WINTECH
BUILDING ENVELOPE TESTING

Technical Report

Report No. R12764

2223

Butech, S.A.Porcelanosa Group
Apartado de correos: 372
Villarreal (Castellon)
Spain
12540

Project

Porcelanosa-Butech System Test

CWCT Test Sequence
Project Ref. 12764

12th June 2013

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WINTECH ENGINEERING LIMITED, HALESFIELD 2, TELFORD, TF7 4QH, ENGLAND.
TEL: +44 (0) 1952 586580 FAX: +44 (0) 1952 586585 E-mail: testing@wintech-group.co.uk Web: www.wintech-engineering.com

Testing Conducted by:	Wintech Engineering Ltd Halesfield 2 Telford Shropshire TF7 4QH
Test Conducted at:	Above Address
Test Conducted for:	Butech, S.A.Porcelanosa Group
Standards Specified:	CWCT Test Methods for Building Envelopes – Dec 2005; Sections 7, 11, 12 & BS8200
The Test Sequence was Witnessed Wholly or in Part by:	C Tortosa — Butech, S.A.Porcelanosa Group A Lopez — Butech, S.A.Porcelanosa Group C Ramos — Butech, S.A.Porcelanosa Group B Varela — Inasus
Project No:	12764
Dates of Final Test Sequence:	4th & 10th June 2013
Product/System Tested:	Porcelanosa-Butech System
Tests Performed:	As Listed in Section 5 – Test Procedures
Final Test Sequence Conducted by:	D Price & D Reynolds

Report Compiled by:	D Price
Testing Supervised by:	M Cox Works Director
Technical Approval: (Authorising Signatory)	M Wass Technical Director

Contents

1. INTRODUCTION

This report describes tests conducted at the test site of Wintech Engineering Ltd on a sample of Rainscreen, on behalf of Butech, S.A.Porcelanosa Group.

The following test sequence was conducted on the 4th & 10th June 2013 in order to determine the weather tightness of the sample with respect to water penetration, wind and impact resistance. The test methods were in accordance with the following standards, and testing was conducted at the request of Butech, S.A.Porcelanosa Group.

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 – Safety (Hard & Soft body)	BS 8200

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

The test sample was supplied and erected on to the test chamber by Butech, S.A.Porcelanosa Group.

2. SUMMARY OF TEST RESULTS

The following summarises the results of tests carried out. The sample was tested in the following sequence and the associated results are as follows;

	Peak Test Pressure	Result	Date of test	Category
Test 1 – Water Penetration (Dynamic Aero Engine)	600 Pa	Pass	04.06.13	-
Test 2 – Wind Resistance (Serviceability)	2400 Pa	Pass	10.06.13	-
Test 3 – Wind Resistance (Safety)	3600 Pa	Pass	10.06.13	-
Test 4a – Impact Resistance (Retention of performance of exterior wall surfaces) - External		See Note	10.06.13	B
Test 4b – Impact Resistance (Safety to persons) - External		See Note	10.06.13	B

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

NOTE: During the impacting both systems tested achieved a Class 3 on serviceability, however during the safety impacting the visible clipped system achieved a low risk class and the hidden clips achieved a high risk class.

THESE RESULTS ARE VALID ONLY FOR THE CONDITIONS UNDER WHICH THE TEST WAS CONDUCTED

3. DESCRIPTION OF TEST SAMPLE

Manufactured By:	Porcelanosa Gupo.
Sample Size:	1200X596mm panel size cutted to various formats.
Rainscreen Type:	Ceramic rainscreen system with open joints. Mechanical and chemical fixing.
Framing Material/Rail System:	Extruded aluminium to BS EN 755-2: 2008 and BS EN 12020-1: 2008 in EN AW-AlMgSi 6005A/T6 grade alloy. Connecting bolts: stainless steel A2 (AISI304). Fasteners: Black lacquered steel clips according to DIN 7504 K stainless steel A2 (AISI304)– concealed fix.
Finish:	Rails: Black powder coated. Fasteners: A2 stainless steel. Black lacquered. Screws and washers: Stainless steel. Additional neoprene washer to avoid galvanic corrosion.
Gaskets:	Open joints. The tiles edges define the joint without any additional gasket. 5 and 8 mm joint.
Panel Types:	PORCELANOSA and VENIS vitrified porcelain panel or URBATEK full body technical porcelain panels, mechanically fixed through its thickness. All them manufactured by PORCELANOSA GROUP. 10/11mm thickness panel, Group BIa, less than 0,2% length and width tolerance, less than 0,1% water absorption, modulus of rupture higher than 40 N/mm2, breaking strength higher than 2,000 N, complying with the UNE-EN ISO standards 10545-6, 10545-12. Reinforced sheet by fibreglass mesh on back.
Fixing Bracket Details:	According to attached drawings.

Further details of the test sample and façade system can be found in Appendix A – Sample Drawings.

Test Sample During Testing

Photograph No. 1

4. TEST ARRANGEMENT

4.1 TEST CHAMBER

A Rainscreen 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 Atmospheric Pressure

A digital barometer was used to take atmospheric pressure readings with an accuracy of ± 1Kpa.

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

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.

4.3.1 Static Air Pressure

The air supply system comprised of a centrifugal fan assembly and associated ducting and control valves which were 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.

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

4.4.1 Spray frame arrangement

A water spray system was used which comprised of nozzles spaced on a uniform grid, not more that 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.

4.5.2 Hard (H2) Body Impactor

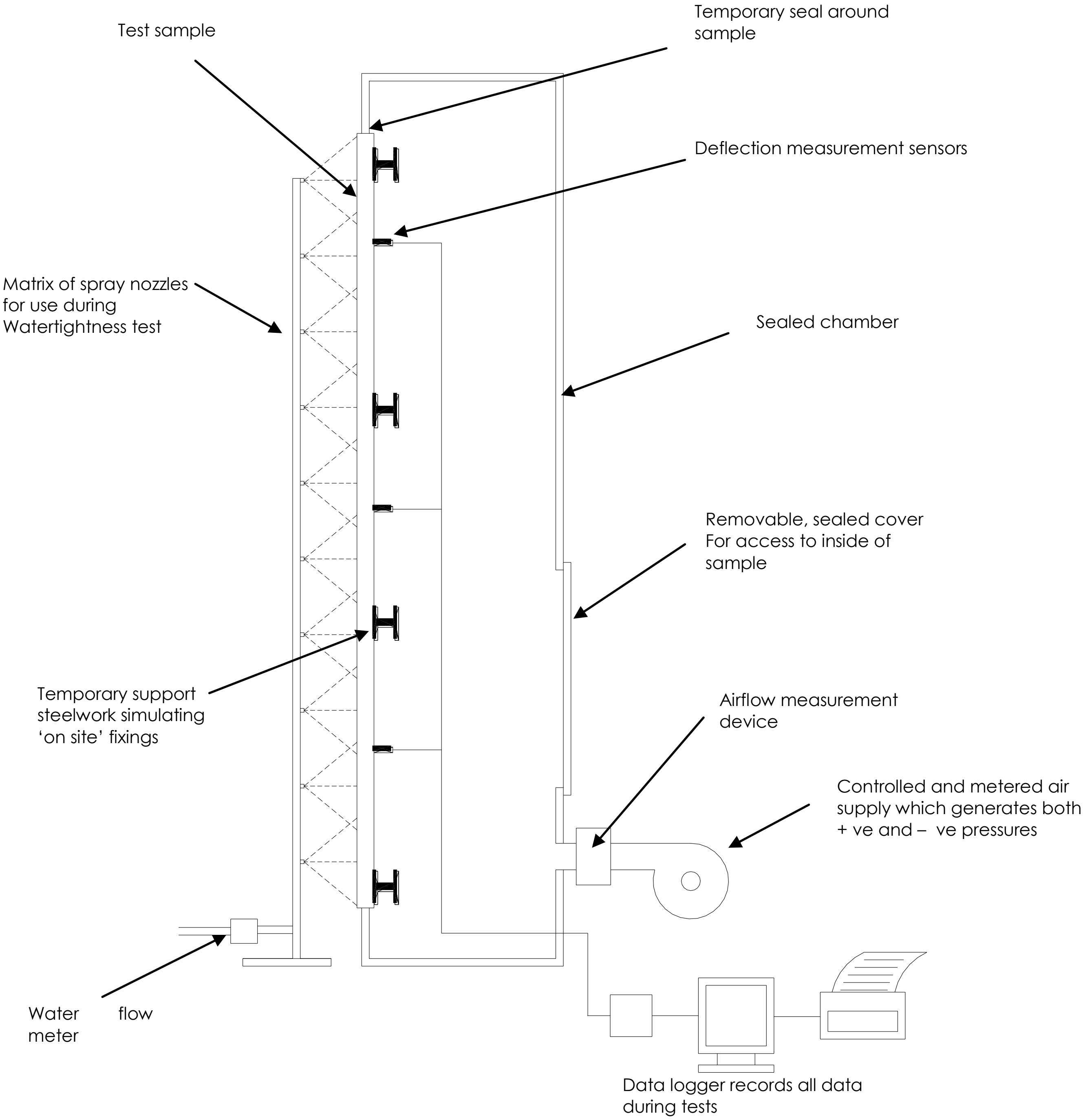
A steel ball with a diameter of 62.5 mm and a mass of 1.135 Kg, modified to allow it to swing from a nylon cord, rather than being dropped onto the sample as required in BS8200, was released from the height, calculated to result in the required impact energies and allowed to fall under gravity until it impacted the designated test zone of the sample.

Note: The test standard requires that the hard body impactor is to be dropped vertically on to the sample however as the test sample is mounted in a vertical arrangement, the above method has been adopted and as such is a deviation from the test standard.

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

Figure 1

General Arrangement of a Typical Test Assembly



5. TEST PROCEDURES

5.1 SEQUENCE OF TESTING

1. Water Penetration – Dynamic Aero Engine
2. Wind Resistance – Serviceability
3. Wind Resistance – Safety
4. Impact Resistance – Retention of performance of exterior wall surfaces (BS 8200)
5. Impact Resistance – Safety to persons (BS 8200)

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 **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 and finally sealed with tape. 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 the preparation pulses, at a negative pressure differential. All sensors other than those used for recording the movement of framing members adjacent to their fixings to building structure were zeroed following preparation pulses.

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 the preparation pulses, with negative pressure. 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 - SAFETY

5.4.1 Impact Test Procedure – Retention of performance

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

The Impactors, as described in section 4.5, 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

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

The Impactors, as described in section 4.5, 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 Test 1 – Water Penetration – Dynamic Aero Engine

Temperatures (°C)		
	Water	15.0
	Ambient	14.7

Test Time	Water collected (Litres)
15 minutes	20.69 ltrs

Observations
The sample was subjected to testing as described in section 5.3.2, for a period of not less than 15 minutes, during which water leakage was observed through the sample, by the means of observation holes cut in the support backing wall. 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 TESTING

	Calculation of deflection
Group A comprised of probes 1, 2 & 3	= Probe 2 – ((Probe 1 + Probe 3)/2)
Group B comprised of probes 4, 5, & 6	= Probe 5 – ((Probe 4 + Probe 6)/2)

An inspection carried out following tests 2 and 3, after both positive and negative pressure testing, showed no evidence of any permanent deformation or damage to the test sample.

Positions of Deflection Measurement Probes

Figure 2

View from Outside

Not to Scale

- Deflection probe position

6.2.1 Test 2 - Wind Resistance, Serviceability

Temperatures (°C)	Ambient	8.0

Measured Length of Framing Member (mm)		Allowable Deflection	
		Ratio	Calculated (mm)
Group A	796	L/300	2.2
Group B	786	L/360	2.2

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	Group B
0	0.0	0.1
600	0.1	0.3
1200	0.2	0.4
1800	0.3	0.5
2400	0.4	0.6
Residuals Immediately following test	0.1	0.1

6.2.1.2 Wind Resistance, Serviceability - Negative Pressure

Negative Pressure Pa	Results	
	Group A	Group B
0	0.0	0.0
600	0.1	0.0
1200	0.2	0.1
1800	0.3	0.3
2400	0.3	0.4
Residuals Immediately following test	0.0	0.1

6.2.2 Test 3 - Wind Resistance, Safety

Temperatures (°C)	Ambient	8.0

Measured Length of Framing Member (mm)		Allowable Residual Deformation	
		Ratio	Calculated (mm)
Group A	796	L/500	1.6
Group B	786	L/500	1.6

6.2.2.1 Wind Resistance, Safety - Positive Pressure

Positive Pressure Pa	Results	
	Group A	Group B
0	0.0	0.1
3600	0.5	0.9
Residuals Immediately following test	0.1	0.1

6.2.2.2 Wind Resistance, Safety - Negative Pressure

Negative Pressure Pa	Results	
	Group A	Group B
0	0.0	0.1
3600	0.6	0.5
Residuals Immediately following test	0.0	0.1

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 IMPACT TESTING

6.3.1 Test 4a – Impact – Retention of performance of exterior wall surfaces (Soft & Hard Body)

Temperatures (°C)	Ambient	8.0
Humidity (%RH)	76	

Impact Reference	Test Category	Impactor Type	Impact Energy (Nm)	Drop Height (mm)	Observations	Result
E1	B	S1	120	245	Bounce and small piece fell from in front of fixing clip	Pass
E2	B	S1	120	245	Bounce	Pass
E3	B	S1	120	245	Bounce	Pass
E4	B	S1	120	245	Bounce	Pass
E5	B	S1	120	245	Bounce	Pass
E6	B	S1	120	245	Bounce	Pass
E7	B	S1	120	245	Bounce	Pass
E8	B	S1	120	245	Bounce	Pass
E9	B	S1	120	245	Bounce	Pass
E10	B	S1	120	245	Bounce	Pass
E11	B	H2	10	898	Bounce & Spalling	Pass
E12	B	H2	10	898	Bounce	Pass
E13	B	H2	10	898	Bounce & Spalling	Pass
E14	B	H2	10	898	Bounce and corner cracked – safely retained	Pass
E15	B	H2	10	898	Bounce and cracked – safely retained	Pass
E16	B	H2	10	898	Bounce and cracked – safely retained	Pass
E17	B	H2	10	898	Bounce and corner cracked – safely retained	Pass
E18	B	H2	10	898	Bounce and crack from top to bottom of tile	Pass
E19	B	H2	10	898	Bounce and cracked – safely retained	Pass
E20	B	H2	10	898	Bounce and small piece fell from in front of fixing clip	Pass

NOTE: During the impacting both systems tested achieved a Class 3 on serviceability.

6.3.2 Test 4b – Impact – Safety to persons (Soft Body)

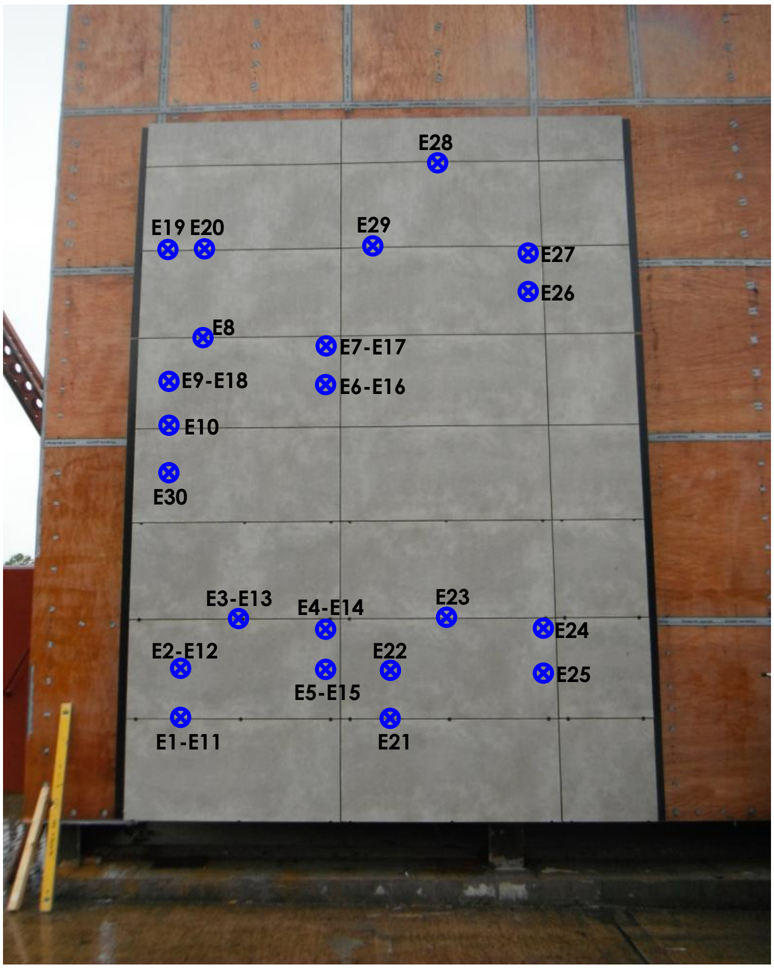
Temperatures (°C)	Ambient	8.0
Humidity (%RH)	76	

Impact Reference	Test Category	Impactor Type	Impact Energy (Nm)	Drop Height (mm)	Observations	Result
E21	B	S1	500	1020	Bounce	Pass
E22	B	S1	500	1020	Bounce	Pass
E23	B	S1	500	1020	Bounce	Pass
E24	B	S1	500	1020	Bounce	Pass
E25	B	S1	500	1020	Bounce	Pass
E26	B	S1	500	1020	Bounce	Pass
E27	B	S1	500	1020	Bounce and small piece fell from in front of fixing clip	Pass
E28	B	S1	500	1020	Bounce and small piece fell from in front of fixing clip	Pass
E29	B	S1	500	1020	Impactor penetrated tile leaving sharp edges which were safely retained	Pass
E30	B	S1	500	1020	Impactor penetrated tile leaving sharp edges which were safely retained	Pass

NOTE: During the safety impacting the visible clipped system achieved a low risk class and the hidden clips achieved a high risk class.

6.3.3 Impact Positions

Figure 3



View from outside –
Not to scale

- External impact position

APPENDIX A

System Drawings

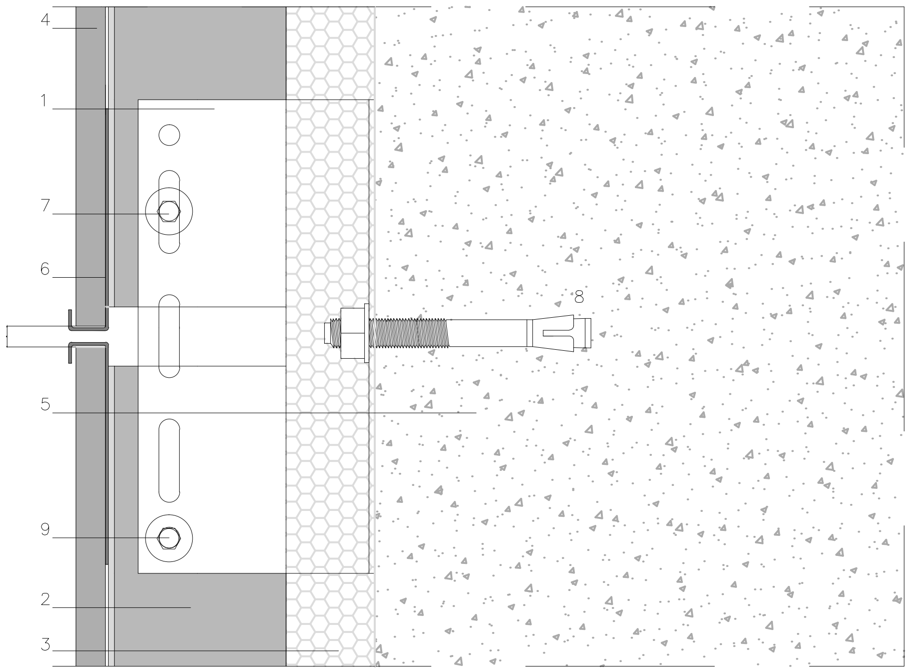
Drawing Number Drawing Title

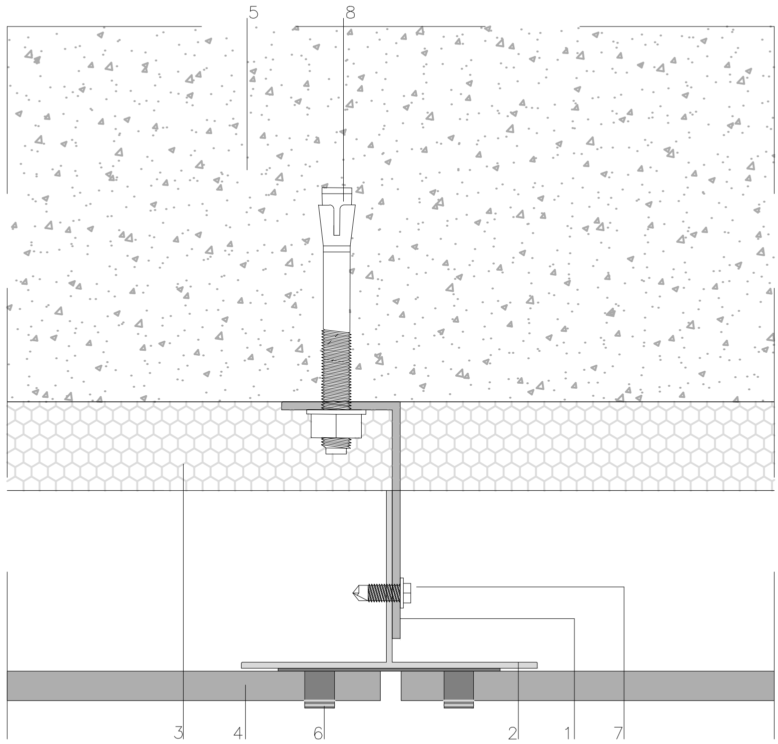
(14 drawings on un-numbered pages)

Bracket Technical Datasheet

11 off un-numbered drawings

| Visible system. Vertical & horizontal sections





1. L-bracket
2. T-profile
3. Thermal insulation
4. Ston-ker ceramic tile
5. Concrete substrate
6. Visible central clamp
7. SN5 self-drilling screw
8. Bolt anchor

Drawings as supplied to WEL

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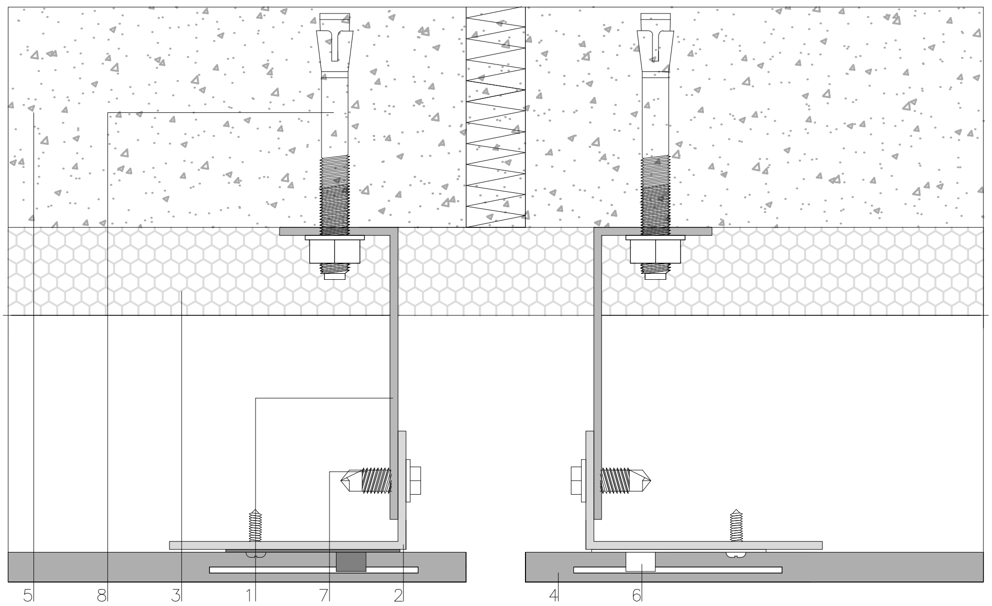
PROJECT : CWCT TEST FV	SCALE : -	DATE : 19H JUNE 2013
butech. ADDRESS: HALESFIELD 2, TELFORD, TF7 4QH, ENGLAND PLAN : TEST SAMPLE LAYOUT	DRAWN BY: BUTECH	WORK CODE: -

| Installation on existing expansion joints



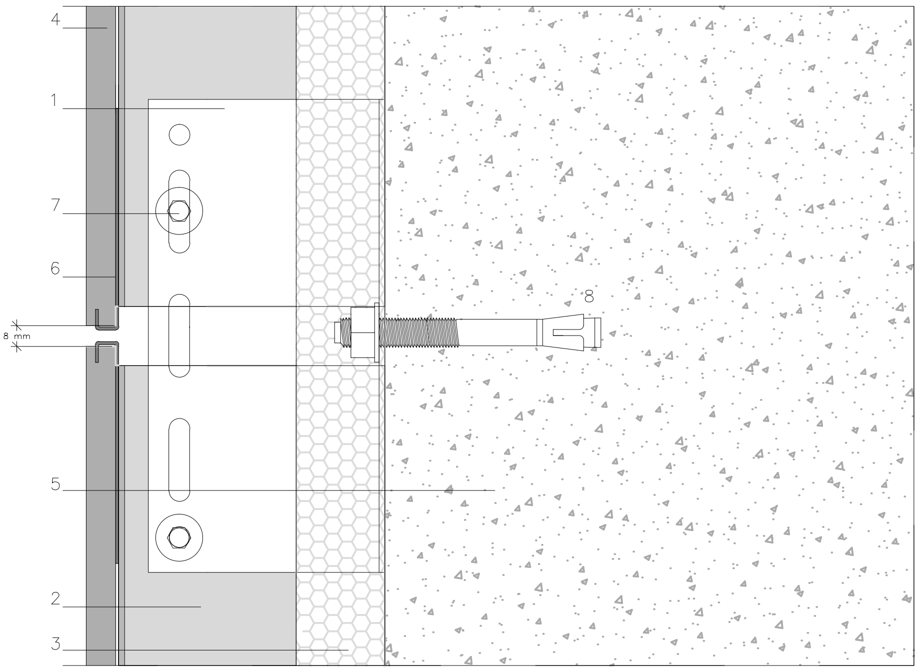
1. L-bracket
2. L-profile
3. Thermal insulation
4. Ston-ker ceramic tile
5. Concrete
6. Invisible lateral clamp
7. SN5 self-drilling screw
8. Bolt anchor

Drawings as supplied to WEL

WINTECH
BUILDING ENVELOPE TESTING

PROJECT : CWCT TEST FV	SCALE : -	DATE : 19H JUNE 2013
butech.	ADDRESS: HALESFIELD 2, TELFORD, TF7 4QH, ENGLAND PLAN : TEST SAMPLE LAYOUT	DRAWN BY: BUTECH	WORK CODE: -

| Expansion joint between profiles



Drawings as supplied to WEL

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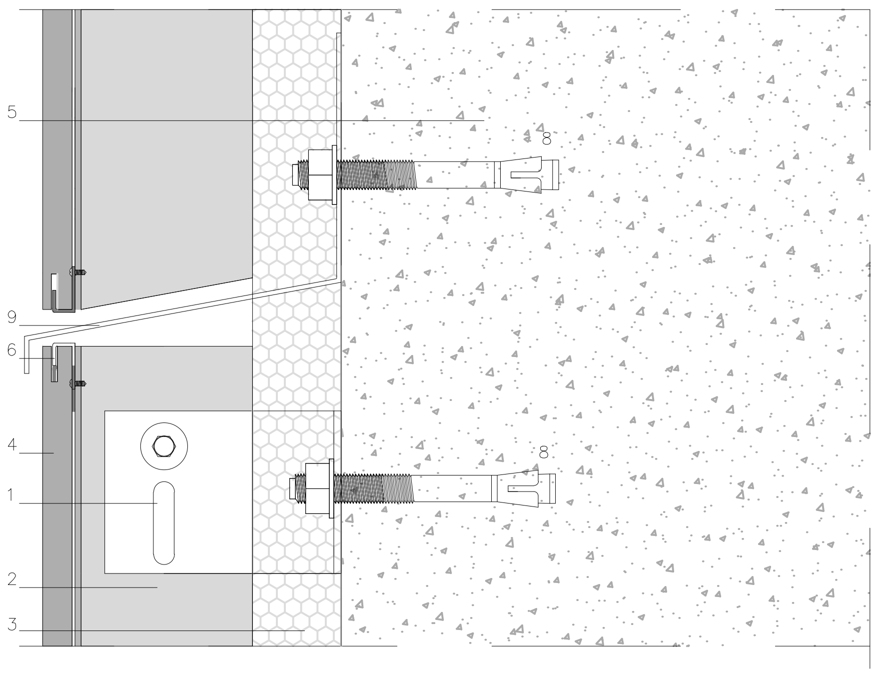
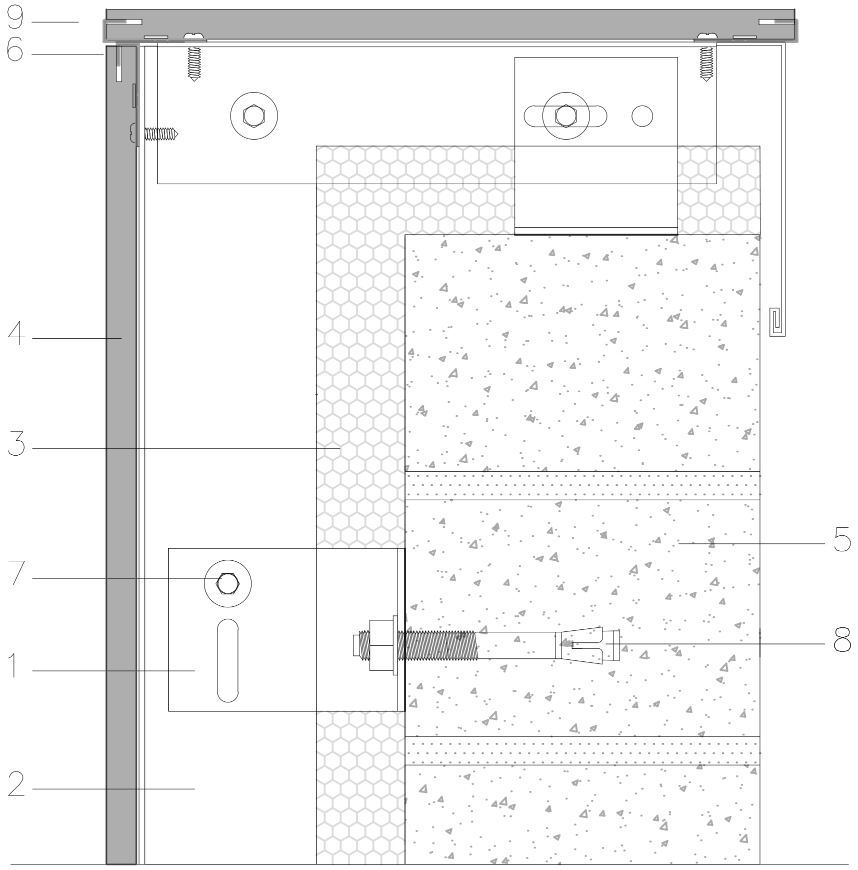
| Interruption of the ventilated air gap



1. L-bracket
2. T-profile
3. Thermail insulation
4. Ston-ker ceramic tile
5. Concrete
6. Invisible starting-finishing clamp
7. SN5 self-drilling screw
8. Bolt anchor
9. Aluminium plate

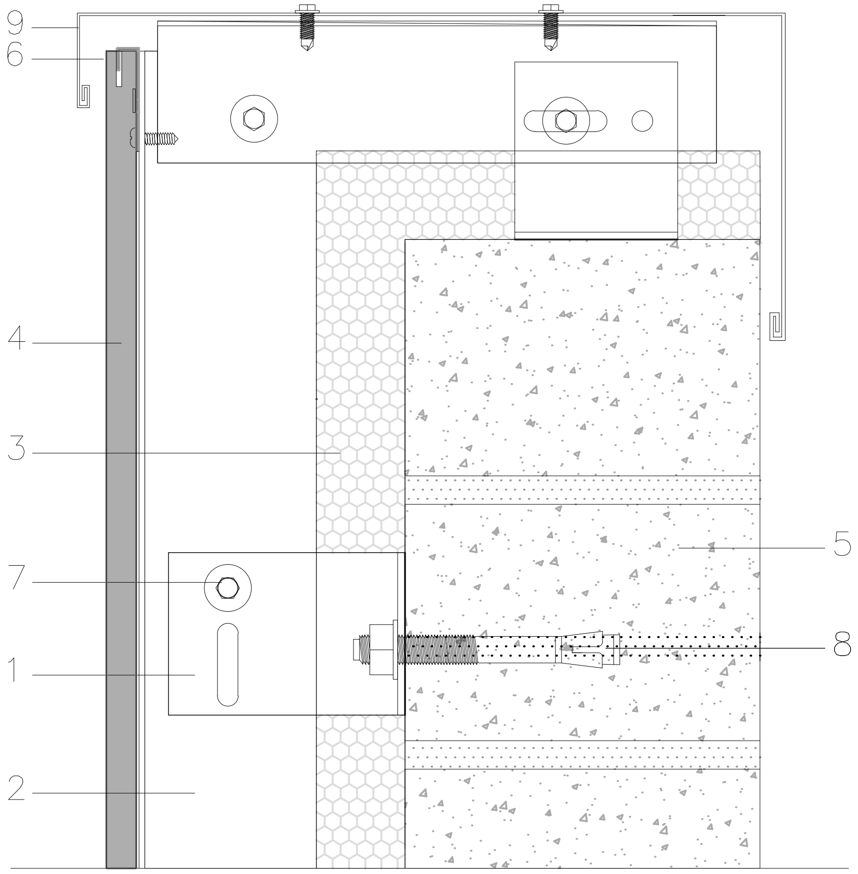
PROJECT : CWCT TEST FV	SCALE : -	DATE : 19H JUNE 2013
butech® — ADDRESS: HALESFIELD 2, TELFORD, TF7 4QH, ENGLAND — PLAN : TEST SAMPLE LAYOUT	DRAWN BY: BUTECH	WORK CODE: -

| Concealed system. Ceramic coping



1. L bracket
2. T profile
3. Thermal insulation
4. Ston-ker ceramic tile
5. Substrate wall
6. Concealed clip
7. SN5 self-drilling screw
8. Bolt anchor
9. Ceramic coping

Figure 16 | Concealed system. Aluminium coping



Drawings as supplied to WEL

WINTECH
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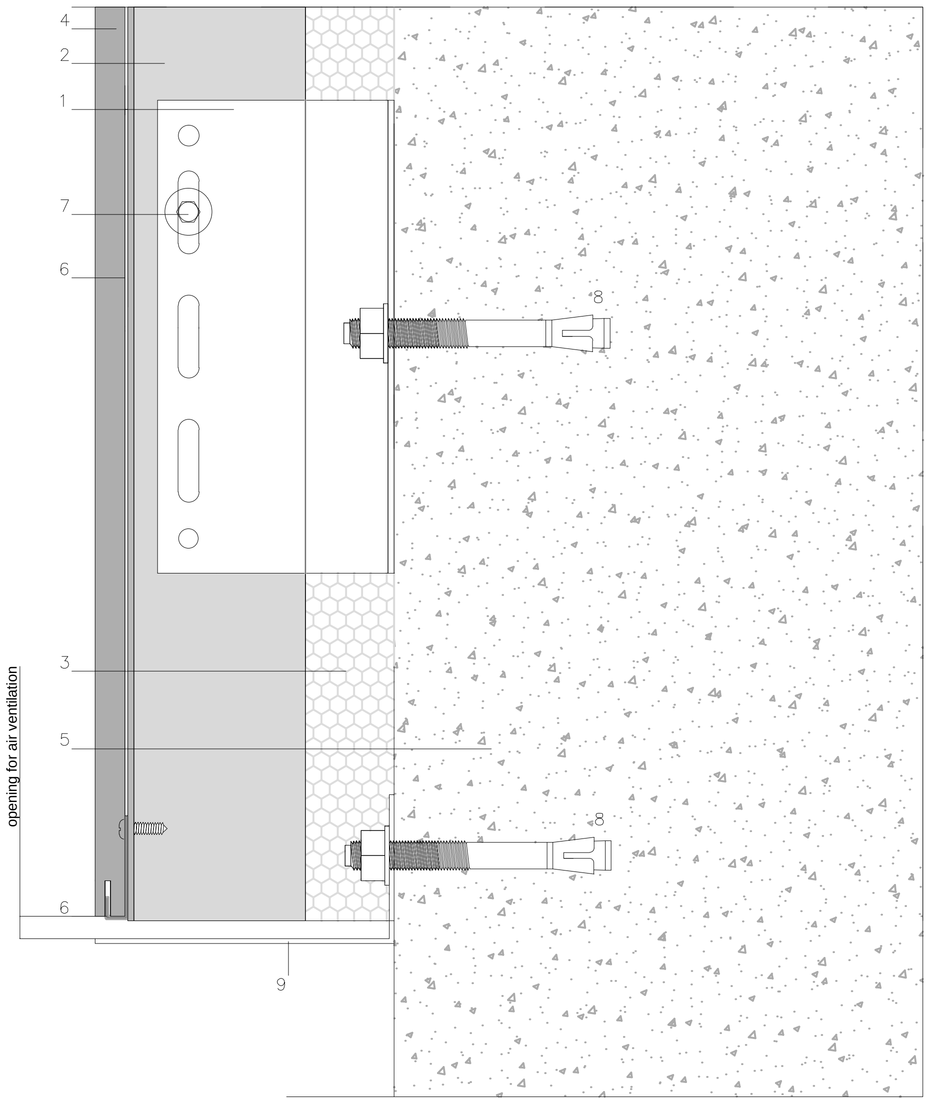
1. L bracket
2. T profile
3. Thermal insulation
4. Ston-ker ceramic tile
5. Substrate wall
6. Concealed clip
7. SN5 self-drilling screw
8. Bolt anchor
9. Aluminium coping

PROJECT : CWCT TEST FV	SCALE : -	DATE : 19H JUNE 2013
butech. ADDRESS: HALESFIELD 2, TELFORD, TF7 4QH, ENGLAND PLAN : TEST SAMPLE LAYOUT	DRAWN BY: BUTECH	WORK CODE: -

| Starting



1. L Bracket
2. T Profile
3. Thermal insulatiom
4. Ston-Ker tile
5. Concrete
6. Start/ending concealed clip
7. Self drilling screw SN5
8. Anchor
9. Aluminium plate

Drawings as supplied to WEL

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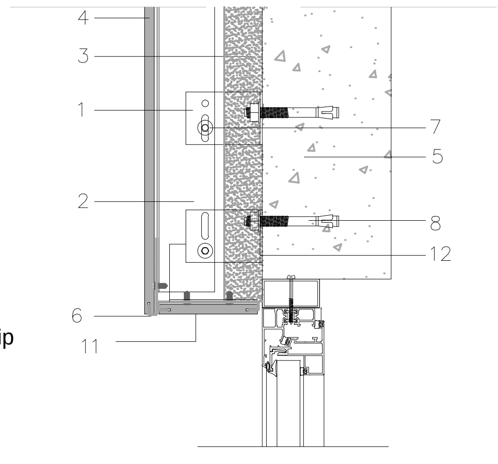
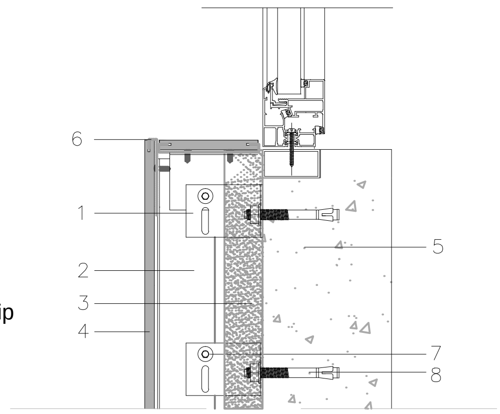
| Window frames - Vertical & horizontal sections

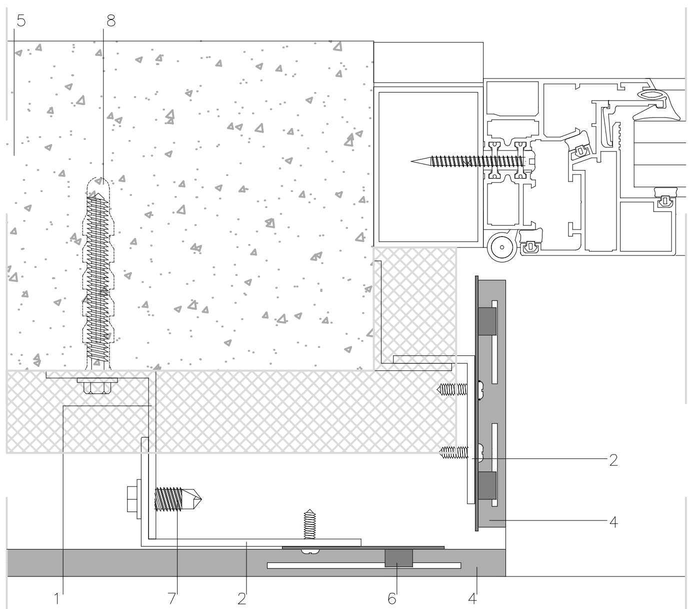
1. L-bracket
2. T-profile
3. Thermal insulation
4. Ston-ker ceramic tile
5. Concrete
6. Invisible starting-finishing clip
7. SN5 self-drilling screw
8. Bolt screw
9. Aluminium window cill



1. L-bracket
2. T-profile
3. Thermal insulation
4. Ston-ker ceramic tile
5. Concrete
6. Invisible starting-finishing clip
7. SN5 self-drilling screw
8. Bolt screw
9. Aluminium window cill



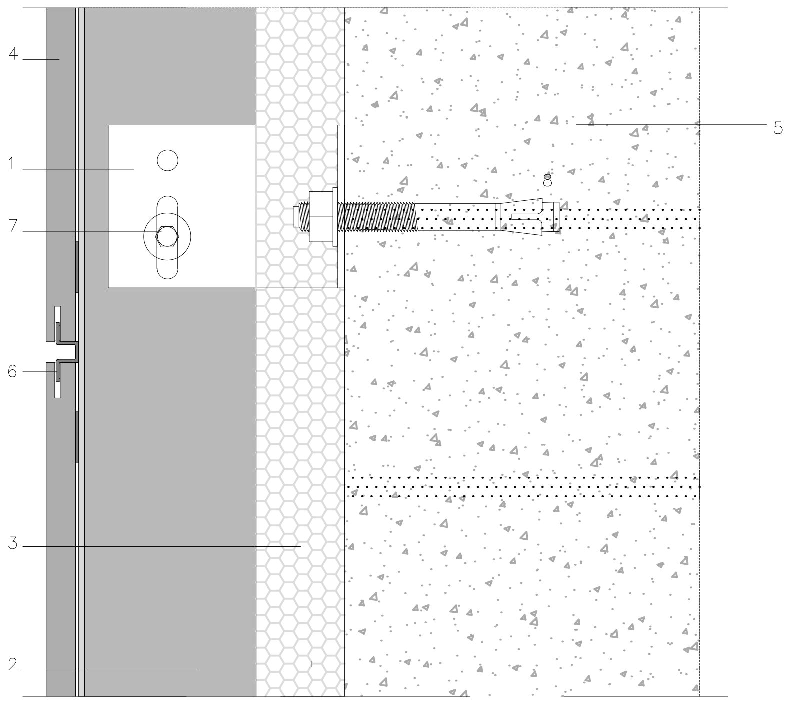
1. L-bracket
2. L-profile
3. Thermal insulation
4. Ston-ker ceramic tile
5. Concrete
6. Invisible lateral clamp
7. SN5 self-drilling screw
8. Bolt anchor

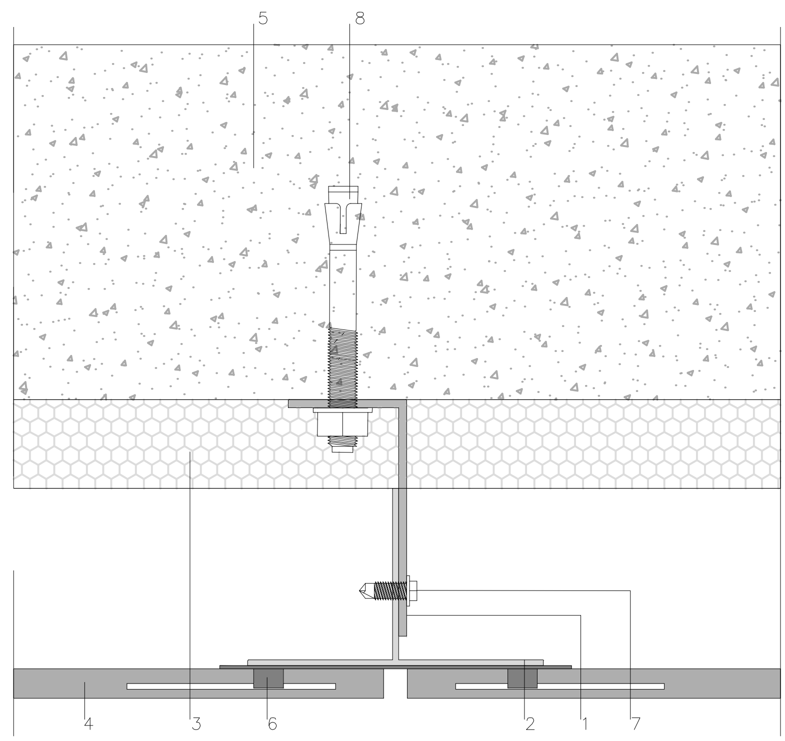


Drawings as supplied to WEL

PROJECT : CWCT TEST FV	SCALE : -	DATE : 19H JUNE 2013
butech	ADDRESS: HALESFIELD 2, TELFORD, TF7 4QH, ENGLAND PLAN : TEST SAMPLE LAYOUT	DRAWN BY: BUTECH	WORK CODE: -

| Concealed system. Vertical & horizontal section





Drawings as supplied to WEL

WINTECH
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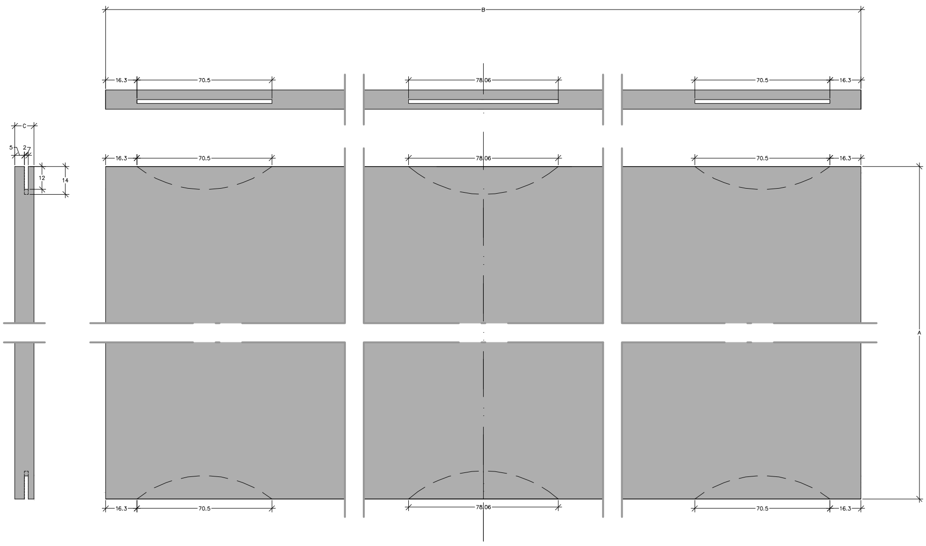
1. L-bracket
2. T-profile
3. Thermal insulation
4. Ston-ker ceramic tile
5. Concrete
6. Invisible central clamp
7. SN5 self-drilling screw
8. Anchor

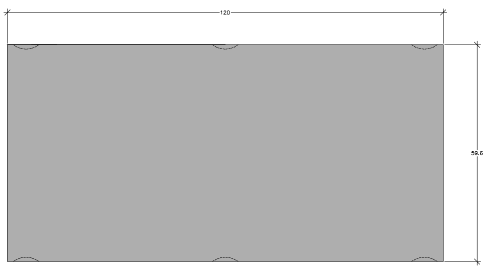
PROJECT : CWCT TEST FV	SCALE : -	DATE : 19H JUNE 2013
butech. — ADDRESS: HALESFIELD 2, TELFORD, TF7 4QH, ENGLAND; PLAN : TEST SAMPLE LAYOUT	DRAWN BY: BUTECH	WORK CODE: -



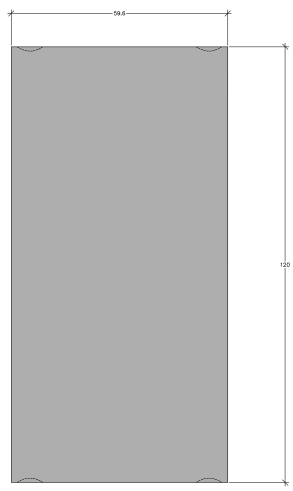
Standard dimensions				
Nominal size AxB (mm)	Width A (mm)	Length B (mm)	Thickness C (mm)	Weigth (g)
1200x596	1200	596	11	18815
1100x546	1100	546	11	15800
660x440	660	440	11	7320
663x442	663	442	10,8	7417
660x330	660	330	9,5	4630
659x373	659	373	9.6	5250
596x596	596	596	10,7	8350
605x605	605	605	10,7	8400

| Grooving of ceramic tiles (according to size and type of tile layout)

HORIZONTAL



VERTICAL

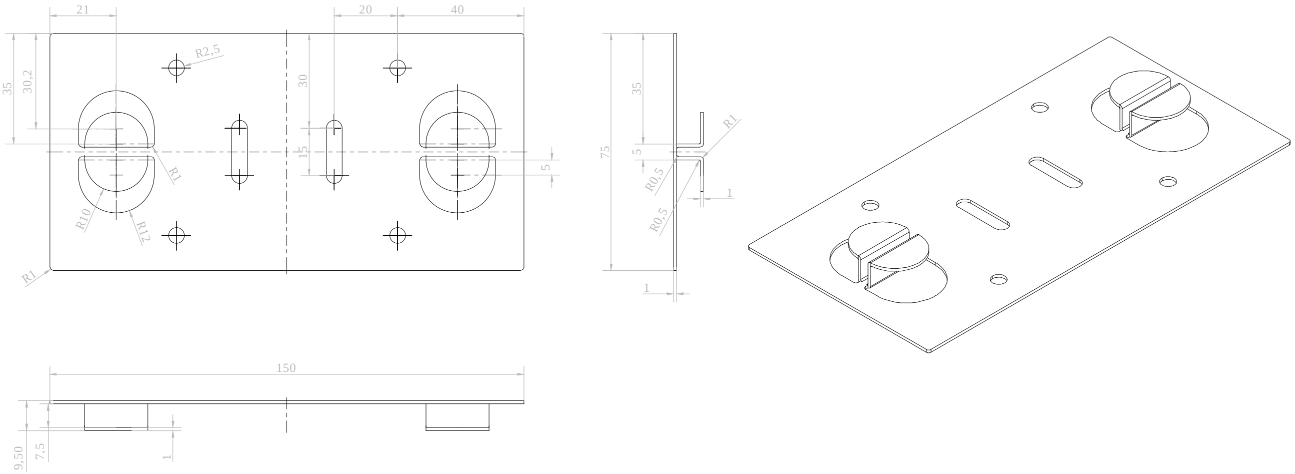


Drawings as supplied to WEL

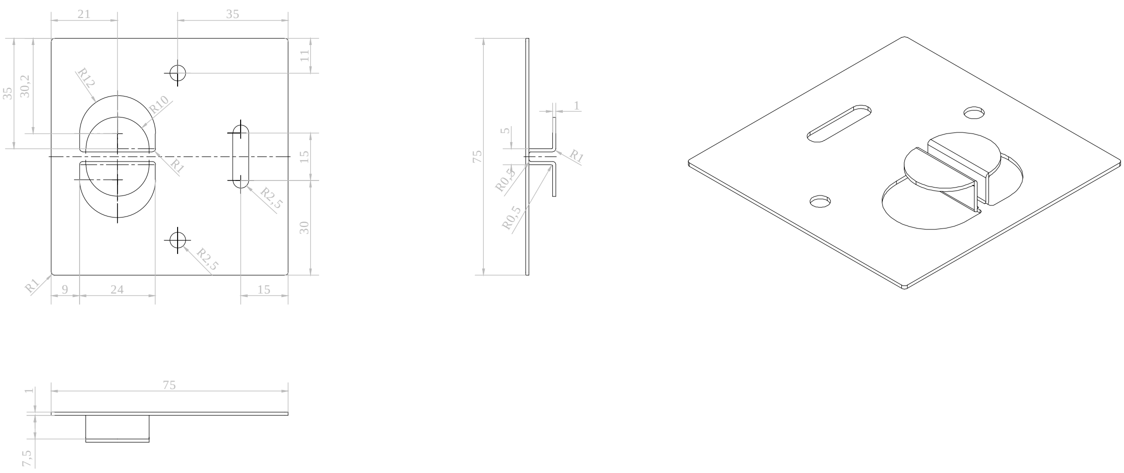
WINTECH
BUILDING ENVELOPE TESTING

PROJECT : CWCT TEST FV	SCALE : -	DATE : 19H JUNE 2013
butech. ADDRESS: HALESFIELD 2, TELFORD, TF7 4QH, ENGLAND; PLAN : TEST SAMPLE LAYOUT	DRAWN BY: BUTECH	WORK CODE: -

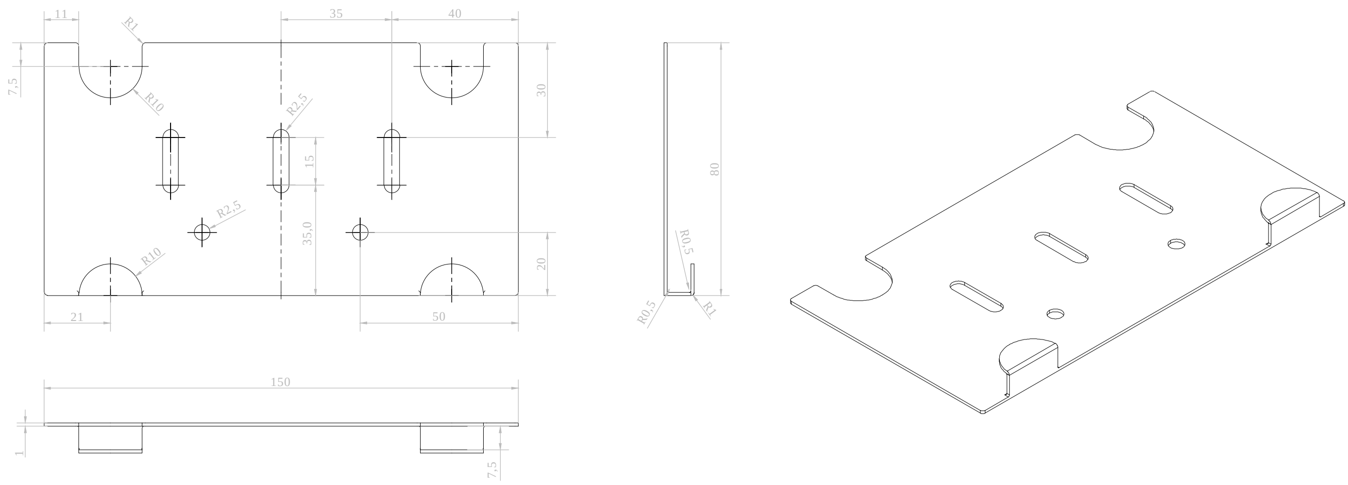
| Concealed central clip for 5 mm joint



| Concealed lateral clip for 5 mm joint

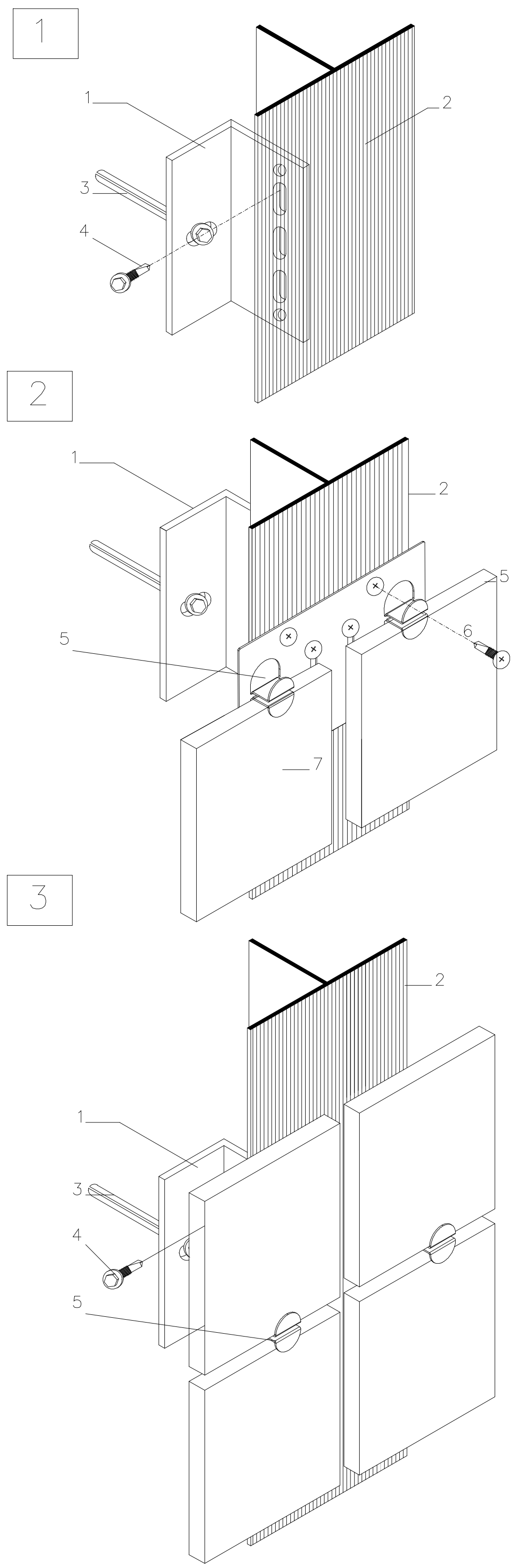


| Starting-finishing concealed clip for 5 joint



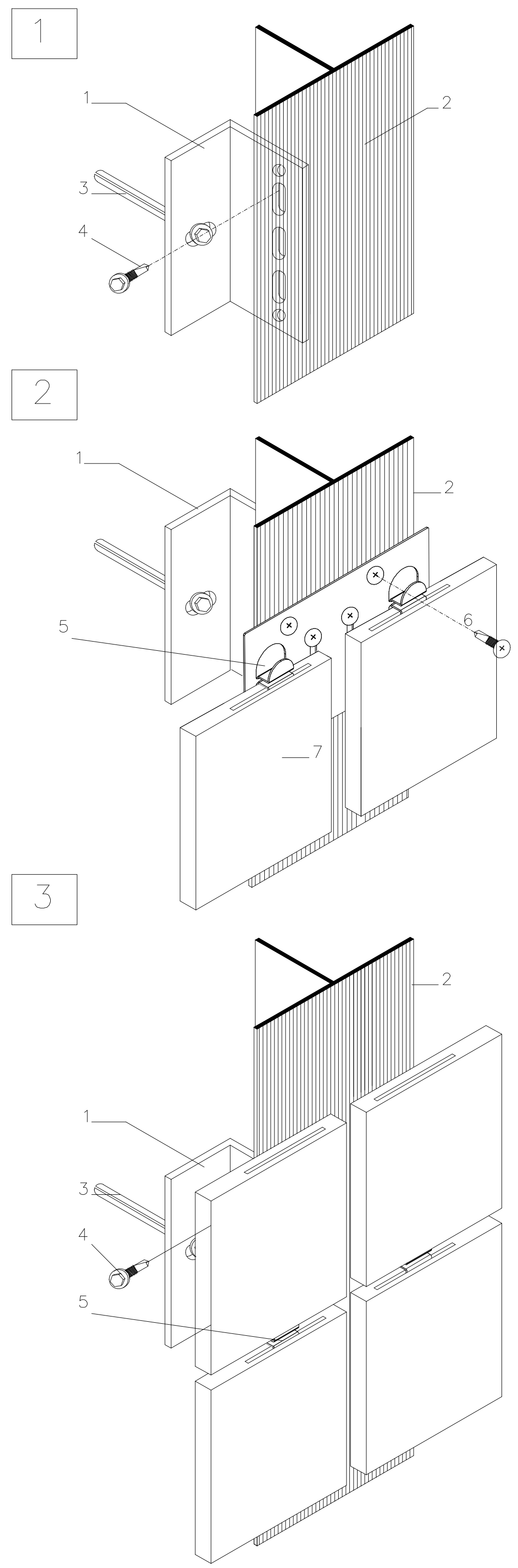
PROJECT : CWCT TEST FV	Drawings as supplied to WEL WINTECH BUILDING ENVELOPE TESTING	SCALE : -	DATE : 19H JUNE 2013
butech®	ADDRESS: HALESFIELD 2, TELFORD, TF7 4QH, ENGLAND PLAN : TEST SAMPLE LAYOUT	DRAWN BY: BUTECH	WORK CODE: -

Metallic Subframe
System description. Invisible Visible Clip



1. Simple L-bracket
2. T-profile
3. Anchor
4. Stainless steel screw type SN5/12 S1 6 5.5x22
5. Visible clip
6. Stainless steel screw DIN 7504-N acero inox. 4.2X13
7. Ceramic tile

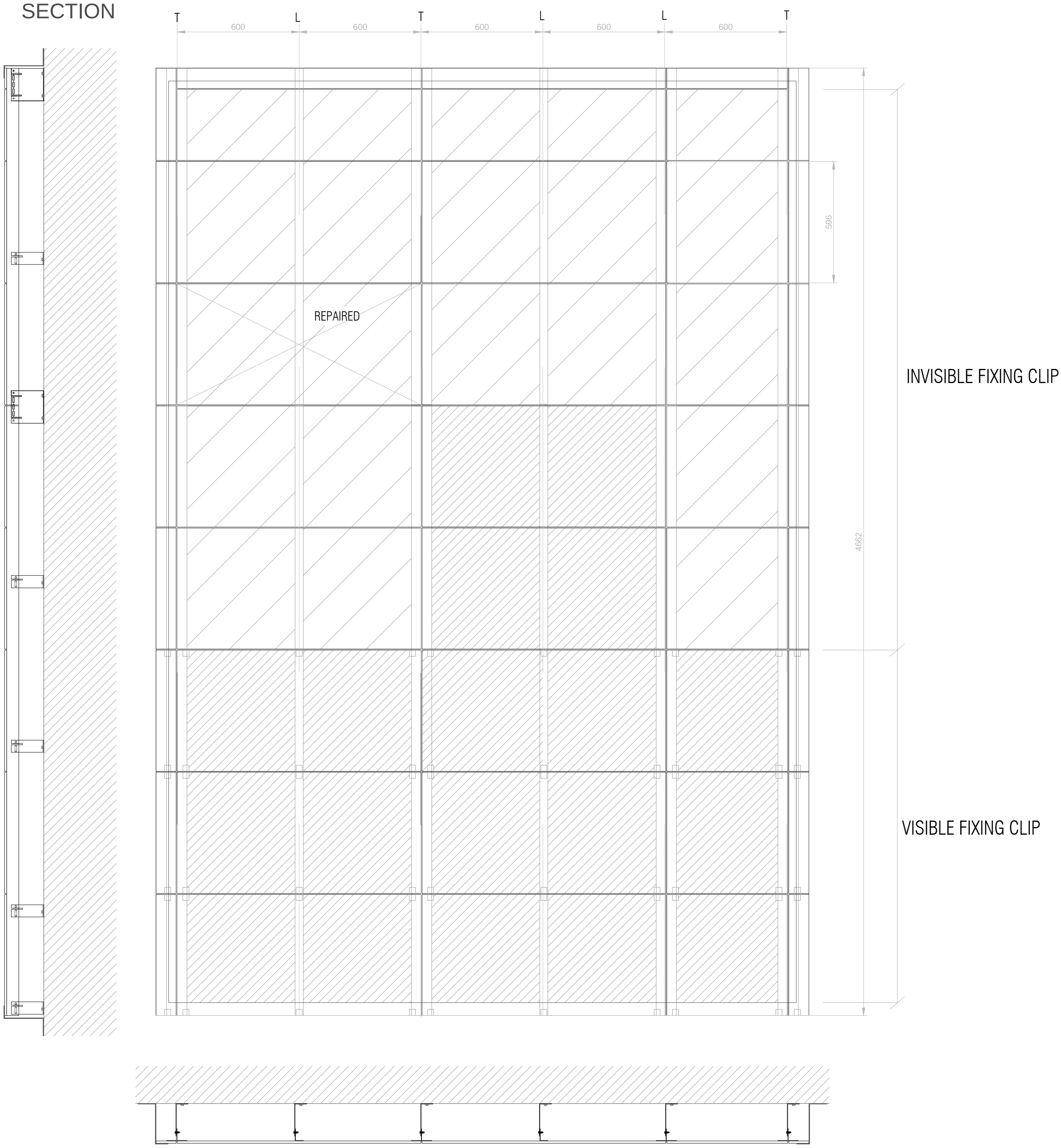
Metallic Subframe
System description. Invisible Fixing Clip

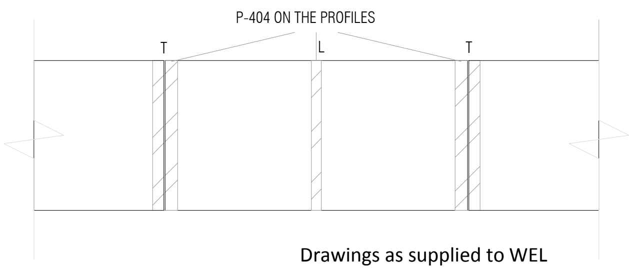


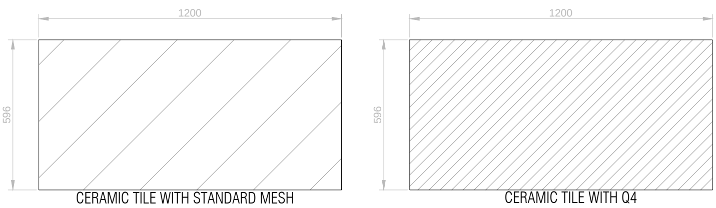
1. Simple L-bracket
2. T-profile
3. Anchor
4. Stainless steel screw type SN5/12 S1 6 5.5x22
5. Invisible clip
6. Stainless steel screw DIN 7504-N acero inox. 4.2X13
7. Ceramic tile

PROJECT : CWCT TEST FV	Drawings as supplied to WEL WINTECH BUILDING ENVELOPE TESTING	SCALE : -	DATE : 19H JUNE 2013
butech.	ADDRESS: HALESFIELD 2, TELFORD, TF7 4QH, ENGLAND PLAN : TEST SAMPLE LAYOUT	DRAWN BY: BUTECH	WORK CODE: -

SECTION







Drawings as supplied to WEL

WINTECH
BUILDING ENVELOPE TESTING

LEGEND
T: "T" SHAPE PROFILE
L: "L" SHAPE PROFILE

PROJECT : CWCT TEST FV	SCALE : 1/30	DATE : 19H JUNE 2013
ADDRESS: HALESFIELD 2, TELFORD, TF7 4QH, ENGLAND PLAN : TEST SAMPLE LAYOUT	DRAWN BY: BUTECH	WORK CODE: -

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Brackets

To attach the vertical profiles to the substrate, brackets made of extruded stainless steel (6005A T6) are used, with an approximate width of 2.7 mm. Following describes the properties of aluminum.

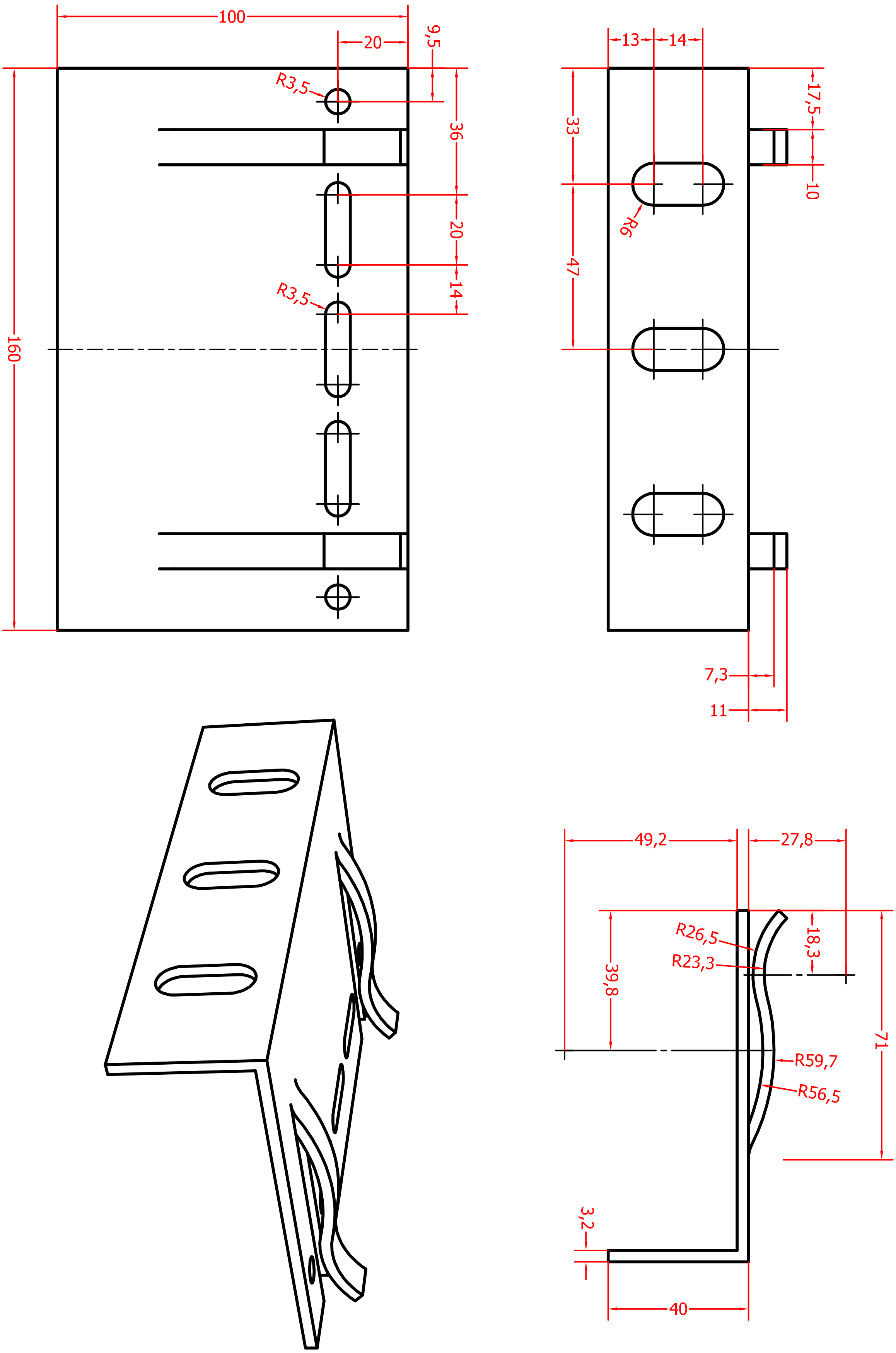
Table 3. ALUMINIUM PROPERTIES	
Designation	
Symbolic	EN AW-Al Mg Si
Numeric	AW 6005A
Treatment	T6
Standard	UNE-EN 755-2[(2)] UNE-EN 12012-1[(3)]
Physical properties	
Specific weight	2.7g/cm^3
Linear expansion coefficient	23.6·10^{-6} K^{-1} (20/100 ºC)
Modulus of elasticity	70,000 MPa
Poisson's coefficient	0.33
Mechanical properties	
Tensile strength (R_m)	≥ 270 N/mm^2
Elastic limit ($R_{p0,2}$)	≥ 225 N/mm^2
Elongation (A)	≥ 8%
Elongation (A_{50mm})	≥ 6%
Brinell hardness	90

Next table shows the geometric and mechanical properties of the most representative brackets. Toleran-ces as per UNE-EN 755-9.

Brackets features

Reference	Section (cm^2)	Perimeter (mm)	Weight (kg/m)	X_c (mm)	I_{xc} (cm^4)	r_{xc} (mm)	y_c (mm)	I_{yc} (cm^4)	r_{yc} (mm)
L 60 x 40 x 2.7	262.63	199	0.709	40.99	3.66	11.80	9.01	9.96	19.47
L 80 x 40 x 2.7	316.63	239	0.855	52.29	3.92	11.13	7.71	21.77	26.22
L 120 x 40 x 3.2	501.68	319	1.355	33.71	76.79	39.13	46.29	4.96	9.95

Technical data sheet



Drawings as supplied to WEL

Technical data sheet

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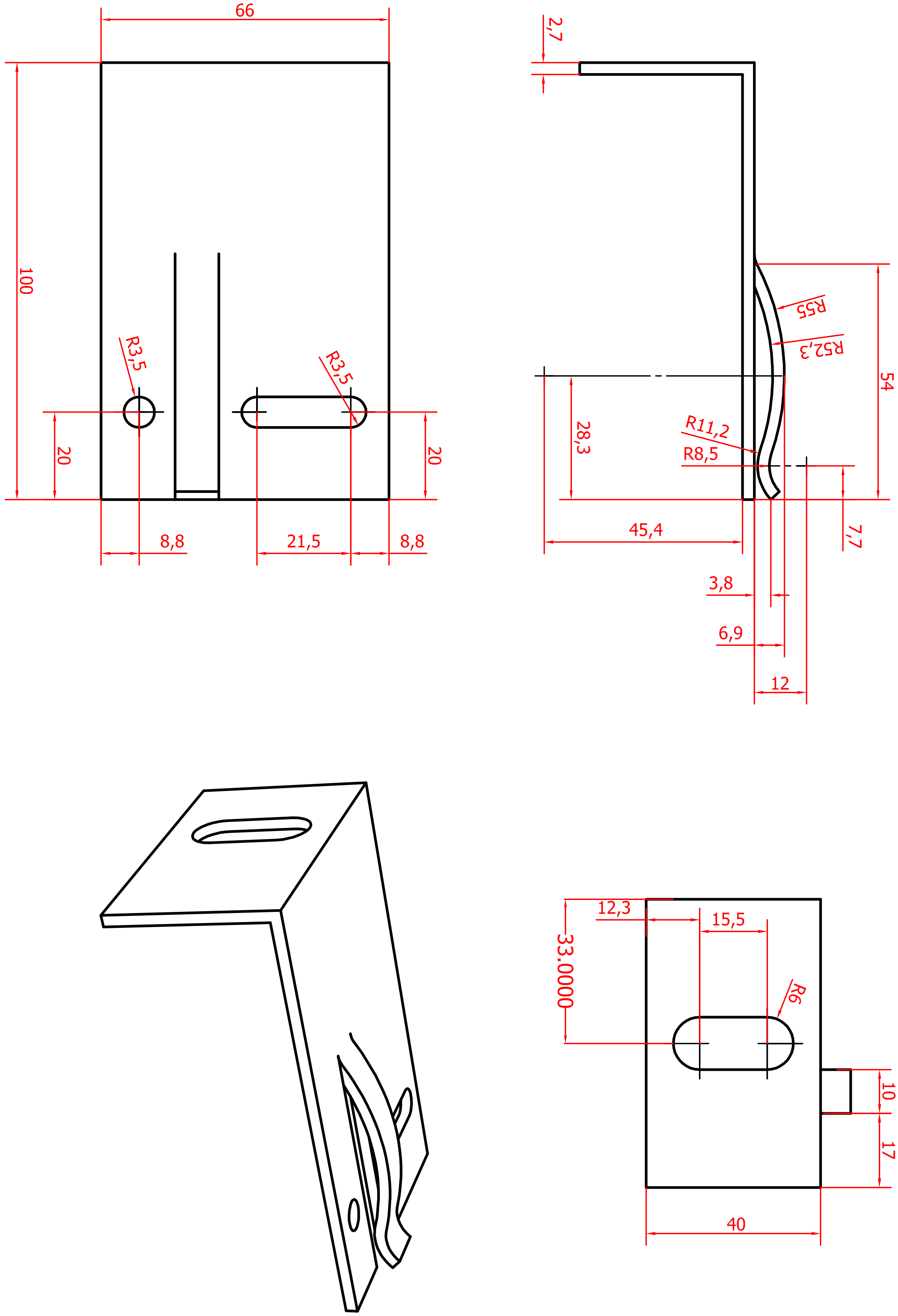
PORCELANOSA Grupo



Drawings as supplied to WEL

WINTECH
BUILDING ENVELOPE TESTING

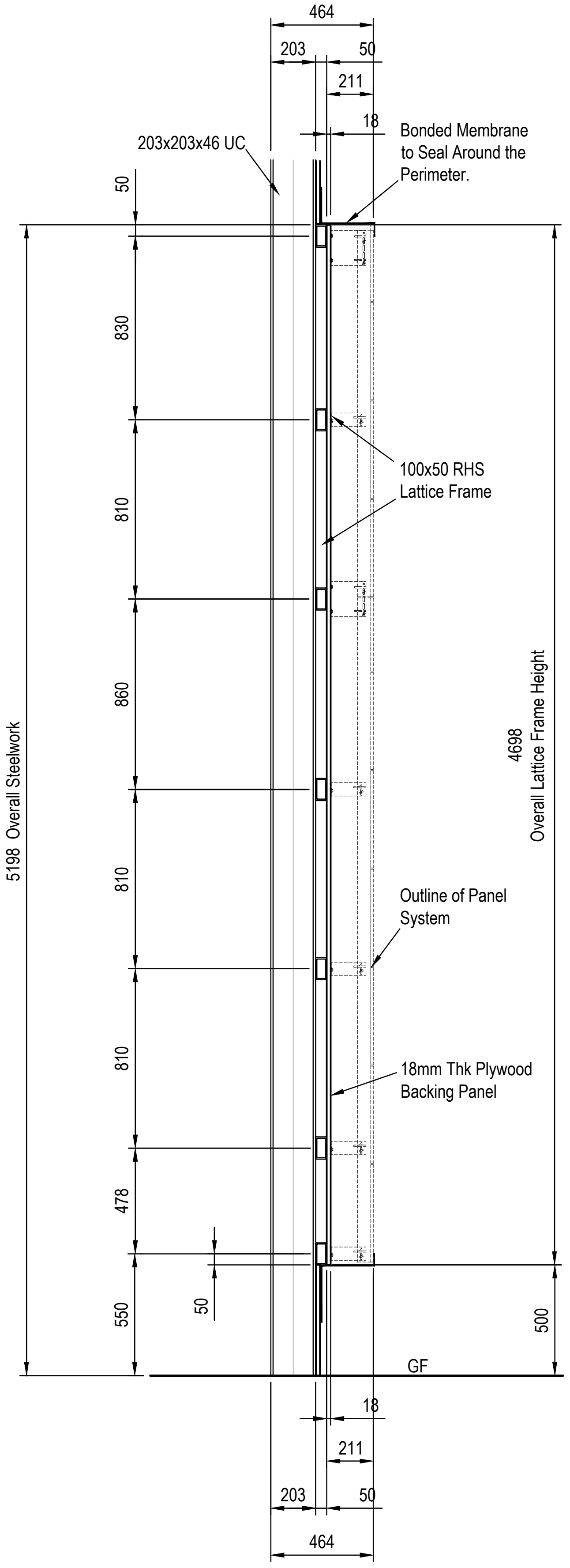
APPENDIX B

Support Steelwork Drawings

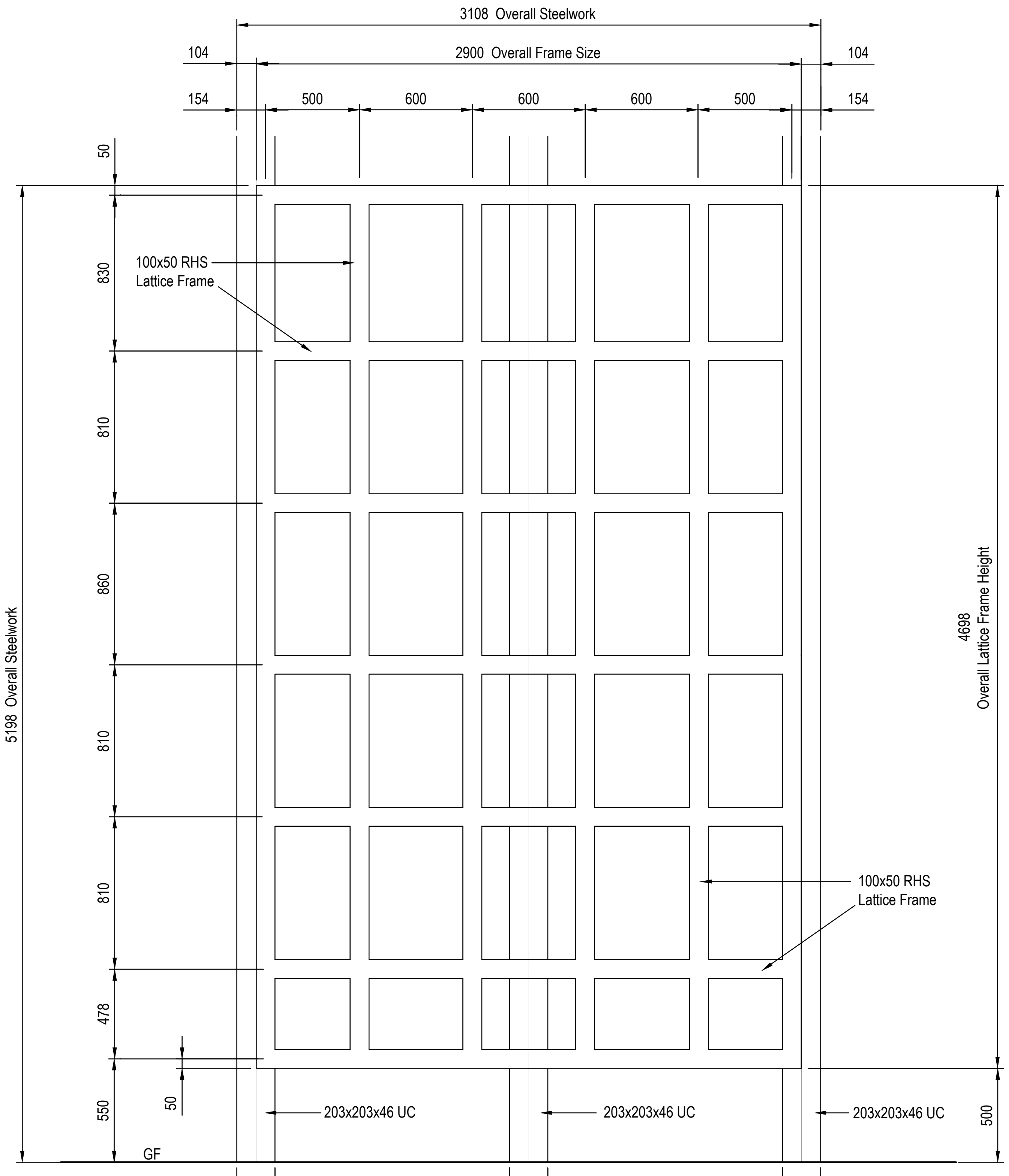
Drawing Number   Drawing Title

(1 drawing on an un-numbered page)

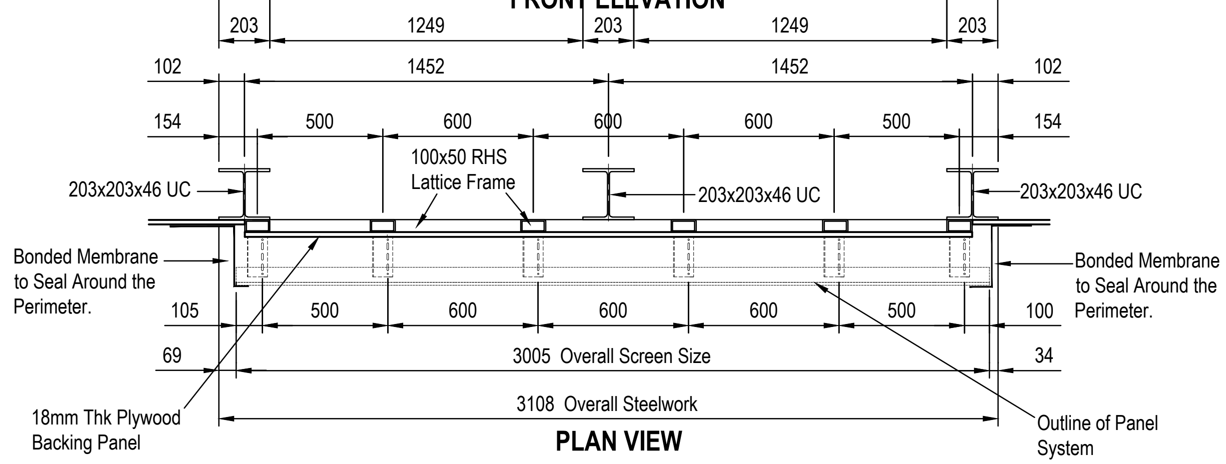
WEL-13-204



CROSS SECTION THROUGH



FRONT ELEVATION



PLAN VIEW

NOTES

1. NO DIMENSIONS ARE TO BE SCALED FROM THIS DRAWING – IF IN DOUBT ASK
2. THIS DRAWING MUST NOT BE ALTERED BY HAND
3. DISCREPANCIES IN SITE DIMENSIONS TO BE REPORTED TO WINTECH.
4. ALL DIMENSIONS IN MILLIMETRES
5. ALL LEVELS IN METRES

Rev	Date	Description	By

WINTECH

WINDOW AND CLADDING
TESTING AND LABORATORY SERVICES

WINTECH ENGINEERING LTD, HALESFIELD 2,
TELFORD, SHROPSHIRE, TF7 4QH.
TEL: 01952 586580 FAX: 01952 586585
E-MAIL ADDRESS: testing@wintech-group.co.uk

Project :	PORCELANOSA - BUTECH SYSTEM		
Main Contractor :	N/A		
Architect :	N/A		
Drawing Title :	STEEL SUPPORT FRAME ASSEMBLY		
Scale :	1:25	Contract No :	12764
Date :	16.04.13	Drawing No :	WEL/12/204
Drawn By :	HGD	Latest Revision No :	-
Checked By :	-		

APPENDIX C

Dismantling

C1. DISMANTLING

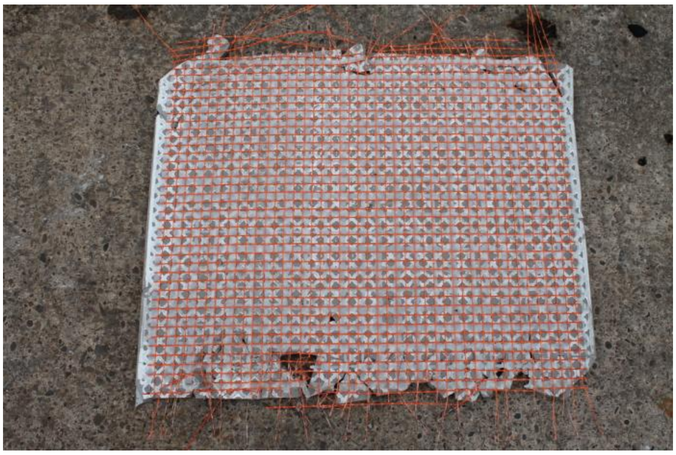
The dismantling was conducted on 15th February 2010 by representatives of Butech, S.A.Porcelanosa Group and was witnessed by D Price of Wintech Engineering Ltd.

When compared against the system drawings provided by Butech, S.A.Porcelanosa Group at the time of dismantle, it was found that…

Dismantling Photograph No. 1

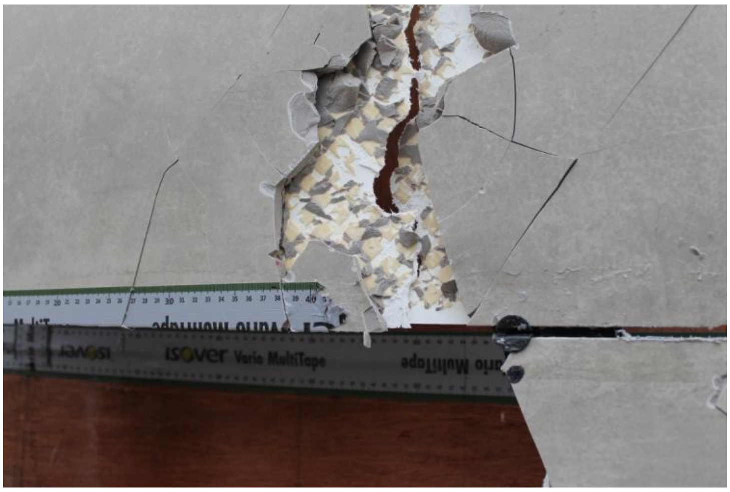
← Sample during dismantle

Dismantling Photograph No. 2



→ Showing mesh on back of tile tested

Dismantling Photograph No. 3

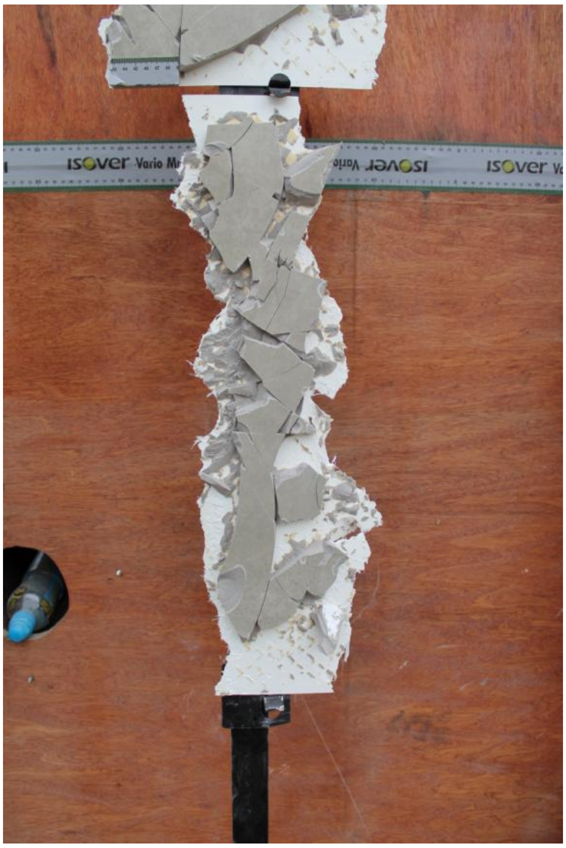


← Showing fibre glass sheet on back of tile tested

Dismantling Photograph No. 4

→ Showing bonding on back of tiles, used on all support rails

Dismantling Photograph No. 5



← Showing tile with fibre glass sheet on support rail due to bonding applied to back of tiles

END OF REPORT