Technical Report – R4791185811
CWCT – Standard for systemised building envelopes – 2005

BTS Fabrications Limited

Vantage® DF – Rainscreen System Test

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Contents

1. Introduction

This report describes tests carried in order to determine the weather tightness of the sample with respect to wind and impact resistance on sample supplied as follow:

Test Details		
Customer:	BTS Fabrications Limited Unit 7 Woodham Road Aycliffe Business Park Newton Aycliffe DL5 6HT	
Product Tested	Vantage® DF – Rainscreen System Test	
Date of Test:	21st May 2024 24th and 26th July 2024 15th and 16th August 2024	
Test Conducted at:	UL International (UK) Limited Halesfield 2 Telford Shropshire TF7 4QH	
Test Conducted by:	C Niven P Seymour J Dove	*Laboratory Assistant* *Laboratory Technician* *Senior Laboratory Assistant*
Test Supervised by:	M Witkowska *Laboratory Manager*	[signature]

Report Authorisation		
Report Compiled by:	R Cooper *Project Handler*	[signature]
Authorised by:	D Price *Senior Engineering Associate*	[signature]

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2. Summary of Results

2.1 The test methods

The performance of the sample tested has been assessed against the criteria described in below standards.

CWCT Standard Test Methods for Building Envelopes - December 2005	
Dynamic Aero Engine	CWCT Section 7
Wind Resistance – Serviceability	CWCT Section 11
Wind Resistance – Safety	CWCT Section 12
Impact – Retention to Performance & Safety to Persons	CWCT TN 76

2.2 Decision Rule

Classifications reported in Section 5 indicate that the product conforms with the relevant accuracy requirements of the testing standards (as summarised below) and the expanded measurement uncertainty (k= 2 for approximately 95% coverage probability) is no greater in magnitude than the accuracy requirements defined in Section 2 of CWCT Standard Test methods for Building Envelopes. If the measured value is on the limit, the result is defined as a pass. This means that the risk of a false positive is 50%. For further information regarding risk assessment refer to ILAC G8: 2019.

2.3 Measurement Uncertainty

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%, and for the wind resistance measurements is +/- 3.16 %, for the mass of the dislodge fragments is +/- 0.02 % and for the size of the dislodge fragments is +/- 0.06 %.

2.4 Summary of Results

The following summarises the results of testing carried out, in accordance with the relevant testing and classification standards.

Test Type	Peak Test Pressure	Result
Test 1 - Wind Resistance – Serviceability – Backing Wall	2400 Pa	Pass
Test 2 - Dynamic Aero Engine – Excluding Water	600 Pa	N/A
Test 3 - Wind Resistance – Serviceability – Cavity	2400 Pa	Pass
Test 4 - Wind Resistance – Safety – Backing Wall	3600 Pa	Pass
Test 5 -Wind Resistance – Safety – Cavity	3600 Pa	Pass
Test 6 - Impact Resistance – Retention of Performance	Cat B	Class 3
Test 7 - Impact Resistance – Safety to Persons	Cat B	Negligible Risk
Dismantle, Inspect & Report	Pass	

More comprehensive details are reported in Section 6.

These results are valid only for the conditions under which the test was conducted.

Note: The above test sequence has been based on the following sample installation requirements.

Full PMU sample with backing wall and window was installed exactly as per previously tested sample reference Vantage® SF (Secret Fix) reference test report R4789929440 and sample reference Vantage® IP reference test report R4789929447

Note**:** The backing wall included in the test sample was to facilitate testing of the rainscreen sample only and did not form part of the tested system.

All measurement devices, instruments and other relevant equipment were calibrated and traceable to National Standards.

3. Description of Test Sample

The description of the test sample in this section has been supplied by BTS Fabrications Limited and has not been verified by UL International (UK) Limited.

See Section 7 for test sample drawings as supplied by BTS Fabrications Limited.

Product Description

Full product name:	Vantage® DF
Product type:	Drained and back ventilated rainscreen
Product description:	Discreet fix – rainscreen panel system
Manufactured by:	BTS Fabrications Limited

Support Framing and bracketry

Material:	EN AW 6005 T6
Finish:	Mill Finish
Vertical rail Ref:	NVELOPE - 100x60x2.2mm T-Rail NVELOPE - 60x40x2.2mm L-Rail
Horizontal rail Ref:	3mm EN AW 3103 H14: bespoke horizontal support strap
Fixing method (horizontal strap to backing wall) :	SX5-S16-5.5x41 (fixed at every stud location)
Bracket to support strap fixing Ref:	SX3-S16-6x38+A4 (general areas) SX5-S16-5.5X61+A2 (at SFS stud locations)
Bracket to rail fixings	Double bracket – 4 fixings (dead fix) Single Bracket – 2 fixings (sliding fix)
Bracket to rail fixing ref :	SDA5/3.8-8-H13-S4-5.5x22
Max Span between vertical rails:	790mm
Max Span between horizontal rails:	775mm
Brackets ref:	NVELOPE - VB270S (single) NVELOPE - VB270D (double) Helping hand brackets & isolator pads
Construction tolerance allowed between fixings, rails and brackets (+/-)	(+/-) 25mm

Panels/ Tiles / Brickslip

Material:	3mm aluminium sheet
Material ref (source, spec):	EN AW 1050a H14
Finish:	PPC Coated
Thickness:	3mm
Reinforcing:	Bespoke panel stiffener
Max height of panel:	3820mm
Max width of panel:	3850mm
Max size of panel by area (m2):	6.876m2
Fixing method:	Panel fixed directly to underlying T rail
Bracket/clip ref:	T-Tag – BTS manufactured
Screws/fixings ref:	SX5/12-D12-5.5x35+A4+Colour

Interface Details (curtain wall to window/door inserts)

Window interface detail:	PURe 1200x1200mm - Senior Architectural Systems Ltd

Backing Wall

Structural support type:	SFS Framing (200x65x1.6 – S390) EOS Framing Ltd
Insulation type:	Not used in test
Insulation thickness:	N/A
Airtight membrane:	N/A
Watertight membrane:	N/A
Particle board detail:	Klasse 12mm A1 Fibre cement C-board 2.4m x 1.2m
Sealants and tapes:	Klasse fire rated sealant 600ml - green Klasse external sheathing joint tape 60mm x 25m
Fixings ref:	WHX32 4.2x32mm
Construction tolerance allowed between SFS (+/-)	(+/-) 10%

Drainage

Drainage type (pressure equalised etc.):	Drained and back ventilated
Drainage specification and weep holes etc.	Drainage slots in reverse of panel – refer to panel drawings

Additional brackets & Fixings

Ref:	SX14-S16-5.5x40 (SFS frame to test rig)

Drawings

Drawing/s must be provides covering the below; -Full drawing of sample including front elevation -Cross Sections (Panels/Rails Etc.) -Hardware Locations -Fixings -Drainage Points Note: drawings are required to show all relevant dimensions.	As detailed in Section 7
Test sample size:	6600mm x 8300mm

Confirmation

Customer is to confirm that the samples provided for testing are representative of standard production. Please note: the details given above, as well as the drawings supplied by the customer as confirmed as typical of normal production are not verified by UL International (UK) Limited.

Company:	BTS Fabrications Limited
Name:	Mark Wiper
Position:	Associate Technical Director
Date:	27th August 2024

Sample during testing

Photograph No. 1 – Dynamic Aero Engine

4. Test Arrangement

4.1 Test Chamber

A specimen, supplied for testing in accordance with CWCT requirements, was mounted on to a rigid test chamber constructed from steel, timber and plywood sheeting.

The pressure within the chamber was controlled by means of a centrifugal fan and a system of ducting and valves. The static pressure difference between the outside and inside of the chamber was measured by means of a differential pressure transmitter.

4.2 Instrumentation

4.2.1 Static Pressure

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

4.2.2 Deflection

Digital linear measurement devices with an accuracy of +/- 0.1 mm were used to measure deflection of principle framing members.

4.2.3 Temperature & Humidity

A digital data logger capable of measuring temperature with an accuracy of ± 1°C and humidity with an accuracy of ± 5 %Rh was used.

4.2.4 General

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

4.3 Pressure Generation

4.3.1 Static Air Pressure

The air supply system comprised of a centrifugal fan assembly and associated ducting and control valves and was used to create both positive and negative static pressure differentials. The fan provided a constant airflow at the required pressure and period required for the tests.

Note: *References are made to both positive and negative pressures in this document, it should be noted that in these instances, positive pressure is when pressure on the weather face of the sample is greater than that on the inside face and vice versa.*

4.3.2 Dynamic Aero Engine

A wind generator was mounted adjacent to the external face of the test sample and used to create positive pressure differential during dynamic testing.

4.4 Impactors

4.4.1 Soft (S1) Body Impactor

A spherical/conical, glass bead filled impactor with a mass of 50 Kg, as required in CWCT TN76

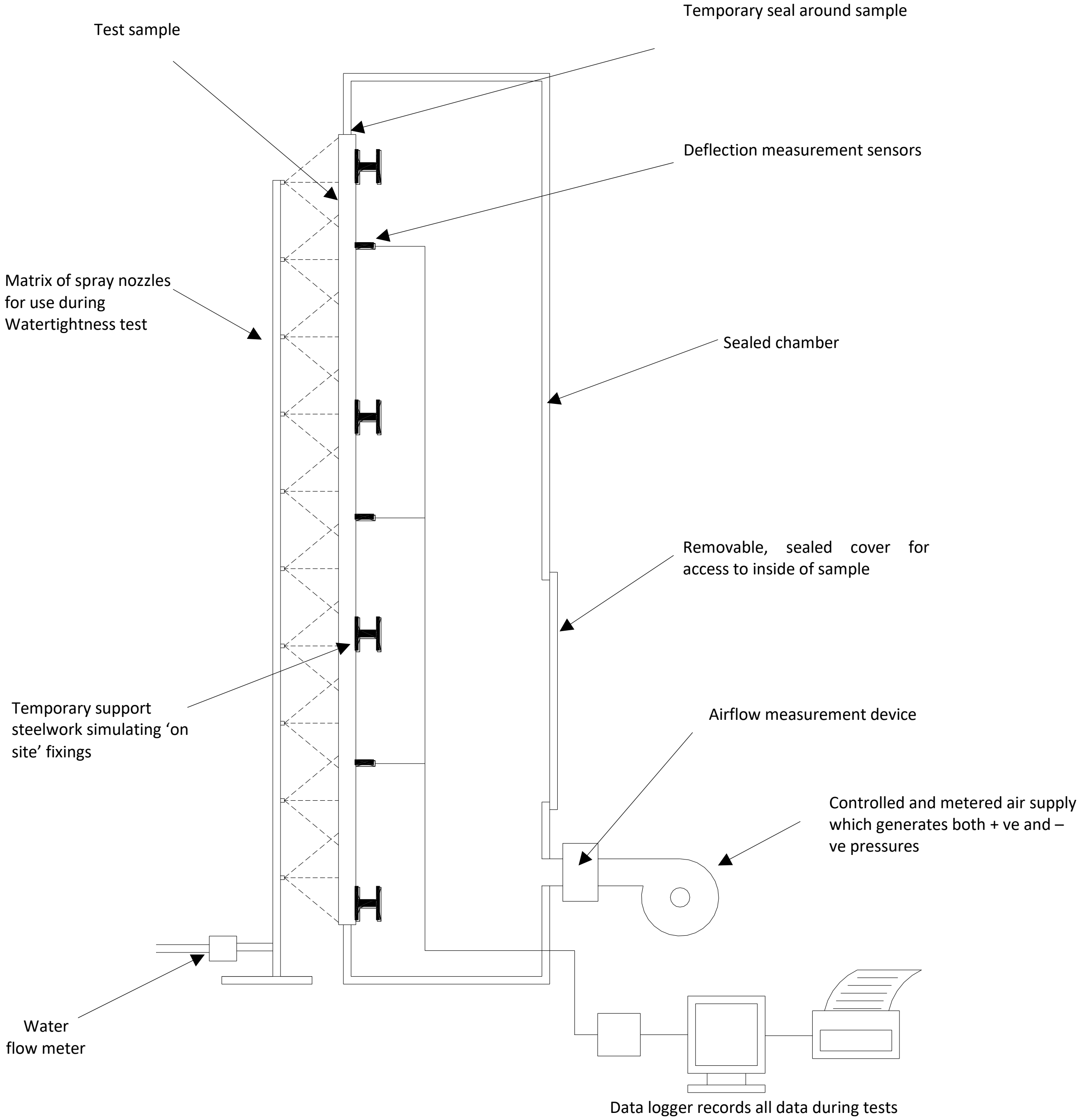
4.4.2 Hard (H2) Body Impactor

A steel ball with a diameter of 62.5 mm and a mass of 1.135 Kg, was released from the height, calculated to result in the required impact energies and allowed to fall under gravity until it impacted the designated test zone of the sample.

All measurement devices, instruments and other relevant equipment were calibrated and are traceable to National Standards.

Figure 1 – Test arrangement

General Arrangement of a Typical Test Assembly



5. Test Procedures

5.1 Sequence of Testing

Test 1 - Wind Resistance – Serviceability – Backing Wall
Test 2 - Water Penetration – Dynamic Aero Engine (Excluding Water)
Test 3 - Wind Resistance – Serviceability – Cavity
Test 4 - Wind Resistance – Safety – Backing Wall
Test 5 - Wind Resistance – Safety – Cavity
Test 6 - Impact Resistance – Retention of Performance
Test 7 - Impact Resistance – Safety to Persons

5.2 Dynamic Aero Engine

The sample was subjected to airflow from the wind generator, as described in 4.3.2, which achieved average deflections equal to those produced at a static pressure differential of 600 Pa and these conditions were met for the specified 15 minutes.

5.3 Wind Resistance

5.3.1 Wind Resistance - Serviceability

Three (3) preparatory pulses of 1200 Pa (50% of design wind load) positive pressure were applied to the test sample. Upon returning to 0 Pa, any opening parts of the test specimen were opened and closed five (5) times, secured in the closed position. All deflection sensors were then zeroed.

The sample was then subjected to positive pressure stages of 600, 1200, 1800 and 2400 Pa (25%, 50%, 75% and 100% of design wind load) and held at each step for 15 seconds (± 5 secs).

The deformation status of the sample was recorded at each step at characteristic points as stated in the standard, following which the pressure was reduced to 0 Pa and any residual deformations recorded within 1 hour of the test.

The above test sequence was then repeated, including preparation pulses, at a negative pressure differential.

Following each of the above tests, the sample was inspected for permanent deformation or damage.

5.3.2 Wind Resistance - Safety

Three preparatory positive air pressure pulses of 1200 Pa (50% of design wind load) positive pressure were applied to the test sample, and the deflection sensors were zeroed.

The sample was subjected to a positive pressure pulse of 3600 Pa (2400 Pa x 150%). The pressure was applied as rapidly as possible but in not less than 1 second and was maintained for 15 seconds (± 5 secs).

Following this pressure pulse and upon returning to zero (0) pressure, residual deformations were recorded and any change in the condition of the specimen was noted.

After the above sequence, a visual inspection was conducted, any moving parts were operated and any damage or functional defects noted.

The above test sequence was then repeated, including preparation pulses, at a negative pressure differential. The deflection sensors were zeroed following the preparation pulses.

Following each of the above tests, the sample was inspected for any permanent deformation or damage.

5.4 Impact Resistance

5.4.1 Impact Test Procedure – Retention of Performance – CWCT TN 76

The test sample was tested using a drop height which corresponded with the required performance level.

The Impactors, as described in section 4.4.1 and 4.4.2, were suspended on a wire/nylon cord and allowed to swing freely, without initial velocity, in a pendulum motion until they hit the sample normal to its face. Only one impact was performed at any single position during the hard body impacting and three times at each position during the soft body impacting.

Tests were conducted at the required impact energies as shown in section 6.4.1 and 6.4.2 to the selected impact points. Drop heights were set to an accuracy of ± 10 mm.

5.4.2 Impact Test Procedure – Safety to Persons – CWCT TN 76

The test sample was tested using a drop height which corresponded with the required performance level.

The Impactors, as described in section 4.4.1 and 4.4.2 were suspended on a wire/nylon cord and allowed to swing freely, without initial velocity, in a pendulum motion until they hit the sample normal to its face. Only one impact was performed at any single position.

Tests were conducted at the required impact energies as shown in section 6.4.1 and 6.4.2 to the selected impact points and the impactors were not allowed to strike the sample more than once.

Drop heights were set to an accuracy of ± 10 mm.

6. Test Results

6.1 Dynamic Aero Engine

Temperatures (°C)	Ambient	19.0

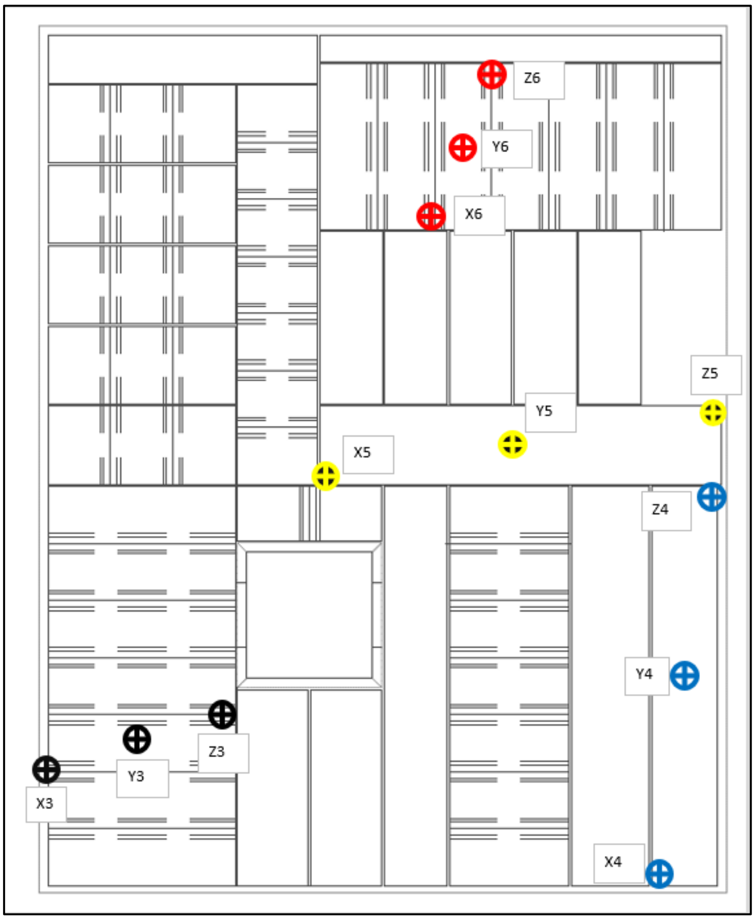
The sample was subjected to testing as described in section 5.2 for a period of not less than 15 minutes, during which no damage was observed to the sample.

6.2 Wind Resistance

Probe Group Identification	Calculation of deflection
Group A comprised of probes X3, Y3 & Z3	= Probe Y3 – ((Probe X3 + Probe Z3)/2)
Group B comprised of probes X4, Y4 & Z4	= Probe Y4 – ((Probe X4 + Probe Z4)/2)
Group C comprised of probes X5, Y5 & Z5	= Probe Y5 – ((Probe X5 + Probe Z5)/2)
Group D comprised of probes X6, Y6 & Z6	= Probe Y6 – ((Probe X6 + Probe Z6)/2)

An inspection carried out following tests 1, 3, 4 and 5, after both positive and negative pressure testing, showed no evidence of any permanent deformation or damage to the test sample.

Figure 2 - Positions of Deflection Measurement Probes



6.2.1 Tests 1 & 3 – Wind Resistance, Serviceability

Ambient Temperature (°C)	20.3

Measured Length of Framing Member (mm)		Allowable Deflection	
		Ratio	Calculated (mm)
Group A	1805	L/90	20.1
Group B	3720	L/90	41.3
Group C	3815	L/90	42.4
Group D	1620	L/90	18.0

6.2.1.1 Wind Resistance, Serviceability – Positive Pressure

Positive Pressure Pa	Results (mm)			
	Group A	Group B	Group C	Group D
0	0.0	0.0	0.0	0.0
600	3.3	3.7	5.5	2.5
1200	7.1	6.7	13.0	5.0
1800	10.7	11.1	23.6	7.8
2400	12.3	17.1	33.2	11.0
Residuals Immediately following test	0.6	1.4	2.1	0.9

6.2.1.2 Wind Resistance, Serviceability – Negative Pressure

Negative Pressure Pa	Results (mm)			
	Group A	Group B	Group C	Group D
0	0.0	0.0	0.0	0.0
600	3.6	5.1	5.9	2.5
1200	6.8	8.1	10.7	4.6
1800	9.8	12.6	16.1	6.8
2400	13.0	15.8	21.3	9.0
Residuals Immediately following test	1.3	1.9	1.6	0.5

6.3 Tests 4 & 5 – Wind Resistance, Safety

Ambient Temperature (°C)	20.1

Measured Length of Framing Member (mm)	
Group A	1805
Group B	3720
Group C	3815
Group D	1620

6.3.1 Wind Resistance, Safety – Positive Pressure

Positive Pressure Pa	Results (mm)			
	Group A	Group B	Group C	Group D
0	0.0	0.0	0.0	0.0
3600	14.9	28.8	46.3	15.4
Residuals Immediately following test	0.4	3.7	2.0	0.7

6.3.1.1 Wind Resistance, Safety – Negative Pressure

Negative Pressure Pa	Results (mm)			
	Group A	Group B	Group C	Group D
0	0.0	0.0	0.0	0.0
3600	17.5	15.2	29.9	13.2
Residuals Immediately following test	1.1	0.2	2.1	0.6

Note: *The standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95%, for the above measurements is ± 2.4 % of the reading.*

6.4 Impacting

6.4.1 Tests 6 & 7 – Impact – Soft Body

Ambient Temperatures (°C)	22.7
Humidity (%RH)	42

Red Zone				
Impact Reference	Test Classification	Impact Energy (J)	Observations	Result
A1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
B1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
C1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
D1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
E1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
F1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk

Class Achieved	Class 1 Negligible Risk

Blue Zone				
Impact Reference	Test Classification	Impact Energy (J)	Observations	Result
A1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
B1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
C1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
D1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
E1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
F1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk

Class Achieved	Class 1 Negligible Risk

Green Zone				
Impact Reference	**Test Classification**	**Impact Energy (J)**	**Observations**	**Result**
A1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
D1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
E1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk
F1	Cat B Cat B	120 x 3 500 x 1	No Damage No Damage	Class 1 Negligible Risk

Class Achieved	Class 1 Negligible Risk

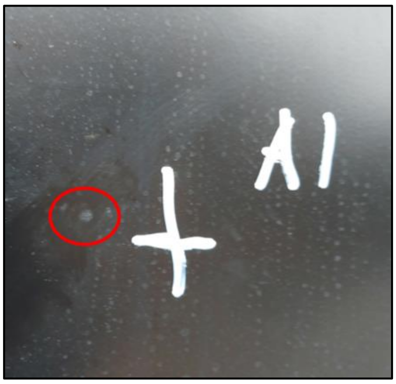
6.4.2 Tests 6 & 7 – Impact – Hard Body H2

Ambient Temperatures (°C)	22.7
Humidity (%RH)	42

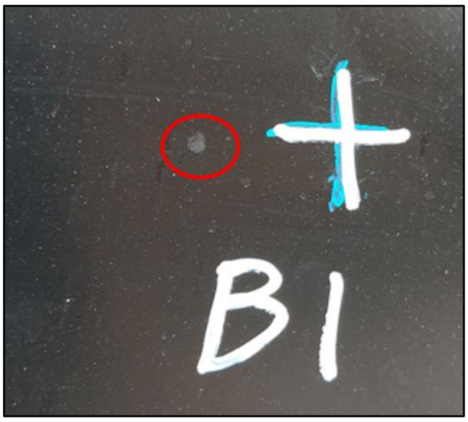
Red Zone				
Impact Reference	**Test Classification**	**Impact Energy (J)**	**Observations**	**Result**
A1	Cat B	10 x 1	Dent	Class 2 Negligible Risk
B1	Cat B	10 x 1	Scuff	Class 2 Negligible Risk
C1	Cat B	10 x 1	Dent	Class 3 Negligible Risk
D1	Cat B	10 x 1	Dent	Class 2 Negligible Risk
E1	Cat B	10 x 1	Scuff	Class 2 Negligible Risk
F1	Cat B	10 x 1	Scuff	Class 3 Negligible Risk

Class Achieved	Class 3 Negligible Risk

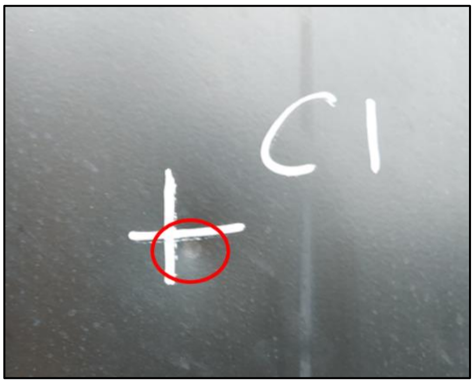
Photograph No. 2 – Damage caused during impact area reference A1



Photograph No. 3 - Damage caused during impact area reference B1

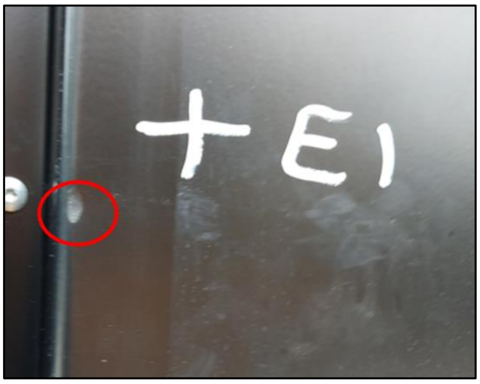


Photograph No. 4 - Damage caused during impact area reference C1



Photograph No. 5 - Damage caused during impact area reference D1

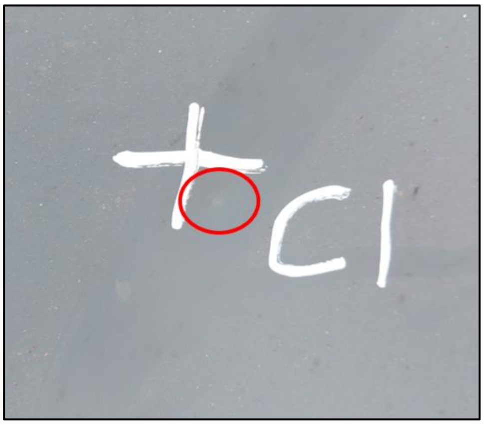
Photograph No. 6 - Damage caused during impact area reference E1



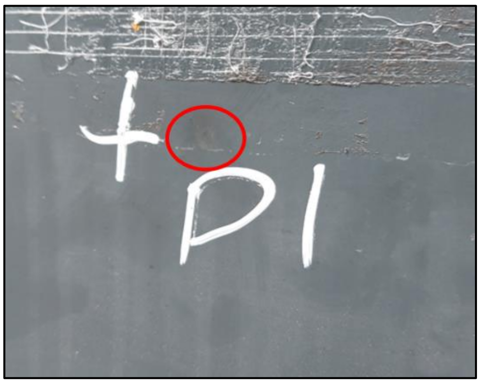
Photograph No. 7 - Damage caused during impact area reference F1

Blue Zone				
Impact Reference	**Test Classification**	**Impact Energy (J)**	**Observations**	**Result**
A1	Cat B	10 x 1	No Damage	Class 1 Negligible Risk
B1	Cat B	10 x 1	No Damage	Class 1 Negligible Risk
C1	Cat B	10 x 1	Dent	Class 3 Negligible Risk
D1	Cat B	10 x 1	Dent	Class 3 Negligible Risk
E1	Cat B	10 x 1	Scuff	Class 2 Negligible Risk
F1	Cat B	10 x 1	Dent	Class 2 Negligible Risk

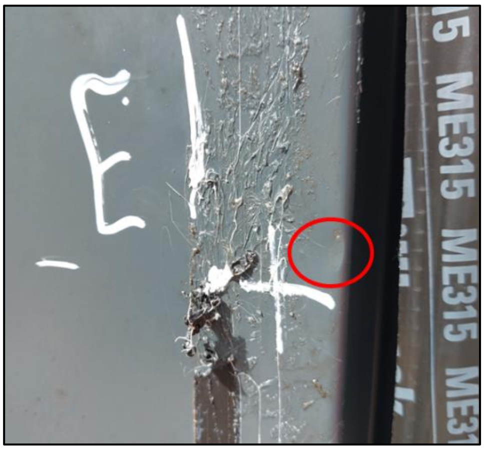
Class Achieved	Class 3 Negligible Risk



Photograph No. 8 - Damage caused during impact area reference C1



Photograph No. 9 - Damage caused during impact area reference D1

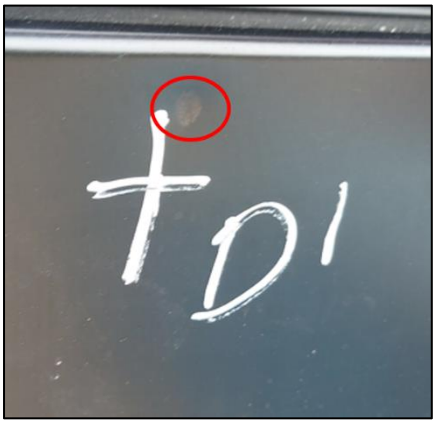


Photograph No. 10 - Damage caused during impact area reference E1

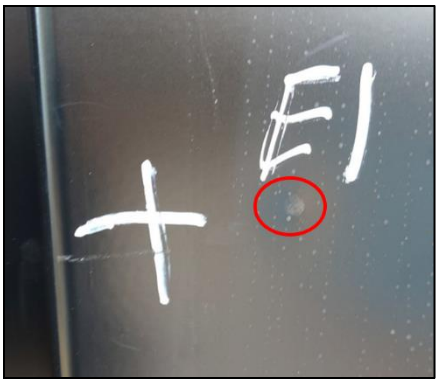
Green Zone				
Impact Reference	**Test Classification**	**Impact Energy (J)**	**Observations**	**Result**
A1	Cat B	10 x 1	No Damage	Class 1 Negligible Risk
D1	Cat B	10 x 1	Dent	Class 3 Negligible Risk
E1	Cat B	10 x 1	Scuff	Class 2 Negligible Risk
F1	Cat B	10 x 1	Scuff	Class 2 Negligible Risk

Class Achieved	Class 3 Negligible Risk

Photograph No. 11 - Damage caused during impact area reference D1



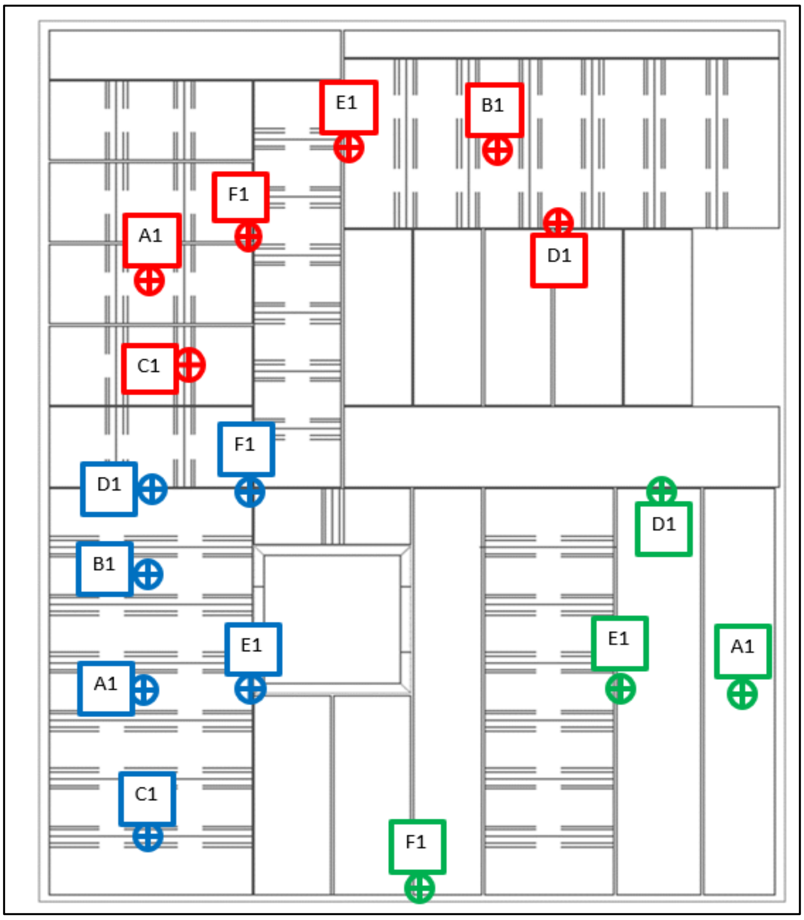
Photograph No. 12 - Damage caused during impact area reference E1



Photograph No. 13 - Damage caused during impact area reference F1

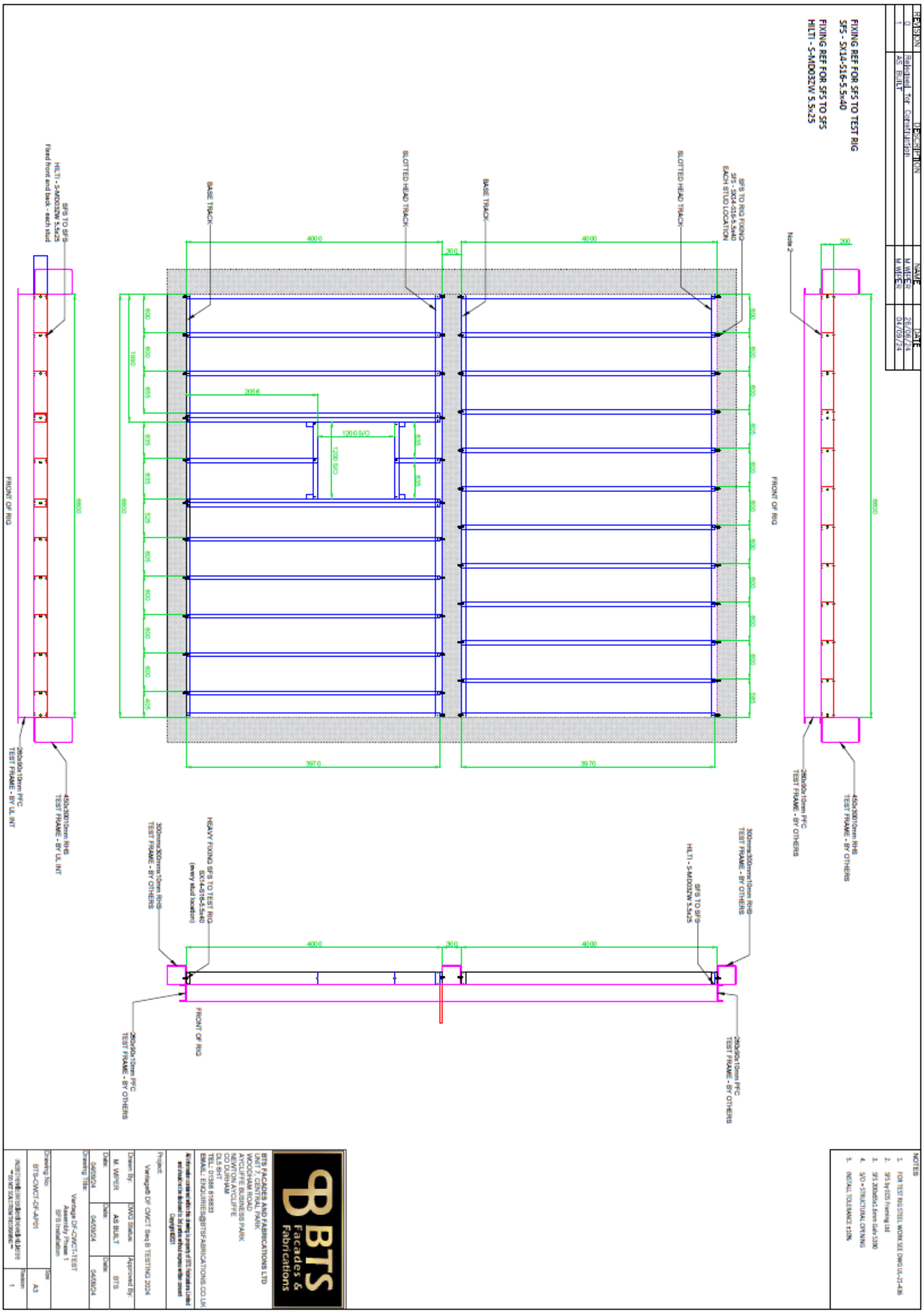
6.4.3 Impact Locations

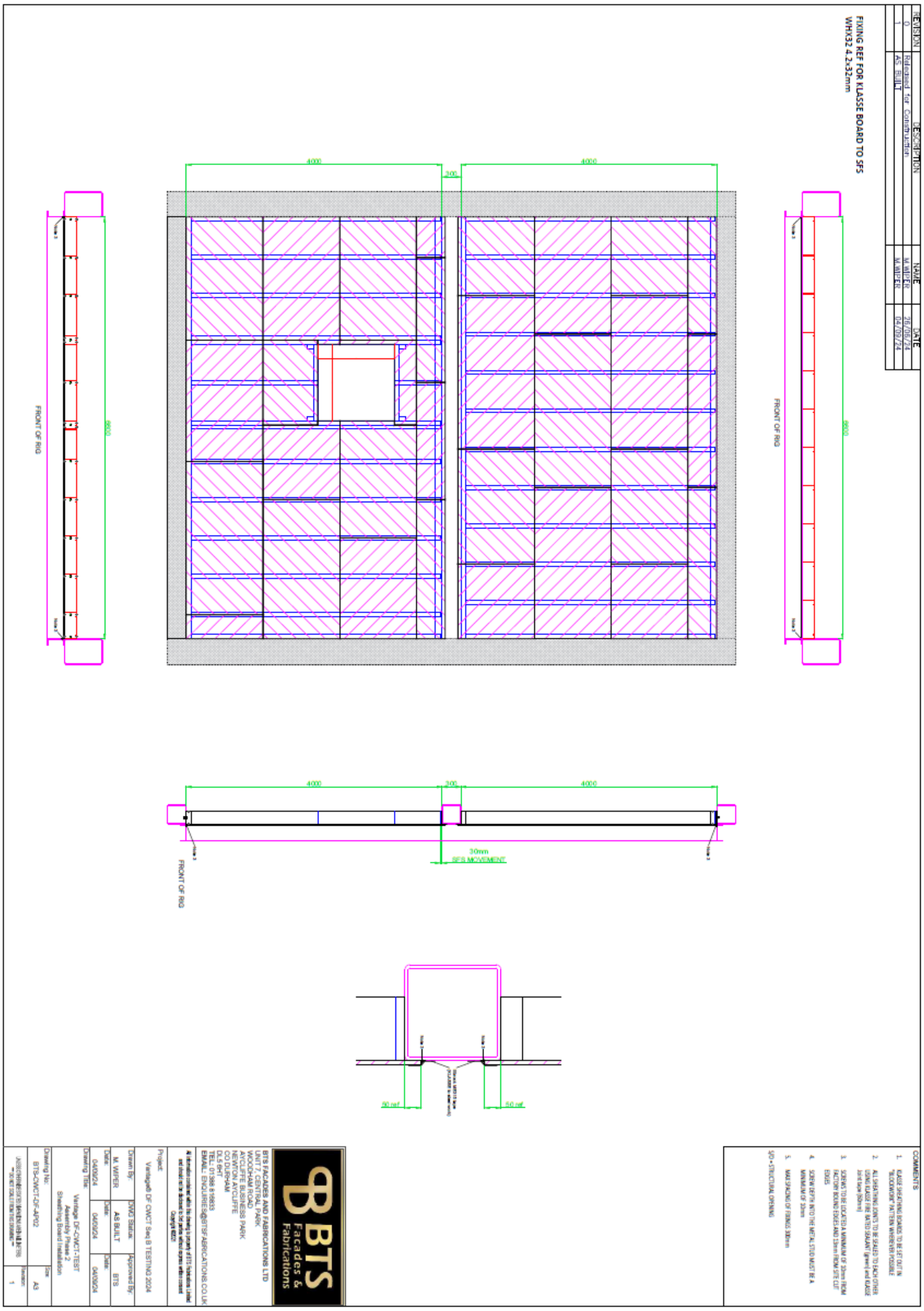
Figure 3

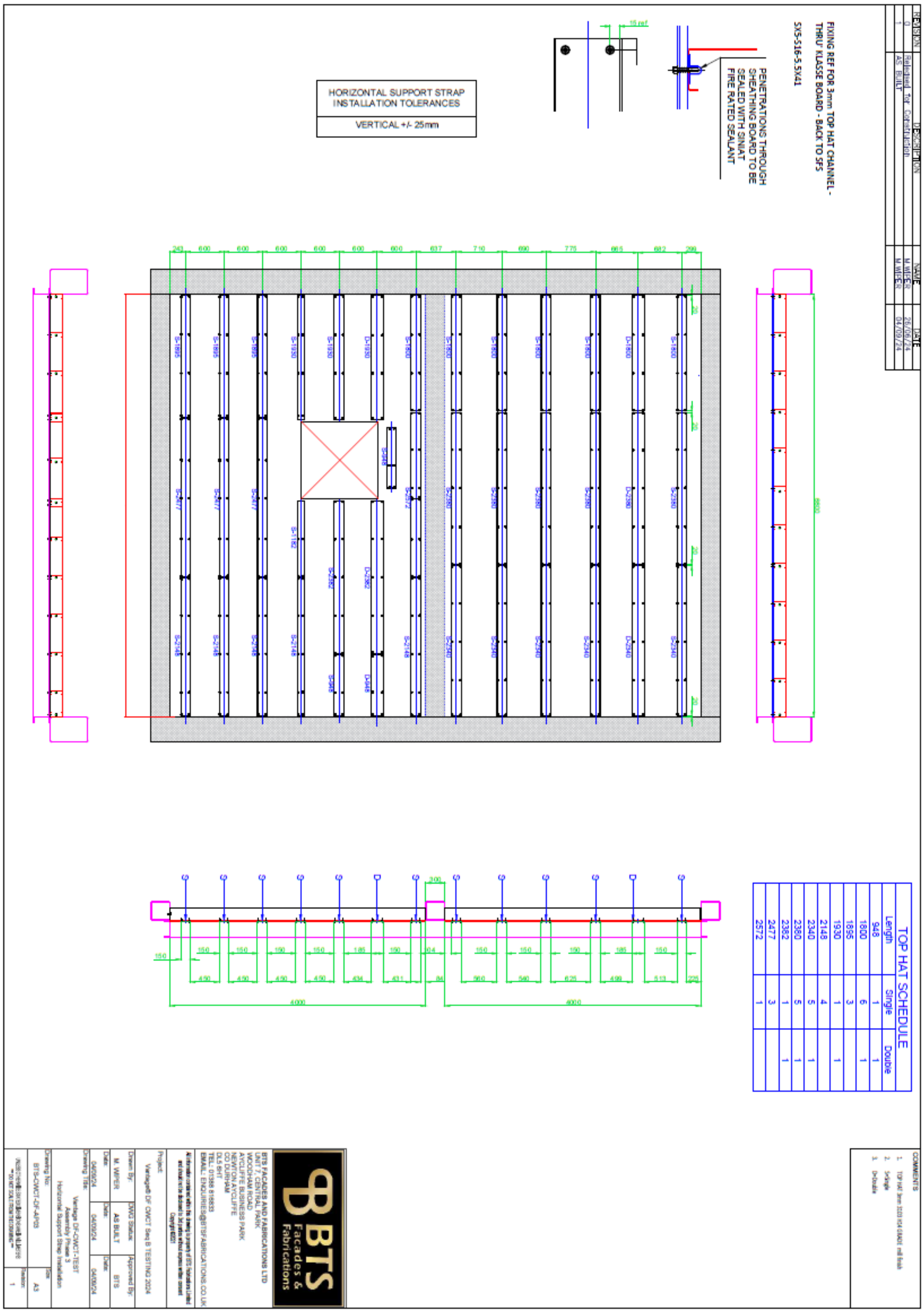


Impact Location	Description
A	Centre of panel
B	Centre of stiffener
C	On a stiffener
D	Unsupported edge
E	Supported edge
F	Corner

7. System Drawings







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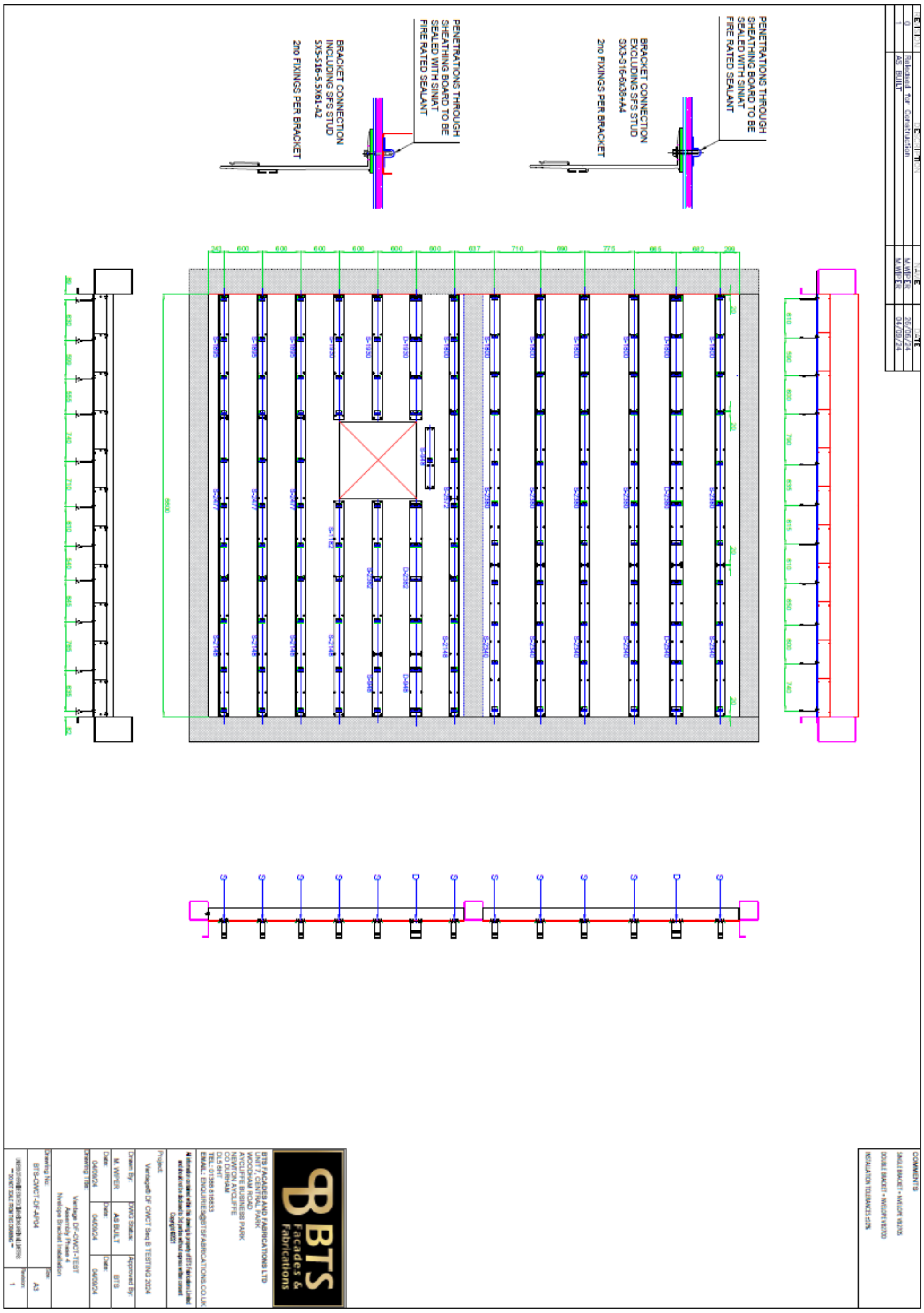
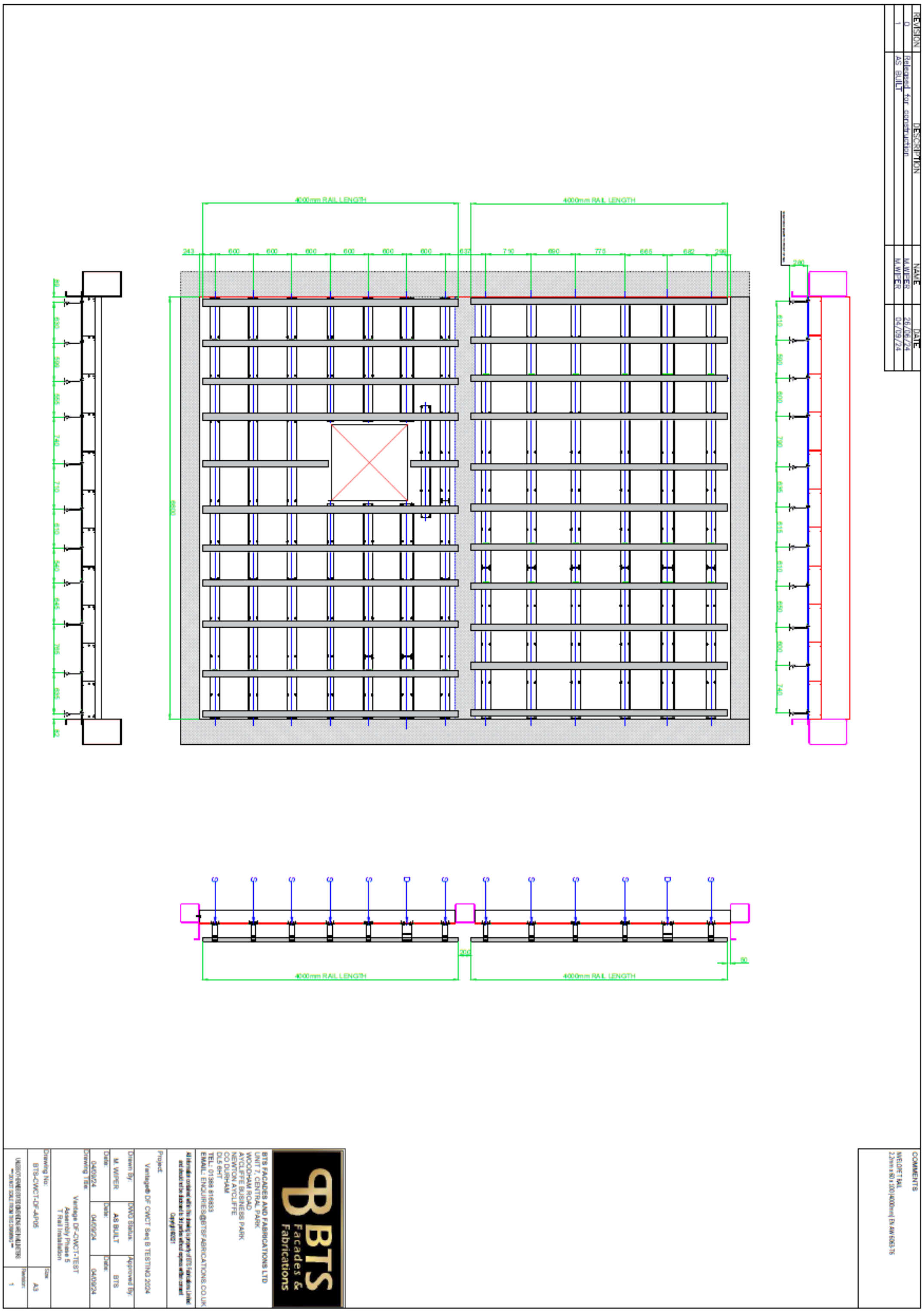
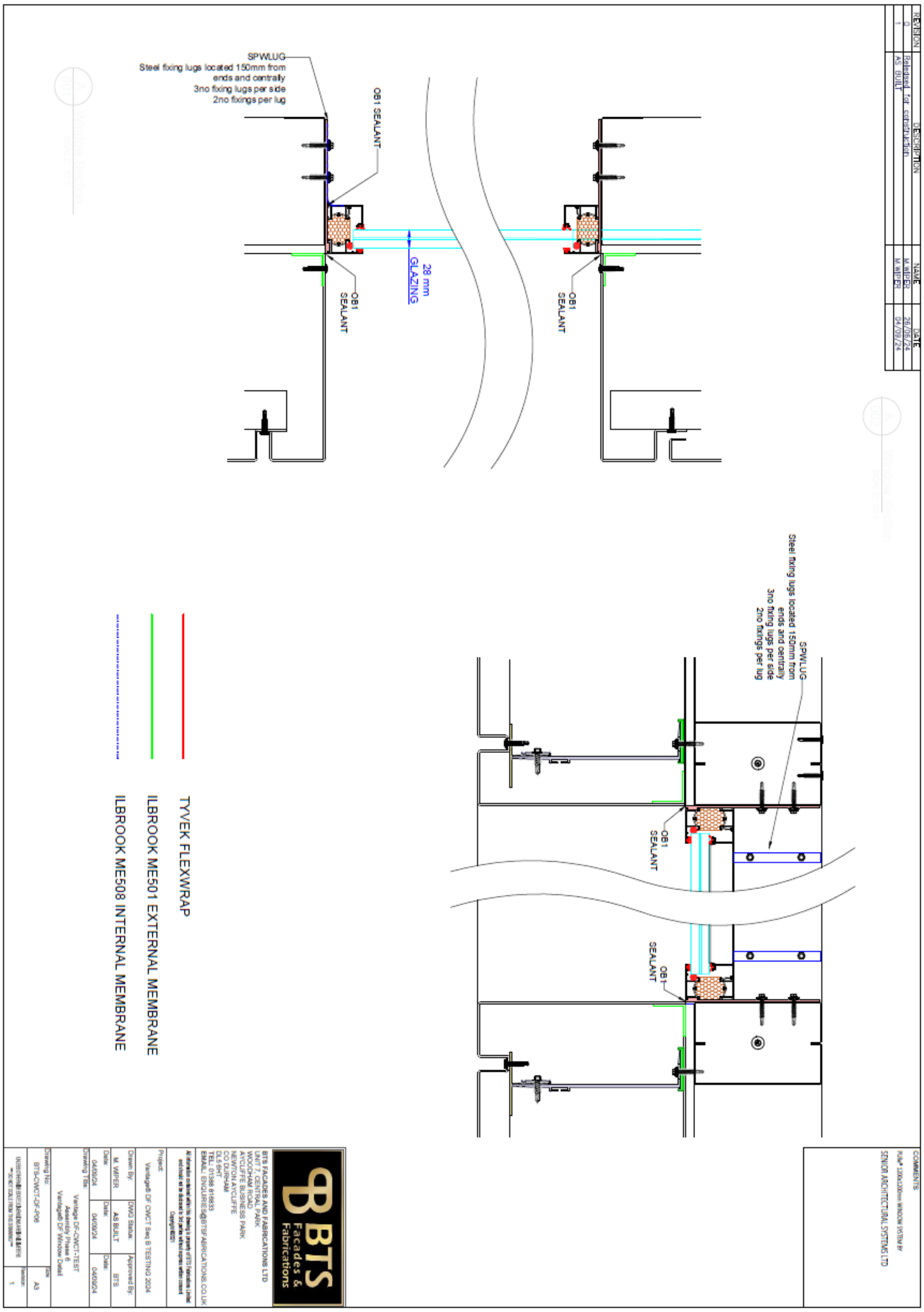
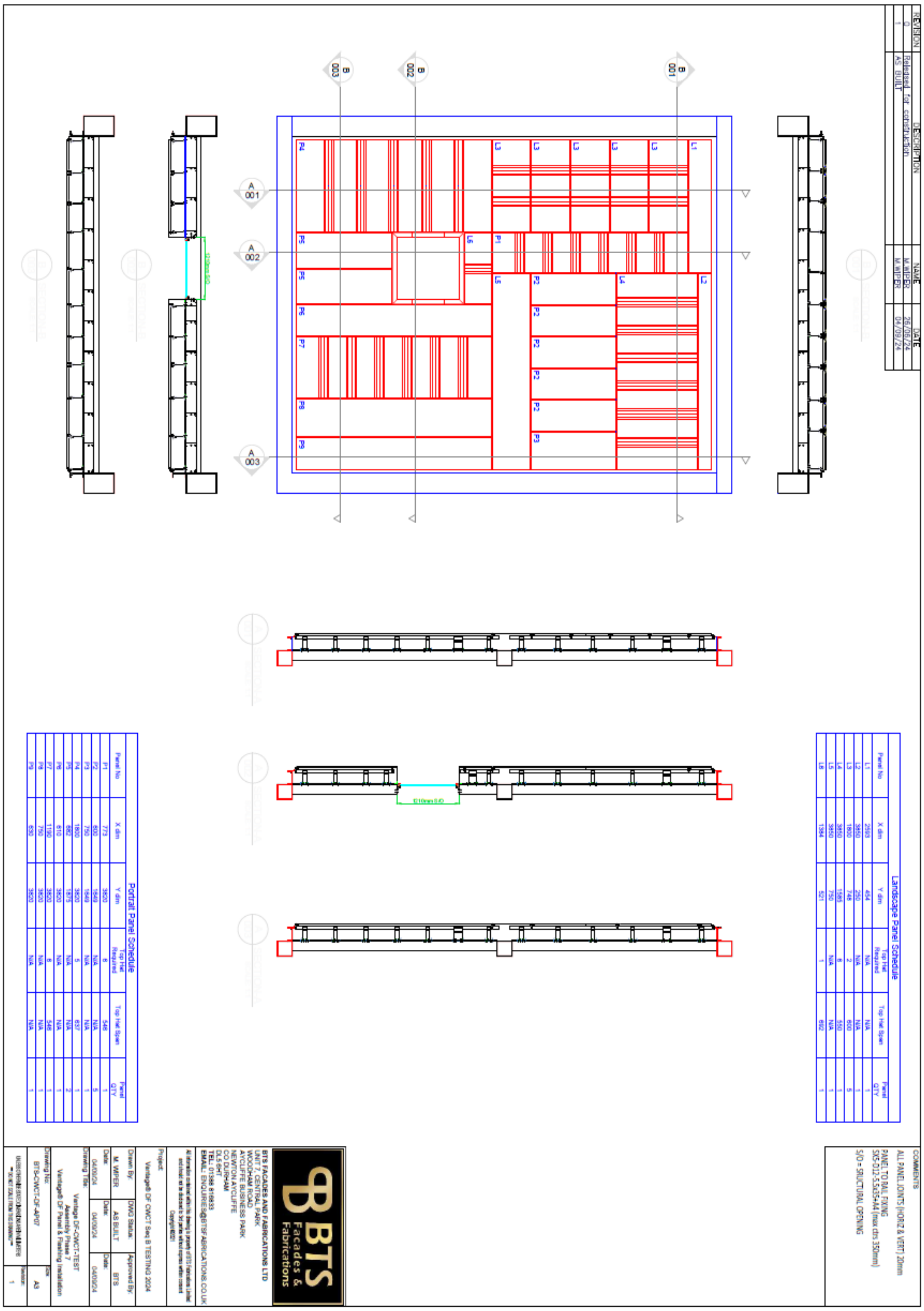
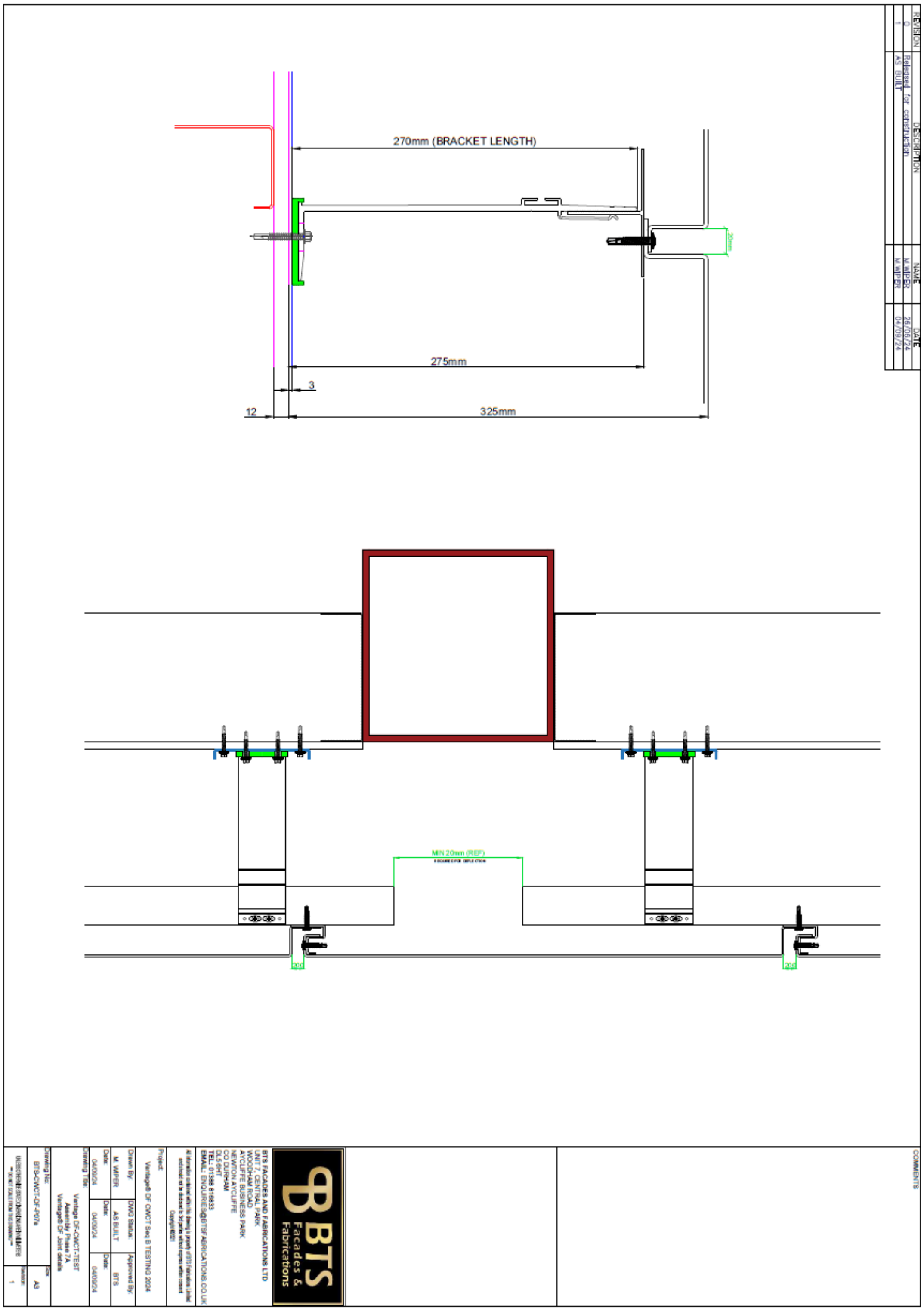


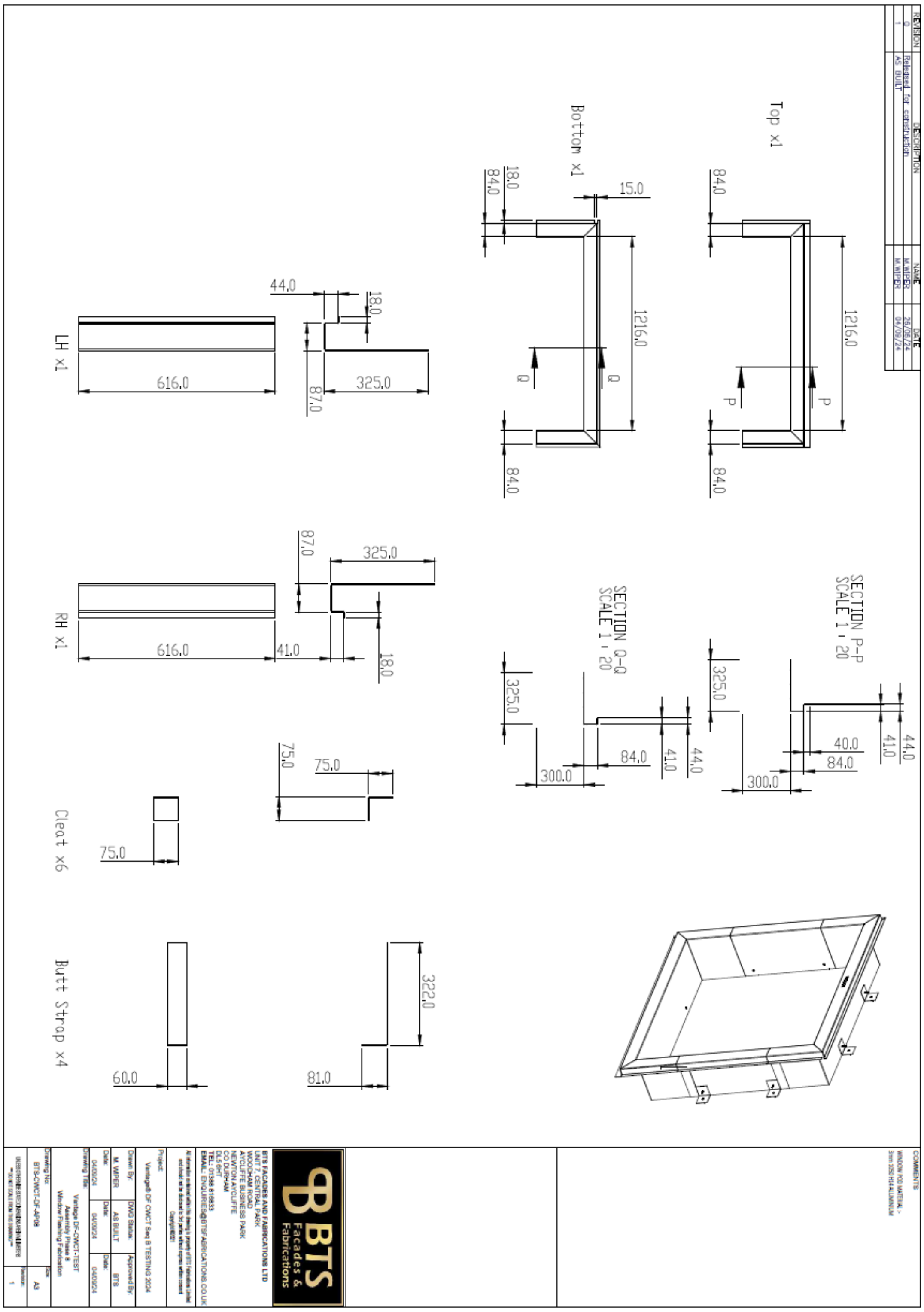

4000mm RAIL LENGTH

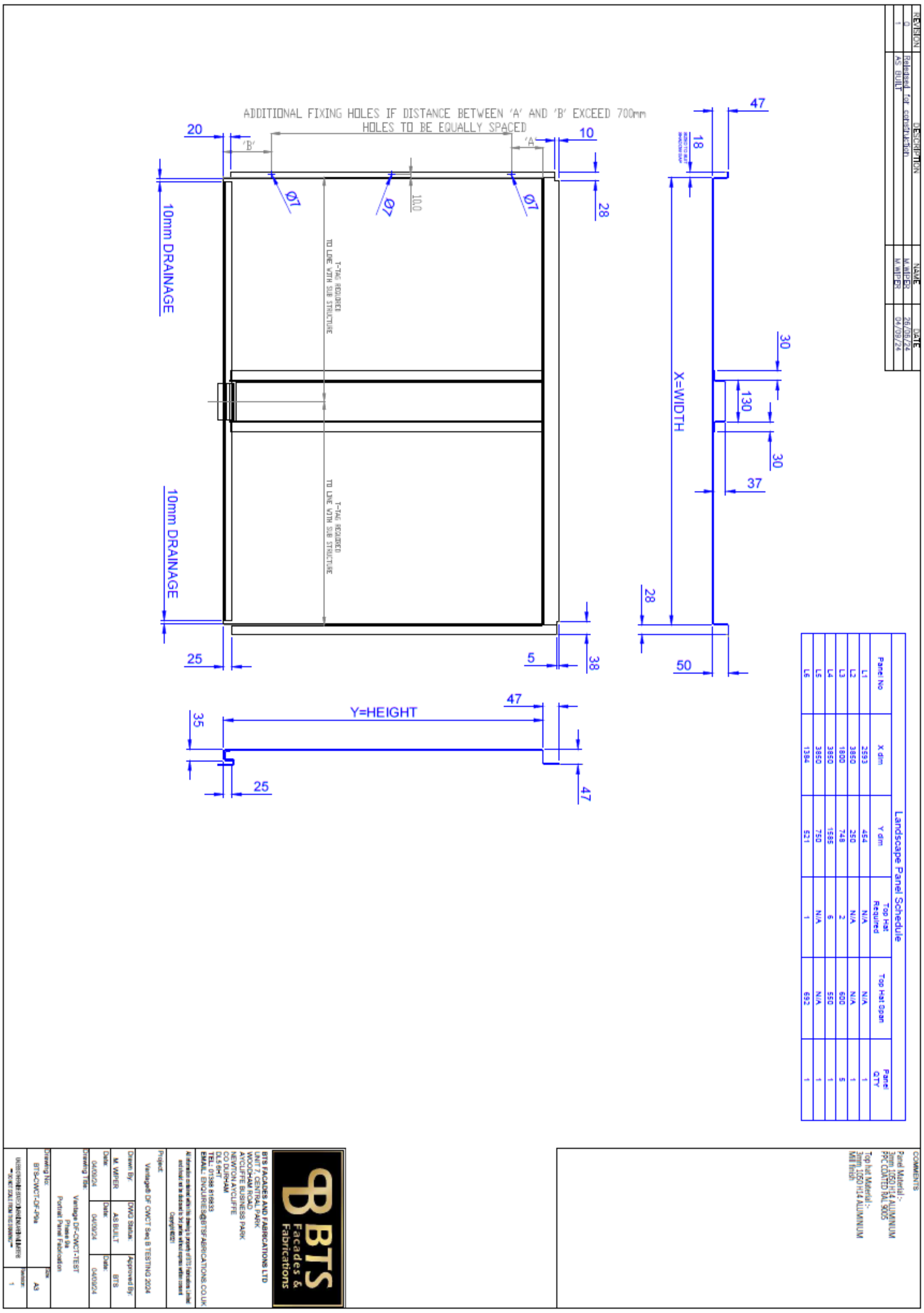


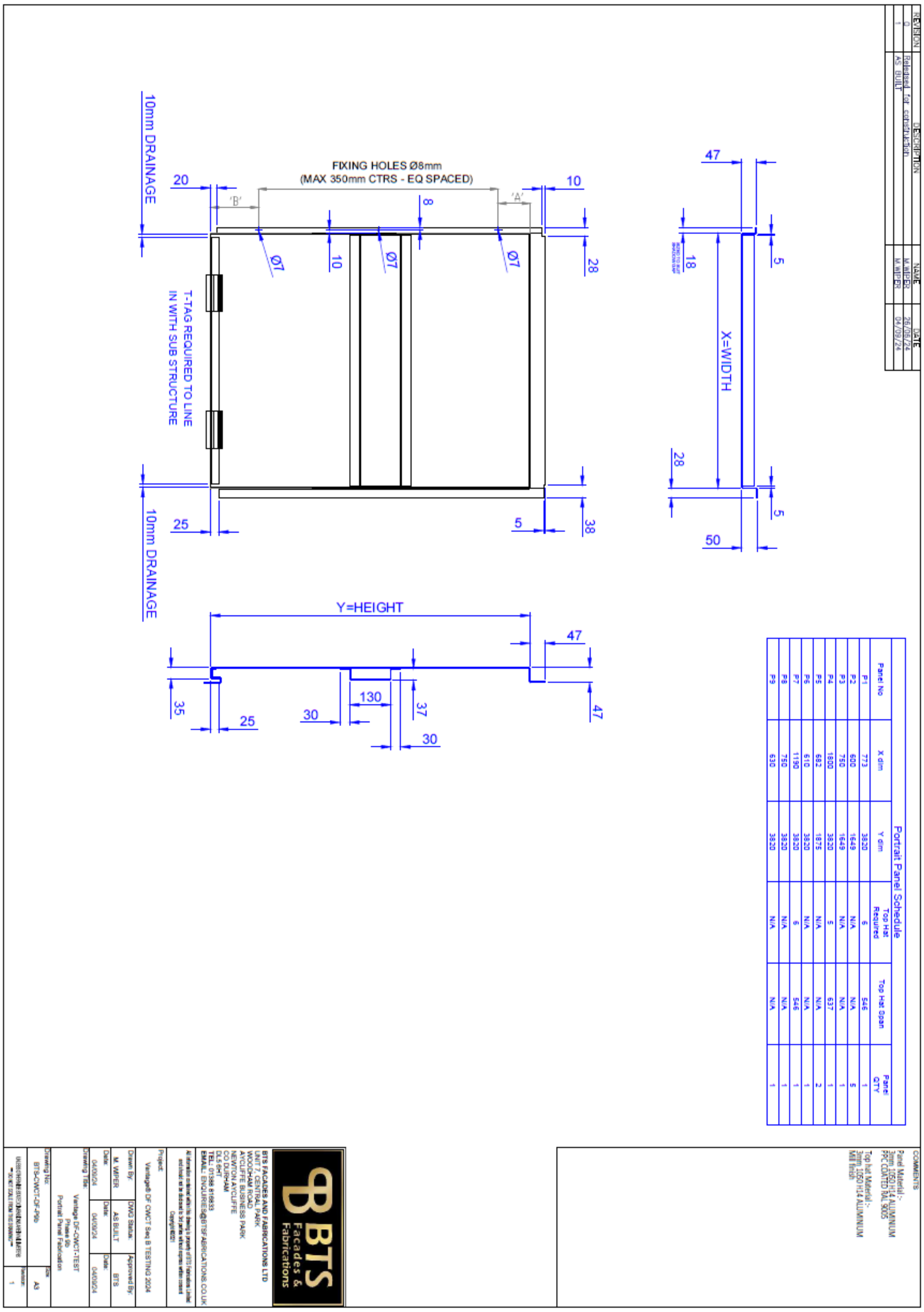
UKAS TESTING
5772




270mm (BRACKET LENGTH)
275mm
3
12
325mm
MIN 20mm (REF)
BTS Facades & Fabrications


Top x1
Bottom x1
LH x1
RH x1
Cleat x6
Butt Strap x4
SECTION P-P
SCALE 1 : 20
SECTION Q-Q
SCALE 1 : 20
1216.0
616.0
325.0
84.0
18.0
15.0
44.0
87.0
41.0
40.0
300.0
75.0
60.0
81.0
322.0
BTS Facades & Fabrications

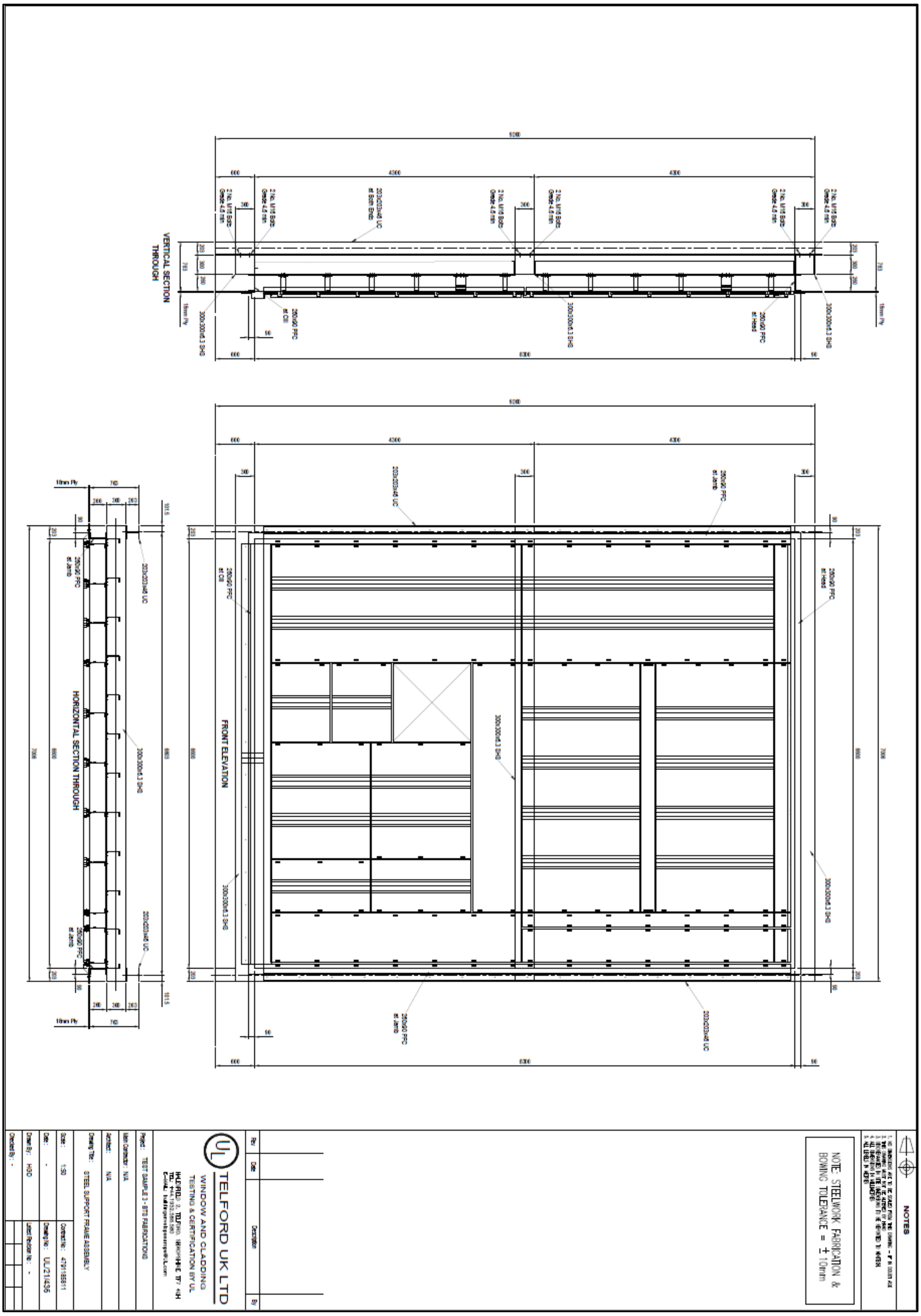

ADDITIONAL FIXING HOLES IF DISTANCE BETWEEN 'A' AND 'B' EXCEED 700mm
HOLES TO BE EQUALLY SPACED
10mm DRAINAGE
10mm DRAINAGE
X=WIDTH
Y=HEIGHT
Landscape Panel Schedule
Panel No | X dim | Y dim | Top Hat Required | Top Hat Span | Panel QTY
L1 | 2593 | 454 | N/A | N/A | 1
L2 | 3850 | 250 | N/A | N/A | 1
L3 | 1800 | 748 | 2 | 600 | 5
L4 | 3850 | 1585 | 6 | 550 | 1
L5 | 3850 | 750 | N/A | N/A | 1
L6 | 1384 | 521 | 1 | 692 | 1
BTS Facades & Fabrications



Portrait Panel Schedule

Panel No	X dim	Y dim	Top Hat Required	Top Hat Span	Panel QTY
P1	773	3820	6	546	1
P2	600	1649	N/A	N/A	5
P3	750	1649	N/A	N/A	1
P4	1800	3820	5	637	1
P5	682	1875	N/A	N/A	2
P6	610	3820	N/A	N/A	1
P7	1190	3820	6	546	1
P8	750	3820	N/A	N/A	1
P9	630	3820	N/A	N/A	1

8. Support Steelwork Drawing



9. Dismantling

The dismantling was conducted on 28th and 29th August 2024 by representatives of BTS Fabrications Limited and was witnessed by representatives of UL International (UK) Limited.

There was no water evident in the system in parts designed not to be wetted, and it was found that the system fully complied with the system drawings in Section 7 provided by BTS Fabrications Limited at the time of the dismantle.

Photograph No. 14 - Sample prior to dismantle

Photograph No. 15 – Top half of panels prior to dismantle

Photograph No. 16 – Stiffeners on panel reference P1

Photograph No. 17 - Stiffeners on panel reference P3

Photograph No. 18 - Stiffeners on panel reference P4

Photograph No. 19 - Stiffeners on panel reference P7

Photograph No. 20 – Backing wall with C Strap, fixing brackets and section of rail

Photograph No. 21 - Backing wall with C Strap, fixing brackets and section of rail

Photograph No. 22 - Backing wall with C Strap, fixing brackets and section of rail

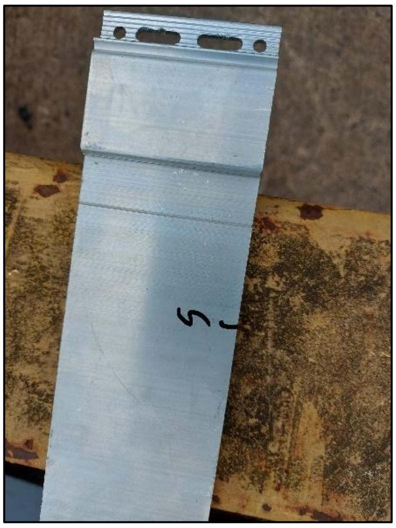
Photograph No. 23 – Backing wall with all panels removed

Photograph No. 24 – Window pod detail

Photograph No. 25 – Helping hand bracket

Photograph No. 26 – Helping hand bracket

Photograph No. 27 – Helping hand bracket



Photograph No. 28 – Large C Strap

Photograph No. 29 – Small C Strap

Photograph No. 30 - Bottom half of panels prior to dismantle

----- END OF REPORT -----

UL International (UK) Limited is an independent UKAS accredited testing laboratory and certification body. We provide a comprehensive range of services to the building and construction industries, either onsite or at our own state-of-the-art test laboratory in Telford, Shropshire, in the heart of industrial England.

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