

## Test report # PF22002

**Test Number 22002**

**Client: Tech Coatings NZ Limited**

**Fire resistance tests for wall penetrations**

**Test method: AS 1530.4:2014**

Report Date 14/02/2022

## 1. Table of Contents



---

1. Table of Contents .....	2
1.1 Document revision schedule .....	3
1.2 Signatories .....	3
2. Contact details.....	4
2.1 IANZ registered Testing Authority .....	4
2.2 Client/Applicant.....	4
2.3 Manufacturer.....	4
3. Test Results .....	5
4. Test Details.....	6
5. Equipment.....	8
6. Test Conditions.....	9
6.1 Furnace Temperature.....	9
6.2 Ambient Temperature.....	9
6.3 Pressure Readings.....	10
7. Schedule of materials.....	11
8. Test Specimens details .....	13
8.1 Thermocouple Positions Table .....	13
8.2 Observations.....	15
9. Separating element .....	17
10. Specimens .....	20
10.1 Specimen A.....	21
10.2 Specimen B .....	23
11. Additional photographs.....	25
11.1 During and after the test .....	25

## 1.1 Document revision schedule

Revision #	Date	Description
1	04/02/2022	Initial Issue for Client review
2	14/02/2022	Issued to Client

## 1.2 Signatories

Report	Name	Signature	Date
Prepared by:	Alexey Kokorin (Technical Manager)		14/02/2022
Authorized by:	Andrew Bain (Authorized signatory)		14/02/2022



All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

## 2. Contact details

---

### 2.1 IANZ registered Testing Authority

Passive Fire Inspection and Test Services Ltd

Accreditation N<sup>o</sup>: 1335

1/113 Pavilion Drive, Mangere, Auckland, 2022

New Zealand

Contact e-mail: [tests@firelab.co.nz](mailto:tests@firelab.co.nz)

### 2.2 Client/Applicant

Tech Coatings NZ Limited

12 Tokomaru Street, Welbourn, New Plymouth, 4312

New Zealand

E-mail: [shanew@techcoatings.co.nz](mailto:shanew@techcoatings.co.nz)

### 2.3 Manufacturer

**Intumescent coating – FBL-100:**

Tech Coatings NZ Limited

12 Tokomaru Street, Welbourn, New Plymouth, 4312

New Zealand

## 3. Test Results

---

Specimen #	Description	Actual Integrity (min)	Actual insulation (min)	FRL
A	Timber penetration	30NF	30NF	-/30/30
B	Timber penetration	30NF	30NF	-/30/30

**NF – No failure during the test**

This report shall not be reproduced, except in full.

The test results relate to the specimens of the product in the form in which they were tested. Differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product, which is supplied or used, is fully represented by the specimens, which were tested.

The specimens were supplied by the sponsor and the Laboratory was not involved in any of selection or sampling procedures.

The results of these fire tests may be used to directly assess fire hazard, but it should be recognized that a single test method will not provide a full assessment of fire hazard under all fire conditions.

## 4. Test Details

---

### **Test Specification Fire Resistance:**

Failure shall be deemed to have occurred when one of the following occurs:

- a) the temperature at any location on the unexposed face of the test specimen exceeds the initial temperature by more than 180 °C
- b) Integrity failure shall be deemed to have occurred upon ignition of the cotton pad when glowing or flaming occurs or for a period of 30 seconds.
- c) Flaming to the unexposed face for 10 seconds or longer shall be deemed to be an Integrity failure.

### **Testing scope:**

AS 1530-2014 Part 4 Section 10 Service penetrations and control joints.

### **Documentation:**

Testing products were verified and tested based on Client description, refer to Specimens description below. No additional documentation was provided.

### **Testing date:**

25/01/2022

### **Installation completion date:**

19/01/2022

### **Specimens conditioning and delivery to Laboratory:**

Separating element was built by Laboratory in line with Client instructions. Coating application was performed by the Client. The Laboratory was not involved in sampling of the materials. Laboratory verified materials during construction of the specimen.

### **Termination of The Test:**

The test was discontinued at 30 minutes.

### **Use of Reports:**

This report shall not be reproduced, except in full.

This report details the methods of construction, test conditions and the results obtained when the specific element of construction described herein was tested following the procedure

outlined in AS 1530.4. Any significant variation with respect to size, constructional details, loads, stresses, edge or end conditions, other than that 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.

## 5. Equipment

---

### **Furnace:**

1200X1200 Indicative Furnace designed to operate to AS1530.4:2014

### **Temperature:**

Furnace Temperature measurements were controlled with four 3mm Type K MIMS thermocouples set within 50-100 mm from the face of the specimens in line with AS1530.4-2014. All thermocouples are calibrated by ISO/IEC 17025 accredited laboratory - a signatory to the International Laboratory Accreditation Corporation (ILAC) through their Mutual Recognition Agreement (MRA) to the accuracy required by AS 1530.4-2014.

### **Pressure measurement:**

Kepware Siemens Data logging system including multi-channel recording data at 5 second intervals. Calibrated by ISO/IEC 17025 accredited laboratory - a signatory to the International Laboratory Accreditation Corporation (ILAC) through their Mutual Recognition Agreement (MRA) to the accuracy required by AS 1530.4-2014.

### **Ambient Temperature:**

Ambient temperature was recorded 15 minutes before the test was commenced, at the start of the test and monitored during the test. All thermocouples are calibrated by ISO/IEC 17025 accredited laboratory - a signatory to the International Laboratory Accreditation Corporation (ILAC) through their Mutual Recognition Agreement (MRA) to the accuracy required by AS 1530.4-2014.

### **Specimen thermocouples:**

Specimen thermocouples were installed to the unexposed face. Type K copper disk thermocouples fixed within the required locations referenced from AS1530.4-2014. Thermocouples are calibrated by ISO/IEC 17025 accredited laboratory - a signatory to the International Laboratory Accreditation Corporation (ILAC) through their Mutual Recognition Agreement (MRA) to the accuracy required by AS 1530.4-2014.

### **Dimensional measurements:**

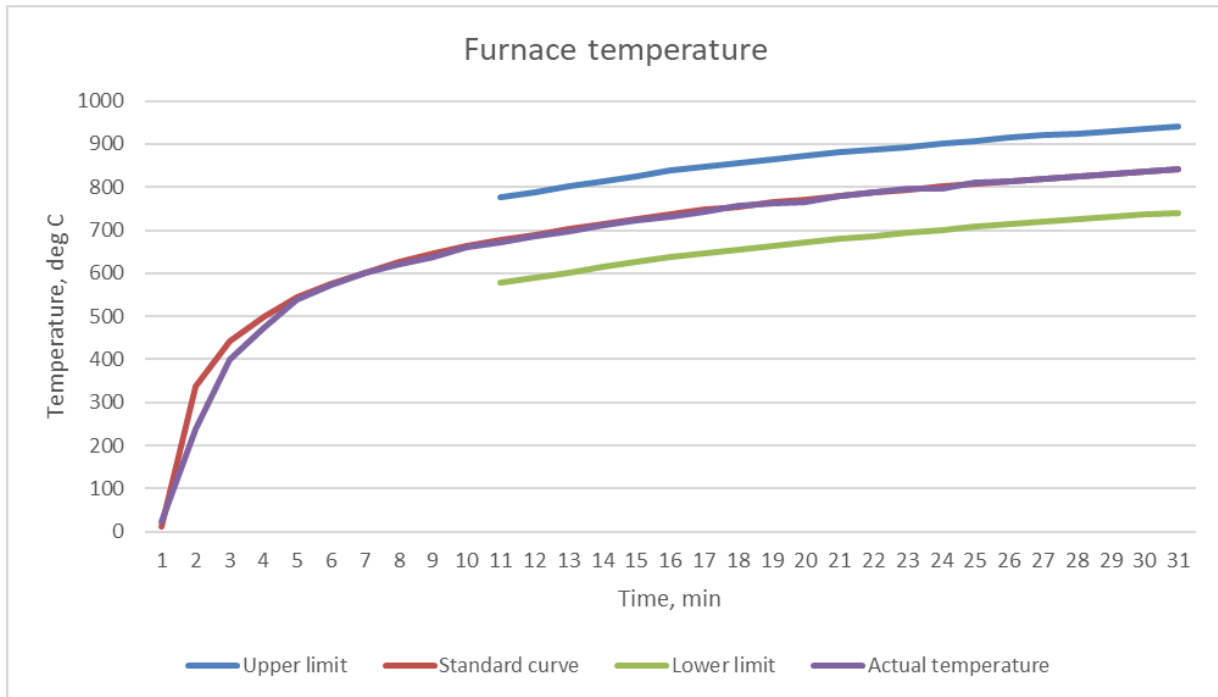
All linear measurements are made with equipment calibrated by ISO/IEC 17025 accredited laboratory - a signatory to the International Laboratory Accreditation Corporation (ILAC) through their Mutual Recognition Agreement (MRA) to the accuracy required by AS 1530.4-2014.



## 6. Test Conditions

### 6.1 Furnace Temperature

The furnace was controlled to follow the temperature/time relationship specified in AS 1530.4-2014 as closely as possible.

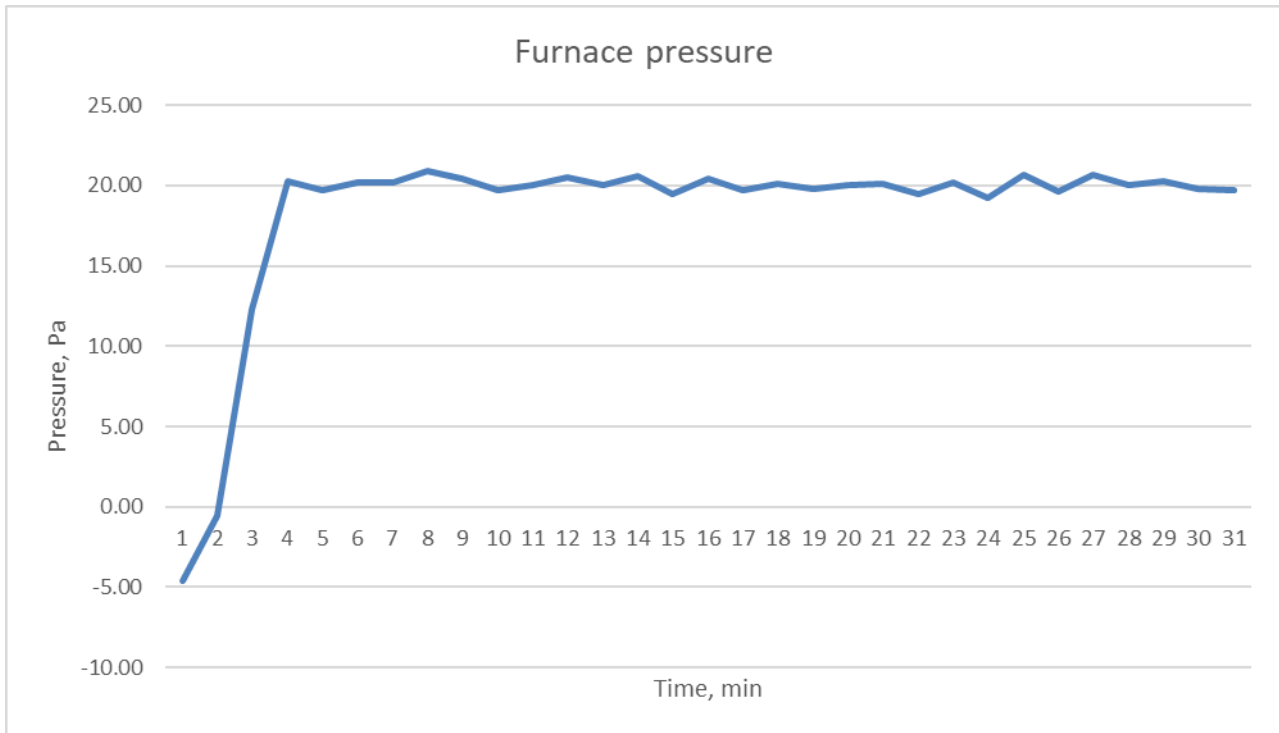


### 6.2 Ambient Temperature

The ambient temperature of the test area 15 minutes before the test and at the commencement of the test was 24 °C.

## 6.3 Pressure Readings

After the first 5 minutes of the test, the furnace pressure was maintained at  $20 \pm 3$  Pa with respect to atmosphere. The probe was located at the top of the specimen.



## 7. Schedule of materials

All services and firestopping products were supplied by Client.

<b>Separating Element</b>		
1.1	Item / Product Name	Plasterboard and timber frame separating element
	Measurements	Width / Height (W/H): 1200mm x 1200mm
		Thickness (T): 116mm
1.2	Item / Product Name	Laser Frame SG8 Timber
	Measurements	Width / Height (W/H): 90mm x 45mm
	Additional Info	Used to construct timber separating element Used to construct Truss section Used for purlin section, fixed to truss structure
1.3	Item / Product Name	GIB Standard Plasterboard
	Measurements	Width / Height (W/H): 1200mm x 1200mm
		Thickness (T): 13mm
Additional Info	Used to construct timber separating element Used to construct Truss section	

<b>Coatings</b>		
3.1	Item / Product Name	FBL-100 Intumescent Fire Resistant Paint
	Measurements	500µm
	Installation	Applied to exposed face of truss structure. Overlapping the separating element by 100mm

<b>Fixings</b>		
4.1	Item / Product Name	Paslode Framing Nails
	Measurements	90mm
	Installation	Used to fix timber frame, and truss structure
4.2	Item / Product Name	GIB Grabber Screws

	Measurements	32mm
	Installation	Used to fix plasterboard to timber frame

Fire Board		
5.1	Item / Product Name	Unbranded Mineral wool board
	Measurements	Width / Height (W/H): 100mm x 300mm
		Thickness (T): 50mm
	Additional Info	Section cut at an angle and installed on top of each truss section, flush with separating element

## 8. Test Specimens details

### 8.1 Thermocouple Positions Table

Specimen	TC#	THERMOCOUPLE LOCATION DESCRIPTION
A	1	Separating element, 25mm above upper chord
A	2	Separating element, 25mm right of the upper chord
A	3	Upper chord, top side, 25mm from separating element
A	4	Upper chord, right side, 25mm from separating element
A	5	Separating element, 25mm left of gap, 50mm below upper chord
A	6	Timber stud, centre of timber inside gap, 50mm below upper chord
A	7	Separating element, 25mm right of gap, 50mm below upper chord
A	8	Separating element, 25mm left of gap, mid-height of timber stud
A	9	Timber stud, centre of timber inside gap, mid-height of timber stud
A	10	Separating element, 25mm right of gap, mid-height of timber stud
A	11	Separating element, 25mm left of gap, 50mm below upper chord
A	12	Timber stud, centre of timber inside gap, 50mm above lower chord
A	13	Separating element, 25mm right of gap, 50mm above lower chord
A	14	Separating element, 25mm right of the lower chord
A	15	Lower chord, top side, 25mm from separating element
A	16	Lower chord, right side, 25mm from separating element
B	17	Separating element, 25mm above upper chord
B	18	Separating element, 25mm right of the upper chord
B	19	Upper chord, top side, 25mm from separating element
B	20	Upper chord, right side, 25mm from separating element
B	21	Separating element, 25mm left of gap, 50mm below upper chord
B	22	Timber stud, centre of timber inside gap, 50mm below upper chord
B	23	Separating element, 25mm right of gap, 50mm below upper chord
B	24	Separating element, 25mm left of gap, mid-height of timber stud

B	25	Timber stud, centre of timber inside gap, mid-height of timber stud
B	26	Separating element, 25mm right of gap, mid-height of timber stud
B	27	Separating element, 25mm left of gap, 50mm below upper chord
B	28	Timber stud, centre of timber inside gap, 50mm above lower chord
B	29	Separating element, 25mm right of gap, 50mm above lower chord
B	30	Separating element, 25mm right of the lower chord
B	31	Lower chord, top side, 25mm from separating element
B	32	Lower chord, right side, 25mm from separating element
SE	33	Separating element, mid width of separating element, 400mm from top edge
SE	34	Separating element, mid width of separating element, 400mm from bottom edge

## 8.2 Observations

Time Minutes	Test Face	SP#	Observations
1	E	B	Visible activation, small visible bubbles
3	E	A	Visible activation, small visible bubbles
3	U	A	Visible smoke from upper chord and separating element junction
4	E	B	Visible discolouring, large bubbling, potential charring
4	E	A	Visible discolouring, large bubbling, potential charring
5	U	A, B	Continued smoke from A, visible smoke from B
5	E	B	Visible cracks in FBL100 on both sides near centre
5	E	SE	Visible flaking of separating element paper, discolouring
6	E	B	Further visible cracking of FBL100
8	E	A	Visible cracks forming through FBL100 on the sides of the penetration approximately 100mm
10	U	A	Visible smoke from bottom junction of truss
10	E	A, B	Further discolouring of specimen
13	E	A, B	Previously mentioned cracks have grown in length
13	E	A	Larger cracks have begun to deflect, opening a gap on the right side, lower half of truss
13	E	B	FBL100 covered areas have begun to discolour to a lighter colour covering most of the specimen
15	E	A	Further discolouring to a lighter colour at the top half
18	U	B	Increased amount of smoke from top junction
20	E	A	Sections of FBL100 have fallen from the separating element near where large cracks had formed.
20	E	B	Small piece of FBL100 has fallen from the separating element near the right side of specimen, near centre

24	E	A	Majority of FBL100 covered areas has now fallen from the separating element, except sections near the upper and lower chords
26	E	B	Cracks have opened up further, no further sections of FBL100 have fallen off
28	E	SE	Visible cracks in separating element near the centre joint
30			TEST DISCONTINUED

**Key: U = unexposed face. E = Exposed face.**



## 9. Separating element

---

Timber (1.2) was used to construct the frame, consisting of a top and bottom plate, and two studs on the outer edges of the refractory frame. An additional 4 studs were installed, at 255mm, 345mm, 810mm and 900mm from the unexposed left side. This created a 45mm gap, 300mm from each side to install the truss sections into the frame. All timber was fixed using framing nails (4.1)

The truss sections (Fig.1) were installed within the separating element gaps, fixed using framing nails.

One layer of plasterboard (1.3) was fixed to each face of the test frame. The 45mm gap where the truss penetrates through was not lined between the upper and lower chords. Above the upper chord, and below the lower chord were lined. The plasterboard was fixed to the timber frame at 300mm centres using screws (4.2)

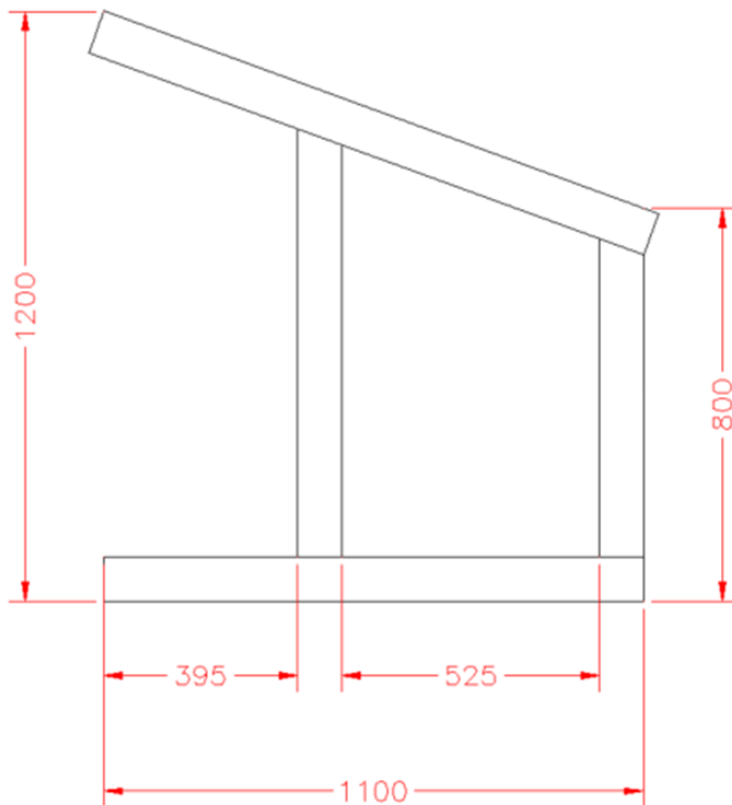


Fig.1 – Truss structure



Fig.2 – Unexposed face view, prior to lining

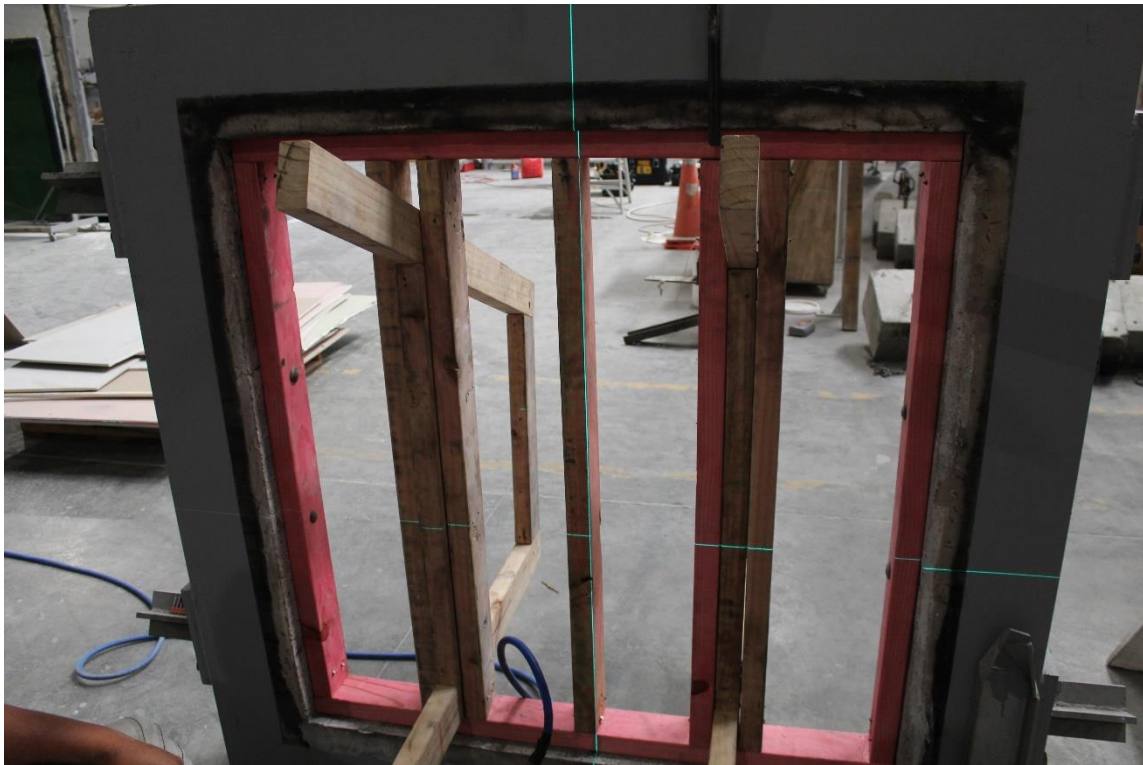


Fig.3 – Exposed face view, prior to lining



Fig.4 – Exposed face prior to fire stopping application



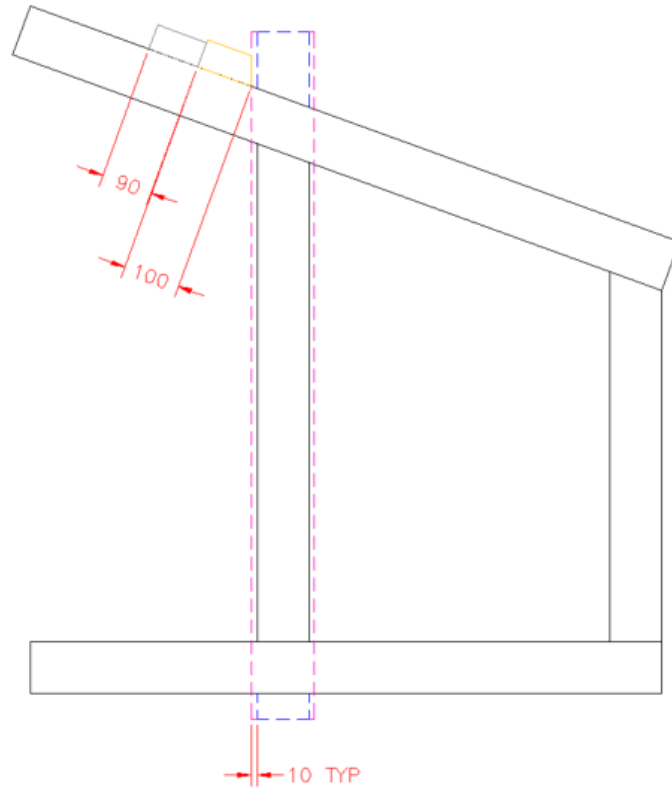
Fig.5 – Unexposed face prior to fire stopping application

## 10. Specimens

---



## 10.1 Specimen A

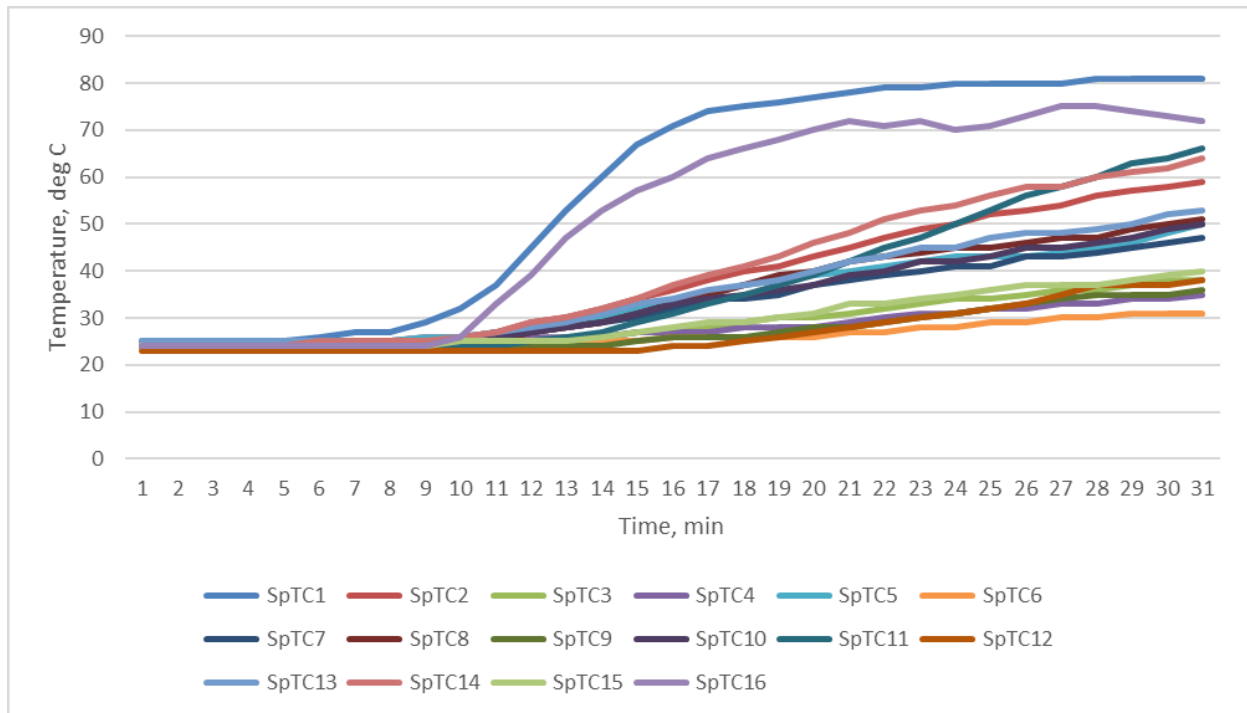


A	Service	Timber penetration
	Service Details	Timber (1.2), Fire Board (5.1), Intumescent Paint (3.1)
	Aperture Size	Width / Height (W/H): 45mm x 1110mm
	<b>Local Fire-stopping Protection</b>	
	Application	Asymmetrical
	Protection Used	<p>A generic truss was constructed using timber (1.2) to be installed in the separating element. The dimensions of these truss sections can be seen below. The truss section was installed within the separating element gaps, fixed using framing nails. The centre stud of the truss protruded 20mm from the exposed face of the timber studs of the separating element. A section of timber was used to create a purlin on the top of the truss structure, located 100mm from the exposed face of the separating element. A section of fire board (5.1) was cut to fit between the purlin section and the separating element. Once plasterboard had been installed on both faces, intumescent paint was applied to the exposed truss stud, fire board, purlin, upper chord and lower chord. The plasterboard was also coated 100mm on each side of the truss section.</p> <p>The inurmescent coating was applied to nominal 500 microns.</p>

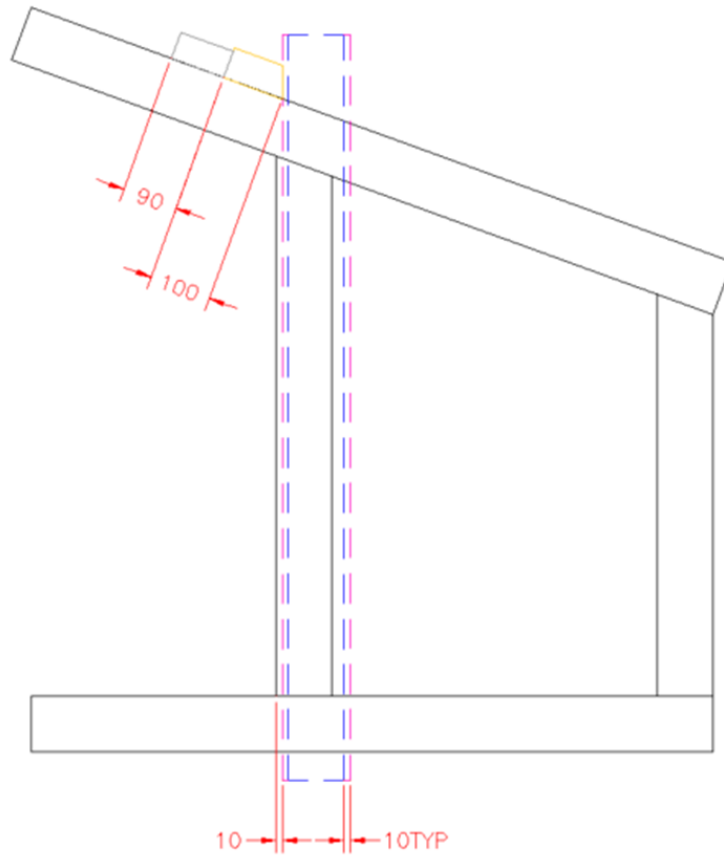
## Test results

<b>Structural adequacy</b>	<b>Not applicable</b>
<b>Integrity</b>	<b>No failure 30 minutes</b>
<b>Insulation</b>	<b>No failure 30 minutes</b>

### Specimen A Thermocouples Readings



## 10.2 Specimen B

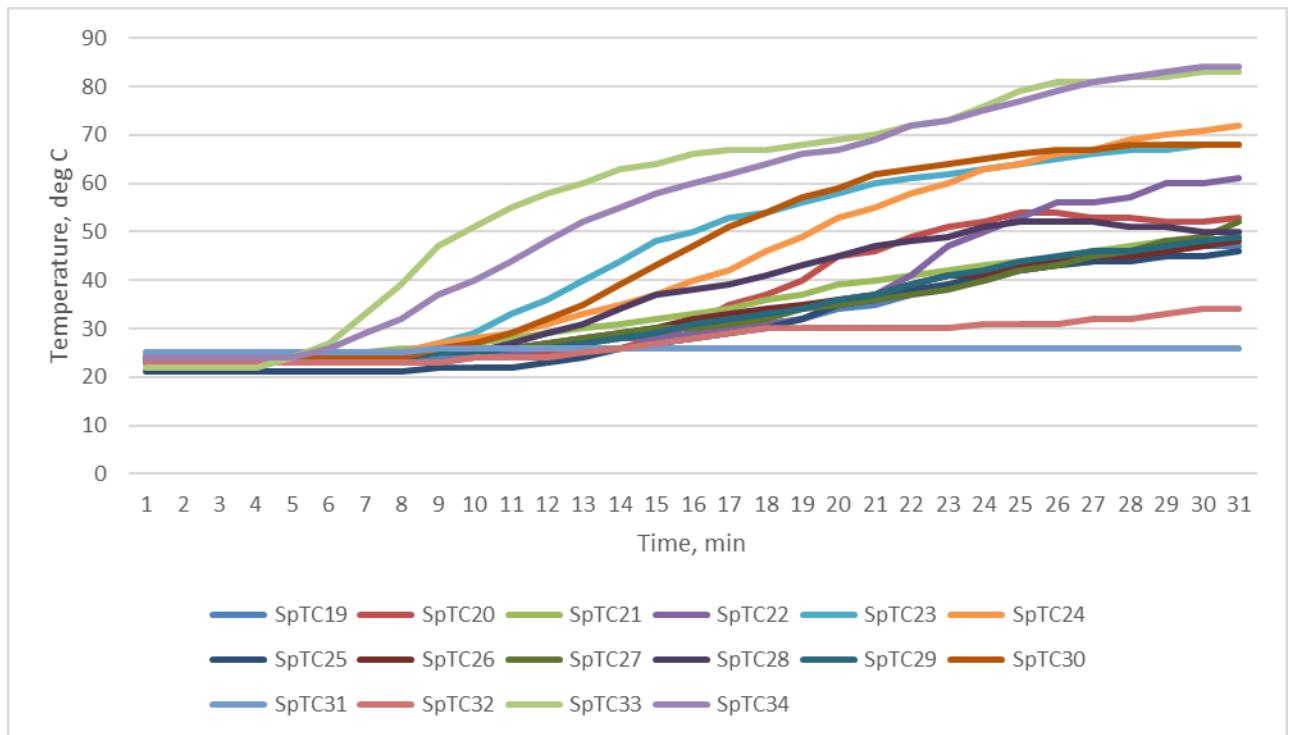


B	Service	Timber penetration
	Service Details	Timber (1.2), Fire Board (5.1), Intumescent Paint (3.1)
	Aperture Size	Width / Height (W/H): 45mm x 1110mm
	<b>Local Fire-stopping Protection</b>	
	Application	Asymmetrical
Protection Used	<p>A generic truss was constructed using timber (1.2) to be installed in the separating element. The dimensions of these truss sections can be seen below. The truss section was installed within the separating element gaps, fixed using framing nails. The centre stud of the truss protruded 20mm from the exposed face of the timber studs of the separating element. A section of timber was used to create a purlin on the top of the truss structure, located 100mm from the exposed face of the separating element. A section of fire board (5.1) was cut to fit between the purlin section and the separating element. Once plasterboard had been installed on both faces, intumescent paint was applied to the exposed truss stud, fire board, purlin, upper chord and lower chord. The plasterboard was also coated 100mm on each side of the truss section.</p> <p>The intumescent coating was applied to nominal 500 microns.</p>	

## Test results

<b>Structural adequacy</b>	<b>Not applicable</b>
<b>Integrity</b>	<b>No failure 30 minutes</b>
<b>Insulation</b>	<b>No failure 30 minutes</b>

### Specimen B Thermocouples Readings





## 11. Additional photographs

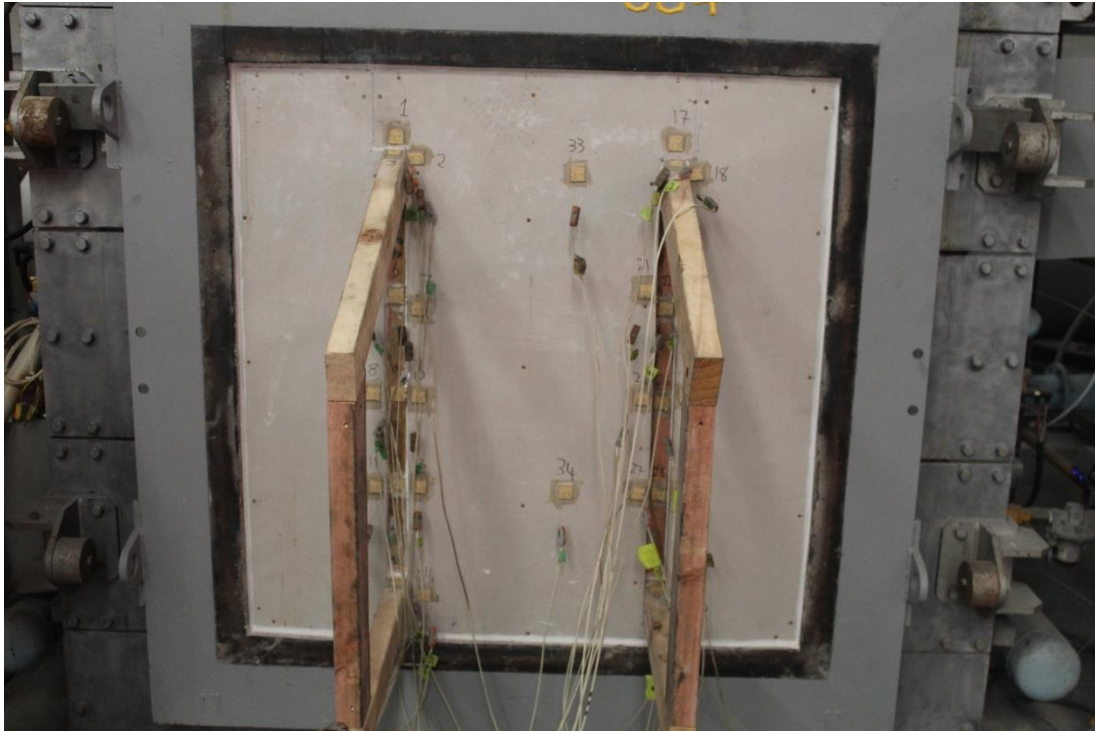
---

### 11.1 During and after the test

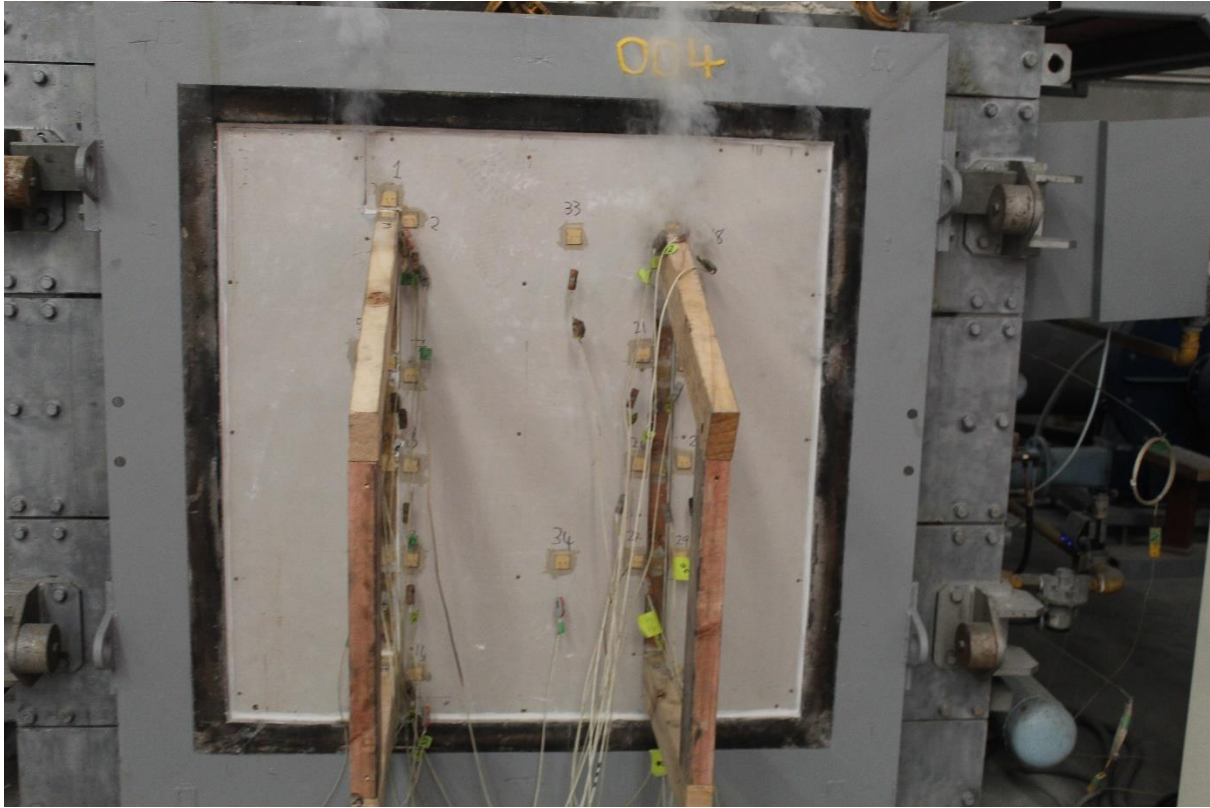
5 minutes:



15 minutes:



30 minutes:



After the test:

