TEST REPORT

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TEST SUMMARY

Objective

Assessment of Supplied Sample AS 4654.1-2012

Project

Assessment of Nitoproof 410 to AS 4654.1

Report Number

371-5 AS 4654.1-2012

Customer

NAME	Parchem Construction Supplies Pty Ltd
ADDRESS	1956 Dandenong Rd, Clayton Vic 3168
CONTACT PERSON	Phil Jones
EMAIL	Phil.jones@fosroc.co.nz
TELEPHONE	+64 21 833216

Name of test material

Nitoproof 410

Description of test material

2 Part liquid applied waterproofing membrane

Date of receipt of test material

19/09/2024

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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

Dried 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 Ma

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SUMMARY OF TESTS

AS4654.1 Requirements:

PROPERTY	METHOD	RESULT	ASSESSMENT CRITERIA	ASSESSMENT
Bond Strength	*ASTM C794*	***23.93 N***	*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*	***87 %***	*AS 4654.1 Appendix A, Table A1*	**CLASS II**
Durability: Control Tensile Strength		***1.16 MPa***	*State result*	
Durability: Water Immersion Elongation at Break	*AS 4654.1 Appendix A*	***109 %***	*AS 4654.1 Appendix A, Table A4*	**PASS**
Durability: Water Immersion Tensile Strength		***0.33 MPa***	*State result*	
Durability: Detergent Immersion Elongation at Break		***82 %***	*AS 4654.1 Appendix A, Table A4*	**PASS**
Durability: Detergent Immersion Tensile Strength		***0.29 MPa***	*State result*	
Durability: Heat Aging Elongation at Break	*N/A*	***102 %***	*AS 4654.1 Appendix A, Table A4*	**PASS**
Durability: Heat Aging Tensile Strength		***1.29 MPa***	*State result*	
Temperature Resistance	*AMTM004*	***3.61 g/m²/24 hours***	*State result*	
Water Vapour Transmission	*ASTM E96*	***3.80 g/m²/24 hours***	*State result*	

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BOND STRENGTH

Date of test: 20/11/2024

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, then primed
Substrate primer	Nitoprime 120
Mesh preparation	N/A
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	30.64	0	0	0	100
Specimen 1 Reading 2	27.81	0	0	0	100
Specimen 1 Reading 3	27.85	0	0	0	100
Specimen 1 Reading 4	25.03	0	0	0	100
Specimen 2 Reading 1	26.27	0	5	0	95

Specimen 2 Reading 2	17.28	0	80	0	20
Specimen 2 Reading 3	19.92	0	85	0	15
Specimen 2 Reading 4	22.14	0	80	0	20
Specimen 3 Reading 1	25.65	0	0	0	100
Specimen 3 Reading 2	20.50	0	0	0	100
Specimen 3 Reading 3	21.94	0	0	0	100
Specimen 3 Reading 4	22.11	0	0	0	100
Average	23.93				
Std Dev	3.90				

Result: 23.93N

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CYCLIC MOVEMENT

Date of test: 4/11-8/11/2024

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	0.93 mm
Sample Size	65 mm x 25 mm
Sample span	2 mm between plates
Sample thickness	1.047 mm

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	4/11/2024	0	☐Yes	☒No	
2	5/11/2024	13	☐Yes	☒No	
3	6/11/2024	24	☐Yes	☒No	
4	7/11/2024	35	☐Yes	☒No	
5	8/11/2024	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: 30/09/2024

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)	22.6-24.9°C
Ambient humidity (conditioning)	32.3-47.8%RH
Ambient temperature (testing)	23.0°C
Ambient humidity (testing)	40.4% 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:

Replicate	Sample thickness (mm)	Maximum Extension (mm)	Tensile Strength (MPa)	Elongation at Break (%)
1	1.36	45.1	1.13	90
2	1.35	53.5	1.22	107
3	1.313	46.6	1.21	93
4	1.284	32.7	1.17	65
5	1.213	38.4	1.10	77
Mean	1.30	43.3	1.16	87
Std Deviation	0.06	8.0	0.05	16

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 II

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DURABILITY OF MEMBRANE

WATER IMMERSION

Date of test: 8/10-26/11/2024

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)	22.6-24.9°C
Ambient humidity (conditioning)	32.3-47.8%RH
Ambient temperature (testing)	22.7-24.9°C
Ambient humidity (testing)	32.2-65.8% 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 Provided
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	1.37	57.7	0.37	115
2	1.36	53.3	0.39	107
3	1.33	56.0	0.38	112
7 Day Means	1.35	55.6	0.38	111
7 Day Std Devs	0.02	2.2	0.01	4
4	1.47	50.8	0.37	102
5	1.52	43.3	0.38	87
6	1.48	53.7	0.35	107
28 Day Means	1.49	49.3	0.37	99
28 Day Std Devs	0.03	5.4	0.02	11
7	1.43	49.6	0.30	99

8	1.25	60.5	0.34	121
9	1.38	53.4	0.35	107
56 Day Means	1.35	54.5	0.33	109
56 Day Std Devs	0.10	5.5	0.03	11

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 22% or greater is required.

Result: 109% PASS

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DURABILITY OF MEMBRANE

DETERGENT IMMERSION

Date of test: 8/10-26/11/2024

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)	22.6-24.9°C
Ambient humidity (conditioning)	32.3-47.8%RH
Ambient temperature (testing)	22.7-24.9°C
Ambient humidity (testing)	32.2-65.8% 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 provided
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	1.22	89.1	0.37	178
2	1.27	89.1	0.37	178
3	1.31	99.2	0.37	198
7 Day Means	1.27	92.5	0.37	185
7 Day Std Devs	0.04	5.9	0.00	12
4	1.29	61.7	0.35	123
5	1.18	68.0	0.31	136
6	1.30	68.4	0.31	137
28 Day Means	1.26	66.0	0.32	132
28 Day Std Devs	0.07	3.7	0.02	7
7	1.49	34.1	0.28	68

8	1.33	46.7	0.31	93
9	1.43	42.1	0.29	84
56 Day Means	1.42	41.0	0.29	82
56 Day Std Devs	0.08	6.4	0.02	13

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 22% or greater is required.

Result: 82% PASS

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DURABILITY OF MEMBRANE

HEAT AGING

Date of test: 16/10/2024

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)	22.6-24.9°C
Ambient humidity (conditioning)	32.3-47.8%RH
Ambient temperature (testing)	24.7°C
Ambient humidity (testing)	46.7% RH
Accuracy grading of test machine	A
Specimen type	Type 2
Elongation measurement type:	Electronic internal measurement
Method of preparation of specimens	Dry film provided
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	1.27	48.5	1.32	97
2	1.20	50.0	1.32	100
3	1.24	54.5	1.23	109
Mean	1.24	51.0	1.29	102
Std Deviation	0.04	3.2	0.05	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 44% or greater is required.

Result: 105% PASS

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TEMPERATURE RESISTANCE

Date of test: 8/10-22/10-2024

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	30/09/2024 09:00Hrs
Cold exposure: Removal date	2/10/2024 09:00Hrs
Cold exposure: Temperature range	-16.0- -16.1°C
Heat exposure: Immersion date	2/10/2024 10:00Hrs
Heat exposure: Removal date	4/10/2024 10:00Hrs
Heat exposure: temperature range	85°C
WVT: Date of test	8/10-22/10-2024
WVT: Test temperature	23.1-25.0°C
WVT: Test humidity	41.6-54.0% RH
WVT: Cup design	Round, anodised aluminium cup
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	1.23	Side A, top of cast film	$Mass_{(g)}=0.0005(Time_{hr})+163.15$	0.9979	3.60
2	1.24	Side A, top of cast film	$Mass_{(g)}=0.0005(Time_{hr})+164.99$	0.9977	3.61
3	1.36	Side B, bottom of cast film	$Mass_{(g)}=0.0005(Time_{hr})+164.71$	0.9980	3.62

4	1.20	Side B, bottom of cast film	$Mass_{(g)}=0.0005(Time_{hr})+160.2$	0.998	3.60
Mean	1.26				3.61
Std Deviation	0.07				0.01

Result: 3.61 g/m^2/24 hours.

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WATER VAPOUR TRANSMISSION RATE

Date of test: 10/10-24/10/2024

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:	23.2-25.3°C
Test humidity:	40.0-46.3% RH
Cup design:	Round, anodised aluminium cup
Sealant:	Paraffin Wax
Desiccant:	Anhydrous Calcium Chloride

Test Results

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	$Mass_{(g)}=0.0006(Time_{hr})+187.97$	0.9991	4.34
2	1.23	Side A, top of cast film	$Mass_{(g)}=0.0005(Time_{hr})+188.06$	0.9987	3.62
3	1.22	Side B, bottom of cast film	$Mass_{(g)}=0.0005(Time_{hr})+187.80$	0.9986	3.61
4	1.17	Side B, bottom of cast film	$Mass_{(g)}=0.0005(Time_{hr})+187.71$	0.9982	3.61
Mean	1.22				3.80
Std Deviation	0.04				0.36

Result: 3.80 g/m^2/24 hours.

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END OF REPORT