	ASSESSMENT CRITERIA	ASSESSMENT
Bond Strength	*ASTM C794*	***TBA***	*State result*	
Acceptance of Cyclic movement	*AS 4654.1 Appendix B*	***Failure not observed***	*AS 4654.1 Appendix B, Paragraph B4*	**PASS**
Durability: Control Elongation at Break	*AS1145.3*	***756%***	*AS 4654.1 Appendix A, Table A1*	**CLASS III**
Durability: Control Tensile Strength		***4.09MPa***	*State result*	
Durability: Water Immersion Elongation at Break	*AS 4654.1 Appendix A*	***673 %***	*AS 4654.1 Appendix A, Table A4*	**PASS**
Durability: Water Immersion Tensile Strength		***2.55 MPa***	*State result*	
Durability: Detergent Immersion Elongation at Break		***714 %***	*AS 4654.1 Appendix A, Table A4*	**PASS**
Durability: Detergent Immersion Tensile Strength		***2.75 MPa***	*State result*	
Durability: Heat Aging Elongation at Break	*N/A*	***739%***	*AS 4654.1 Appendix A, Table A4*	**PASS**
Durability: Heat Aging Tensile Strength		***4.50MPa***	*State result*	
Temperature Resistance	*AMTM004*	***5.24g/m²/24 hours***	*State result*	
Water Vapour Transmission	*ASTM E96*	***4.88g/m²/24 hours***	*State result*	

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BOND STRENGTH

Date of test: TBA

Testing

Testing carried out in accordance with ASTM C794.

Additions, deviations and/or exclusions from ASTM C794:

N/A

Specimen Preparation:

PARAMETER	VALUE
Substrate	-
Substrate preparation	-
Substrate primer	-
Mesh preparation	-
Mesh primer	-

Test Results:

READING	PEAK PEEL FORCE (N)	MODE OF FAILURE			
		SUBSTRATE FAILURE (%)	ADHESIVE FAILURE (%)	COHESIVE FAILURE (%)	SCREEN DELAMINATION (%)
Specimen 1 Reading 1		-	-	-	-
Specimen 1 Reading 2		-	-	-	-
Specimen 1 Reading 3		-	-	-	-
Specimen 1 Reading 4		-	-	-	-
Specimen 2 Reading 1		-	-	-	-

Specimen 2 Reading 2		-	-	-	-
Specimen 2 Reading 3		-	-	-	-
Specimen 2 Reading 4		-	-	-	-
Specimen 3 Reading 1		-	-	-	-
Specimen 3 Reading 2		-	-	-	-
Specimen 3 Reading 3		-	-	-	-
Specimen 3 Reading 4		-	-	-	-
Average					
Std Dev					

Result: TBA

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CYCLIC MOVEMENT

Date of test: 14-18/04/2025

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	III
Number of cycles	50
Cycle time	2 Hours
Cycle expansion	4 mm
Sample Size	65 mm x 25 mm
Sample span	2 mm between plates
Sample thickness	1.049mm

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	14/04/2025	0	☐Yes	☑No	
2	15/04/2025	11	☐Yes	☑No	
3	16/04/2025	23	☐Yes	☑No	
4	17/04/2024	33	☐Yes	☑No	
5	18/04/2025	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*

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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DURABILITY OF MEMBRANE

CONTROL SET

Date of test: 6/03/2025

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)	23.7-24.4°C
Ambient humidity (conditioning)	45.4-55.5%RH
Ambient temperature (testing)	23.8°C
Ambient humidity (testing)	53.0% 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:

Replicate	Sample thickness (mm)	Maximum Extension (mm)	Tensile Strength (MPa)	Elongation at Break (%)
1	1.109	420.9	4.97	842
2	1.149	383.0	3.94	766
3	1.122	366.5	3.71	733
4	0.992	360.2	3.81	720
5	0.984	359.6	4.03	719
Mean	1.07	378.0	4.09	756
Std Deviation	0.08	25.8	0.51	52

Requirement for Class III (high extensibility): ≥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 III

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DURABILITY OF MEMBRANE

WATER IMMERSION

Date of test: 24/03-12/05/2025

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)	23.7-24.4°C
Ambient humidity (conditioning)	45.4-55.5%RH
Ambient temperature (testing)	23.7-24.4°C
Ambient humidity (testing)	45.4-55.5%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	1.05	329.6	2.81	659
2	1.06	329.5	2.77	659
3	1.10	334.8	2.90	670
7 Day Means	1.07	331.3	2.83	663
7 Day Std Devs	0.02	3.1	0.07	6
4	1.15	352.3	2.63	705
5	1.12	364.6	2.93	729
6	1.18	340.4	2.55	681
28 Day Means	1.15	352.4	2.70	705
28 Day Std Devs	0.03	12.1	0.20	24
7	1.18	317.7	2.27	635

8	1.17	348.4	2.59	697
9	1.15	343.0	2.78	686
56 Day Means	1.17	336.3	2.55	673
56 Day Std Devs	0.01	16.4	0.25	33

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 190% or greater is required.

Result: 673% PASS

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DURABILITY OF MEMBRANE

DETERGENT IMMERSION

Date of test: 24/03-12/05/2025

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)	23.7-24.4°C
Ambient humidity (conditioning)	45.4-55.5%RH
Ambient temperature (testing)	23.7-24.4°C
Ambient humidity (testing)	45.4-55.5%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	1.03	299.2	2.36	598
2	1.02	306.0	2.50	612
3	1.02	300.4	2.51	601
7 Day Means	1.02	301.9	2.45	604
7 Day Std Devs	0.00	3.6	0.08	7
4	1.06	309.2	2.22	618
5	1.05	325.2	2.44	650
6	1.05	321.9	2.41	644
28 Day Means	1.05	318.8	2.36	637
28 Day Std Devs	0.01	8.4	0.12	17
7	1.09	366.0	2.77	732

8	1.14	343.7	2.52	687
9	1.11	362.2	2.96	724
56 Day Means	1.11	357.3	2.75	714
56 Day Std Devs	0.02	11.9	0.22	24

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 190% or greater is required.

Result: 714% PASS

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DURABILITY OF MEMBRANE

HEAT AGING

Date of test: 2/04/2025

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)	23.7-24.4°C
Ambient humidity (conditioning)	45.4-55.5%RH
Ambient temperature (testing)	24.0°C
Ambient humidity (testing)	41.4% 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	1.03	376.6	4.68	753
2	1.11	365.3	4.22	730
3	1.03	367.3	4.58	734
Mean	1.05	369.7	4.50	739
Std Deviation	0.05	6.0	0.24	12

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 379% or greater is required.

Result: 739% PASS

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TEMPERATURE RESISTANCE

Date of test: 31/03-14/04/2025

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	24/03/2025
Cold exposure: Removal date	26/03/2025
Cold exposure: Temperature range	-17.0 - -17.4°C
Heat exposure: Immersion date	26/03/2025
Heat exposure: Removal date	28/03/2025
Heat exposure: temperature range	85°C
WVT: Date of test	31/03-14/04/2025
WVT: Test temperature	23.7-24.1°C
WVT: Test humidity	45.4-51.4% RH
WVT: Cup design	Round cup with sealing flange
WVT: Cup sealant	Paraffin Wax
WVT: Desiccant	Anhydrous Calcium Chloride

Test Results- Temperature Resistance

SAMPLE	THICKNESS (mm)	SIDE OF SPECIMEN HIGHER VAPOUR PRESSURE WAS APPLIED TO	REGRESSION		WATER VAPOUR TRANSMISSON RATE ($g/m^2/24$ hours)
			EQUATION	r^2 VALUE	
1	1.12	Side A, top of cast film	$Mass_{(g)}=0.0007(Time_{hr})+173.88$	0.9998	5.06
2	1.19	Side A, top of cast film	$Mass_{(g)}=0.0007(Time_{hr})+173.0$	0.9998	5.06
3	1.09	Side B, bottom of cast film	$Mass_{(g)}=0.0007(Time_{hr})+172.7$	0.9998	5.06

4	0.99	Side B, bottom of cast film	$Mass_{(g)}=0.0008(Time_{hr})+171.25$	0.9997	5.79
Mean	1.10				5.24
Std Deviation	0.08				0.36

Result: 5.24 g/m^2/24 hours.

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WATER VAPOUR TRANSMISSION RATE

Date of test: 25/03-8/04/2025

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:	23.3-24.2°C
Test humidity:	48.4-51.4% RH
Cup design:	Round cup with sealing flange
Sealant:	Paraffin Wax
Desiccant:	Anhydrous Calcium Chloride

Test Results

SAMPLE	THICKNESS (mm)	SIDE OF SPECIMEN HIGHER VAPOUR PRESSURE WAS APPLIED TO	REGRESSION		WATER VAPOUR TRANSMISSON RATE (g/m^2/24 hours)
			EQUATION	r^2 VALUE	
1	1.10	Side A, top of cast film	$Mass_{(g)}$= 0.0007x($Time_{hr}$)+165.42	0.9992	5.05
2	1.07	Side A, bottom of cast film	$Mass_{(g)}$= 0.0007x($Time_{hr}$)+ 172.68	0.9992	5.06
3	1.15	Side B, top of cast film	$Mass_{(g)}$= 0.0007x($Time_{hr}$)+174.38	0.9992	5.06
4	1.19	Side B, bottom of cast film	$Mass_{(g)}$= 0.0006x($Time_{hr}$)+172.55	0.9992	4.34
Mean	1.13				4.88
Std Deviation	0.05				0.36

Result: 4.88 g/m^2/24 hours.

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END OF REPORT