

Test report # PF22005

Test Number 22005

Client: Parchem Construction Supplies Pty Ltd

Fire resistance tests for wall linear gaps

Test method: AS 1530.4:2014

Report Date 04/03/2022

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1.1 Document revision schedule

Revision #	Date	Description
1	04/03/2022	Initial Issue for Client review
2	09/03/2022	Issued to Client

1.2 Signatories

Report	Name	Signature	Date
Prepared by:	Alexey Kokorin (Technical Manager)		09/03/2022
Authorized by:	Andrew Bain (Authorized signatory)		09/03/2022



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

Fire TS Lab - Passive Fire Inspection and Test Services Ltd

Accreditation N°: 1335

1/113 Pavilion Drive, Mangere, Auckland, 2022

New Zealand

Contact e-mail: tests@firelab.co.nz

2.2 Client/Applicant

Parchem Construction Supplies Pty Ltd

1956 Dandenong Rd Clayton, VIC,

Australia

Contact e-mail: phil.jones@parchem.co.nz

2.3 Manufacturer

Same as Client/Applicant

3. Test Results

Specimen #	Joint	Actual Integrity (min)	Actual insulation (min)	FRL
A*	30mm Butt-joined Vertical Linear Joint, 15mm deep sealant on non-fire side only	243 NF	151	-/240/150
B	20mm Butt-joined Vertical Linear Joint, 10mm deep sealant on both sides	243 NF	243 NF	-/240/240
C*	20mm Butt-joined Vertical Linear Joint, 10mm deep sealant on non-fire side only	243 NF	151	-/240/150
D*	20mm Butt-joined Vertical Linear Joint, 20mm deep sealant on non-fire side only	243 NF	203	-/240/180

* - asymmetrical one-way system, the rating applied if exposed to fire as tested.

NF – No failure during the test

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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

AS 4072.1-2005 Part 1 Appendix A - Typical examples of fire-stopping systems for movement joints.

Documentation:

Testing products were verified and tested based on Client description, refer to Specimens description below.

Testing date:

28/02/2022

Installation completion date:

01/02/2022

Specimens conditioning and delivery to Laboratory:

Separating element was built by Laboratory in line with Client instructions. Installation of fire stopping system was performed by Laboratory. 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 243 minutes.



Use of Reports:

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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.

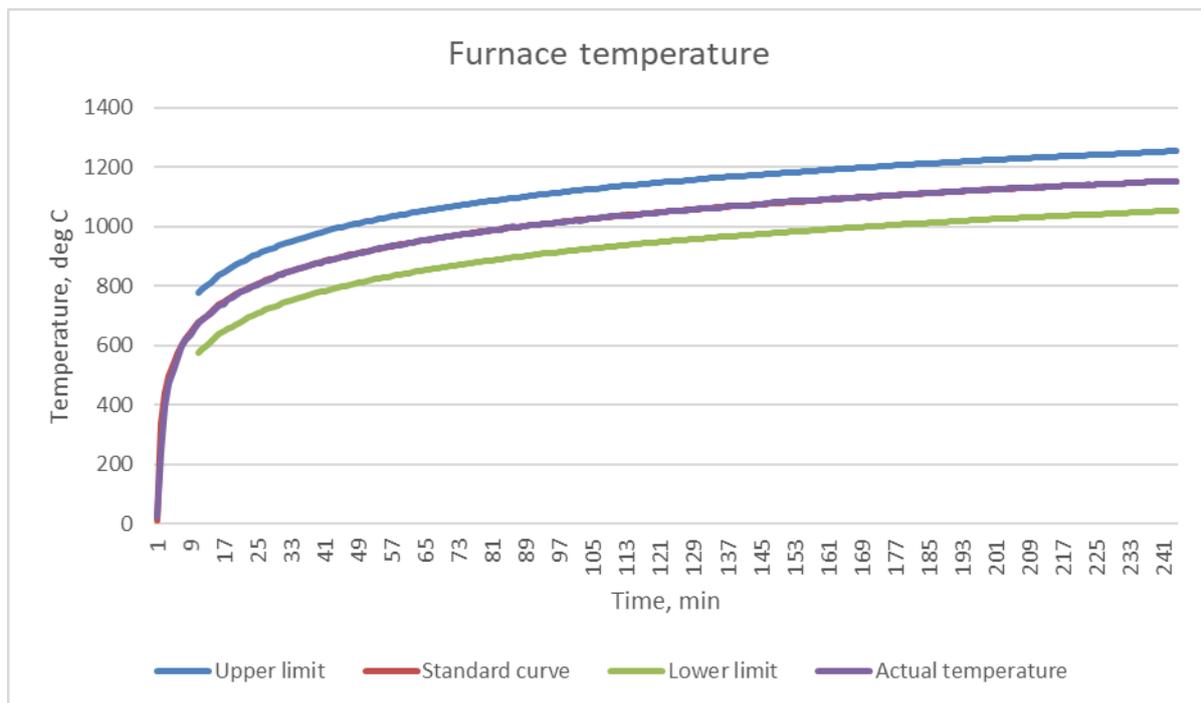
Dimensional measurements:

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.

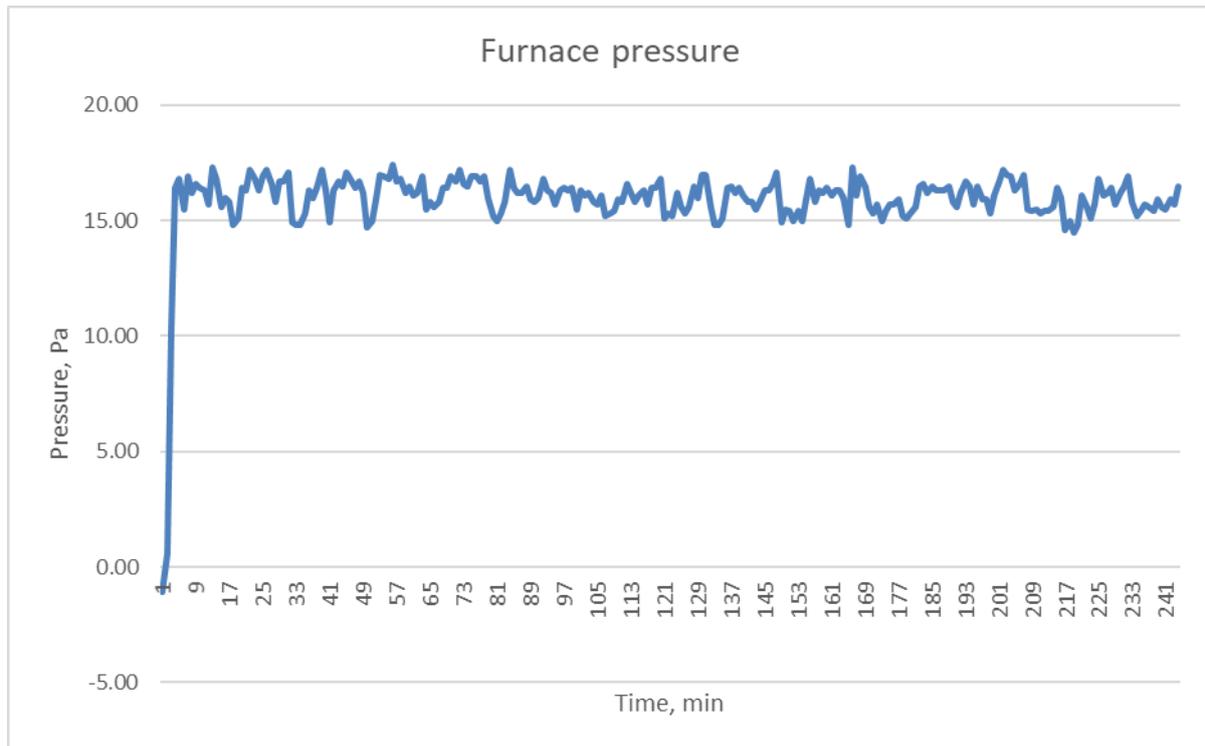


6.2 Ambient Temperature

The ambient temperature of the test area 15 minutes before the test and at the commencement of the test was 27 °C.

6.3 Pressure Readings

After the first 5 minutes of the test, the furnace pressure was maintained at 16 ± 3 Pa with respect to atmosphere. The probe was located 500mm above the furnace floor.



7. Schedule of materials

All firestopping products were supplied by Client.

Separating Element		
1.1	Item / Product Name	Concrete Slab Separating element
	Measurements	1200mm x 1200mm
	Thickness	180mm (nominal)
1.3	Item / Product Name	Galvanised steel saddle clamps
	Additional Info	Used to fix concrete slabs to Unistrut structure

Sealants		
3.1	Item / Product Name	Fosroc Flamex XT
	Measurements	600mL tube
	Installation	Inserted into separating element gaps

Fixings/Miscellaneous Items		
4.1	Item / Product Name	Ramset ShureDrive Mushroom Head Anchor Drive
	Measurements	6 x 30mm
	Installation	Used to fix concrete slabs to saddle clamps
4.2	Item / Product Name	PEF Backing Rod
	Measurements	25mm
	Installation	Placed in separating element gaps to ensure correct sealant depth
4.3	Item / Product Name	PEF Backing Rod
	Measurements	30mm
	Installation	Placed in separating element gaps to ensure correct sealant depth

8. Test Specimens details

8.1 Thermocouple Positions Table

Sp#	TC#	THERMOCOUPLE LOCATION DESCRIPTION
A	1	On sealant, centre of 20mm sealed aperture, 200mm below top edge of Concrete Slab
A	2	On sealant, centre of 20mm sealed aperture, vertical centre of Concrete Slab
A	3	On sealant, centre of 20mm sealed aperture, 200mm above bottom edge of Concrete Slab
A	4	Separating element, 25mm left of Specimen A, 200mm below top edge of Concrete Slab
A	5	Separating element, 25mm right of Specimen A, 200mm below top edge of Concrete Slab
A	6	Separating element, 25mm left of Specimen A, vertical centre of Concrete Slab
A	7	Separating element, 25mm right of Specimen A, vertical centre of Concrete Slab
A	8	Separating element, 25mm left of Specimen A, 200mm above bottom edge of Concrete Slab
A	9	Separating element, 25mm right of Specimen A, 200mm above bottom edge of Concrete Slab
B	10	On sealant, centre of 20mm sealed aperture, 200mm below top edge of Concrete Slab
B	11	On sealant, centre of 20mm sealed aperture, vertical centre of Concrete Slab
B	12	On sealant, centre of 20mm sealed aperture, 200mm above bottom edge of Concrete Slab
B	13	Separating element, 25mm left of Specimen B, 200mm below top edge of Concrete Slab
B	14	Separating element, 25mm right of Specimen B, 200mm below top edge of Concrete Slab

B	15	Separating element, 25mm left of Specimen B, vertical centre of Concrete Slab
B	16	Separating element, 25mm right of Specimen B, vertical centre of Concrete Slab
B	17	Separating element, 25mm left of Specimen B, 200mm above bottom edge of Concrete Slab
B	18	Separating element, 25mm right of Specimen B, 200mm above bottom edge of Concrete Slab
C	19	On sealant, centre of 20mm sealed aperture, 200mm below top edge of Concrete Slab
C	20	On sealant, centre of 20mm sealed aperture, vertical centre of Concrete Slab
C	21	On sealant, centre of 20mm sealed aperture, 200mm above bottom edge of Concrete Slab
C	22	Separating element, 25mm left of Specimen C, 200mm below top edge of Concrete Slab
C	23	Separating element, 25mm right of Specimen C, 200mm below top edge of Concrete Slab
C	24	Separating element, 25mm left of Specimen C, vertical centre of Concrete Slab
C	25	Separating element, 25mm right of Specimen C, vertical centre of Concrete Slab
C	26	Separating element, 25mm left of Specimen C, 200mm above bottom edge of Concrete Slab
C	27	Separating element, 25mm right of Specimen C, 200mm above bottom edge of Concrete Slab
D	28	On sealant, centre of 20mm sealed aperture, 200mm below top edge of Concrete Slab
D	29	On sealant, centre of 20mm sealed aperture, vertical centre of Concrete Slab
D	30	On sealant, centre of 20mm sealed aperture, 200mm above bottom edge of Concrete Slab
D	31	Separating element, 25mm left of Specimen D, 200mm below top edge of Concrete Slab

D	32	Separating element, 25mm right of Specimen D, 200mm below top edge of Concrete Slab
D	33	Separating element, 25mm left of Specimen D, vertical centre of Concrete Slab
D	34	Separating element, 25mm right of Specimen D, vertical centre of Concrete Slab
D	35	Separating element, 25mm left of Specimen D, 200mm above bottom edge of Concrete Slab
D	36	Separating element, 25mm right of Specimen D, 200mm above bottom edge of Concrete Slab
SE	37	Separating element, Mid-width of 4 th from left Concrete Slab, 400mm below top edge of Concrete Slab

8.2 Observations

Time Minutes	Test Face	SP#	Observations
5	E	B	Visible charring of sealant
10	E	B	Specimen has visibly combusted, with visible discolouring
10	E	B	Visible expansion, small gaps in sealant
15	E	B	Further visible expansion, previously mentioned gaps have disappeared
15	E	B	White discolouring of sealant
30	E	B	Two visible cracks in expansion, visibly less flaming
45	U	A, C	Minor expansion of specimens
45	E	B	No notable changes
60	E	ALL	No notable changes
60	U	A, C	Further expansion of specimens
75	U	D	Minor expansion near top of specimen
90	E/U	ALL	No notable changes
105	U	A, C, D	Further expansion
120	E/U	ALL	No notable changes
135	E	ALL	No notable changes
135	U	B	Minor visible expansion
150	U	A, C	Visible discolouring of specimen above top thermocouple locations
175	U	C	Visible gap in junction, right of TC20, with smoke protruding from gap
195	U	B	Increased amount of smoke, discolouring along entire seal
195	U	A, C	Cracks forming on seal surface
210	U	A	Further discoloring near top of seal
210	U	C	Further discolouring near centre of specimen

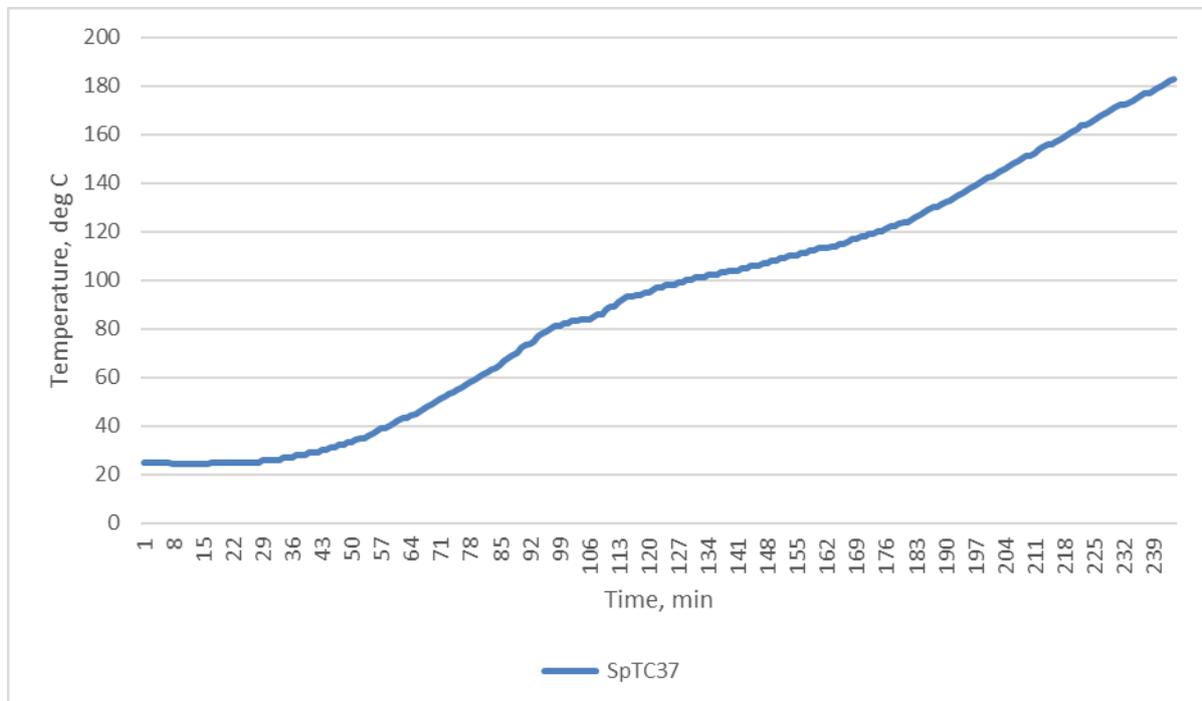
210	E	B	Expanded specimen beginning to peel away from separating element
220	U	B	Further visible expansion
225	U	A, C	Further discolouring and cracking of surface
225	E	B	Piece of specimen has broken off from surface, opening visible gaps
238	U	C	Cotton pad test for 30 seconds near centre of seal - Pass
243			TEST DISCONTINUED

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

9. Separating element

Concrete Slab (1.1) was cut into 5 slabs with a width of 210mm (nominal) and a height of 1190mm (nominal). The cut concrete slabs were placed in the refractory frame and fixed using steel saddle clamps (1.3) and drive anchors (4.1). The horizontal spacing between each concrete slab from left to right (unexposed view) was measured to be 30mm, 20mm, 20mm and 20mm. The spacing between outer concrete slabs and the refractory frame was packed using ceramic fibre.

Separating element temperature



10. Specimens

Unexposed faced:



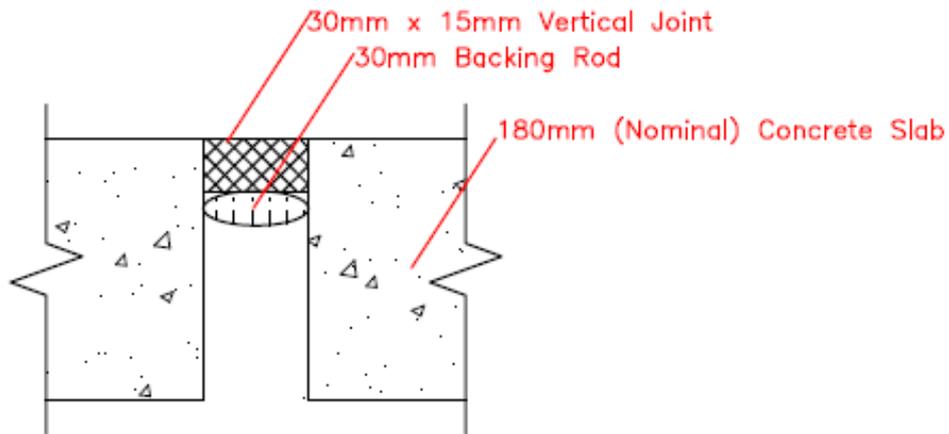
Exposed face:



10.1 Specimen A

Unexposed Face
(Non-Fire Side)

Specimen A



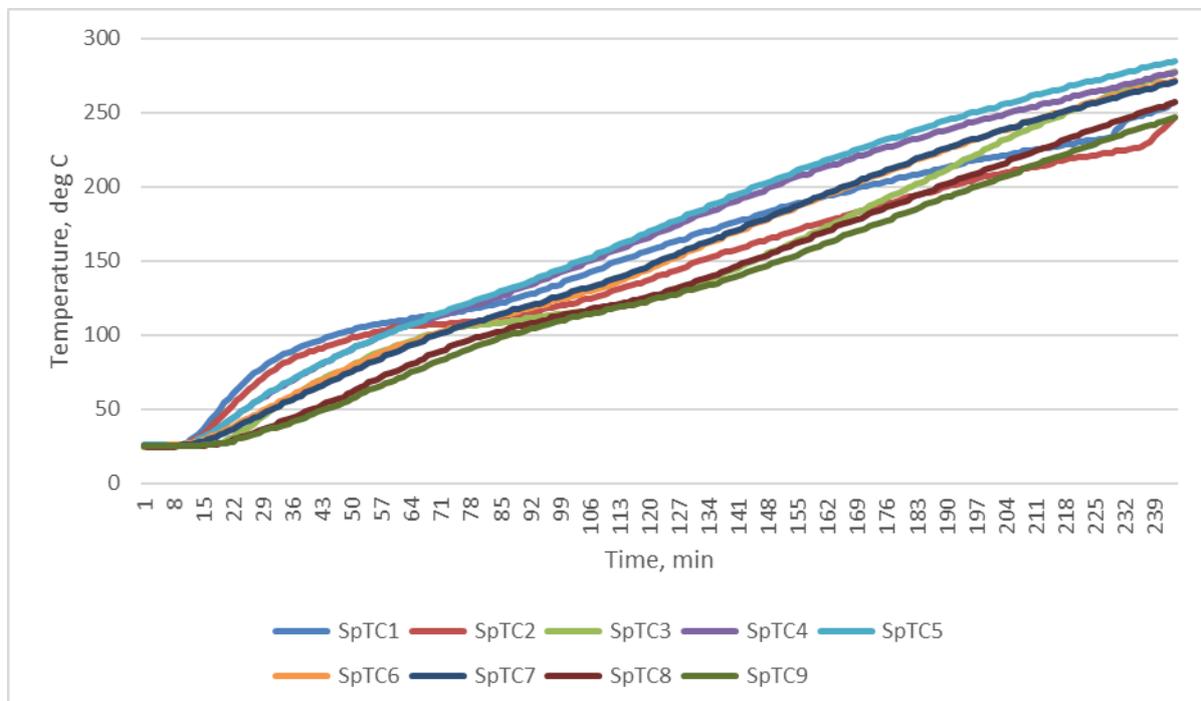
Exposed Face
(Fire Side)

Penetration System		
A	Service	30mm Butt-joined Vertical Linear Joint
	Joint Details	Sealant (3.1)
	Aperture Size	Width/Height (W/H): 30mm x 1200mm
Local Fire-stopping Protection		
	Application	Asymmetrical
	Protection Used	PEF Backing rod (4.2) was pressed into the Concrete Slab (1.2) separating element gap from the unexposed face. PEF rod was recessed 15mm from the surface. Sealant (3.1) was applied on top of the PEF rod, flush with the separating element face, resulting in a 15mm (nominal) depth of sealant along the aperture.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 243 min
Insulation	151 min

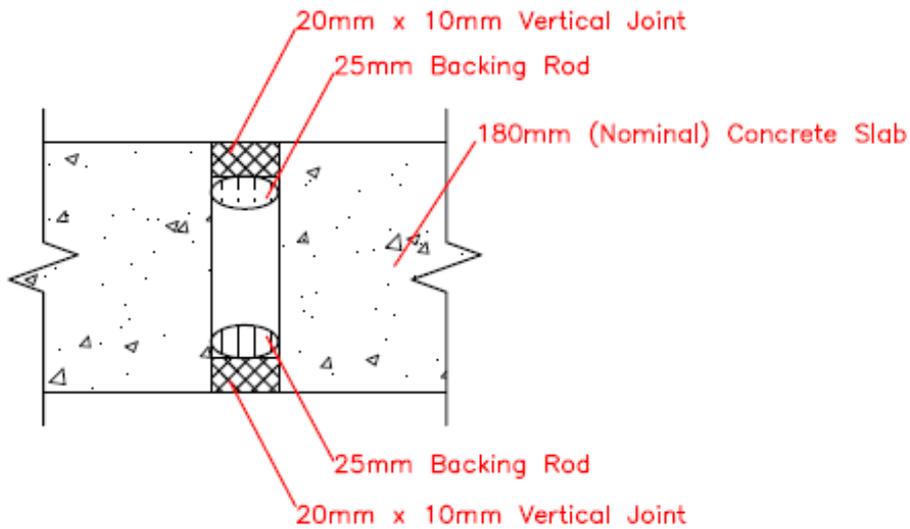
Specimen A Thermocouples Readings



10.2 Specimen B

Unexposed Face
(Non-Fire Side)

Specimen B



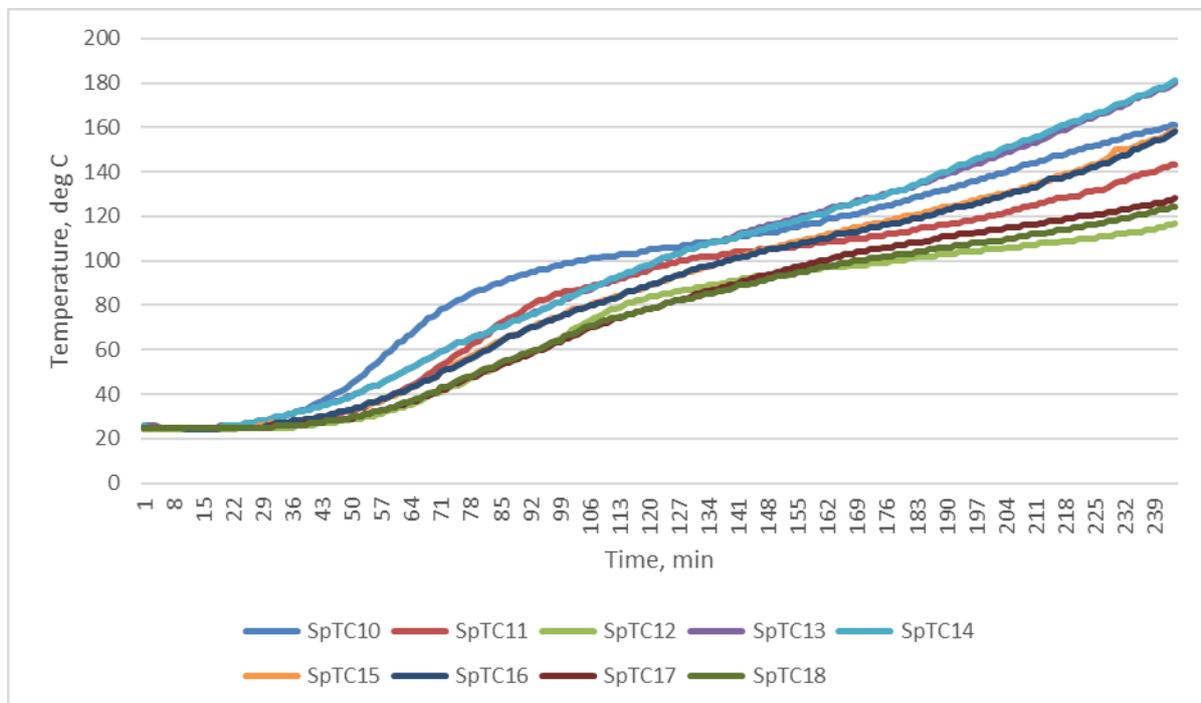
Exposed Face
(Fire Side)

Penetration System		
B	Service	20mm Butt-jointed Vertical Linear Joint
	Joint Details	Sealant (3.1)
	Aperture Size	Width/Height (W/H): 20mm x 1200mm
Local Fire-stopping Protection		
	Application	Symmetrical
	Protection Used	PEF Backing rod (4.2) was pressed into the Concrete Slab (1.2) separating element gap from both faces. PEF rod was recessed 10mm from the surfaces. Sealant (3.1) was applied on top of both PEF rods, flush with the separating element faces, resulting in a 10mm (nominal) depth of sealant along each aperture.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 243 min
Insulation	No failure at 243 min

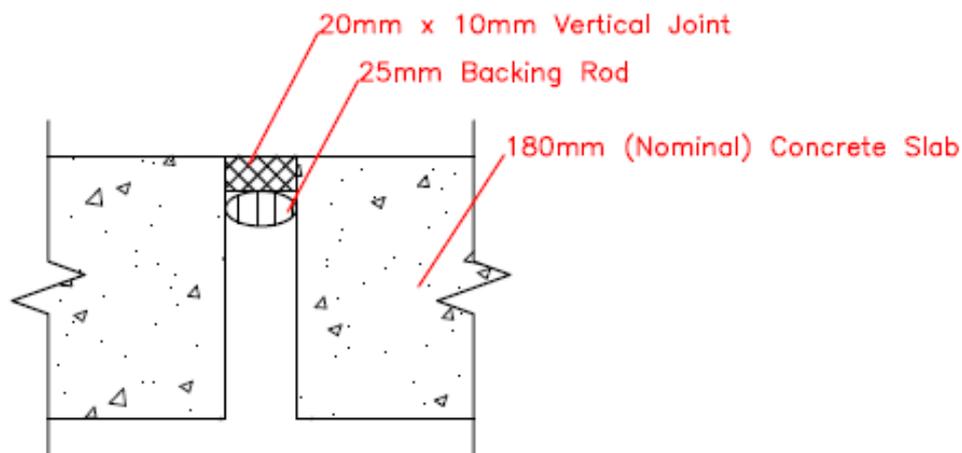
Specimen B Thermocouples Readings



10.3 Specimen C

Unexposed Face
(Non-Fire Side)

Specimen C



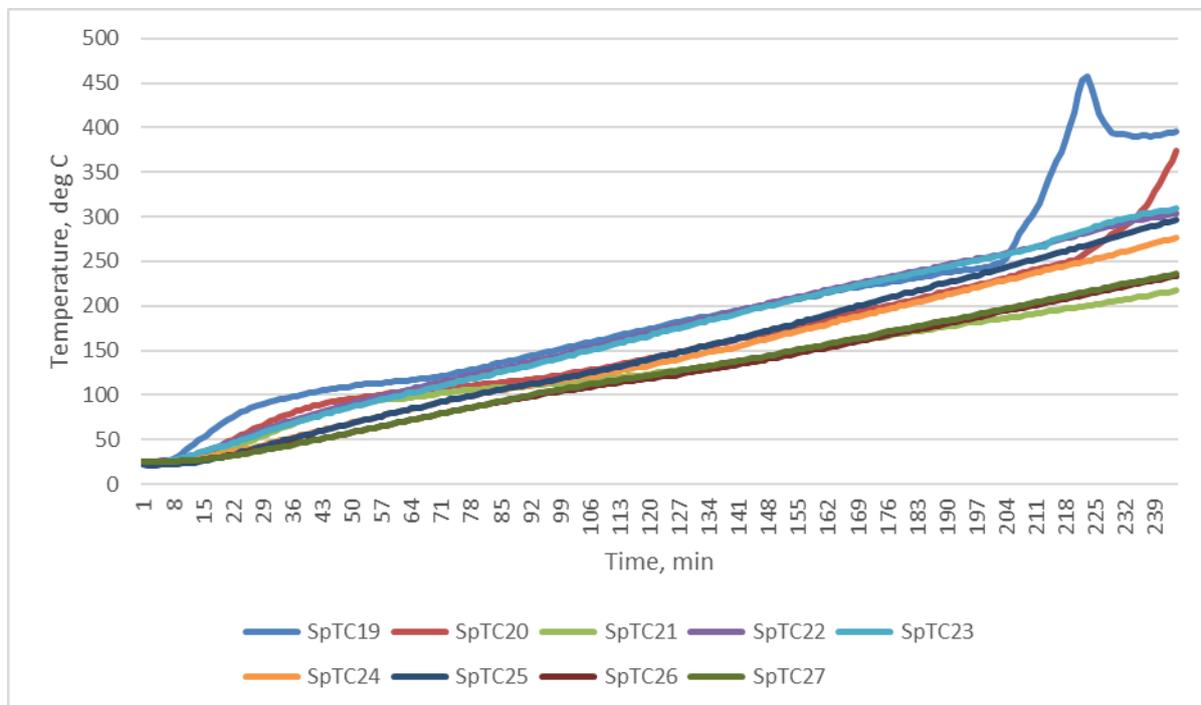
Exposed Face
(Fire Side)

Penetration System		
C	Service	20mm Butt-joined Vertical Linear Joint
	Joint Details	Sealant (3.1)
	Aperture Size	Width/Height (W/H): 20mm x 1200mm
	Local Fire-stopping Protection	
	Application	Asymmetrical
	Protection Used	PEF Backing rod (4.2) was pressed into the Concrete Slab (1.2) separating element gap from the unexposed face. PEF rod was recessed 10mm from the surface. Sealant (3.1) was applied on top of the PEF rod, flush with the separating element face, resulting in a 10mm (nominal) depth of sealant along the aperture.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 243 min
Insulation	151 min

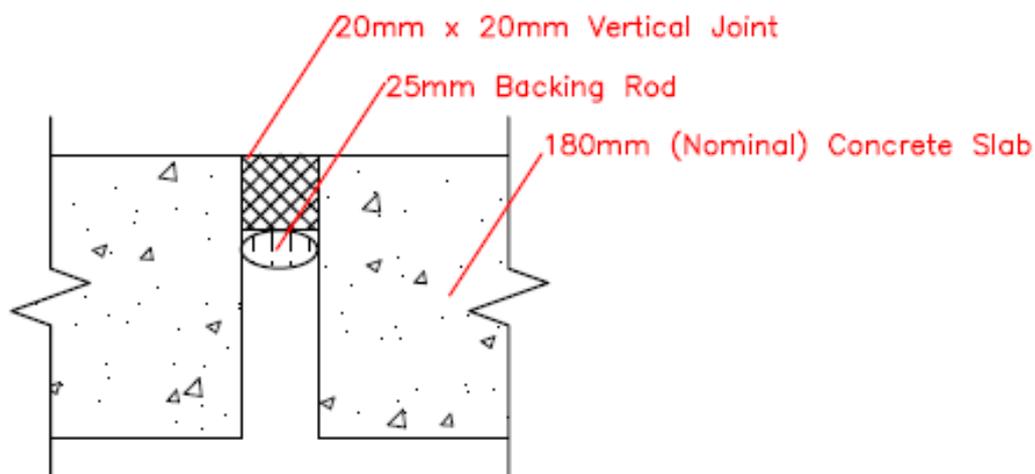
Specimen C Thermocouples Readings



10.4 Specimen D

Unexposed Face
(Non-Fire Side)

Specimen D



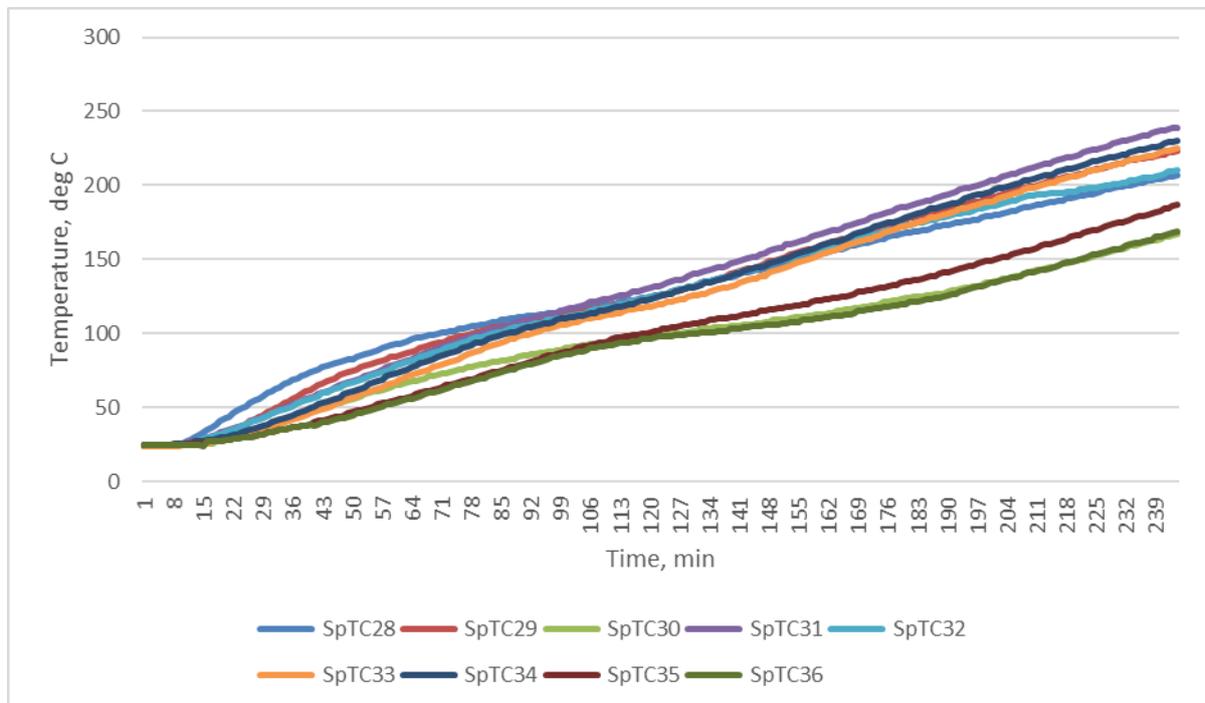
Exposed Face
(Fire Side)

Penetration System		
D	Service	20mm Butt-joined Vertical Linear Joint
	Joint Details	Sealant (3.1)
	Aperture Size	Width/Height (W/H): 20mm x 1200mm
	Local Fire-stopping Protection	
	Application	Asymmetrical
	Protection Used	PEF Backing rod (4.2) was pressed into the Concrete Slab (1.2) separating element gap from the unexposed face. PEF rod was recessed 20mm from the surface. Sealant (3.1) was applied on top of the PEF rod, flush with the separating element face, resulting in a 20mm (nominal) depth of sealant along the aperture.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 243 min
Insulation	203 min

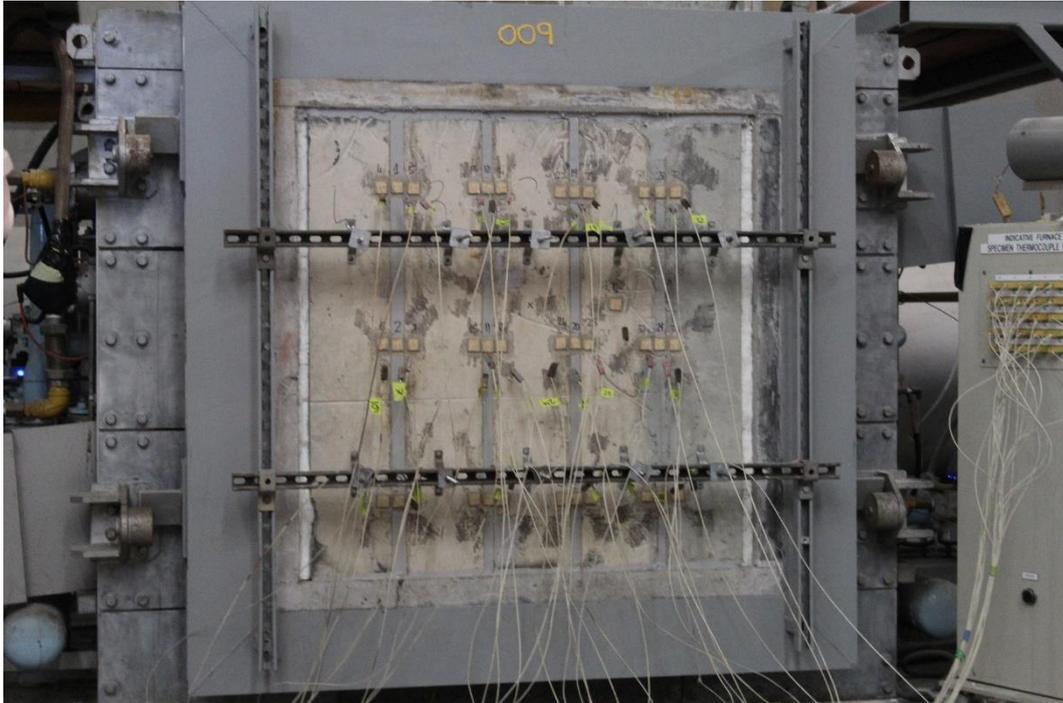
Specimen D Thermocouples Readings



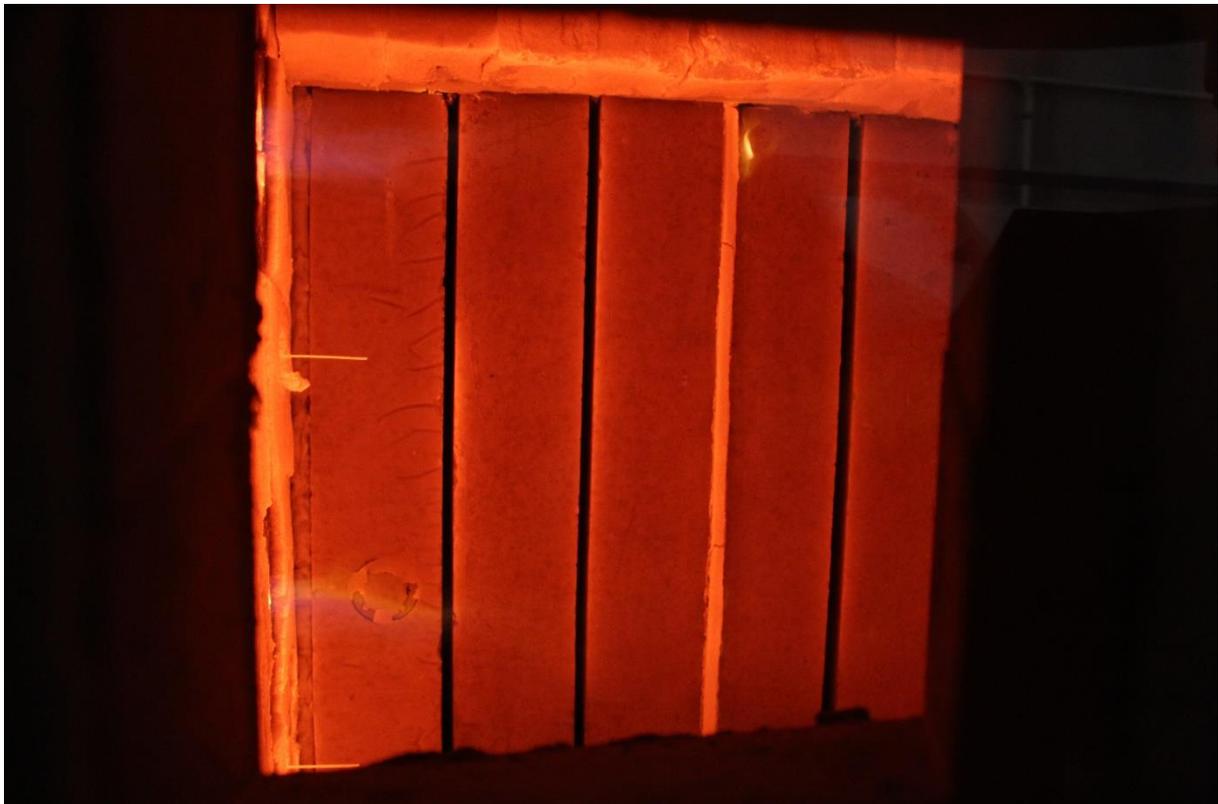
11. Additional photographs

11.1 During and after the test

10 minutes:



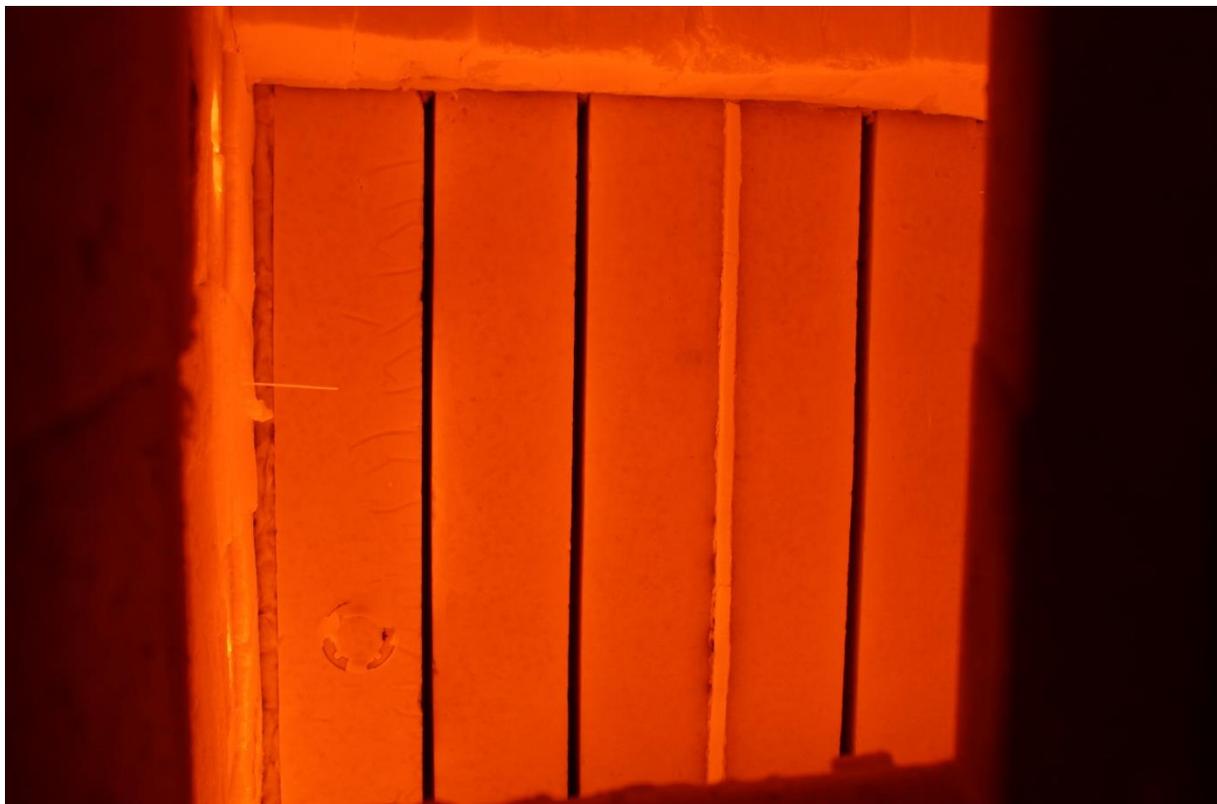
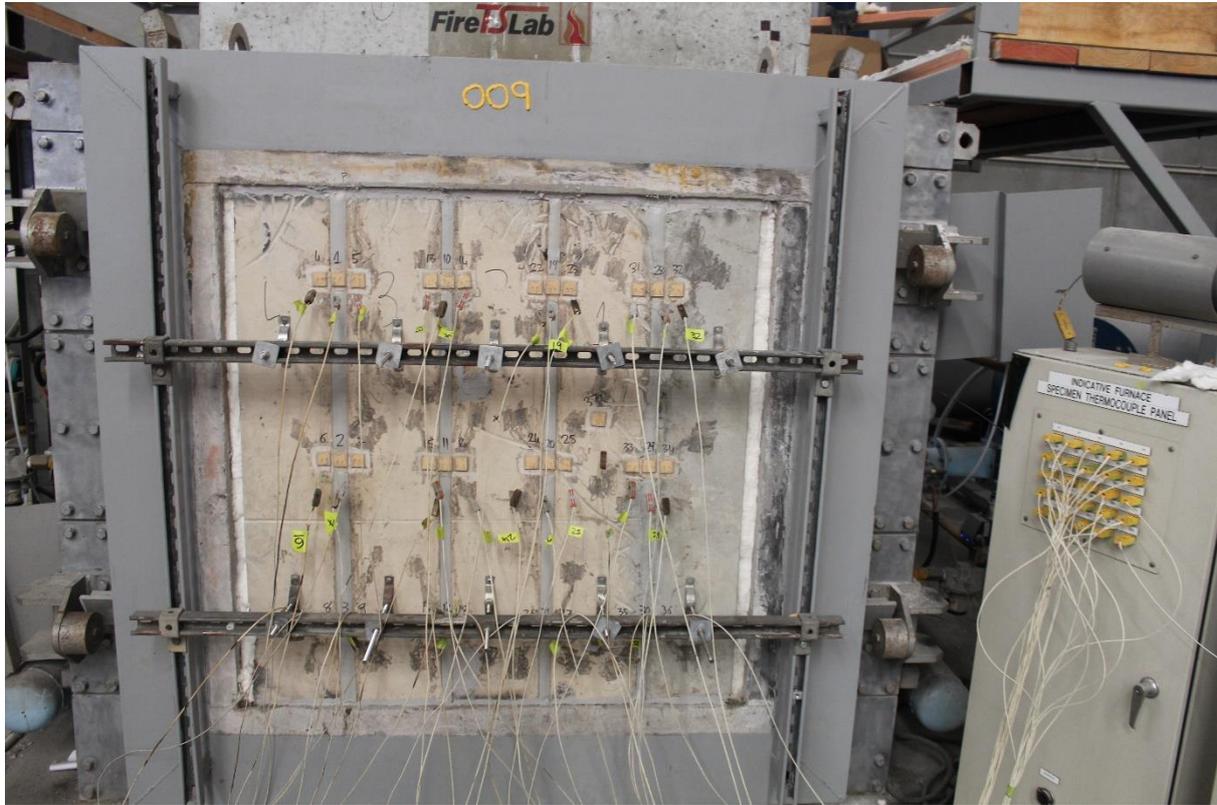
30 minutes:



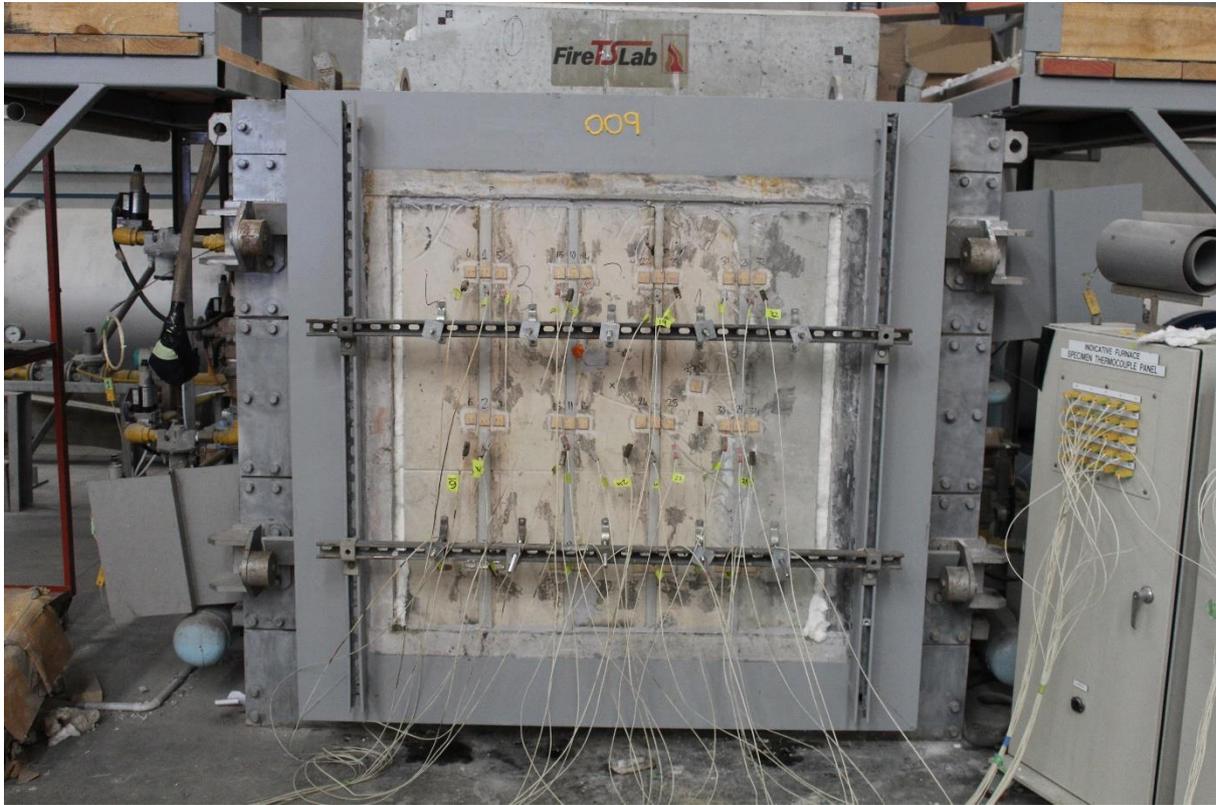
60 minutes:



120 minutes:



180 minutes:



240 minutes:



After the test:

