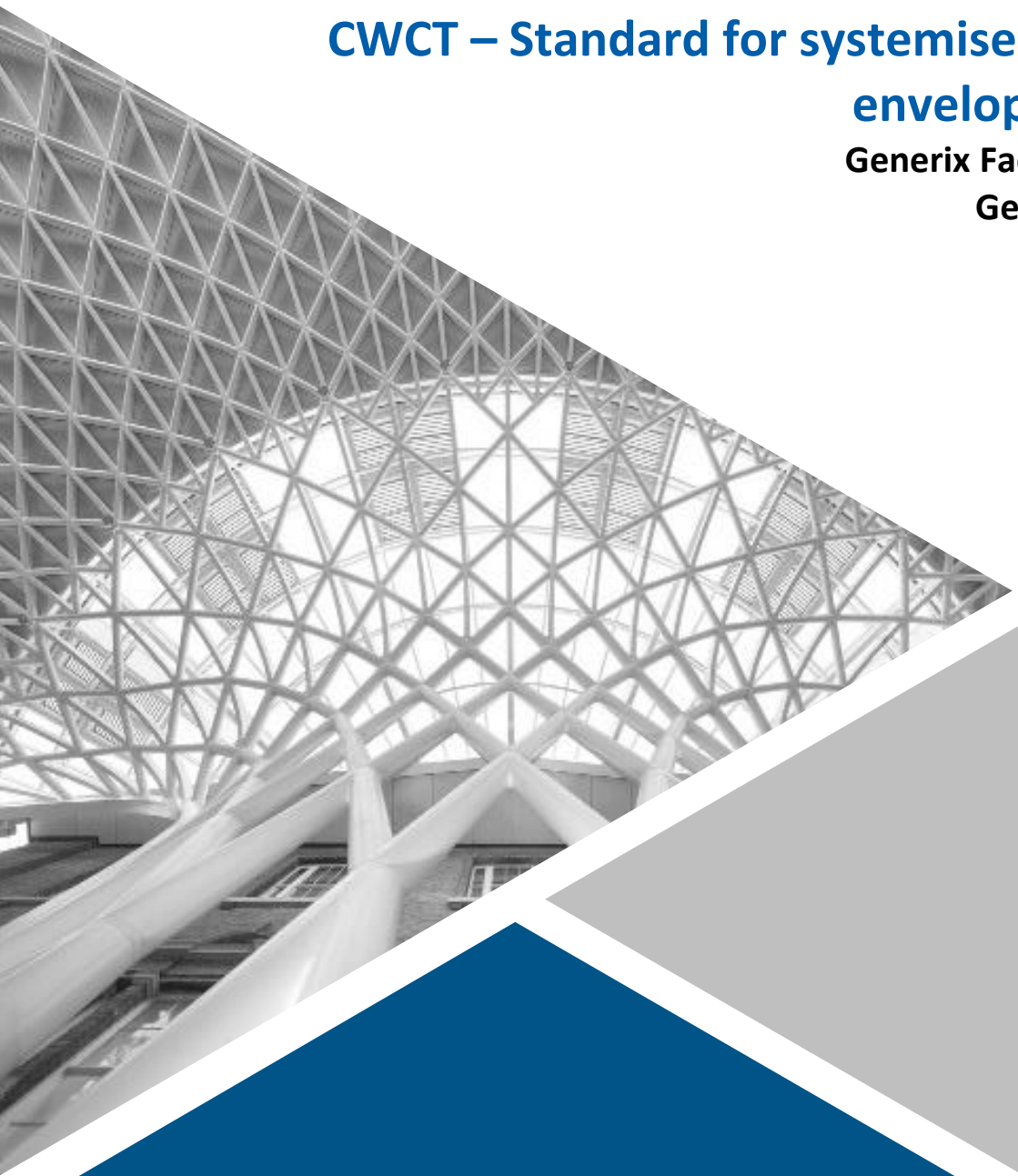
09 July 2019

WINTECH
TESTING & CERTIFICATION

UKAS TESTING
2223

Technical Report – R20228
CWCT – Standard for systemised building envelopes – 2005

Generix Facades Limited
Generix Genbrix



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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 water penetration, wind and impact resistance on sample supplied as follow:

Test Details	
Customer:	Generix Facades Limited Leamore Lane Bloxwich Walsall West Midlands WS2 7DQ
Product Tested:	Generix Genbrix
Date of Test:	22nd June 2019
Test Conducted at:	Wintech Engineering Limited Halesfield 2 Telford Shropshire TF7 4QH
Test Conducted by:	R Cadwallader- Test Engineer K Alden- Senior Fabrication Technician
Test Supervised by:	M Cox – Works Director
Test Witnessed by:	J Nolan – Generix Facades Limited

Report Authorisation	
Report Compiled by:	D Price – Senior Test Engineer
Authorised by:	M Wass – Technical Director

Wintech Engineering Ltd is accredited by the United Kingdom Accreditation Service as UKAS Testing Laboratory No. 2223.

2. Summary of Results

2.1 The test methods

The test methods were in accordance with the following standards:

CWCT Standard Test Methods for Building Envelopes - December 2005	
Water Penetration – 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 Summary of Results

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

The performance of the sample tested has been assessed against the criteria described in below standards. The results as reported will be used to determine the conformance or non-conformance with the specification without making any consideration of the uncertainty.

Test Type	Peak Test Pressure	Result	Date of Test	Classification
Test 1 – Water Penetration (Dynamic Aero Engine)	600 Pa	Pass	22.06.19	N/A
Test 2 – Wind Resistance (Serviceability)	2400 Pa	Pass	22.06.19	N/A
Test 3 -Wind Resistance – Safety	3600 Pa	Pass	22.06.19	N/A
Test 4 - Impact Resistance – Retention of Performance	Cat B	-	22.06.19	Class 2
Test 5 - Impact Resistance – Safety to Persons	Cat B	-	22.06.19	Neg Risk
Dismantle, Inspect & Report	**Sample Passed**			

The test sample successfully passed all of the above CWCT test requirements and all tests are either equal to or in excess of the requirements for current BS EN Standards for Curtain Walling.

More comprehensive details are reported in Section 6.

These results are valid only for the conditions under which the test was conducted.
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 the customer and has not been verified by Wintech Engineering Limited.

See Section 7 for test sample drawings as supplied by Generix Facades Limited.

Product Description

Full product name:	Generix Genbrix
Product type:	Mechanically fixed brick cladding system
Product description:	Natural Brick cladding system
Manufactured by:	Generix Facades Limited

Support Framing and bracketry

Material:	Extruded Alumninium
Finish:	Mill Finish
Vertical rail Ref:	Generix Lite 100 x 60 x 2.2mm rail
Horizontal rail Ref:	Genbrix 3 & Genbrix 1 course horizontal track
Fixing method (rail to backing wall):	Tekscrew
Fixing Ref:	SS 5.5 x 25
Fixing method (rail to rail):	Bracket to rail – Tekscrew
Fixing Ref:	SS 5.5 x 25
Max Span between vertical rails:	600mm
Brackets ref:	BR 220

Panels/tiles

Material:	Natural brick clay
Material ref (source, spec):	Genbrix
Finish:	textured
Thickness:	28mm
Max height of panel:	65mm per brick
Max width of panel:	215 -300mm brick length
Max size of panel by area (m2):	As above
Fixing method:	Click into place

Interface Details (curtain wall to window/door inserts)

Window interface detail:	Aluminium pod liner
Horizontal Expansion Joint:	SikaBond TF Plus N

Backing Wall

Structural support type:	Lightweight steel walling SFS
Insulation type:	Mineral wool
Particle board detail:	10mm
Sealants and tapes:	Vario tape

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 shown in Section 7
Test sample size:	5000 mm wide x 5000 mm high

Confirmation

Please confirm that the samples provided for testing are representative of standard production?	I confirm the above John Nolan Generix

Sample during testing

Photograph No. 1

Photograph No. 2

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 Water Flow

An in-line flowmeter, mounted in the spray frame water supply system, was used to measure water flow to the test sample to an accuracy of ± 5%.

4.2.3 Deflection

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

4.2.4 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.

4.2.5 Barometric Pressure

A digital barometer capable of measuring barometric pressure with an accuracy of ± 1 kPa was used.

4.2.6 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 Water Spray System

4.4.1 Spray frame arrangement

A water spray system was used which comprised of nozzles spaced on a uniform grid, not more than 700 mm apart and mounted approximately 400 mm from the face of the sample. The nozzles provided a full cone pattern, as per the requirements outlined by CWCT. The system delivered water uniformly to the entire surface of the test sample at a rate of not less than 3.4 lt/m^2/min.

4.5 Impactors

4.5.1 Soft (S1) Body Impactor

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

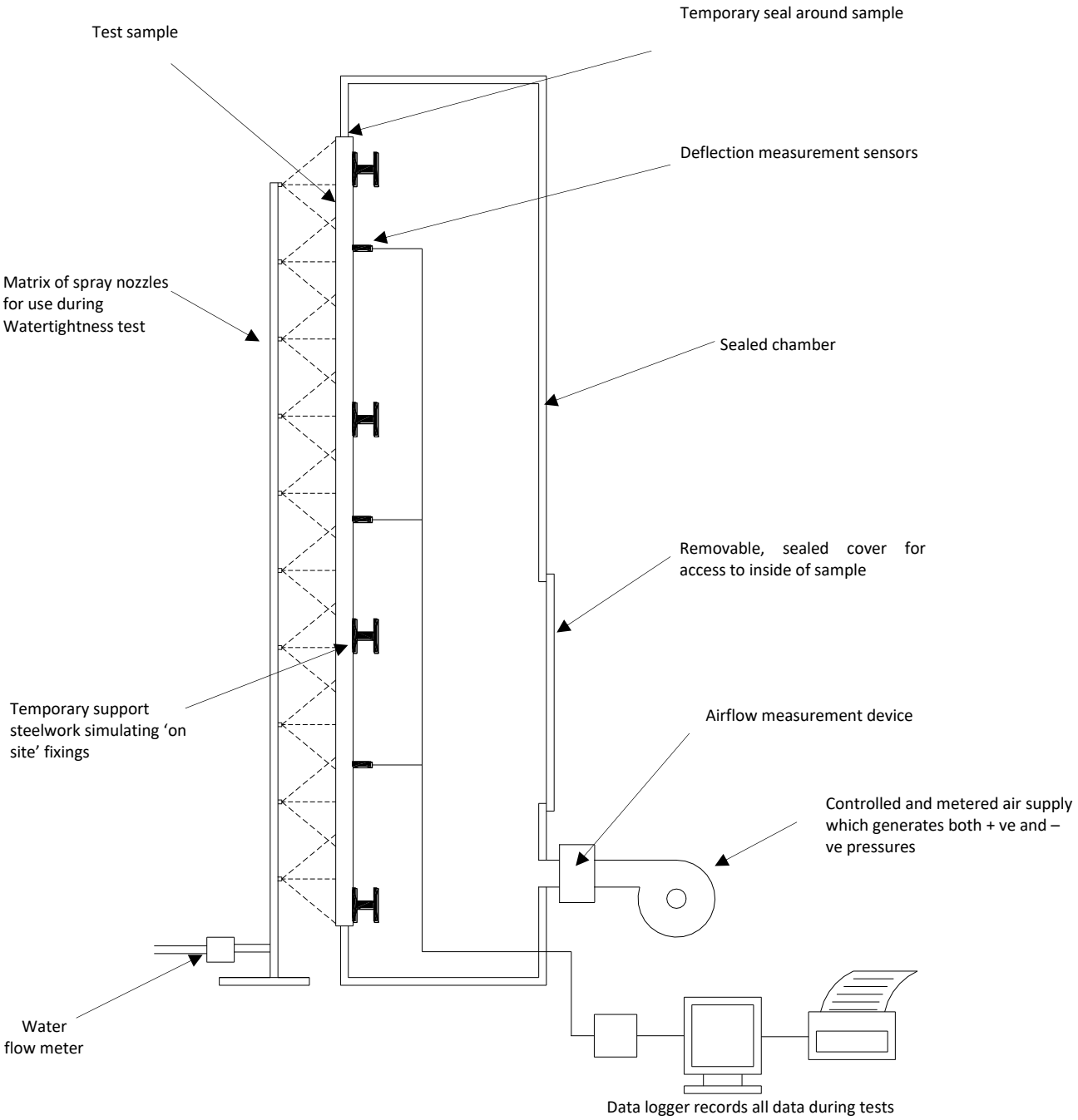
4.5.2 Hard (H2) Body Impactor

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 – Water Penetration (Dynamic Aero Engine)
Test 2 – Wind Resistance - Serviceability – Backing Wall
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 and Safety to Persons

5.2 Water Penetration

5.2.1 Water Penetration – Dynamic Aero Engine

Water was sprayed on to the sample as described in section 4.4.1.

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.

The interior face of the sample was continuously monitored for water ingress throughout the test.

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 4.5.1 and 4.5.2, 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 6.3.1 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 4.5.1 and 4.5.2 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 6.3.2 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 Water Penetration

6.1.1 Water Penetration – Dynamic Aero Engine

Temperatures (°C)	**Water**	9.2
	Ambient	15.2

Time Tested - Minutes	15 mins
Water Collected - Litres	150 ml

Observations

The sample was subjected to testing as described in section 5.2.1, for a period of not less than 15 minutes, during which no water leakage was observed through the sample. The water was also collected by means of a drainage system at the bottom of the sample, which was then weighed at the end of the test.

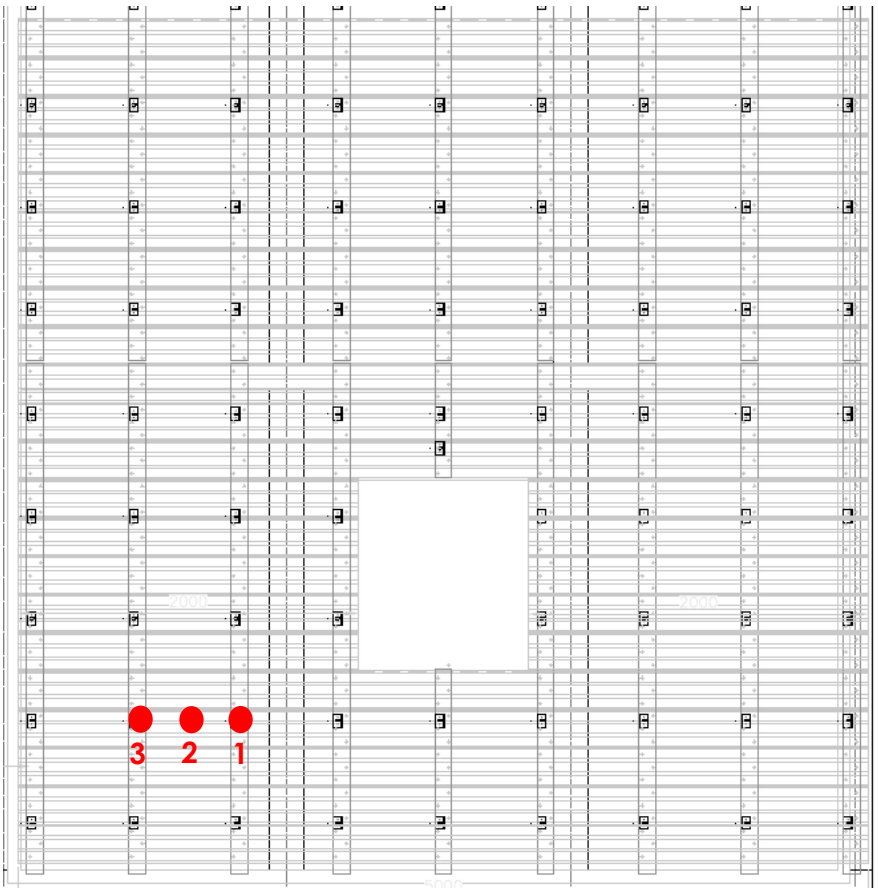
6.2 Wind Resistance

Probe Group Identification	Calculation of deflection
Group A comprised of probes 1, 2 & 3	= Probe 2 – ((Probe 1 + Probe 3)/2)

An inspection carried out following tests 2 - 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



- Deflection probe position

View from Outside
Not to Scale

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6.2.1 Wind Resistance, Serviceability

Temperatures (°C)	Ambient	17.2

Measured Length of Framing Member (mm)		Allowable Deflection	
		Ratio	Calculated (mm)
Group A	540	L/360	1.5

Frontal deflection shall recover by either 95%, or 1mm, whichever the greater.

6.2.1.1 Wind Resistance, Serviceability - Positive Pressure

Positive Pressure Pa	Results Group A
0	0.0
600	0.0
1200	0.1
1800	0.0
2400	0.1
Residuals Immediately following test	0.0

6.2.1.2 Wind Resistance, Serviceability - Negative Pressure

Negative Pressure Pa	Results Group A
0	0.0
600	0.0
1200	0.0
1800	0.0
2400	0.1
Residuals Immediately following test	0.0

6.2.2 Wind Resistance, Safety

Temperatures (°C)	Ambient	20.5

Measured Length of Framing Member (mm)		Allowable Residual Deformation	
		Ratio	Calculated (mm)
Group A	540	L/500	1.1

6.2.2.1 Wind Resistance, Safety - Positive Pressure

Positive Pressure Pa	Results Group A
0	0.0
3600	0.1
Residuals Immediately following test	0.0

6.2.2.2 Wind Resistance, Safety - Negative Pressure

Negative Pressure Pa	Results Group A
0	0.0
3600	0.0
Residuals Immediately following test	0.0

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

6.3 Impacting

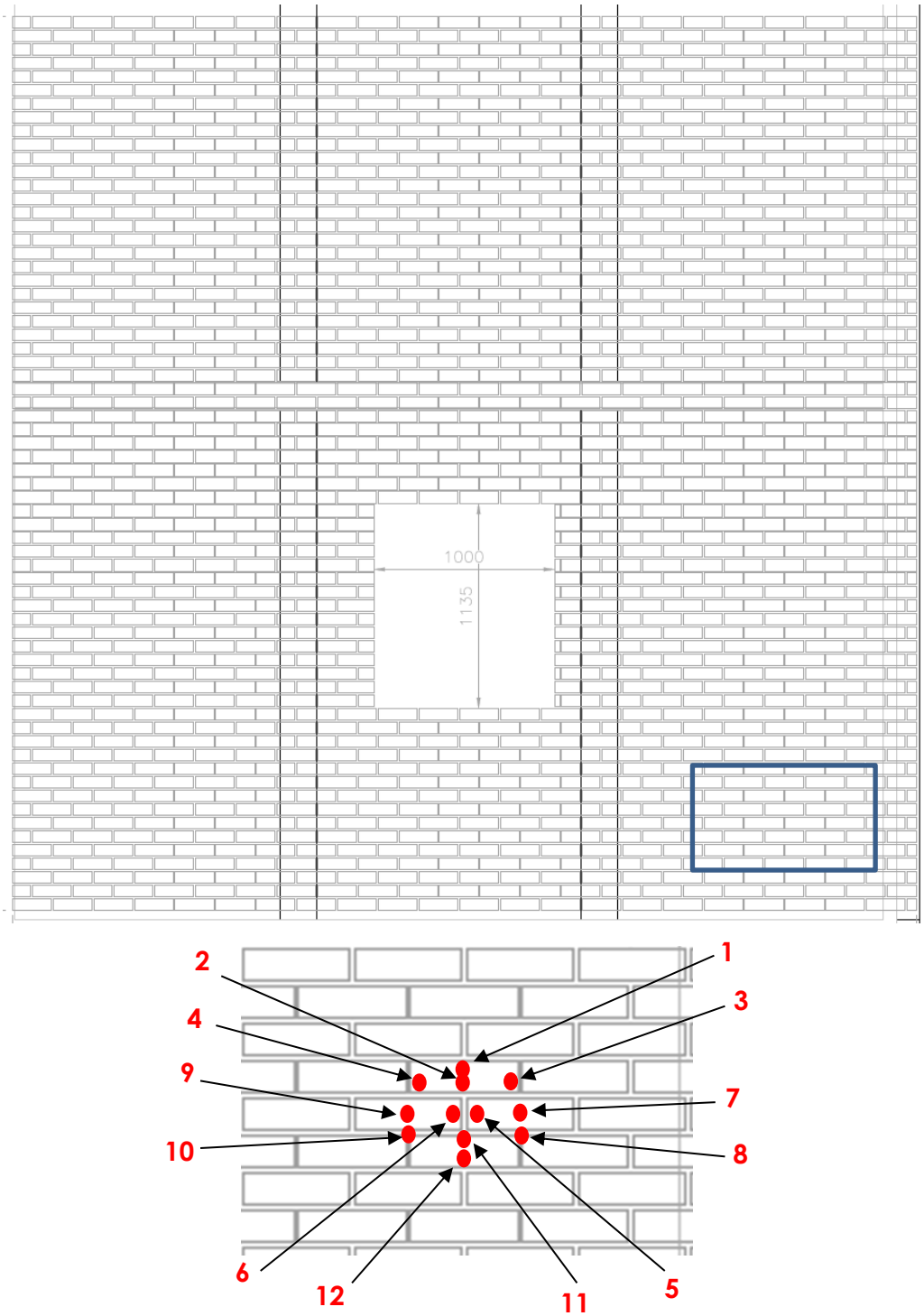
6.3.1 Retention of performance (Soft Body S2 & Hard Body H2) – CWCT TN 76

Temperatures (°C)	**Ambient**	20.4
Humidity (%RH)	61.0	

Impact Reference	Test Category	Impactor Type	Impact Energy (Nm)	Drop Height (mm)	Observations	Result
1	Cat B	Soft Body (S1)	120	245	No Damage	Class 1
2	Cat B	Soft Body (S1)	120	245	No Damage	Class 1
3	Cat B	Soft Body (S1)	120	245	No Damage	Class 1
4	Cat B	Soft Body (S1)	120	245	No Damage	Class 1
5	Cat B	Soft Body (S1)	120	245	No Damage	Class 1
6	Cat B	Soft Body (S1)	120	245	No Damage	Class 1
7	Cat B	Soft Body (S1)	120	245	No Damage	Class 1
8	Cat B	Soft Body (S1)	120	245	No Damage	Class 1
9	Cat B	Soft Body (S1)	120	245	No Damage	Class 1
10	Cat B	Soft Body (S1)	120	245	No Damage	Class 1
11	Cat B	Soft Body (S1)	120	245	No Damage	Class 1
12	Cat B	Soft Body (S1)	120	245	No Damage	Class 1
1	Cat B	Hard Body (H2)	10	898	No Damage	Class 1
2	Cat B	Hard Body (H2)	10	898	No Damage	Class 1
3	Cat B	Hard Body (H2)	10	898	Mortar broke from corner of brick	Class 1
4	Cat B	Hard Body (H2)	10	898	Small indentation	Class 2
5 Retest of area 3	Cat B	Hard Body (H2)	10	898	No damage	Class 1
6	Cat B	Hard Body (H2)	10	898	No Damage	Class 1
7	Cat B	Hard Body (H2)	10	898	No Damage	Class 1
8	Cat B	Hard Body (H2)	10	898	No Damage	Class 1
9	Cat B	Hard Body (H2)	10	898	No Damage	Class 1
10	Cat B	Hard Body (H2)	10	898	No Damage	Class 1
11	Cat B	Hard Body (H2)	10	898	No Damage	Class 1
12	Cat B	Hard Body (H2)	10	898	No Damage	Class 1
13	Cat B	Hard Body (H2)	10	898	No Damage	Class 1

Figure 3

Soft Body - Retention of Performance Impact Positions



View from Outside
Not to Scale

6.3.2 Safety to Persons (Soft Body S2 & Hard Body H2) – CWCT TN 76

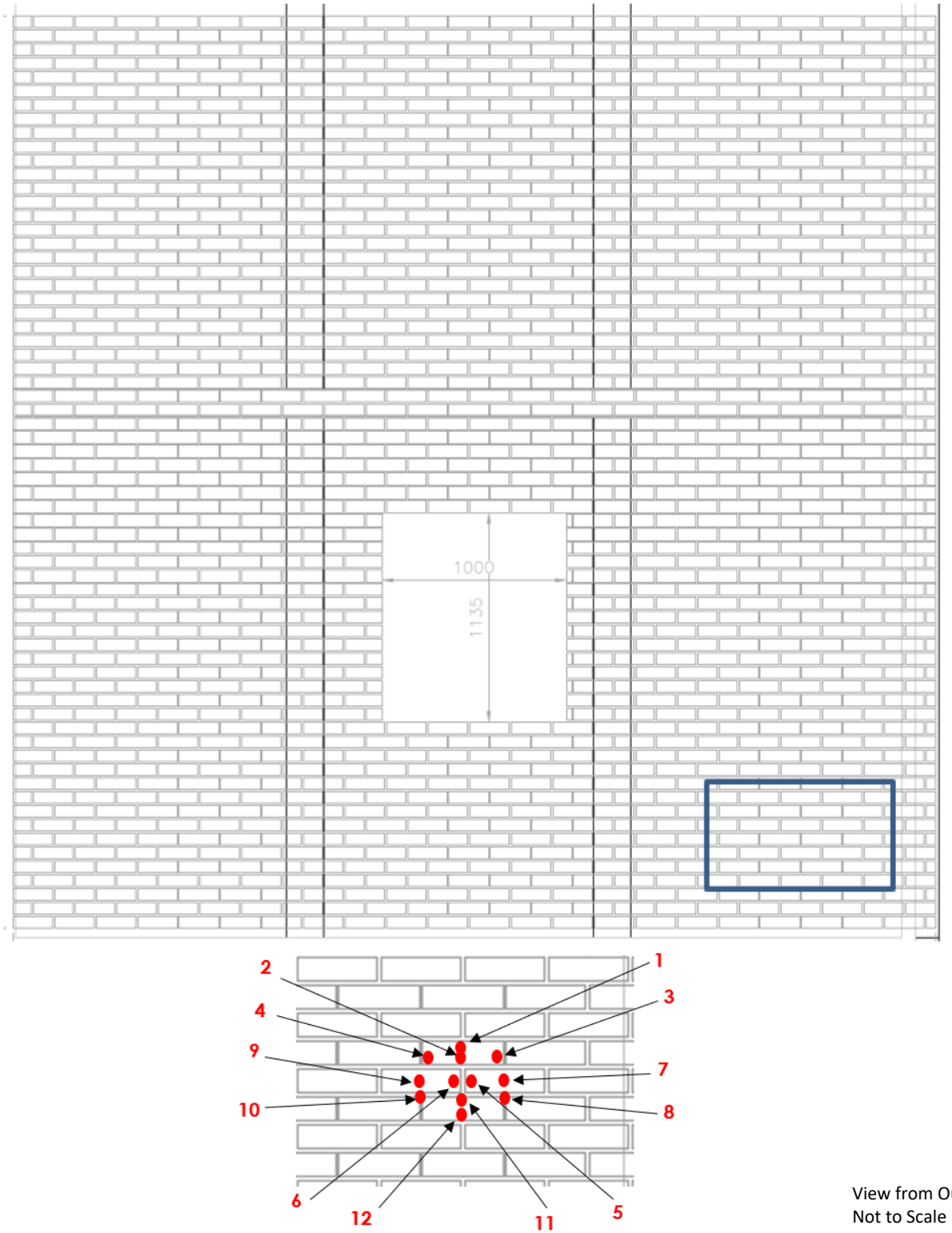
Temperatures (°C)	Ambient	20.4
Humidity (%RH)	61.0	

Impact Reference	Test Category	Impactor Type	Impact Energy (Nm)	Drop Height (mm)	Observations	Result
1	Cat B	Soft Body (S1)	500	1020	No Damage	Neg Risk
2	Cat B	Soft Body (S1)	500	1020	No Damage	Neg Risk
3	Cat B	Soft Body (S1)	500	1020	No Damage	Neg Risk
4	Cat B	Soft Body (S1)	500	1020	No Damage	Neg Risk
5	Cat B	Soft Body (S1)	500	1020	No Damage	Neg Risk
6	Cat B	Soft Body (S1)	500	1020	No Damage	Neg Risk
7	Cat B	Soft Body (S1)	500	1020	No Damage	Neg Risk
8	Cat B	Soft Body (S1)	500	1020	No Damage	Neg Risk
9	Cat B	Soft Body (S1)	500	1020	No Damage	Neg Risk
10	Cat B	Soft Body (S1)	500	1020	No Damage	Neg Risk
11	Cat B	Soft Body (S1)	500	1020	No Damage	Neg Risk
12	Cat B	Soft Body (S1)	500	1020	No Damage	Neg Risk
1	Cat B	Hard Body (H2)	10	898	No Damage	Neg Risk
2	Cat B	Hard Body (H2)	10	898	No Damage	Neg Risk
3	Cat B	Hard Body (H2)	10	898	Mortar broke from corner of brick	Neg Risk
4	Cat B	Hard Body (H2)	10	898	Small indentation	Neg Risk
5 Retest of area 3	Cat B	Hard Body (H2)	10	898	No damage	Neg Risk
6	Cat B	Hard Body (H2)	10	898	No Damage	Neg Risk
7	Cat B	Hard Body (H2)	10	898	No Damage	Neg Risk
8	Cat B	Hard Body (H2)	10	898	No Damage	Neg Risk
9	Cat B	Hard Body (H2)	10	898	No Damage	Neg Risk
10	Cat B	Hard Body (H2)	10	898	No Damage	Neg Risk
11	Cat B	Hard Body (H2)	10	898	No Damage	Neg Risk
12	Cat B	Hard Body (H2)	10	898	No Damage	Neg Risk
13	Cat B	Hard Body (H2)	10	898	No Damage	Neg Risk

NOTE: The hard body impacting for safety to persons was conducted during the retention of performance test due to the impact energy being the same.

Soft Body – Safety to Persons Impact Positions

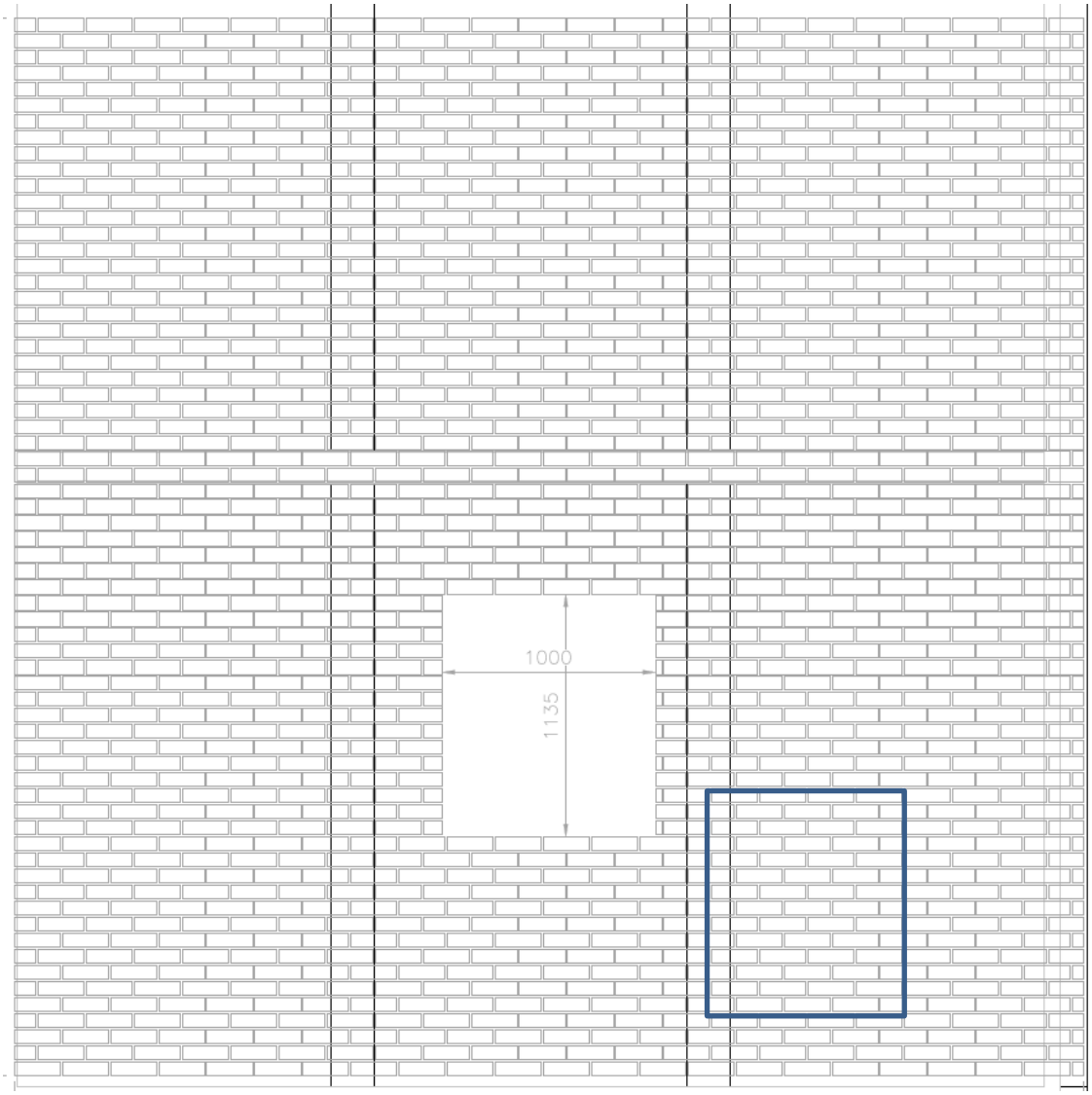
Figure 4

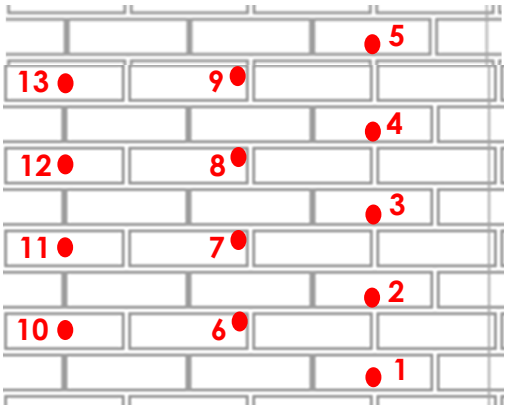


View from Outside
Not to Scale

Hard Body – Retention of Performance & Safety to Persons Impact Positions

Figure 5



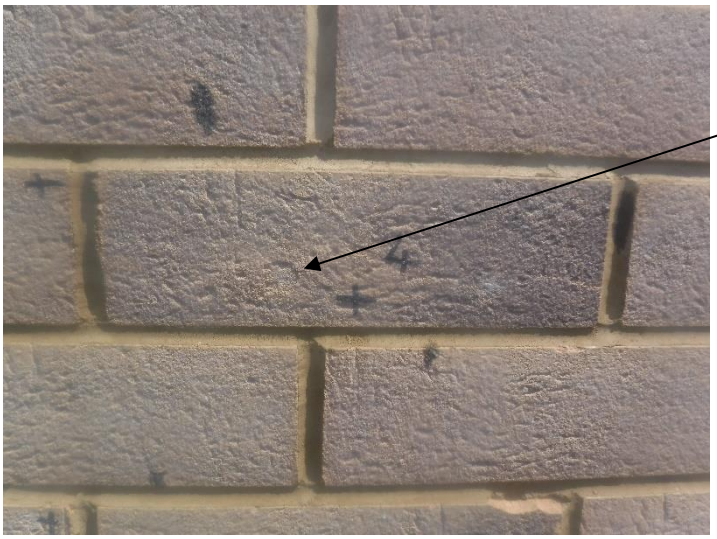


View from Outside
Not to Scale

Photograph No. 3

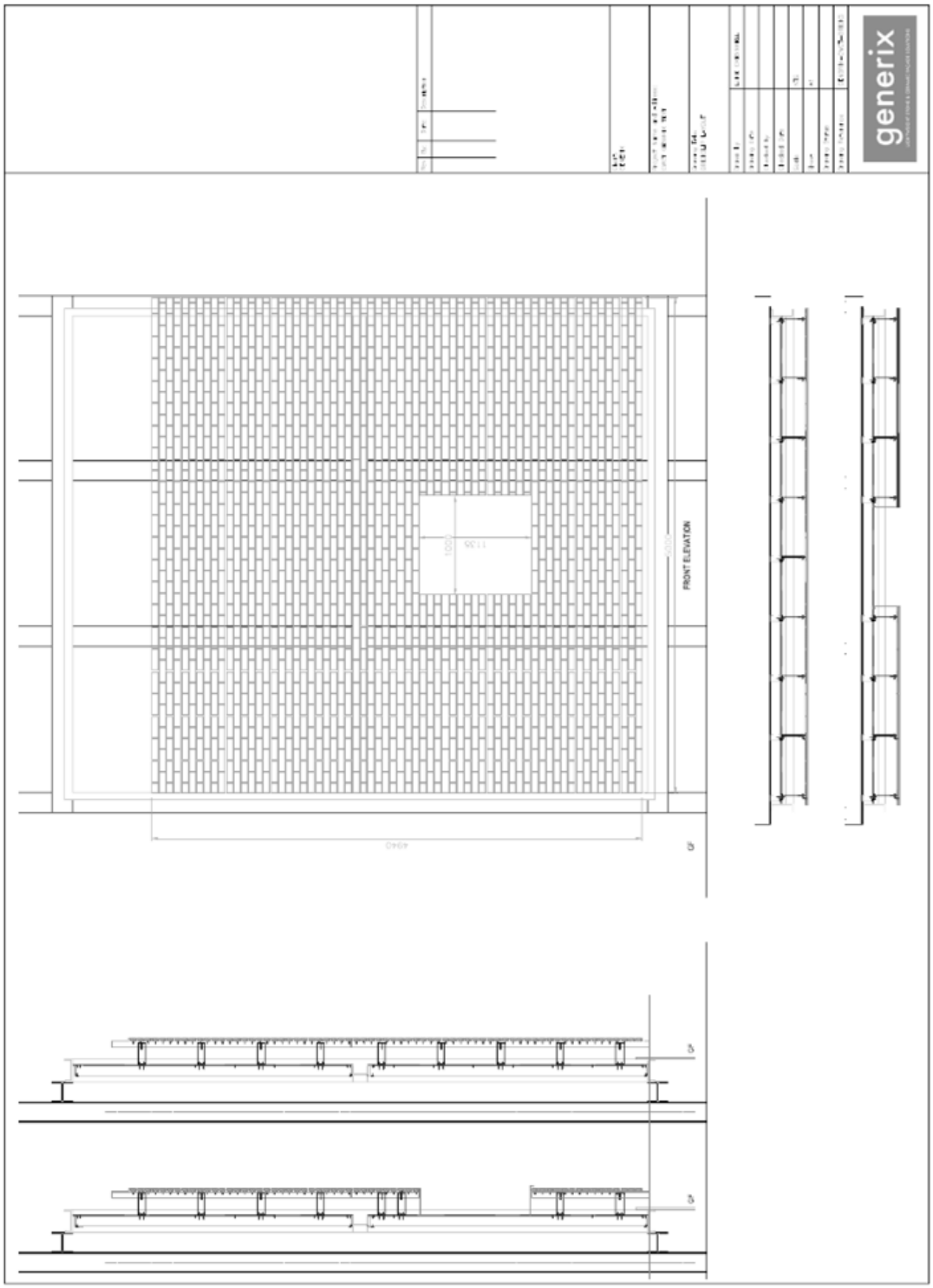
Showing damage caused following hard body impacting. This area was found to have been previously been filled with mortar prior to testing being conducted. Following this impact, a further impact was conducted at impact reference 5 and no damage was found.

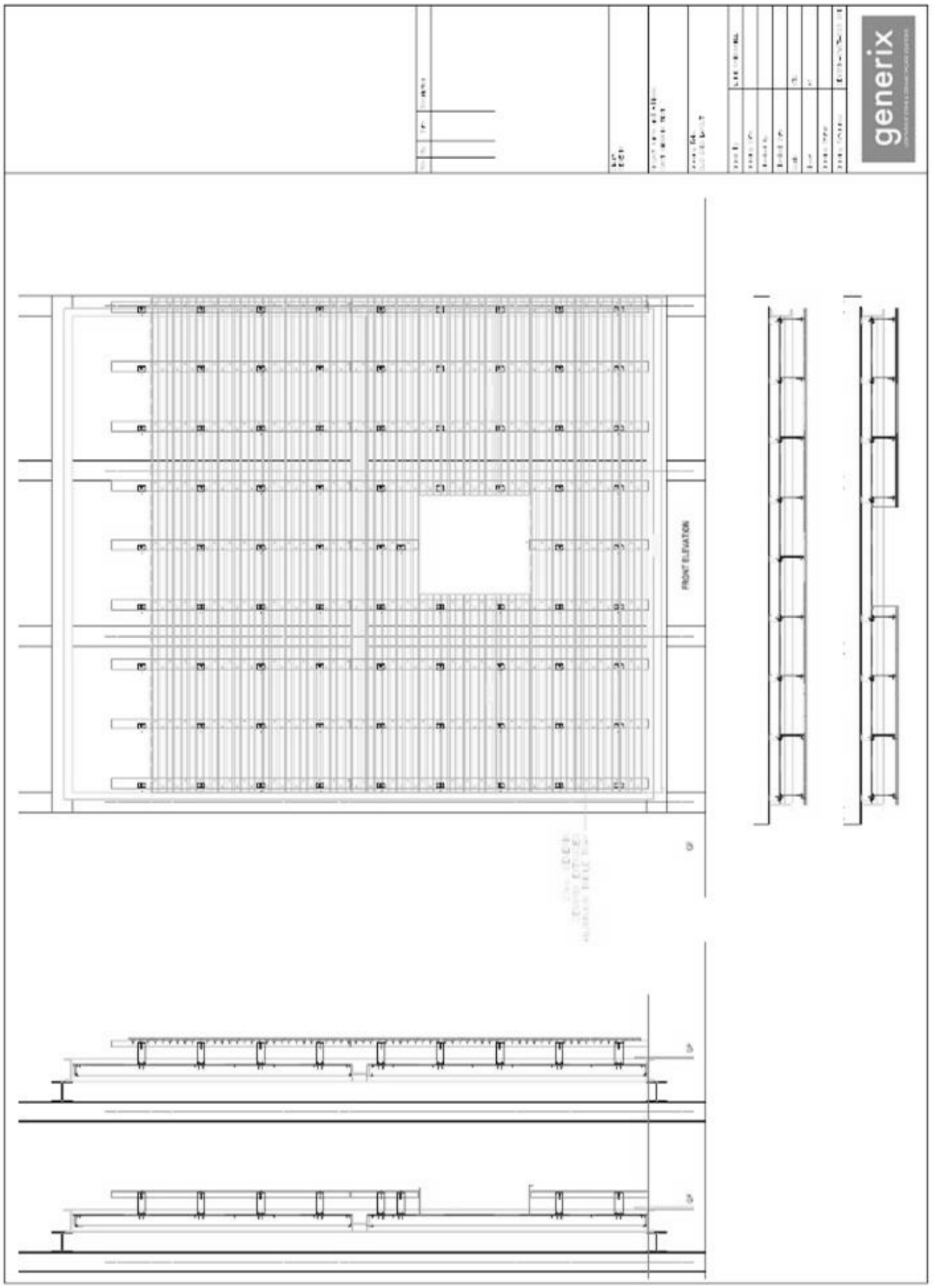
Photograph No. 4

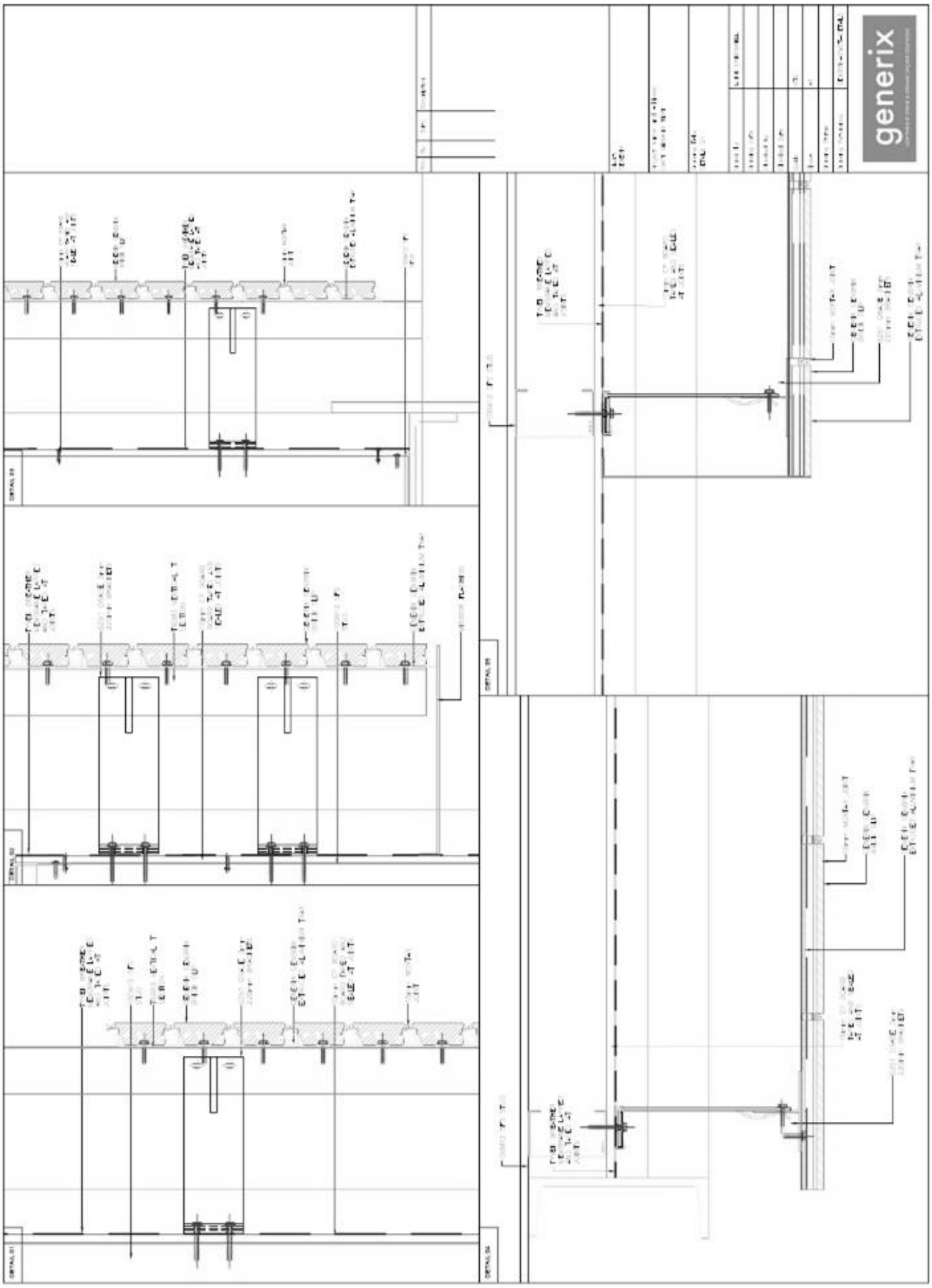


Showing small indentation following hard body impacting, resulting in a Class 2

7. System Drawings




generix
FRONT ELEVATION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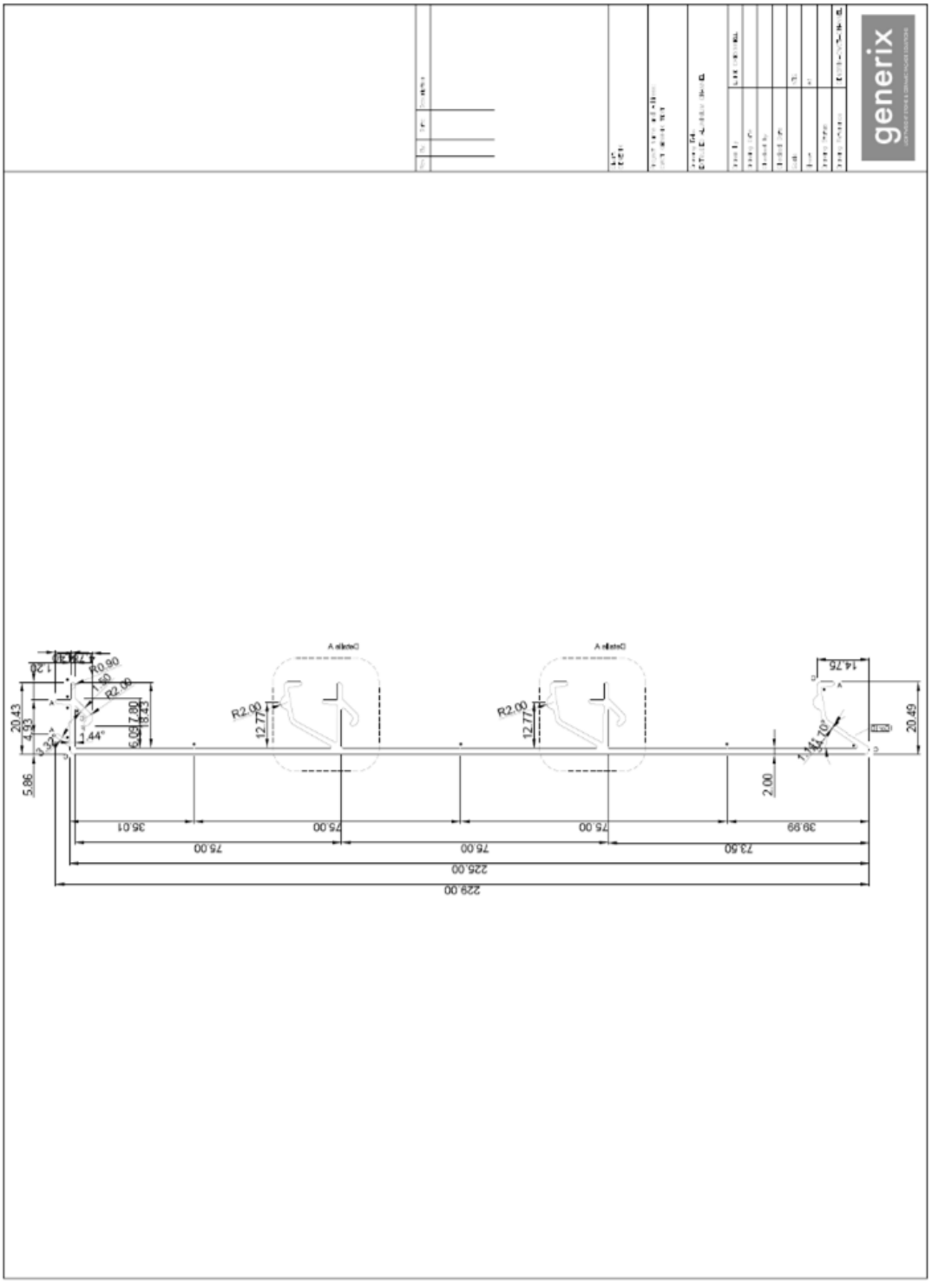
generix
R0.90
R2.00
1.44°
20.43
4.93
5.86
6.08
7.00
16.43
R2.00
12.77
R2.00
12.77
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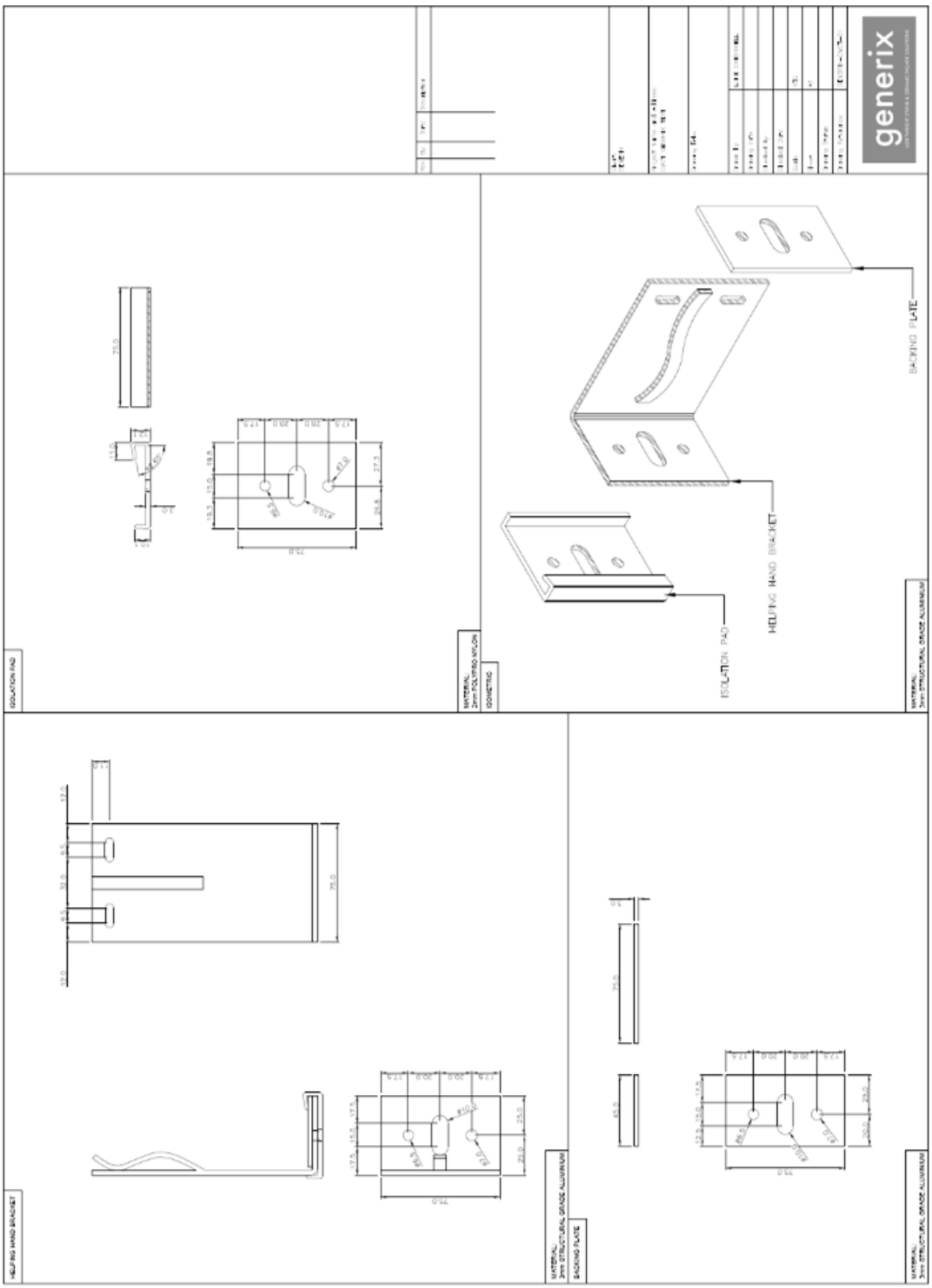
75.00
39.99
75.00
73.60
225.00
229.00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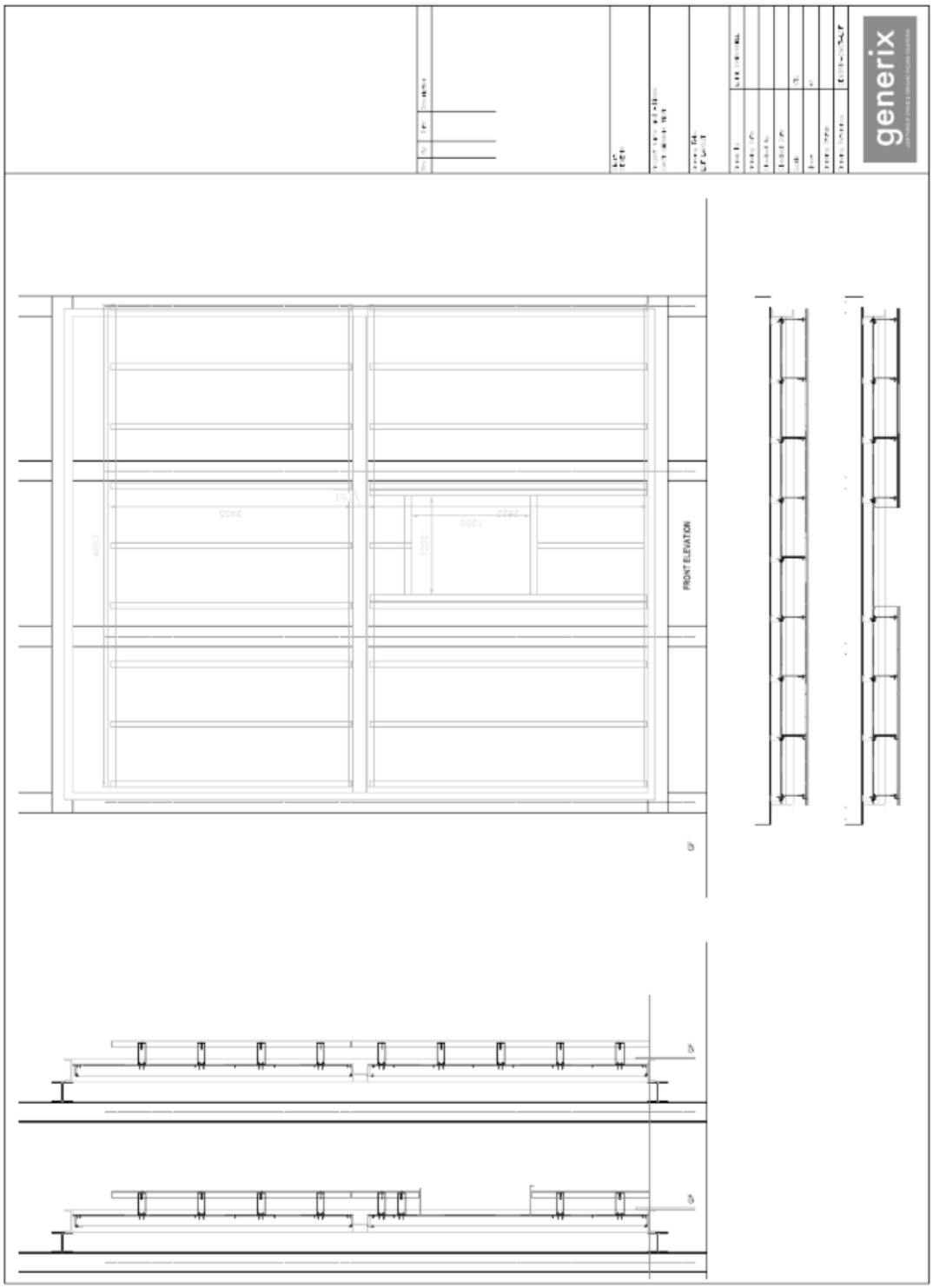
BACKING PLATE
HELPING HAND BRACKET
ISOLATION PAD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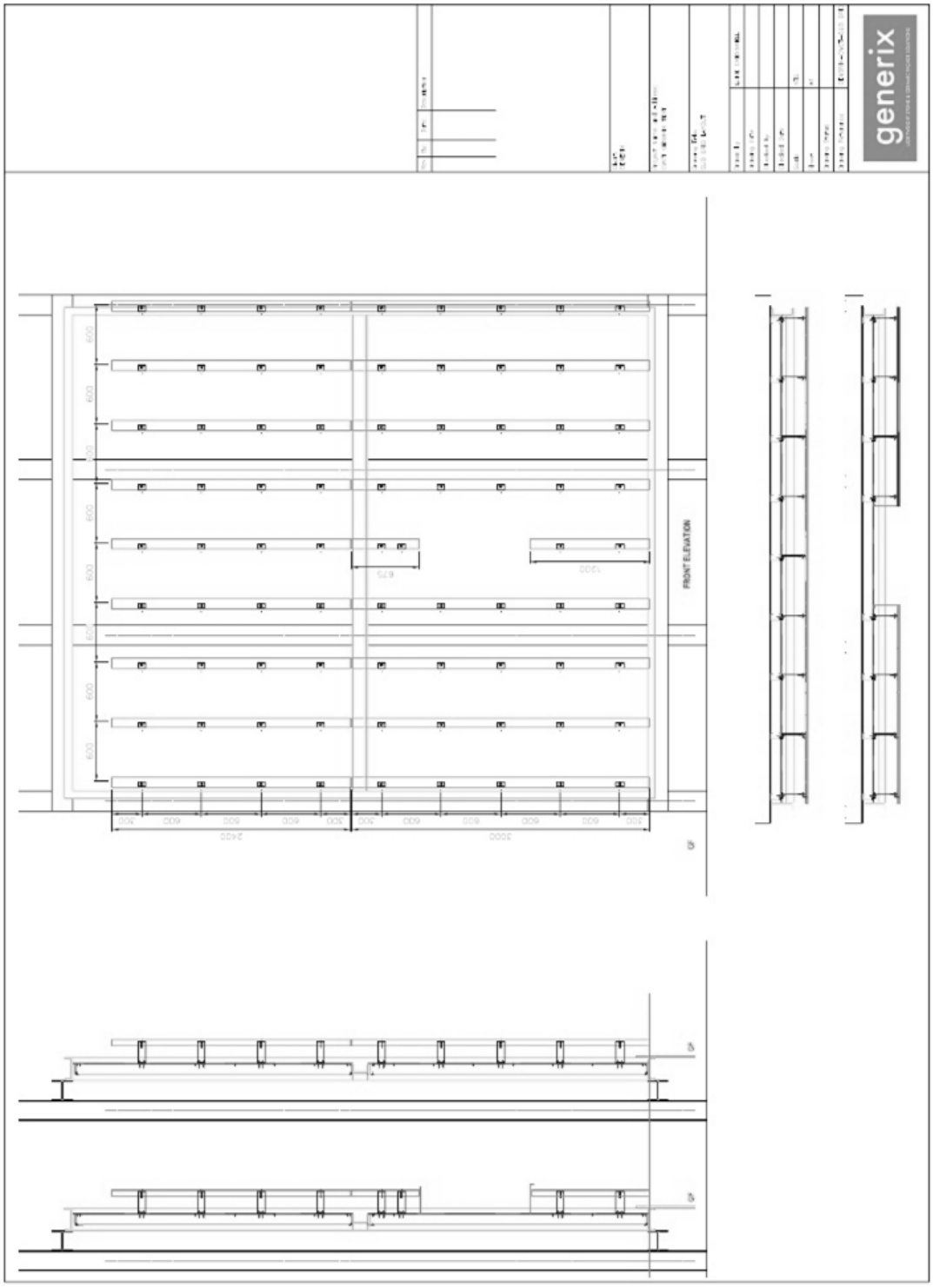
FRONT ELEVATION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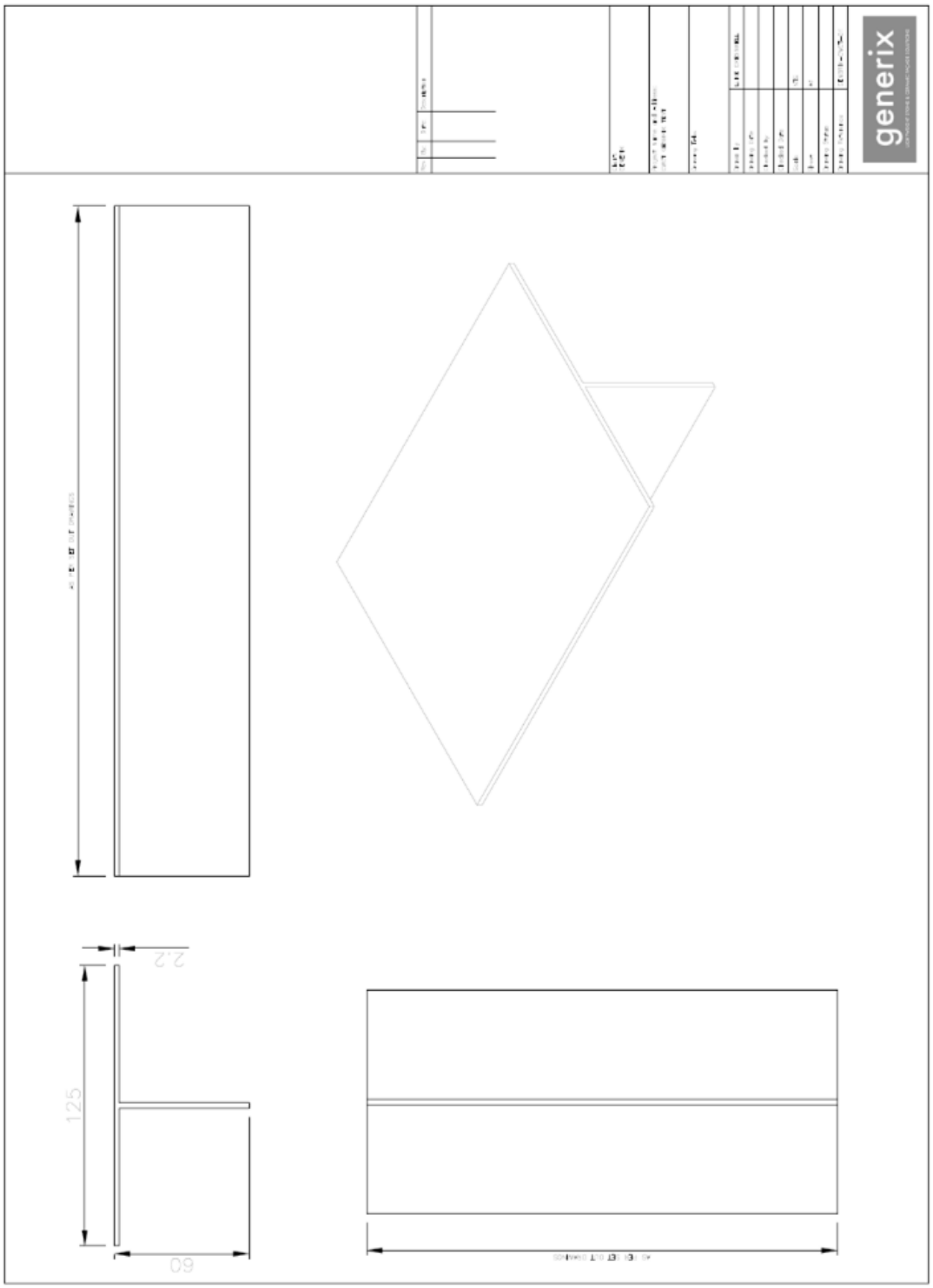
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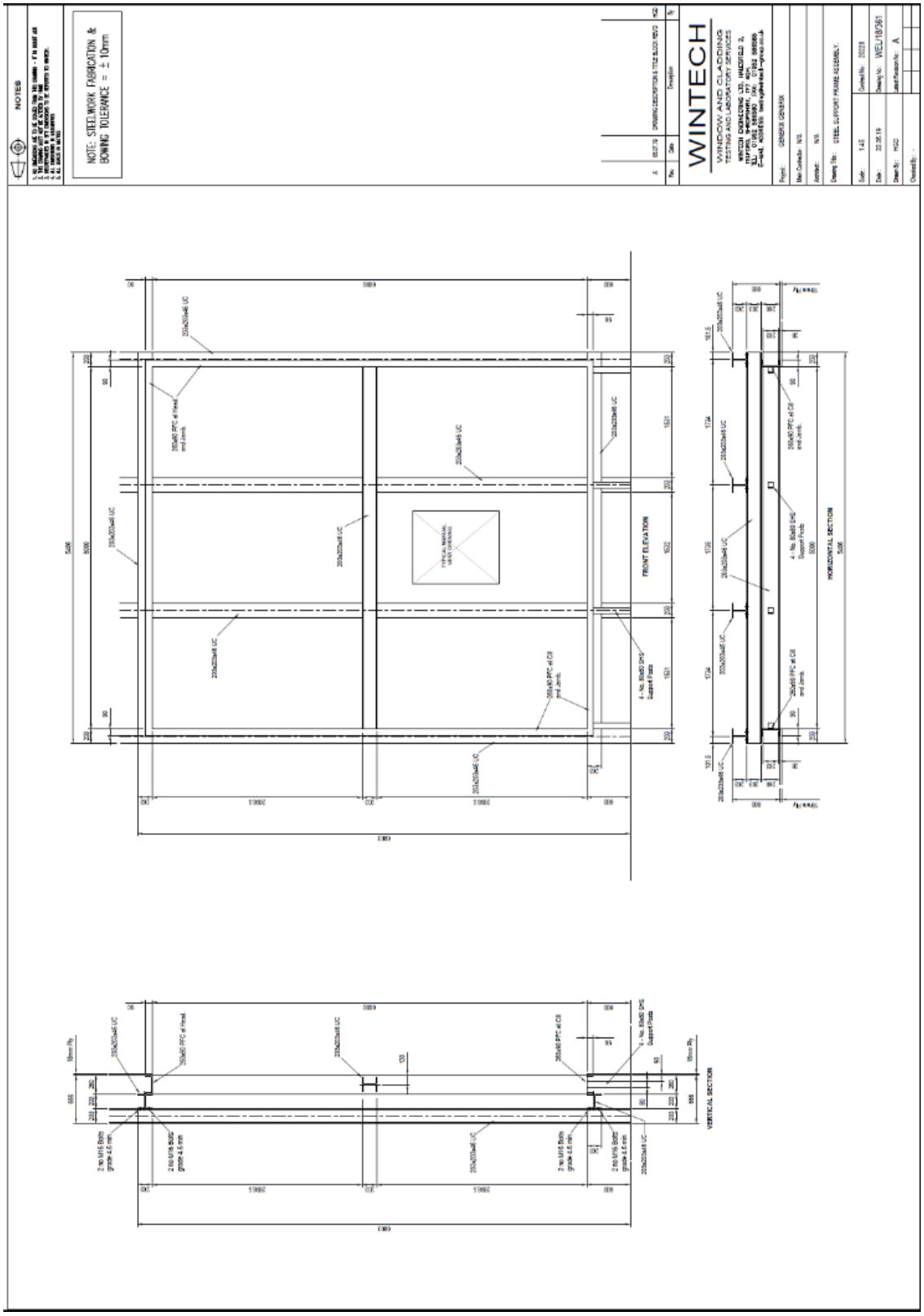
2.2
125
60

8. Support Steelwork Drawing



9. Dismantling

The dismantling was conducted on 27th June 2019 by representatives of Generix Facades Limited and was witnessed by representatives of Wintech Engineering Ltd.

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 Generix Facades Limited at the time of the dismantle.

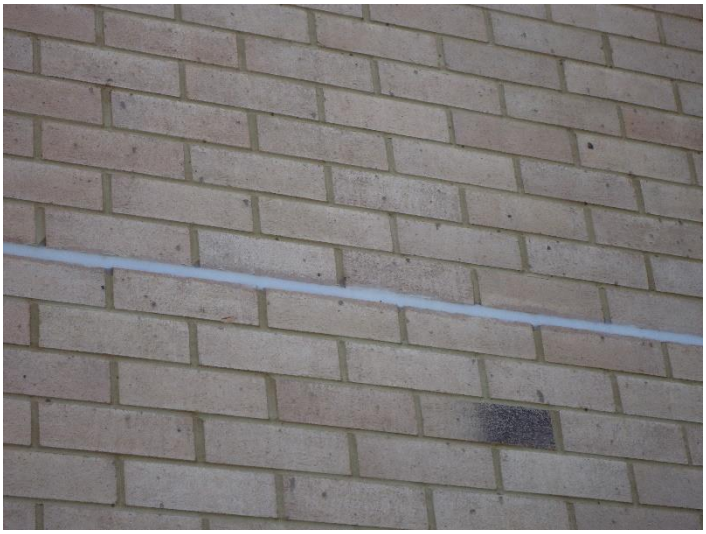
Photograph No. 5

Sample prior to dismantle

Photograph No. 6

Typical brick detail with mortar

Photograph No. 7



Horizontal expansion joint detail

Photograph No. 8

Showing bricks removed with horizontal fixing trays

Photograph No. 9

Showing bottom section of sample with bricks removed

Photograph No. 10

Helping hand and T-rail

Photograph No. 11

Helping hand bracket

Photograph No. 12

Section of T-rail

Photograph No. 13

Side view of brick tray

Photograph No. 14

Side view of brick

Photograph No. 15

Rear view of brick

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

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