



REFERENCE: Symonite Panels Ltd
PO Box 101-760
North Shore
Auckland 0745

Performance tests on Symonite composite Aluminium cladding system in accordance AS/NZS 4284: 2008 Testing of Building Facades.

DATE OF TEST: 14 - 16 July 2014

SUMMARY

Structural Test at Serviceability Limit State Wind Pressure:

No structural deflection tests on the timber framed test unit were required. The Symonite composite Aluminium cladding system was exposed to Serviceability test pressures of ±2500 Pa, prior to the water penetration tests.

Water penetration test by Static pressure:

During the preliminary test the Symonite composite Aluminium cladding system demonstrated "no water penetration" at a test pressure of 450 Pa, but at a pressure of 750 Pa water penetrated through two gaps in the bottom plate due to reduced sill cover from the cladding. Following isolation of a leakage path through the bolt holes in the bottom timber plate of the test enclosure detailed below, the test façade achieved compliance with water penetration requirements at a test pressure of 750 Pa.

Water penetration test by Cyclic pressure:

During preliminary cyclic pressure tests, water penetration occurred on sill fixings of the larger window, and subsequently water penetrated onto the Air barrier from the sill of the window installation. Following isolation of a leakage path through the bolt holes in the bottom timber plate of the test enclosure, and the remedial work on the commercial window sill installation, as detailed in Appendix A, the Symonite test façade achieved compliance with "no water penetration" requirements at cyclic test pressures up to 750 - 1500 Pa.

Structural test at Ultimate limit state wind pressure:

Following the modifications detailed below, the Symonite composite Aluminium cladding system complied with Ultimate Limit State structural tests of +3810 Pa, but due to test booth limitations, the maximum negative test pressure was limited to -3270 Pa. No structural damage or collapse was observed.

DESCRIPTION:

The test sample consisted of a single storey timber framed structure, with stepped external face providing sample details of internal and external corners, two alternative window

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penetrations, a horizontal control joint and a top soffit detail. General details of the test structure as well as the details of the fixing methods and the panel joints are shown in the attached Symonite drawings.

The Symonite composite aluminium cladding system consists of a nominal 4mm thick panel with pre-coated aluminium faces and a composite polymeric core, which is fabricated using V groove machining and folding into individual panels. The panels are fitted together with overlapping horizontal and vertical joints, incorporating aluminium extrusions riveted to the inner edge of the panel edges and fixed onto the support framing. With the exception of horizontal drained joints, all horizontal and vertical panel joints are subsequently filled with silicone sealants on PEF backing rod.



The test structure used a transparent rigid air barrier of 4.5 mm clear polycarbonate sheet for viewing into the cavity, applied onto the external face of the timber framing. No internal linings were fastened to the timber framing for the AS/NZS 4284: 2008 tests

PERFORMANCE SPECIFICATIONS:

The following performance requirements for the on Symonite composite aluminium cladding system were agreed with the clients for assessing performance:

Serviceability Wind Pressure	2500 Pa (equivalent to ULS \approx 3.6 kPa)
Water penetration by Static pressure;	750 Pa
Water penetration by Cyclic pressures	up to 750 – 1500 Pa
Structural Test at Ultimate Limit State	\pm 3.6 kPa (or greater)

TESTING:

The tests were performed using the testing procedures of AS/NZS 4284:2008 Testing of Building Facades, in the IANZ accredited window test facility Facadelab Ltd, Rosedale Road, Albany, Auckland with representatives of the client in attendance.

As the Symonite composite Aluminium cladding system was installed onto a timber framed support structure, generally complying with the requirements of NZS 3604:2011, the measurement of deflections of structural elements was not required. The test pressures for providing compliance in excess of the Extra High Wind Zone and the 2.5 kPa ULS limit of NZS 3604 were agreed with the clients. The AS/NZS 4284: 2008 optional air infiltration tests were not conducted on the test sample.

The preset series of Static and Cyclic pressure water penetration tests were based on a serviceability wind pressure of 2500 Pa. The Structural test at the agreed minimum Ultimate Limit State pressures in excess of \pm 3.6 kPa was conducted following the cyclic water penetration tests even though the cladding was a pressure equalised cavity system in which only the air barrier and frame structure would be fully evaluated.

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During the preliminary static water penetration test, water penetrated through open joints in the framing bottom plate, due to a leakage path through the bolt holes in the bottom timber portal plate of the test enclosure. This allowed water to penetrate to the underside of the framing bottom plate, tracking along to the open joints of the test framing bottom plate. The client applied sealing tape to the re-entrant corner between the test enclosure steel base and the portal plate to eliminate the leakage, as shown on Drawing "M".



Following water penetration that occurred on the sill of the commercial window during the preliminary cyclic pressure water penetration test, the client undertook remedial work prior to the complete formal testing sequence. The client's summary of the remedial work is attached as Appendix A

TEST RESULTS:

PRELIMINARY STRUCTURAL TEST

The Symonite composite aluminium cladding system was exposed to the agreed Serviceability test pressures of ± 2.50 kPa. No deflection measurements were required. No structural damage was observed.

PRELIMINARY STATIC PRESSURE WATER PENETRATION TEST

During the preliminary test the Symonite composite aluminium cladding system demonstrated "no water penetration" at a test pressure of 450 Pa, but at a pressure of 750 Pa water penetrated through two gaps in the sectional bottom plate due to a leakage path through the bolt holes in the bottom timber portal plate of the test enclosure. This allowed water to penetrate to the underside of the framing bottom plate, tracking along to the open joints of the test framing bottom plate.

PRELIMINARY CYCLIC PRESSURE WATER PENETRATION TEST

During preliminary cyclic pressure tests, water penetration occurred initially around sill fixings of the commercial window installation, and subsequently water penetrated onto the Air barrier from one side of the sill tray.

STRUCTURAL TEST AT SERVICEABILITY LIMIT STATE (AS/NZS 4284:2008)

The Symonite composite aluminium cladding system was exposed to the agreed Serviceability test pressures of ± 2.50 kPa. No deflection measurements were required. No structural damage was observed.

STATIC PRESSURE WATER PENETRATION (AS/NZS 4284:2008)

Test pressure	750 Pa
Test duration	15 minutes

Following the sealing of the bottom timber plate of the test enclosure as detailed in Appendix A, no water penetration was visible through the transparent rigid air barrier, during the static pressure water penetration tests.

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CYCLIC PRESSURE WATER PENETRATION (AS/NZS 4284:2008)

Test Pressure, Pa	Duration, mins	Comments
375 - 750	5	No water penetration observed
500 - 1000	5	No water penetration observed
750 - 1500	5	No water penetration observed

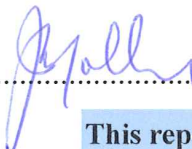
Following the modifications made by the clients to the commercial window sill installation, as detailed in Appendix A, no water penetration was visible through the transparent rigid air barrier, during the cyclic pressure water penetration tests.

STRUCTURAL TEST AT ULTIMATE LIMIT STATE (AS/NZS 4284:2008)

The Symonite composite Aluminium cladding system complied with Ultimate limit State structural tests up to +3810 Pa, but due to test booth limitations, the maximum negative test pressure achieved was limited to -3270 Pa.

No structural damage or collapse was observed.


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Authorised Signatory
25 July 2014

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APPENDIX A

The following Report was prepared by the clients detailing the remedial action undertaken by clients following the Preliminary Static and Cyclic Pressure water penetration tests.

During Monday's initial test sequence, two areas of concern became apparent during the constant high pressure wet test. Firstly we noted several leaks through the bolt fixing points securing the portal plate to the steel structure and water egress at each of the 2 cuts in the bottom plate where the 3 pre-nailed frames butt together. We also noted a small track of water on the RAB at the lower right corner of the light commercial window.

Subsequently we investigated and remedied each problem as follows.

The issue at the bottom plate was found to be that the portal plate is not fully sealed to the steel structure allowing air/water to track between the portal plate and the steel, penetrate through the bolt holes to the underside of the bottom plate. From there the air/water found a route under the bottom plate to the cut in the bottom plate and through any other imperfections along the portal plate causing the leak. As the root cause of this leak is not associated with Symonites panel system, no panels were removed or altered. A remedy was effected by applying flashing tape to the underside of the portal plate and down onto the structural steel.

To find the cause of the minor leak in the area of the light commercial window, we inspected the area and found no apparent issue with either the window or the panels. Therefore we removed the panels around the window and the removed the window itself. At this point we noticed the end dam at the right end of the sill tray was not correctly seated and presented a small gap through which water from the sill tray could pass. All other aspects of the window fitment were checked and found to be satisfactory. The remedy was to refit the end dam element correctly and refit the window and panels.

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