



Tests indicated as
not accredited are
outside the scope
of the laboratory's
accreditation

FMI Research Ltd

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TEST REPORT No. 12/15

Page 1 of 5 pages

REFERENCE: The Laminex Group
P.O. Box 12270,
Penrose, Auckland

Performance tests on Laminam CS45 cassette cladding system in
accordance with AS/NZS 4284:2008 Testing of Building Facades.

DATE OF TEST: 02 July 2012

SUMMARY:

Structural Test at Serviceability Limit State Wind Pressure:

No structural deflection tests on the timber framed test unit were required. The Laminam CS45 cladding system was exposed to Serviceability test pressure of ± 1780 Pa, prior to the water penetration tests.

Water penetration test by Static pressure:

The Laminam CS45 cassette cladding system demonstrated "no water penetration" at a test pressure of 534 Pa apart from minor droplet transfer onto the rigid air barrier at the cut back rail adjacent to the window sill.

Water penetration test by Cyclic pressure:

The Laminam CS45 cassette cladding system demonstrated "no water penetration" at the cyclic test pressures up to 534 - 1068 Pa, apart from minor droplet transfer onto the rigid air barrier at the cut back rail adjacent to the window sill.

Structural test at Ultimate limit state wind pressure:

As the Laminam CS45 cassette cladding, is a cavity system in which all static wind pressure is applied to the timber framing and negligible loading is impacted on the cladding or support system, no Ultimate limit State structural test was undertaken.

Serviceability Seismic Test: (Not IANZ accredited)

A seismic displacement of ± 20 mm was repeated 5 times.

Water penetration test by Static pressure following Seismic Serviceability

The Laminam CS45 cassette cladding system demonstrated no other water penetration at a test pressure of 534 Pa.

Water penetration test by Cyclic pressure following Seismic Serviceability

The Laminam CS45 cassette cladding system demonstrated no other water penetration" at the cyclic test pressures up to 534 - 1068 Pa,

Ultimate Limit State Seismic Test: (Not IANZ accredited)

Maximum movements were constrained by the hydraulic load mechanism and provided a maximum horizontal movement of 86 mm in one direction and 10

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mm in the opposite direction. The loading cycle was repeated 5 times with no structural damage of the cladding system or supporting structure 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, a window penetration, and a top soffit detail. General details of the test structure are shown in the attached drawings.

The CS45 cassette cladding system is a cavity cladding using a combination of aluminium profiles to support and weather the horizontally applied panels machined from 3 mm thick "Laminam" pre-finished reinforced ceramic panel material. The panels are imported from Italy and locally fabricated from a range of stock sheets, into a "cassette" by adding extrusions attached with a combination of the Sika Tack tape and adhesive system. The vertical extrusions attached to the Laminam have cnc "key holes" machined into them. These key holes engage with the aluminium horizontal pins set in the CS45-30 vertical rail at 400mm centres.

The CS45-30 vertical rail is a top hat section divided into 2 chambers, the outer chamber controls the water, the inner chamber is a dry area which takes a proprietary 12mm diameter square headed set screw which slides within a channel for fixing to a range of brackets for levelling a facade and/or creating features by relief. Another method of installing the CS45-30 onto a structure is by screwing through both chambers with a Timber Tek or similar fixing with a neoprene washer. Both examples of fixing are demonstrated on the test.

The horizontal extrusion attached to the Laminam provide weathering of the panel to panel horizontal joint and the finished cassette panels form a vented and drained labyrinth at the horizontal joint.

The test structure used two forms of rigid air barriers (6 mm clear Polycarbonate for viewing the cavity and 7 mm Plyseal for toughness in seismic racking) applied onto the external face of the timber framing. (Refer drawing). Within the timber frame were 45x45 vertical timber battens tek screwed to the studs (Refer drawing) for additional width at the vertical ply joints to ensure maximum movement during seismic racking. The ply had 7mm holes and was fixed in place with wafer head head screws and a neo washer to ensure slippage and movement. The RAB had a layer of 1.6mm closed foam tape between the RAB and timber frame to provide an airseal.

The attached Cladding Systems Drawings show the dimensions and overall arrangement of the timber framed structure, the location of the rigid air barriers, and the position for observation polycarbonate sheet.

A single fixed light window was installed into appropriately sized openings in the timber framing, the requisite external flashing details achieved at the head by a profiled and stop ended flashing, at the cill by lapping the panel upstand and at the jambs by lapping the CS45-30 vertical flanges.

The details of the Laminam CS45 cladding system are shown on the attached series of drawings.

PERFORMANCE SPECIFICATIONS:

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The following performance requirements for the Laminam CS45- cassette cladding system were agreed with the clients for assessing performance:

Serviceability Wind Pressure	1780 Pa (equivalent to ULS of 2.5 kPa)
Water penetration by Static pressure;	534 Pa
Water penetration by Cyclic pressures	up to 534 – 1068 Pa
Structural Test at Ultimate Limit State	2.5 kPa
Serviceability seismic displacement	±20 mm
Ultimate seismic displacement	up to 100 mm if achievable

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 of FMI Laboratories, Timaru Place, Mt Wellington, Auckland with System designers Cladding Systems (NZ) Ltd representatives of The Laminex Group in attendance.

As the Laminam CS45 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 with the requirements of the Extra High Wind Zone and up to 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 1780 Pa, being 71% of the 2.5 kPa ULS, exceeding the Extra High Wind Zone serviceability pressures of 1515 Pa. The Structural test at the agreed Ultimate Limit State pressures of ±2.50 kPa was not conducted following the cyclic water penetration tests as the cladding was a cavity system in which only the air barrier and frame structure would be evaluated, These were constructed in accordance with NZS 3604: 2011.

Serviceability Seismic movement was applied at the top of the full height test sample following release of side and head infill panels and flashing. Following replacement of the side panels and flashing, repeat static and cyclic water penetration tests were conducted. An ultimate seismic displacement test was conducted following the second static and cyclic water penetration tests.

NOTE The seismic displacement tests are currently not included in the IANZ Laboratory Scope of Testing procedures.

In response to the client enquiry regarding the likelihood of some reduction in the cavity pressure equalisation during the water penetration cyclic pressure test, additional measurements were carried out measuring the differential pressure between the cavity and the applied exterior pressure in the test enclosure.

Within the scope of the response time of the digital manometer used for the differential pressure measurement, and the possible transient effects of the approximately 3m of connecting tubing, the differential pressure indicated that pressure equalization on this system is almost instantaneous, and that the maximum net loading on the cladding panels was in the order of 1 Pa. As a conservative assessment the net differential pressure is unlikely to exceed 3 Pa.

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RESULTS:

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

The Laminam CS45 cladding system was exposed to the agreed Serviceability test pressures of ± 1780 Pa. No deflection measurements were required.

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

Test pressure 534 Pa
Test duration 15 minutes



Minor droplet penetration at the horizontal cut back rail joint adjacent to the window sill due to water dropping from panel edge at the top of the window was observed. Localised droplets of water accumulated on the external surface of the rigid air barrier.

No other water penetration was visible through any other of the purpose constructed observation ports in the internal lining, as well as the corresponding sealed penetrations through the rigid air barrier, at the maximum test pressure of 534 Pa.

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

Test Pressure, Pa	Duration, mins	Comments
267 - 534	5	No water penetration observed
356 - 712	5	No water penetration observed
534 - 1068	5	No water penetration observed

Continuation of water droplet transfer as above. No other water penetration was visible through any of the purpose constructed observation ports through the rigid air barrier, during the cyclic water penetration tests.

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

Not tested as structure in compliance with NZS 3604: 2011 and cladding is fully pressure equalised.

Tested by:.....*J. Goll*.....

Checked by:.....*[Signature]*.....

SERVICEABILITY SEISMIC TEST (AS/NZS 4284:2008) (Not IANZ accredited)

A seismic displacement of $\pm 20\text{mm}$ was repeated 5 times..

**STATIC PRESSURE WATER PENETRATION following Seismic Serviceability
Displacements (AS/NZS 4284:2008)**

Test pressure 534 Pa
Test duration 15 minutes


Continuation of water droplet transfer as above. No other water penetration was visible through any of the purpose constructed observation ports through the rigid air barrier, during the cyclic water penetration tests.

**CYCLIC PRESSURE WATER PENETRATION following Seismic Serviceability
Displacements (AS/NZS 4284:2008)**

Continuation of water droplet transfer as above. No other water penetration was visible through any of the purpose constructed observation ports through the rigid air barrier, during the cyclic water penetration tests.

**ULTIMATE LIMIT STATE SEISMIC TEST (AS/NZS 4284:2008)
(Not IANZ accredited)**

Maximum movements were constrained by the hydraulic load mechanism and provided a maximum horizontal movement of 86 mm in one direction and 10mm in the opposite direction. The loading cycle was repeated 5 times with no structural damage of the cladding system or supporting structure observed.

.....John Yolland
Authorised Signatory
17 July 2012

Tested by:.....

Checked by:.....

LAMINAM CASSETTE SYSTEM - TEST BOOTH DETAILS

Product	Application	Detail	Description	Issue Date	Revision
TB	INDX	0A	Drawing Index	12.07.2012	-
TB	INDX	0B	Profile Index	12.07.2012	-
TB	INDX	0C	Item Index	12.07.2012	-
TB	FS	01	Framing Set Up	12.07.2012	1
TB	RAB	02	Rigid Air Barrier	12.07.2012	1
TB	VR	03	Vertical Rails	12.07.2012	1
TB	TC	04	Trepsa Netcon Cladding	12.07.2012	1
TB	EPS	05	Elevation, Plan, Sections & Details	12.07.2012	1
TB	WH	06	Aluminium window Head Detail & 3D stop and	12.07.2012	1
TB	WS	07	Aluminium Window Sill Detail	12.07.2012	1
TB	WJ	08	Aluminium Window Jamb Detail	12.07.2012	1
TB	HJ	09	Horizontal Panel to Panel Joint Detail	12.07.2012	1
TB	HJ	10	Horizontal Panel to Panel on Bracket Joint Detail	12.07.2012	1
TB	VR	11	Vertical Rail Panel Jamb Detail	12.07.2012	1
TB	VR	12	Vertical Rail Mid Panel Support Detail	12.07.2012	1
TB	IC	13	Internal Corner Panel to Panel Detail	12.07.2012	1
TB	VR	14	Off Set Vertical Rail Panel to Panel Joint Detail	12.07.2012	1
TB	VR	15	Off Set Vertical Mid Support Rail Detail	12.07.2012	1
TB	ES	16	External Panel / Soffit Detail	12.07.2012	1
TB	IS	17	Internal Soffit / Panel Detail	12.07.2012	1
TB	HF	18	Head Flashing Detail	12.07.2012	1
TB	HF	19	Head Flashing Off Set Detail	12.07.2012	1
TB	FF	20	Vertical Frame Flashing Detail	12.07.2012	1



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Name: **Test Booth Drawing Index**

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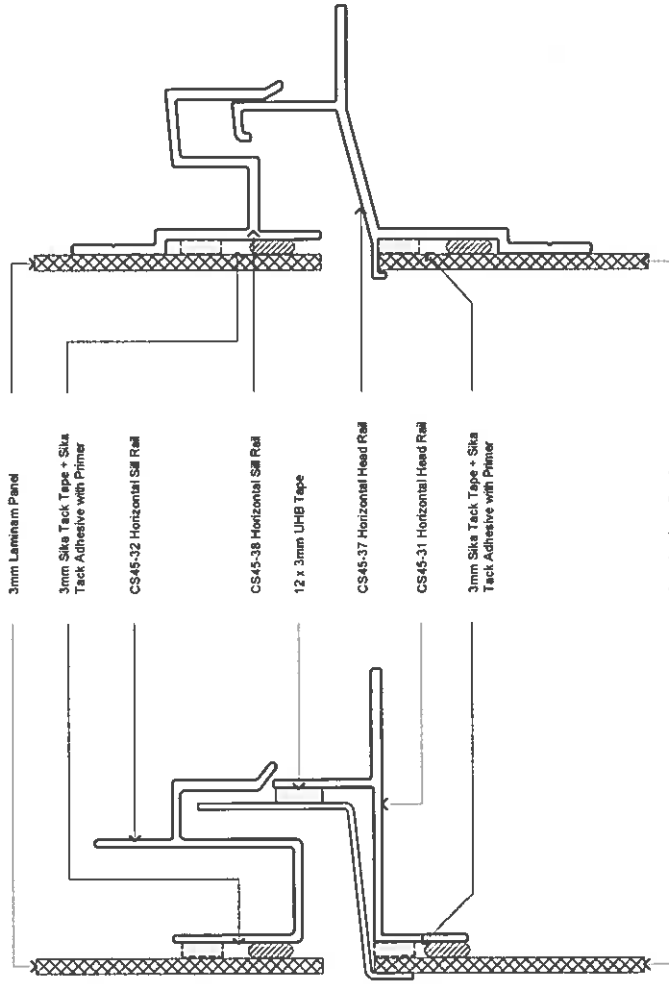
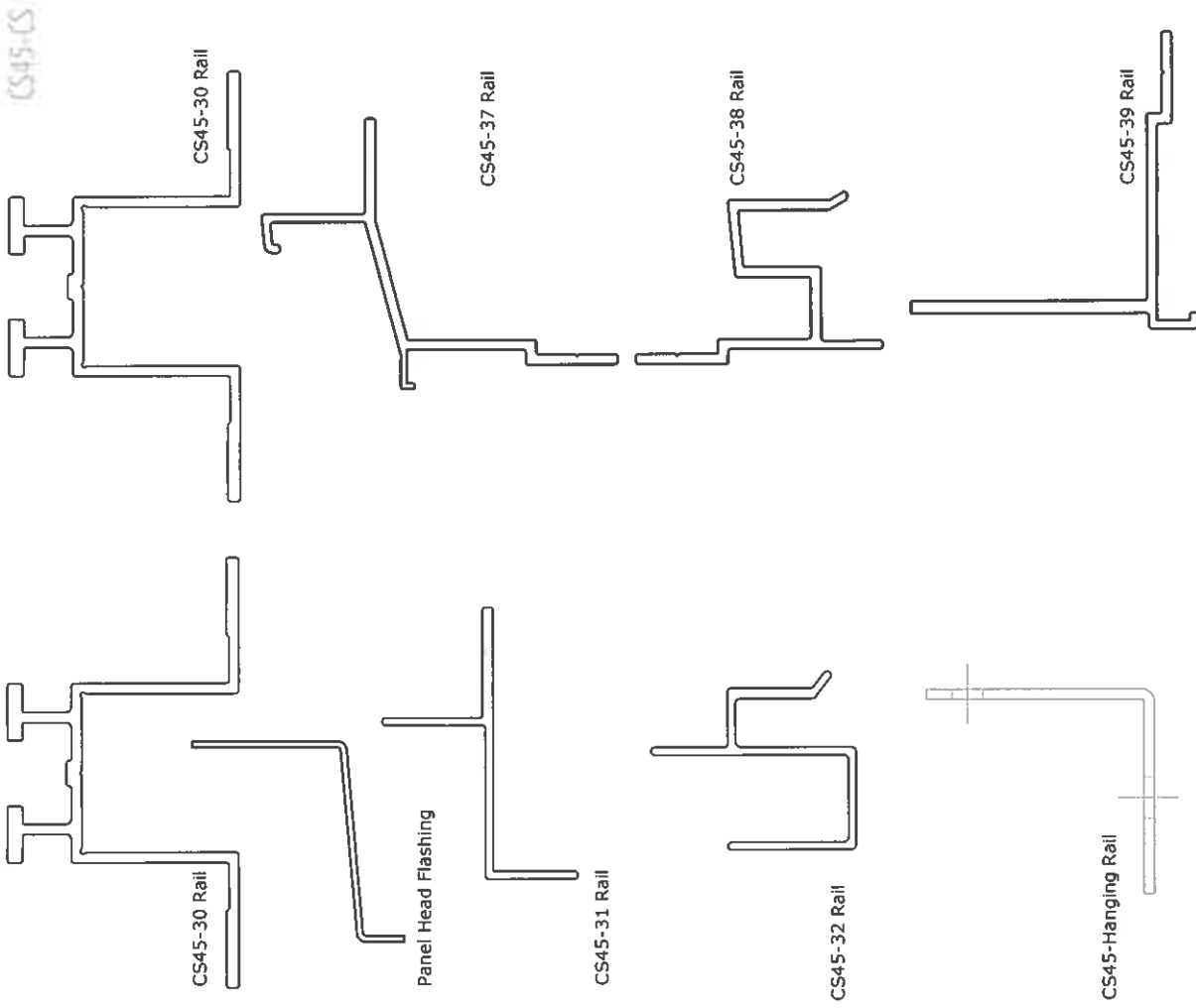
job number: C0039

A3 Scale 12.07.2012 Date TB-INDX - 0A Dwg



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Test Booth Configuration Horizontal Joint Refer TB-HJ-09

Developed Configuration Horizontal Joint

Test Booth Configuration

Developed Configuration

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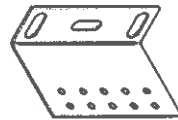
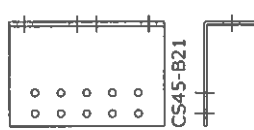
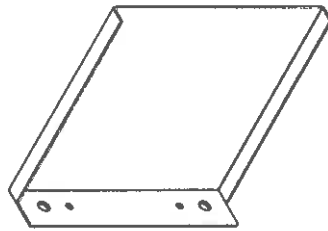
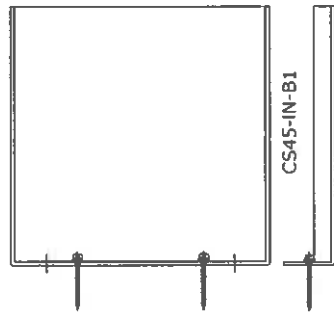
Name: **Test Booth Profile Index**

job number: C0039

1 : 1 @ A3	12.07.2012	
Scale	Date	Revision

TB-INDX - 0B
Dwg

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Hanging Rail



12g Metal Tek Screw x 22mm long
Class 4 Finish with Neo Washer



10g Wafer Head Pozidrive Screw x 25mm



14g Timber Tek Screw x 50mm long
Class 4 Finish with Neo Washer



14g Timber Tek Screw x 75mm long
Class 4 Finish



Sqr Head M12 Set Bolt x 25 HDG



6mm Aluminium Cassette Pin

Name: **Test Booth Component Index**

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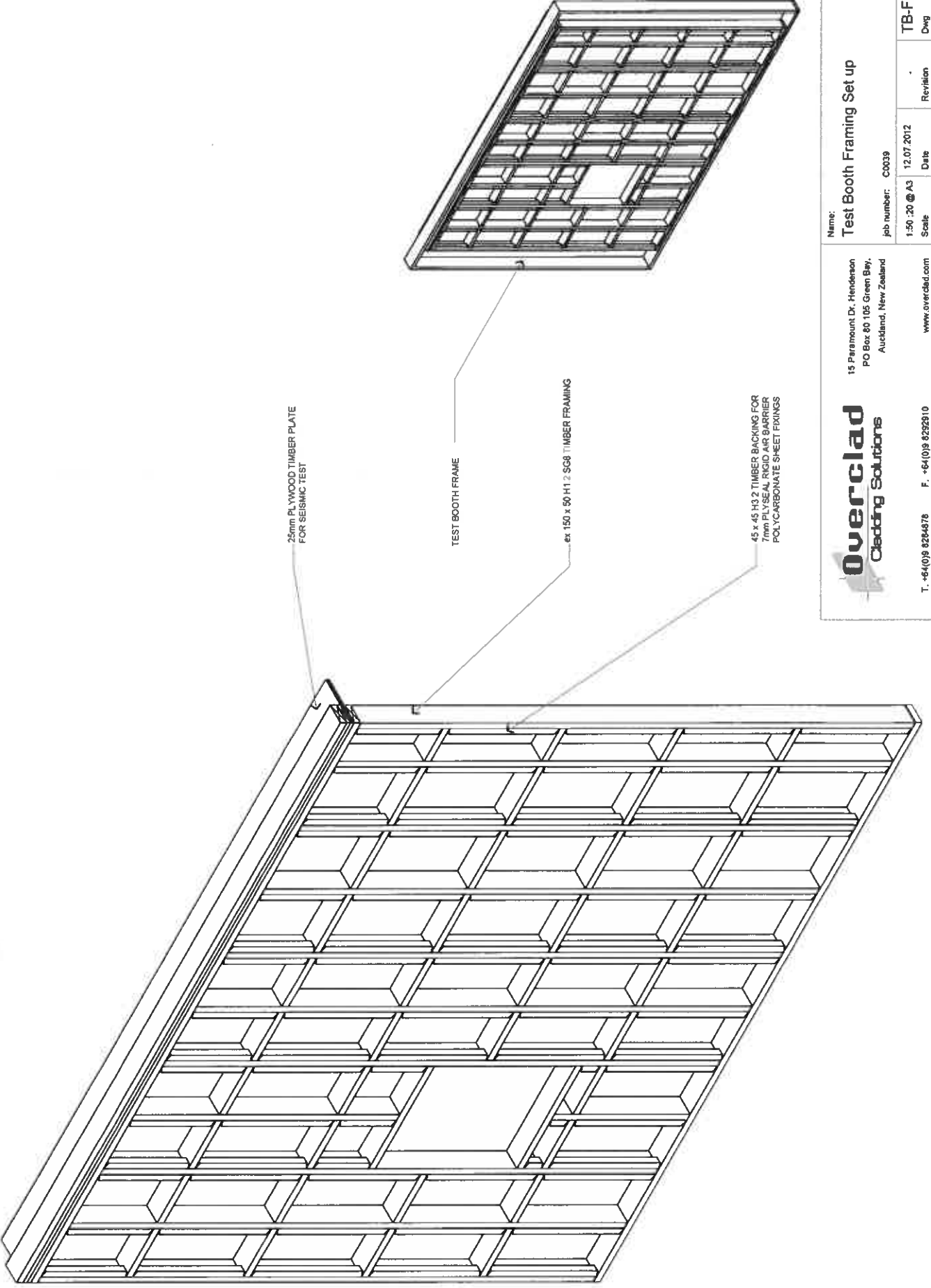
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job number: C0039

A3	12.07.2012	Date	Revision
Scale			Dwg

TB-INDEX - 0C



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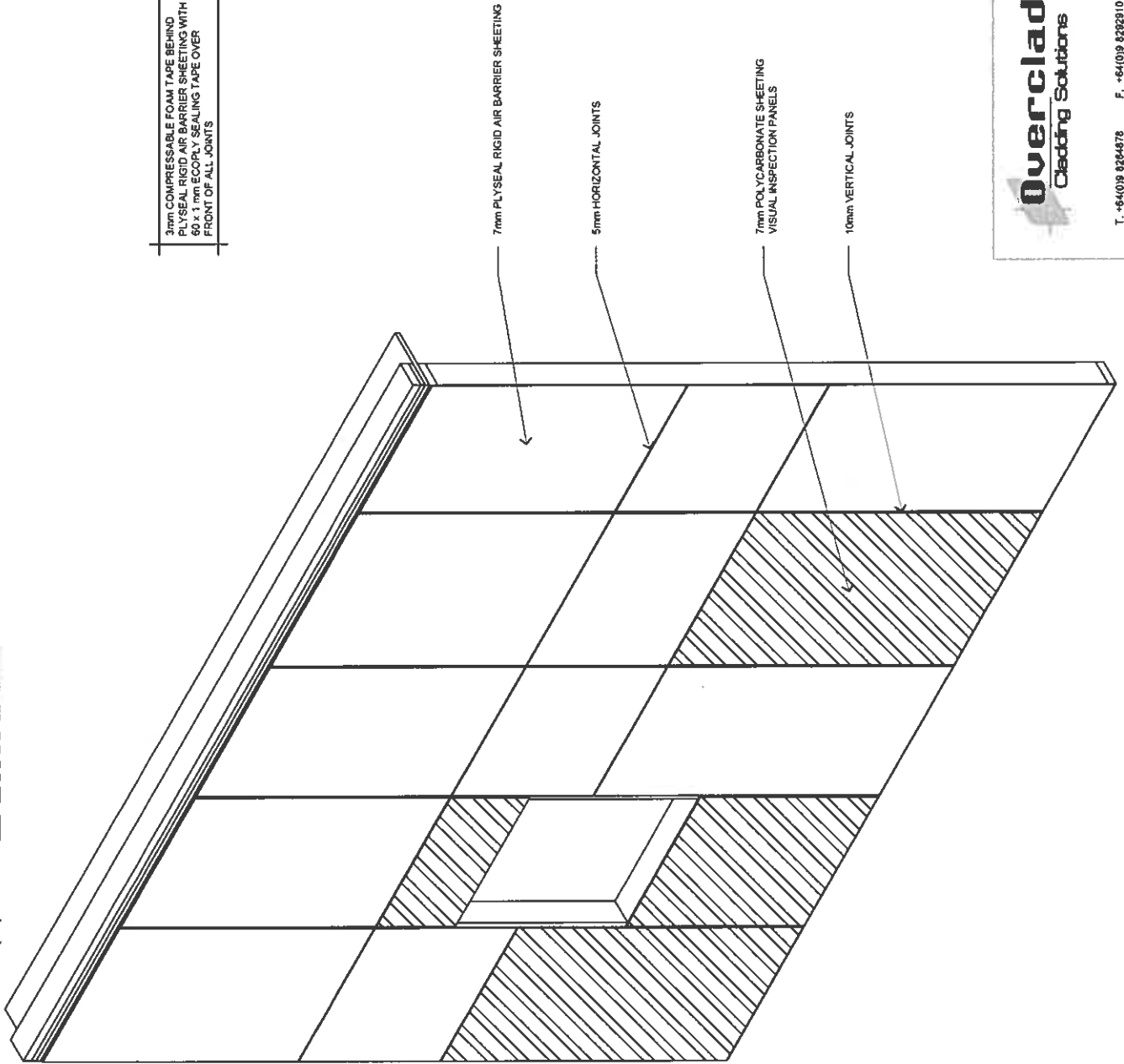
Name: **Test Booth Framing Set up**

job number: C0039

Scale: 1:50 @ A3 Date: 12.07.2012

Revision: TB-FS-01

3mm COMPRESSIBLE FOAM TAPE BEHIND
PLYSEAL RIGID AIR BARRIER SHEETING WITH
60mm POLYSEAL SEALING TAPE OVER
FRONT OF ALL JOINTS



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Name: **Test Booth Rigid Air Barrier**

job number: C0039

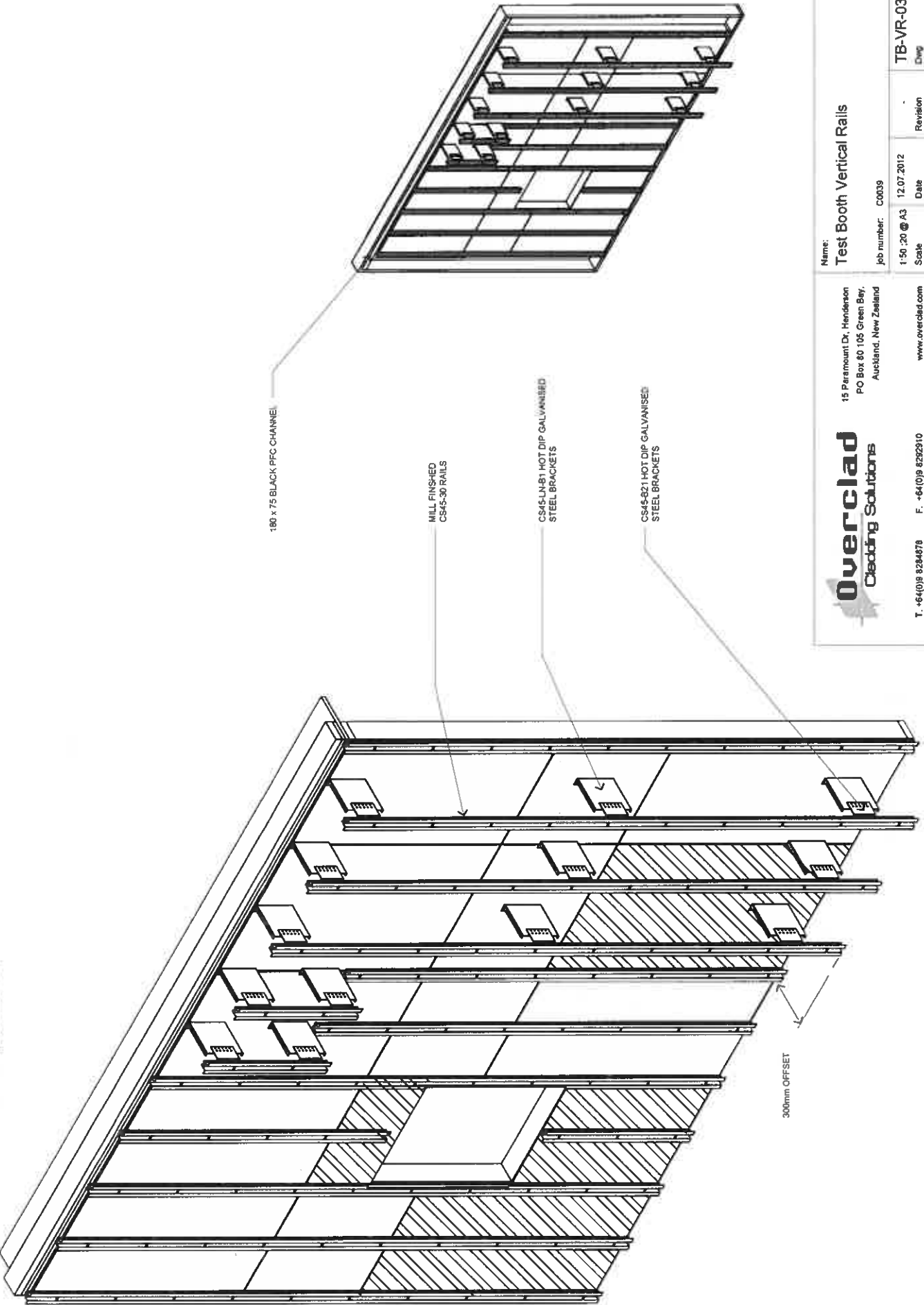
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12.07.2012 Date

Revision

TB-RAB-02 Dwg

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Name: **Test Booth Vertical Rails**

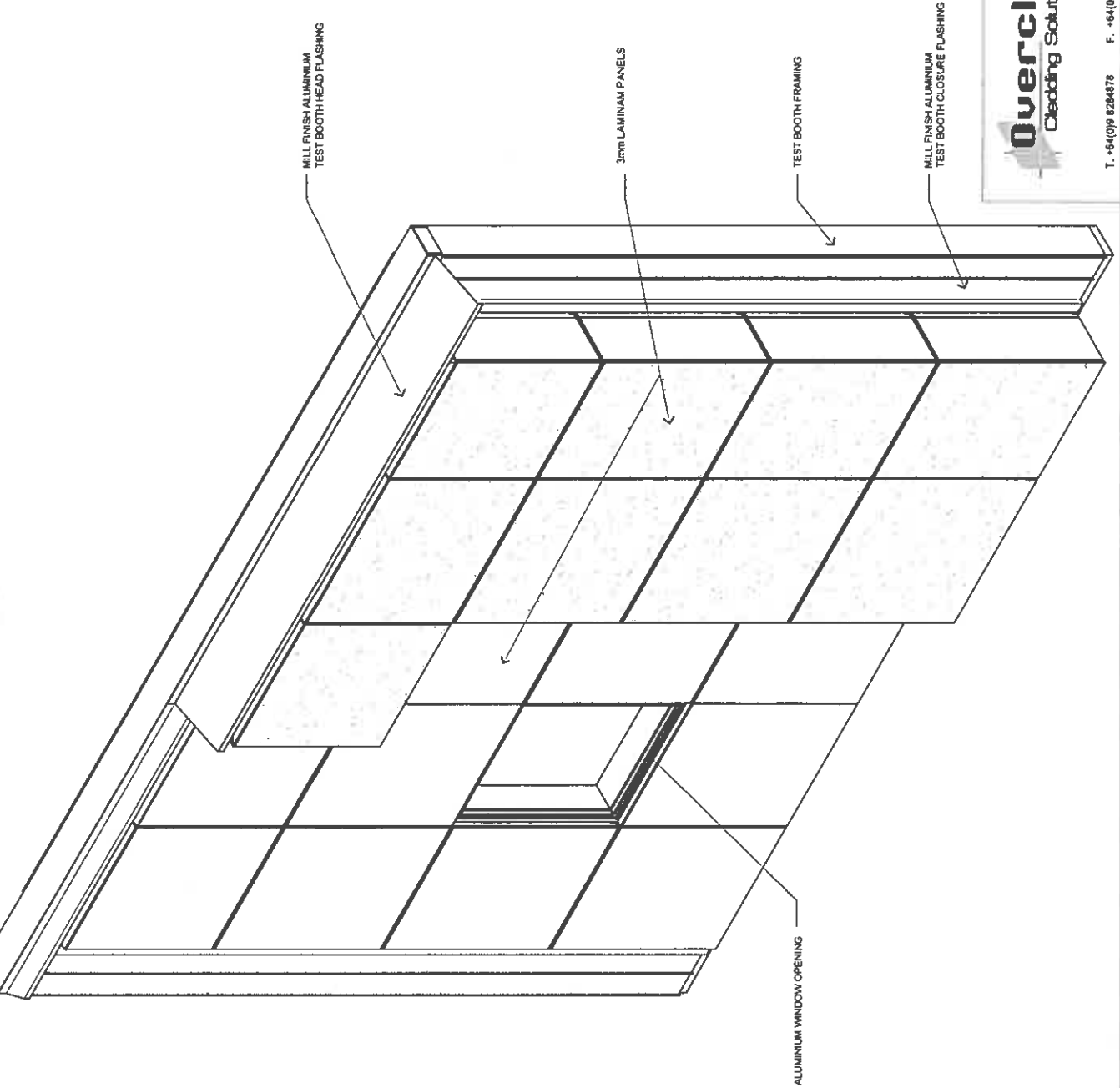
Job number: C0039

Scale: 1:50, 20 @ A3

Date: 12.07.2012

Revision: Dwg

Dwg: TB-VR-03



MILL FINISH ALUMINIUM
TEST BOOTH HEAD FLASHING

3mm LAMINAM PANELS

TEST BOOTH FRAMING

MILL FINISH ALUMINIUM
TEST BOOTH CLOSURE FLASHING

ALUMINIUM WINDOW OPENING

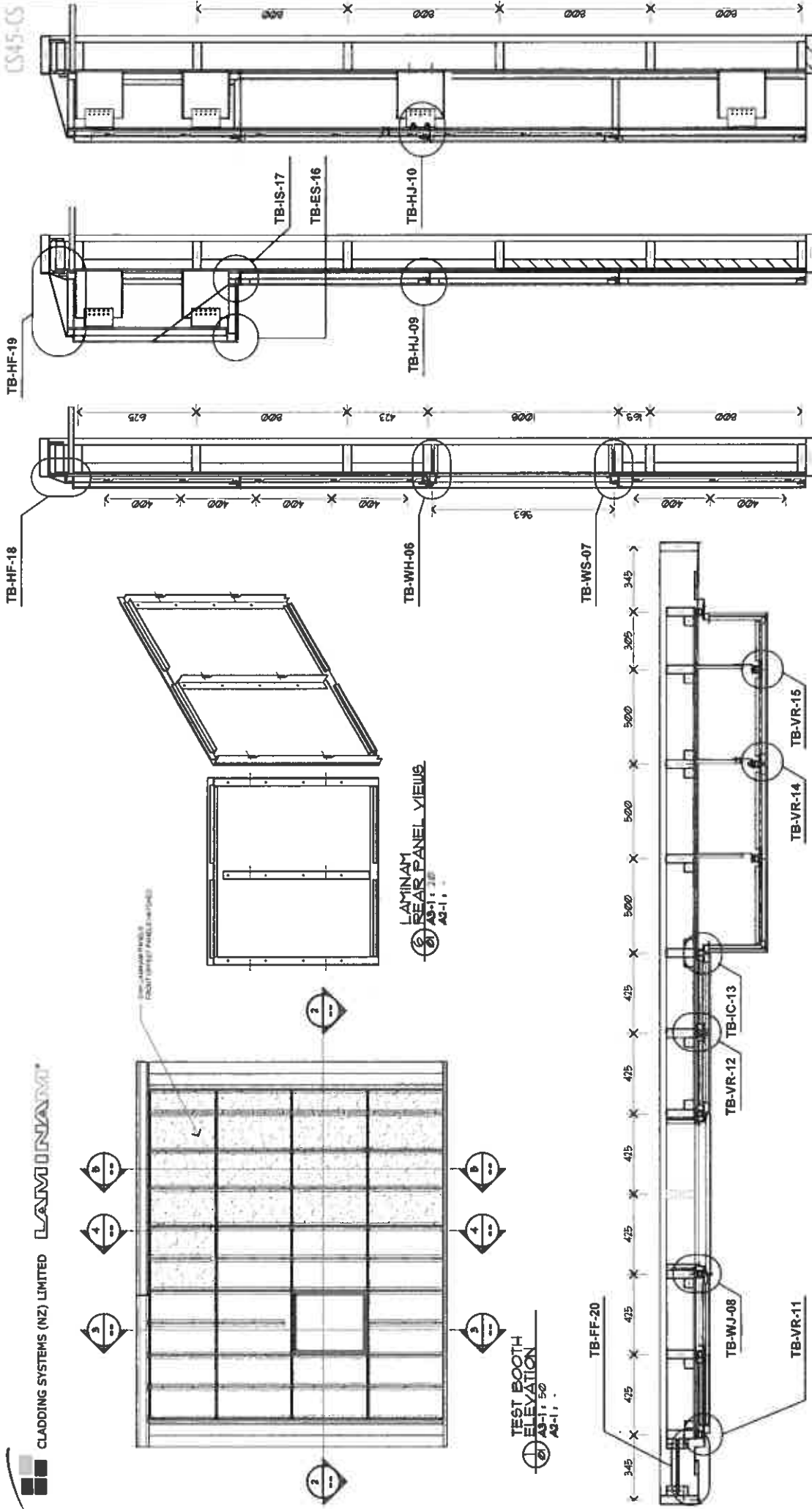
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Name: **Test Booth Laminam Cladding**
job number: C0039
Scale: 1:20 @ A3
Date: 12.07.2012
Revision: TB-LC-04
Dwg

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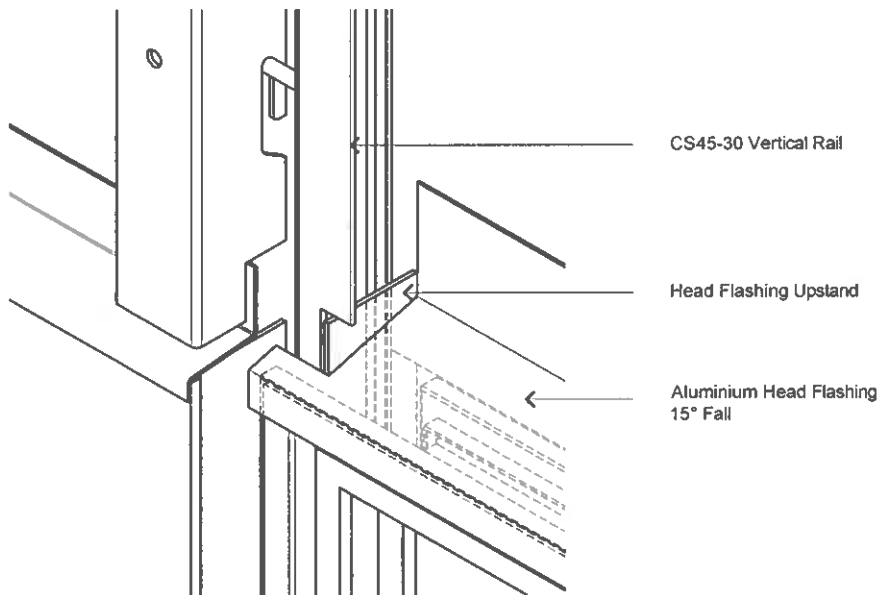
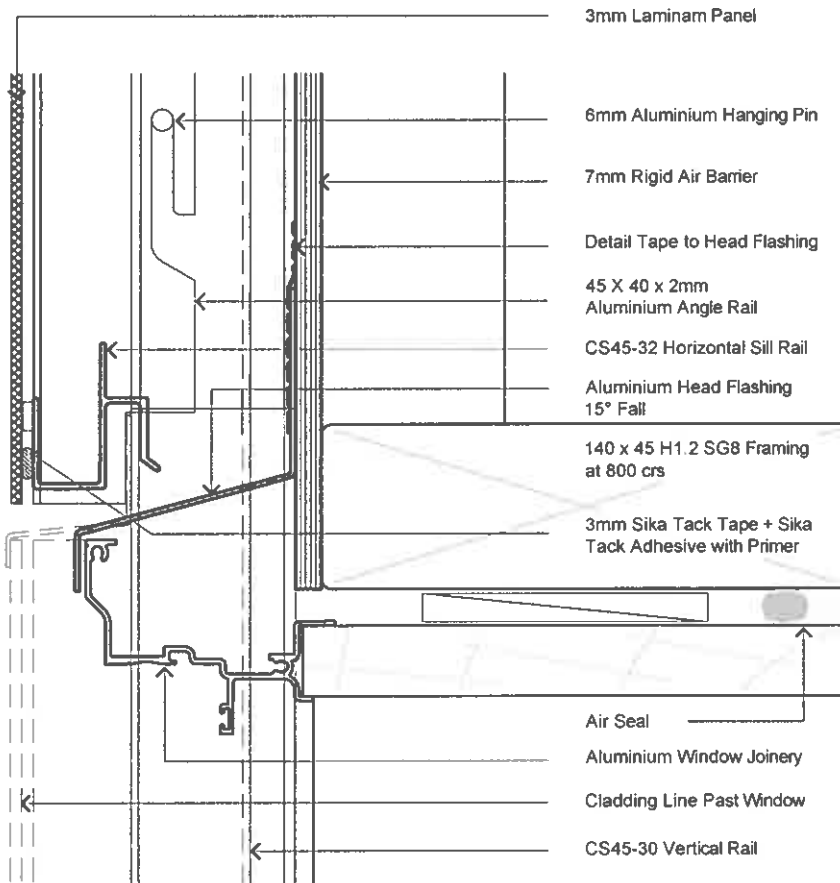
Name: Test Booth Framing Set Up
Elevation, Plan, Sections & Details
job number: C0039

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1:50, 20 @ A3 Scale Date 12.07.2012 Revision Drawing TB-EPS-05

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Name:

Test Booth Aluminium Window Head Detail
& 3D stop end

job number: C0039

1:2 @ A4

12.07.2012

-

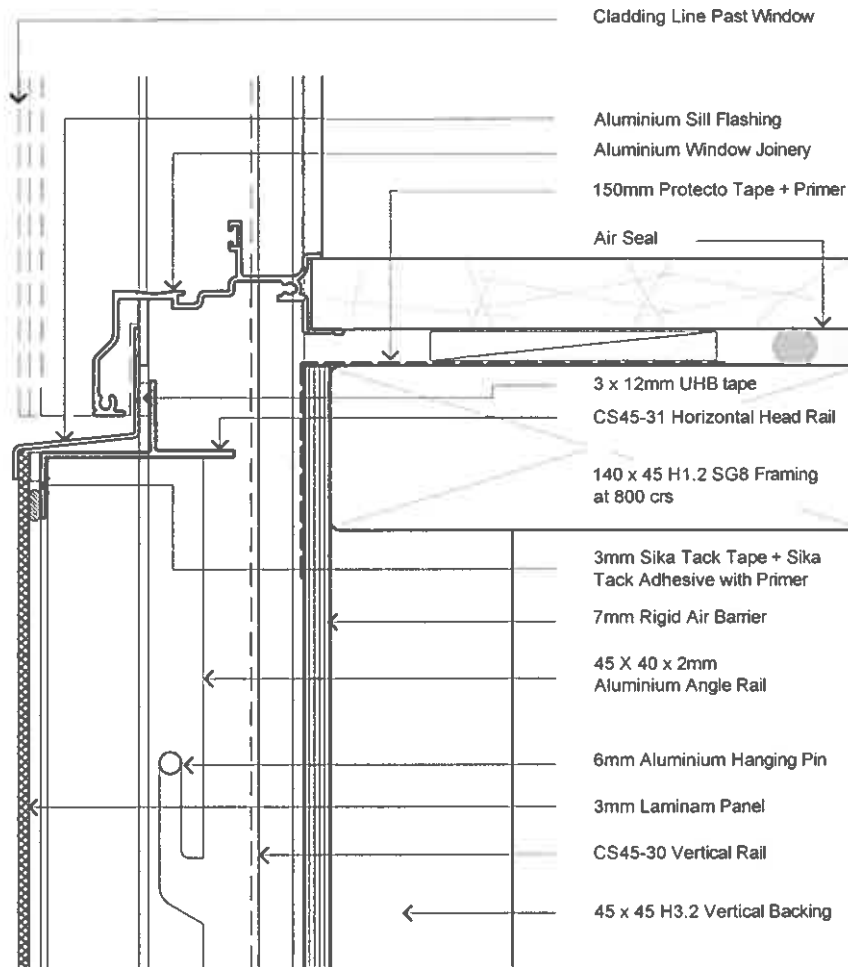
TB-WH-06

Scale

Date

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Name:

Test Booth Aluminium Window Sill Detail

job number: C0039

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1:2 @ A4

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TB-WS-07

Scale

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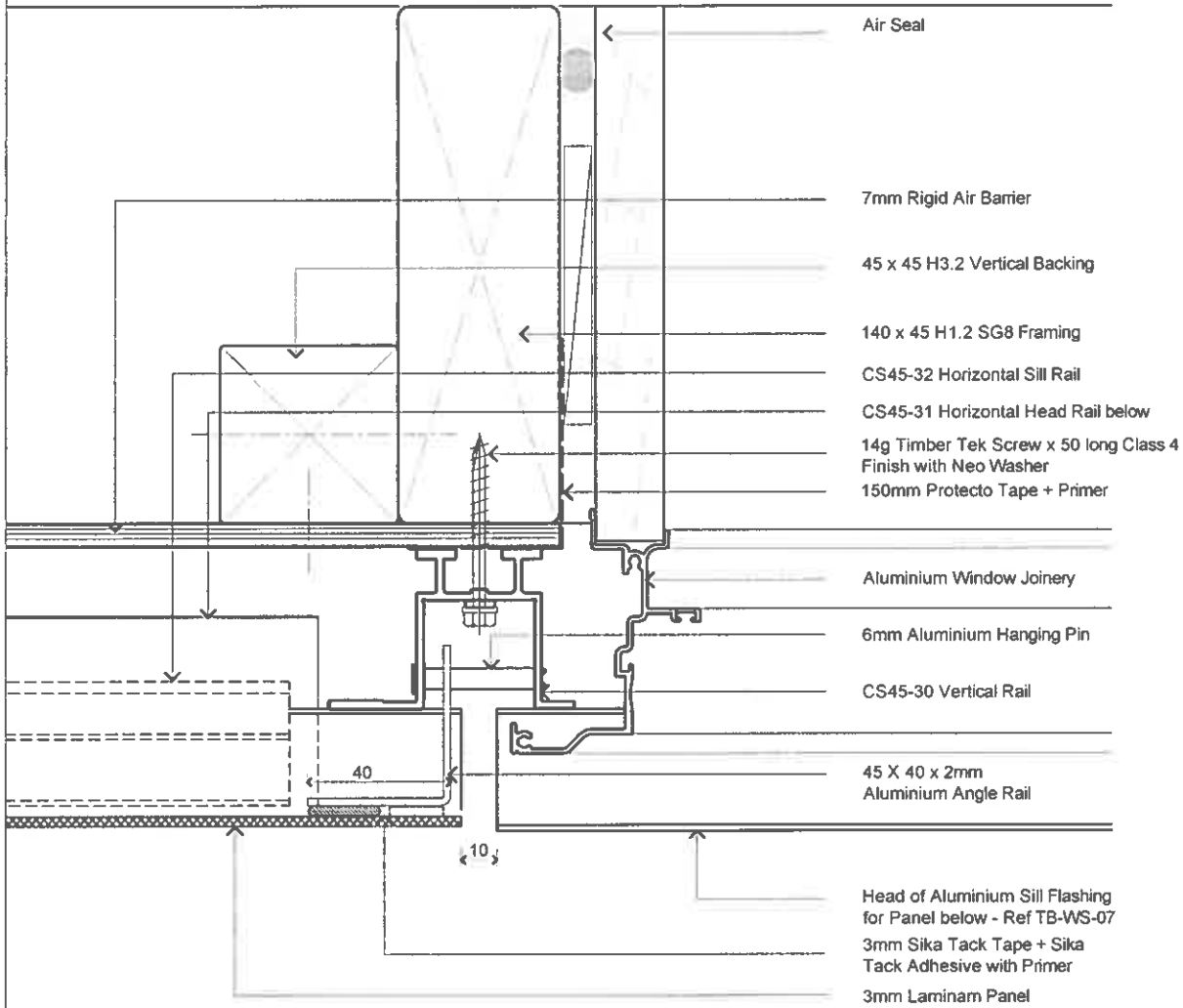
Dwg



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TS45-CS



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Name:

Test Booth Aluminium Window Jamb Detail

job number: C0039

1:2 @ A4

Scale

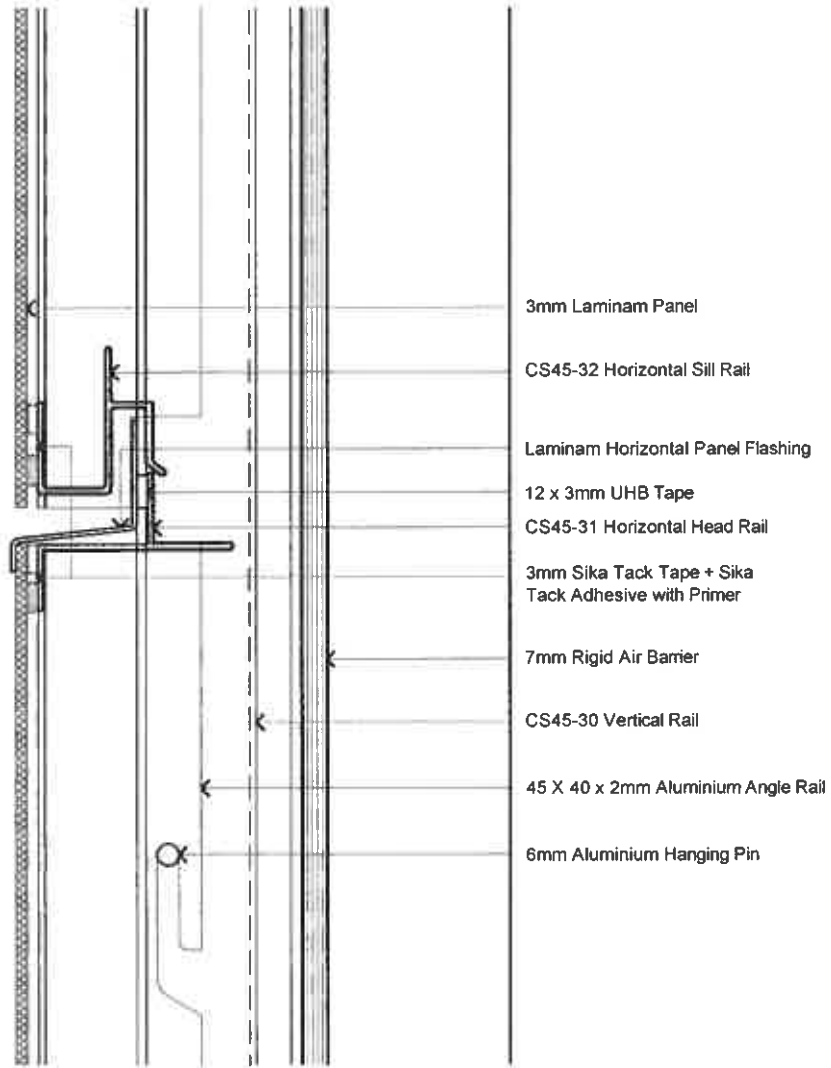
12.07.2012

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TB-WJ-08

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Name:

Test Booth Horizontal Panel Joint Detail

job number: C0039

1:2 @ A4

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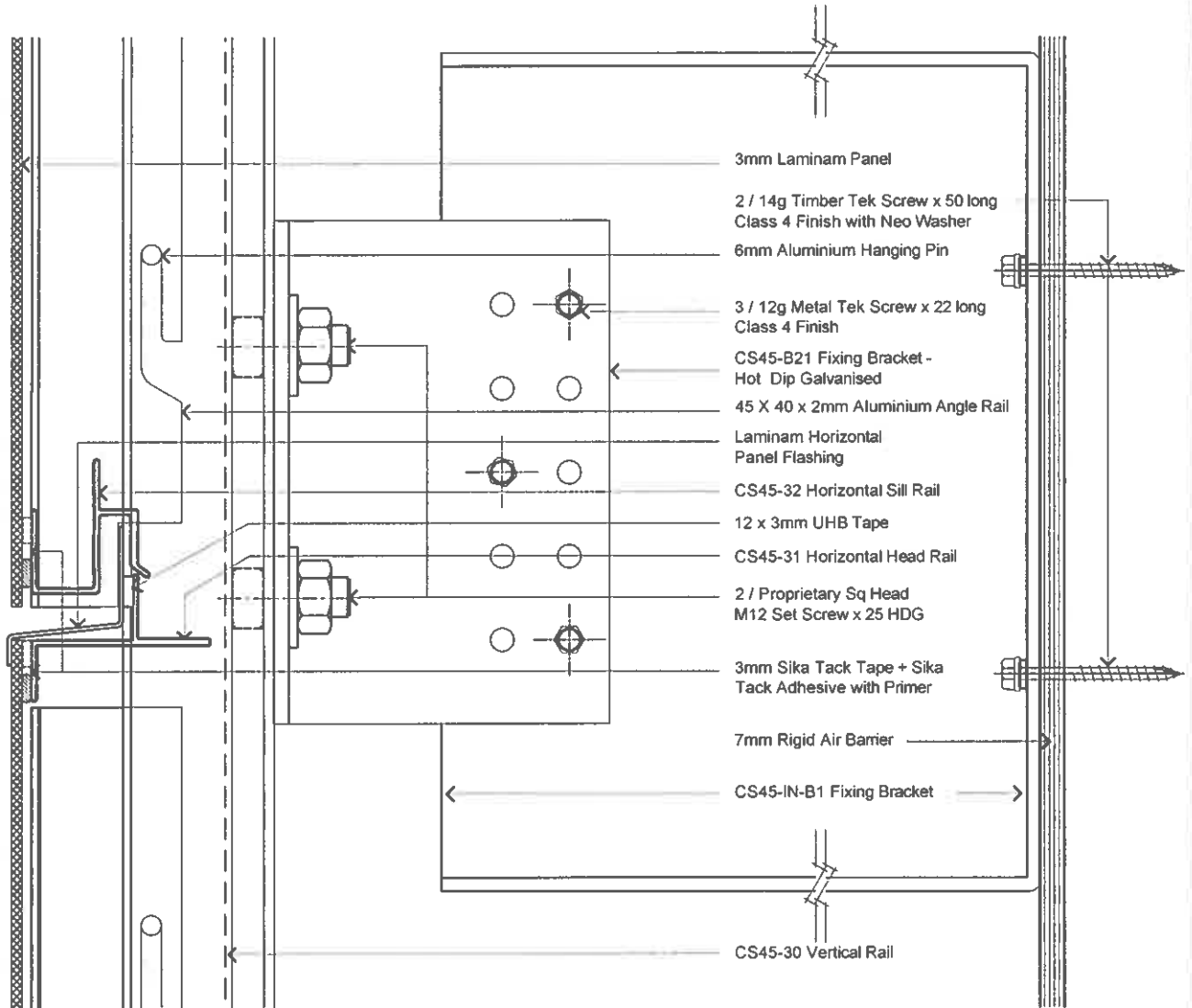
TB-HJ-09

Scale

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Name:

Test Booth Horizontal Panel to
Panel Joint Detail

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1:2 @ A4

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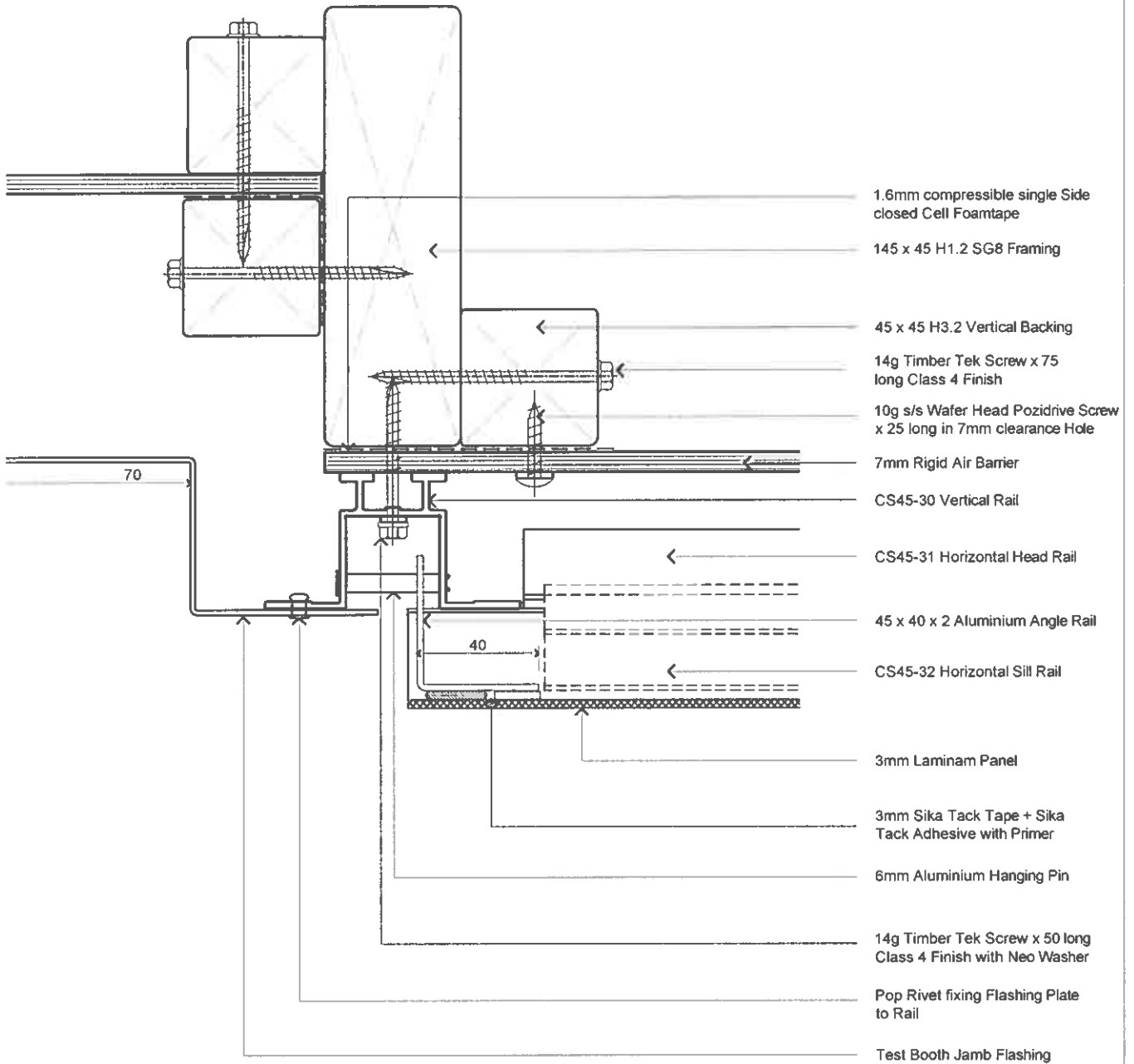
TB-HJ-10

Scale

Date

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Name:

Test Booth Vertical Rail Panel Jamb Detail

job number: C0039

1:2 @ A4

12.07.2012

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TB-VR-11

Scale

Date

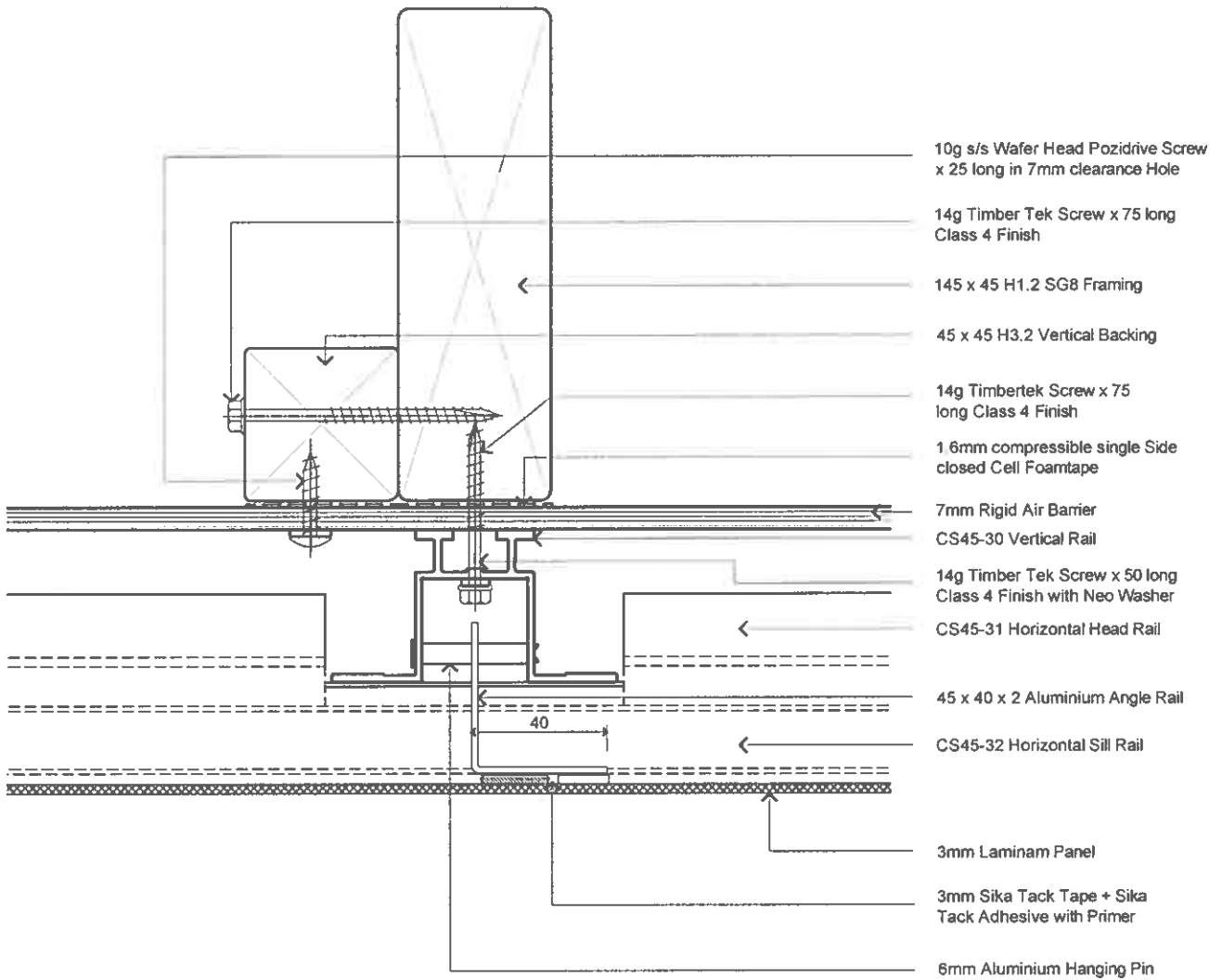
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Name:

Test Booth Vertical Rail Mid Panel
Support Detail

job number: C0039

1:2 @ A4

12.07.2012

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TB-VR-12

Scale

Date

Revision

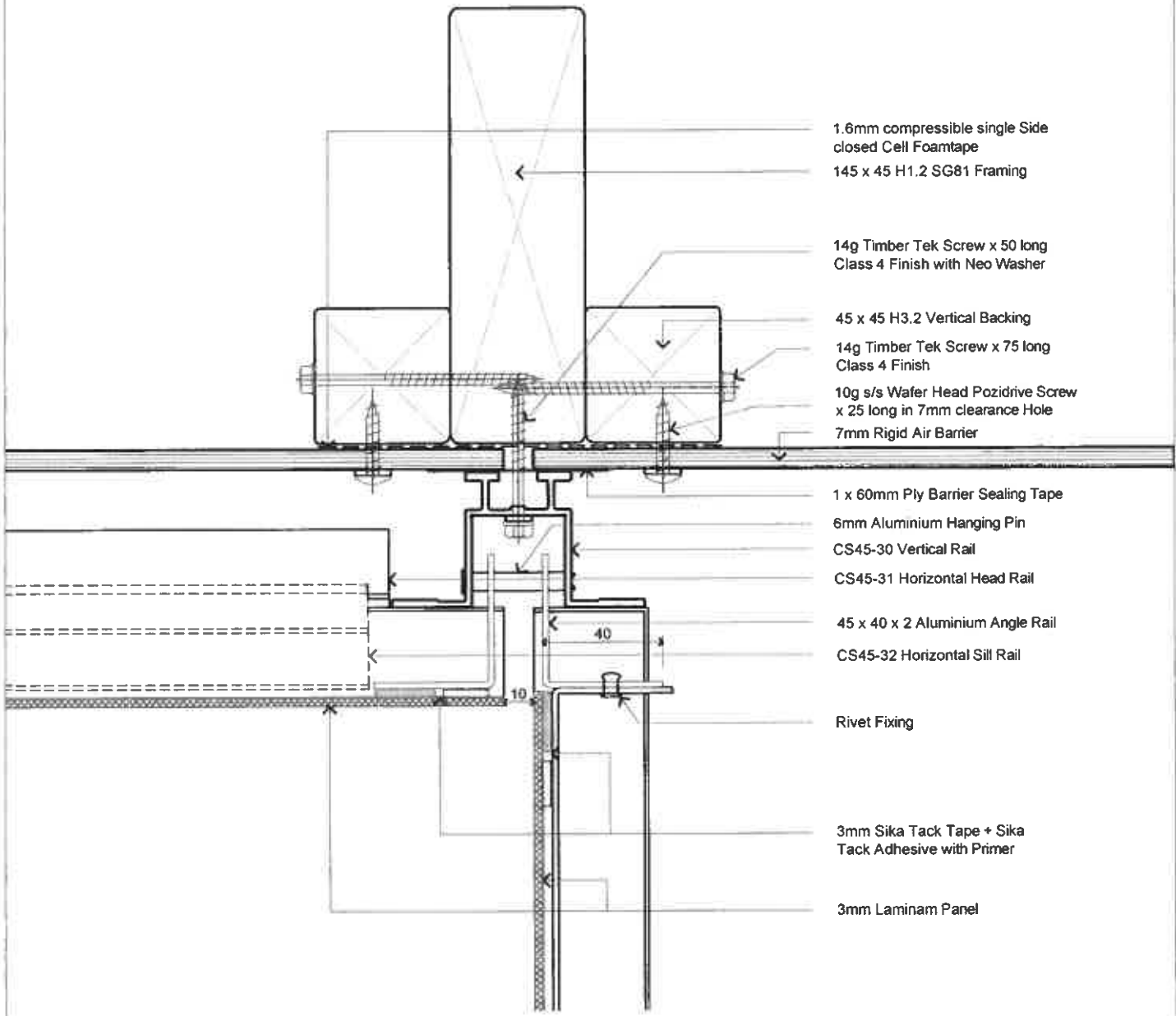
Dwg



CLADDING SYSTEMS (NZ) LIMITED

LAMINAM®

TS45-CS



1.6mm compressible single Side closed Cell Foamtape
145 x 45 H1.2 SG81 Framing

14g Timber Tek Screw x 50 long Class 4 Finish with Neo Washer

45 x 45 H3.2 Vertical Backing
14g Timber Tek Screw x 75 long Class 4 Finish

10g s/s Wafer Head Pozidrive Screw x 25 long in 7mm clearance Hole
7mm Rigid Air Barrier

1 x 60mm Ply Barrier Sealing Tape

6mm Aluminium Hanging Pin

CS45-30 Vertical Rail

CS45-31 Horizontal Head Rail

45 x 40 x 2 Aluminium Angle Rail

CS45-32 Horizontal Sill Rail

Rivet Fixing

3mm Sika Tack Tape + Sika Tack Adhesive with Primer

3mm Laminam Panel



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Name:

Test Booth Internal Corner Panel to Panel
Detail

job number: C0039

1:2 @ A4

12.07.2012

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TB-IC-13

Scale

Date

Revision

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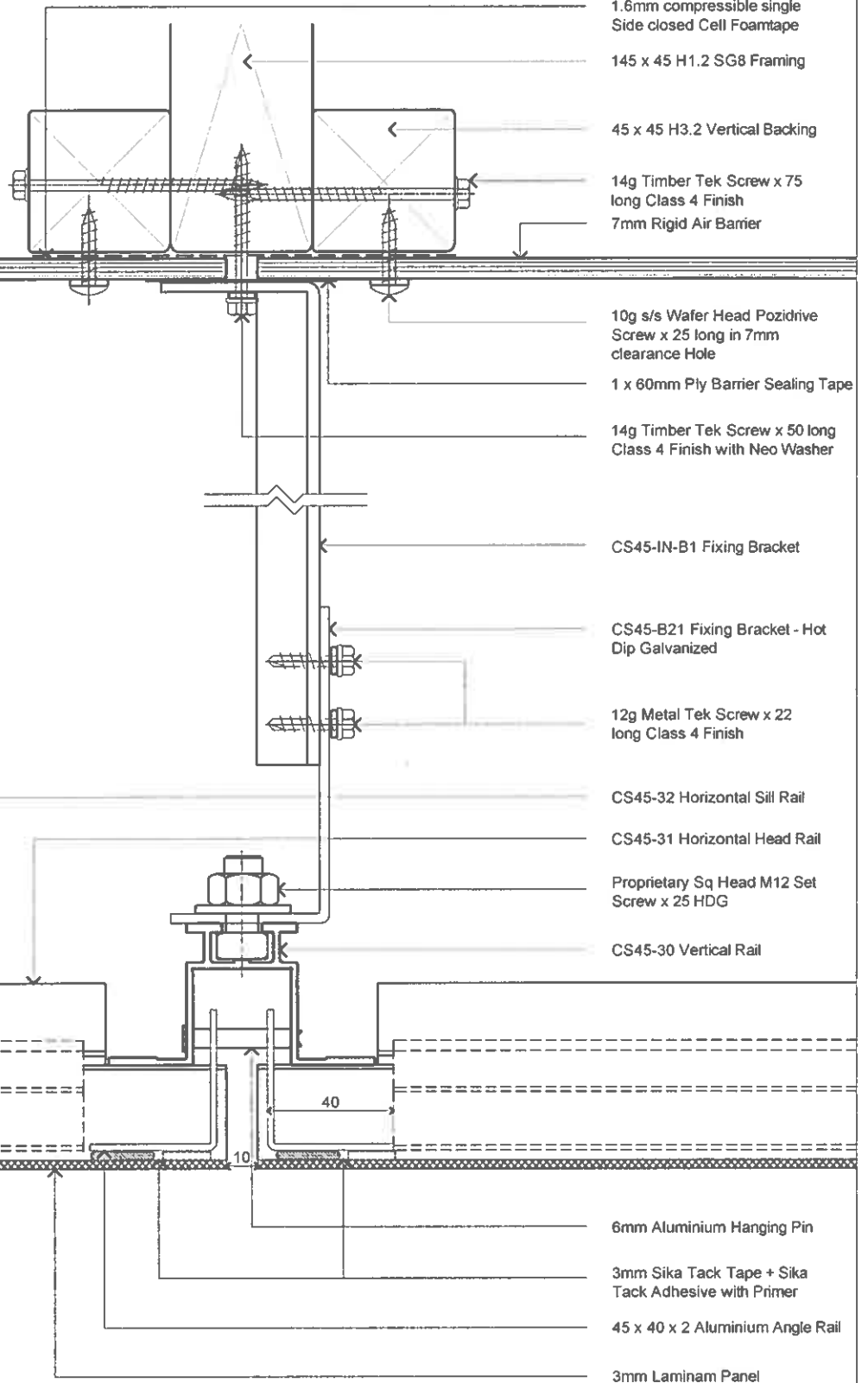
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TS45-CS



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Name:

Test Booth Off Set Vertical Rail
Panel to Panel Joint Detail

job number: C0039

1:2 @ A4

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TB-VR-14

Scale

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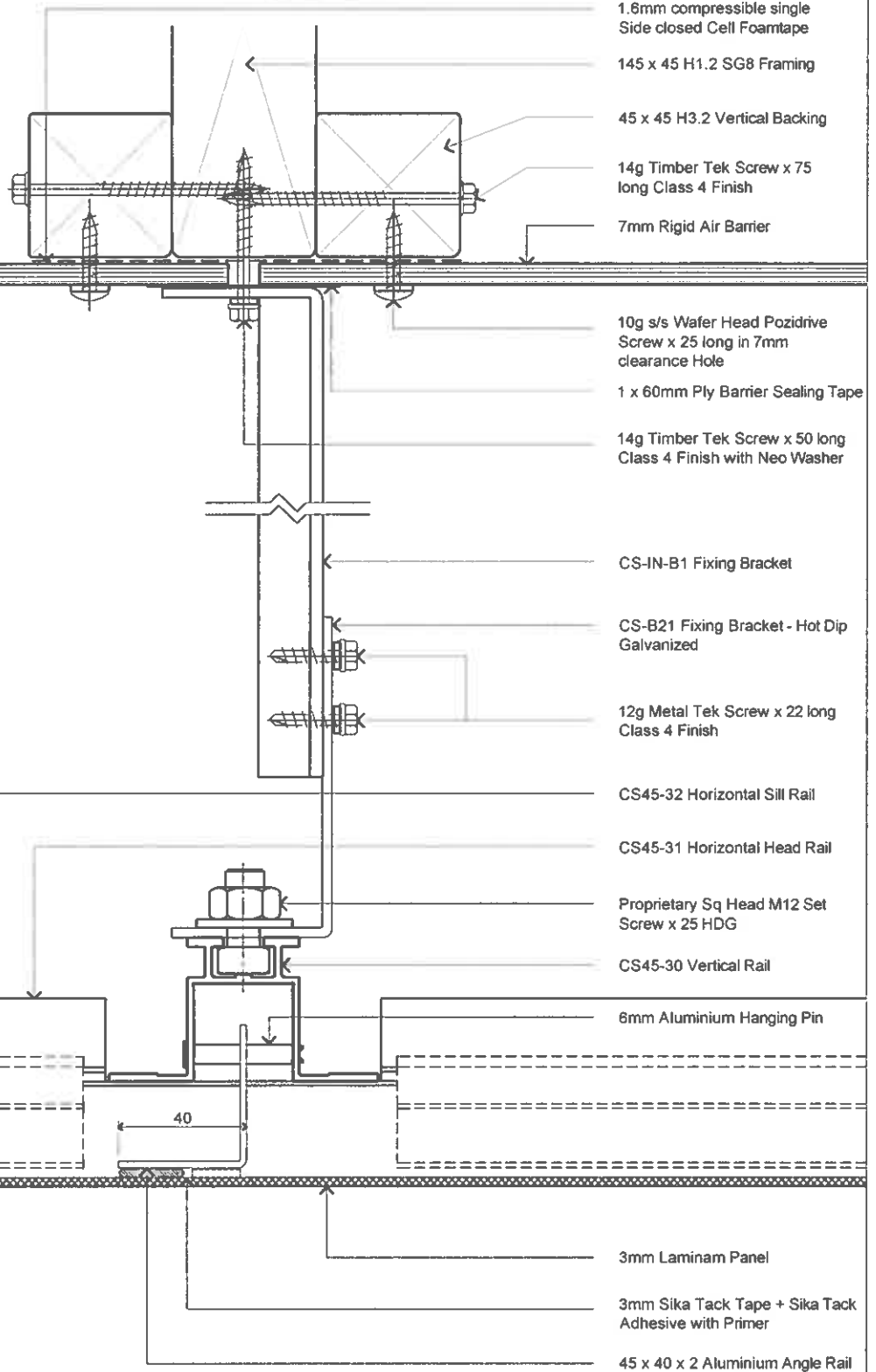
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CLADDING SYSTEMS (NZ) LIMITED

LAMINAM®

TS45-CS



- 1.6mm compressible single Side closed Cell Foamtape
- 145 x 45 H1.2 SG8 Framing
- 45 x 45 H3.2 Vertical Backing
- 14g Timber Tek Screw x 75 long Class 4 Finish
- 7mm Rigid Air Barrier
- 10g s/s Wafer Head Pozidrive Screw x 25 long in 7mm clearance Hole
- 1 x 60mm Ply Barrier Sealing Tape
- 14g Timber Tek Screw x 50 long Class 4 Finish with Neo Washer
- CS-IN-B1 Fixing Bracket
- CS-B21 Fixing Bracket - Hot Dip Galvanized
- 12g Metal Tek Screw x 22 long Class 4 Finish
- CS45-32 Horizontal Sill Rail
- CS45-31 Horizontal Head Rail
- Proprietary Sq Head M12 Set Screw x 25 HDG
- CS45-30 Vertical Rail
- 6mm Aluminium Hanging Pin
- 3mm Laminam Panel
- 3mm Sika Tack Tape + Sika Tack Adhesive with Primer
- 45 x 40 x 2 Aluminium Angle Rail



15 Paramount Dr, Henderson
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Auckland, New Zealand

Name:

Test Booth Off Set Vertical Mid Support Rail

Detail

job number: C0039

1:2 @ A4

12.07.2012

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TB-VR-15

Scale

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