Assessment of Proofex Torchseal A825 to AS 4654.1:2012 Waterproofing membranes for external above-ground use Part 1: Materials

Client
Parchem Construction Supplies Pty Ltd
1956 Dandenong Rd
Clayton
VIC 3168
Australia

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TERM OF VALIDITY

This CSIRO Wet Area Membranes 1st revalidation report will retain validity to 19/12/2027.

Revalidation/reassessment is required to extend conformity beyond this date.

Commercial-in-confidence

Report Status and Revision History

VERSION	STATUS	DATE	DISTRIBUTION	COMMENT
Revision A	Final	20 December 2024	CSIRO, Parchem Construction Supplies Pty Ltd	
Revision B	Final	19 November 2025	CSIRO, Parchem Construction Supplies Pty Ltd	Typographical error in membrane type on summary of results page 6 (non-exposed); corrected to 'exposed'.

This report replaces the previous version

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The results reported herein relate only to the item(s) tested.

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Summary

Test Standard: Testing was conducted on a waterproofing membrane for external above-ground use with fully bonded membrane Sheet Exposed - Non-Trafficable to assess its performance for: water vapour transmission; water absorption; acceptance of cycle movement; durability; abrasion resistance, bond strength, thickness and dimensional stability. The external waterproofing membranes properties were tested in accordance with the Australian Standard AS4654.1:2012.

All methods were carried out according to Tables 2.1 under fully bonded membrane sheet, exposed against the performance criteria of Tables A1, A3 and A4.

Test results: The waterproofing membrane presented for testing complied with the performance criteria set in AS4654.1:2012 waterproofing membrane for external above-ground, exposed, non-trafficable. The following table shows the Proofex Torchseal A825 performance as assessed from testing.

TABLE 1 SUMMARY OF TEST REQUIREMENTS AND TEST SPECIMEN RESULTS FOR AS4654.1:2012

TEST	METHOD	REQUIREMENTS	RESULT	STATUS
(a) Moisture Transmission Rate	ASTM E 96 Desiccant method for Determining Water Vapour Transmission (WVT)	State result	WVT 0.57 g/m^2/24hrs Permeance 5.63 ng/Pa.s.m^2	Complied
(b) Acceptance of movement	AS AS4654.1 Appendix B for assessment of cyclic movement of membrane	Pass or fail criteria by observing any cracking, rupture holing or extending through the thickness for more than 1 mm in from the edge of the specimen.	Class I	Complied
(c) Abrasion resistance **2.3.1 non-trafficable**	AS 1580.403.2.1-2006 Paints and related materials	Areas subjected only to maintenance access; the depth of abrasion shall be less than 0.2mm.	0.18mm	Non-trafficable
(d) Durability **1. Control(1ST revalidation)** **2. Control** **3. Water immersion** **4. Detergent immersion** **5. Heat ageing at 80°C** **6. Ultraviolet resistance** **7. Temperature resistance at -15°C to +85°C**	AS4654.1 Appendix A for assessment of membranes durability AS4654.2 temperature resistance section 2.4.2 (c)	Pass or fail criteria; compared to control samples: elongation at break shall be not less than 25 % for water and detergent immersion. Whereas elongation at break shall be not less than 50 % for heat ageing samples. Elongation at break shall be not less than 40 % for UV samples.	1. Class I 2. Class I 3. Class I 4. Class I 5. Class I 6. Class I 7. Class I	Complied
(e) Bond strength to concrete substrate	ASTM C794 Standard test method for adhesion-in-peel of elastomeric joint sealants	Test samples exposed to dry conditions, then tested for adhesion-in-peel strength.	35.31 N with 100% cohesive failure loss for concrete.	Complied
(f) Membrane thickness	AS/NZS 4347.9:1995 (Reconfirmed) 2014 Damp-proof courses and flashings.	The film thickness shall be measured at a minimum of five points and a maximum of 10 points, equally spaced across the strip	3.42mm	Complied
(g) Dimensional stability of fabrics to changes in humidity and temperature	ASTM D6207-03(2019)	State result	Remains the same	Complied

Note: The above is only a summary of the overall results and must be read in conjunction with the relevant sections of this report.

SUMMARY OF RESULTS

AS 4654.1:2012 Waterproofing membranes for external above-ground use, exposed:

Appendix A: Assessment of Durability of waterproof membranes

Test Report No.	**8360**	**SW8572(1st Revalidation)**	
Year of test	2020	2024	
Control	25%(**Class I**)	23%(**Class I)**	
Water Immersion	32%		PASS
Detergent Immersion	29%		PASS
Heat Ageing @ 80 ºC	25%		PASS
Ultraviolet resistance@1000hrs	21%		PASS
Temperature Resistance	22% @-15°C		PASS
	14% @+85°C		PASS

Parchem Construction Supplies Pty Ltd , The Proofex Torchseal A825– applied bituminous Waterproofing Membrane achieves the performance requirements of AS 4654.1:2012 Waterproofing membranes for external above-ground use, Exposed - Non-Trafficable, Class I membrane installation.
Appendix B: Assessment of resistance of waterproofing membranes to cyclic movement

Pass or fail criteria by observing any cracking, rupture holing or extending through the thickness for more than 1 mm in from the edge of the specimen.

Result:	No fatigue cracking exhibited.	PASS

ASTM E96: Water Vapour Transmission of Materials

Result	0.57 g/m²/24	PASS
AS 4347.9:2002	**Thickness**	3.42mm
ASTM C794:2015	**Bond Strength** – Concrete	35.31N

ASTM D6207-03 (2019) Standard Test Method for Dimensional Stability of Fabrics to Changes in Humidity and Temperature : No signs of discoloration, bubbling or curling of the specimens recorded. **PASS**

Note: The above is only a summary of the overall results and must be read in conjunction with the relevant sections of this report.

Introduction

CSIRO Services was engaged by Parchem Construction Supplies Pty Ltd to assess a waterproofing membrane for compliance against the AS4654.1:2012 according to Table 2.1 under fully bonded membrane sheet, exposed non-trafficable with compliance confirmed against the performance criteria of Tables A1, A3 and A4. The details for this assessment are listed in Table 3 below.

TABLE 2 DETAILS OF SUBMITTED TEST SPECIMEN

CSIRO Job Number.:	SW8572
TEST SPONSOR:	Parchem Construction Supplies Pty Ltd
PRODUCT DESCRIPTION:	Proofex Torchseal A825

Note: CSIRO accepts no responsibility for the selection of specimens. The results in this report apply to the specimens tested and may not be applicable to other specimens of the same product.

This report details the performance, testing conditions and outcomes of the specimen assessed in accordance with waterproofing membrane system for exterior use - above ground level. Table 3 details the sponsor's specified schedule of tests for the product.

TABLE 3 DETAILS OF THE SCHEDULE FOR TESTING OF THE SUBMITTED SPECIMEN

CSIRO Job Number.:	SW8572
TEST SCHEDULE:	AS4654.1 Clause A2, A4 Tables A1, A3 & A4: a) Moisture vapour transmission rate - ASTM Designation E96/E96M – 16, 'Standard Test Methods for Water Vapour Transmission'; b) Acceptance of cyclic movement; Appendix B 'Assessment of resistance of waterproofing membranes to cyclic movement'; c) Abrasion resistance AS 1580.403.2.1-2006 Paints and related materials; d) Durability - Appendix A 'Assessment of durability of waterproofing membranes: Table A4 (a) Controls (1ST revalidation). Table A4 (b) Water immersion Table A4 (c) Detergent immersion Table A1 & A4 (d) Heat aging at 80°C Table A1 & A4 (f) Ultraviolet resistance at 1000h of exposure (e) Temperature resistance at -15°C to +85°C e) Bond strength to concrete substrate - ASTM C794:2018 Standard test method for adhesion-in-peel of elastomeric joint sealants. f) Membrane thickness – AS/NZS 4347.9:1995 (Reconfirmed) 2014 Damp-proof courses and flashings. g) Dimensional stability of fabrics to changes in humidity and temperature - ASTM D6207-03(2019).

Test specimen description

The Proofex Torchseal A825 supplied by Parchem Construction Supplies Pty Ltd is manufactured by co-extrusion of an Elastoplast Meric bitumen-polymer compound and a nonwoven polyester reinforcement. The lower face of the membrane is manufactured with a sacrificial polyethylene film which prevents sticking when the membrane is in storage. Proofex Torchseal A825 has the upper face self-protected with a layer of grey slate granules. A side selvedge is provided along one edge of the roll to allow for adequate heat welding of the side laps.

Test specimen as received 218 mm wide, 300 mm length and 3.41 mm thick.

The supplied specimen for assessment is shown below in Figures 1 and 2.

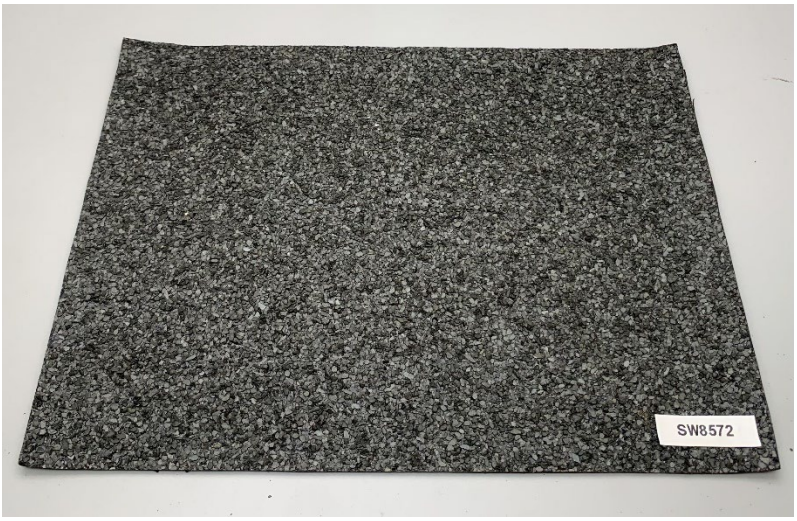


FIGURE 1 TOP FACE OF PROOFEX TORCHSEAL A825



FIGURE 2 UNDERSIDE OF PROOFEX TORCHSEAL A825

Test Methodology

ASTM E96/E96M – 16 Water Vapour Transmission of materials

This Standard outlines the method for determining water vapour transmission (WVT) through the membrane using the desiccant and dummy sample method.

Four test samples were prepared by mechanical sealed using two neoprenes and a Teflon gasket placed onto the open side of the test cups. The test cups contain dried desiccant with the trafficable side facing up were placed in a climate-controlled environment with periodic weighing so that the rate of water vapour movement through the membrane to the desiccant can be determined.

The exposed area (test dish face) for each of the cups was 0.002827 m^2. The test cups (all except the dummy sample, no desiccant) had a 6 mm gap between the desiccant and the underside of the membrane.

All test assemblies were kept in a Steridium environmental where chamber temperature humidity are maintained at a temperature of 23 ±2°C and 60 ±5% relative humidity, for the 46 days duration. Measurements taken each afternoon (excluding weekends) over this period to determine the weight change and permeance of the membrane.

AS4654.1-2012 Appendix B Resistance to cyclic movement

This Standard outlines the method for determining resistance of membrane to cyclic movement set at maximum strain used for the cycling shall be 4mm of extension.

A rectangular test sample of 65 mm x 25 mm x 4.52 mm was cut from the Proofex Torchseal A825, then held in the test grips (70(w) x 45(l) x 20(t) mm), exposing a 25 x 2 mm central portion of the sample.

An Applied Test Systems Series 904 Vertical Sealant Tester (ERM.030.045) was used for testing. The vertical sealant testing machine used software for cyclic movement control. The vertical testing machine was set to elongate the clamped test sample for the cycling is 4 mm extension. Once the test piece reached full extension, it then returned to its original position, which completed one cycle of movement. The elongation and return was then repeated to complete a 50 cycle movement test, each cycle conducted over a nominal 2 hour period.

The test sample was inspected for signs of breakage or cracks and measured for any necking. A reduction in width of more than 1 mm inwards from the edge of the test sample constitutes a failure.

AS 1580.403.2-2006 Paints and related materials – methods of test: Abrasion resistance

This Standard outlines the method for determining the abrasion resistance for non-trafficable of the exposed membrane when tested in accordance with AS 1580.403.2 using the CS-10 wheel with 500 cycles.

Two supplied square test panels of 100 mm x 100 mm x 3.412 mm plain low carbon steel with Proofex Torchseal A825 coated on top. Samples were kept in a conditioning room maintained at a temperature of 23 ±2°C and 60 ±5% relative humidity, for the minimum of 24h duration. After the completion of this exposure period the samples, a hole shall be drilled in the centre of each panel to enable it to be held securely in position on the Taber 5155 abrader. Each panel were wiped dry and then weighed (g) and recorded thickness (mm) before and after 500 cycles, determining the mass loss and depth thickness.

AS 4654.1-2012 Appendix A Durability of membrane and Temperature Resistance

This Standard outlines the method for determining resistance of the membrane's durability after conditioning in various solutions over set periods, then assessed against an unconditioned material.

Testing of the Proofex Torchseal A825 was in accordance with Appendix A4.2 Durability of membranes. As specified in A2.2.1 the membrane test samples were prepared in accordance with AS 1145.3-2001, Type 2, strip samples 10mm width with a 50mm gauge length. Test samples were exposed and conditioned to those requirements specified in Table A1, A4 & Temperature Resistance of AS4654.1-2012.

In accordance with A4.2.2.2 Testing, Instron 5585H (ERM.030.043) testing machine, fitted with a calibrated 5kN load cell, was used to record the elongation at break and tensile strength. The test rate of 50 mm/min used for testing elongation at break of the immersed test samples were compared to the control test samples.

ASTM C794:2018 Standard test method for adhesion-in-peel of elastomeric joint sealants

This modified test method consists of preparing four strip test specimens of 25mm width and 250mm in length of Proofex Torchseal A825 on to the surface of concrete substrate. All adhesion-in-peel test specimens were prepared by the manufacturer per ASTM C794:2018 procedure. After delivered to the laboratory, all test specimens were kept in a conditioning room maintained at a temperature of 23 ±2°C and 60 ±5% relative humidity, for the 21 days duration. Then the specimens were placed in a tension-testing machine in such a way the test sample is peeled back from the substrates at 180° to the face of the sample. The exerted force was measured as well as the mode of failure of the membrane from both substrates at the test rate of 50mm/min for 1 minute.

AS/NZS 4347.9:1995 (Reconfirmed) 2014 Damp-proof courses and flashings— Methods of test, Method 9: Determining thickness

This Standard sets out a means to determining the thickness of Proofex Torchseal A825. All three rectangular test strips of 300 mm x 50 mm was cut across middle width of supplied sheets. The sheet thickness measured a three points, equally spaced across the strip. The specimens were tested in a conditioning room maintained at a temperature of 23 ±2°C and 60 ±5% relative humidity.

ASTM D6207-03 (2019) Standard Test Method for Dimensional Stability of Fabrics to Changes in Humidity and Temperature

This Standard sets out a means to measured dimensional change (growth and shrinkage) data is collected for a specimen of fabric that is subjected to controlled cycles of specified relative humidity and temperature conditions. After delivered to the laboratory, cut two test specimens each 150 by 1000 ± 6 mm, one cut in the lengthwise direction of the roll, and one cut in the width wise direction of the roll. Position and clamp length and width test specimens in the specimen frame with a weight spring clamp mass of 100 ± 5 g, one per specimen, to create a uniformly distributed force across the specimen width dimension of 1.00 ± 0.005N. Place the prepared precondition the specimens for 24hrs at 15 ±5 % RH and 32 ±2°C in calibrated test chamber Thermoline L+M (ERF.016.001) in vertical position. Then carrying out the cycle 1 and cycle 2 in accordance to the clause 10 test procedure.

Results

ATSM E96/E96M - 16 Water Vapour Transmission of materials

The periodic measurements of the membrane test samples were recorded as shown in Table 4, below.

Date of test: 22 February 2021 – 09 April 2021

TABLE 4 WATER VAPOUR TRANSMISSION TEST RESULTS

Product	Samples	Weight change	Water Vapour Transmission	Permeance
		G/t = g / s	(G/t)/A = g / m^2 24hr	WVT/S(R1-R2) = ng/Pa.s.m^2
Proofex Torchseal A825	8360/57 8360/58 8360/59	2.5 x 10^{-8} 2.0 x 10^{-8} 3.5 x 10^{-8}	0.61 0.43 0.67	5.28 4.22 7.39
	Average	6.5 x 10^{-8}	**0.57**	**5.63**

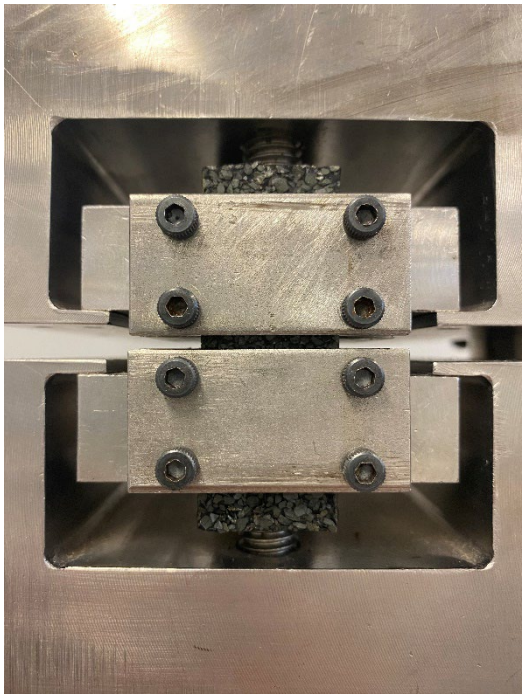
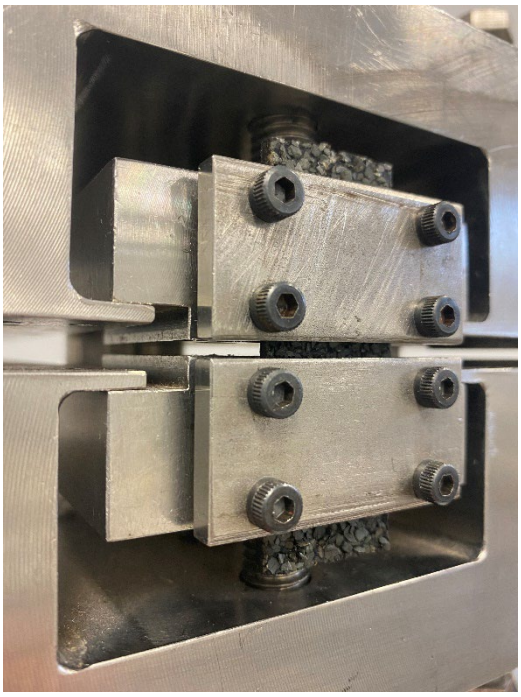
The performance criteria set out in AS4654.1 – 2012, Table A3 to record result, specifies a water vapour transmission rate shall determine if material is a moisture suppressant coating.

AS 4654.1:2012 Appendix B Resistance of waterproofing membranes to cyclic movement

The test result for cyclic movement of the waterproofing membrane test sample is shown in Table 5 below. The test sample completed 50 cycles for the nominal 2 hour period.

Date of test: 29 March 2021 – 01 April 2021

TABLE 5 TEST SAMPLE HOLING DURING CYCLIC MOVEMENT AND TEST RESULTS

Specimen:	Proofex Torchseal A825
Test sample and elongation at break:	Test sample 65 (l) mm x 25 (w) mm x 3.38 (t) mm section; Maximum strain used for the cycling shall be 50% the elongation at break – Class I.
Clamped test sample of cyclic test:	 
Observation and measurement:	Observations: At test completion the specimen showed no signs of rupture holing or cracking.

The performance criteria set out in AS4654.1:2012, Table A3 and section B4, pass or fail criteria by observing any cracking, rupture or necking of more than 1 mm down from original width.

AS 1580.403.2.1-2006 Paints and related materials – methods of test: Abrasion resistance

The test result for abrasion resistance using abrader wheels CS10 on the waterproofing membrane test sample is shown in Table 6 below. The test sample completed 500 cycles.

Date of test: 28 July 2021

TABLE 6 ABRASION RESISTANCE TEST RESULTS

Proofex Torchseal A825	Specimen No.: 8360/61 Thickness (mm)			Specimen No.: 8360/62 Thickness (mm)		
Test Point	Pre Taber	Post Taber	Loss	Pre Taber	Post Taber	Loss
1	3.446	3.286	0.160	3.076	2.947	0.129
2	3.223	3.078	0.145	2.987	2.847	0.140
3	3.441	3.273	0.168	2.975	2.786	0.189
4	3.388	3.153	0.235	3.130	2.940	0.190
5	3.446	3.288	0.158	3.178	2.961	0.217
6	3.099	2.889	0.210	3.293	3.101	0.192
7	3.092	2.877	0.215	3.091	2.934	0.157
8	3.360	3.186	0.174	2.963	2.758	0.205
Average			0.183			0.177
Mean loss	**0.18**					

The performance criteria set out in AS4654.1:2012 section 2.3.1 Non-trafficable.

Areas subjected only to maintenance access, the depth of abrasion shall be less than 0.2mm.

AS 4654.1:2012 Appendix A Durability of membrane

The tensile strength and elongation at break were recorded for the control and immersed test samples. Criteria for pass or failure of the immersed test samples were then compared to the control samples. AS 4654.1:2012 Table A2 joint movement bond breaker was also referenced in Table 7, below.

Date of test: 12 February 2021, 18 February 2021, 08 – 11 March 2021, 08 - 09 April 2021 and 19 May 2021.

Date of Revalidation test for Control : 12/12/2024.

TABLE 7 DURABILITY TEST RESULTS

Proofex Torchseal A825			Tensile Strength and Elongation		
Control samples	Break Force (N)	Thickness (mm)	Tensile strength (F/A) (MPa)	Elongation at break (mm) & (%)	Passed/Failed
SW8572/01	89.63	3.43	2.61	9.88 & 20	
SW8572/02	48.00	3.38	1.42	10.07 & 20	
SW8572/03	50.71	3.46	1.47	10.36 & 21	
SW8572/04	45.97	3.43	1.34	12.40 & 25	
SW8572/05	88.05	3.34	2.64	13.79 & 28	
Average	64.47	3.41	1.90	11.30 & 23	
Tensile Strength	**64.47**	**3.41**	**1.90**	**11.30 & 23**	**Class I**
8360/01	77.58	3.39	2.29	11.26 & 23	-
8360/02	88.36	3.40	2.60	12.11 & 24	-
8360/03	71.91	3.40	2.11	10.46 & 21	-
8360/04	89.86	3.41	2.64	16.57 & 33	-
8360/05	86.11	3.40	2.53	11.33 & 23	-
Average	82.76	3.40	2.43	12.35 & 25	-
Tensile Strength	**82.76**	**3.40**	**2.43**	**12.35 & 25**	-
Water Immersion	Average (N)		Average (MPa)	Average (mm) & (%)	-
7 day period	38.07	3.36	1.13	9.44 & 19	Passed*
28 day period	44.74	3.33	1.34	18.08 & 36	Passed*
56 day period	45.46	3.33	1.36	16.22 & 32	Passed*
Detergent Immersion	Average (N)		Average (MPa)	Average (mm) & (%)	-
7 day period	39.72	3.37	1.18	8.21 & 16	Passed*
28 day period	44.33	3.39	1.31	14.41 & 29	Passed*
56 day period	38.47	3.38	1.14	14.30 & 29	Passed*
Heat Ageing @ 80°C	Average (N)		Average (MPa)	Average (mm) & (%)	-
14 day period	52.91	3.40	1.56	12.62 & 25	Passed**
Ultraviolet resistance	Average (N)		Average (MPa)	Average (mm) & (%)	-
1000h of exposure	56.43	3.39	1.67	10.42 & 21	Passed***
Temperature Resistance	Average (N)		Average (MPa)	Average (mm) & (%)	
7 Days @-15°C	54.76	3.44	1.59	11.22 & 22	Passed*
7 Days @+85°C	58.69	3.41	1.61	7.08 & 14	Passed*

Table A4: Pass / Fail and Criteria compared with control samples		*Passed – Elongation at break was above the 25% limit; and all immersed samples were above the 25% criteria for elongation at break Control samples. Class I of Table A1. ** Passed – Elongation at break for heat ageing at 80°C shall be not less than 50% of the results recorded for the controls. *** Passed – Elongation at break for ultraviolet resistance shall be not less than 40% of the results recorded for the controls. UV test specimen unchanged colour after 1000hrs exposed.
The performance criteria set out in AS 4654.1:2012, Table A4 specifies a comparison of the immersed test samples to the unconditioned (control) test samples shall be greater than 25% elongation at break.		

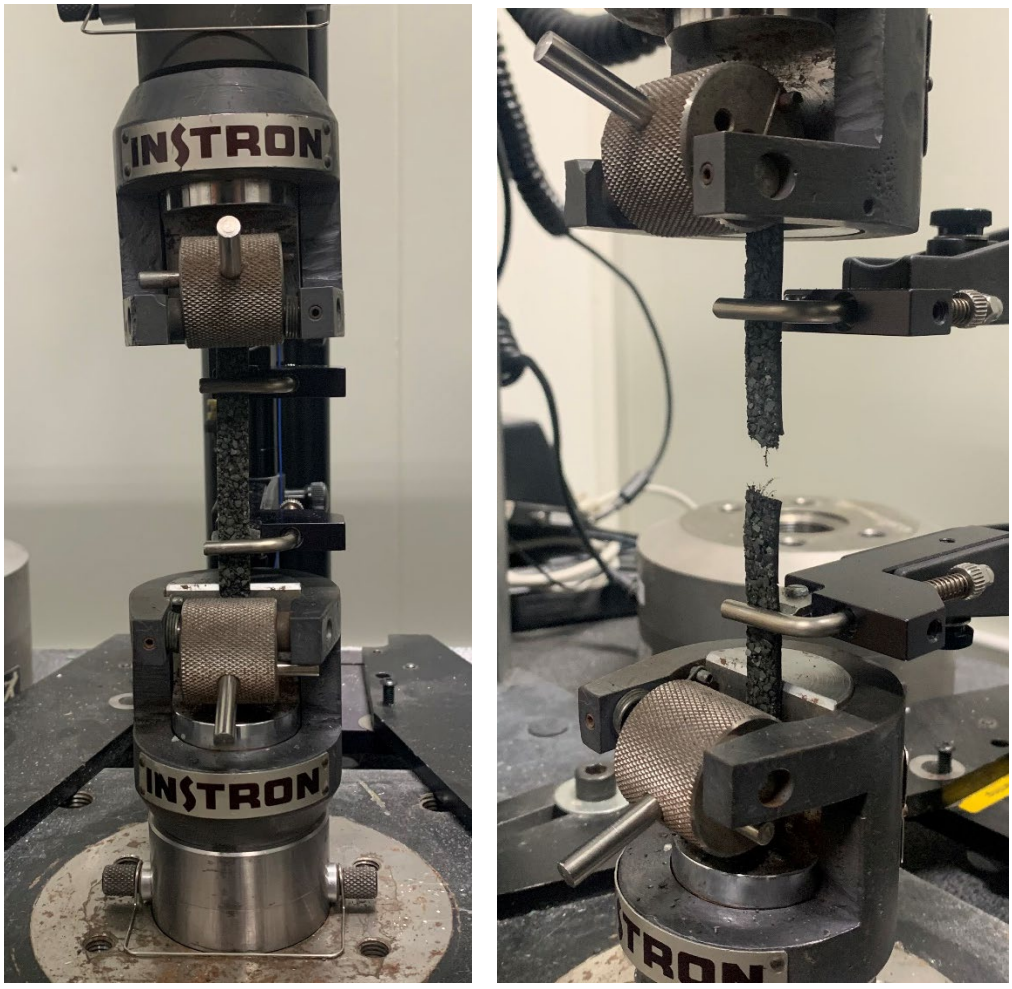


FIGURE 3 IMAGES OF TEST SAMPLE PERFORMING DURABILITY LOAD / ELONGATION TEST

ASTM C794:2018 Standard test method for adhesion-in-peel of elastomeric joint sealants

The measured dimensions of the test samples placed in the test rig stand are shown in Table 8, below.

Date of test: 06 July 2021 – 27 July 2021

TABLE 8 ADHESION-IN-PEEL STRENGTH TESTS RESULTS

Product	Samples	Length and Width of test samples	Concrete	
			Peel Adhesion strength in Dry condition	Cohesive Failure Loss
		mm	N	%
Proofex Torchseal A825	8360/63 8360/64 8360/65 8360/66	25x250 25x250 25x250 25x250	27.39 31.64 33.55 48.65	100 100 100 100
			Average = 35.31 N	100%

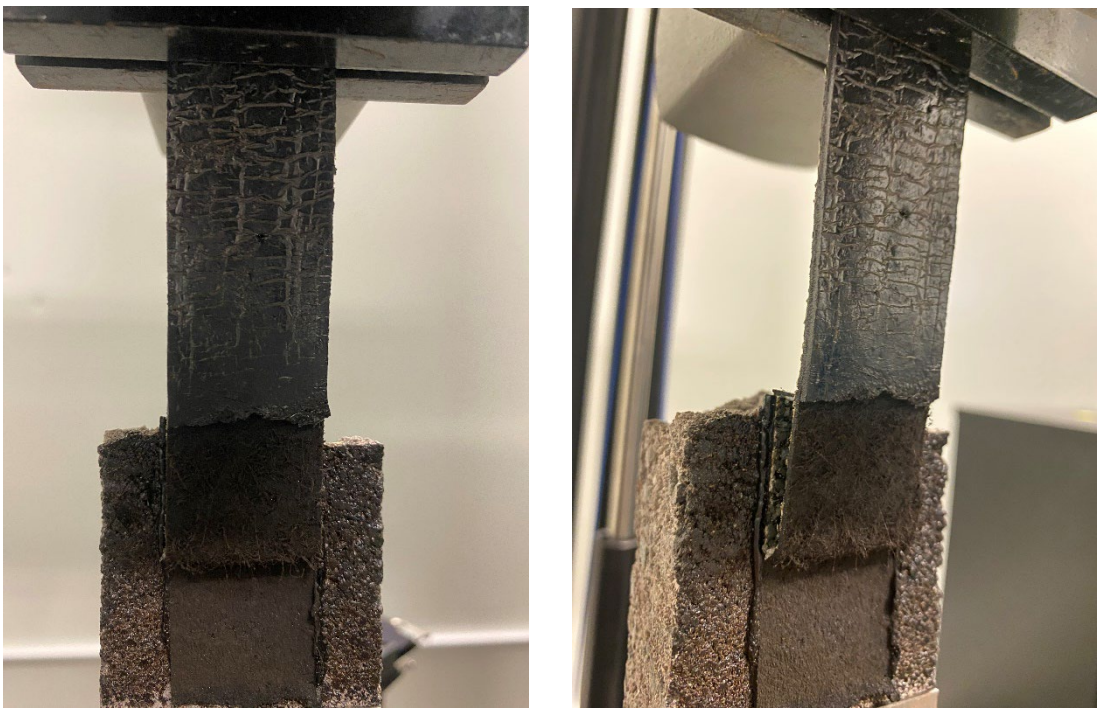


FIGURE 4 IMAGES OF TEST SAMPLE PERFORMING ADHESION-IN-PEEL

AS/NZS 4347.9:1995 (Reconfirmed) 2014 Damp-proof courses and flashings—Methods of test, Method 9: Determining thickness

The sheet thickness measured a three points, equally spaced across the strip. The specimens tested in a conditioning room maintained at a temperature of 23 ±2°C and 60 ±5% relative humidity are shown in Table 9, below.

Date of test: 09th February 2021

TABLE 9 DETERMINING THICKNESS TEST RESULTS

Product	Samples	Length and Width of test samples	Thickness
		mm	mm
Proofex Torchseal A825	8360/58	300 x 50	3.47
	8360/58	300 x 50	3.35
	8360/58	300 x 50	3.34
	8360/59	300 x 50	3.43
	8360/59	300 x 50	3.46
	8360/59	300 x 50	3.41
	8360/60	300 x 50	3.49
	8360/60	300 x 50	3.45
	8360/60	300 x 50	3.42
		Average	3.42

ASTM D6207-03 (2019) Standard Test Method for Dimensional Stability of Fabrics to Changes in Humidity and Temperature

All test specimens precondition for 24hrs at 15 ±5 % RH and 32 ±2°C then subjected to controlled cycles of specified relative humidity and temperature conditions are shown in Table 10, below.

Date of test: 18th August 2021 – 20th August 2021

TABLE 10 DETERMINING DIMENSIONAL STABILITY TEST RESULTS

				CYCLE 1				CYCLE 2			
Specimen No.:	Cut directions	Initial Pointer Setting (mm)		Pointer Reading at 95% RH & 20°C (mm)		Pointer Reading at 15% RH & 32°C (mm)		Pointer Reading at 95% RH & 20°C (mm)		Pointer Reading at 15% RH & 32°C (mm)	
		L	R	L	R	L	R	L	R	L	R
8360/67	WIDTHWISE	123	120	123	120	123	120	123	120	123	120
8360/68	LENGTHWISE	127	130	127	130	127	130	127	130	127	130

Observations:

At test completion the specimen showed no signs of discoloration, bubbling or curling of the specimens recorded. The test specimens were tested as directed in this test method and remains the same when subjected to a specified range of humidity and temperature conditions.

Comments

The Proofex Torchseal A825, as described herein, when subjected to the test methods of AS 4654.1:2012 the properties of (a) moisture vapour transmission, (b) cyclic movement (Class I), (c) abrasion resistance, (d) durability (Class I), (e) Bond strength to concrete substrate (f) membrane thickness and (g) dimensional stability met the performance criteria to AS 4654.1:2012 Waterproofing membranes for external above-ground use Part 1: Materials.

- 1ST Revalidation performed for the Control, and Average value of Elongation at break was 23% - Class I.

Prepared on behalf of CSIRO by:

	Author	**Reviewer**
Name	Ahmed Menisi	Ms Money Arora
Position	Technical Officer- Materials Performance	Team leader- Materials Performance
Date	19 November 2025	19 November 2025





CSIRO Science Connect

Infrastructure Technologies

Materials Performance

Gate 5, 2 Normanby Road

CLAYTON, VIC

AUSTRALIA 3168

Ph.: +61 (0)3 9545 8774

Web: https://www.csiro.au/

Fax: +61 (0)3 9544 1128

End of report