

TECHNICAL REPORT

Title: Wind performance testing of 3mm Composite panels for Newbrel Limited.

Report No: N950-25-18940

Technical Report

Title: Wind performance testing of 3mm composite panels for Newbrel Limited.

Customer: Newbrel Limited,
Gainford Drive, Halesowen Industrial Park, Halesowen, West Midlands B62 8BQ

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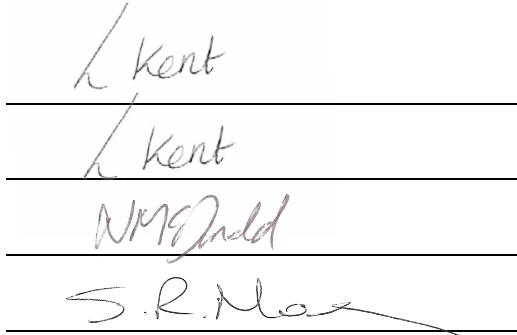
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1 INTRODUCTION

This report describes tests carried out at Initivo Consultancy Limited at the request of Newbrel Limited.

The test samples consisted of 3mm composite spandrel panels manufactured by Newbrel Limited.

The tests were carried out during March 2024 and were to determine the weathertightness of the test sample. The test methods were in accordance with the CWCT Standard Test Methods for building envelopes, 2005, for:

Wind resistance – serviceability.

Wind cyclic.

Wind resistance – safety.

The testing was carried out in accordance with Initivo method statement C10485-TMS-REV00.

This test report relates only to the actual sample as tested and described herein.

The results are valid only for sample(s) tested and the conditions under which the tests were conducted.

A fatigue wind loading test was carried out using the assessment method contained in BRE Digest 346 1989.

Initivo Consultancy Limited is accredited to ISO/IEC 17025:2017 by the United Kingdom Accreditation Service as UKAS Testing Laboratory No. 0057 for a schedule of tests. Tests listed above marked with an asterisk are not on our schedule.

Initivo Consultancy Limited is Approved Body No. 1766.

Initivo Consultancy Limited is certified by BSI for:

- ISO 9001:2015 Quality Management System,
- ISO 14001:2015 Environmental Management System,
- ISO 45001:2018 Occupational Health and Safety Management System.

The tests were witnessed wholly or in part by:

Jason Nock	-	Newbrel
Gary Nock	-	Newbrel
Barrie Nuttall	-	Newbrel
Simon Carter	-	Newbrel

2 SUMMARY AND CLASSIFICATION OF TEST RESULTS

The following summarises the results of the tests carried out. For full details refer to Sections 7.

TABLE 1

Date	Test number	Test description	Result
18 March 2025	1	Wind resistance – serviceability ±2400 Pa	Pass
18-23 March 2025	2	Wind cyclic	Pass
24 March 2025	3	Wind resistance – safety ±3600 Pa	Pass

Statement of uncertainty

The above declared results have been taken from the actual measured values without the uncertainty being applied. The measurements have been taken using suitably calibrated equipment that allows measurements to be taken as outlined in the following sections of this report.

3 DESCRIPTION OF TEST SAMPLE

3.1 GENERAL ARRANGEMENT

The sample was as shown in the photo below. The following details apply:

Façade type 3mm Composite spandrel panels

Location on project - System test

The specimen details have been provided by Newbrel Limited on their drawings and are included as an appendix to this report. *Some of the information supplied and included has not be verified by Initivo.*

The sample was installed by representatives of Adept Facades Limited in accordance with their installation method statement.

PHOTO 3493

TEST SAMPLE ELEVATION

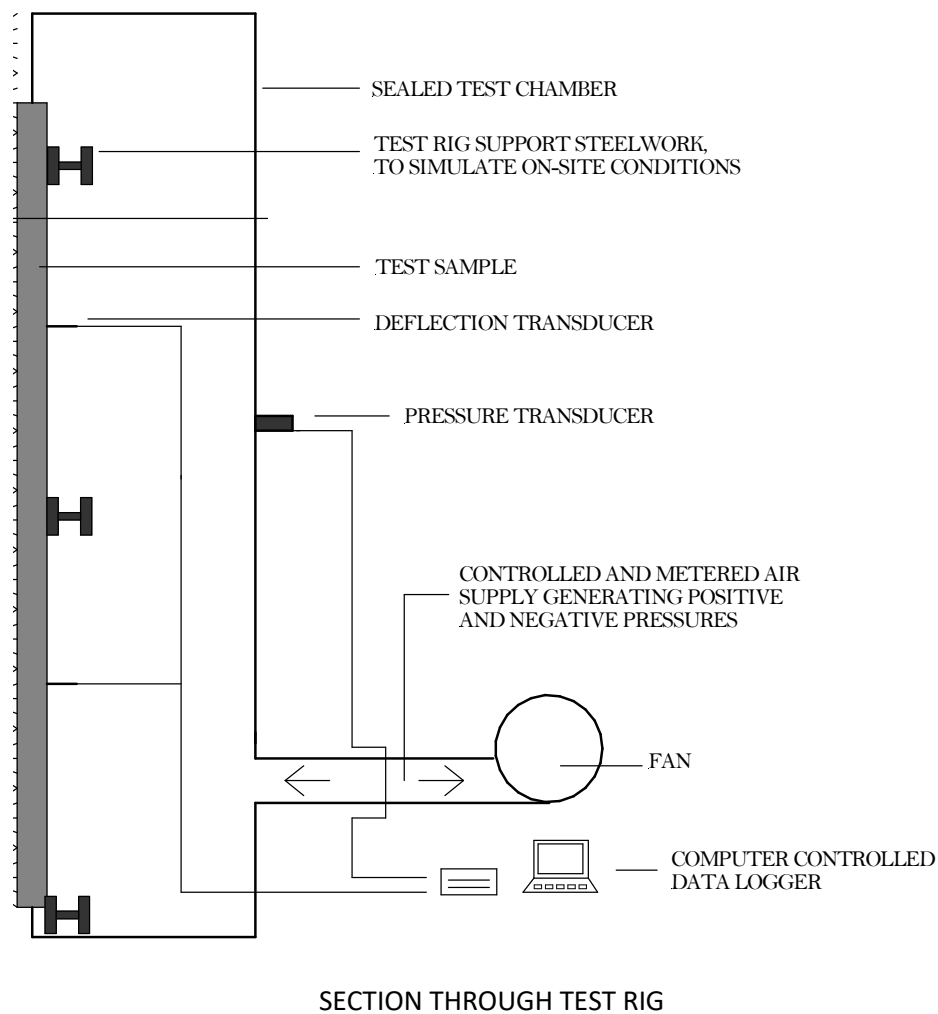


4 TEST RIG GENERAL ARRANGEMENT

The test sample was mounted on a rigid test rig with support steelwork designed to simulate the on-site/project conditions. The test rig comprised a well sealed chamber, fabricated from steel and plywood. A door was provided to allow access to the chamber. Representatives of Adept Facades Limited installed the sample on the test rig. See Figure 1.

FIGURE 1

TEST RIG SCHEMATIC ARRANGEMENT



5 TEST SEQUENCE

The test sequence was as follows:

- (1) Wind resistance – serviceability
- (2) Wind cyclic
- (3) Wind resistance – safety
- (4) Wind resistance – overload
- (5) Controlled dismantle

6 WIND RESISTANCE TESTING

6.1 INSTRUMENTATION

6.1.1 Pressure

One static pressure tapping was provided to measure the chamber pressure and was located so that the readings were unaffected by the velocity of the air supply into or out of the chamber.

A pressure transducer, capable of measuring rapid changes in pressure to within 2% was used to measure the differential pressure across the sample.

6.1.2 Deflection

Displacement transducers were used to measure the deflection of principle framing members to an accuracy of 0.1 mm. The gauges were set normal to the sample framework at mid-span and as near to the supports of the members as possible and installed in such a way that the measurements were not influenced by the application of pressure or other loading to the sample. The gauges were located at the positions shown in Figure 2.

6.1.3 Temperature

Platinum resistance thermometers (PRT) were used to measure air temperatures to within 2°C.

6.1.4 General

Electronic instrument measurements were scanned by a computer controlled data logger, which also processed and stored the results.

All measuring instruments and relevant test equipment were calibrated and traceable to national standards.

6.2 FAN

The air supply system comprised a variable speed centrifugal fan and associated ducting and control valves to create positive and negative static pressure differentials. The fan provided essentially constant air flow at the fixed pressure for the period required by the tests and was capable of pressurising at a rate of approximately 600 pascals in one second.

6.3 PROCEDURE

6.3.1 Wind Resistance – serviceability (CWCT (2005))

Three positive pressure differential pulses of 1200 pascals were applied to prepare the sample. The displacement transducers were then zeroed.

The sample was subjected to one positive pressure differential pulse from 0 to **2400** pascals to 0. The pressure was increased in four equal increments each maintained for 15 ±5 seconds. Displacement readings were taken at each increment. Residual deformations were measured on the pressure returning to zero.

Any damage or functional defects were recorded.

The test was then repeated using a negative pressure of **-2400** pascals.

6.3.2 Wind resistance – cycling loading (CWCT (2005))

The following cyclic load tests were carried out on the same sample.

No of cycles	Applied pressure (pascals)
1	$0.9 \times W_p = \pm 2160$
960	$0.4 \times W_p = \pm 960$
60	$0.6 \times W_p = \pm 1440$
240	$0.5 \times W_p = \pm 1200$
5	$0.8 \times W_p = \pm 1920$
14	$0.7 \times W_p = \pm 1680$

Where W_p = design wind load

The sequence above was repeated for a total of six times representing 60 years exposure period and then a single pulse of W_p (+2400 / -2400) was applied.

The frequency of oscillation was seven seconds between loading, with loading applied in a sinusoidal manner.

6.3.3 Wind Resistance – safety (CWCT (2005))

Three positive pressure differential pulses of 1200 pascals were applied to prepare the sample. The displacement transducers were then zeroed.

The sample was subjected to one positive pressure differential pulse from 0 to **3600** pascals to 0. The pressure was increased as rapidly as possible but not in less than 1 second and maintained for 15 ± 5 seconds. Displacement readings were taken at peak pressure. Residual deformations were measured on the pressure returning to zero.

Any damage or functional defects were recorded.

The test was then repeated using a negative pressure of **-3600** pascals.

6.3.4 Wind resistance overload

The sample was finally subjected to one negative pressure differential (up to 4500 pascals maximum) increasing until panel failure or capacity of the fan was reached.

FIGURE 2

DEFLECTION GAUGE LOCATIONS

External View

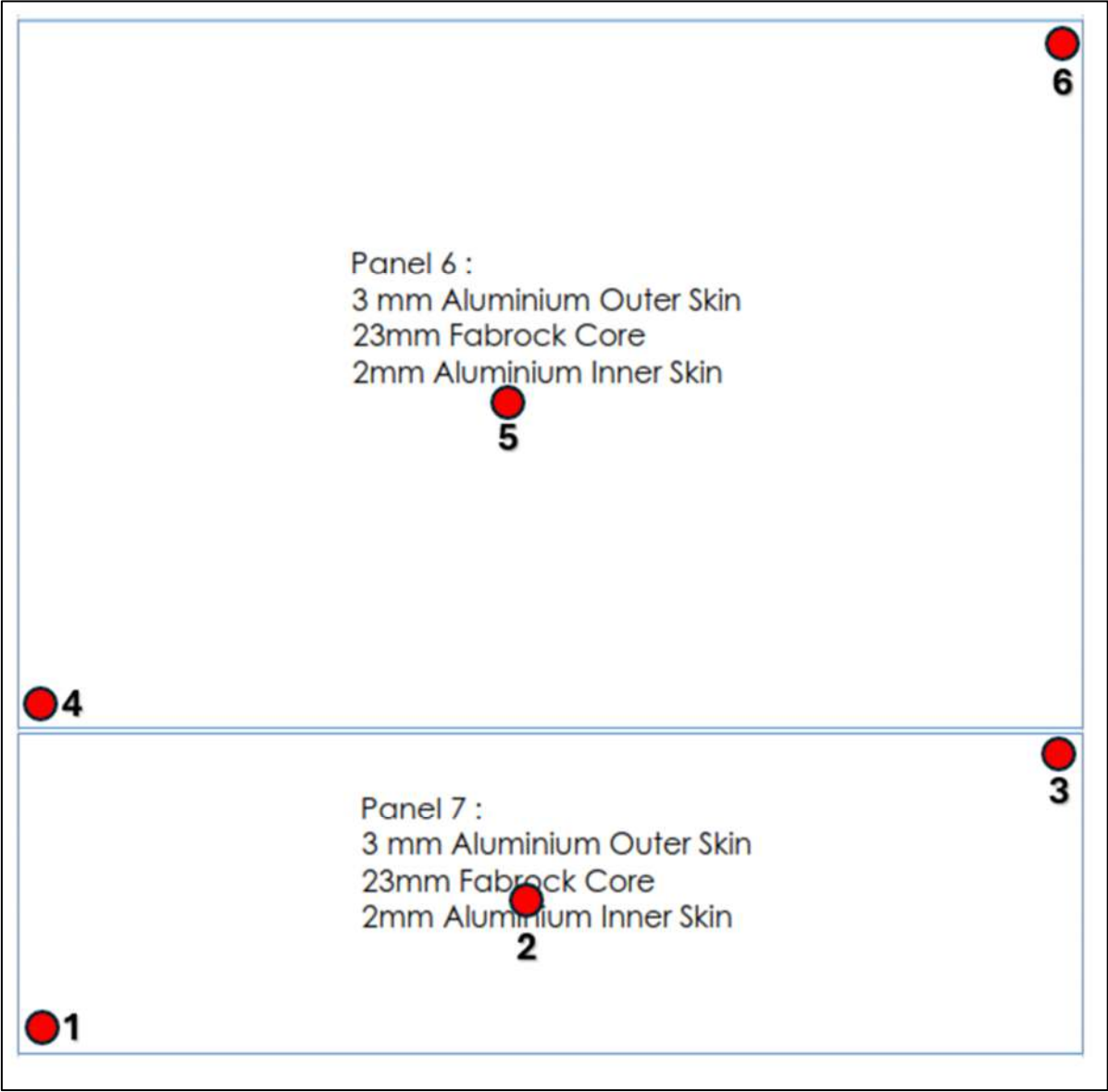


PHOTO 3493

GAUGE LOCATIONS ON SAMPLE



6.4 RESULTS SUMMARY

TABLE 2

Serviceability Test

Gauge number	Position on panel	Span (L)	Measured deflection	Measured residual deformation
2	Centre	3050 mm	1.2 mm (L/2542) -1.2 mm (L/2542)	0.1 mm 0.0 mm
5	Centre	3500 mm	10.0 mm (L/350) -9.1 mm (L/385)	0.3 mm -0.1 mm

TABLE 3

Safety Test

Gauge number	Position on panel	Span (L)	Measured deflection	Measured residual deformation
2	Centre	3050 mm	1.1 mm (L/2773) -1.6 mm (L/1906)	0.0 mm 0.1 mm
5	Centre	3500 mm	15.1 mm (L/232) -14.1 mm (L/248)	0.2 mm -0.2 mm

6.5 RESULTS DETAIL

Test 1 (serviceability) Date: 18 March 2025 Time: 14:23

The deflections measured during the wind resistance test, at the positions shown in Figure 2, are shown in Tables 4 and 5.

No damage to the test sample was observed.

Ambient temperature = 14 °C

Chamber temperature = 16 °C

TABLE 4

WIND RESISTANCE – POSITIVE SERVICEABILITY TEST RESULTS

Position	Pressure (pascals) / Deflection (mm)				
	601	1207	1808	2413	Residual
1	0.2	0.2	0.3	0.4	0.0
2	1.4	1.7	2.1	2.4	0.1
3	1.0	1.6	2.0	2.1	0.0
4	0.1	0.2	0.2	0.1	0.0
5	2.9	5.4	7.8	10.3	0.3
6	0.2	0.3	0.4	0.4	0.0
2 *	0.8	0.8	0.9	1.2	0.1
5 *	2.8	5.2	7.5	10.0	0.3

* Mid-span reading adjusted between end support readings

TABLE 5

WIND RESISTANCE – NEGATIVE SERVICEABILITY TEST RESULTS

Position	Pressure (pascals) / Deflection (mm)				
	-601	-1196	-1810	-2402	Residual
1	-0.2	-0.2	-0.3	-0.3	0.0
2	-0.5	-0.8	-1.2	-1.5	0.0
3	-0.1	-0.1	-0.2	-0.2	0.0
4	-0.1	-0.2	-0.3	-0.4	0.0
5	-2.3	-4.4	-6.8	-9.0	-0.1
6	0.0	-0.1	-0.1	-0.1	0.0
2 *	-0.4	-0.6	-0.9	-1.2	0.0
5 *	-2.3	-4.5	-6.9	-9.1	-0.1

* Mid-span reading adjusted between end support readings

Test 2 (Cycling loading) Date: 18 March 2025 – 23 March 2025

No damage to the sample was observed.

Ambient temperature = 15 °C

Chamber temperature = 17 °C

Test 3 (safety)

Date: 24 March 2025

Time 07:39

The deflections measured during the structural safety test, at the positions shown in Figure 2, are shown in Table 6.

No damage to the sample was observed.

Ambient temperature = 6 °C

Chamber temperature = 7 °C

TABLE 6

WIND RESISTANCE – SAFETY TEST RESULTS

Position	Pressure (pascals) / Deflection (mm)				Overload	
	3601	Residual	-3606	Residual	-4293	Residual
1	0.3	0.0	-0.3	0.0	-0.3	0.0
2	2.5	0.0	-1.9	-0.1	-2.3	0.1
3	2.4	0.0	-0.4	0.0	-0.4	0.0
4	0.3	0.0	-0.6	0.0	-0.6	0.0
5	15.2	0.2	-13.9	-0.3	-17.2	-0.2
6	0.5	0.0	-0.1	0.0	-0.2	0.0
2 *	1.1	0.0	-1.6	-0.1	-2.0	-0.0
5 *	15.1	0.2	-14.1	-0.2	-17.5	-0.2

* Mid-span reading adjusted between end support readings

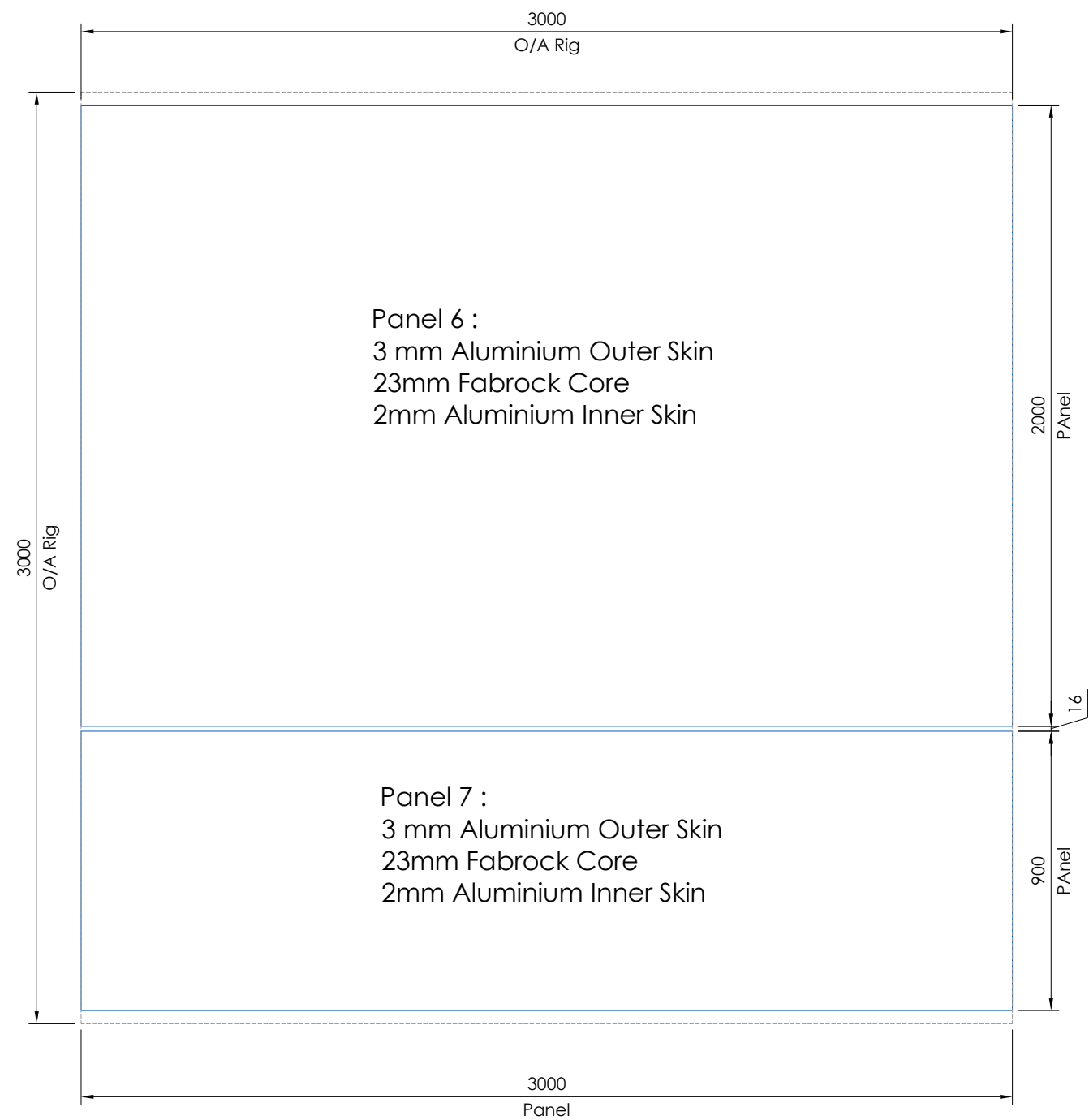
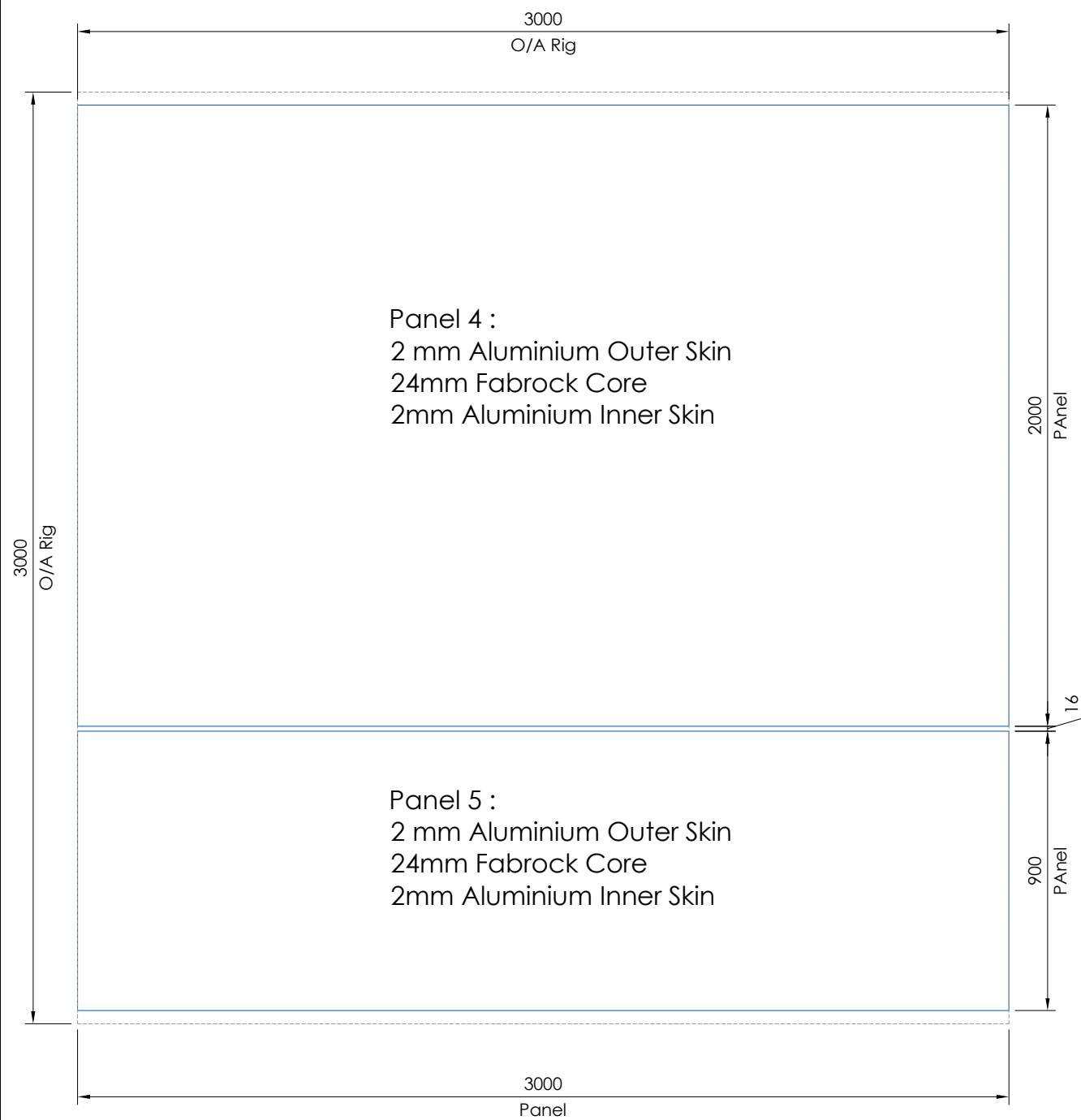
7 APPENDIX A – DRAWINGS

The following 3 unnumbered pages are copies of Newbrel Limited drawings:

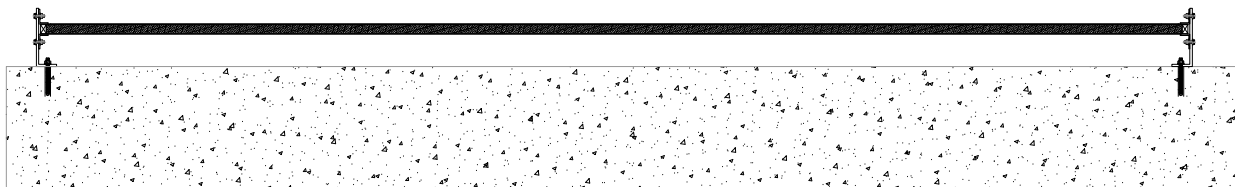
1702-1003 REV P1

1702-1004 REV P1

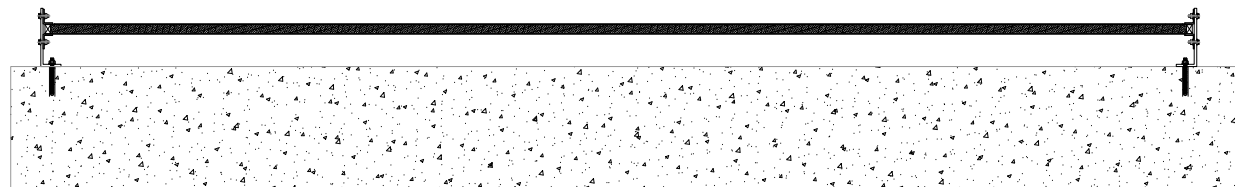
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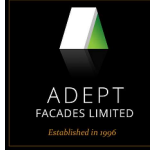


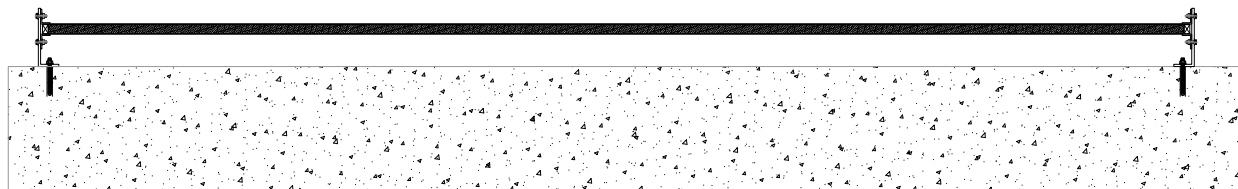
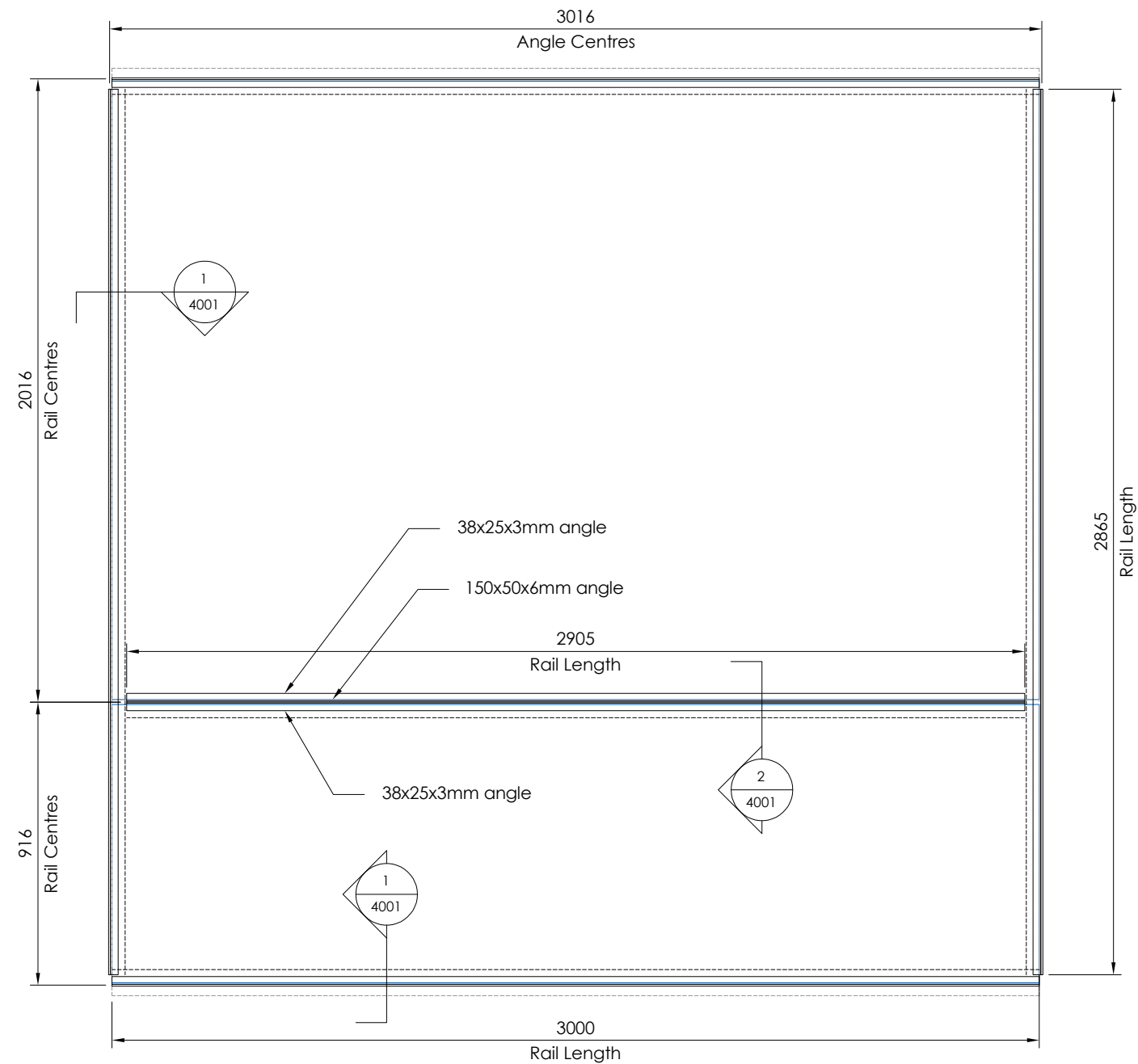
1	Test 1	1:20
-	Serviceability, Safety & Cyclic	



2	Test 2	1:20
-	Serviceability, Safety & Cyclic	



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NS Unusual, non-standard or bespoke element			
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Newbrell			
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Insulated Panels Impact and Wind Load Testing			
Title			
Test Rig - Panel Arrangement Wind Load Testing			
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1702-1000	VERTEKS	-	
Date	Scale	Size	
Feb 25	1:20		A3
Drawing Number			Revision
1702-1003			P1



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Rev	Date	Description

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Client

Newbrell

Project

Insulated Panels
Impact and Wind Load Testing

Title

Test Rig - Panel Arrangement
Wind Load Testing

Cad File Name	Drawn By	Checked
1702-1000	VERTEKS	-
Date	Scale	Size
Feb 25	1:20	A3

Drawing Number	Revision
1702-1004	P1