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Report No. 23-09

TESTING OF SPECTRAFORM SFUT OPEN JOINT UNITISED SYSTEM TO AS/NZS 4284:2008

PROJECT:	Spectraform SFUT open joint unitised system weathertightness
CLIENT:	Big River Group (NZ) Ltd trading as Decortech
SPECIFIER:	Cladding Systems (NZ) Ltd
SAMPLE DESIGNER:	Cladding Systems (NZ) Ltd
INSTALLER:	Cladding Systems (NZ) Ltd
TEST DATES:	4,5, 8 May 2023 following preliminary testing on 3 May
TEST SCHEDULE:	The test order specified in AS/NZS 4284:2008 was followed, with sections a, b, c, d, e, g, and h requested, except that section g (ULS strength) was completed before section e (SLS seismic)
PERSONS PRESENT:	John Burgess, Richard Gibbs (FaçadeLab manager), John Lukaszewicz, and for parts of the testing, Mark Judson, Paul van Gessel, Hayden Giddens (Cladding Systems NZ), Ross Millin, George Marevich (Decortech).
TEST FACILITY:	FaçadeLab Ltd, 320 Rosedale Rd, Albany, Auckland.

IANZ accredited testing officer: Richard Gibbs/John Burgess

IANZ accreditation number for testing 1091, including AS/NZS 4284.

Notes: The “Test Request’ has been attached in the Appendix.

Tested & Reported by		**Verified by**	
	John Burgess		Richard Gibbs
	Test Technician		Lab Manager
Report Authorised by	Richard Gibbs		
Release Date	23/11/2023		

Figure 1: Photo of 'wet side' of sample prior to testing

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

Contents

1. Figures

2. Tables

3. Summary

The Spectraform Open joint cassette system (SFUT) cladding system was erected on a timber frame and subjected to tests from the AS/NZS 4284:2008 testing suite at the FaçadeLab facility in Albany.

The parameters used in the test for this system are at or above the values used in the E2/VM2 (BRANZ EM7) test, except that the air barrier does not form a part of the system.

3.1. Preliminary Tests

Complies – air pressure at 1250 and -1450 Pa.

Complies – water penetration at 540 Pa.

3.2. Serviceability Limit State Deflection Test

Structure complies with deflection requirements at +3.6, -3.98 kPa

Spandrel panel complies with deflection requirements at +2500 and -2900 Pa. Span/60

3.3. Air Infiltration Test

Complies with requirements at ±150 Pa

3.4. Static Water Penetration Test

Complies with requirements at + 540 Pa

3.5. Cyclic Water Penetration Test

Complies with requirements, without the rivets and window head to 1080 Pa cyclic water

3.6. Seismic Testing at Serviceability Limit State.

Complies with requirements at ±20 mm in-plane deflection.

3.7. Pressure Test at Ultimate Limit State

Complies with requirements at +3650 kPa and -3980 kPa

3.8. Seismic Test at Ultimate Limit State.

Complies with requirements at ± 40 mm in-plane deflection.

4. Notation

The reference numbers from the AS/NZS 4284:2008 'Testing of building facades' document are used in the following, for ease of reference.

5. Principle

A sample of a building façade forms one face of an eternally mounted pressure chamber and is sealed at its perimeter and then successively subjected to tests.

6. Apparatus

The Spectraform Open joint cassette system (SFUT) cladding system cladding system was tested using the IANZ-accredited FaçadeLab test facility located at 320 Rosedale Rd, Albany.

7. Sample

7.1. Test Sample

7.1.1. Orientation

The orientation of all elements is recorded in this report as viewed from the outside of the test booth (dry side), being the inside of the façade when constructed. The inside of the test booth has the outside (wet side) of the façade.

7.1.2. Sample Description

The test arrangement consisted of an assembly of the Spectraform Open joint cassette system (SFUT) cladding system with overall size 4216 (including three trimming studs) mm wide by 3465 mm high. This arrangement can be seen in the drawings in section 10.2.

This unit was installed into a timber framed opening in the test rig. Allowance for seismic movement was made prior to the seismic tests by removal of the interior lining.

The construction sequence of the sample, together with 'as-built' drawings are shown in the photos and drawings following.

The infill structure around the sample was constructed of 140 x 45 mm timber framing with 10 mm thick plywood as cladding.

7.2. Drawings

Drawings are attached as appendices at the end of this report.

7.2.1. Modifications to the Sample during Construction

There were no modifications to the sample during construction.

7.2.2. Modifications to the Sample during Testing

As the testing progressed, several elements had leakage that could not be addressed, so these elements were removed from the test. These included:

- covering the fixing rivets (at the head of the cassette only) since they were open and allowed water and air to pass through some of the connections.
- the sill/jamb junction was over-sealed at RHS (from inside)
- the window glazing joints were taped up since they were leaking water

Prior to the seismic SLS testing, the timber framing above and beside the sample was disconnected from the surrounding structure.

Fixings between the seismic beam and the sample were modified to enable the ULS seismic displacement testing to be undertaken.

8. Procedure

Note the same clause numbers have been used as in AS/NZS 4284 for ease of reference in the below.

8.1. Test Sequence

8.1.1. General

The tests were performed using the testing procedures of AS/NZS 4284:2008 in the cladding test facilities of FaçadeLab Limited in the following sequence.

- Preliminary SLS pressure test at +1250 and -1450 Pa
- Preliminary water test (Static) at 540 Pa
- Serviceability deflection tests on a timber stud at ± +2500 and -2900 Pa.
- Air infiltration test on the total of the sample and booth at 150 Pa air pressure difference.
- Water penetration static at 540 Pa
- Water penetration cycles from 270 – 540, 360 – 720, and 540 to 1080 Pa.
- Seismic SLS lateral deflection at ± 20 mm
- Spandrel deflections across the middle of the largest panel
- ULS air pressure at + 3600 Pa, then +3650 and -3980Pa
- ULS Seismic test at ± 40 mm

8.1.2. Variation in Test Sequence

There was no variation in test sequence. Clause 8.9.2 allows for the ULS displacement test (seismic ram) to be carried out before or after the ULS structural test (air pressure). In this test the ULS structural test was carried out before the ULS seismic displacement test.

8.2. Preliminary Tests

8.2.1. General

Preliminary testing (as below) was conducted.

8.2.2. Preliminary Static Air Pressure

The test sample was subjected to the positive and negative SLS design wind pressures. Air pressures of + 1250 Pa and - 1450 kPa were applied to the test sample.

8.2.3. Water

8.2.3.1. Preliminary Static Water Test

A preliminary static water penetration test at an air pressure of 540 Pa was carried out as required by clause 8.5 of AS/NZS 4284.

8.2.3.2. Preliminary Cyclic Water Test

The preliminary cyclic water penetration test was not carried out, at the request of the client.

8.3. Structural Test at Serviceability Limit State (SLS)

The deflection of the second full height single timber stud was assessed at pressures up to +2500 and -2900 Pa.

8.3.1. Structural Test Pressures

The SLS test pressures used were calculated by the specifier as + 2500 Pa, and - 2900 Pa.

8.3.2. Location of the Displacement Transducers

The displacement transducers were located as close as possible to the end of the timber stud. The photo shows the actual locations as tested which was within 5 mm of the visible end of the stud.

Figure 2: SLS displacement transducers on stud

8.3.3. Pressure Loading Sequence

The pressure loading sequence requested by the specifier was as per AS/NZS 4284 and required ramping up under positive pressure in five steps, being 20%, 40%, 60%, 80% and 100%, before continuing with negative pressures, as in Fig 1 of AS/NZS 4284: 2008. The optional ramping down pressures were omitted.

8.3.4. Displacement Measurement of Spandrel Panels

The displacement of spandrel panels was undertaken following the seismic testing, so this test sequence was not undertaken.

8.3.4.1. Spandrel Test Pressures

The SLS test pressures used were calculated by the specifier as + 2500 Pa, and - 2900 Pa, as for the structural tests.

8.3.4.2. Location of the Displacement Transducers

The displacement transducers were located as close as possible to the edges of the spandrel panel on the largest horizontal panel, of 1130 mm wide.

8.3.5. Calculation of Deflection/Span Ratio

This was undertaken with a span of 2802 mm for the stud and 1120 for the spandrel deflection test. The standard requires that no framing members shall deflect by greater than span/250 mm, and span/60 for the spandrel panel, with the distance measured between fixing positions.

8.3.6. Calculation of Successive Member Displacement

This was not requested.

8.3.7. Calculation of Maximum Displacement

This quantity was calculated as 11.2 mm and compared to the allowable displacement.

8.4. Air Infiltration

An air infiltration test at a pressure difference of ±150 Pa across the cladding system was undertaken. The air infiltration shall not exceed 1.6 l/m²s of the face of the sample (nominally the area of the air barrier).

8.5. Water Penetration by Static Pressure

The static water penetration test pressure of 540 Pa was nominated by the specifier. No visible water leakage shall be recorded through the sample.

8.6. Water Penetration Test by Cyclic Pressure

The three stages of cyclic water penetration were nominated as follows:

Stage 1: 270 – 540 Pa

Stage 2: 360 - 720 Pa

Stage 3: 540 - 1080 Pa

No visible water leakage shall be recorded through the sample.

8.7. BMU Restraint Test

A BMU restraint test was not requested as part of the AS/NZS 4284:2008 test procedure.

8.8. Structural Test at Ultimate Limit State (ULS)

The test pressures of + 2500 Pa, and - 2900 Pa were nominated by the specifier and applied.

8.9. Seismic Testing at Serviceability Limit State.

8.9.1. Test Displacement

A lateral displacement of ± 20 mm between the cladding system and the surrounding framing was requested. With 15 cycles requested, and 15 cycles undertaken. The moving support beam was located above the cladding and bolted to the sample.

8.9.2. Procedure

8.9.2.1. Static Water Test Post SLS Seismic Testing

Static water testing post SLS seismic testing was not performed.

8.9.2.2. Cyclic Water Test Post SLS Seismic Testing

Cyclic water testing post SLS seismic testing was not performed.

8.10. Seal Degradation Testing

No seal degradation testing was requested as part of the AS/NZS 4284:2008 test procedure.

8.11. Seismic Testing at Ultimate Limit State

(Note this clause number does not align with AS/NZS 4284, with clause 8.9 discussing both the SLS and the ULS tests)

A lateral displacement of >± 40 mm was specified for the ULS seismic testing. There were some losses in the connections due to flex in the fixings, and the zero central point was not obtained. A displacement of 40 mm was obtained by stopping the symmetric ± movement with the centre of the displacements aligned with the centre of the ram's stroke and re-attaching the ram in a non-symmetric manner to allow un-equal deflections in each direction.

9. Results

9.1. General

The performance requirements below, resulted from the request by the specifier.

9.1.1. Preliminary Tests

Results of preliminary testing undertaken are recorded below.

9.1.2. Preliminary Static Pressure

There was no visible dislodgement of any elements following SLS pressure testing.

9.1.3. Preliminary Static Water

Stage	Air pressure (Pa)	Duration	Result
0	0	5 minutes	OK
1	540	15 minutes	Some water in cavity and on back of interior lining
2	0	5 minutes	Water remained.

Table 1: Preliminary static water test pressures

There were occasional water leaks through the cladding system, which remained on the back of the cladding, although some water was able to contact the inside of the polycarbonate which was taking the place of a rigid air barrier. This does not demonstrate non-compliance with the requirements of the test; however, the client was interested to reduce or eliminate this water.

9.1.4. Preliminary Cyclic Water

Not performed.

9.2. Structural test at Serviceability Limit State (SLS)

The maximum deflection of (7.32 ± 0.5) mm was found under a pressure of 2500 Pa, and (-10.04 ± 0.5) mm under a pressure of -2900 Pa. These deflections were less than the 11.2 mm required. The full set of results for the SLS deflection test of the stud are contained in the appendix.

9.2.1. Deflection/Span Ratios

A summary of the deflection of the stud is shown in Table 2, where the uncertainty is expected to be within 2%. The deflection/span ratio of the stud complies with the requirements.

Reference	Span (mm)	Max Net Deflection (mm)	Min span/ deflection	Requirement	Complies?
Stud	2802	7.32 ± 0.5	383	<11.21 mm	Yes
Stud	2802	-10.04 ± 0.5	279	<11.21 mm	Yes

Table 2: Deflection span table for stud

9.2.2. Successive Member Displacement

The successive member displacements were not measured.

9.2.3. Maximum Displacement

The maximum displacement of the stud is shown in Table 2. The maximum displacements comply with the requirements.

9.3. Air Infiltration (AS/NZS 4284:2008 Part c)

This test was undertaken to determine the airtightness of the 4216 mm x 3465 mm high sample. The client did not want to undertake testing of the sealed sample, being content to only measure the total leakage of the booth plus the sample.

Overall area: 19.2 m²

Allowable leakage, at 1.6 l/m²/s 30.72 l/s

	Positive pressure (infiltration) l/s	Negative pressure (exfiltration) l/s
Measured (booth + sample)	15.97 ± 0.2	17.87 ± 0.2

Table 3: Air tightness leakage results at 150 Pa

The uncertainty in the airflow measurements has been assessed with the FaçadeLab Excel-based 'Expanded Uncertainty Calculator'. The airtightness of the sample complied with the air leakage requirements, having an air leakage of 15.97 l/s under positive pressure, and 17.87 l/s under negative pressure. The expanded uncertainty is ± 0.2 l/s with a coverage factor of 2.3 in positive and is ± 0.2 l/s with a coverage factor of 2.3 in negative.

The expanded uncertainty is calculated with a coverage factor, k and defines an interval estimated to have a 95% level of confidence.

9.4. Water Penetration

The results of the static and cyclic water tests, as per clause 8.5 are shown below.

9.4.1. Static Pressure Water Penetration

Stage	Air pressure (Pa)	Duration	Result
0	0	5 minutes	Water in cavity
1	540	15 minutes	Water below jambs on back of RAB. Water leaks from rivets.
2	0	5 minutes	Water in cavity

Table 4: Static water leakage results

There were no water leaks that penetrated beyond the cavity, meeting the requirement of the standard.

9.4.2. Cyclic Pressure Water Penetration

Phase	Air pressure (Pa)	Duration	Result
	0	5 minutes	Water in cavity
1	270 - 540	5 minutes	Rivets removed from test
2	360 - 720	5 minutes	Removed window from test
3	540 - 1080	5 minutes	OK

Table 5: Cyclic water test results

There were no water leaks beyond the cavity, meeting the requirement of the standard.

9.5. Seismic Testing at Serviceability Limit State

Limit State	Distance Specified (d ± x mm)	Distance Achieved (d ± x mm)	Cycles (n)	Period (T, seconds)	Pause at mid-point and ends (sec)
SLS	20 mm	20 mm	15	Not specified	Not specified

Table 6: Seismic test results at SLS displacements

A lateral displacement of ± 20 mm was specified and achieved.

9.5.1. Post seismic SLS Cyclic Pressure Water Penetration

Not requested.

9.6. BMU Restraint Test

Not requested.

9.7. Structural Test at Ultimate Limit State Air Pressure

Air pressure (Pa)	Result	Air pressure (Pa)	Result
+ 3600	OK	- 3980	OK
+ 3650	OK		

Table 7: Ultimate limit state air pressure results

On inspection, there was no visible dislodgement of the system, failure of fixings, breakage of cladding or permanent distortion of cladding following ULS pressure testing.

9.8. Seismic Testing at Ultimate Limit State

Limit State	Distance Specified (d ± x mm)	Distance Achieved (d ± x mm)	Cycles (n)	Period (T, seconds)	Pause at mid-point and ends (sec)
ULS	40 mm	40 mm	15	Not specified	Not specified

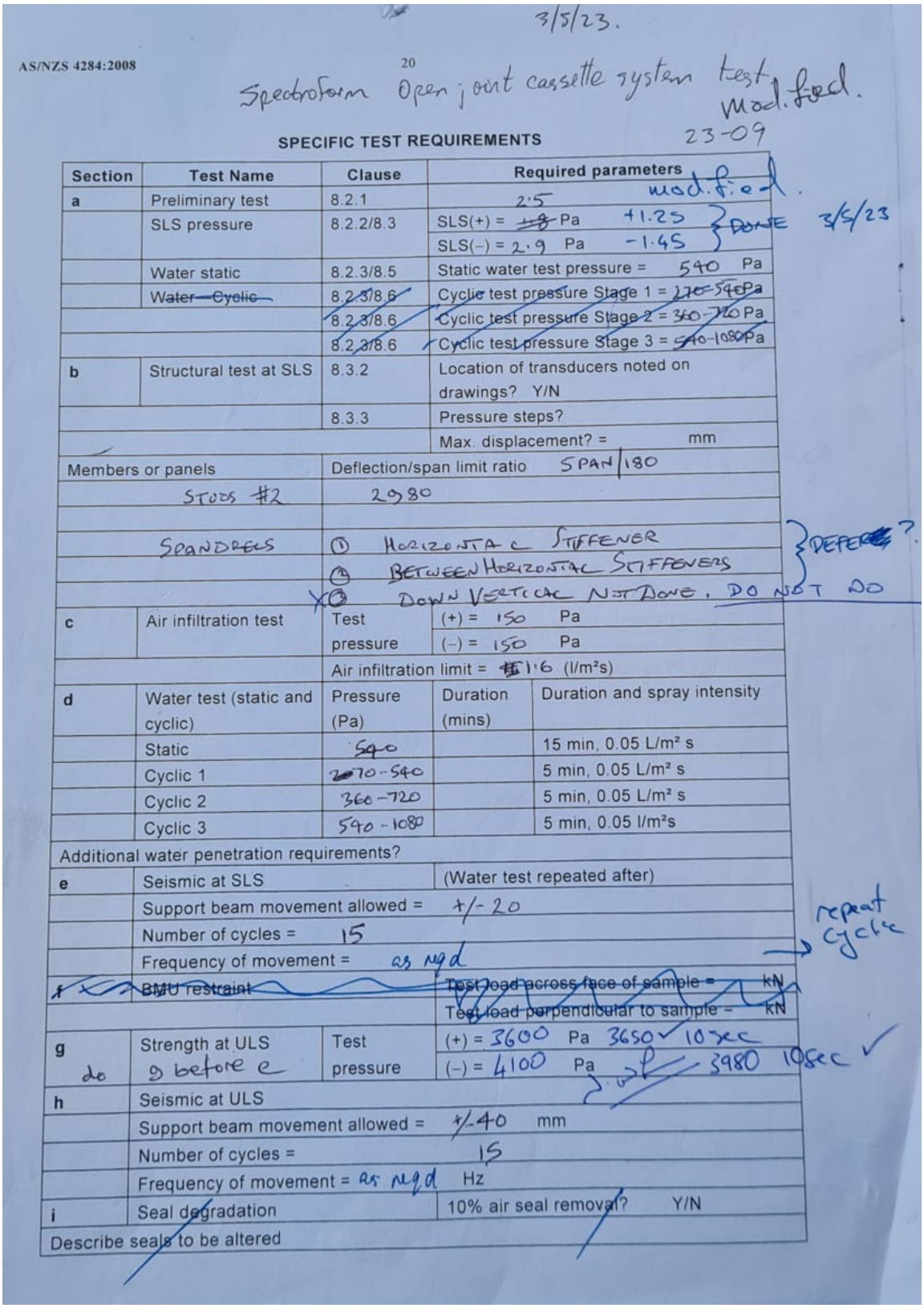
Table 8: Seismic test results at ULS displacements

A lateral displacement of ± 40 mm was specified and achieved.

There was no collapse of the sample following this testing.

10. Appendices

10.1. Test Request



3/5/23.

AS/NZS 4284:2008 20

Spectroform Open joint cassette system test. mod. fied.

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SPECIFIC TEST REQUIREMENTS

Section	Test Name	Clause	Required parameters
a	Preliminary test	8.2.1	2.5 mod. fied.
	SLS pressure	8.2.2/8.3	SLS(+) = ~~+3~~ Pa +1.25 } DONE 3/5/23
			SLS(−) = 2.9 Pa −1.45 }
	Water static	8.2.3/8.5	Static water test pressure = 540 Pa
	~~Water Cyclic~~	8.2.3/8.6	Cyclic test pressure Stage 1 = ~~270-540~~ Pa
		8.2.3/8.6	Cyclic test pressure Stage 2 = ~~360-720~~ Pa
		8.2.3/8.6	Cyclic test pressure Stage 3 = ~~540-1080~~ Pa
b	Structural test at SLS	8.3.2	Location of transducers noted on drawings? Y/N
		8.3.3	Pressure steps?
			Max. displacement? = mm
Members or panels			Deflection/span limit ratio SPAN/180
STUDS #2			2980
SPANDRELS			① HORIZONTAL STIFFENER } DEFER ?
			② BETWEEN HORIZONTAL STIFFENERS
XO			DOWN VERTICAL NOT DONE. DO NOT DO
c	Air infiltration test	Test pressure	(+) = 150 Pa
			(−) = 150 Pa
		Air infiltration limit = ~~5~~ 1.6 (l/m²s)	

d	Water test (static and cyclic)	Pressure (Pa)	Duration (mins)	Duration and spray intensity
	Static	540		15 min, 0.05 L/m² s
	Cyclic 1	~~270~~-540		5 min, 0.05 L/m² s
	Cyclic 2	360-720		5 min, 0.05 L/m² s
	Cyclic 3	540-1080		5 min, 0.05 l/m²s

Additional water penetration requirements?		
e	Seismic at SLS	(Water test repeated after)
	Support beam movement allowed =	+/- 20
	Number of cycles =	15
	Frequency of movement =	as ngd → repeat cycle
f	~~BMU restraint~~	~~Test load across face of sample = kN~~
		Test load perpendicular to sample = kN
g do	Strength at ULS g before e	Test pressure (+) = 3600 Pa 3650 ✓ 10sec
		(−) = 4100 Pa 3980 10sec ✓
h	Seismic at ULS	
	Support beam movement allowed =	+/-40 mm
	Number of cycles =	15
	Frequency of movement = as ngd	Hz
i	Seal degradation	10% air seal removal? Y/N
Describe seals to be altered		

10.2. System Notes – from client

Decortech has engaged Cladding Systems to undertake AS/NZS 4284 testing of Spectraform / Mondoclad /Unoclad

- Two Spectraform systems are proposed to be tested each with 2 cladding products – Mondoclad and Unoclad.
- Spectraform is Decortech's brand name for cladding systems supporting 3mm 5052 H32 Aluminium cladding panels.
- Mondoclad is a pvdf coil coated 3mm solid aluminium panel which can be fabricated straight out of the box and immediately ready for install.
- Unoclad is a mill finish 3mm solid aluminium panel which is capable of being coated with a variety of decorative powdercoat finishes post fabrication these are represented in the test by a 3mm mill finish solid aluminium Panel.
- Because these are open joint systems particular attention has been paid to the cruciform and the addition of soakers.
- The RAB for the test is 8mm acrylic for its critical inspection of the whole of the reverse of the cladding.
- The RAB has been placed 2mm closed cell foam to provide a slip plane between the acrylic and the timber framework under seismic test.
- RAB to RAB joints (600 horizontal centres) have a screw with a washer under the screw head giving unobstructed movement under seismic test.
- Airseal on these joints is provided by Pro Clima tape.
- The unitised system has been tested previously as a sealed system CSACM,
- Panel stiffeners have been introduced to suit the span/spacing/engineering requirements. An optional detail using the Spectraform rails as a stiffener was included in the test.
- The Spectraform system has Aluminium brackets that negate the need for packers and allow a degree of correction for a twisted substrate. These can be fixed to either studs or nogs.
- A pipe penetration through the cavity utilised a Vanluk Mg100 cavity flashing and external escutcheon plate.

10.3. Certificate of Identification

The client has provided the following certification to confirm that the sample matches the drawings.

CSnzL cladding systems (nz) ltd.

27th October 2023

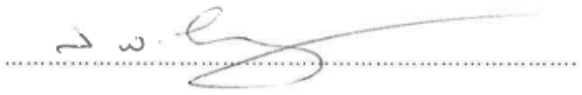
To Whom it May Concern

Re: C0258 Certificate of Identification for SF45 & SFUT Systems AS/NZS 4284 Tests on behalf of Big River Group and Decortech

Cladding Systems (NZ) Ltd as the Designers and Manufacturers of the SF45 & SFUT Systems do confirm that the façade test sample is a true representation of an intended façade to be placed onto buildings which will incorporate the same materials and construction methodology as the drawings detailed in the following AS/NZS 4284 test reports:

1) Façade Lab Test Report No. 23-10 for the Spectraform SF45 open joint system.

2) Façade Lab Test Report No. 23-09 for the Spectraform SFUT open joint system.



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10.4. Serviceability Deflections

10.4.1. Stud Deflections

	Gauge 3	Gauge 2	Gauge 1	Span: 2802 mm		
Pressure (Pa)	Top (mm)	Mid (mm)	Bottom (mm)	Net deflection (mm)	Check	Defl/Span ratio
0	0.00	0.00	0.00	0.00		
500	1.37	2.15	0.51	1.21		2316
1000	4.30	5.85	1.92	2.74		1023
1500	5.59	8.49	3.03	4.18		670
2000	6.87	11.25	4.13	5.75		487
2500	8.10	14.06	5.39	7.32		383
0	0.19	0.44	0.22	0.24		
0	0.00	0.00	0.00	0.00		
-580	-2.72	-3.61	-1.33	-1.59		-1768
-1160	-5.54	-7.83	-2.71	-3.71		-756
-1740	-8.31	-12.09	-4.18	-5.85		-479
-2320	-11.01	-16.35	-5.72	-7.99		-351
-2900	-13.75	-20.49	-7.16	-10.04		-279
0	0.02	-0.41	-0.10	-0.37		
			Max	7.32	Min (+ve)	383
			Min	-10.04	Min (-ve)	279

Table 9: Serviceability Deflections

10.4.2. Spandrel Deflections

	Gauge 2	Gauge 3	Gauge 1	Span: 1120 mm		
Pressure (Pa)	Left (mm)	Mid (mm)	Right (mm)	Net deflection (mm)	Check	Defl/Span ratio
0	0.00	0.00	0.00	0.00		
500	1.80	3.07	0.85	1.75		642
1000	4.12	7.11	2.65	3.73		301
1500	6.08	10.69	4.21	5.55		202
2000	8.43	15.43	6.80	7.82		143
2500	10.09	18.44	8.03	9.38		119
0	0.00	0.00	0.00	0.00		
-580	-1.65	-2.97	-0.76	-1.77		-635
-1160	-3.56	-6.11	-1.94	-3.36		-333
-1740	-5.92	-9.55	-3.45	-4.87		-230
-2320	-8.00	-12.68	-4.84	-6.26		-179
-2900	-10.74	-16.03	-6.59	-7.37		-152
0	-0.61	-0.59	-0.43	-0.07		
			Max	9.38	Min (+ve)	119
			Min	-7.37	Min (-ve)	152

Table 10: Spandrel Serviceability Deflection

10.4.3. Seismic Serviceability Deflections

Cycle #	Displacements (mm)				
	Beam	Sample (+)	Zero	Sample (-)	Beam
1		20	0	-20	
2		20	0	-20	
3		20	0	-20	
4		20	0	-20	
5		20	0	-20	
6		20	0	-20	
7		20	0	-20	
8		20	0	-20	
9		20	0	-20	
10		20	0	-20	
11		20	0	-20	
12		20	0	-20	
13		20	0	-20	
14		20	0	-20	
15		20	0	-20	

Table 11: Seismic Serviceability Deflections

10.5. Ultimate Limit State Deflections

Cycle #	Displacements (mm)				
	Beam	Sample (-)	Zero	Sample (+)	Beam
1		40	0	-40	
2		40	0	-40	
3		40	0	-40	
4		40	0	-40	
5		40	0	-40	
6		40	0	-40	
7		40	0	-40	
8		40	0	-40	
9		40	0	-40	
10		40	0	-40	
11		40	0	-40	
12		40	0	-40	
13		40	0	-40	
14		40	0	-40	
15		40	0	-40	

Table 12: Ultimate Displacements (Seismic)

10.6. Drawings

Drawings in this report have been supplied by the client.

SPECTRAFORM Open Joint Test SFUT

SPECTRAFORM OPEN JOINT TEST - DRAWING INDEX

Sheet N°	Issue Date	Revision	Sheet Description	Products
A101	27/04/2023	A	FRAMING 3D VIEWS	NA
A102	27/04/2023	A	FRAMING REFERENCE ELEVATION	NA
A103	27/04/2023	A	FRAMING SECTIONS	NA
A104	27/04/2023	A	FRAMING PLANS	NA
A105	27/04/2023	A	RIGID AIR BARRIER 3D VIEWS	NA
A106	27/04/2023	A	RIGID AIR BARRIER LAYOUT PLANS	NA
A107	27/04/2023	A	RIGID AIR BARRIER VERTICAL SECTIONS	NA
A108	27/04/2023	A	3D REFERENCE ELEVATION LEFT	CSACM
A109	27/04/2023	A	3D REFERENCE ELEVATION RIGHT	CSACM
A110	27/04/2023	A	PANELS NUMBERS LEFT	CSACM
A111	27/04/2023	A	PANELS NUMBERS RIGHT	CSACM
A112	27/04/2023	A	PANELS ELEVATION	CSACM
A113	27/04/2023	A	PANEL LAYOUT PLANS	CSACM
A114	27/04/2023	A	PANEL VERTICAL SECTIONS	CSACM
A115	27/04/2023	A	COMPONENTS	CSACM
01	27/04/2023	A	TOP BOOTH LINER SECTION SEISMIC DETAIL	CSACM
02	27/04/2023	A	TOP BOOTH LINER SECTION DETAIL	CSACM
03	27/04/2023	A	SOFFIT CORNER SECTION DETAIL	CSACM
04	27/04/2023	A	SOFFIT / WALL JUNCTION SECTION DETAIL	CSACM
05	27/04/2023	A	BOTTOM BOOTH LINER SECTION DETAIL	CSACM
06	27/04/2023	A	HORIZONTAL JOINT SECTION DETAIL	CSACM
07	27/04/2023	A	VERTICAL JUNCTION PLAN DETAIL	CSACM
08	27/04/2023	A	INTERSTOREY JUNCTION SECTION DETAIL	CSACM
09	27/04/2023	A	LEFT JAMB BOOTH LINER PLAN DETAIL	CSACM
10	27/04/2023	A	EXTERNAL CORNER PLAN DETAIL	CSACM
11	27/04/2023	A	INTERNAL CORNER PLAN DETAIL	CSACM
12	27/04/2023	A	INTERNAL CORNER PLAN DETAIL	CSACM
13	27/04/2023	A	WINDOW HEAD SECTION DETAIL	CSACM
14	27/04/2023	A	WINDOW SILL SECTION DETAIL	CSACM
15	27/04/2023	A	WINDOW JAMB PLAN DETAIL	CSACM
16	27/04/2023	A	3D ALUMINIUM STIFFENER FIXING	CSACM
17	27/04/2023	A	PENETRATION PLAN DETAIL	CSACM
18	27/04/2023	A	RIGID AIR BARRIER TEST DETAILS	NA
19	27/04/2023	A	RIGID AIR BARRIER TEST DETAILS	NA
20	27/04/2023	A	RIGID AIR BARRIER TEST DETAILS	NA

SPECTRAFORM
ALUMINIUM PANEL SYSTEM

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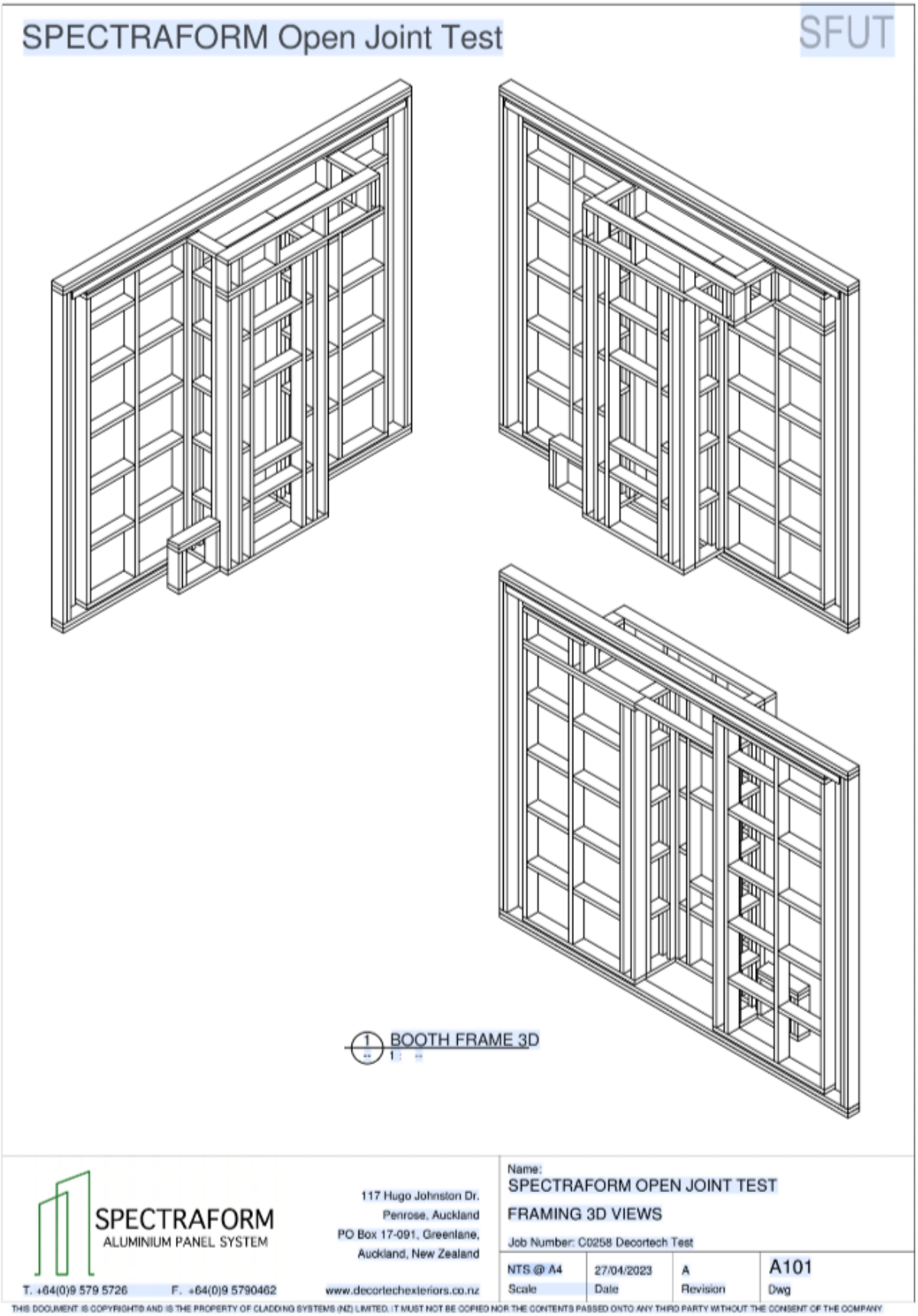
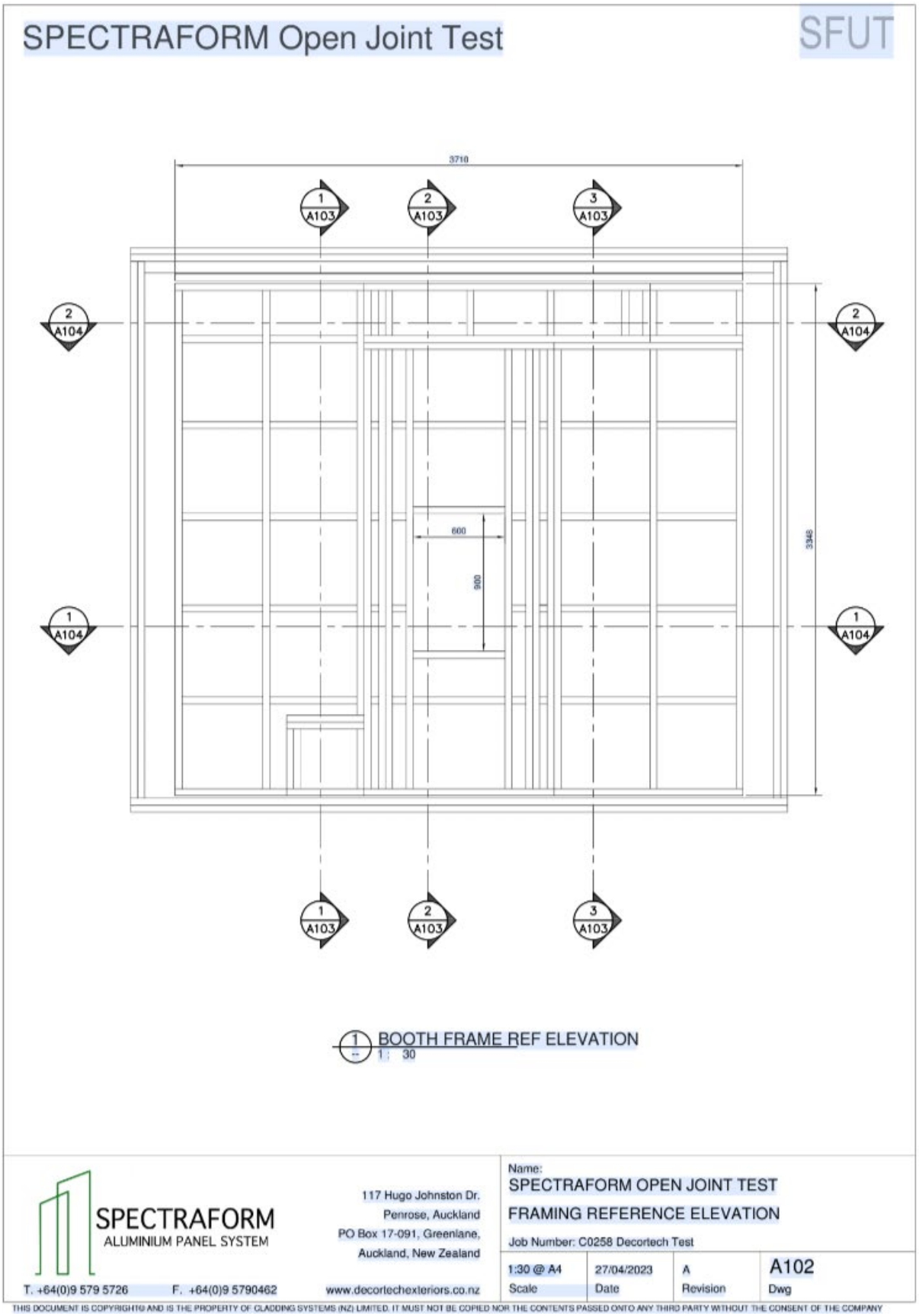
Name:
SPECTRAFORM OPEN JOINT TEST
INDEX
Job Number: C0258 Decortech Test

NTS @ A4	27/04/2023	A	IDX-00
Scale	Date	Revision	Dwg

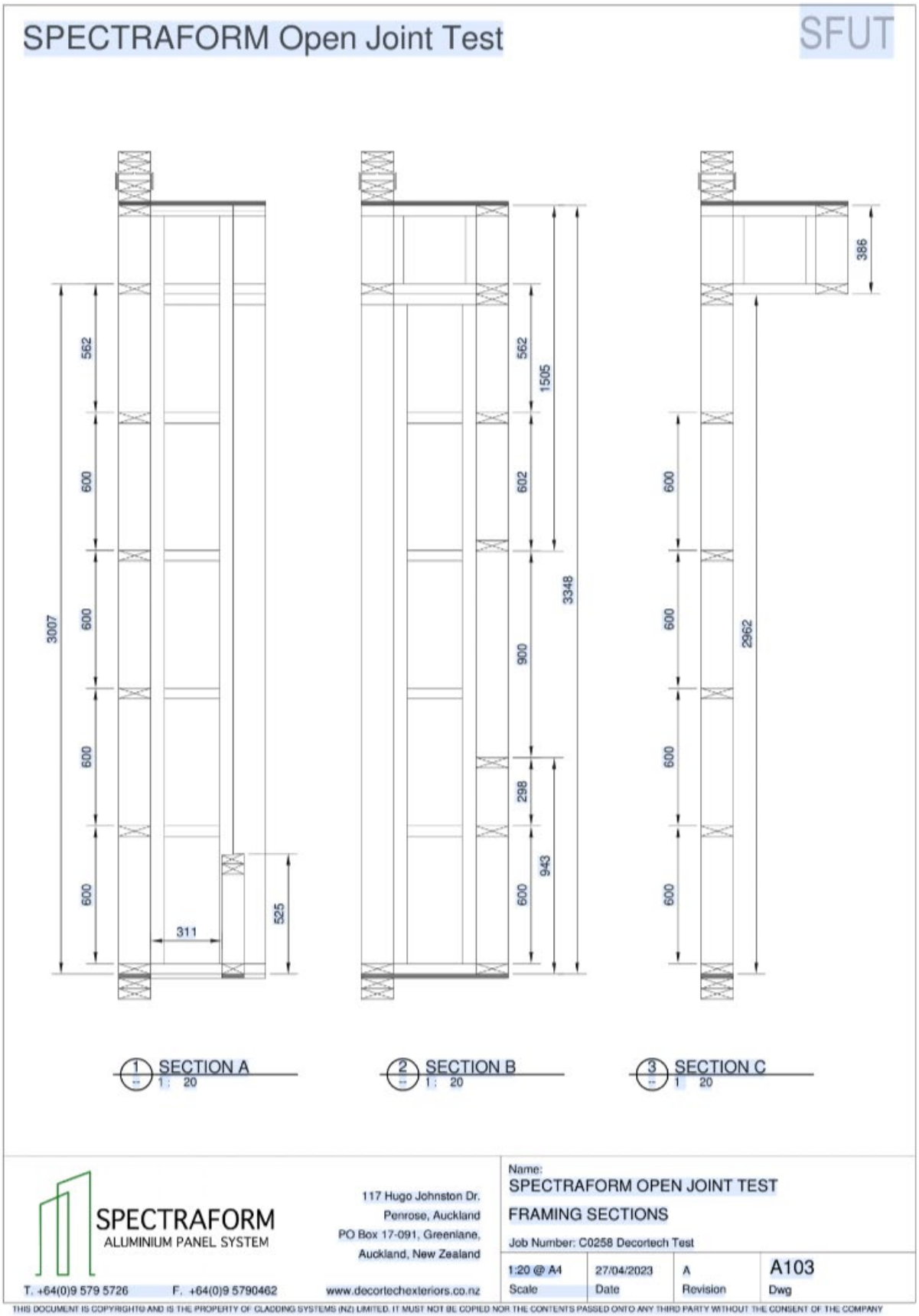
Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG



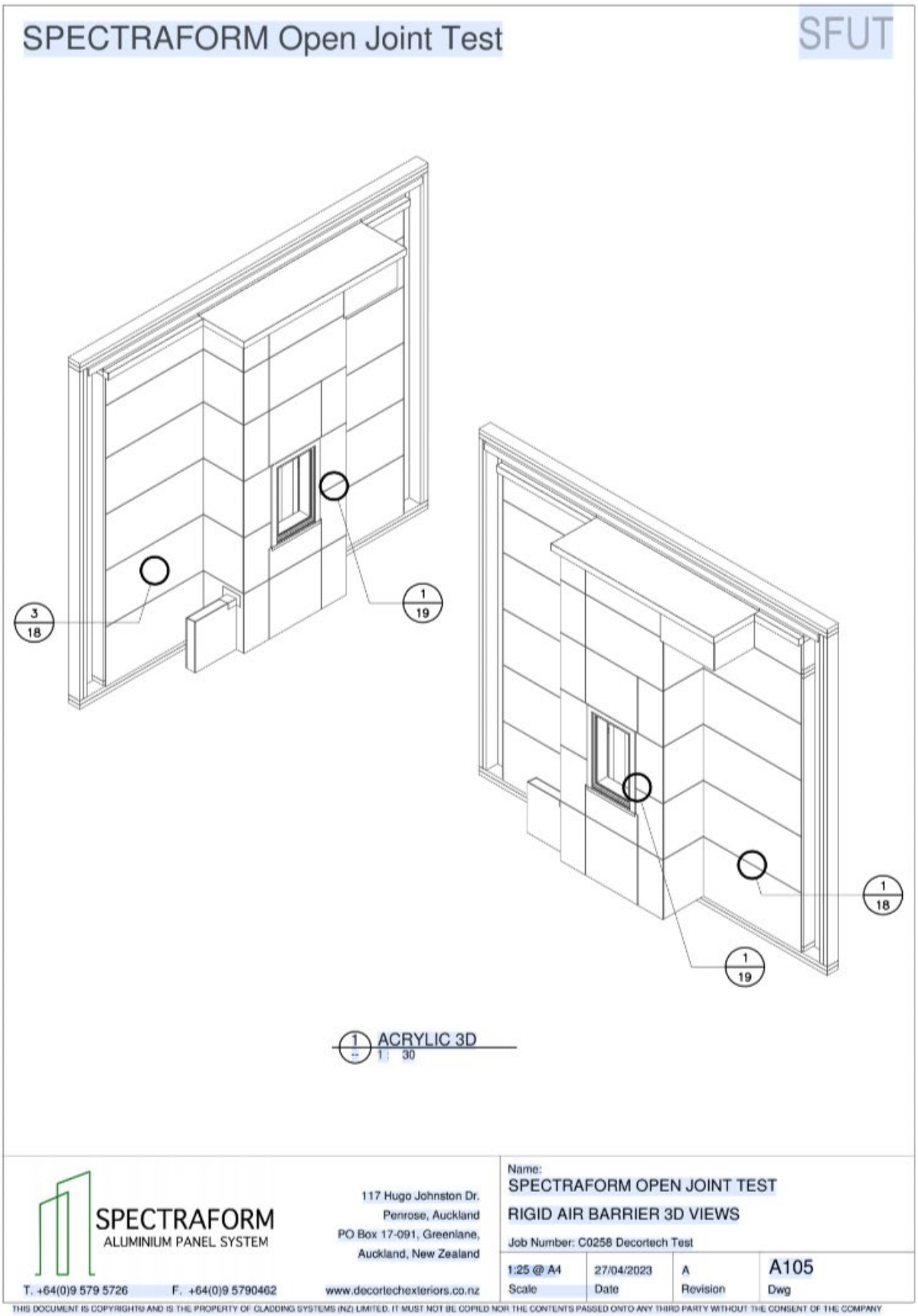
Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG



Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG



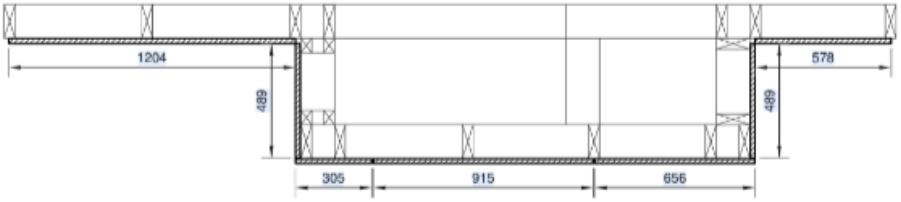
Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG



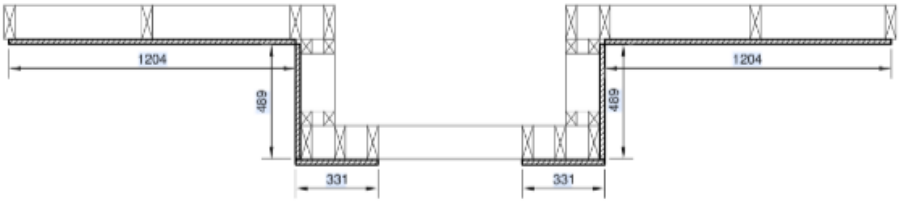
Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

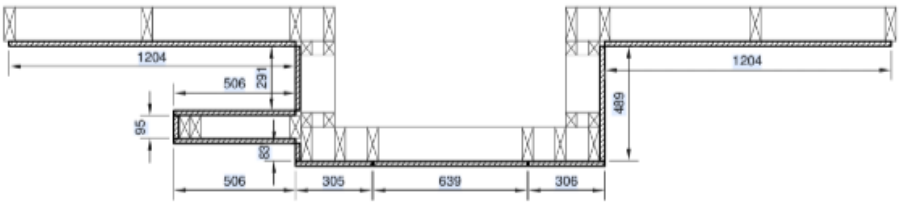
SFUT



1 SECTION A
1 : 20



2 SECTION B
1 : 20



3 SECTION C
1 : 20

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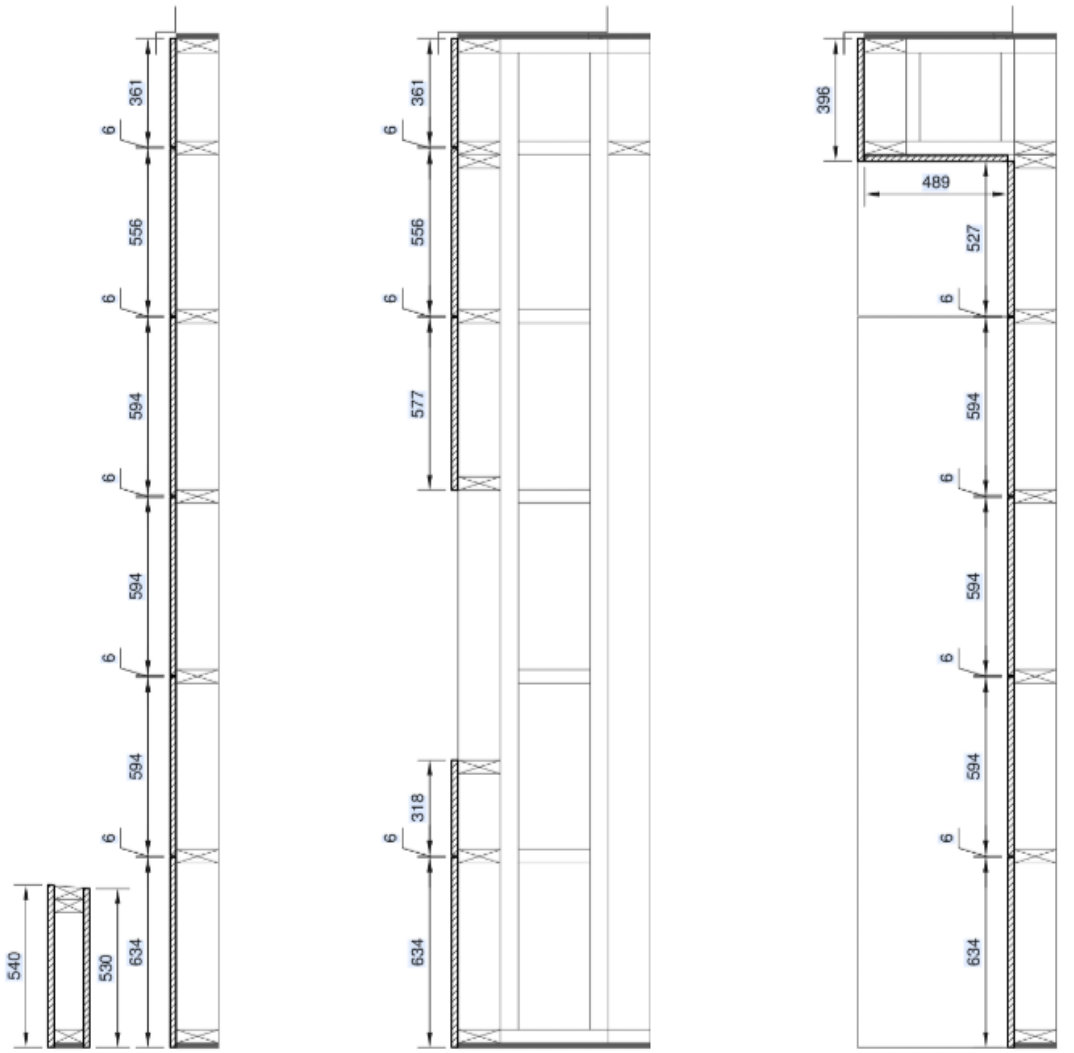
Name:
SPECTRAFORM OPEN JOINT TEST
RIGID AIR BARRIER LAYOUT PLANS
Job Number: C0258 Decortech Test

1:25 @ A4	27/04/2023	A	A106
Scale	Date	Revision	Dwg

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 SECTION D 1 : 20

2 SECTION E 1 : 20

3 SECTION F 1 : 20

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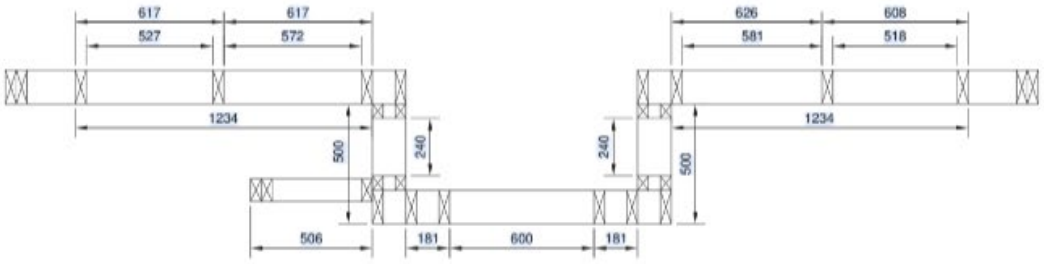
Name:
SPECTRAFORM OPEN JOINT TEST
RIGID AIR BARRIER VERTICAL SECTIONS
Job Number: C0258 Decortech Test

1:20 @ A4	27/04/2023	A	A107
Scale	Date	Revision	Dwg

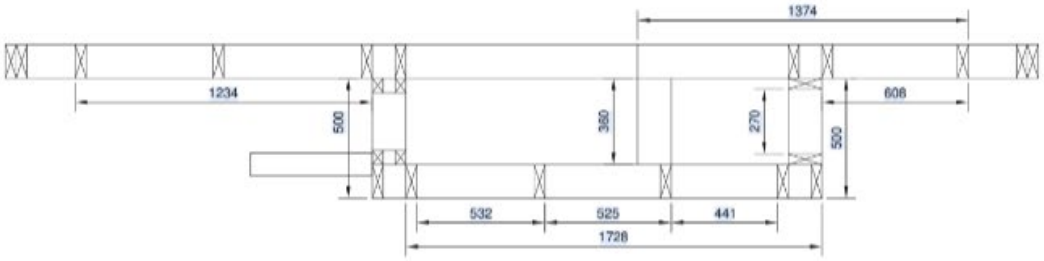
Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 SECTION D
1 25



2 SECTION E
1 25

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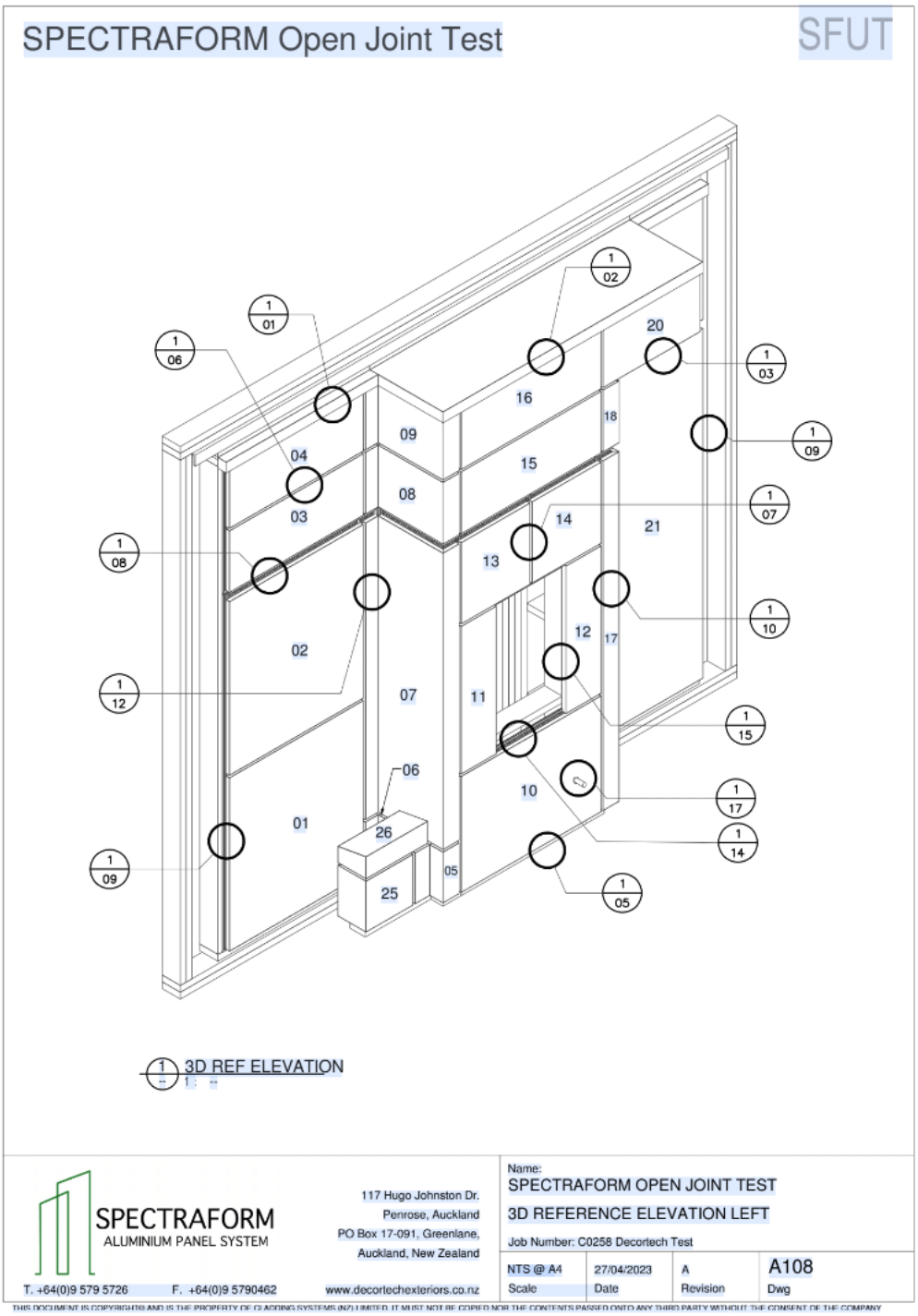
Name:
SPECTRAFORM OPEN JOINT TEST

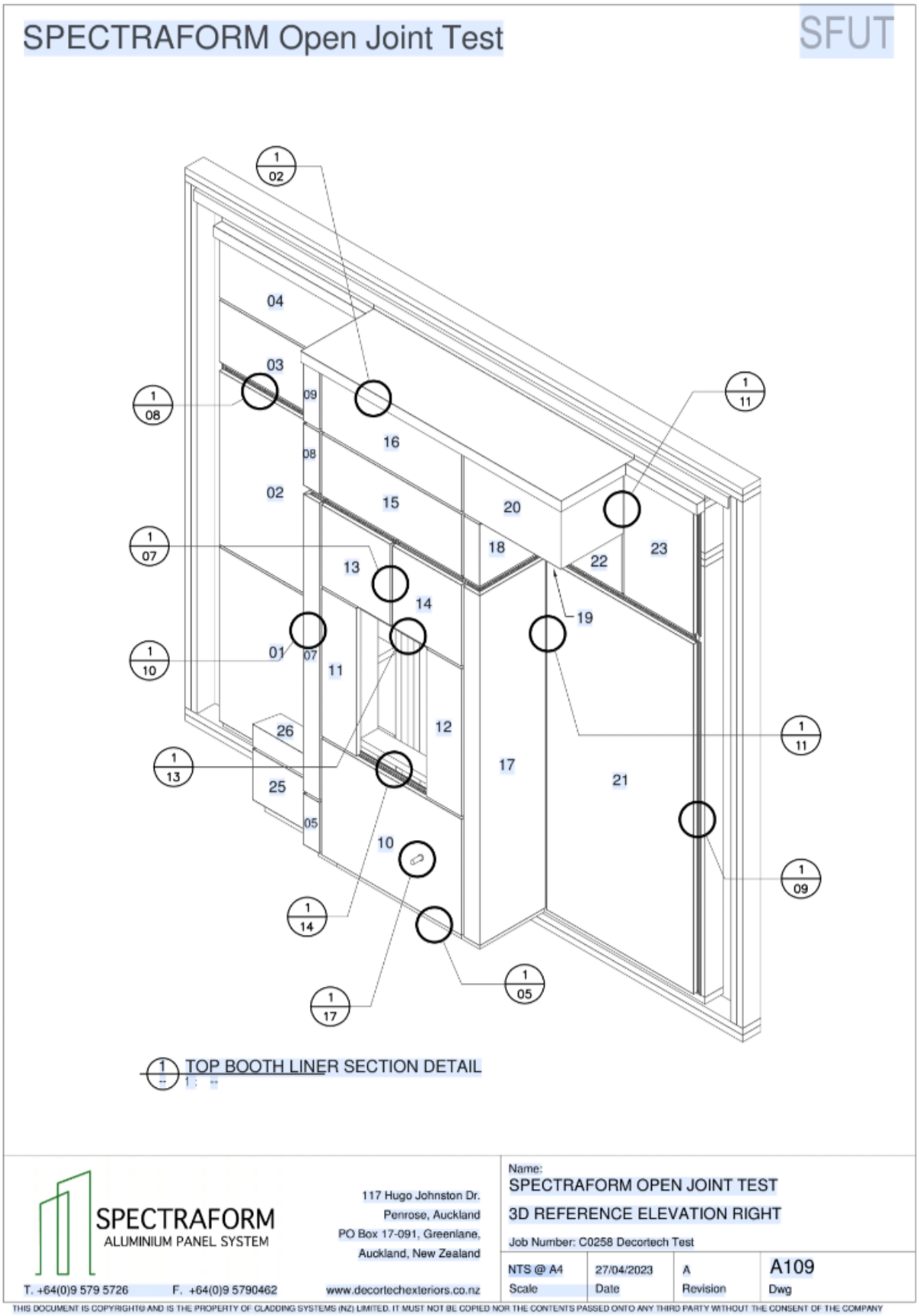
FRAMING PLANS

Job Number: C0258 Decortech Test

1:25 @ A4	27/04/2023	A	A104
Scale	Date	Revision	Dwg

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

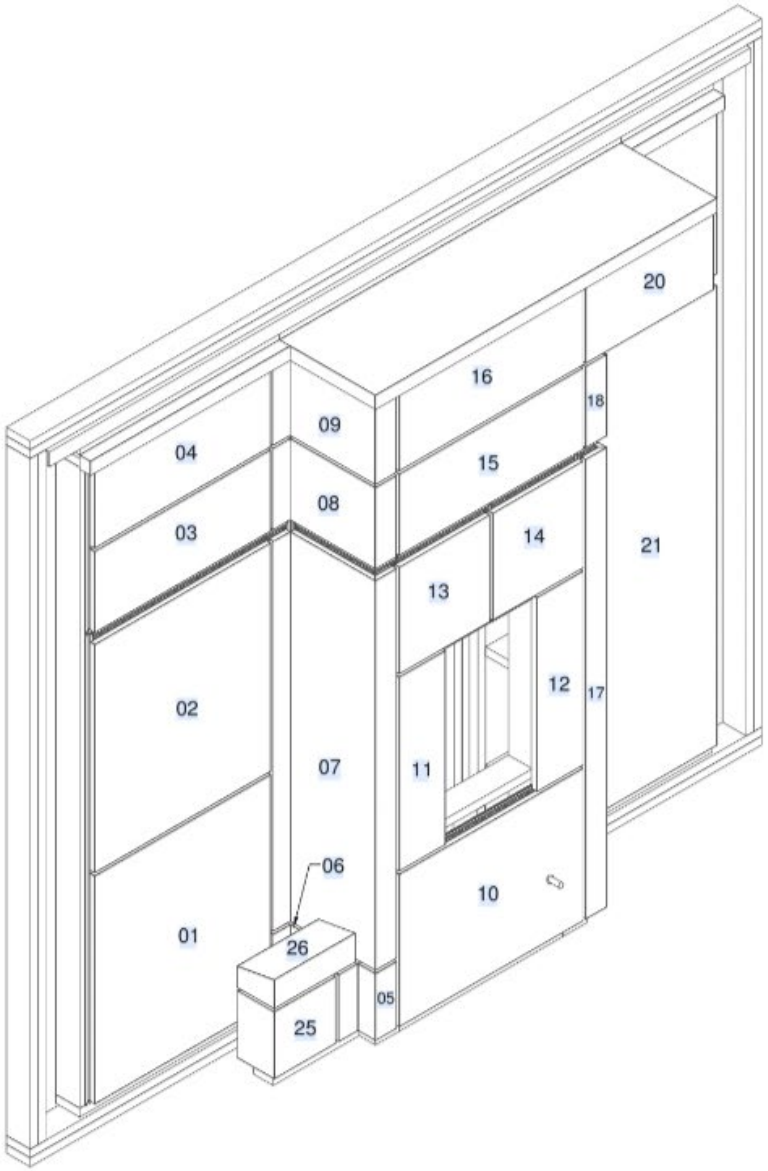




Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 PRABRICATED PANELS INDEX
1 : --

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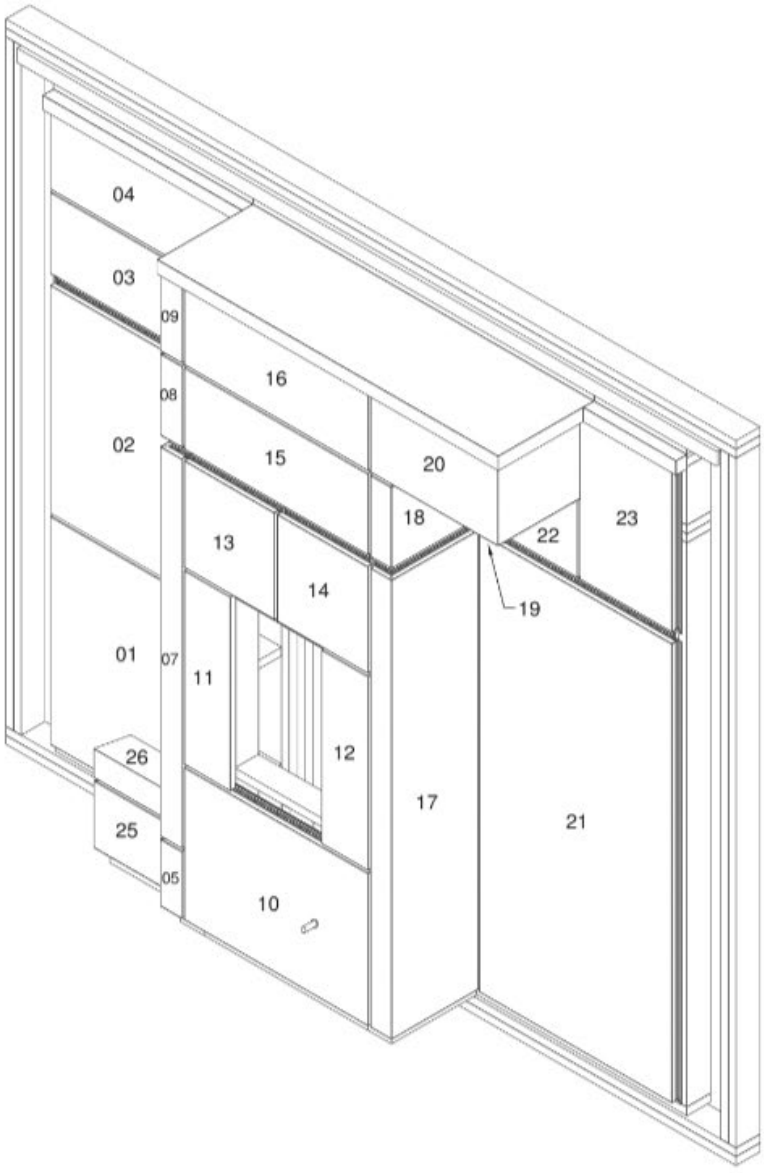
Name:
SPECTRAFORM OPEN JOINT TEST
PANELS NUMBERS LEFT
Job Number: C0258 Decortech Test

NTS @ A4	27/04/2023	A	A110
Scale	Date	Revision	Dwg

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 PREFABRICATED PANELS INDEX

SPECTRAFORM
ALUMINIUM PANEL SYSTEM

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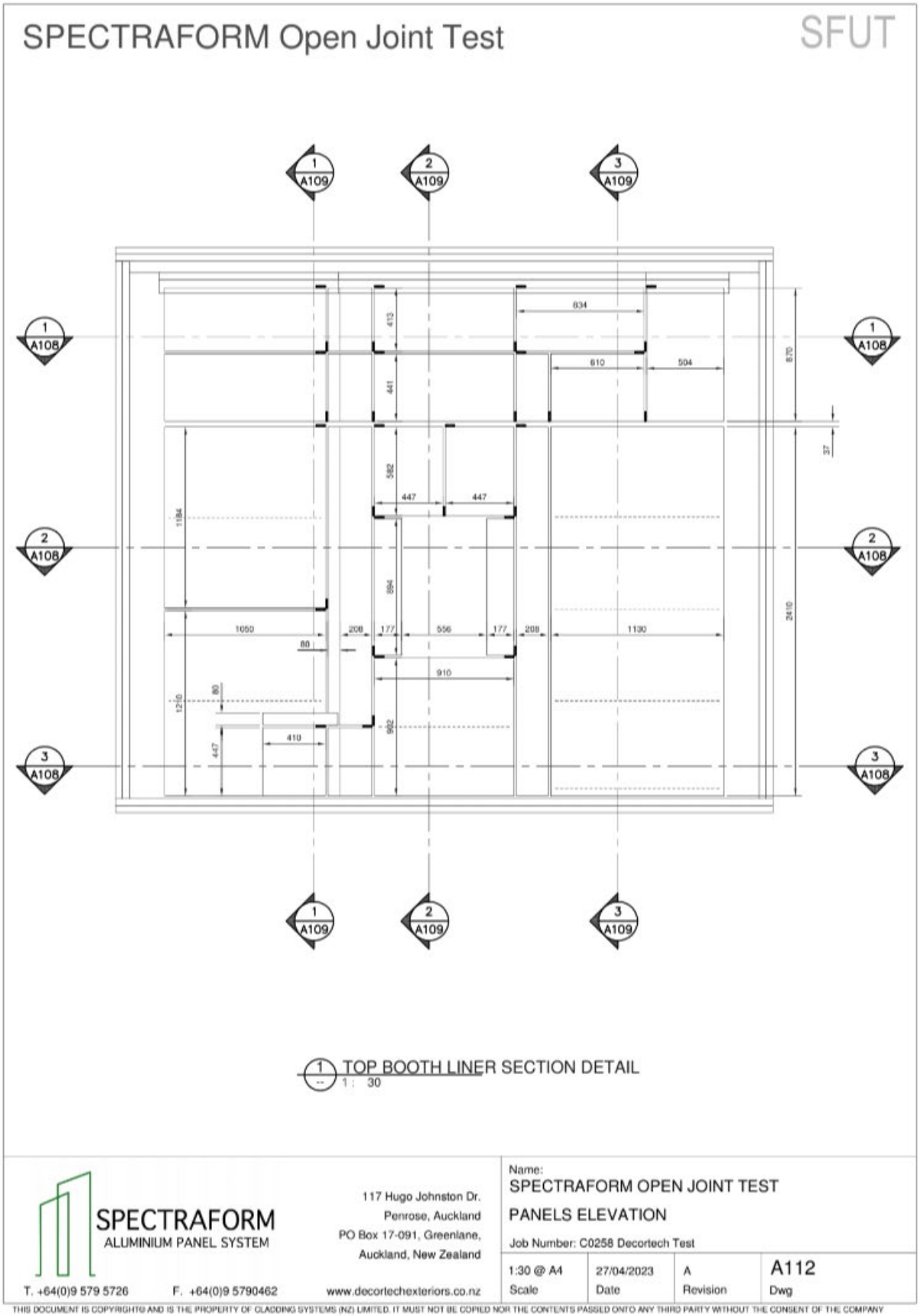
Name:
SPECTRAFORM OPEN JOINT TEST
PANELS NUMBERS RIGHT
Job Number: C0258 Decortech Test

NTS @ A4	27/04/2023	A	A111
Scale	Date	Revision	Dwg

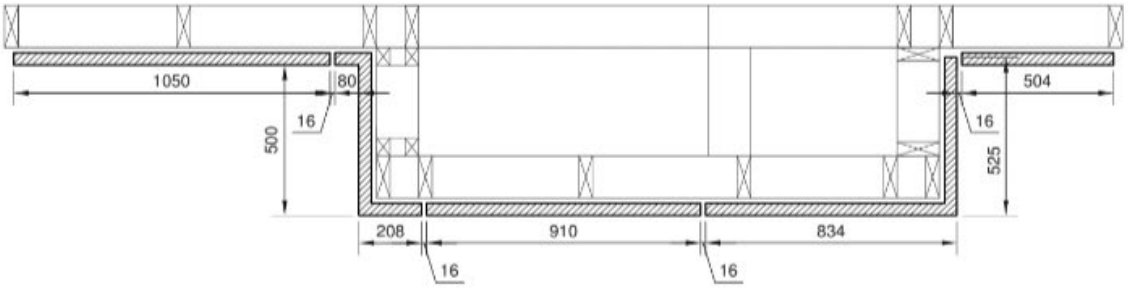
Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG



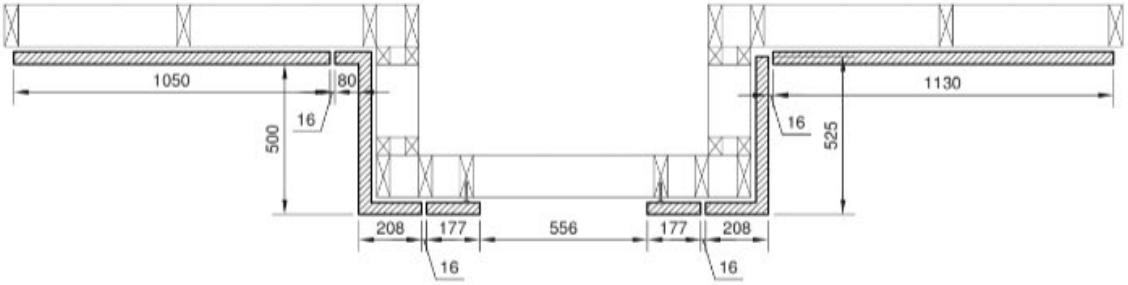
Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

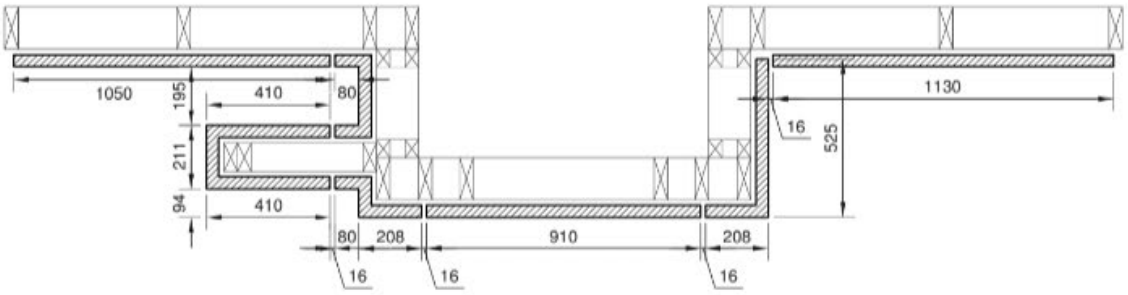
SFUT



1 SECTION A
1 : 20



2 SECTION B
1 : 20



3 SECTION C
1 : 20

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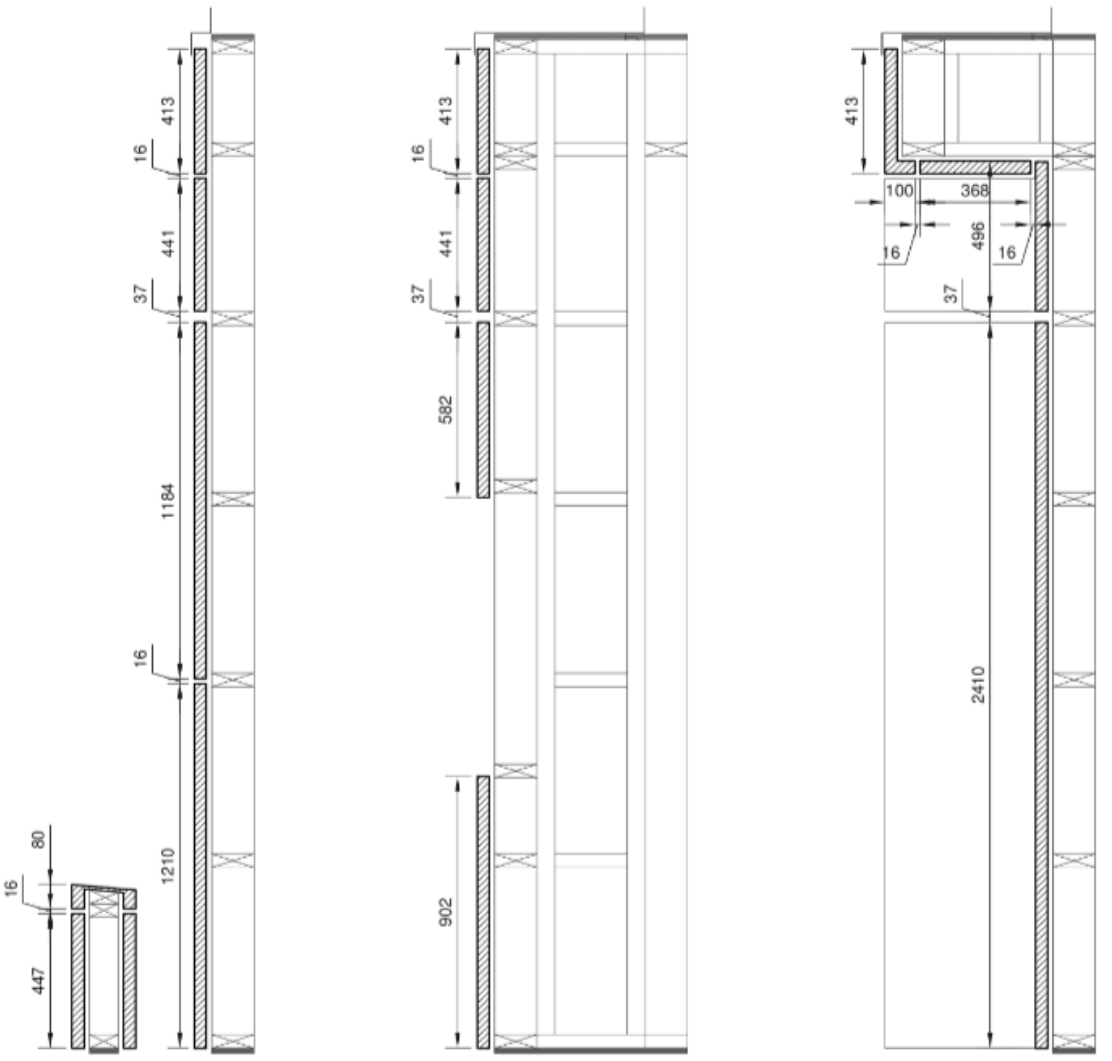
Name:
SPECTRAFORM OPEN JOINT TEST
PANEL LAYOUT PLANS
Job Number: C0258 Decortech Test

1:20 @ A4	27/04/2023	A	A113
Scale	Date	Revision	Dwg

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 SECTION D 1 : 20

2 SECTION E 1 : 20

3 SECTION F 1 : 20

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Name:
SPECTRAFORM OPEN JOINT TEST
PANEL VERTICAL SECTIONS
Job Number: C0258 Decortech Test

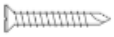
1:20 @ A4	27/04/2023	A	A114
Scale	Date	Revision	Dwg

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT

Blind Rivet 73 AS5-5

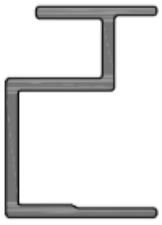


10g Countersunk Metal Tek screw
x30 long

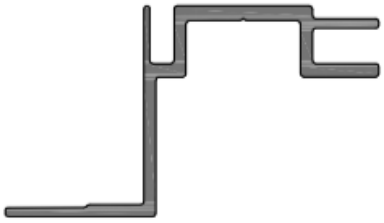
10g Countersunk Head screw
x50 long with washer

10g Pan Head screw x40 long

12g Timber Tek screw x65 long
Class 5 finish with neo washer



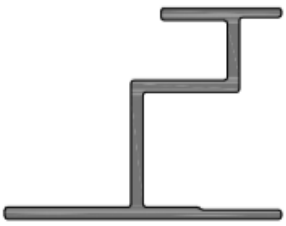
CSACM-01



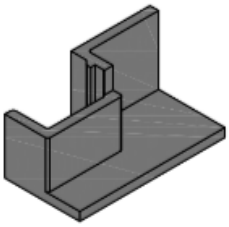
CSACM-02

CSACM-03

CSACM-04



CSACM-07



PROPRIETARY JOINT SOAKER

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Name:
SPECTRAFORM OPEN JOINT TEST
COMPONENTS

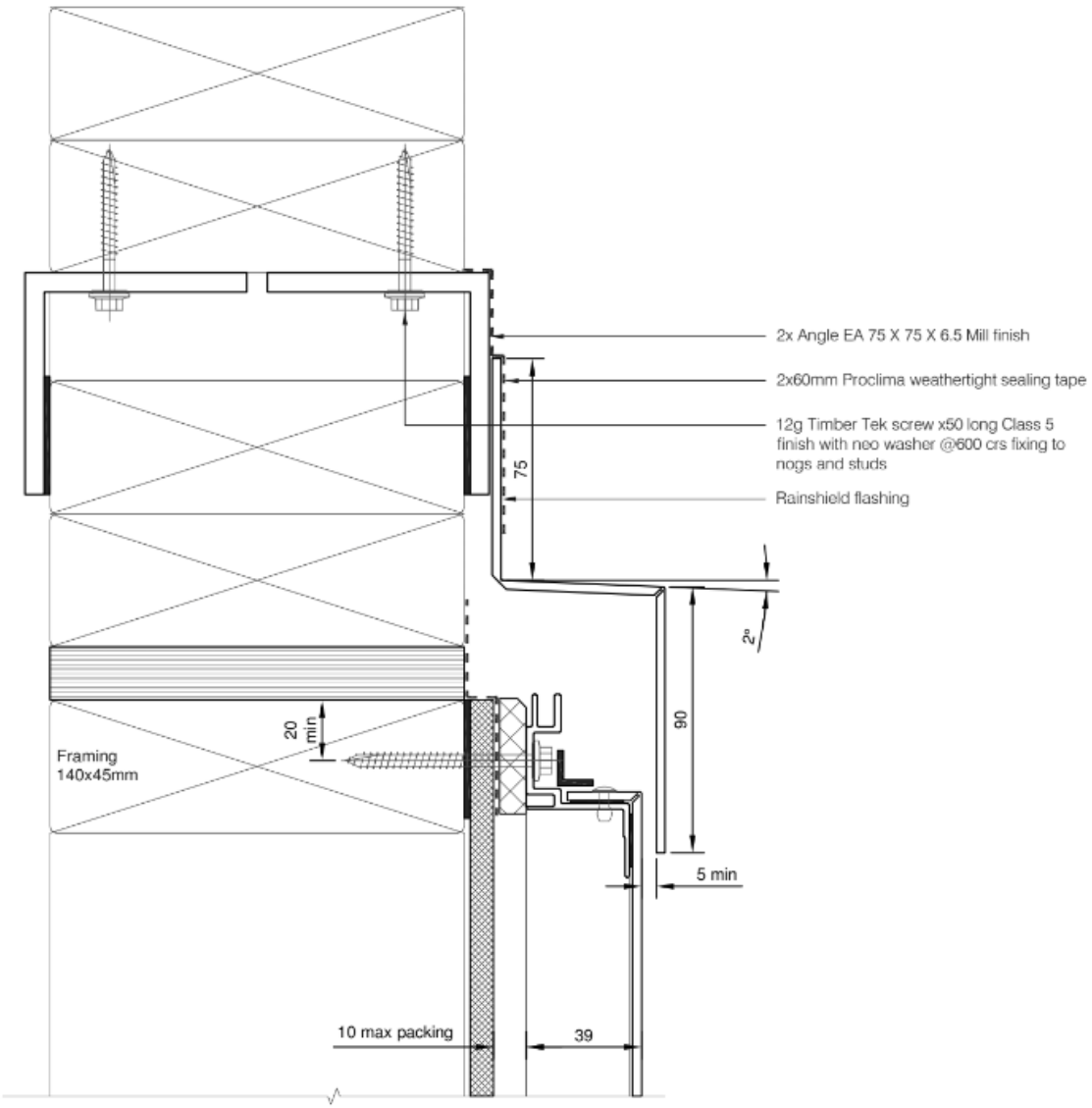
Job Number: C0258 Decortech Test

NTS @ A4	27/04/2023	A	A115
Scale	Date	Revision	Dwg

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 -- TOP BOOTH LINER SECTION SEISMIC DETAIL
1 : 2

SPECTRAFORM
ALUMINIUM PANEL SYSTEM

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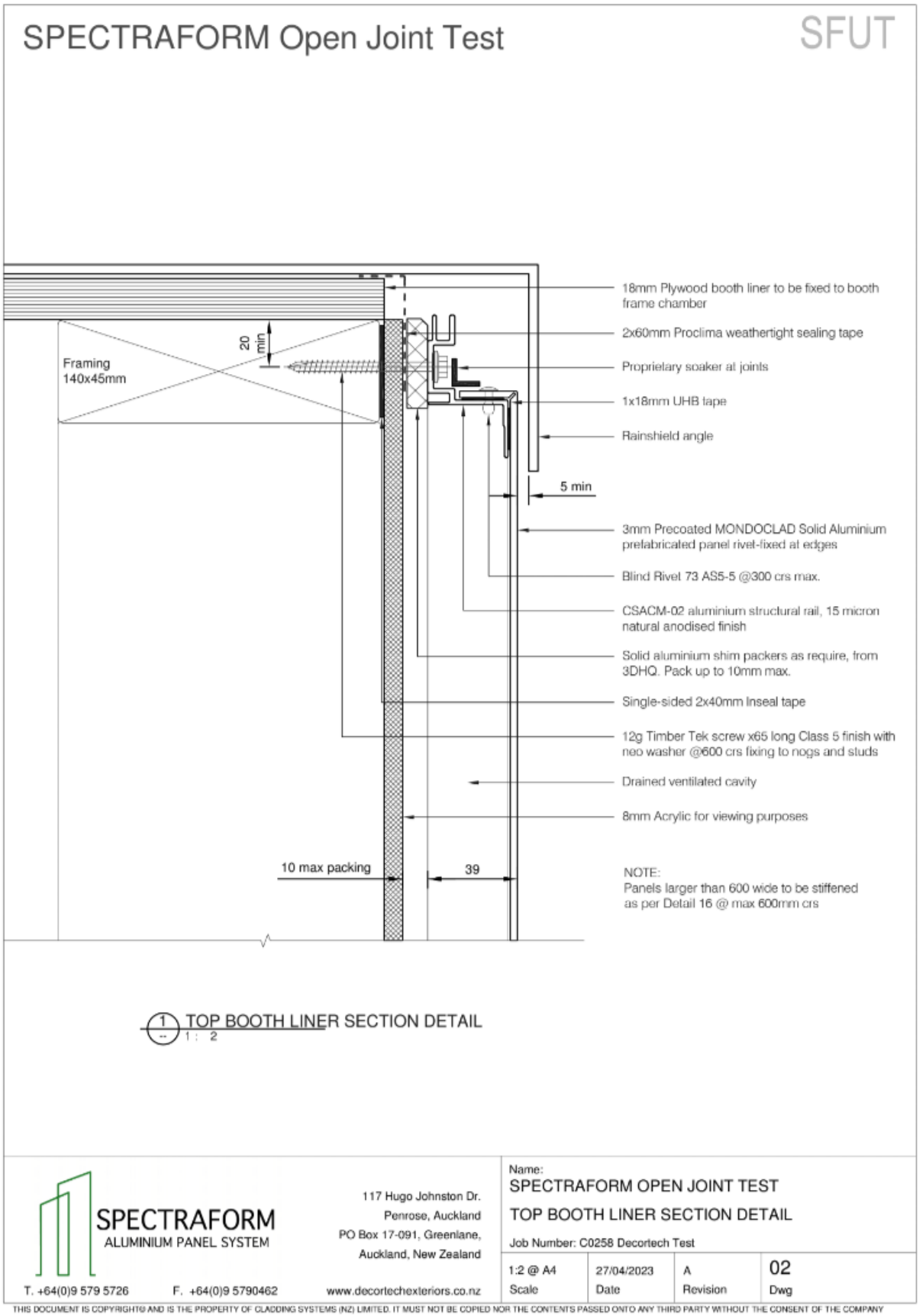
Name:
SPECTRAFORM OPEN JOINT TEST
TOP BOOTH LINER SECTION SEISMIC DETAIL
Job Number: C0258 Decortech Test

1:2 @ A4	27/04/2023	A	01
Scale	Date	Revision	Dwg

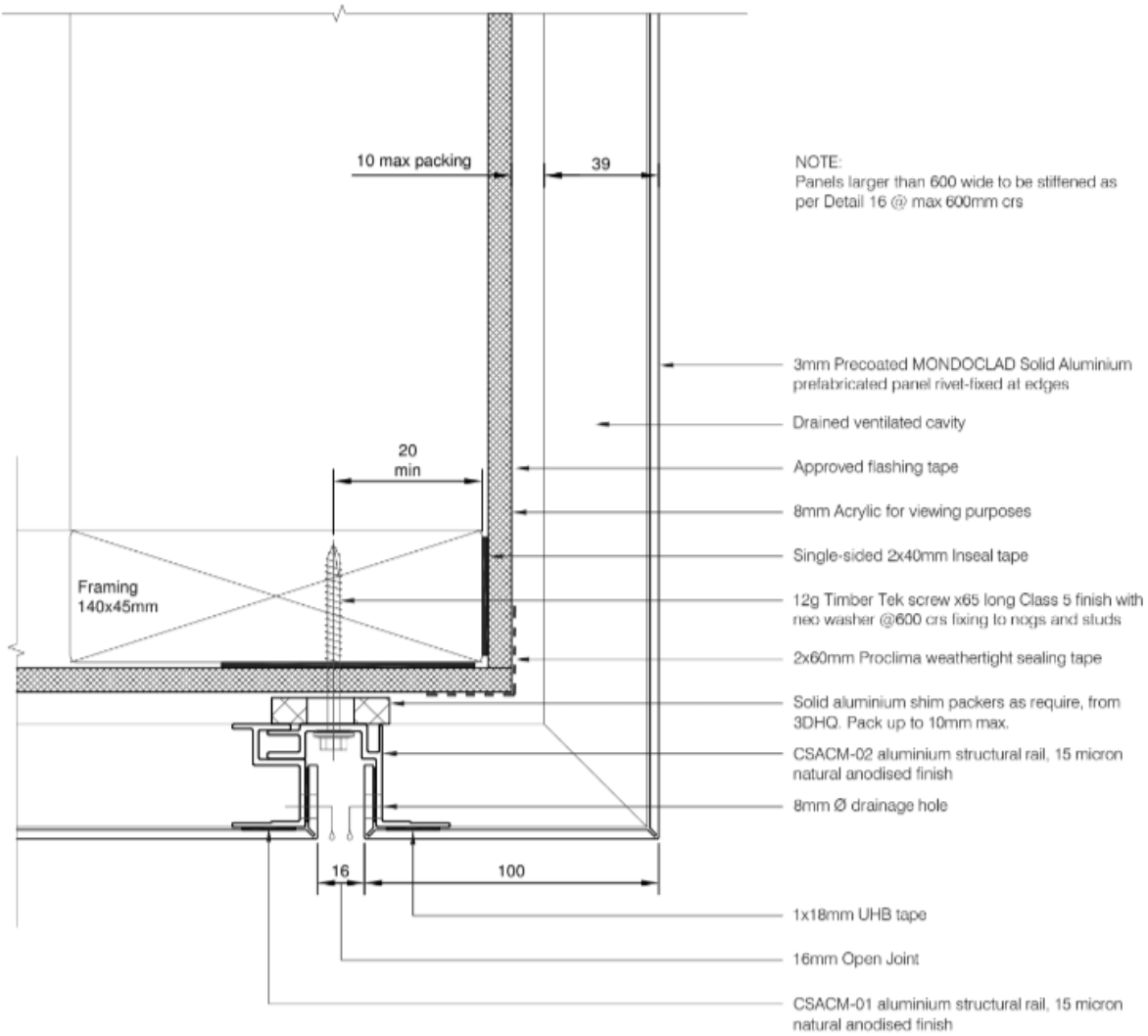
Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG



Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 SOFFIT CORNER SECTION DETAIL
1 : 2

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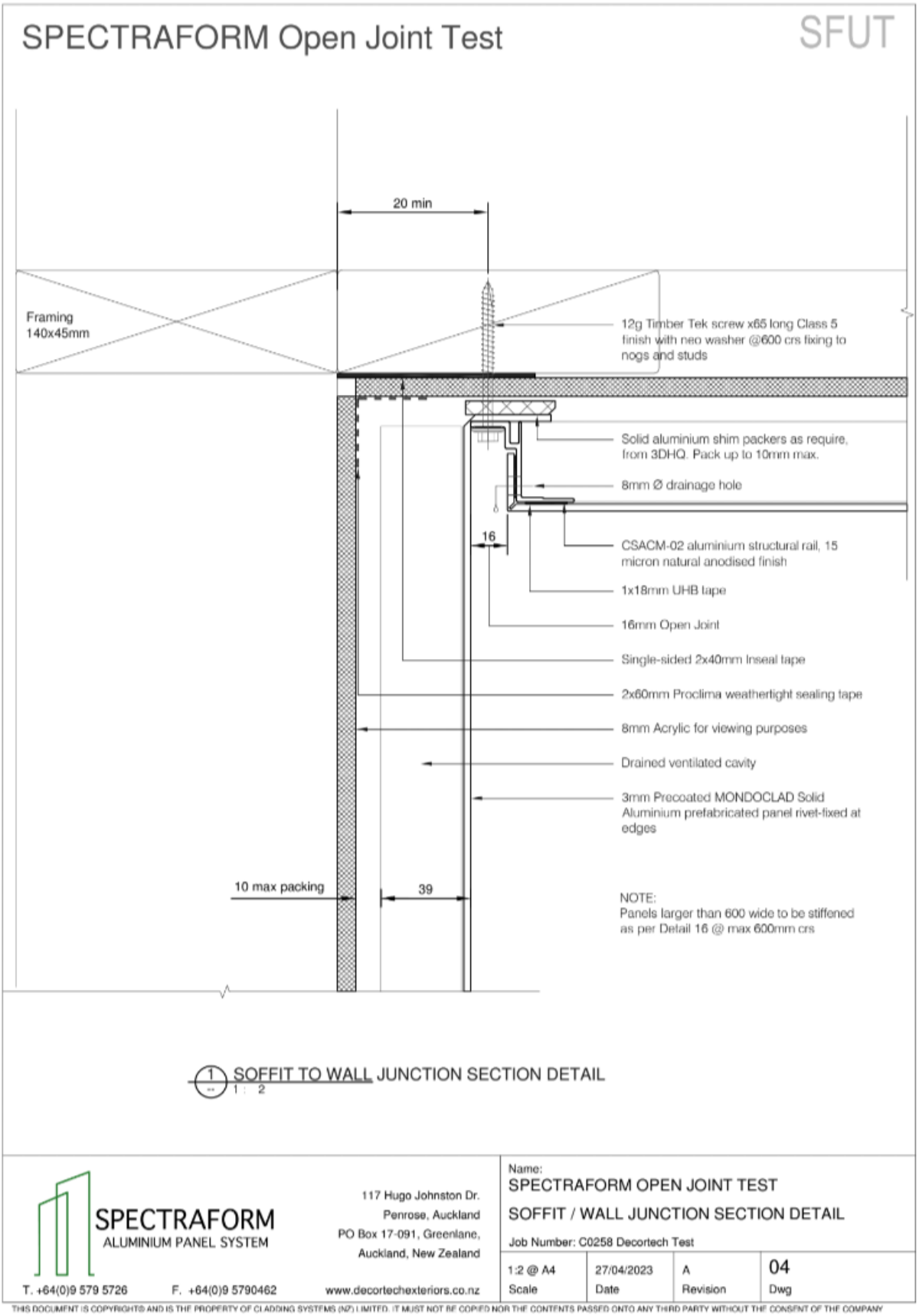
Name:
SPECTRAFORM OPEN JOINT TEST
SOFFIT CORNER SECTION DETAIL
Job Number: C0258 Decortech Test

1:2 @ A4	27/04/2023	A	03
Scale	Date	Revision	Dwg

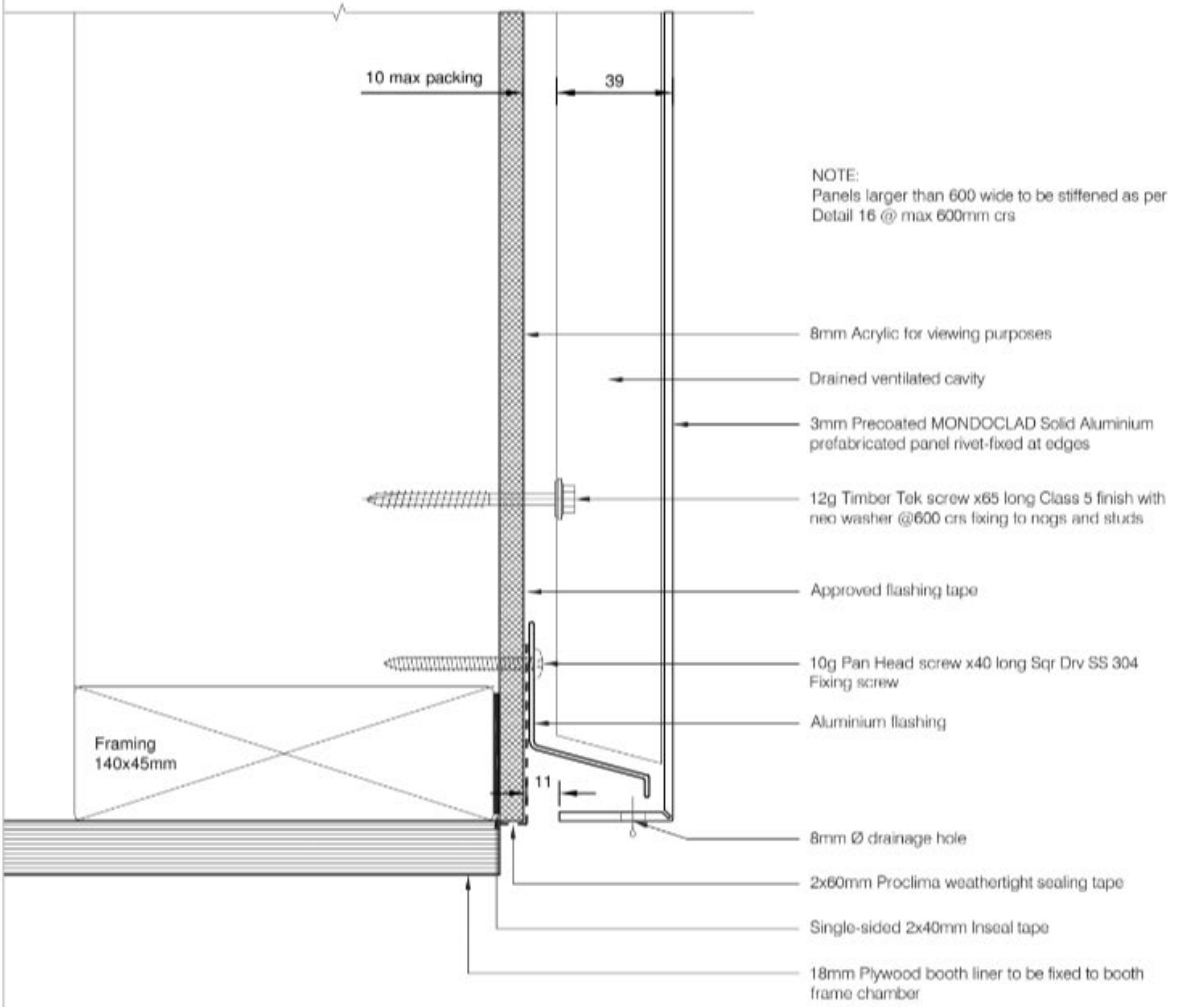
Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG



Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 BOTTOM BOOTH LINER SECTION DETAIL
1 : 2

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Name:
SPECTRAFORM OPEN JOINT TEST
BOTTOM BOOTH LINER SECTION DETAIL

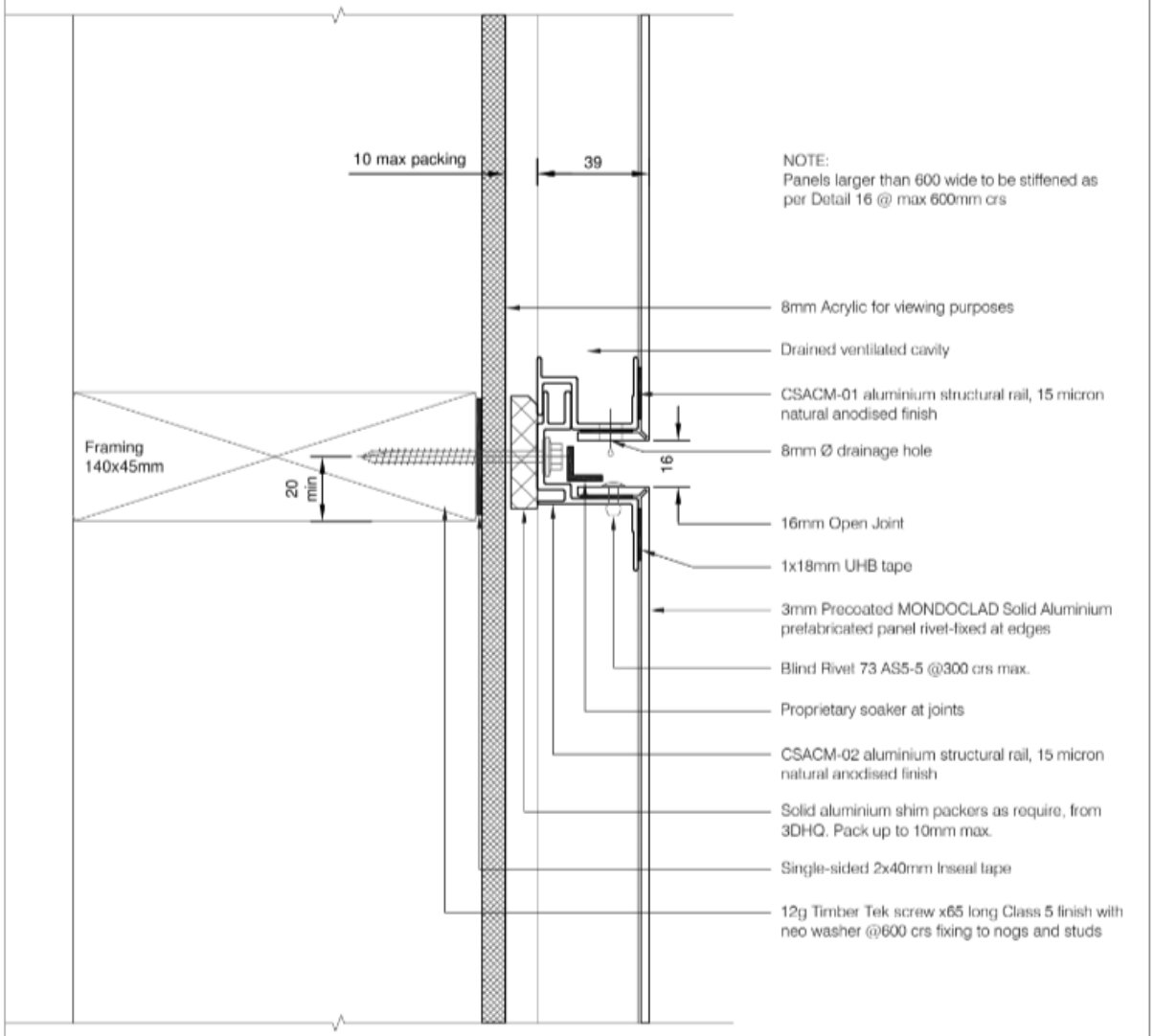
Job Number: C0258 Decortech Test

1:2 @ A4	27/04/2023	A	05
Scale	Date	Revision	Dwg

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 HORIZONTAL JOINT SECTION DETAIL
1 : 2

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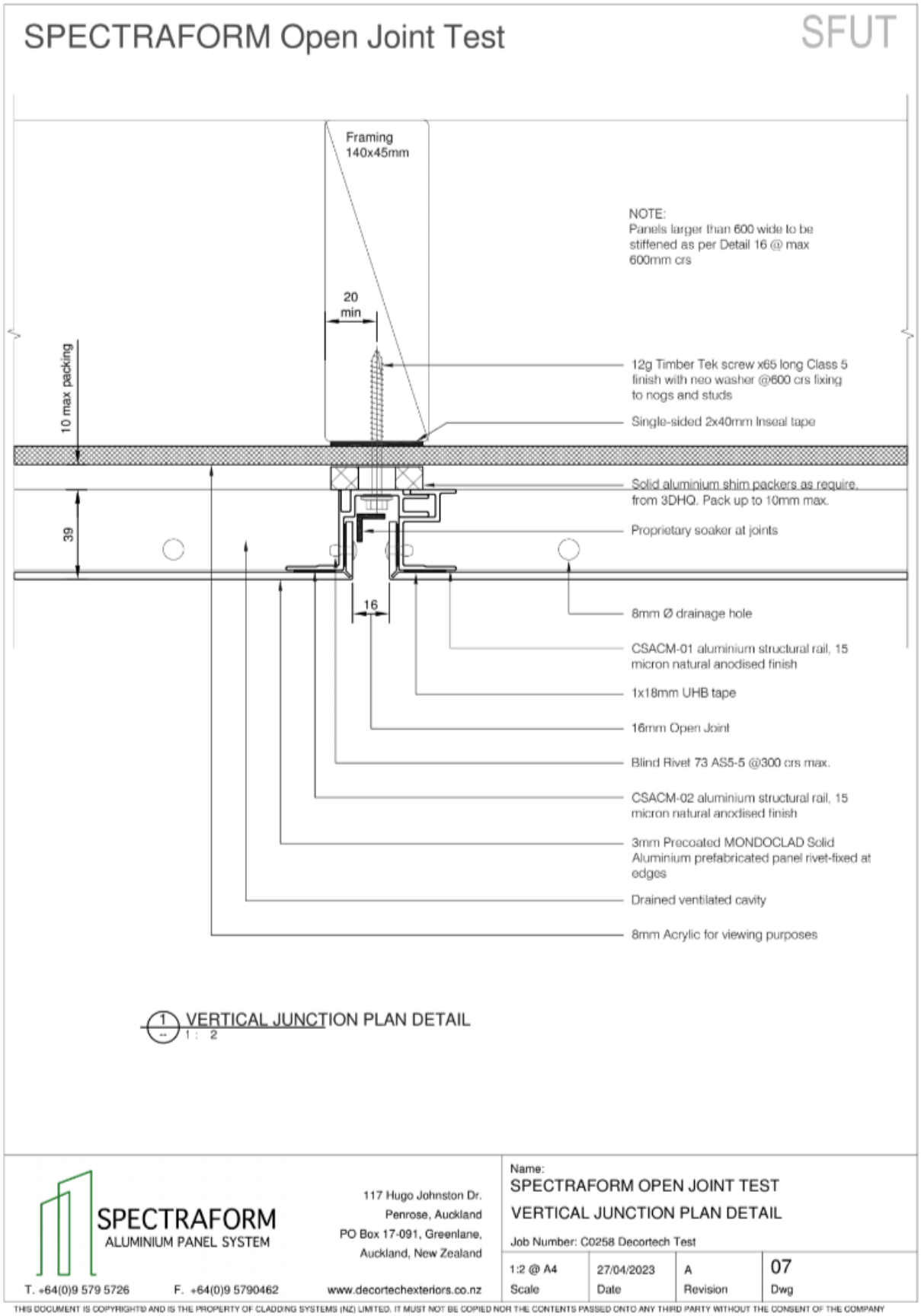
Name:
SPECTRAFORM OPEN JOINT TEST
HORIZONTAL JOINT SECTION DETAIL
Job Number: C0258 Decortech Test

1:2 @ A4	27/04/2023	A	06
Scale	Date	Revision	Dwg

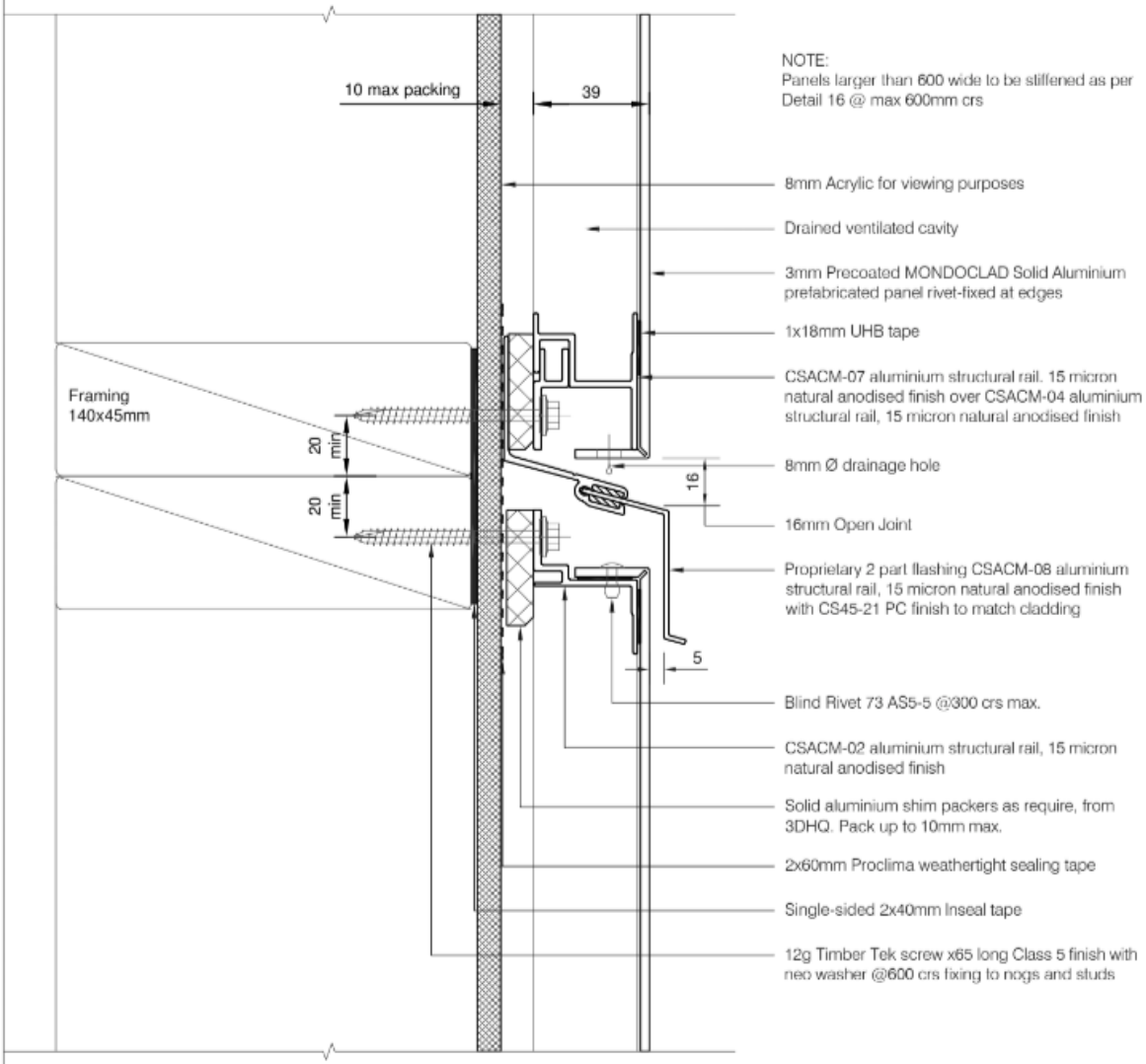
Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG



Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 INTERSTOREY JUNCTION SECTION DETAIL
1 : 2

SPECTRAFORM
ALUMINIUM PANEL SYSTEM

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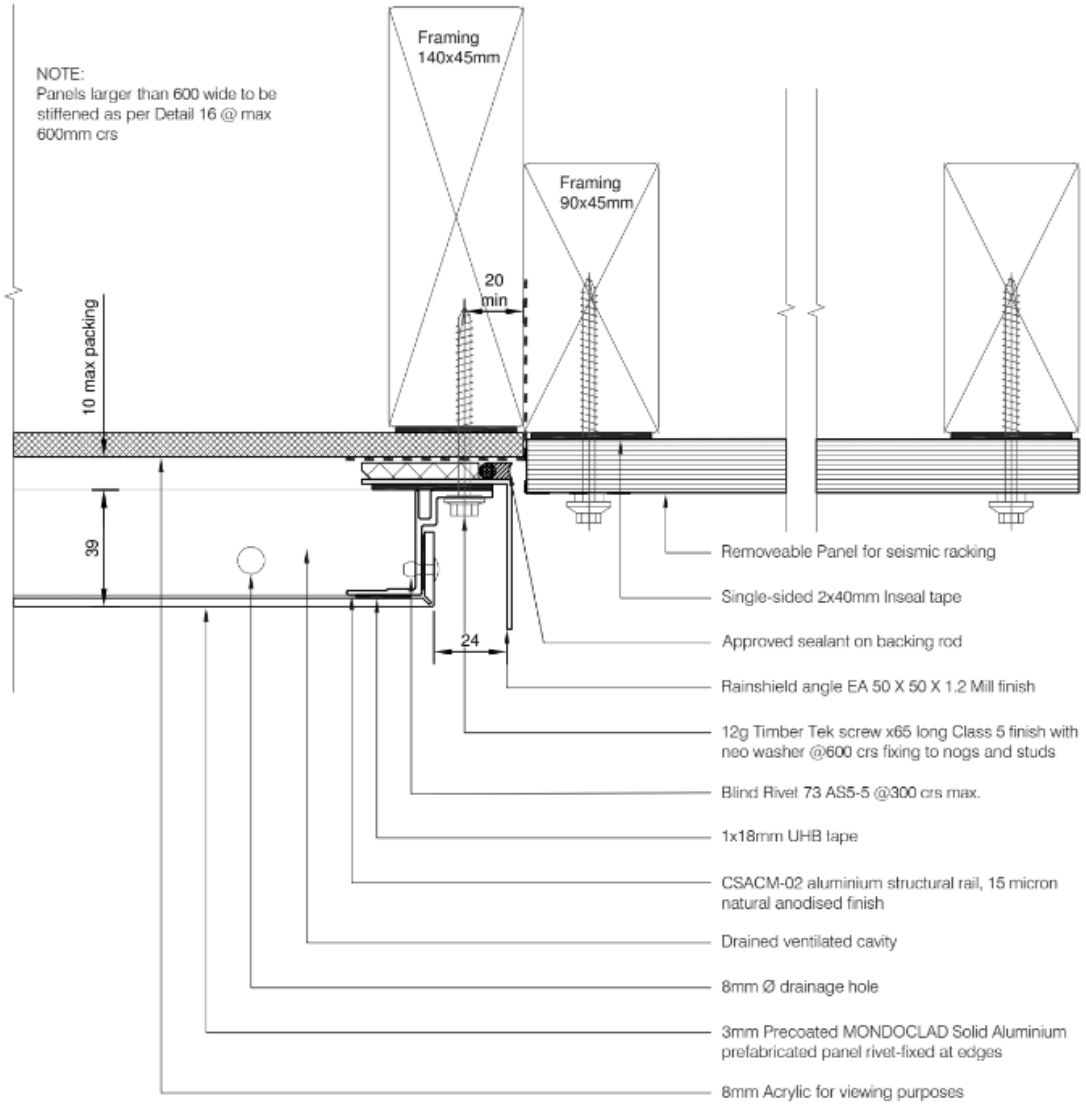
Name:
SPECTRAFORM OPEN JOINT TEST
INTERSTOREY JUNCTION SECTION DETAIL
Job Number: C0258 Decortech Test

1:2 @ A4	24/11/2018	A	08
Scale	Date	Revision	Dwg

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 RIGHT JAMB BOOTH LINER PLAN DETAIL
1 : 2

SPECTRAFORM
ALUMINIUM PANEL SYSTEM

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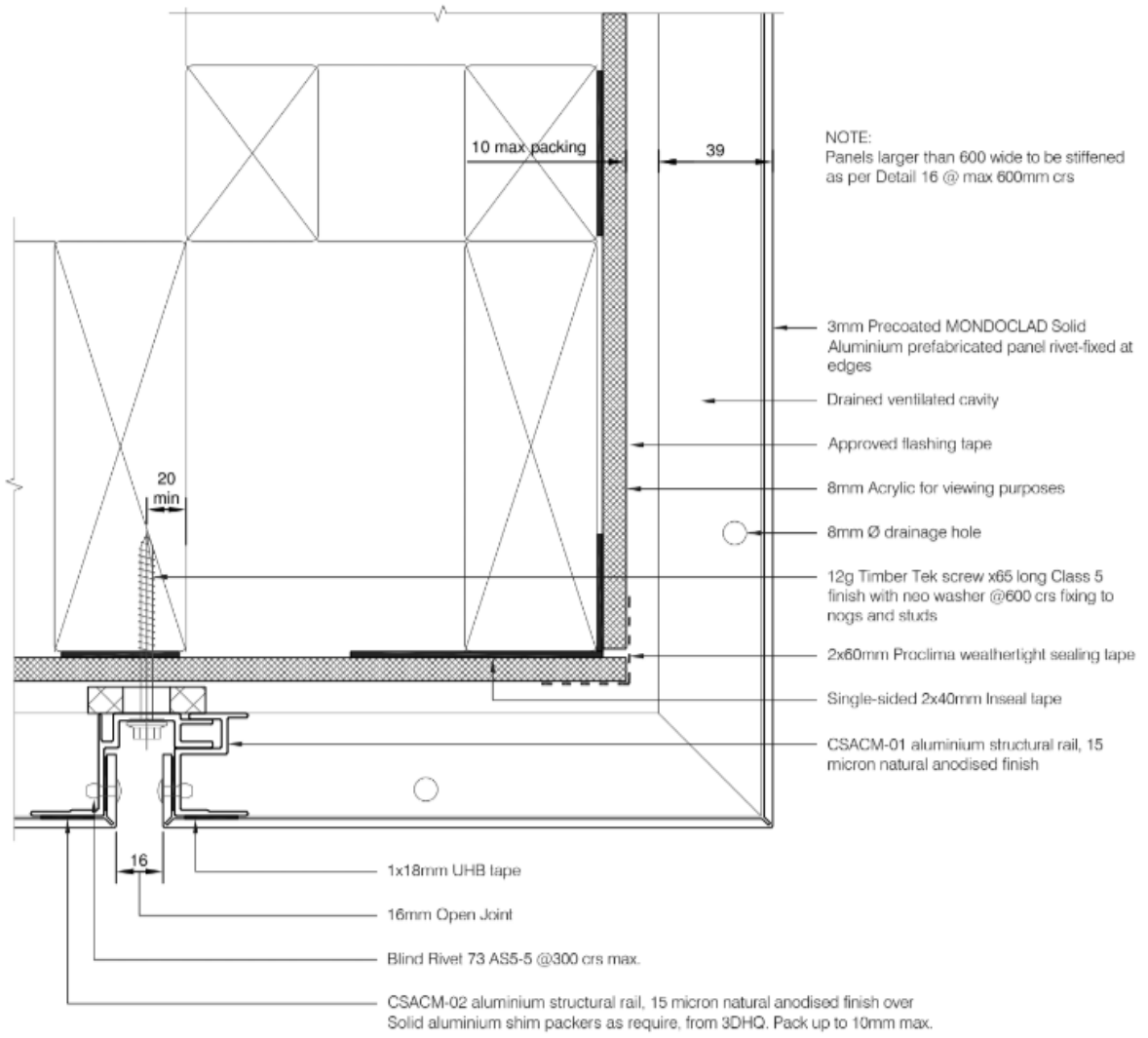
Name:
SPECTRAFORM OPEN JOINT TEST
LEFT JAMB BOOTH LINER PLAN DETAIL
Job Number: C0258 Decortech Test

1:2 @ A4	27/04/2023	A	09
Scale	Date	Revision	Dwg

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 EXTERNAL CORNER PLAN DETAIL
1 : 2

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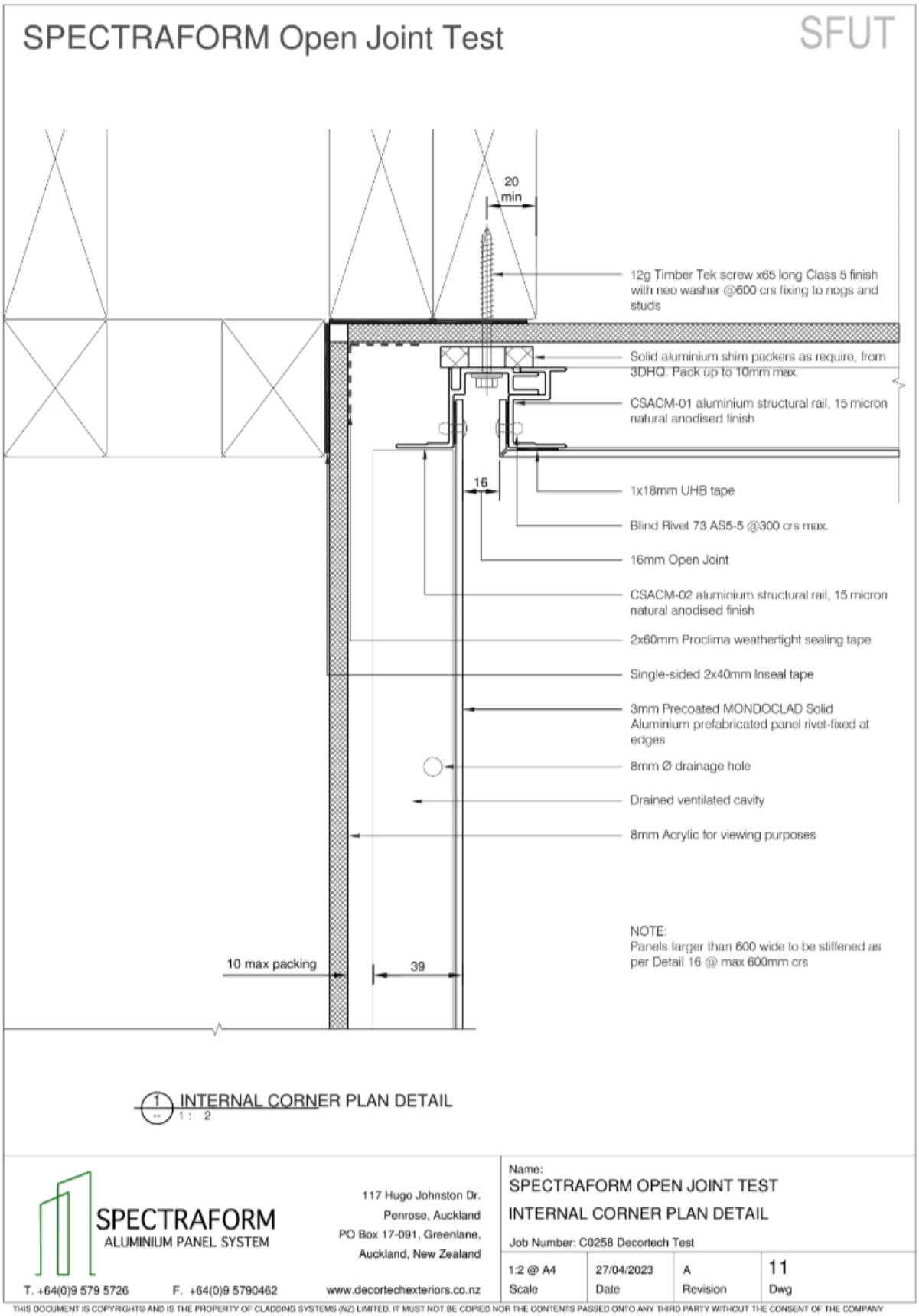
Name:
SPECTRAFORM OPEN JOINT TEST
EXTERNAL CORNER PLAN DETAIL
Job Number: C0258 Decortech Test

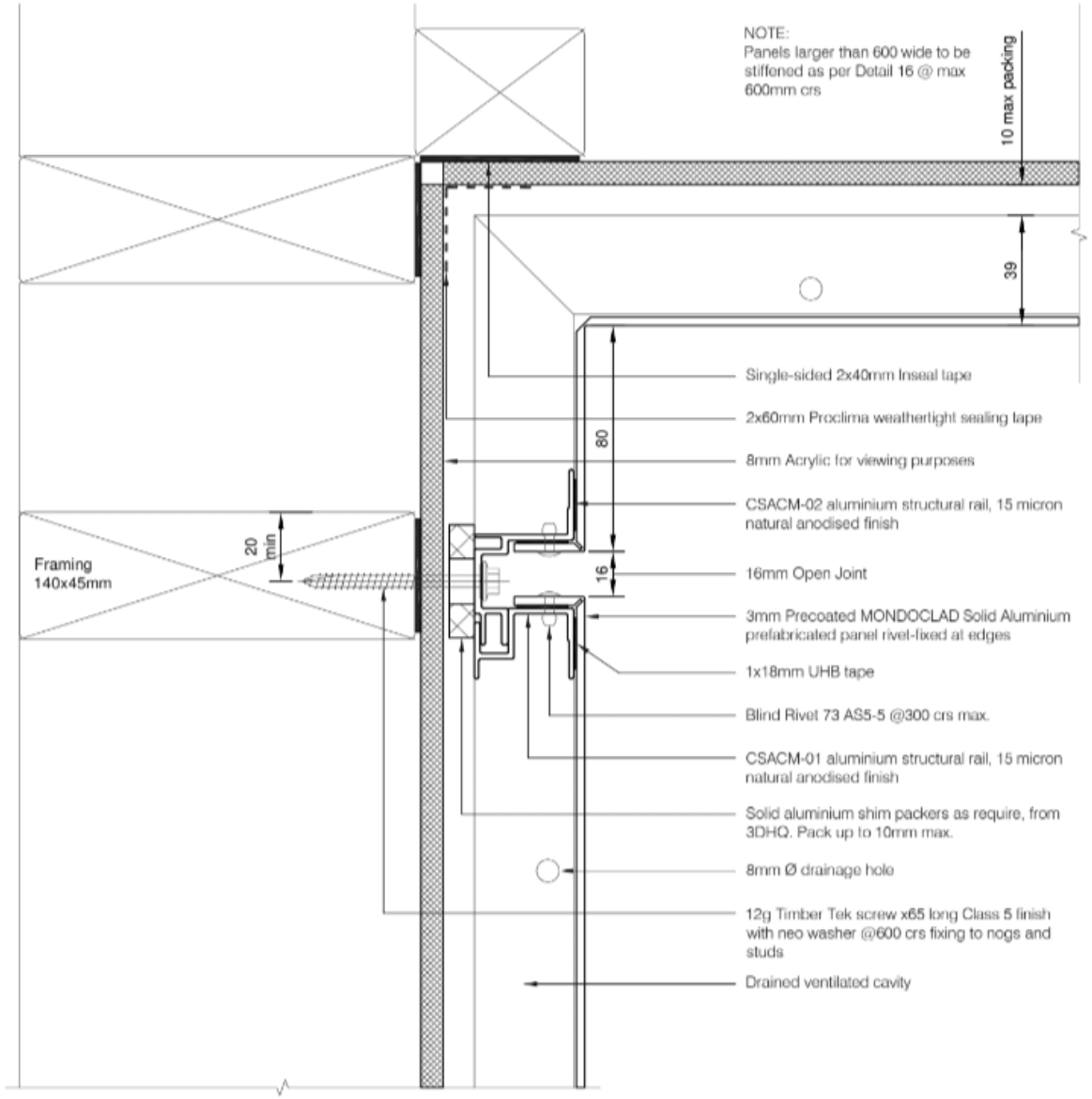
1:2 @ A4	27/04/2023	A	10
Scale	Date	Revision	Dwg



Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 INTERNAL CORNER PLAN DETAIL
1 : 2

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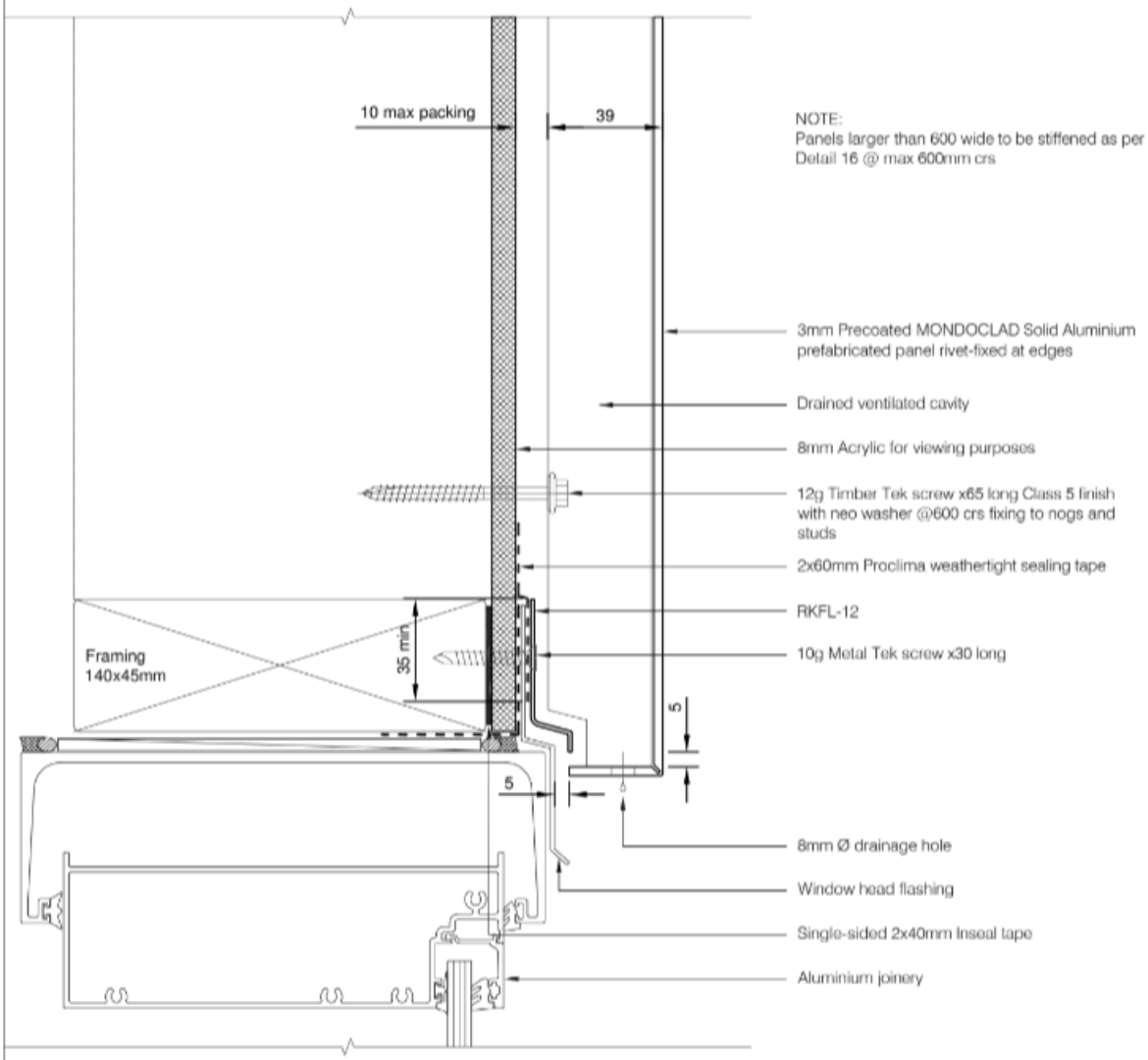
Name:
SPECTRAFORM OPEN JOINT TEST
INTERNAL CORNER PLAN DETAIL
Job Number: C0258 Decortech Test

1:2 @ A4	27/04/2023	A	12
Scale	Date	Revision	Dwg

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 WINDOW HEAD SECTION DETAIL
1 : 2

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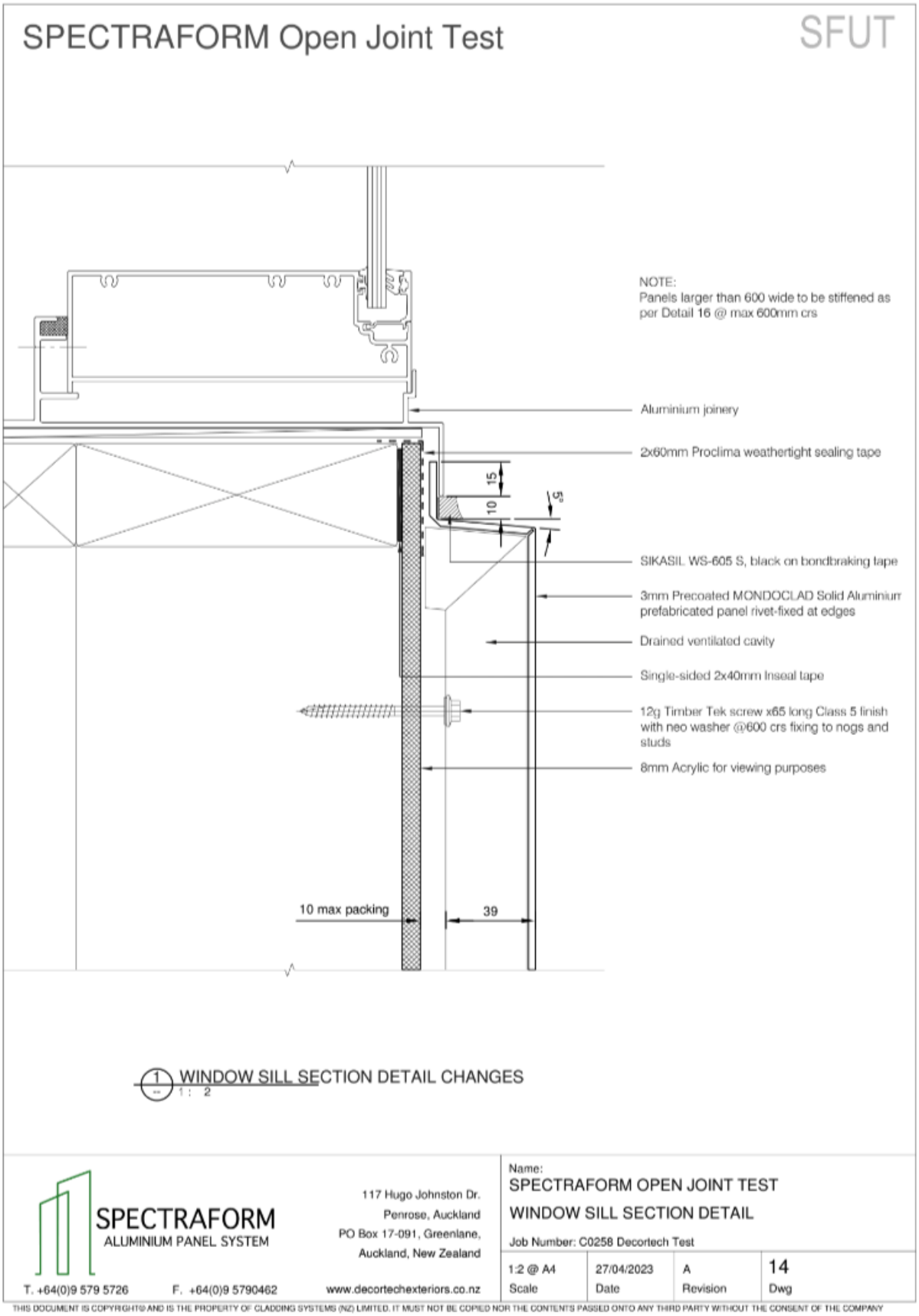
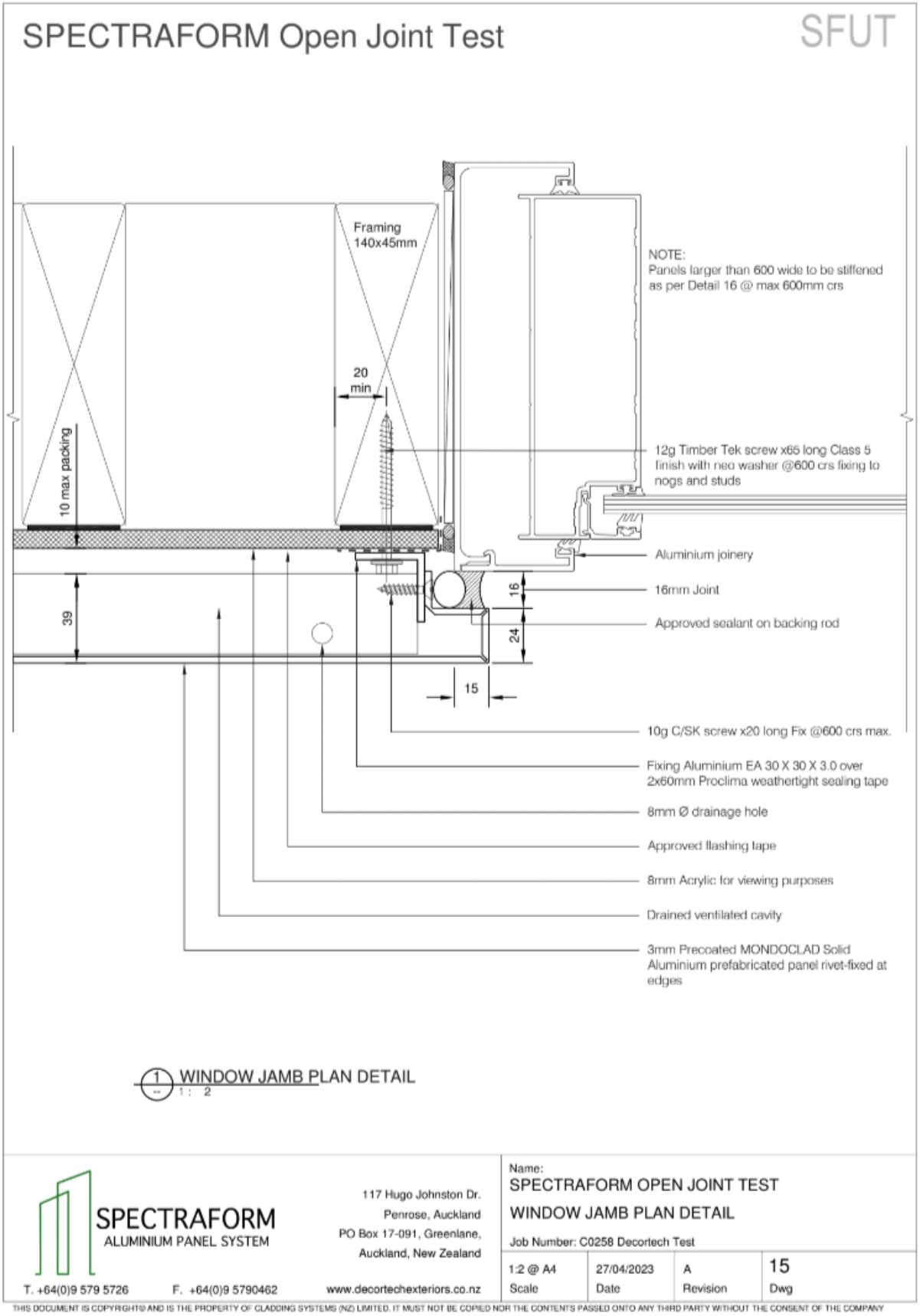
Name:
SPECTRAFORM OPEN JOINT TEST
WINDOW HEAD SECTION DETAIL
Job Number: C0258 Decortech Test

1:2 @ A4	27/04/2023	A	13
Scale	Date	Revision	Dwg

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG



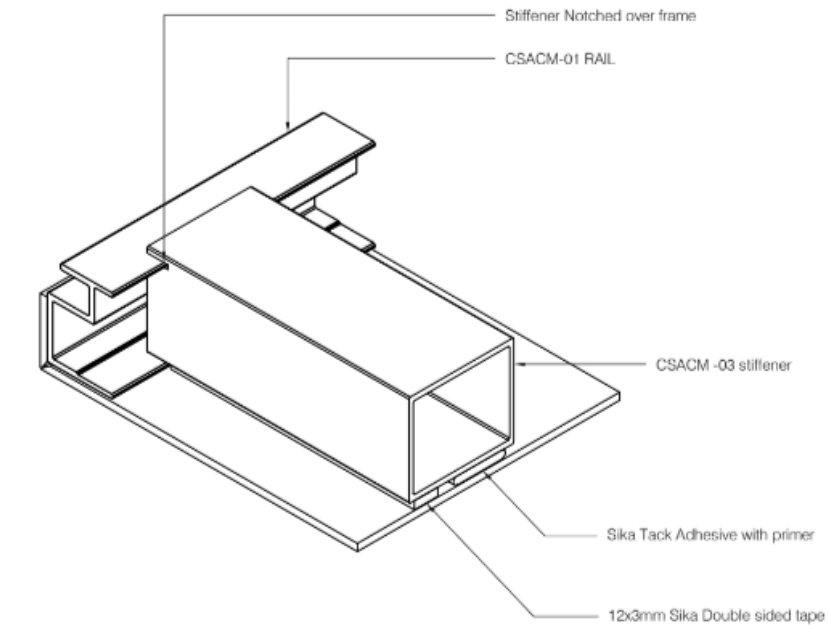
Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

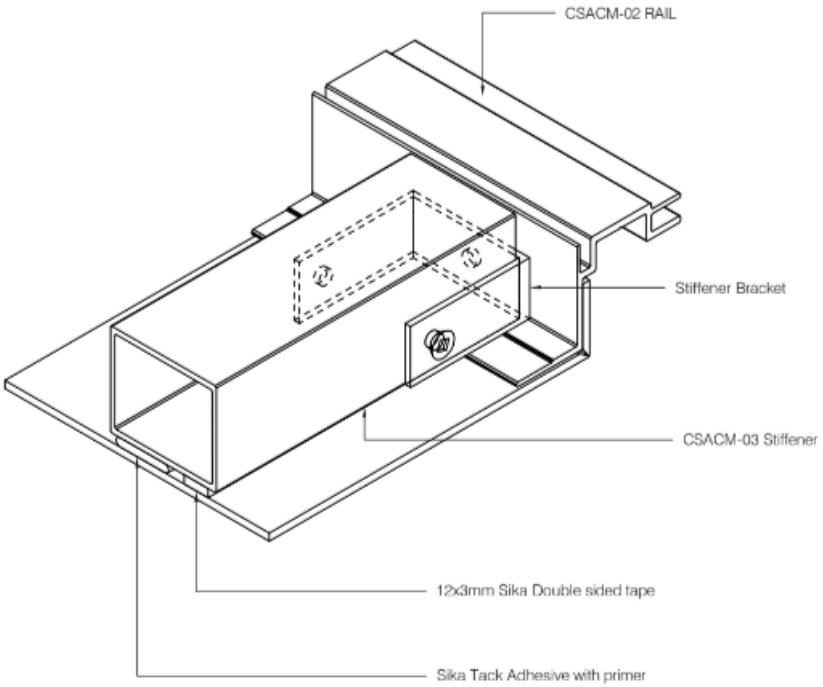


Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT





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Name:
SPECTRAFORM OPEN JOINT TEST
3D ALUMINIUM STIFFENER FIXING

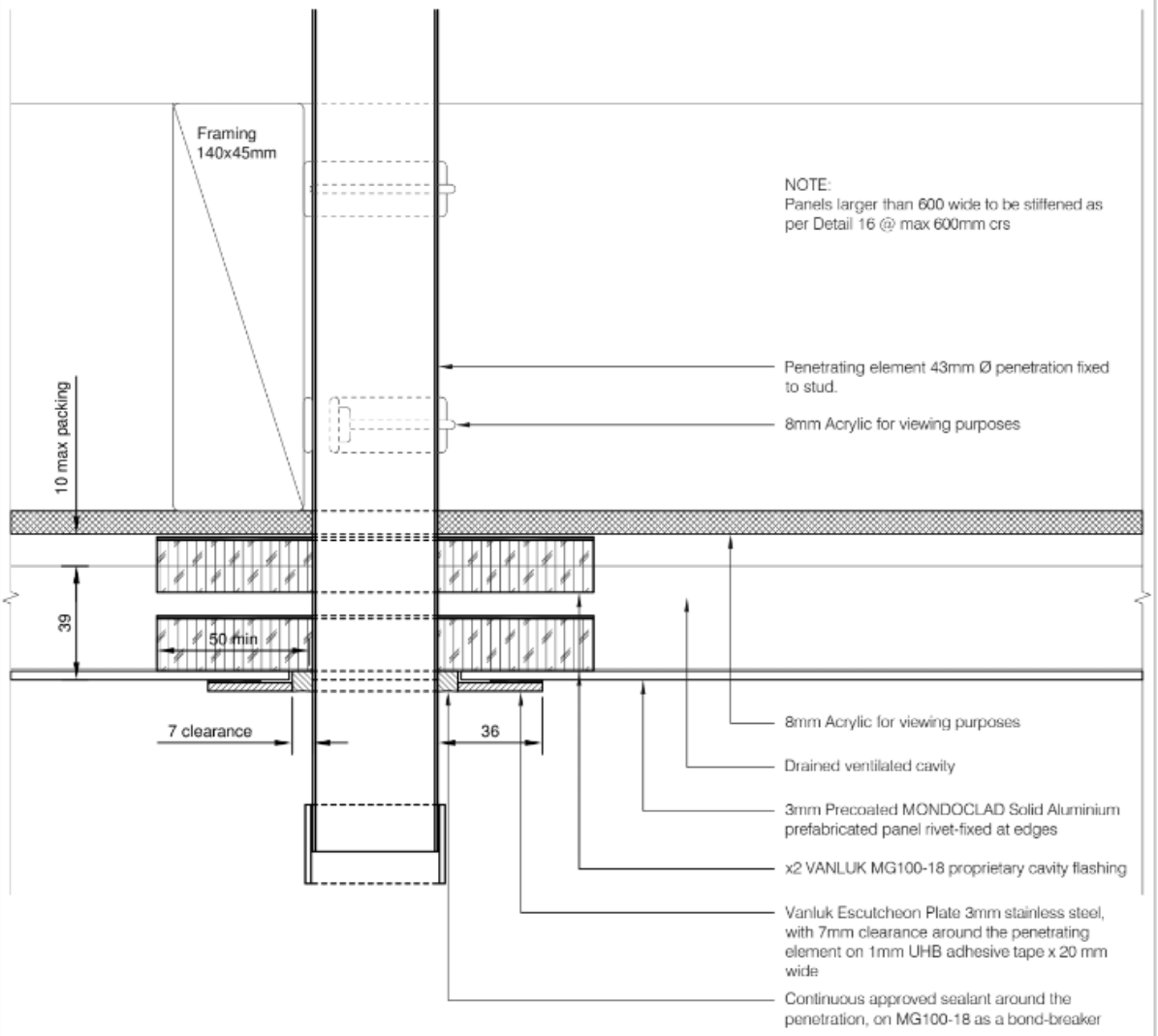
Job Number: C0258 Decortech Test

1:2 @ A4	27/04/2023	A	16
Scale	Date	Revision	Dwg

Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

SPECTRAFORM Open Joint Test

SFUT



1 PENETRATION PLAN DETAIL
1 : 2

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Auckland, New Zealand

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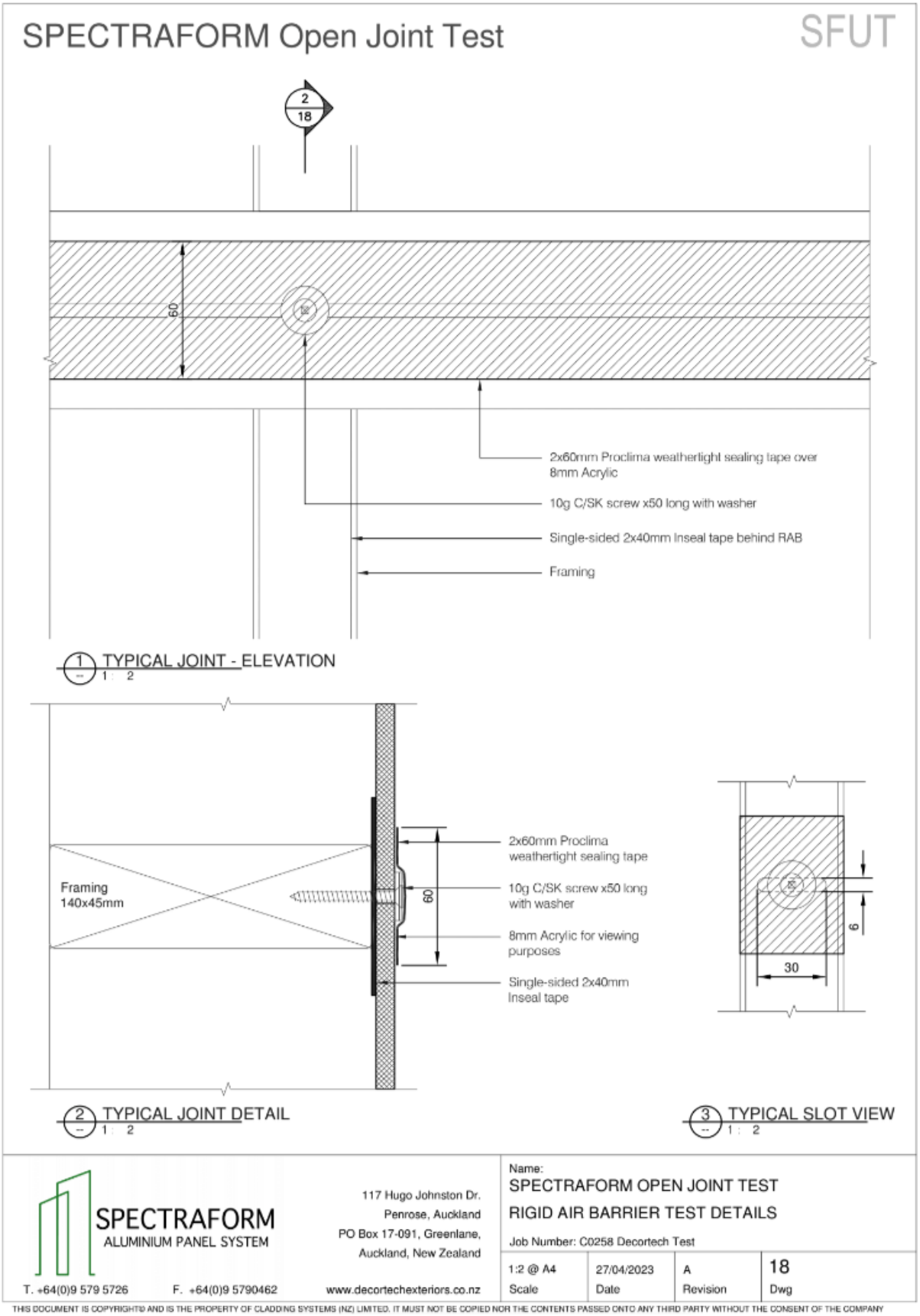
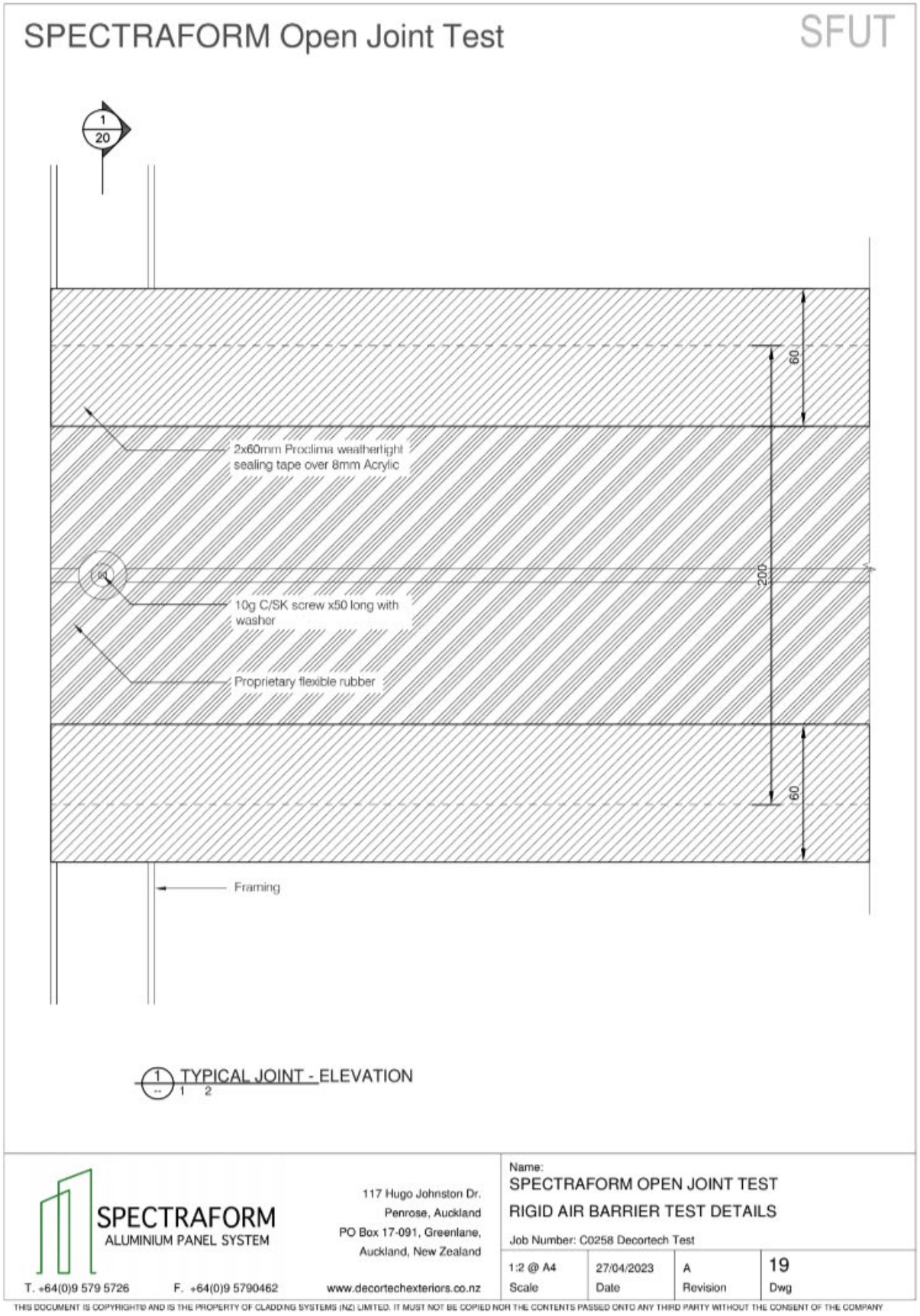
Name:
SPECTRAFORM OPEN JOINT TEST
PENETRATION PLAN DETAIL
Job Number: C0258 Decortech Test

1:2 @ A4	27/04/2023	A	17
Scale	Date	Revision	Dwg

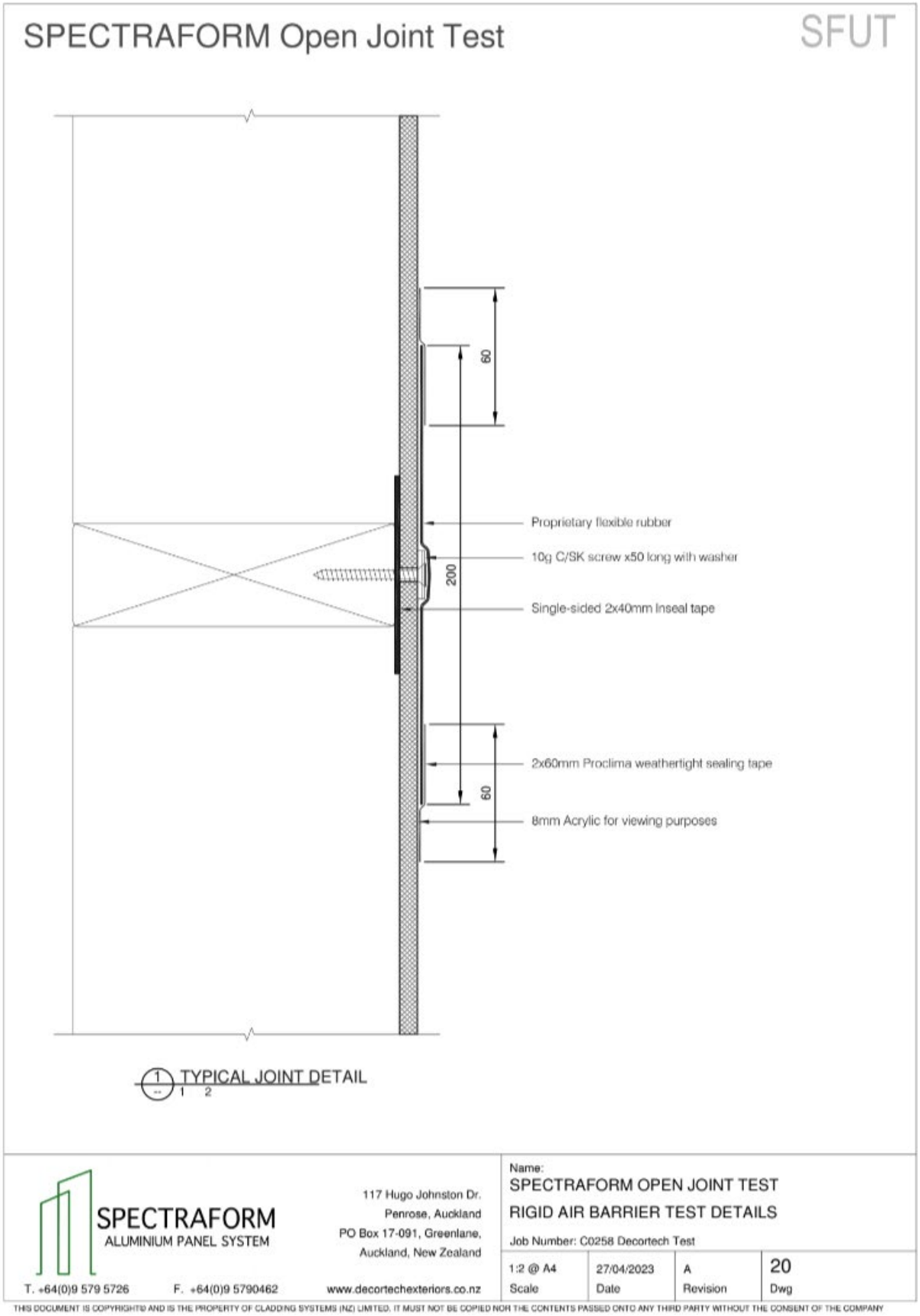
Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG



Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG



Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG



Tested by: John Burgess (JCB), and Richard Gibbs (RJG). Checked by: JCB and RJG

11. Photos

Figure 3: Selected Photos from Testing