

## **FIRE TEST REPORT EUI-23-B-000614**

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According to BS EN 1363-1:2020 and BS EN 1364-1:2016 +A1:2018

<b>Test</b>	EUI-23-B-000614
<b>Performed on</b>	20 <sup>th</sup> October 2023
<b>Regarding</b>	SHAFT-60-I-B-3X15-GFFC-CBE One Non-loadbearing wall Exposed side: One layer of plasterboard reference Glasroc F FireCase 20mm, (BRITISH GYPSUM) Unexposed side: Triple layer of plasterboard reference Glasroc F FireCase 15mm, (BRITISH GYPSUM)
<b>Sponsor</b>	<b>Hadley Group Technology (A division of Hadley Sections Ltd) Ltd.</b> P.O Box 92 Downing Street B66 2PA Smethwick, West Midlands UNITED KINGDOM



10169

## 1. DOCUMENT TRACKING

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Revision Index.	Modification
0	Original document

## 2. SCOPE OF THIS TEST REPORT

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Fire resistance test regarding an asymmetrical non-loadbearing wall, according to the general requirements of the standard BS EN 1363-1:2020 and to the specific requirements of the standard BS EN 1364-1:2015.

## 3. TEST LABORATORY

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EFFECTIS UK & IRELAND      Shore Road  
Jordanstown  
BT37 0QB County Antrim  
Northern Ireland

## 4. REFERENCE AND MANUFACTURER OF THE TESTED SPECIMEN

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Reference:                      SHAFT-60-I-B-3X15-GFFC-CBE

Manufacturer:                **Hadley Group Technology (A division of Hadley Sections Ltd) Ltd.**  
P.O Box 92  
Downing Street  
B66 2PA Smethwick, West Midlands  
UNITED KINGDOM

## 5. FURTHER INFORMATIONS FOR UKCA/UKNI MARKING (CHAPTER NOT COVERED UNDER THE UKAS'S ACCREDITATION)

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The tested sample has not been subject of a sampling; thus, the results apply to the sample as received.

## 6. DESCRIPTION OF THE TESTED SPECIMEN

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**Technical data in this chapter and drawings from Appendix A concerning the sample and its composition have been supplied by the sponsor who attests their accuracy.**

### 6.1. GENERAL

The sample frame was consisted of six studs, head track, base track. The exposed side of the sample was boarded with one layer of plasterboard, reference Glasroc F FireCase 20mm, (BRITISH GYPSUM) and the unexposed side of the sample was boarded with triple layer of plasterboard reference Glasroc F FireCase 15mm, (BRITISH GYPSUM)

Overall dimensions:

- Element:                      3000 x 3000 x 107mm (w x L x th)
- Clear opening:                3030 x 3000mm (w x L)

See Drawings, Appendix A.

## 6.2. LIST OF THE COMPONENTS

According to the information supplied by the sponsor.

Name	Reference	Characteristics	Material	Supplier
Tracks (on the sides and) and Base Track	Hadley Track	62 x 25 x 0.55mm (depth x flange x gauge) Length: 3000mm	Light Gauge Steel (EN 14195)	HADLEY DRYLINING
I Studs	60mm Hadley I Stud	60 x 38 x 0.9mm (depth x flange x gauge) Length: 3000mm		
Head Track	Hadley Deep Track	62 x 50 x 0.55mm (depth x flange x gauge) Length: 3000mm		
Flat Strap	Hadley Flat Strap	70 x 0.6mm (width x gauge) Length: 2400mm		
Screw (LGS to LGS) (Bracket to LGS)	Sheet & Framing Screws	4.2 x 19mm (Ø x L)	Finish: Zinc Material: Carbon Steel	TIMCO
Concrete Screws (Top and Bottom frame to test rig)	Easydrive Tx Countersunk Concrete Screws	7.5 x 50mm (Ø x L)	Zinc-Plated & Yellow-Passivated	EASYDRIVE
Concrete Screws (Side frame to test rig)		7.5 x 80mm (Ø x L)		
Plasterboard (1 layer on the exposed side)	Glasroc F FireCase 20mm	1200 x 2000 x 20mm ( <i>w x h x th</i> ) Square edge Reaction to fire: Euroclass A1 (declared) Thermal conductivity (W/mK): 0.3	Glass reinforced gypsum board	BRITISH GYPSUM
Bracket (To LGS)	Shaftcore Angle Bracket	22 x 37 x 37mm (L x L x h) Thickness: 1mm	Steel	HADLEY DRYLINING
L Angle	Gypframe GA3 Steel Angle	19 x 32mm Gauge: 0.70mm	Steel	BRITISH GYPSUM
Plasterboard (3No layers on the unexposed side)	Glasroc F FireCase 15mm	1200 x 2400 x 15mm ( <i>w x h x th</i> ) Square edge Reaction to fire: Euroclass A1 (declared) Thermal conductivity (W/mK): 0.3	Glass reinforced gypsum board	
Drywall screw (Plasterboard 1 <sup>st</sup> Layer)	Jack-Point Screws 35mm	Length: 35mm	Zinc plated steel	
Drywall screw (Plasterboard 2 <sup>nd</sup> Layer)	Jack-Point Screws 41mm	Length: 41mm		
Drywall screw (Plasterboard 3 <sup>rd</sup> Layer)	Jack-Point Screws 60mm	Length: 60mm		
Sealant	Gyproc Sealant	600ml foil sausage	Acrylic	
Joint Filler	Gyproc Joint Filler	12,5kg bag	Gypsum-based	
Joint Tape	Gyproc Joint Tape	Width: 50mm	Paper Tape	

*Th = Thickness --- d = Density w = width --- h = height --- th = Thickness --- Ø = diameter --- L=Length*

### **6.3. DETAILED DESCRIPTION OF THE SPECIMEN**

The drawing in the Appendix A have been supplied by the Sponsor, checked by the test laboratory EFECTIS, and are in conformity with the tested specimen.

#### **6.3.1. Sample frame.**

The sample frame consisted of six LGS studs: Two tracks reference Hadley Track (HADLEY DRYLINING), 62 x 25mm (depth x flange) at the sides and four 'I' studs' reference 60mm Hadley 'I' Stud (HADLEY DRYLINING). These studs were placed at 600 centres and fixed on a head track reference Hadley Deep Track, 62 x 50mm (depth x flange) and base track reference Hadley Track, 62 x 25mm (depth x flange), by one screw reference Sheet & Framing Screws, 4.2 x 19mm (Ø x L), (TIMCO) per junction. The fire side flange of the tracks at the sides were inside the base track and the non-fire side of the tracks at the sides was outside the base track. Two continuous beads of Sealant reference Gyproc Sealant (BRITISH GYPSUM) were applied under head and base tracks.

The framing system was fixed to the frame with Concrete Screws, reference Easydrive Tx Countersunk Concrete Screws (EASYDRIVE), with 7.5 x 50mm (Ø x L) for top and bottom frame to test rig and 7.5 x 80mm (Ø x L) for side frame to test rig, all at 600mm centres on all sides except for the free edge which was left unrestrained.

See Drawings 1, 2 and 6, Appendix A for the sample frame.

#### **6.3.2. Exposed side**

The exposed side was boarded with one layer of plasterboard, reference Glasroc F FireCase 20mm (BRITISH GYPSUM). The boards were fixed with brackets reference Shaftcore Angle Bracket (HADLEY DRYLINING) with 2No screws reference Sheet & Framing Screws, 4.2 x 19mm (Ø x L), (TIMCO) per junction on the web of the studs at 600m centres. A steel 'L' angle, reference Gyprframe GA3 Steel Angle (BRITISH GYPSUM), 19mm depth x 32mm length, was put between the horizontal joints with sealant, reference Gyproc Sealant (BRITISH GYPSUM), on the top of the angle. From the fire side, horizontal joints were covered with 150mm height plasterboard, reference Glasroc F FireCase 20mm (BRITISH GYPSUM) with sealant, reference Gyproc Sealant (BRITISH GYPSUM), applied on the top and bottom board of the board and screwed with Jack-Point Screws 35mm (BRITISH GYPSUM) one on the right and one on the left side of the board.

See Drawing 6, Appendix A for the boarding layout.

#### **6.3.3. Unexposed side**

A flat strap (HADLEY DRYLINING), 70mm wide, on the unexposed side of the frame behind the first layer of horizontal joint was fixed by 2No screws, reference Sheet & Framing Screws, 4.2 x 19mm (Ø x L), (TIMCO) per junction. The unexposed side was boarded with triple layer of plasterboard, reference Glasroc F FireCase 15mm (BRITISH GYPSUM). Flat straps (HADLEY DRYLINING), 70mm wide, behind the horizontal joint behind the second layer of plasterboard and behind the third layer of plasterboard were placed using the plasterboard screws. The first layer of the plasterboard was fixed to the frame using screws reference Jack-Point Screws 35mm (BRITISH GYPSUM) at 300mm centres along the stud lines and in perimeter and second layer of the plasterboard was fixed to the frame using screw reference Jack-Point Screws 41mm (BRITISH GYPSUM) at 300mm centres along the stud lines and in perimeter and third layer of the plasterboard was fixed to the frame using screw reference Jack-Point Screws 60mm (BRITISH GYPSUM) at 300mm centres along the stud lines and in perimeter.

See Drawing 3, 4 and 5, Appendix A for the boarding layouts.

#### **6.3.4. Insulation between studs**

No insulation between the studs.

#### 6.3.5. Finishing

Only the unexposed side of the wall was finished by applying a layer of jointing tape reference Gyproc Joint Tape (BRITISH GYPSUM), and jointing compound reference Gyproc Joint Filler (BRITISH GYPSUM) over the joints of the plasterboards. The heads of the screws of plasterboard were covered with jointing compound.

#### 6.3.6. Additional equipment

No additional equipment was used.

### 6.4. VERIFICATION

The tested element has been collected as described in chapter 6. of this report.

## 7. TEST ASSEMBLY

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### 7.1 DEFINITION OF THE TESTED SPECIMEN

The choice and the definition of this test specimen have been carried out by the sponsor.

### 7.2 ASSEMBLY OF THE TESTED SPECIMEN

#### 7.2.1 Supporting construction

The tested specimen has been assembled within a reinforced concrete frame supplied by EFECTIS. The gap between the vertical free edge and the test frame were filled by high-density stone mineral wool to provide a seal without restricting freedom of movement.

- Drying duration: more than 28 days.
- Thickness of the frame: 320 mm.
- Opening in the frame: 3030 mm x 3000 mm (w x h).

##### 7.1.1. Restraint/Free edge

One of the vertical edges of the specimen was left unrestrained by packing the gaps between the testing frame and the sample with high-density stone mineral wool, to provide a seal without restricting freedom of movement. The remaining vertical edge and both horizontal edges of the sample were fixed to the testing frame as detailed in section 6.3.

#### 7.2.2 Staff

The supporting construction has been supplied and installed on the furnace by the staff of the test laboratory. The staff of the sponsor did the assembly of the sample.

## 8. TEST METHOD

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### 8.1. PRELIMINARY CONDITIONING

The specimen was conditioned inside the test laboratory, in conformity with the statement in paragraph 8.1 of the BS EN 1363-1:2020, the weight stability was therefore estimated to be reached on the day of the test.

### 8.2. THERMAL PROGRAM

The temperature rise inside the furnace above the ambient temperature has been controlled according to the **standard thermal program** represented by the following function:

$$T = 345 \log_{10} (8t + 1) + 20$$

where :

$t$  = Time (min)

$T$  = Furnace temperature at time  $t$  (°C)

### 8.3. PRESSURE

In conformity with the requirements of the standard BS EN 1363-1:2020, the pressure inside the furnace was continuously controlled throughout the whole test.

Taking into account the dimensions of the specimen and the location of the pressure sensor, the prescribed value was established at 15.7 Pa, equating to a pressure of 20 Pa at the head of the sample.

### 8.4. FIRE SIDE

The fire test was performed with the following fire side:

For the specimen: Fire on 1No layer of plasterboard, reference Glasroc F FireCase 20mm, (BRITISH GYPSUM)

## 9. MEASUREMENTS DURING THE FIRE TEST AND TEST RESULTS

This section provides the details of the sensors used during the fire test. The locations of the sensors are shown in Appendix B. The graphic measurements are shown in Appendix C.

### 9.1. TEMPERATURE MEASUREMENTS.

#### 9.1.1. Ambient temperature in the laboratory

The ambient temperature was measured according to the requirements of the standard BS EN 1363-1:2020. See Chart 1, Appendix C for the measurements recorded during the test.

#### 9.1.2. Ambient temperature in the furnace

It was measured in conformity with the standard BS EN 1363-1:2020 by 6 plate thermocouples in the furnace, with the metal plate facing towards the back of the furnace. See Chart 2, Appendix C for the measurements recorded during the test.

#### 9.1.3. Temperatures of the specimen

The temperatures were measured by 19 external thermocouples according to the requirements of the standard BS EN 1363-1:2020 and located according to the standard BS EN 1364-1:2015, and by 6 internal thermocouples, as requested by the test Sponsor for additional data gathering.

See Figures 1, Appendix B for the plot of the instrumentation, and Charts 5 to 6, Appendix C for the measurements recorded during the test.

The internal thermocouples were installed in central studs, at mid-height of the sample. Both studs have three thermocouples; one on the exposed flange, one on the web and one on the unexposed flange. See Drawing 6 Appendix A for the plot of the instrumentation, and Charts 8, Appendix C for the measurements recorded during the test.

<b>Location</b>	<b>Markings</b>	<b>Appendix</b>
On the centre of each quarter section	1, 2, 4, 5	B
On the geometric centre of the specimen	3	
At the top of the specimen adjacent to joint	6, 9	
At the top of the specimen in line with a stud	7, 10	
At the top of the specimen, at mid-width	8	
In the intersection between a horizontal joint and vertical joint	11, 13	
At mid width, adjacent to a horizontal joint	12	
At mid-height, adjacent to the fixed vertical edge	14	
At mid-height, adjacent to a vertical joint	15, 17	
At mid-height, in line with a stud	16, 18	
At mid-height, 150 mm in from the free vertical edge	19	
<b>Internal Thermocouple</b>	<b>Markings</b>	<b>Appendix</b>
On the inside of the exposed flange on stud 3, as viewed from the unexposed side on Drawing 6	1	A
On the web of the flange on stud 3, as viewed from the unexposed side on Drawing 6	2	
On the inside of the unexposed flange on stud 3, as viewed from the unexposed side on Drawing 6	3	
On the inside of the exposed flange on stud 4, as viewed from the unexposed side on Drawing 6	4	
On the web of the flange on stud 4, as viewed from the unexposed side on Drawing 6	5	
On the inside of the unexposed flange on stud 4, as viewed from the unexposed side on Drawing 6	6	



**9.2. PRESSURE MEASUREMENTS**

In conformity with the requirements of the standard BS EN 1363-1:2020, the pressure inside the furnace was continuously controlled throughout the whole test, according to the conditions described in section 8.3 of this document.

See Chart 4, Appendix C for the measurements recorded during the test.

**9.3. DEFLECTION MEASUREMENTS**

In conformity with the requirements of the standard BS EN 1363-1:2020 and BS EN 1364-1:2015, the deflection located in the horizontal orientation was measured and recorded throughout the test.

The deflection was measured using calibrated wire type displacement gauges and recorded via a data acquisition system. The horizontal deflection was measured at the geometric centre of the sample and at mid-height at ¼ width, from the left and right sides, and at mid-width at ¼ height from the top and bottom.

<i>Location</i>	<i>Markings</i>	<i>Appendix</i>
Mid-width, at ¾ height	1	B
Mid-height, at 750mm from edges	2 (left), 4 (right)	
Centre of the sample	3	
Mid-width, at ¼ height	5	

See Appendix B: Instrumentation for the plot of the instrumentation and Chart 7, Appendix C for the measurements recorded during the test.

## 10. OBSERVATIONS

### 10.1. BEFORE THE TEST

- Ambient temperature inside the laboratory : 15.5 °C.
- Specimen temperature before the test : 17.4 °C.

### 10.2. DURING THE TEST

<i>Time (min)</i>	<i>Specimen</i>	<i>Observations</i>
<b>00</b>	<b>ES/NES</b>	<b>Start of the test</b>
05	NES	No Significant Change (NSC)
09	ES	Paper on the outside of the core board is burning
15	NES	NSC
30	NES	NSC
31	ES	Metal studs are darkening
45	NES	NSC
52	ES	Gaps between the horizontal joints on the top are widening
60	NES	NSC
75	NES	NSC
78	ES	Gaps between the horizontal joints on the bottom are widening
90	NES	NSC
100	ES	Gaps between the horizontal joints on the top are widening more. Fire side flanges of central studs are buckling around top
105	ES	NSC
120	NES	NSC
124	ES	Gaps between the horizontal joints on the top are around 20mm. Fire side flanges of central studs are buckling towards mid-height
<b>132</b>	<b>E/NES</b>	<b>End of the test on the request of the sponsor</b>

ES = Exposed side --- NES = Non-exposed side --- NSC = No Significant Change --- TC: Thermocouple

### 10.3. AFTER THE TEST AND COOL DOWN

All boards are in place.

See Photo 14, Appendix D.

## 11. FIRE RESISTANCE CRITERIA

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In conformity with the standards mentioned in chapter 1, the times during which the specimen meets the fire resistance criteria may be regarded as follows:

### 11.1. FIRE INTEGRITY

#### 11.1.1. Cotton wool pad

Duration: ONE HUNDRED THIRTY-TWO MINUTES (132 min)  
Cause of limitation: No failure - End of the test on request of the sponsor

#### 11.1.2. Gap gauges

Duration: ONE HUNDRED THIRTY-TWO MINUTES (132 min)  
Cause of limitation: No failure - End of the test on request of the sponsor

#### 11.1.3. Sustained flaming

Duration: ONE HUNDRED THIRTY-TWO MINUTES (132 min)  
Cause of limitation: No failure - End of the test on request of the sponsor

### 11.2. THERMAL INSULATION

#### 11.2.1. Thermal insulation

Duration: ONE HUNDRED THIRTY-TWO MINUTES (132 min)  
Cause of limitation: No failure - End of the test on request of the sponsor

## 12. FIELD OF DIRECT APPLICATION OF THE TEST RESULTS

The direct application field of the test results is limited to the determination of the permissible modifications of the test specimen following a successful fire resistance test. These modifications may be automatically introduced without the sponsor having to apply for any additional assessment, calculation, or agreement.

**Note:** When extended prescriptions concerning the dimensions of the element are considered, lower dimensions than the actual dimensions may be used for some elements of the test specimen in order to maximize the extrapolation of the test results by modelling the interaction between the elements at the same scale.

As the laboratory was not responsible for the sampling stage, thus the test results only apply to the tested specimen.

### 12.1. GENERAL

The results of the fire test are directly applicable to similar constructions where one or more of the changes listed below are made and the construction continues to comply with the appropriate design code for its stiffness and stability, except with respect to the construction types covered in Annex A and Annex B of BS EN 1364-1:2015 where specific direct field of application rules are given.

- a) decrease in height;
- b) increase in the thickness of the wall;
- c) increase in the thickness of component materials;
- d) decrease in linear dimensions of boards or panels but not thickness;
- e) decrease in stud spacing
- f) decrease in distance of fixing centres;
- g) increase in the number of horizontal joints, of the type tested when tested with one joint not more than  $(500\pm 150)$  mm from the top edge
- h) increase in the number of vertical joints, of the type tested;
- ~~i) the use of installations such as electrical sockets, switches, etc. when tested as illustrated in Figures 9, 10 and 11 of BS EN 1364-1:2015 with the installations not more than 500 mm from the top edge – not applicable~~
- j) horizontal and/or vertical joints, of the type tested.

### 12.2. EXTENSION OF WIDTH

For test specimens tested without a supporting construction, the width of an identical construction may be increased if the specimen was tested at a minimum of nominally 3 m wide with one vertical edge without restraint.

~~For test specimens tested with a supporting construction, the width of an identical construction may be increased if the specimen was tested at a minimum of nominally 2,8 m wide with one vertical edge without restraint. – not applicable.~~

~~In case of EW classification, an increase in width of an identical construction is only allowed when the average unexposed surface temperature of any discrete area of the test specimen remains below 300 °C or the measured radiation remains below 6 kW/m<sup>2</sup>. In any other case, no increase in width is allowed. – not applicable.~~

### 12.3. EXTENSION OF HEIGHT

The height of the construction may be increased by 1,0 m under the following conditions:

- a) minimum tested height is 3 m when tested without a supporting construction or 2,8 m when tested with a supporting construction
- b) the maximum deflection of the test specimen was not in excess of 100 mm
- c) the expansion allowances are increased pro-rata

~~In case of EW classification, an increase in height of an identical construction is only allowed when the average unexposed surface temperature of any discrete area of the test specimen remains below 300 °C or the measured radiation remains below 6 kW/m<sup>2</sup>. In any other case, no increase in height is allowed not applicable.~~

#### ~~Supporting constructions – not applicable~~

~~The following rules for the field of application apply.~~

~~Standard supporting constructions – not applicable.~~

- ~~a) For specimens tested in the test frame without any supporting construction, the result is applicable to high density rigid supporting constructions with at least the same fire resistance as the test specimen.~~
- ~~b) For specimens tested with any standard supporting construction as defined in EN 1363-1, the result is applicable to any other supporting construction of the same type (flexible or rigid) that has the same or a greater classified fire resistance (thicker, denser, more layers of boards, as appropriate) than the one used in the test and the same horizontal and/or vertical orientation, i.e.:~~
  - ~~• only vertical if the specimen was tested with the standard supporting construction fixed along the vertical edge;~~
  - ~~• only horizontal if the specimen was tested with the standard supporting construction fixed along the horizontal edge;~~
  - ~~• both if the specimen was tested with the standard supporting construction fixed along both the horizontal and the vertical edge.~~

#### ~~Non-standard supporting constructions – not applicable~~

~~The result of a test on a non-loadbearing wall tested in a non-standard supporting construction is only applicable to that construction.~~

### 13. STATEMENT

"This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in EN 1363-1, and where appropriate EN 1363-2. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report."

"Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result".

22nd April 2024

SIGNED

APPROVED

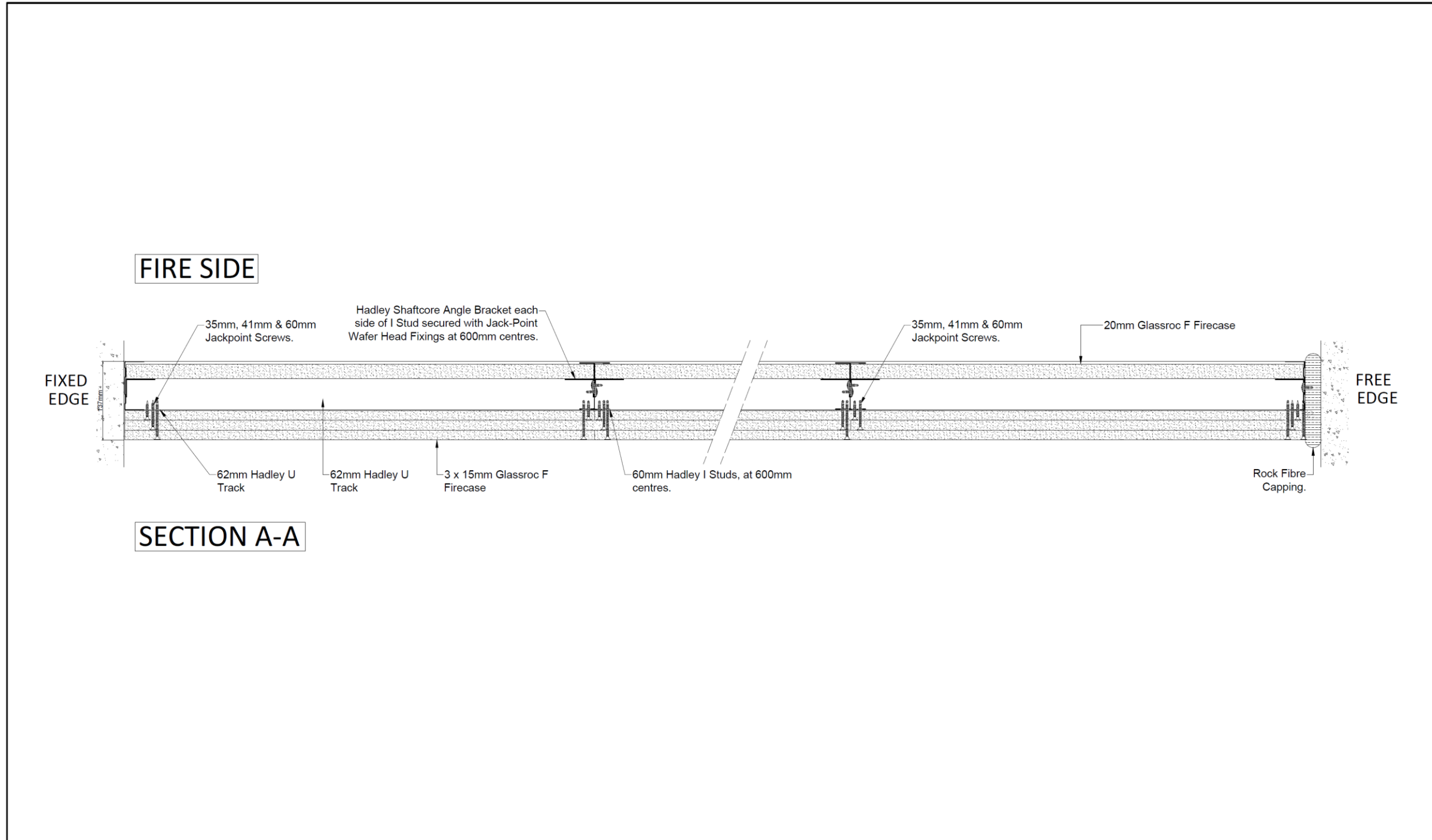



Yunus Ustundag  
Project leader



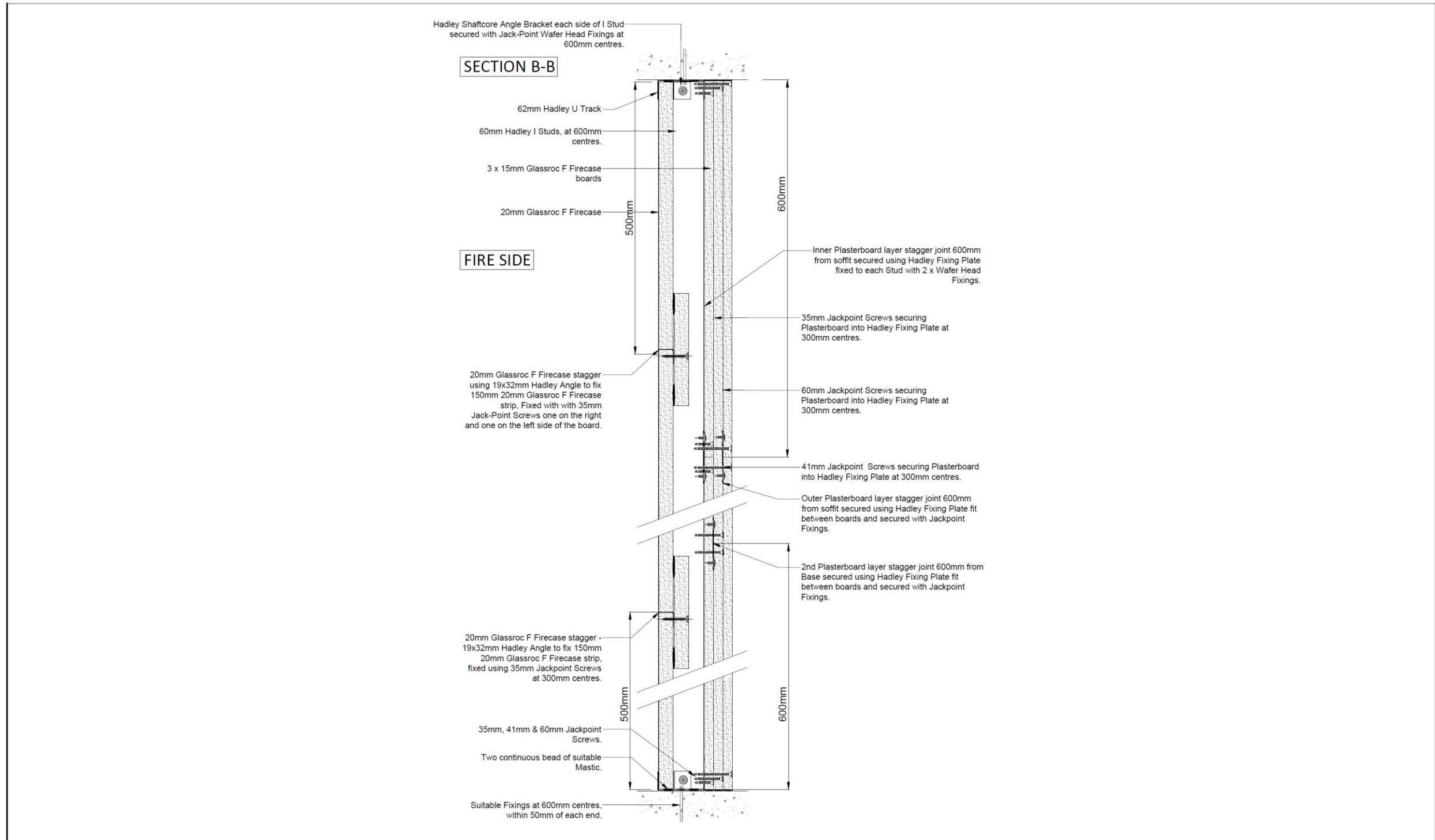
Maurice McKee  
Lab Manager


APPENDIX A: DRAWINGS



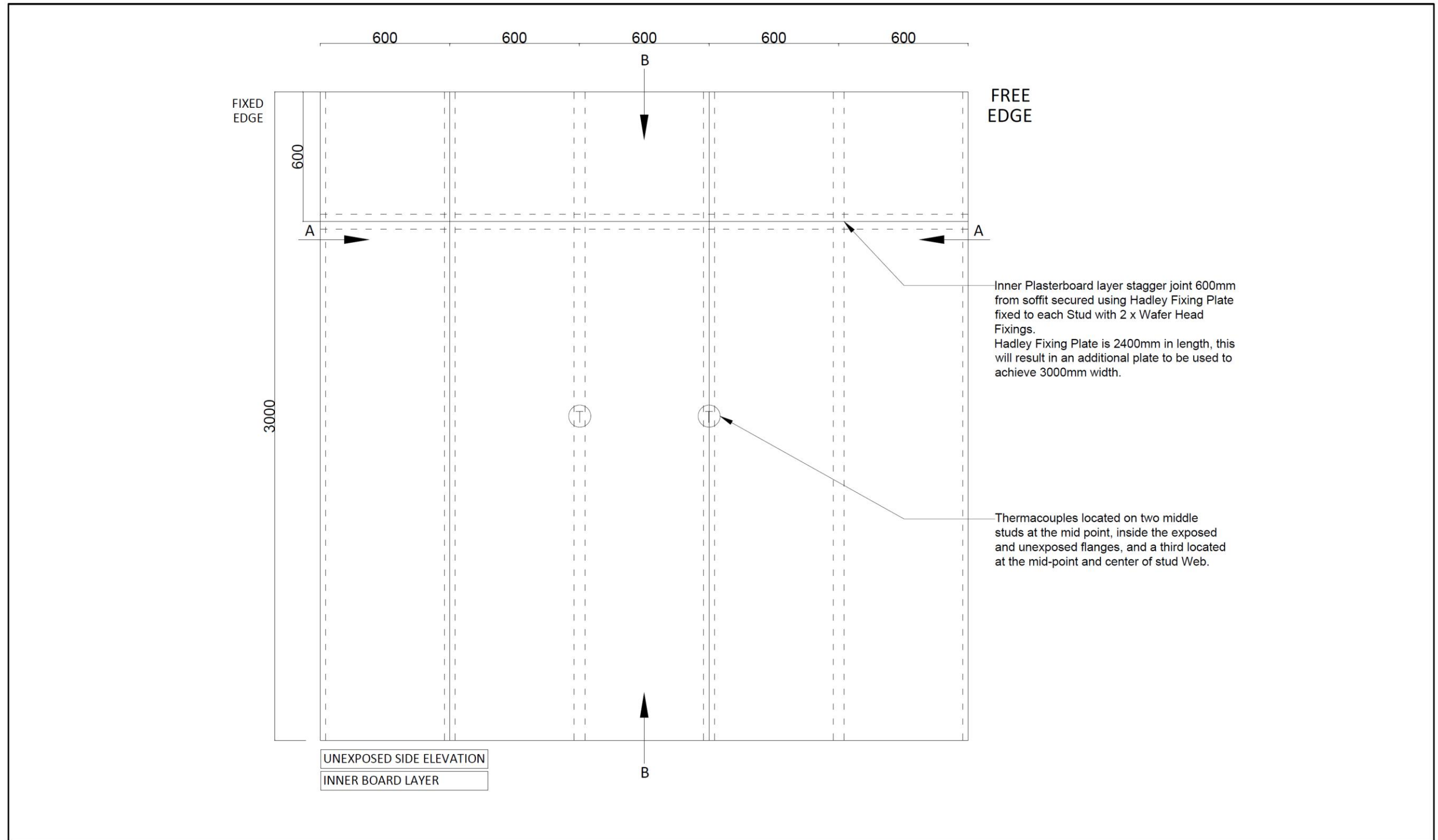
TITLE: HORIZONTAL CROSS SECTIONS (SECTION A-A)	DWG_NUMBER: SHAFT-60-I-B-3X15-GFFC-CBE-01		HADLEY GROUP	
SYSTEM: 3 x 15mm BRITISH GYPSUM GLASSROC F FIRECASE BOARDS ONE SIDE, 20MM GLASSROC F FIRECASE OTHER SIDE WITH 60MM HADLEY I STUDS - SHAFTWALL SYSTEM	TEST_REF: EUI-23-000614		TEST_DATE: 20/10/23	PHONE: +44 (0) 121 555 1300 EMAIL: drylining.technical@hadleygroup.com
	DATE: 20/06/2023		DRN: FM	SCALE: NTS


Drawing 1 – Horizontal Cross Section



TITLE: VERTICAL CROSS SECTIONS (SECTION B-B)	DWG_NUMBER: SHAFT-60-I-B-3X15-GFFC-CBE-02				<b>HADLEY GROUP</b> PHONE: +44 (0) 121 555 1300 EMAIL: drylining.technical@hadleygroup.com
SYSTEM: 3 x 15mm BRITISH GYPSUM GLASSROC F FIRECASE BOARDS ONE SIDE, 20MM GLASSROC F FIRECASE OTHER SIDE WITH 60MM HADLEY I STUDS - SHAFTWALL SYSTEM	TEST_REF: EUI-23-000614	TEST_DATE: 20/10/23			
	DATE: 20/06/2023	DRN: FM	SCALE: NTS		

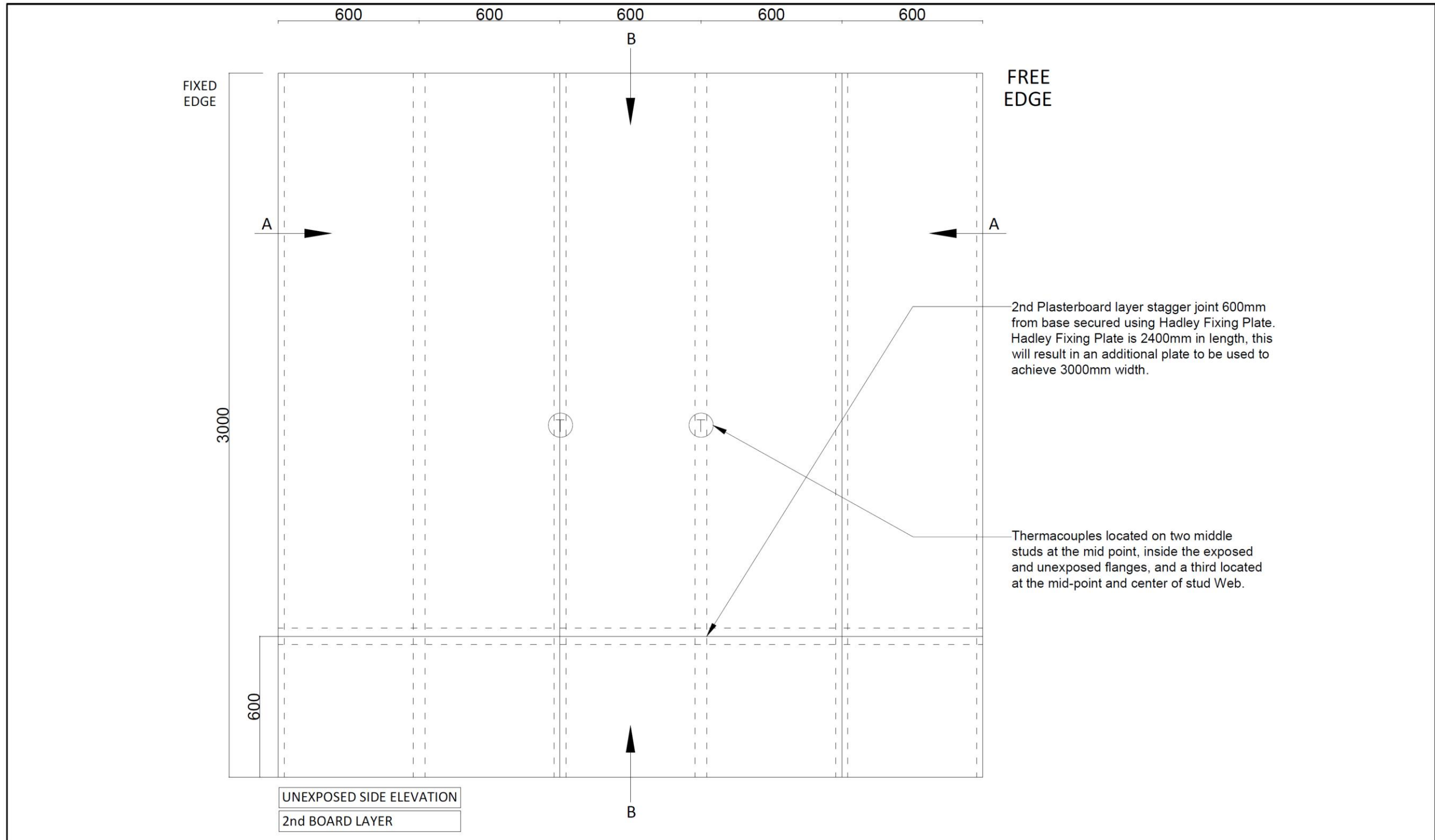
Drawing 2 – Vertical Cross Section



TITLE: UNEXPOSED SIDE ELEVATION - INNER BOARD LAYER	DWG_NUMBER: SHAFT-60-I-B-3X15-GFFC-CBE-03				<b>HADLEY GROUP</b> PHONE: +44 (0) 121 555 1300 EMAIL: drylining.technical@hadleygroup.com
	SYSTEM: 3 x 15mm BRITISH GYPSUM GLASSROC F FIRECASE BOARDS ONE SIDE, 20MM GLASSROC F FIRECASE OTHER SIDE WITH 60MM HADLEY I STUDS - SHAFTWALL SYSTEM	TEST_REF: EUI-23-000614	TEST_DATE: 20/10/23		

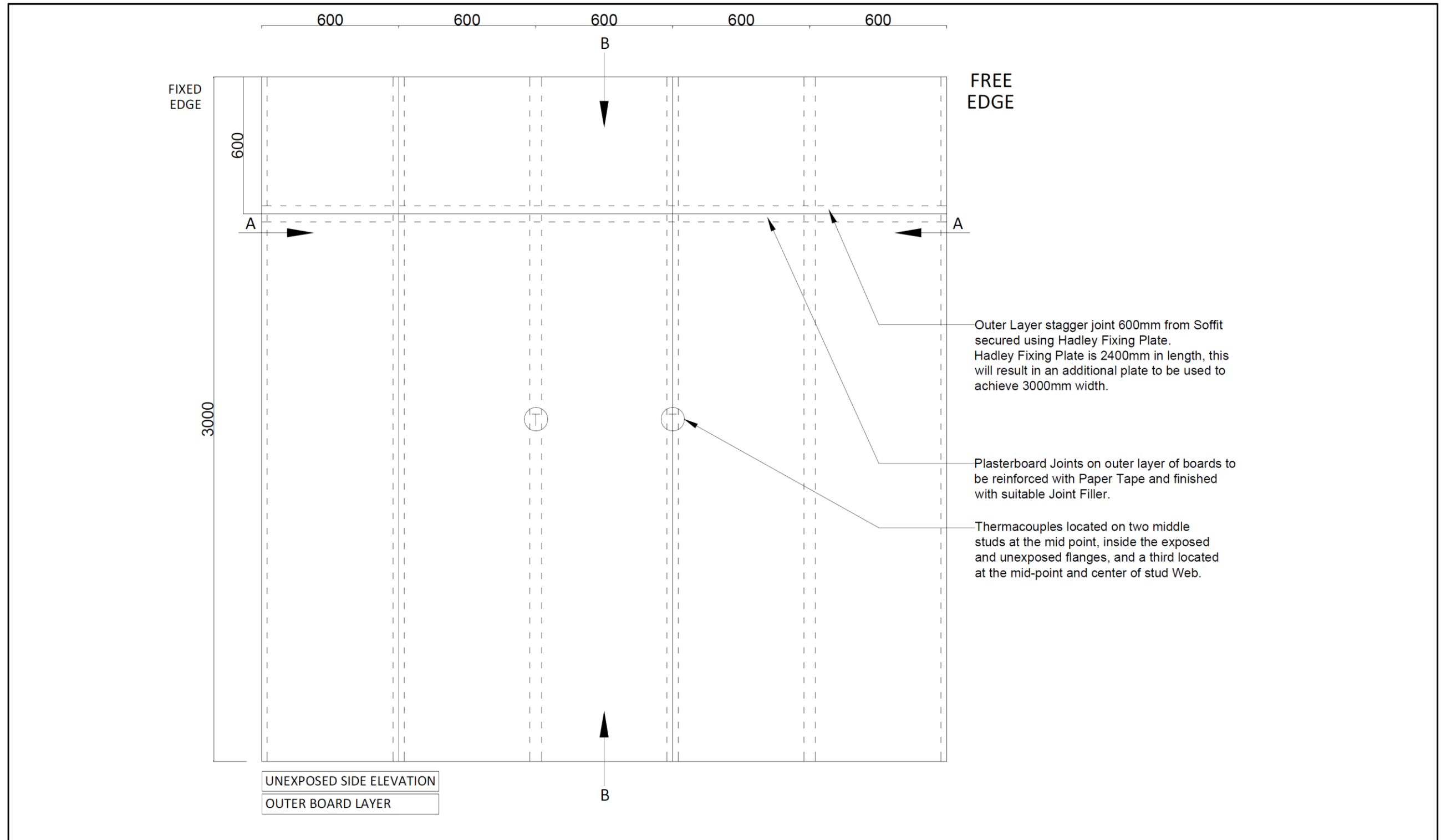
Drawing 3 – Unexposed Side Elevation – Inner layer






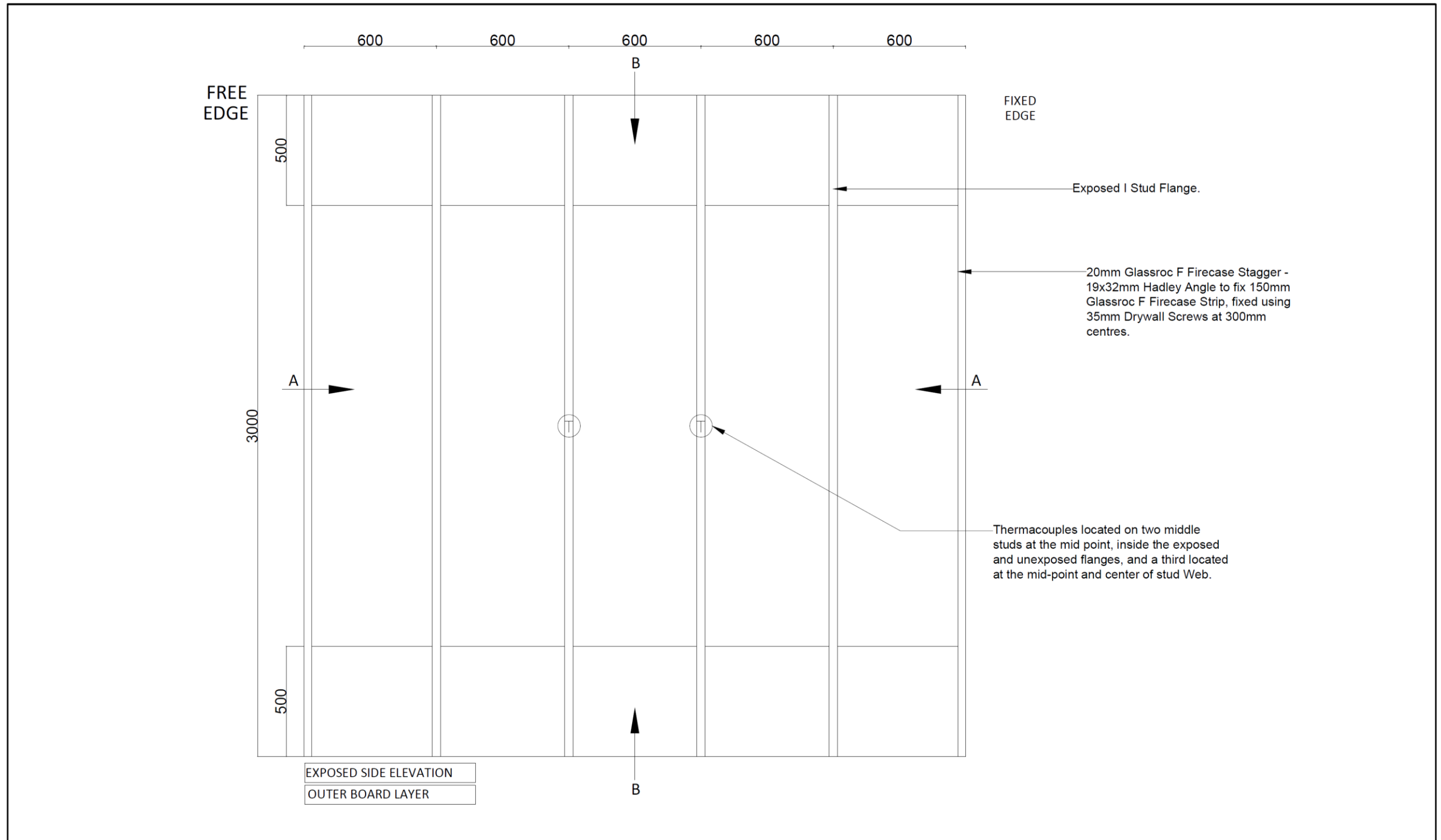
<b>TITLE:</b> UNEXPOSED SIDE ELEVATION - 2ND BOARD LAYER		<b>DWG_NUMBER:</b> SHAFT-60-I-B-3X15-GFFC-CBE-04			<b>HADLEY GROUP</b>  PHONE: +44 (0) 121 555 1300 EMAIL: drylining.technical@hadleygroup.com
<b>SYSTEM:</b> 3 x 15mm BRITISH GYPSUM GLASSROC F FIRECASE BOARDS ONE SIDE, 20MM GLASSROC F FIRECASE OTHER SIDE WITH 60MM HADLEY I STUDS - SHAFTWALL SYSTEM		<b>TEST_REF:</b> EUI-23-000614	<b>TEST_DATE:</b> 20/10/23		
<b>DATE:</b> 20/06/2023	<b>DRN:</b> FM	<b>SCALE:</b> NTS			


Drawing 4 – Unexposed Side Elevation – 2<sup>nd</sup> Board Layer



TITLE: UNEXPOSED SIDE ELEVATION - OUTER BOARD LAYER		DWG_NUMBER: SHAFT-60-I-B-3X15-GFFC-CBE-05			<b>HADLEY GROUP</b> PHONE: +44 (0) 121 555 1300 EMAIL: drylining.technical@hadleygroup.com
SYSTEM: 3 x 15mm BRITISH GYPSUM GLASSROC F FIRECASE BOARDS ONE SIDE, 20MM GLASSROC F FIRECASE OTHER SIDE WITH 60MM HADLEY I STUDS - SHAFTWALL SYSTEM		TEST_REF: EUI-23-000614	TEST_DATE: 20/10/23		
DATE: 20/06/2023	DRN: FM	SCALE: NTS			

Drawing 5 – Unexposed Side Elevation – Outer Board Layer



TITLE: EXPOSED SIDE ELEVATION - OUTER BOARD LAYER	DWG_NUMBER: SHAFT-60-I-B-3X15-GFFC-CBE-06			<b>HADLEY GROUP</b> PHONE: +44 (0) 121 555 1300 EMAIL: drylining.technical@hadleygroup.com
SYSTEM: 3 x 15mm BRITISH GYPSUM GLASSROC F FIRECASE BOARDS ONE SIDE, 20MM GLASSROC F FIRECASE OTHER SIDE WITH 60MM HADLEY I STUDS - SHAFTWALL SYSTEM	TEST_REF: EUI-23-000614	TEST_DATE: 20/10/23		
	DATE: 20/06/2023	DRN: FM		

Drawing 6 – Exposed Side Elevation – Board Layer

**APPENDIX B: INSTRUMENTATION**

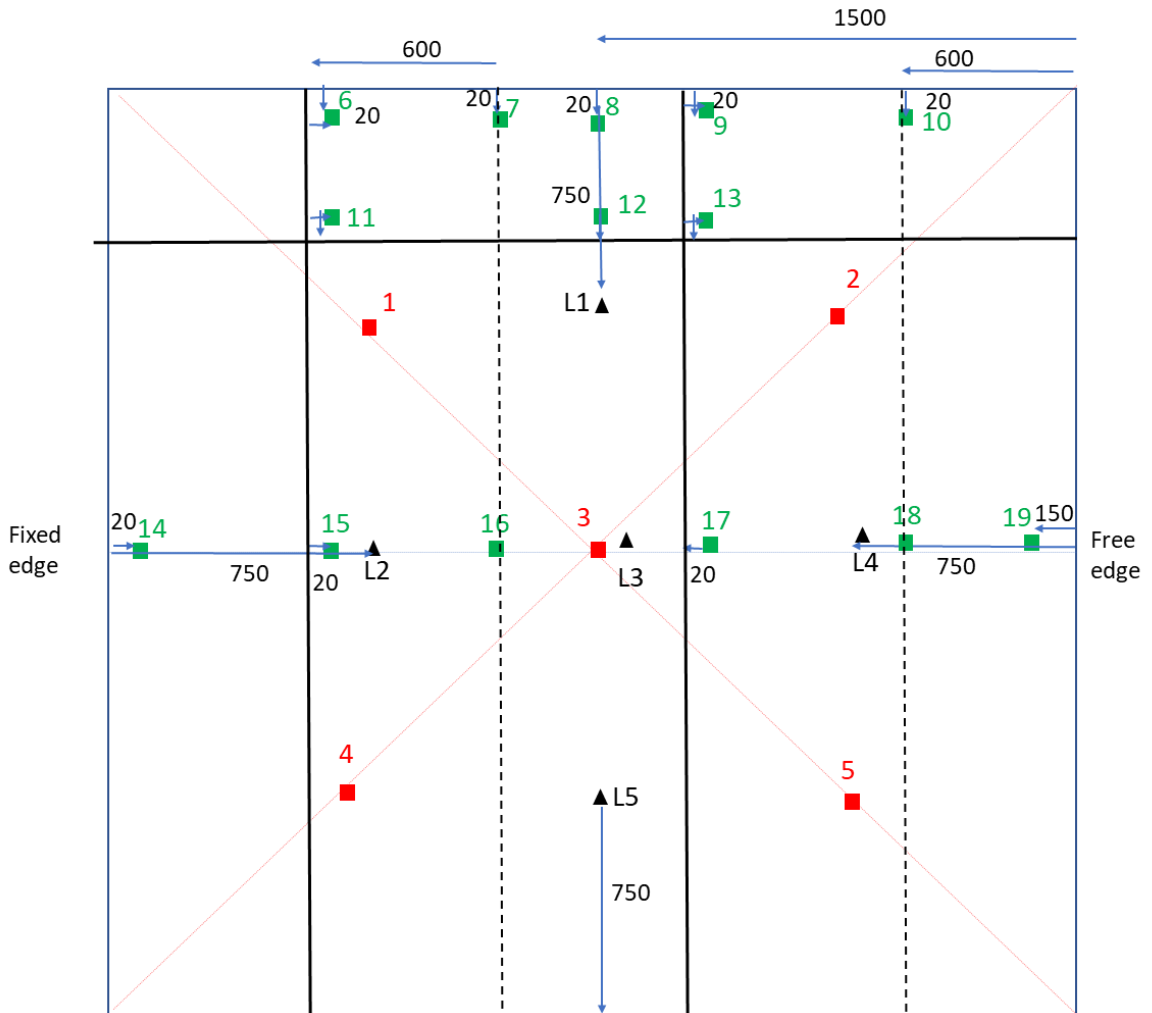


Figure 1 - Plot of the external instrumentation (as viewed from the unexposed side)

- Thermocouples for average/maximum temperature rise (at least 50 mm from hotspots)
- Thermocouples for maximum temperature rise (at least 20 mm from hotspots)
- ▲ LVDTs for horizontal deflection

**All distance in mm. Drawing not to scale.**

**APPENDIX C: CHARTS**

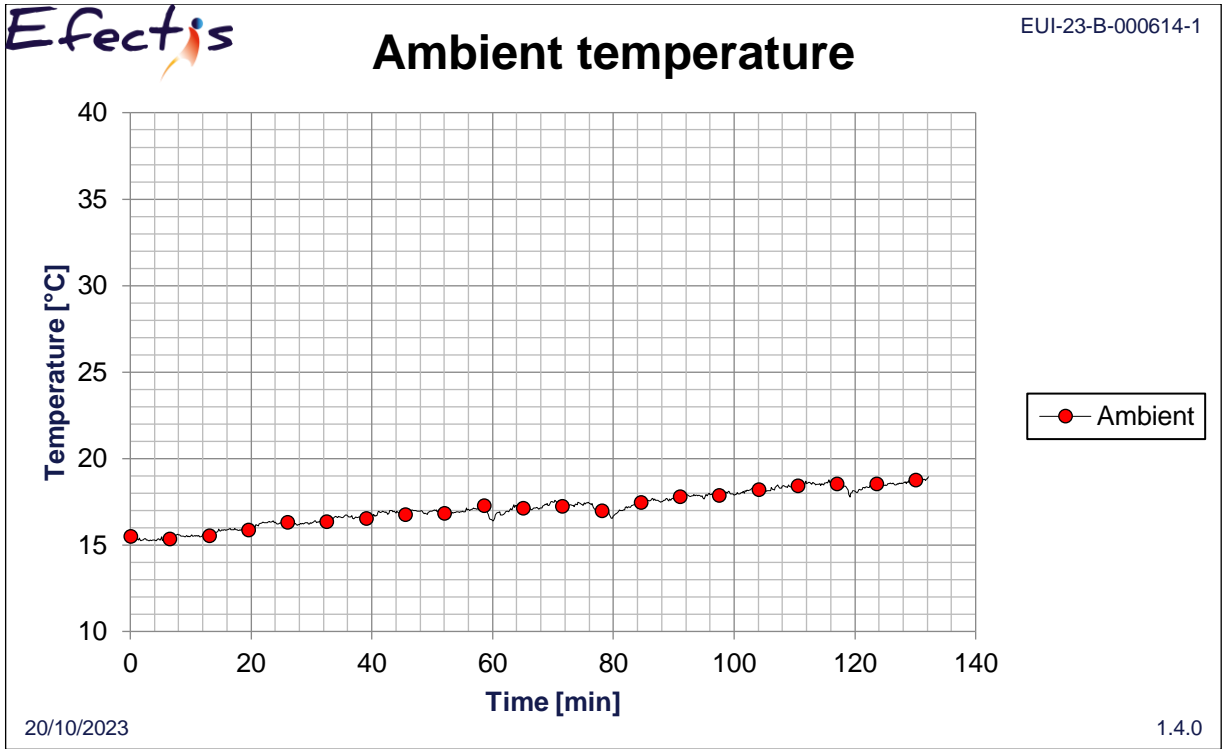


Chart 1 - Ambient laboratory temperature during the test

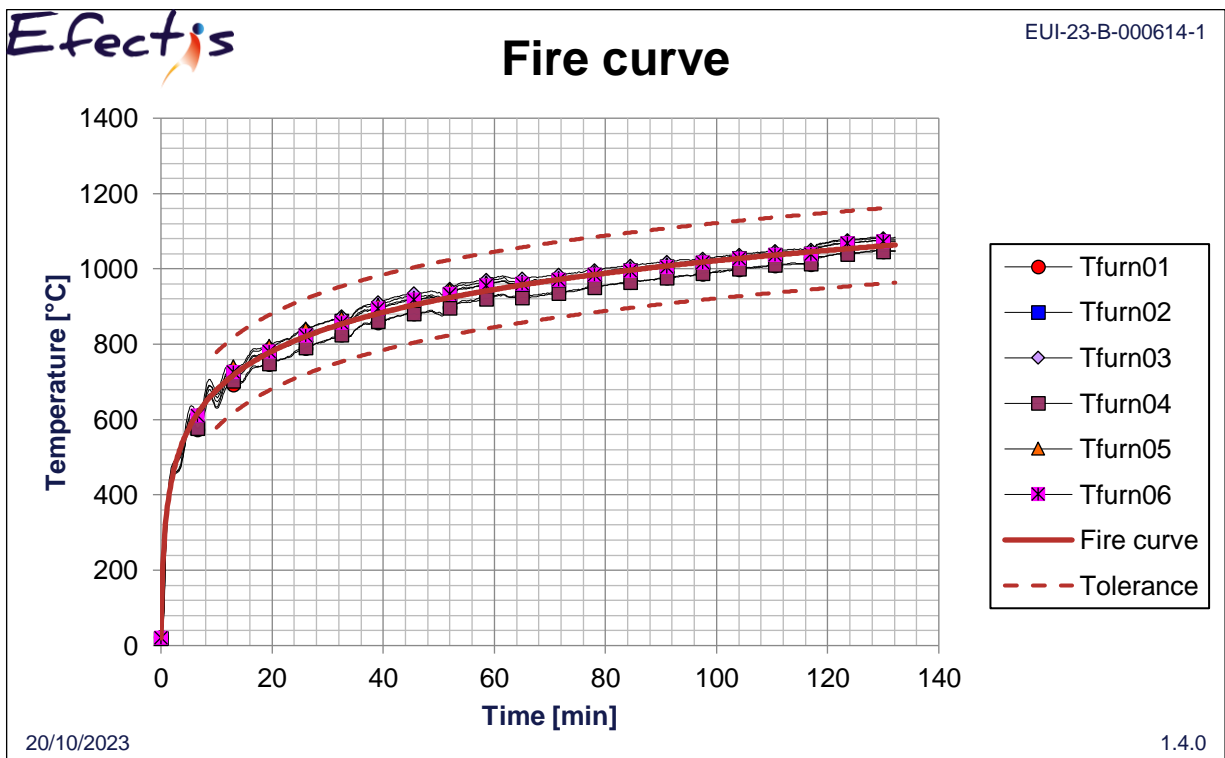


Chart 2 - Furnace temperature during the test

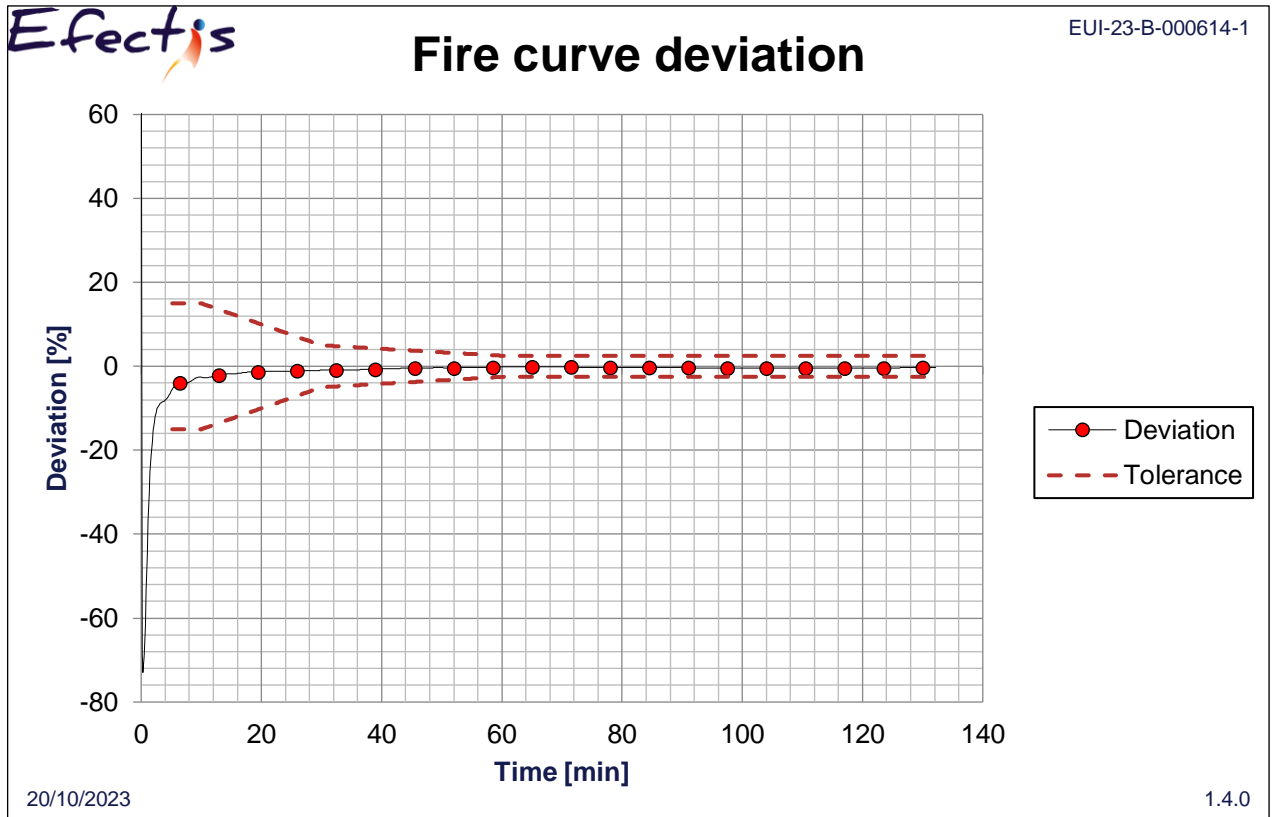


Chart 3 - Deviation curve of fire during test

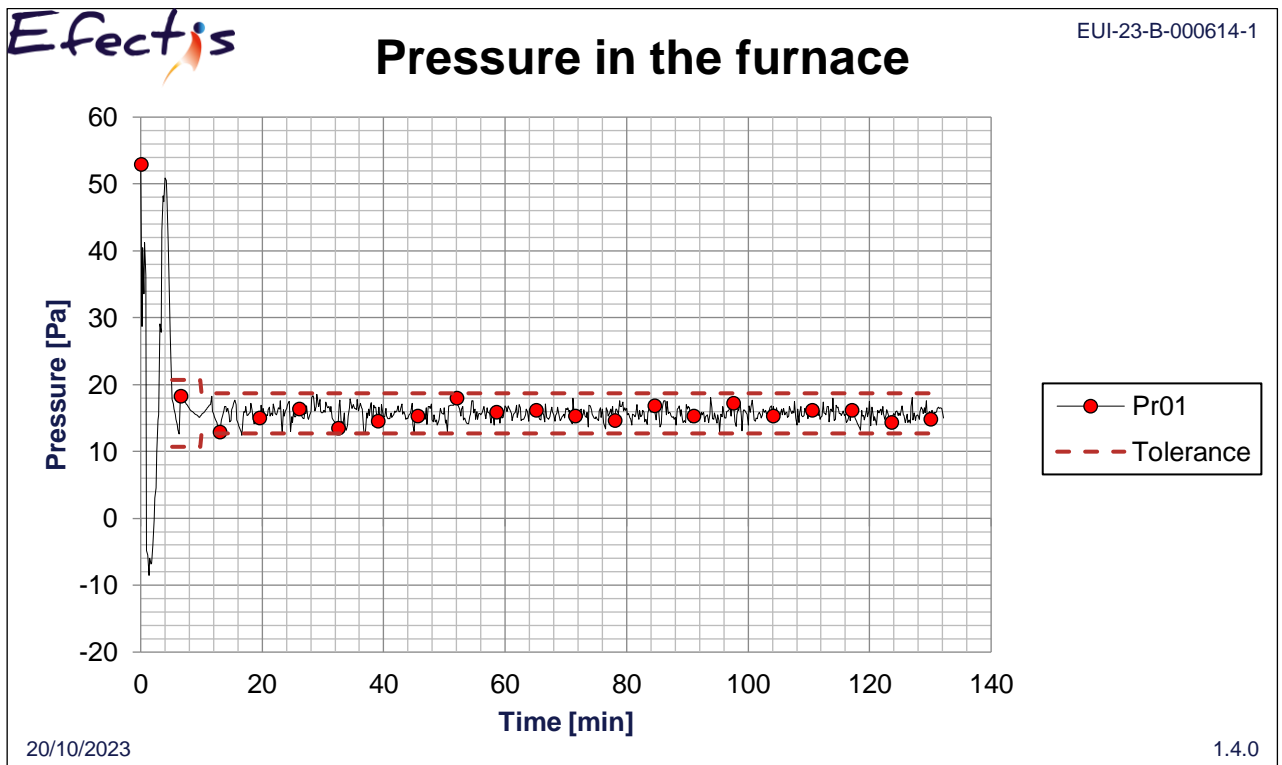


Chart 4 - Furnace pressure during the test

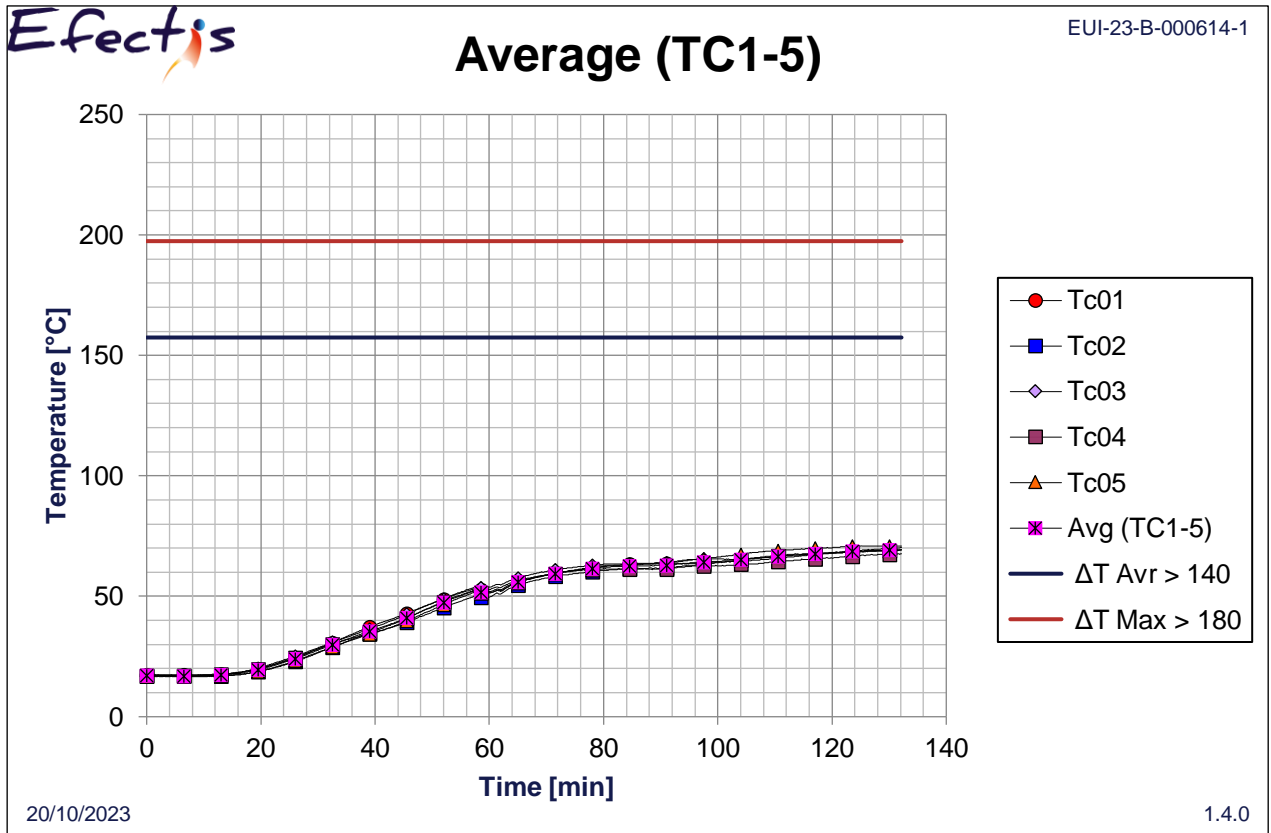


Chart 5 - Average temperature of unexposed side during the test

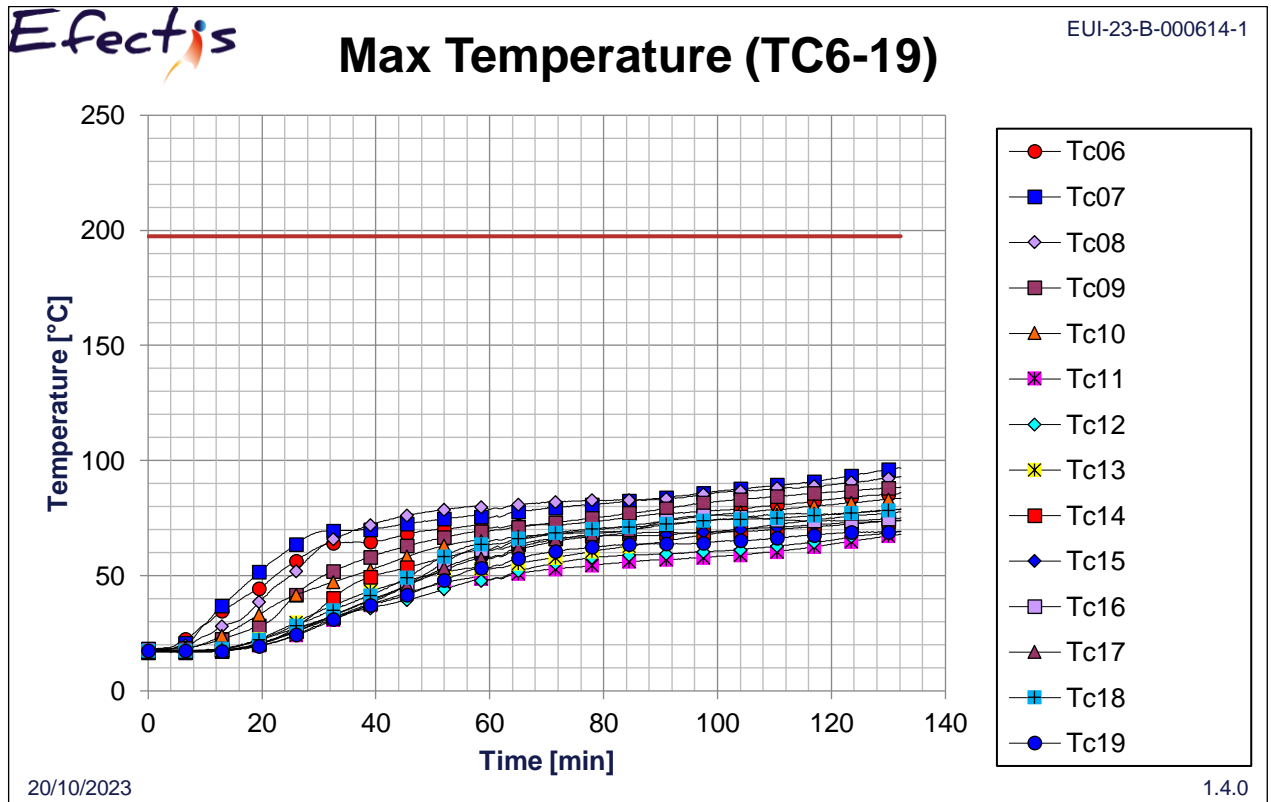


Chart 6 – Maximum temperature during the test

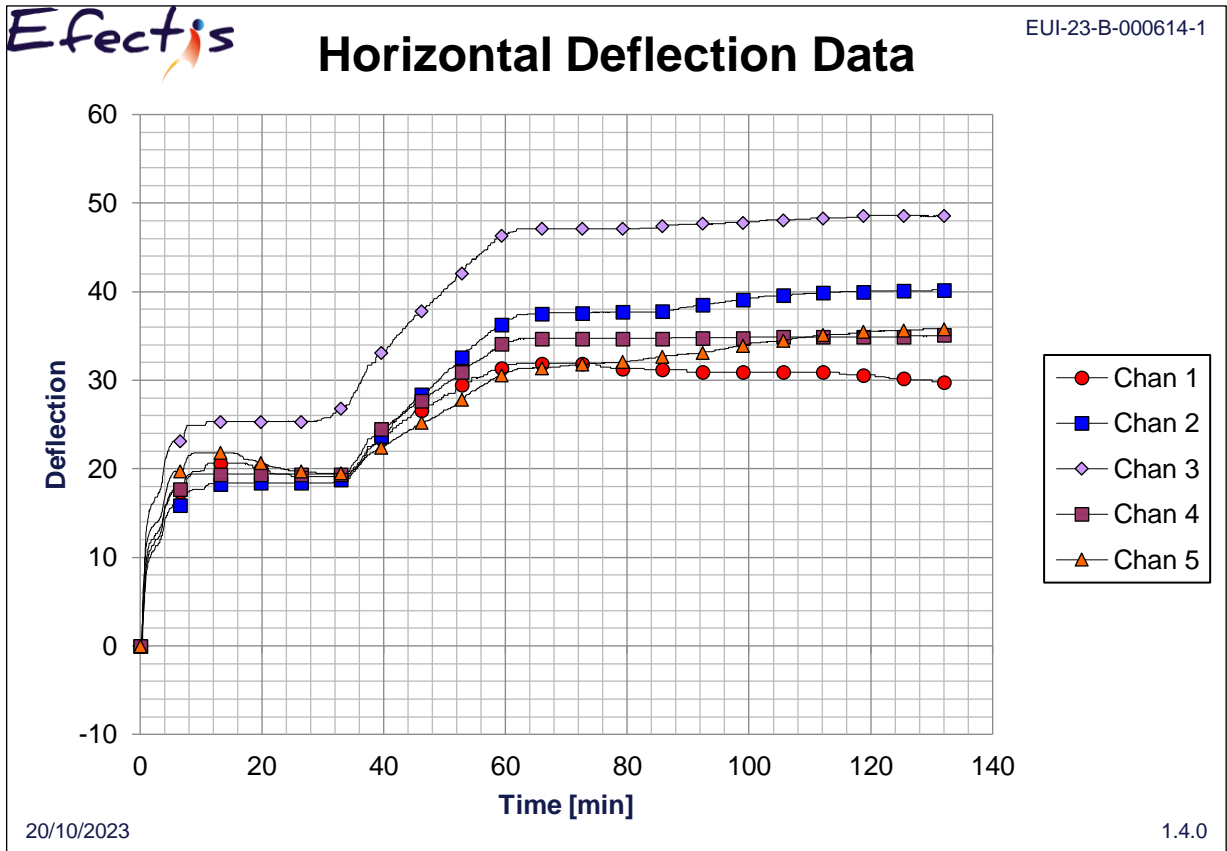


Chart 7 - Horizontal deflection during the test

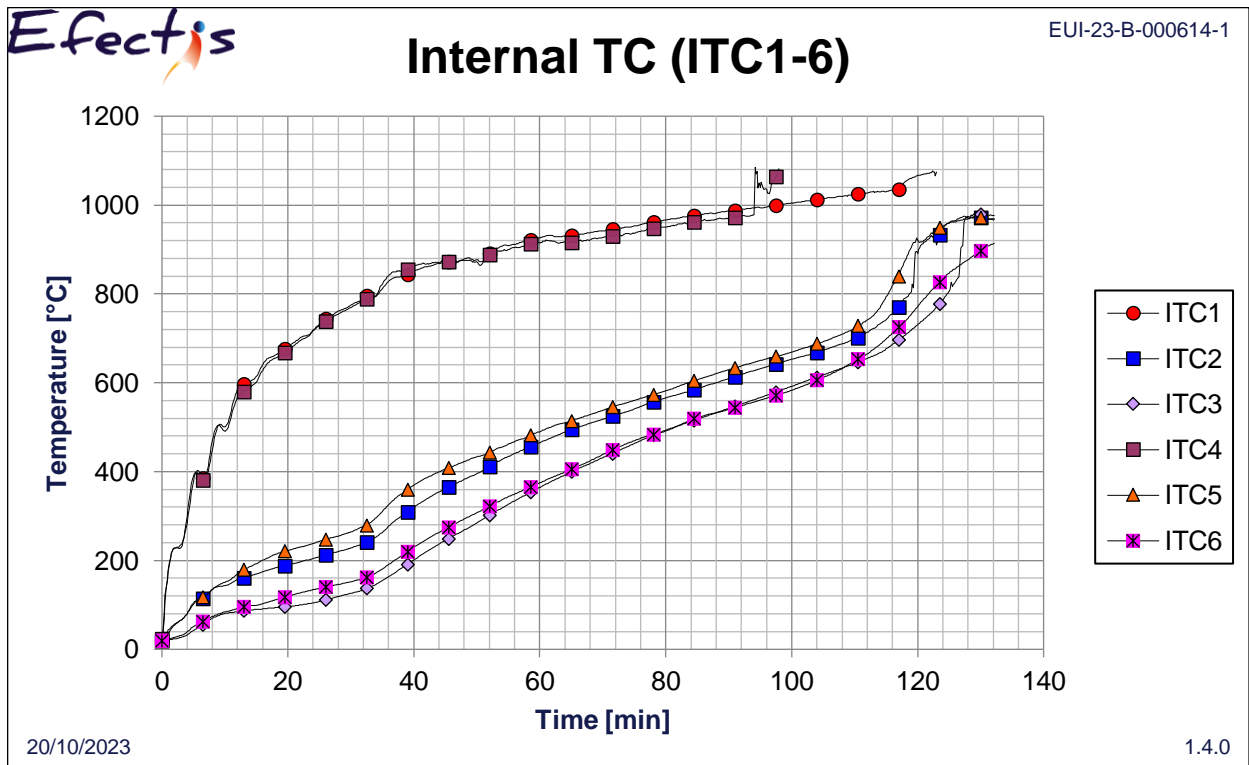


Chart 8 - Plot of internal thermocouples (ITC1 did not work after Min 123 and ITC4 did not work after Min98)



APPENDIX D: PHOTOGRAPHS



Photo 1 - Specimen During construction – Exposed side



Photo 2 - Specimen during construction - Exposed side boarding view from unexposed side. Note the angles on the horizontal joints.



Photo 3 - Specimen during construction - Unexposed side boarding – first layer. Note the boards over the angles on the horizontal joints.



Photo 4 – Second layer of boarding on the unexposed side



Photo 5 - Third layer of boarding on the unexposed side. Note the fixing strap.



Photo 6 - Exposed side of the specimen before the test



Photo 7 - Unexposed side of the specimen at the beginning of the test



Photo 8 - Exposed side of the specimen - Min 31

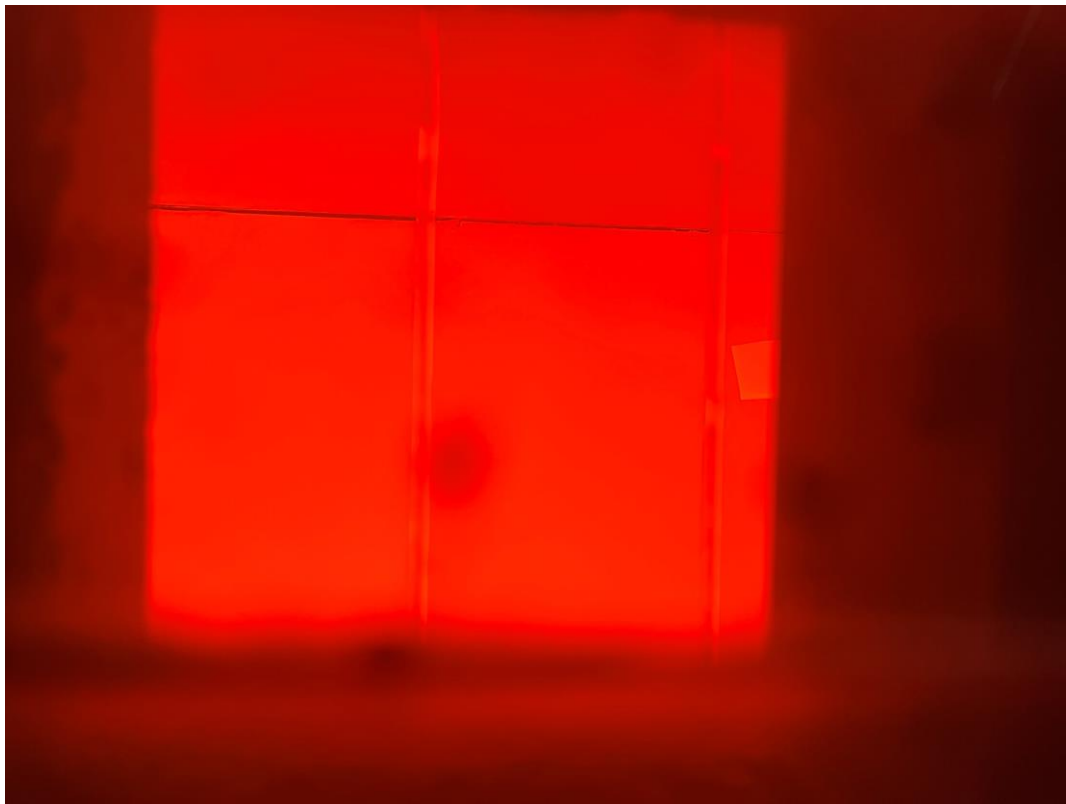


Photo 9 - Exposed side of the specimen - Min 52

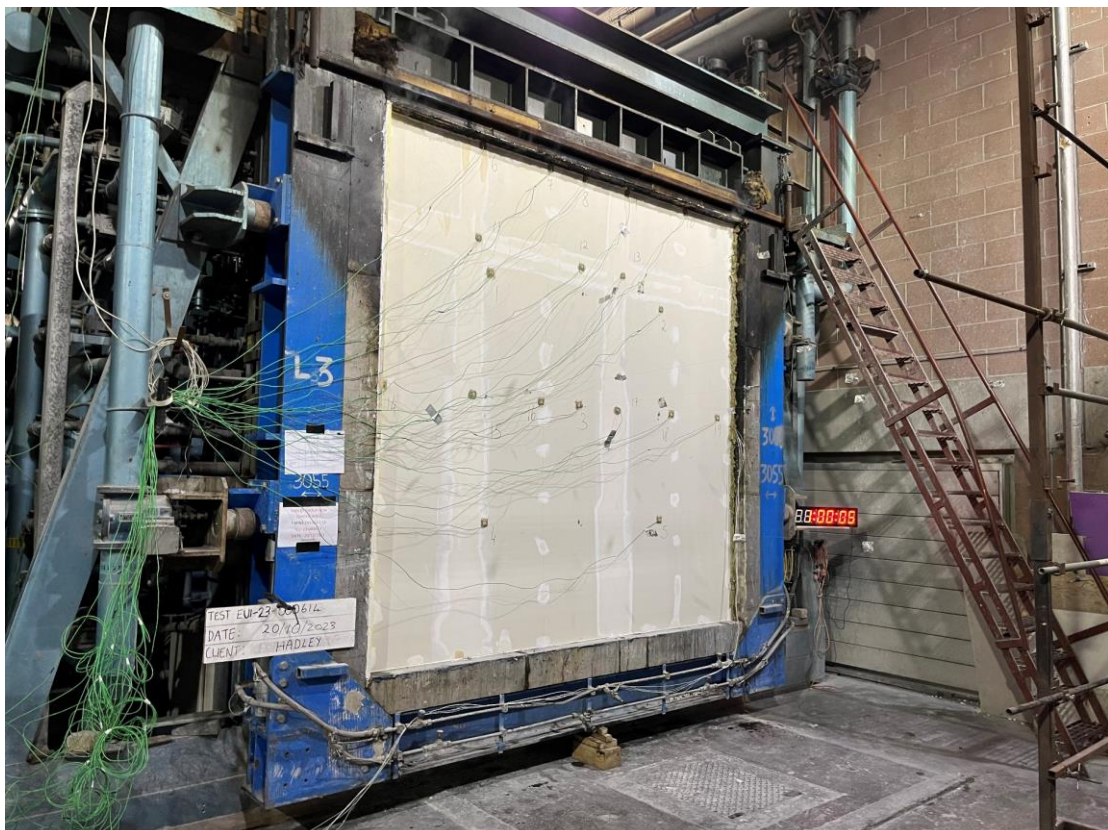


Photo 10 - Unexposed side of the specimen - Min 60

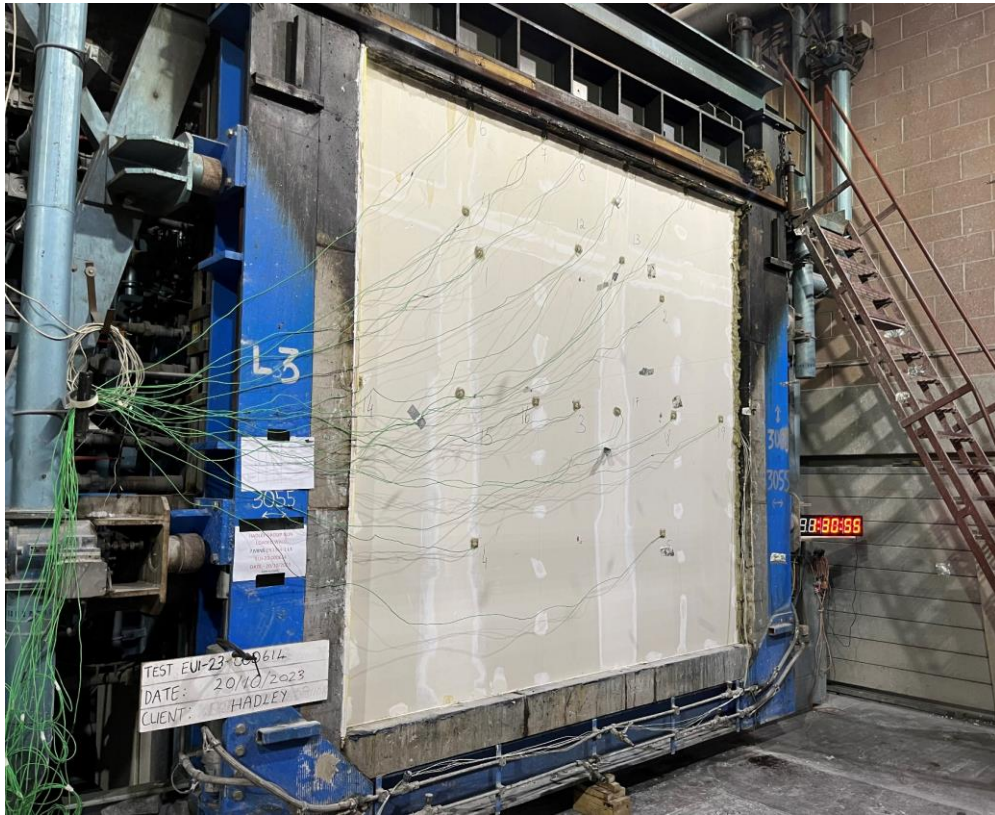


Photo 11 - Unexposed side of the specimen - Min 90

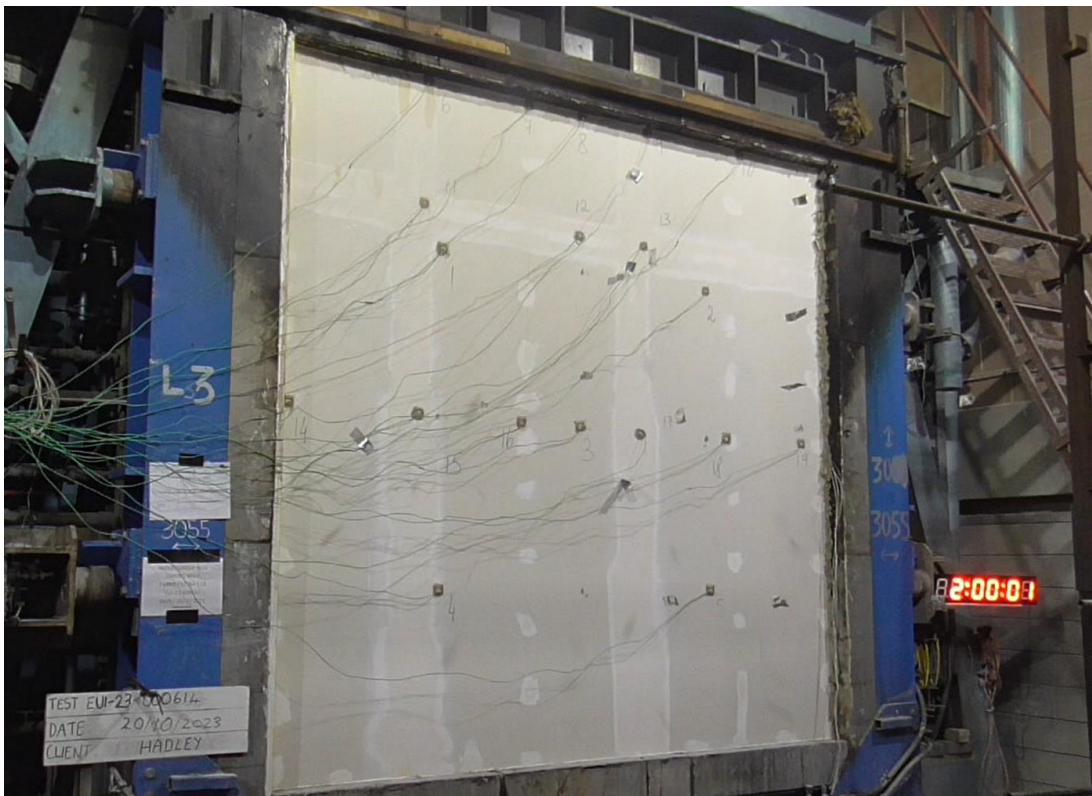


Photo 12 - Unexposed side of the specimen - Min 120



Photo 13 - Unexposed side of the specimen - Min 132 – At the end of the test



Photo 14 - Exposed side of the specimen after the test

**END OF TEST REPORT**