INITIVO
Testing Engineering Consultancy

# TECHNICAL REPORT

**Title:** **Wind performance testing of 2mm Composite panels for Newbrel Limited.**

**Report No:** **N950-25-18939**

**Technical Report**

| | |
|---|---|
| **Title:** | **Wind performance testing of 2mm Composite panels for Newbrel Limited.** |
| Customer: | Newbrel Limited<br>Gainford Drive, Halesowen Industrial Park, Halesowen, West Midlands B62 8BQ |
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| Distribution: (confidential) | 1 copy to Newbrel Limited<br>1 copy to project file |



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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 2mm 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 |
|---|---|---|---|
| 12 March 2025 | 1 | Wind resistance – serviceability<br>±2400 Pa | Pass |
| 12-16 March 2025 | 2 | Wind cyclic | Pass |
| 17 March 2025 | 3 | Wind resistance – safety<br>±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 2mm 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 3335

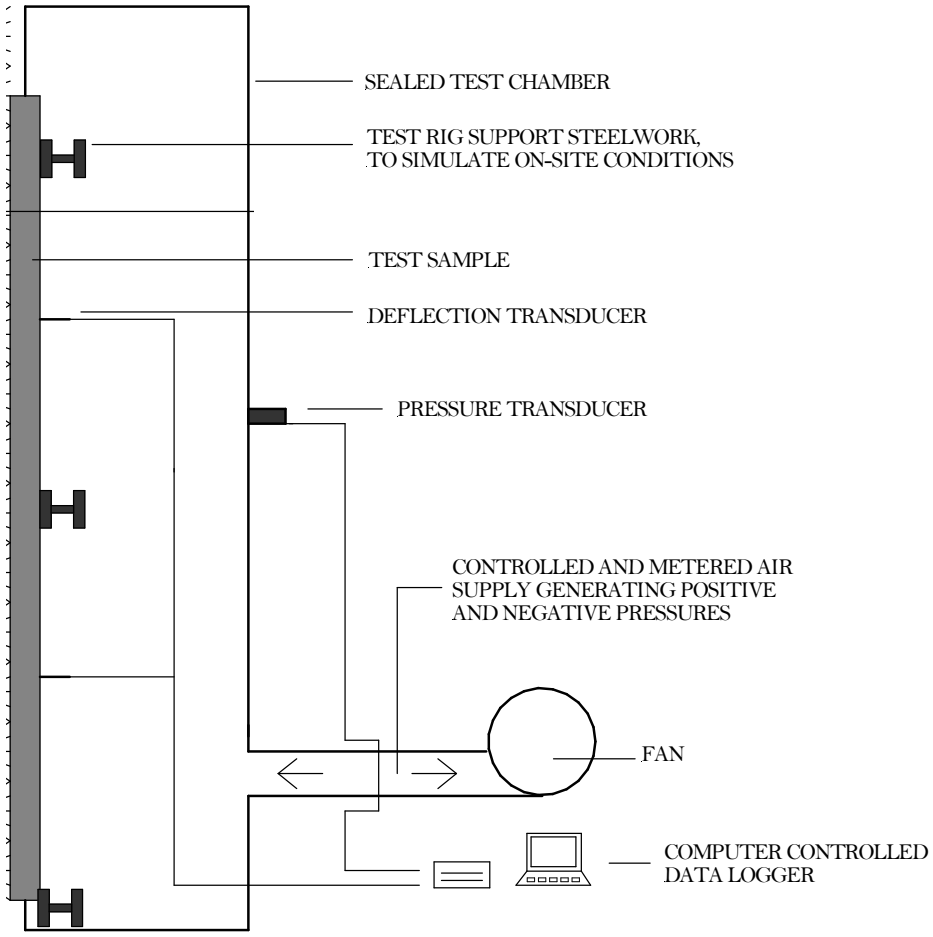
TEST SAMPLE ELEVATION

## 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




SECTION THROUGH TEST RIG

## 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 x Wp = ±2160 |
| 960 | 0.4 x Wp = ±960 |
| 60 | 0.6 x Wp = ±1440 |
| 240 | 0.5 x Wp = ±1200 |
| 5 | 0.8 x Wp = ±1920 |
| 14 | 0.7 x Wp = ±1680 |
| | Where Wp = 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 Wp (+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 092729

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 | 1.6 mm (L/1906)<br>-1.6 mm (L/1906) | 0.0 mm<br>-0.1 mm |
| 5 | Centre | 3500 mm | 10.9 mm (L/321)<br>-10.6 mm (L/330) | 0.1 mm<br>-0.1 mm |

TABLE 3

Safety Test

| Gauge number | Position on panel | Span (L) | Measured deflection | Measured residual deformation |
|---|---|---|---|---|
| 2 | Centre | 3050 mm | 2.2 mm (L/1386)<br>-2.2 mm (L/1386) | 0.0 mm<br>-0.1 mm |
| 5 | Centre | 3500 mm | 17.6 mm (L/199)<br>-18.1 mm (L/193) | 0.4 mm<br>-0.2 mm |

## 6.5 RESULTS

**Test 1 (serviceability)** Date: 12 March 2025 Time: 9:20

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 = 5 °C
Chamber temperature = 6 °C

TABLE 4

WIND RESISTANCE – POSITIVE **SERVICEABILITY** TEST RESULTS

| Position | Pressure (pascals) / Deflection (mm) | | | | |
|---|---|---|---|---|---|
| | 607 | 1199 | 1806 | 2403 | Residual |
| 1 | 0.0 | 0.1 | 0.2 | 0.2 | 0.0 |
| 2 | 0.7 | 1.1 | 1.6 | 2.0 | 0.0 |
| 3 | 0.1 | 0.3 | 0.4 | 0.5 | 0.0 |
| 4 | 0.1 | 0.0 | 0.2 | 0.2 | 0.0 |
| 5 | 3.1 | 5.6 | 8.4 | 11.0 | 0.1 |
| 6 | 0.1 | 0.2 | 0.3 | 0.5 | 0.0 |
| 2 * | 0.6 | 1.0 | 1.3 | 1.6 | 0.0 |
| 5 * | 3.0 | 5.5 | 8.3 | 10.9 | 0.1 |

* Mid-span reading adjusted between end support readings

TABLE 5

WIND RESISTANCE – NEGATIVE **SERVICEABILITY** TEST RESULTS

| Position | Pressure (pascals) / Deflection (mm) | | | | |
|---|---|---|---|---|---|
| | **-600** | **-1198** | **-1806** | **-2401** | **Residual** |
| **1** | -0.1 | -0.1 | -0.2 | -0.2 | 0.0 |
| **2** | -0.6 | -1.0 | -1.4 | -1.8 | -0.1 |
| **3** | -0.2 | -0.2 | -0.2 | -0.2 | 0.0 |
| **4** | -0.0 | -0.1 | -0.1 | -0.1 | 0.0 |
| **5** | -2.6 | -5.1 | -7.6 | -10.3 | -0.1 |
| **6** | -0.0 | 0.0 | -0.2 | -0.4 | 0.0 |
| **2 *** | -0.5 | -0.8 | -1.2 | -1.6 | -0.1 |
| **5 *** | -2.6 | -5.1 | -7.8 | -10.6 | -0.1 |

* Mid-span reading adjusted between end support readings

**Test 2 (Cycling loading)** Date: 12 March 2025 – 16 March 2025

No damage to the sample was observed.

Ambient temperature = 6 °C
Chamber temperature = 7 °C

**Test 3 (safety)** Date: 17 March 2025 Time 8:57

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) | | | | Wind overload | |
|---|---|---|---|---|---|---|
| | 3615 | Residual | -3606 | Residual | -4207 | Residual |
| **1** | 0.2 | 0.0 | -0.2 | 0.0 | -0.3 | 0.0 |
| **2** | 2.5 | 0.0 | -2.5 | -0.1 | -2.9 | 0.2 |
| **3** | 0.4 | 0.0 | -0.3 | 0.0 | -0.4 | 0.0 |
| **4** | 0.4 | 0.0 | -0.3 | 0.0 | -0.4 | 0.0 |
| **5** | 17.6 | 0.4 | -18.0 | -0.3 | -21.8 | -0.6 |
| **6** | 0.2 | 0.1 | -0.1 | -0.1 | -0.1 | -01 |
| **2 *** | 2.2 | 0.0 | -2.2 | -0.1 | -2.5 | -0.1 |
| **5 *** | 17.6 | 0.4 | -18.1 | -0.2 | -22.0 | -0.5 |

* Mid-span reading adjusted between end support readings

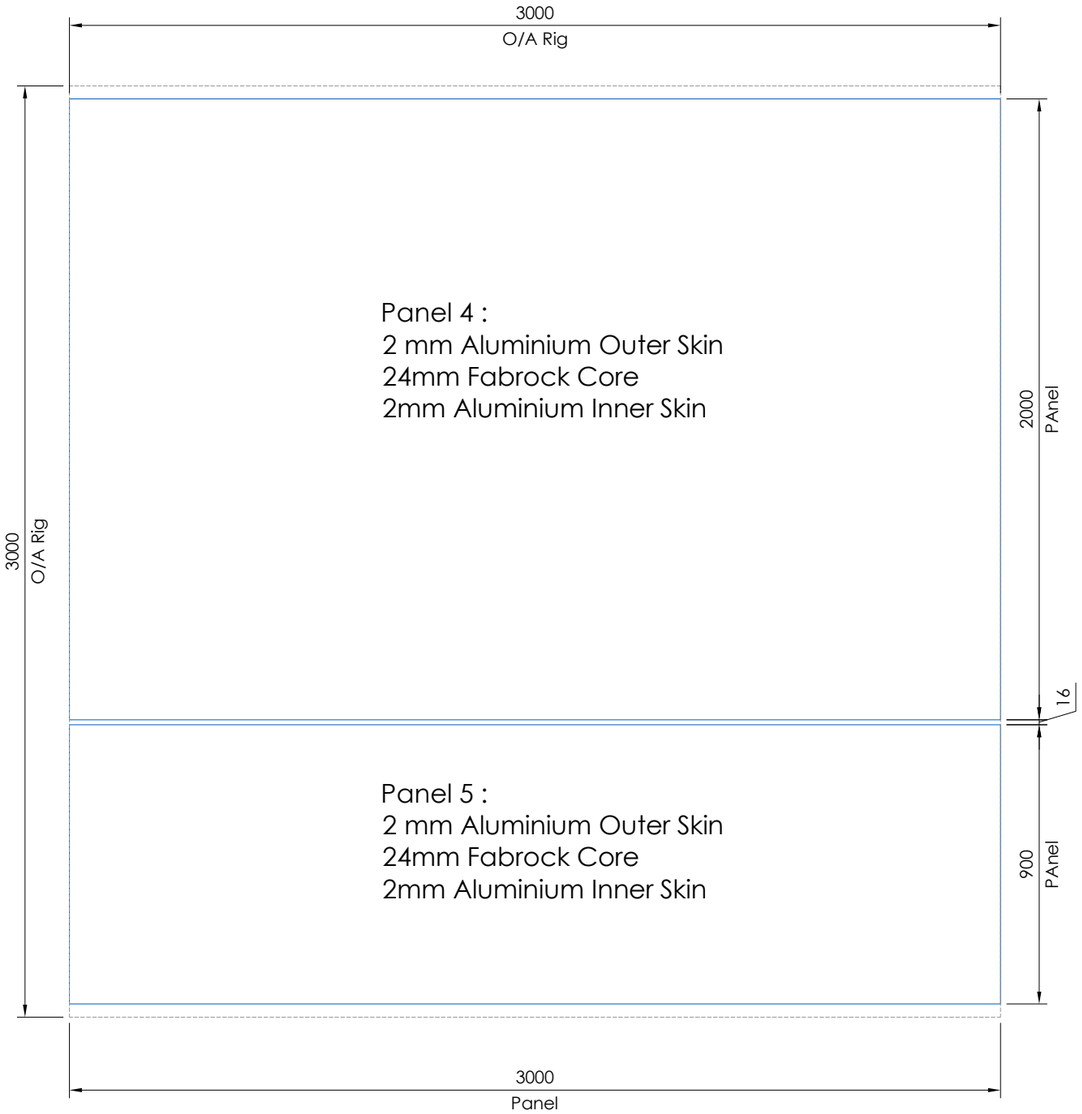
# 7 APPENDIX A – DRAWINGS

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

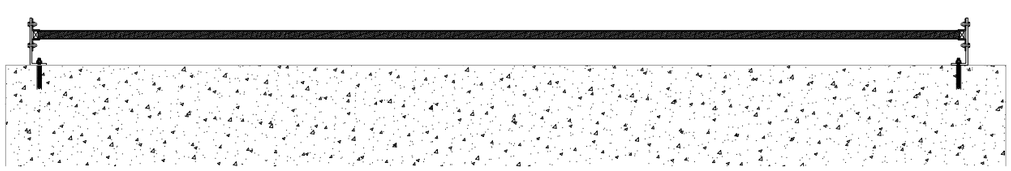
1702-1003 REV P1

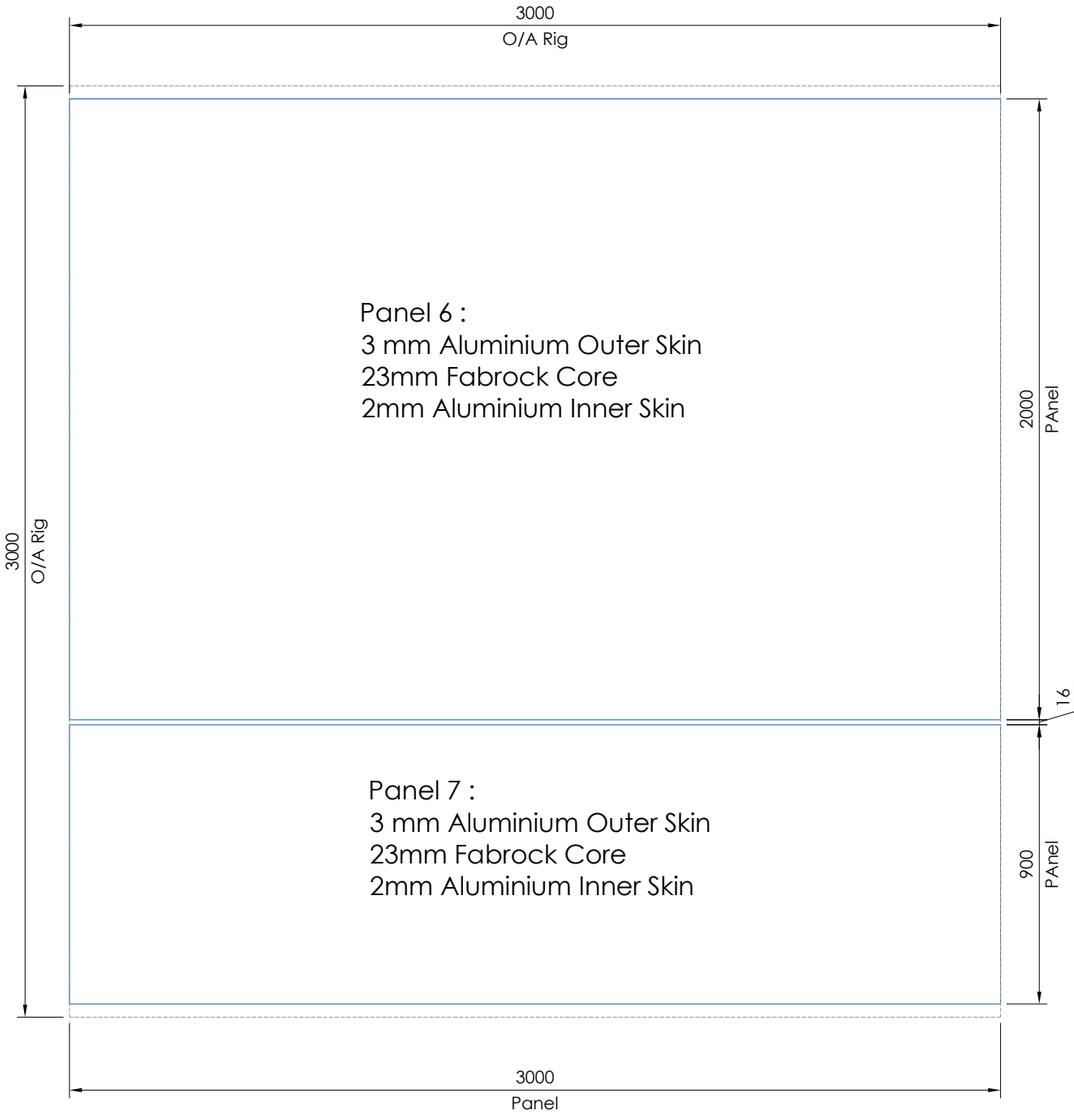
1702-1004 REV P1

1702-4001 REV P1

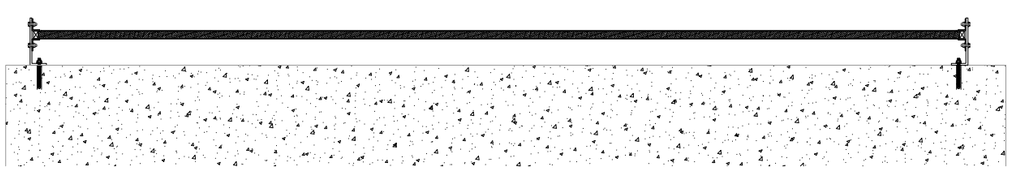



1 - Test 1 1:20
Serviceability, Safety & Cyclic






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



| IF IN DOUBT ASK | DO NOT SCALE |
|---|---|

NOTES:

These design drawings are to be read in conjunction with system manufacturers standard details and literature. Drawings are subject to Architect and Project Structural Engineer final approval.



IDENTIFIED POTENTIAL RISKS ON DRAWING:

SQ1 Construction sequence determined by buildability of detail

!1 Potential functional or maintenance issue due to construction or architectural requirements

INSTALLATION NOTES:

NS1 Unusual, non-standard or bespoke element

| Rev | Date | Description |
|---|---|---|
| P1 | 05.02.25 | ISSUED FOR APPROVAL |

Document Status
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ADEPT FACADES LIMITED Established in 1996
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Client
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Project
Insulated Panels
Impact and Wind Load Testing

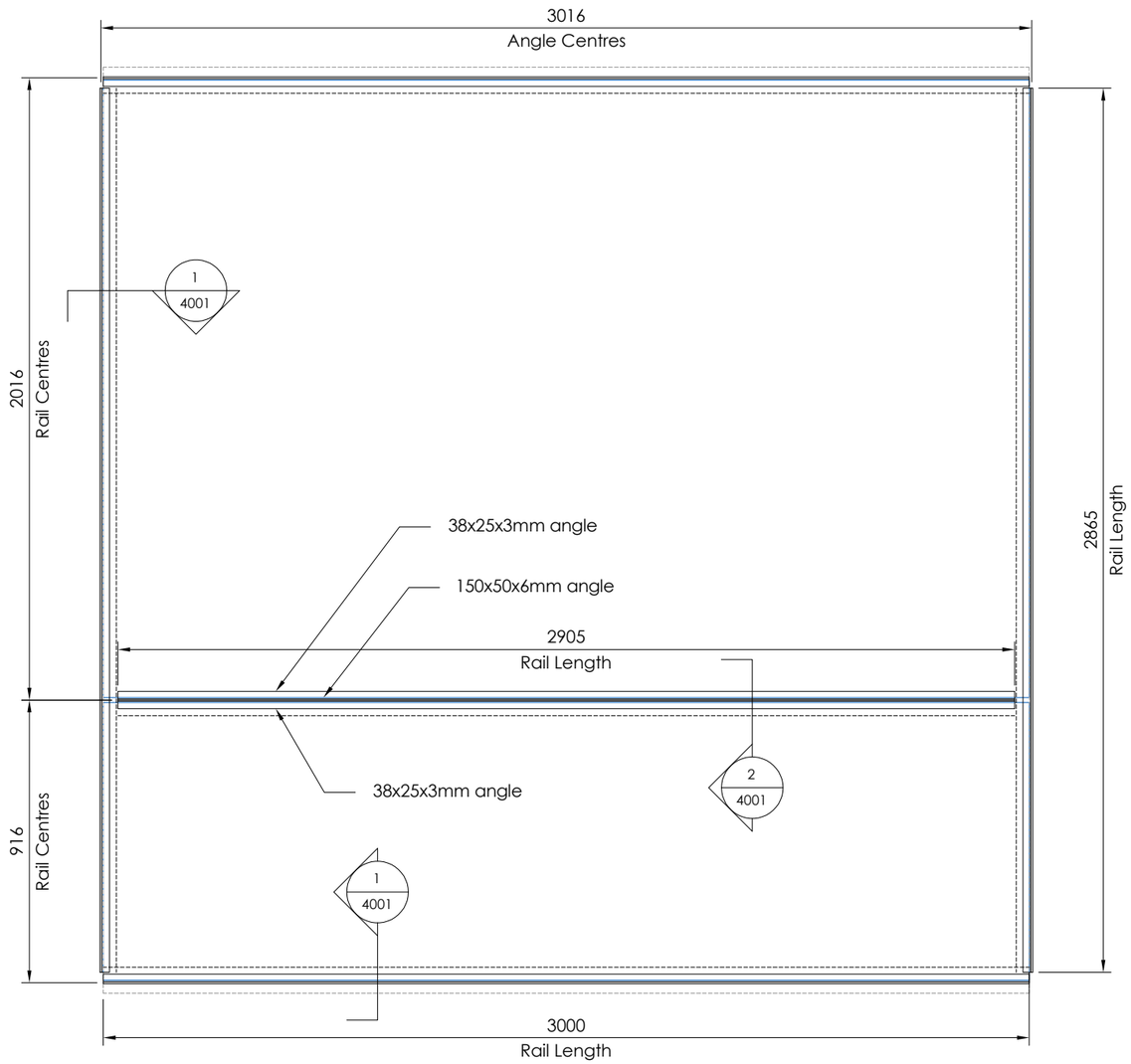
Title
Test Rig - Panel Arrangement
Wind Load Testing

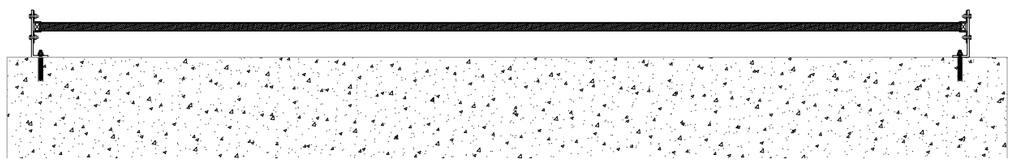
| Cad File Name | Drawn By | Checked |
|---|---|---|
| 1702-1000 | VERTEKS | - |

| Date | Scale | Size |
|---|---|---|
| Feb 25 | 1:20 | A3 |

Drawing Number
1702-1003

Revision
P1



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Document Status: FOR APPROVAL/COMMENT

Adept Facades Ltd
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Project: Insulated Panels
Impact and Wind Load Testing

Title: Test Rig - Panel Arrangement
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|---|---|
| 1702-1004 | P1 |