

Warringtonfire
Chiltern House
Stocking Lane
High Wycombe
HP14 4ND
United Kingdom
T: +44 (0)1494 569750
W: www.warringtonfire.com



Title:

The fire resistance performance of 3no. vertical and 3no. horizontal linear joint seals with associated supporting constructions, when tested in accordance with BS EN 1366-4:2021 and BS EN 1363-1: 2020

Date Of Test:

16/05/2023

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18/01/2024

WF Report No:

WF 529939



Prepared for:

Soudal UK

Soudal House,
Centurion Way,
Tamworth,
B77 5PN

Approved Body No: 1314



Test Specimen

Summary of Tested Specimen	3 no. horizontal and 3 no. vertical linear joint seals were installed into a plasterboard clad EI 60 steel stud supporting construction with steel ‘C’ studs meeting the specification of Group A within table 1 of EN 1363-1. The horizontal linear joint seals were designated as A1, A2 & A3, and the vertical linear joint seals were designated as B1, B2 & B3. The seals were comprised of Soudafoam FR HY fully filling the 15mm gap between the framing material and the supporting construction and cut back to sit flush with the framing material. A Jeld-Wen UK Melton hardwood framing material 900mm long x 28mm high x 85mm deep was placed into each aperture. Seals A2, A3, B1 & B2 were fitted flush to the exposed face, and Seals A1 & B3 were fitted flush to the unexposed face.
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Detailed drawings of the test specimen and a comprehensive description of the test construction based on a detailed survey of the specimen and information supplied by the sponsor of the test are included in the Test Specimen and Schedule of Components sections of this report.

Performance Criteria and Test Results

This section summarises the results achieved by the test specimens against the performance criteria listed in BS EN 1366-4:2021 and BS EN 1363-1:2020 for the following parameters:

Integrity: The specimen must retain its separating function, without causing either ignition of a cotton pad when applied, or resulting in sustained flaming on the unexposed surface.

Insulation: It is required that the maximum temperature rise at any individual location on the unexposed surface shall not be greater than 180°C. Insulation failure also occurs simultaneously with integrity failure as specified in BS EN 1363-1:2020.

The test results only apply to the tested orientation.

Test results – Specimen A1

Performance criteria		Results
Integrity	Ignition of a cotton pad	No failure occurred for this criteria prior to the test being discontinued
	Sustained flaming	No failure occurred for this criteria prior to the test being discontinued
Insulation		No failure occurred for this criteria prior to the test being discontinued
The test was discontinued for this specimen after a duration of 72 (seventy two) minutes.		

Test results – Specimen A2

Performance criteria		Results
Integrity	Ignition of a cotton pad	No failure occurred for this criteria prior to the test being discontinued
	Sustained flaming	No failure occurred for this criteria prior to the test being discontinued
Insulation		No failure occurred for this criteria prior to the test being discontinued
The test was discontinued for this specimen after a duration of 72 (seventy two) minutes.		

Test results – Specimen A3

Performance criteria		Results
Integrity	Ignition of a cotton pad	No failure occurred for this criteria prior to the test being discontinued
	Sustained flaming	No failure occurred for this criteria prior to the test being discontinued
Insulation		66 (sixty-six) minutes
The test was discontinued for this specimen after a duration of 72 (seventy two) minutes.		

Test results – Specimen B1

Performance criteria		Results
Integrity	Ignition of a cotton pad	No failure occurred for this criteria prior to the test being discontinued
	Sustained flaming	No failure occurred for this criteria prior to the test being discontinued
Insulation		No failure occurred for this criteria prior to the test being discontinued
The test was discontinued for this specimen after a duration of 72 (seventy two) minutes.		

Test results – Specimen B2

Performance criteria		Results
Integrity	Ignition of a cotton pad	No failure occurred for this criteria prior to the test being discontinued
	Sustained flaming	68 (sixty-eight) minutes
Insulation		68 (sixty-eight) minutes*
The test was discontinued for this specimen after a duration of 72 (seventy two) minutes.		
‘*’ indicates failure due to integrity failure.		

Test results – Specimen B3

Performance criteria		Results
Integrity	Ignition of a cotton pad	No failure occurred for this criteria prior to the test being discontinued
	Sustained flaming	No failure occurred for this criteria prior to the test being discontinued
Insulation		No failure occurred for this criteria prior to the test being discontinued
The test was discontinued for this specimen after a duration of 72 (seventy two) minutes.		

Quality Management

Version	Date	Information about the report	
1	18 January 2024	Description	Initial issue
		Prepared by	
		Authorised by	
		Name	Adriano Montanino
		Signature	Rob Axe
		DocuSigned by:  0612F5967A5B4AA...	DocuSigned by:  A16C1E7E36D44A0...

Signed for and on behalf of Warringtonfire Testing and Certification Limited

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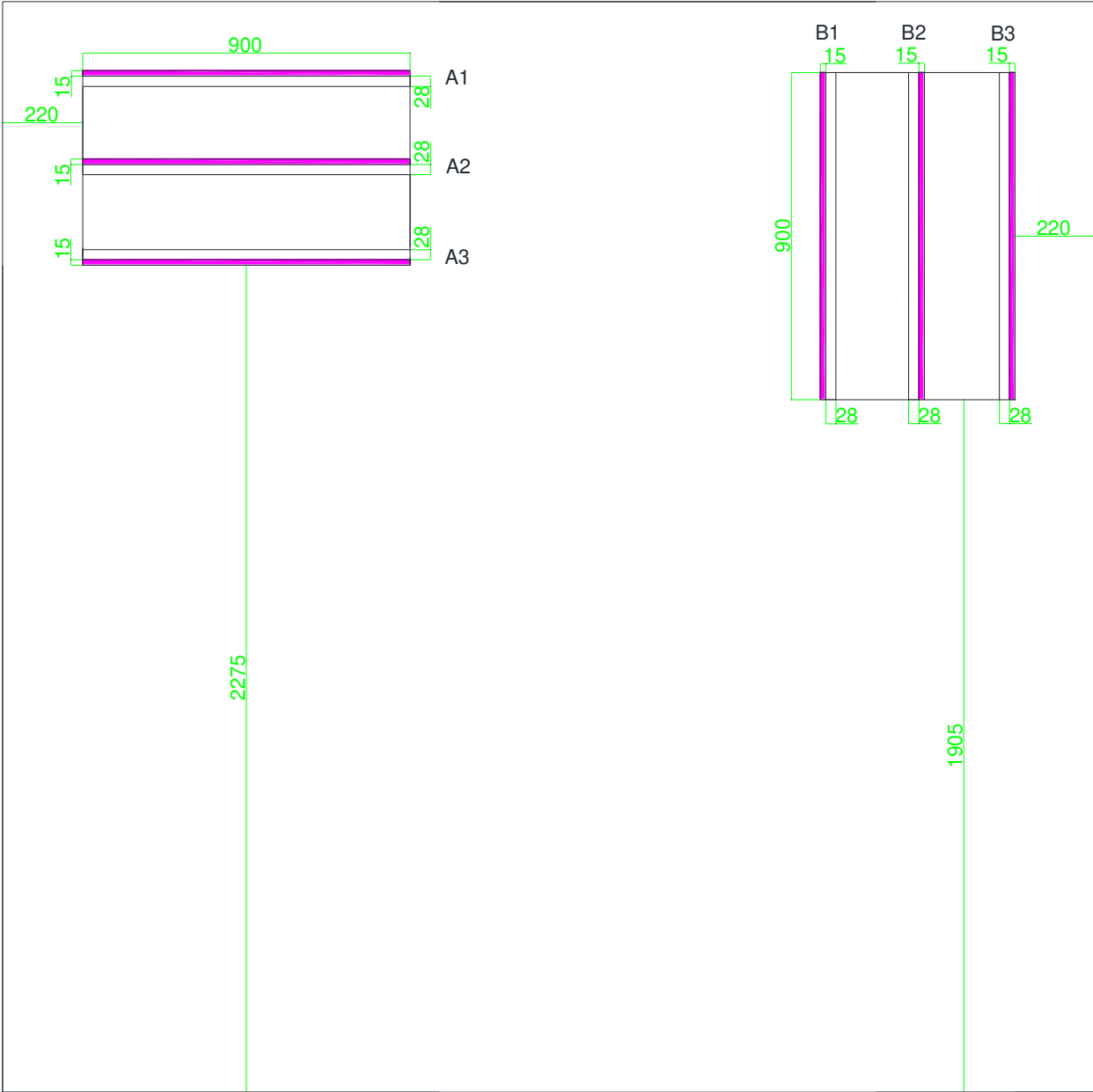
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Test Conditions

Standard	BS EN 1366-4: 2021 (with BS National Annex), Fire resistance tests for service installations Part 4: Linear Joint Seals and BS EN 1363-1: 2020, Fire resistance tests Part 1: General requirements.
Deviations from test method	None
Sampling	Warringtonfire was not involved in factory sampling of the products and materials used for the test specimen described in this report, and as such the results of this test apply to the sample as received.
Supporting Construction	Warringtonfire provided a plasterboard clad EI 60 steel stud supporting construction with steel 'C' studs meeting the specification of Group A within table 1 of EN 1363-1: type supporting construction as defined in clause 7.3.2 of BSEN 1366-4:2021. Additional associated supporting elements were installed by Warringtonfire on behalf of the client alongside the supporting construction.
Installation	The components were received during the month of May. The specimens were installed directly into the supporting construction by representatives of the client with the assistance of Warringtonfire , as necessary.
Induced Movement	The scope of this test did not include an induced movement to the installed sample, and hence it was not conducted.
Conditioning	Warringtonfire stored the specimens in climatic conditions approximate to those expected in normal service, and used the guidelines of Annex F.1 of BS EN 1363 – 1: 2020 to establish a suitable conditioned level where possible.
Ambient Temperature	The ambient air temperature in the vicinity of the test construction was 10 °C at the start of the test with a maximum variation of +2°C during the test.
Furnace	The furnace was controlled so that its mean temperature complied with the requirements of BS EN 1363-1: 2020 Clause 5.1 using nine plate thermometers, distributed over a plane 100±50 mm from the surface of the test construction.
Thermocouples	Thermocouples were provided to monitor the unexposed surface of the specimen at the positions described in BSEN 1366-4:2021. The output of all instrumentation was recorded at no less than one minute intervals. The locations and reference numbers of the various unexposed surface thermocouples are shown in Figure 1. A roving thermocouple was available to monitor any positions suspected of being at a greater temperature than indicated by fixed position thermocouples
Furnace Pressure	Vertical After the first 5 minutes of the test, the furnace pressure was maintained at -1 Pa ± 5 Pa and after 10 minutes was maintained at -1 Pa ± 3 Pa with respect to atmosphere, equating to 15Pa at the centre of the lowest positioned seal 2380mm above the furnace floor.

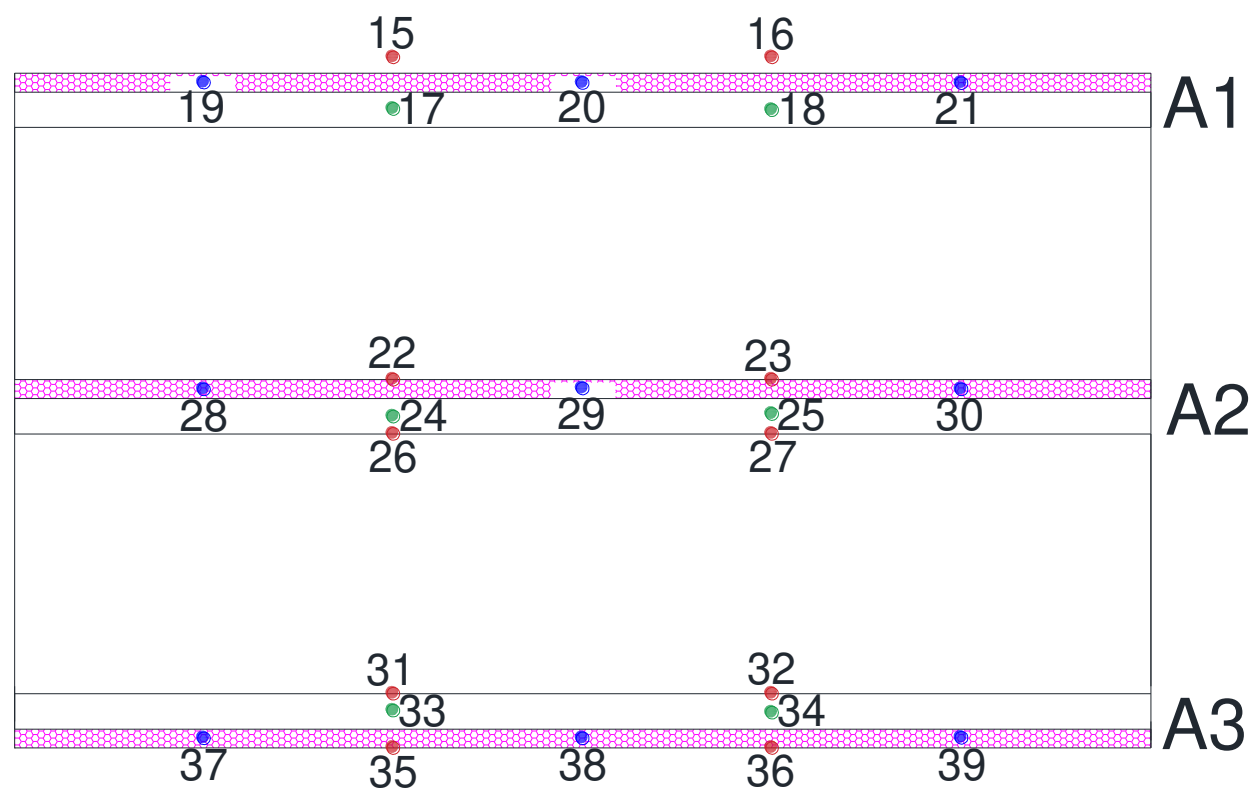
Test Specimen Drawings

Figure 1 – Unexposed face elevation of the test construction with dimensions



Do not scale. All dimensions are in mm

Figure 2 – Unexposed face elevation of the specimens A1 to A3 with thermocouple locations

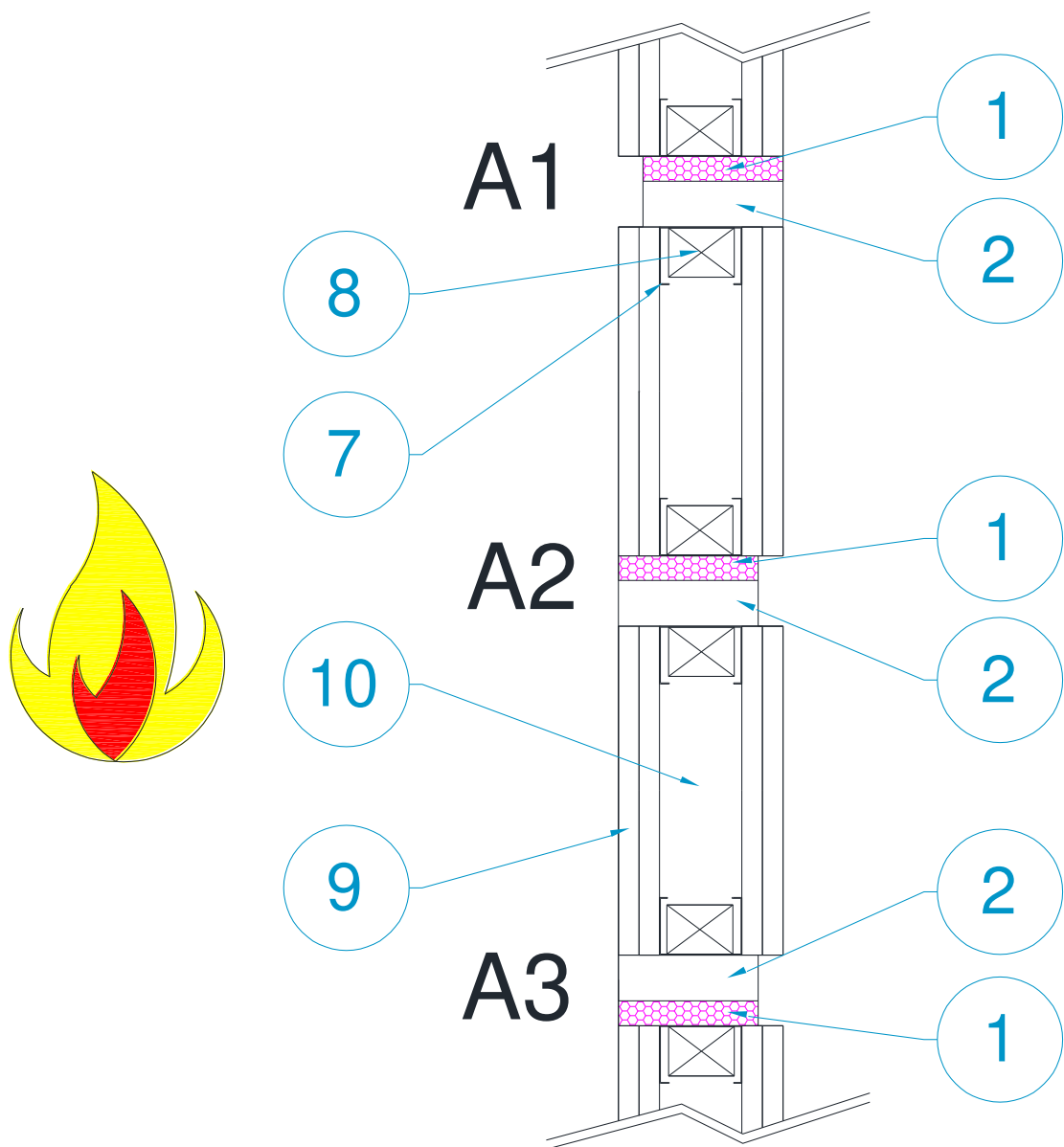


- : Thermocouples on Framing
- : Thermocouples on Joint Seal
- : Thermocouples on Supporting Construction

Viewed From Unexposed Face

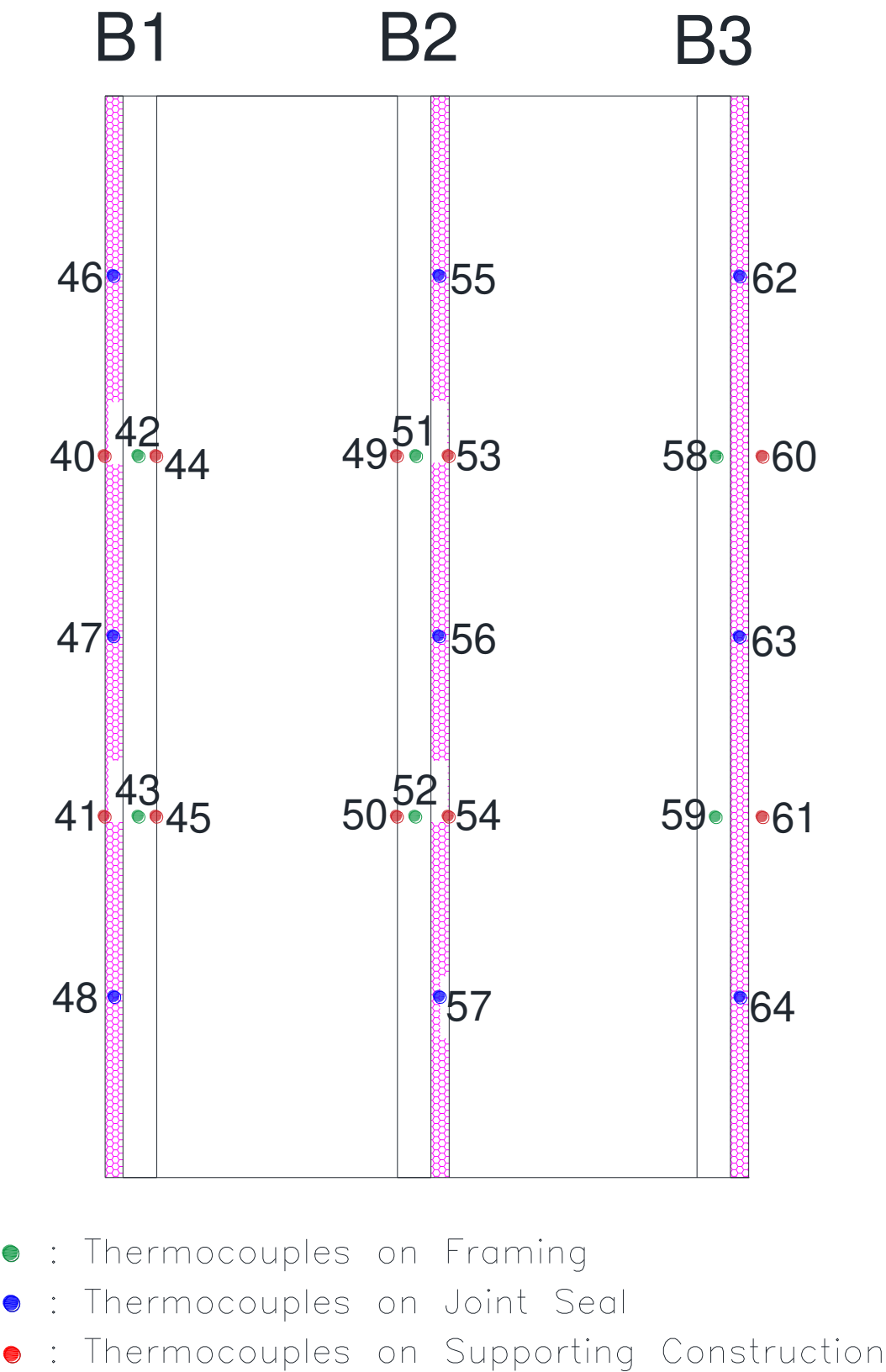
Do not scale.

Figure 3 – Cross-section of specimens A1 to A3



Do not scale.
Figures referenced in drawings refer to component numbers within 'Schedule of Components'

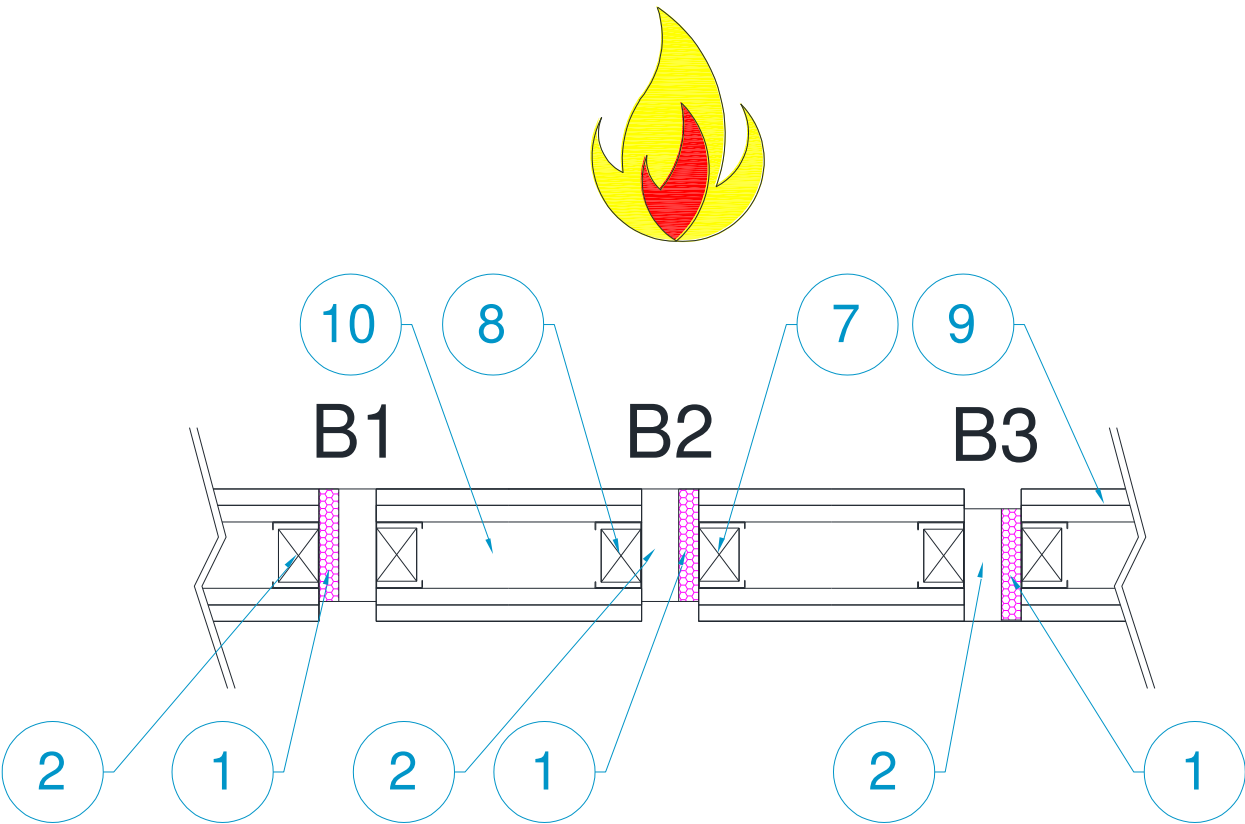
Figure 4 – Unexposed face elevation of the specimens B1 to B3 with thermocouple locations



Viewed From Unexposed Face

Do not scale.

Figure 5 – Cross-section of specimens B1 to B3



Do not scale.
Figures referenced in drawings refer to component numbers within 'Schedule of Components'

Schedule of Components

(Refer to Figures 1 to 5)
(All values are nominal unless stated otherwise)
* Stated by sponsor, not verified by laboratory

Specimen A1 (Sample No. 1a)

1. Seal		Description
Manufacturer	:	Soudal
Reference	:	Soudafoam FR HY
Material	:	Polyurethane foam
Overall section size	:	15mm wide x 85mm
Application method	:	Foam cannister

2. Framing Material		Description
Manufacturer	:	Jeld-Wen UK Melton*
Reference	:	DFR0306*, DFR0307*, DFR0308*
Material	:	Solid Hardwood*
Density	:	626kg/m ³
Moisture content	:	11%
Weight	:	1.341kg
Overall size	:	900mm x 28mm x 85mm
Details of fixings to supporting construction		
Manufacturer	:	Held on file by Warringtonfire
Reference	:	Gold screw
Type & material	:	Carbon steel woodscrew
Overall size	:	5mm Ø x 100mm
Locations	:	Adjacent to packers

3. Sealant		Description
Manufacturer	:	Mann McGowan
Reference	:	Pyromas A
Material	:	Intumescent mastic
Location	:	Applied between the supporting construction and framing material

4. Packing Material		Description
Manufacturer	:	Promat

4. Packing Material		Description
Reference	:	Supalux
Material	:	Calcium silicate boards separated by a bead of mastic
Overall size	:	6mm boards, cut back 10mm from face of partition for foam application
Location	:	100mm from both ends of seal

Specimen A2 (Sample No. 1b)

1. Seal		Description
Manufacturer	:	Soudal
Reference	:	Soudafoam FR HY
Material	:	Polyurethane foam
Overall section size	:	15mm wide x 85mm
Application method	:	Foam cannister

2. Framing Material		Description
Manufacturer	:	Jeld-Wen UK Melton*
Reference	:	DFR0306*, DFR0307*, DFR0308*
Material	:	Solid Hardwood*
Density	:	567kg/m ³
Moisture content	:	14%
Weight	:	1.214kg
Overall size	:	900mm x 28mm x 85mm
Details of fixings to supporting construction		
Manufacturer	:	Held on file by Warringtonfire
Reference	:	Gold screw
Type & material	:	Carbon steel woodscrew
Overall size	:	5mm Ø x 100mm
Locations	:	Adjacent to packers

3. Sealant		Description
Manufacturer	:	Mann McGowan
Reference	:	Pyromas A
Material	:	Intumescent mastic
Location	:	Applied between the supporting construction and framing material

4. Packing Material		Description
Manufacturer	:	Promat
Reference	:	Supalux
Material	:	Calcium silicate boards separated by a bead of mastic
Overall size	:	6mm boards, cut back 10mm from face of partition for foam application
Location	:	100mm from both ends of seal

Specimen A3 (Sample No. 3)

1. Seal		Description
Manufacturer	:	Soudal
Reference	:	Soudafoam FR HY
Material	:	Polyurethane foam
Overall section size	:	15mm wide x 85mm
Application method	:	Foam cannister

2. Framing Material		Description
Manufacturer	:	Jeld-Wen UK Melton*
Reference	:	DFR0306*, DFR0307*, DFR0308*
Material	:	Solid Hardwood*
Density	:	568kg/m ³
Moisture content	:	13%
Weight	:	1.216kg
Overall size	:	900mm x 28mm x 85mm
Details of fixings to supporting construction		
Manufacturer	:	Held on file by Warringtonfire
Reference	:	Gold screw
Type & material	:	Carbon steel woodscrew
Overall size	:	5mm Ø x 100mm
Locations	:	Adjacent to packers

3. Sealant		Description
Manufacturer	:	Mann McGowan
Reference	:	Pyromas A
Material	:	Intumescent mastic
Location	:	Applied between the supporting construction and framing material

4. Packing Material		Description
Manufacturer	:	Screwfix
Material	:	Plastic
Overall size	:	1.6mm thick cut back 10mm from face of partition for foam application
Location	:	100mm from both ends of seal

Specimen B1 (Sample No. 4)

1. Seal		Description
Manufacturer	:	Soudal
Reference	:	Soudafoam FR HY
Material	:	Polyurethane foam
Overall section size	:	15mm wide x 85mm
Application method	:	Foam cannister

2. Framing Material		Description
Manufacturer	:	Jeld-Wen UK Melton*
Reference	:	DFR0306*, DFR0307*, DFR0308*
Material	:	Solid Hardwood*
Density	:	639kg/m ³
Moisture content	:	8%
Weight	:	1.368kg
Overall size	:	900mm x 28mm x 85mm
Details of fixings to supporting construction		
Manufacturer	:	Held on file by Warringtonfire
Reference	:	Gold screw
Type & material	:	Carbon steel woodscrew
Overall size	:	5mm Ø x 100mm
Locations	:	Adjacent to packers

3. Sealant		Description
Manufacturer	:	Mann McGowan
Reference	:	Pyromas A
Material	:	Intumescent mastic
Location	:	Applied between the supporting construction and framing material

4. Packing Material		Description
Manufacturer	:	Screwfix
Material	:	Plastic
Overall size	:	1.6mm thick cut back 10mm from face of partition for foam application
Location	:	100mm from both ends of seal

Specimen B2 (Sample No. 2b)

1. Seal		Description
Manufacturer	:	Soudal
Reference	:	Soudafoam FR HY
Material	:	Polyurethane foam
Overall section size	:	15mm wide x 85mm
Application method	:	Foam cannister

2. Framing Material		Description
Manufacturer	:	Jeld-Wen UK Melton*
Reference	:	DFR0306*, DFR0307*, DFR0308*
Material	:	Solid Hardwood*
Density	:	746kg/m ³
Moisture content	:	12%
Weight	:	1.597kg
Overall size	:	900mm x 28mm x 85mm
Details of fixings to supporting construction		
Manufacturer	:	Held on file by Warringtonfire
Reference	:	Gold screw
Type & material	:	Carbon steel woodscrew
Overall size	:	5mm Ø x 100mm
Locations	:	Adjacent to packers

3. Sealant		Description
Manufacturer	:	Mann McGowan
Reference	:	Pyromas A
Material	:	Intumescent mastic
Location	:	Applied between the supporting construction and framing material

4. Packing Material		Description
Manufacturer	:	Held of file by Warringtonfire – see DIAP section for packer considerations
Reference	:	Held of file by Warringtonfire – see DIAP section for packer considerations
Material	:	Calcium silicate boards separated by a bead of mastic
Overall size	:	6mm boards, cut back 10mm from face of partition for foam application
Location	:	100mm from both ends of seal

Specimen B3 (Sample No. 2a)

1. Seal		Description
Manufacturer	:	Soudal
Reference	:	Soudafoam FR HY
Material	:	Polyurethane foam
Overall section size	:	15mm wide x 85mm
Application method	:	Foam cannister

2. Framing Material		Description
Manufacturer	:	Jeld-Wen UK Melton*
Reference	:	DFR0306*, DFR0307*, DFR0308*
Material	:	Solid Hardwood*
Density	:	620kg/m ³
Moisture content	:	6%
Weight	:	1.329kg
Overall size	:	900mm x 28mm x 85mm
Details of fixings to supporting construction		
Manufacturer	:	Held on file by Warringtonfire
Reference	:	Gold screw
Type & material	:	Carbon steel woodscrew
Overall size	:	5mm Ø x 100mm
Locations	:	Adjacent to packers

3. Sealant		Description
Manufacturer	:	Mann McGowan
Reference	:	Pyromas A
Material	:	Intumescent mastic
Location	:	Applied between the supporting construction and framing material

4. Packing Material		Description
Manufacturer	:	Promat
Reference	:	Supalux
Material	:	Calcium silicate boards separated by a bead of mastic
Overall size	:	6mm boards, cut back 10mm from face of partition for foam application
Location	:	100mm from both ends of seal

Supporting Construction

Item	Detail			
Supporting construction type	A plasterboard clad EI 60 steel stud supporting construction with steel ‘C’ studs meeting the specification of Group A within table 1 of BSEN 1366-4:2021.			
Orientation	Vertical			
Overall construction dimensions	Width	3000		
	Height	3000		
	Depth	100		
Aperture dimensions	Specimen	Width	Height	Depth
	A1	900mm	43mm	100mm
	A2	900mm	43mm	100mm
	A3	900mm	43mm	100mm
	B1	43mm	900mm	100mm
	B2	43mm	900mm	100mm
	B3	43mm	900mm	100mm
5. Head track		Description		
Manufacturer or supplier	:	Speedline		
Reference	:	SPT52		
Material	:	Galvanised steel		
Overall size				
Width	:	52mm		
Flange	:	25mm		
Length	:	3000mm		
Sheet thickness	:	0.5mm		
Details of fixings to restraint frame				
Manufacturer	:	EASYDRIVE		
Reference	:	TX COUNTERSUNK CONCRETE SCREWS		
Type & material	:	Carbon steel zinc plated		
Overall size	:	7.5mm x 80mm		
Spacing	:	50mm from edges and 600mm centres		

6. Base track		Description
Manufacturer or supplier	:	Speedline
Reference	:	SPT52
Material	:	Galvanised steel
Overall size		
Width	:	52mm
Flange	:	25mm
Length	:	3000mm
Sheet thickness	:	0.5mm
Fixing Method to restraint frame and centres	:	
Details of fixings to restraint frame		
Manufacturer	:	EASYDRIVE
Reference	:	TX COUNTERSUNK CONCRETE SCREWS
Type & material	:	Carbon steel zinc plated
Overall size	:	7.5mm x 80mm
Spacing	:	50mm from edges and 600mm centres
7. Vertical / horizontal studs		Description
Manufacturer or supplier	:	Speedline
Reference	:	SPS50
Material	:	Galvanised steel
Spacing	:	600mm centres
Overall size		
Width	:	50mm
Flange	:	32mm
Length	:	3000mm for full height studs
Sheet thickness	:	0.5mm
Fixing method to head and base track		Friction fitted or fixed at specimen aperture locations edges
Manufacturer	:	EASYDRIVE
Reference	:	PHILLIPS WAFFER UNCOLLATED DRYWALLSCREWS
Type & material	:	Carbon steel zinc plated
Overall size	:	4.2mm x 13mm

8. Timber inserts		Description
Manufacturer or Supplier	:	GK
Material	:	Softwood
Location	:	Inserted within C-studs around all apertures
Overall section size		
Width	:	50mm
Thickness	:	25mm
Length	:	3000
Fixing Method to vertical studs	:	Friction fitted
9. Boards applied to the internal framing both face		Description
Manufacturer	:	British Gypsum
Reference	:	Gyproc FireLine 12.5mm
Material	:	Gypsum core with paper liners
No. of layers per face	:	2
Individual board dimension	:	3000mm long x 1200mm wide x 12.5mm thick
Overall dimension	:	3000mm high x 3000mm wide
Details of fixings to internal framing		
Manufacturer	:	EASYDRIVE
Reference	:	Phillips Bugle Uncollated Drywall Screws
Type & material	:	Carbon Steel zinc plated
Overall size	:	3.5mm x 25mm
Spacing	:	50mm from board edges and 300mm centres
10. Insulation		Description
Manufacturer	:	Rockwool
Reference	:	Flexi
Material	:	Mineral wool
Density	:	33kg/m ³
Overall dimension	:	1200mm long x 600mm wide x 50mm thick
Location	:	Sandwiched between all board on the partition
Application method	:	Friction fitted
11. Sealant 1		Description
Manufacturer	:	Mann McGowan
Reference	:	Pyromas A
Material	:	Intumescent mastic
Location	:	Applied underneath the head track, base track, fixed stud and around the perimeter of the partition
Nominal application thickness	:	Nominally 5mm

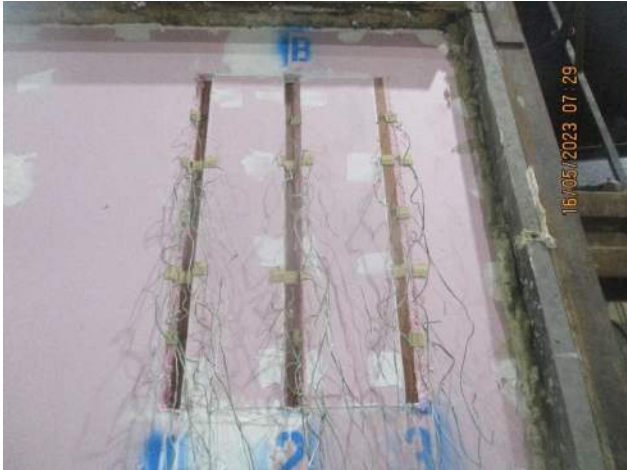
12. Jointing tape		Description
Manufacturer	:	Diall
Reference	:	FIBREGLASS MESH TAPE WHITE
Material	:	Fiberglass Mesh Tape
Location	:	Applied to all exposed board joints
13. Jointing compound		Description
Manufacturer	:	British Gypsum
Reference	:	Gyproc Ready Mix Joint Cement
Material	:	Gyproc filler
Location	:	Applied to all exposed board joints

Photographs of Components

Specimens A1-A3



Specimens B1-B3



Test Observations

Time		All observations are from the unexposed face unless noted otherwise.
Mins	secs	
00	00	The test has started.
01	08	A2. There is smoke issuing at the right side.
01	37	A2. There is smoke issuing at the centre.
03	15	B1 and B2. There is smoke issuing at the top.
03	57	A1. There is smoke issuing approximately 100mm from the right.
04	25	A1. There is smoke issuing approximately 150mm from the left.
05	23	A2. There is smoke issuing approximately 200mm from the left.
06	57	A3. There is smoke issuing at the right side.
08	46	A3. There is smoke issuing at the left side.
10	33	B1. There is smoke issuing approximately 100mm up.
14	43	A1, A2 and A3. There is an increase of smoke issuing at the right side.
15	45	B3. There is smoke issuing at the centre.
18	25	B2. There is an increase of smoke issuing at the top.
19	54	A3. There is an increase of smoke issuing from the left.
21	46	A2. There is an increase of smoke issuing from the right.
22	10	A2. There is discolouration at both sides.
23	06	B1, B2 and B3. There is smoke issuing at the bottom.
25	23	B2. There is an increase of smoke issuing at the top.
25	42	A3. There is an increase of smoke issuing at both sides.
27	06	B2. There is discolouration at the top.
31	35	A1, A2 and A3. There is an increase of smoke issuing at both sides.
38	04	B1. There is an increase of smoke issuing at the bottom
38	28	A3. There is discolouration at the left side.
45	00	There is no change visible.

Time		All observations are from the unexposed face unless noted otherwise.
Mins	secs	
48	06	A2. There is an increase of smoke issuing approximately 200mm in from the left.
49	27	A1. There is an increase in discolouration on the left.
51	06	A3. There is discolouration on the foam approximately 300mm in from the left.
53	34	B2. There is an increase of smoke issuing at the top.
56	39	A2. There is discolouration approximately 200mm in from the left
57	07	A2. There is glow visible on the left.
58	22	A3. There is glow visible on the left.
61	00	A3. A cotton pad test was performed which did not result in the ignition of the cotton pad. No failure.
61	52	B2. There is an increase in discolouration at the top.
63	49	A2. There is glow visible on the right.
64	57	B2. There is glow visible at the top.
65	30	A2. A cotton pad test was performed on the right which did not result in the ignition of the cotton pad. No failure.
66	50	B2. A cotton pad test was performed at the top which did not result in the ignition of the cotton pad. No failure.
67	28	A3. There is glow visible on the right.
68	08	B2. There is continuous flaming at the top therefore constituting integrity failure.
69	50	A2. There is glow visible approximately 200mm in.
71	00	A2. A cotton pad test was performed approximately 200mm in which did not result in the ignition of the cotton pad. No failure.
72	10	A3. A cotton pad test was performed on the left which did not result in the ignition of the cotton pad. No failure.
72	20	Test terminated.

Test Photographs

The
unexposed
face prior
to testing



The
exposed
face prior
to testing



The
unexposed
face after a
test
duration of
10 minutes



The
unexposed
face after a
test
duration of
20 minutes



The
unexposed
face after a
test
duration of
30 minutes



The
unexposed
face after a
test
duration of
40 minutes



The unexposed face after a test duration of 50 minutes 34 seconds



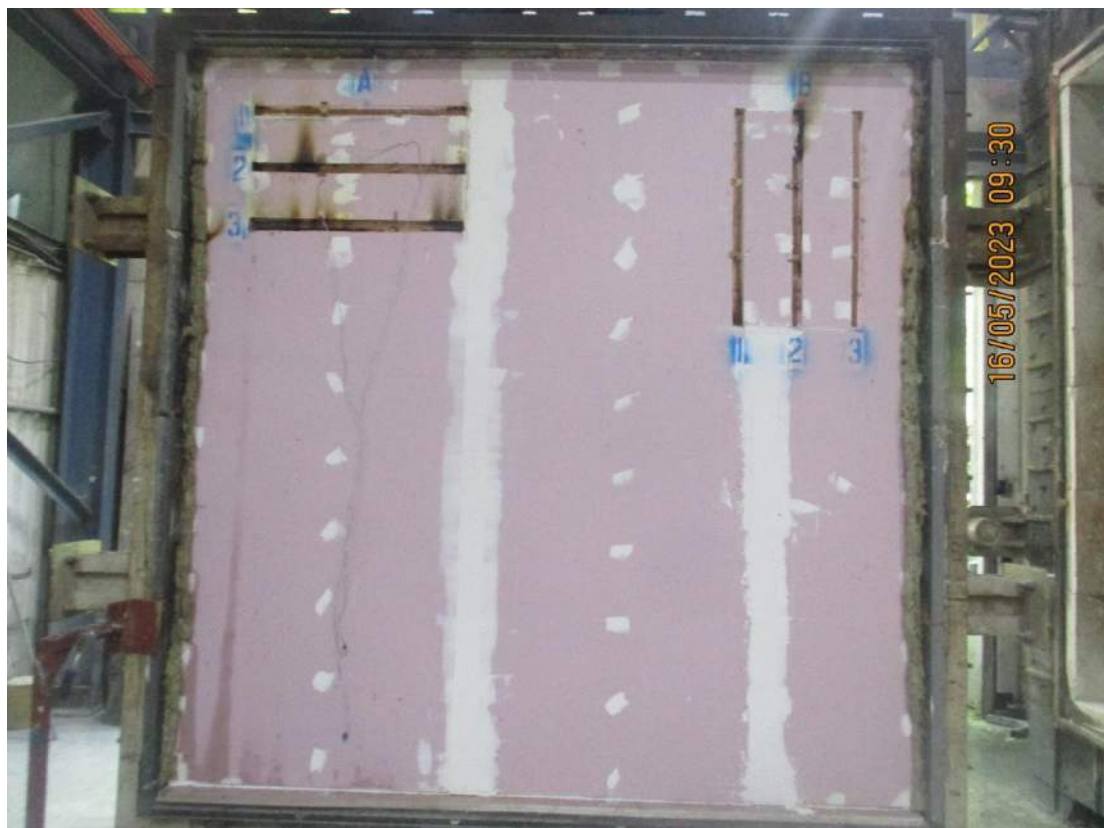
The unexposed face after a test duration of 60 minutes



The
unexposed
face after a
test
duration of
70 minutes



The
unexposed
face after
the
completion
of the test



The
exposed
face after
the
completion
of the test



Thermocouple positions

The temperature of the unexposed face was monitored by means of the following thermocouples.

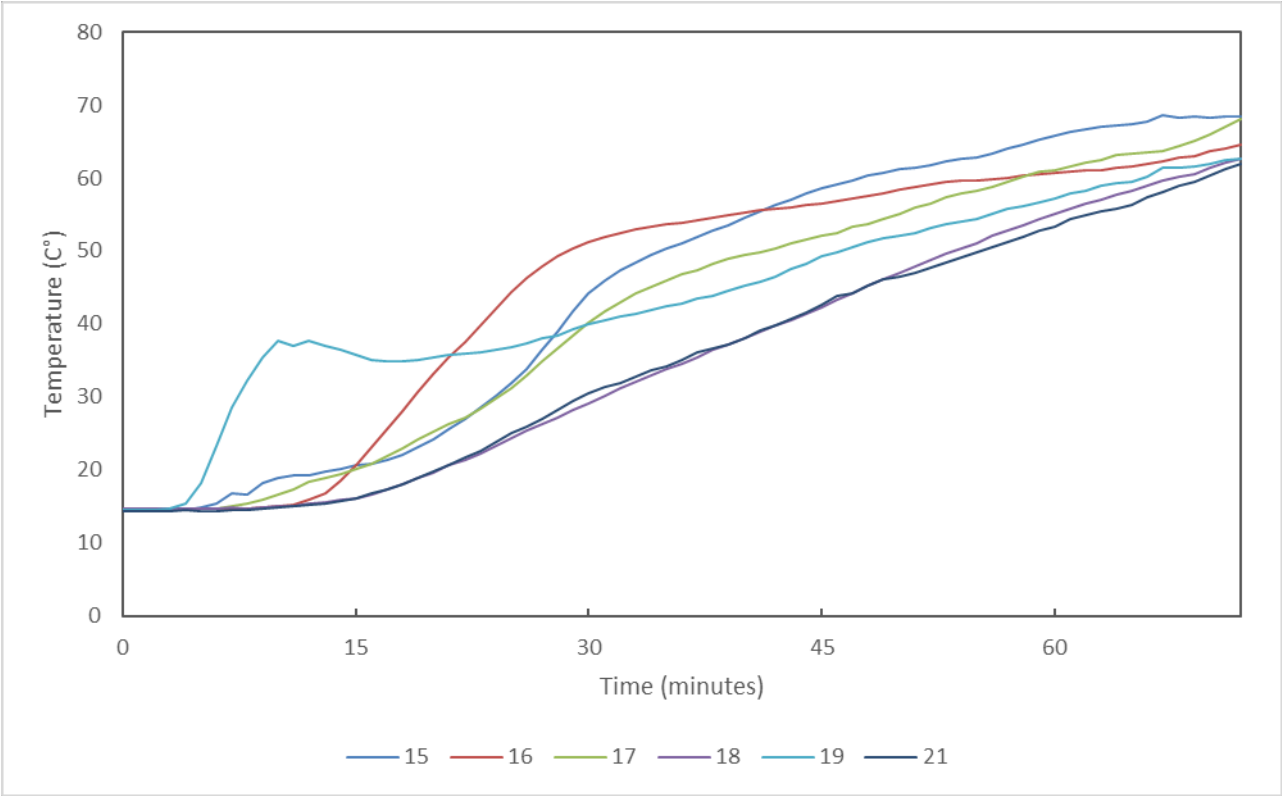
Test specimen	T/C number	Description of location
A1	15	On the supporting construction, 300mm from the left edge of the seal, 15mm from the upper edge of the seal
	16	On the supporting construction, 600mm from the left edge of the seal, 15mm from the upper edge of the seal
	17	On the timber frame section, 300mm from the left edge of the seal, 15mm from the lower edge of the seal
	18	On the timber frame section, 600mm from the left edge of the seal, 15mm from the lower edge of the seal
	19	On the seal 150mm from the left edge of the seal
	20	On the seal 450mm from the left edge of the seal
	21	On the seal 750mm from the left edge of the seal
A2	22	On the supporting construction, 300mm from the left edge of the seal, 15mm from the face of the seal
	23	On the supporting construction, 600mm from the left edge of the seal, 15mm from the face of the seal
	24	On the timber frame section, 300mm from the left edge of the seal, 15mm from the lower edge of the seal
	25	On the timber frame section, 600mm from the left edge of the seal, 15mm from the lower edge of the seal
	26	On the supporting construction, 300mm from the left edge of the seal, 15mm from the face of the timber frame
	27	On the supporting construction, 600mm from the left edge of the seal, 15mm from the face of the timber frame
	28	On the seal 150mm from the left edge of the seal
	29	On the seal 450mm from the left edge of the seal
	30	On the seal 750mm from the left edge of the seal

Test specimen	T/C number	Description of location
A3	31	On the supporting construction, 300mm from the left edge of the seal, 15mm from the face of the timber frame
	32	On the supporting construction, 600mm from the left edge of the seal, 15mm from the face of the timber frame
	33	On the timber frame section, 300mm from the left edge of the seal, 15mm from the upper edge of the seal
	34	On the timber frame section, 600mm from the left edge of the seal, 15mm from the upper edge of the seal
	35	On the supporting construction, 300mm from the left edge of the seal, 15mm from the face of the seal
	36	On the supporting construction, 600mm from the left edge of the seal, 15mm from the face of the seal
	37	On the seal 150mm from the left edge of the seal
	38	On the seal 450mm from the left edge of the seal
	39	On the seal 750mm from the left edge of the seal
B1	40	On the supporting construction, 300mm from the top edge of the seal, 15mm from the face of the seal
	41	On the supporting construction, 600mm from the top edge of the seal, 15mm from the face of the seal
	42	On the timber frame section, 300mm from the top edge of the seal, 15mm from the left edge of the seal
	43	On the timber frame section, 600mm from the top edge of the seal, 15mm from the left edge of the seal
	44	On the supporting construction, 300mm from the top edge of the seal, 15mm from the face of the timber frame
	45	On the supporting construction, 600mm from the top edge of the seal, 15mm from the face of the timber frame
	46	On the seal 150mm from the top edge of the seal
	47	On the seal 450mm from the top edge of the seal
	48	On the seal 750mm from the top edge of the seal

Test specimen	T/C number	Description of location
B2	49	On the supporting construction, 300mm from the top edge of the seal, 15mm from the face of the timber frame
	50	On the supporting construction, 600mm from the top edge of the seal, 15mm from the face of the timber frame
	51	On the timber frame section, 300mm from the top edge of the seal, 15mm from the right edge of the seal
	52	On the timber frame section, 600mm from the top edge of the seal, 15mm from the right edge of the seal
	53	On the supporting construction, 300mm from the top edge of the seal, 15mm from the face of the seal
	54	On the supporting construction, 600mm from the top edge of the seal, 15mm from the face of the seal
	55	On the seal 150mm from the top edge of the seal
	56	On the seal 450mm from the top edge of the seal
	57	On the seal 750mm from the top edge of the seal
B3	58	On the timber frame section, 300mm from the top edge of the seal, 15mm from the right edge of the seal
	59	On the timber frame section, 600mm from the top edge of the seal, 15mm from the right edge of the seal
	60	On the supporting construction, 300mm from the top edge of the seal, 15mm from the right edge of the seal
	61	On the supporting construction, 600mm from the top edge of the seal, 15mm from the right edge of the seal
	62	On the seal 150mm from the top edge of the seal
	63	On the seal 450mm from the top edge of the seal
	64	On the seal 750mm from the top edge of the seal

Specimen Temperature Data

Graph showing individual temperatures recorded on the unexposed face of Specimen A1 (Sample No. 1a)



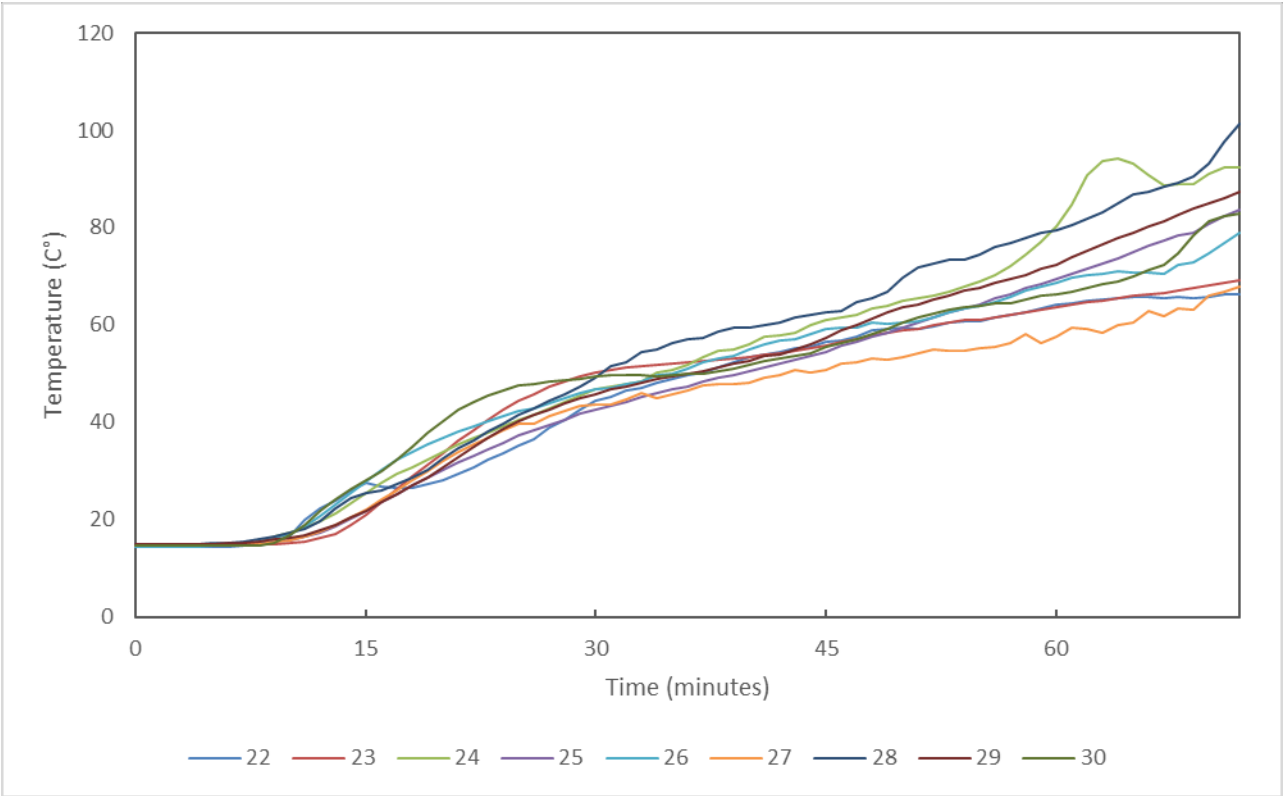
Individual temperatures recorded on the unexposed face of Specimen A1

Time (min)	Chan 15 (°C)	Chan 16 (°C)	Chan 17 (°C)	Chan 18 (°C)	Chan 19 (°C)	Chan 21 (°C)
0	14	15	14	15	15	14
1	14	15	14	15	14	14
2	14	15	15	15	15	14
3	14	15	14	15	15	14
4	15	15	15	15	15	14
5	15	15	15	15	18	14
6	15	15	15	15	23	14
7	17	15	15	15	29	15
8	17	15	15	15	32	15
9	18	15	16	15	35	15
10	19	15	17	15	38	15
11	19	15	17	15	37	15
12	19	16	18	15	38	15
13	20	17	19	15	37	15
14	20	19	19	16	36	16
15	21	21	20	16	36	16
16	21	23	21	17	35	17
17	21	26	22	17	35	17
18	22	28	23	18	35	18
19	23	31	24	19	35	19
20	24	33	25	20	35	20
21	26	35	26	21	36	21
22	27	38	27	21	36	22
23	29	40	28	22	36	23
24	30	42	30	23	36	24
25	32	44	31	24	37	25
26	34	46	33	25	37	26
27	36	48	35	26	38	27
28	39	49	37	27	38	28
29	42	50	38	28	39	29
30	44	51	40	29	40	30
31	46	52	42	30	41	31
32	47	52	43	31	41	32
33	48	53	44	32	41	33
34	49	53	45	33	42	34
35	50	54	46	34	42	34
36	51	54	47	35	43	35
37	52	54	47	35	43	36
38	53	55	48	36	44	37
39	54	55	49	37	44	37
40	55	55	50	38	45	38
41	55	56	50	39	46	39
42	56	56	50	40	47	40
43	57	56	51	41	47	41
44	58	56	52	41	48	42

Time (min)	Chan 15 (°C)	Chan 16 (°C)	Chan 17 (°C)	Chan 18 (°C)	Chan 19 (°C)	Chan 21 (°C)
45	59	56	52	42	49	43
46	59	57	52	43	50	44
47	60	57	53	44	50	44
48	60	58	54	45	51	45
49	61	58	54	46	52	46
50	61	58	55	47	52	46
51	61	59	56	48	52	47
52	62	59	56	49	53	48
53	62	60	57	50	54	48
54	63	60	58	50	54	49
55	63	60	58	51	54	50
56	63	60	59	52	55	51
57	64	60	60	53	56	51
58	65	60	60	54	56	52
59	65	61	61	54	57	53
60	66	61	61	55	57	53
61	66	61	61	56	58	54
62	67	61	62	56	58	55
63	67	61	62	57	59	55
64	67	61	63	58	59	56
65	67	62	63	58	59	56
66	68	62	64	59	60	57
67	69	62	64	60	61	58
68	68	63	64	60	61	59
69	68	63	65	61	62	59
70	68	64	66	61	62	60
71	68	64	67	62	62	61
72	68	65	68	63	63	62

* - Chan 20 has been removed due to a malfunction

Graph showing individual temperatures recorded on the unexposed face of Specimen A2

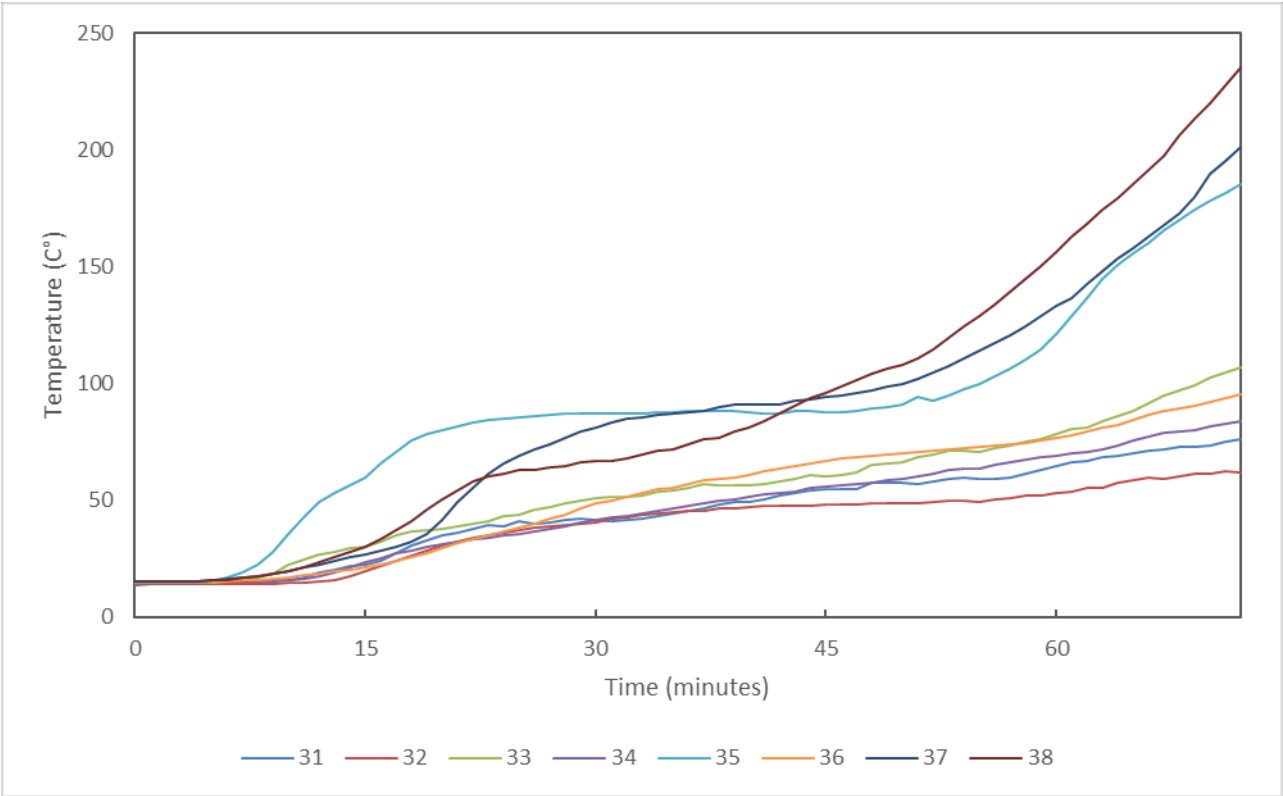


Individual temperatures recorded on the unexposed face of Specimen A2

Time (min)	Chan 22 (°C)	Chan 23 (°C)	Chan 24 (°C)	Chan 25 (°C)	Chan 26 (°C)	Chan 27 (°C)	Chan 28 (°C)	Chan 29 (°C)	Chan 30 (°C)
0	14	15	15	15	14	15	15	15	15
1	14	15	15	15	14	15	15	15	15
2	14	15	15	15	15	15	15	15	15
3	14	15	15	15	14	15	15	15	15
4	14	15	15	15	15	15	15	15	15
5	14	15	15	15	15	15	15	15	15
6	14	15	15	15	15	15	15	15	15
7	15	15	15	15	15	15	16	15	15
8	15	15	15	15	15	15	16	16	15
9	15	15	17	15	16	15	17	16	15
10	16	15	17	16	17	16	17	16	17
11	20	16	18	16	19	17	18	17	19
12	22	16	20	17	21	18	20	18	22
13	24	17	21	19	23	19	22	19	24
14	26	19	23	20	26	20	24	20	26
15	28	21	26	22	28	22	25	22	28
16	27	24	28	24	30	24	26	24	30
17	26	26	29	25	32	26	27	25	32
18	27	29	31	27	34	28	29	27	35
19	27	31	32	29	35	30	30	29	38
20	28	34	34	30	37	32	32	31	40
21	29	36	36	32	38	34	35	33	42
22	31	38	37	33	39	35	36	35	44
23	32	40	38	35	40	37	38	37	45
24	34	42	39	36	41	38	40	39	46
25	35	44	41	37	42	40	41	40	48
26	37	46	41	38	43	40	43	42	48
27	39	47	43	39	44	41	45	43	48
28	40	48	44	41	45	42	46	44	49
29	43	49	46	42	46	43	47	45	49
30	44	50	47	43	47	44	49	46	49
31	45	51	47	43	47	44	52	47	50
32	46	51	48	44	48	45	52	47	50
33	47	52	48	45	48	46	54	48	50
34	48	52	50	46	50	45	55	49	50
35	49	52	51	47	50	46	56	50	50
36	50	52	52	47	51	46	57	50	50
37	50	53	53	48	52	48	57	51	50
38	51	53	55	49	53	48	59	51	51
39	52	53	55	50	54	48	60	52	51
40	53	53	56	50	55	48	59	53	52
41	54	54	57	51	56	49	60	54	53
42	55	54	58	52	57	50	61	54	53
43	55	55	58	53	57	51	62	55	54
44	55	55	60	54	58	50	62	56	54

Time (min)	Chan 22 (°C)	Chan 23 (°C)	Chan 24 (°C)	Chan 25 (°C)	Chan 26 (°C)	Chan 27 (°C)	Chan 28 (°C)	Chan 29 (°C)	Chan 30 (°C)
45	57	56	61	55	59	51	63	57	55
46	57	57	62	56	60	52	63	59	56
47	58	57	62	56	60	52	65	60	57
48	59	58	63	58	61	53	65	61	58
49	59	58	64	58	60	53	67	63	59
50	59	59	65	59	61	53	70	64	60
51	59	59	66	61	61	54	72	64	61
52	60	60	66	62	62	55	73	65	62
53	60	60	67	63	62	55	73	66	63
54	61	61	68	63	63	55	73	67	64
55	61	61	69	64	64	55	75	68	64
56	61	62	70	65	65	55	76	69	64
57	62	62	72	66	66	56	77	70	65
58	63	63	74	68	67	58	78	70	65
59	63	63	77	68	68	56	79	71	66
60	64	64	80	69	69	58	80	72	66
61	64	64	85	71	70	59	80	74	67
62	65	65	91	72	70	59	82	75	68
63	65	65	94	73	71	58	83	77	68
64	66	66	94	74	71	60	85	78	69
65	66	66	93	75	71	61	87	79	70
66	66	66	91	76	71	63	87	80	71
67	65	66	89	77	71	62	88	81	72
68	66	67	89	78	72	63	89	83	75
69	65	67	89	79	73	63	91	84	78
70	66	68	91	81	75	66	93	85	81
71	66	69	92	82	77	67	98	86	82
72	66	69	92	84	79	68	101	87	83

Graph showing individual temperatures recorded on the unexposed face of Specimen A3



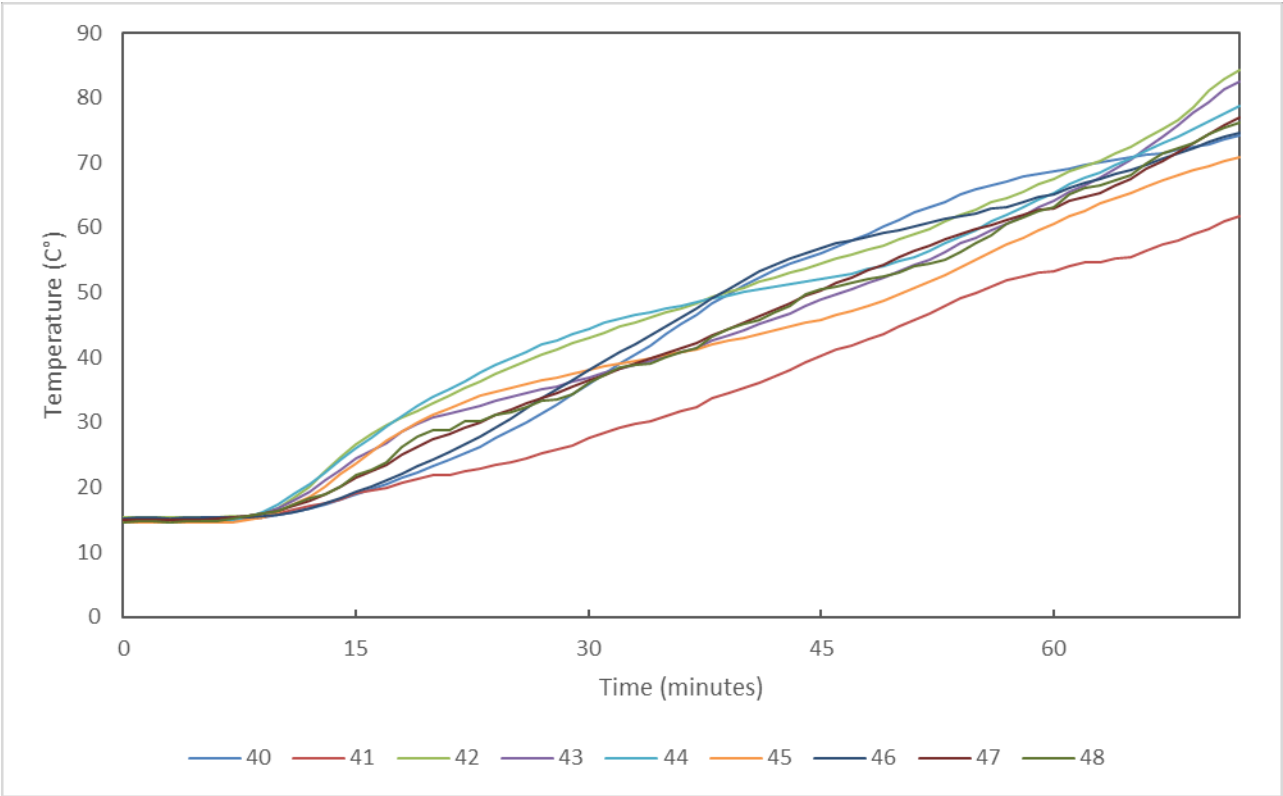
Individual temperatures recorded on the unexposed face of Specimen A3

Time (min)	Chan 31 (°C)	Chan 32 (°C)	Chan 33 (°C)	Chan 34 (°C)	Chan 35 (°C)	Chan 36 (°C)	Chan 37 (°C)	Chan 38 (°C)
0	14	14	15	15	14	15	15	15
1	14	14	15	15	14	15	15	15
2	14	14	15	15	15	15	15	15
3	14	14	15	15	15	15	15	15
4	14	14	15	15	15	15	15	15
5	14	14	15	15	15	15	16	16
6	14	14	15	15	17	15	16	16
7	14	14	16	15	19	16	17	17
8	14	14	17	15	22	16	17	17
9	15	14	19	16	28	16	19	18
10	16	14	22	16	35	17	20	20
11	17	15	25	16	43	18	21	21
12	19	15	27	18	49	19	22	23
13	20	16	28	19	53	19	24	26
14	22	18	29	21	56	20	25	28
15	22	19	30	23	60	21	27	30
16	24	22	32	25	65	23	28	33
17	27	24	35	27	71	24	30	37
18	31	26	37	29	75	26	32	41
19	33	29	37	30	78	27	36	46
20	35	30	38	31	80	29	42	50
21	36	32	39	32	82	32	49	54
22	38	34	40	33	83	33	55	58
23	39	35	41	34	84	35	61	60
24	39	36	43	35	85	37	66	61
25	41	37	44	36	86	38	69	63
26	40	38	46	37	86	40	72	63
27	40	39	47	38	86	42	74	64
28	42	39	49	39	87	44	76	65
29	42	40	50	40	87	46	79	66
30	42	41	51	41	87	48	81	67
31	41	42	52	42	87	50	83	67
32	41	43	51	43	87	52	85	68
33	42	44	52	44	87	53	86	69
34	43	44	53	46	87	55	86	71
35	44	45	54	46	88	55	87	71
36	45	45	55	48	88	57	88	74
37	47	46	57	49	88	58	88	76
38	48	46	56	50	88	59	90	76
39	49	47	56	50	88	60	91	79
40	49	47	57	51	88	61	91	81
41	50	47	57	52	87	62	91	84
42	52	47	58	53	87	64	91	87
43	53	48	59	54	88	65	92	90
44	54	48	61	55	88	66	93	94

Time (min)	Chan 31 (°C)	Chan 32 (°C)	Chan 33 (°C)	Chan 34 (°C)	Chan 35 (°C)	Chan 36 (°C)	Chan 37 (°C)	Chan 38 (°C)
45	55	48	60	56	88	67	94	96
46	55	48	61	56	88	68	95	98
47	55	48	62	57	88	68	96	101
48	57	49	65	58	89	69	97	104
49	58	49	66	59	90	69	98	106
50	57	48	66	59	91	70	100	108
51	57	49	68	60	94	70	102	111
52	58	49	69	61	93	71	105	115
53	59	50	71	63	95	72	107	120
54	60	50	71	63	98	72	110	124
55	59	49	71	64	100	73	114	129
56	59	50	72	65	103	73	117	134
57	60	51	74	66	106	74	121	139
58	61	52	75	67	110	75	124	145
59	63	52	76	68	115	76	129	150
60	65	53	78	69	121	76	133	156
61	66	54	81	70	129	78	136	163
62	67	55	81	71	136	79	142	169
63	68	55	84	72	145	81	148	174
64	69	57	86	73	151	82	154	180
65	70	58	88	75	155	84	158	185
66	71	59	91	77	160	86	163	192
67	72	59	94	79	166	88	168	197
68	73	60	97	80	170	89	173	206
69	73	61	99	80	174	91	180	213
70	74	62	102	82	178	92	190	220
71	75	62	105	83	182	94	195	227
72	76	62	107	84	185	95	201	235

Chan 39 has been removed due to a malfunction

Graph showing individual temperatures recorded on the unexposed face of Specimen B1

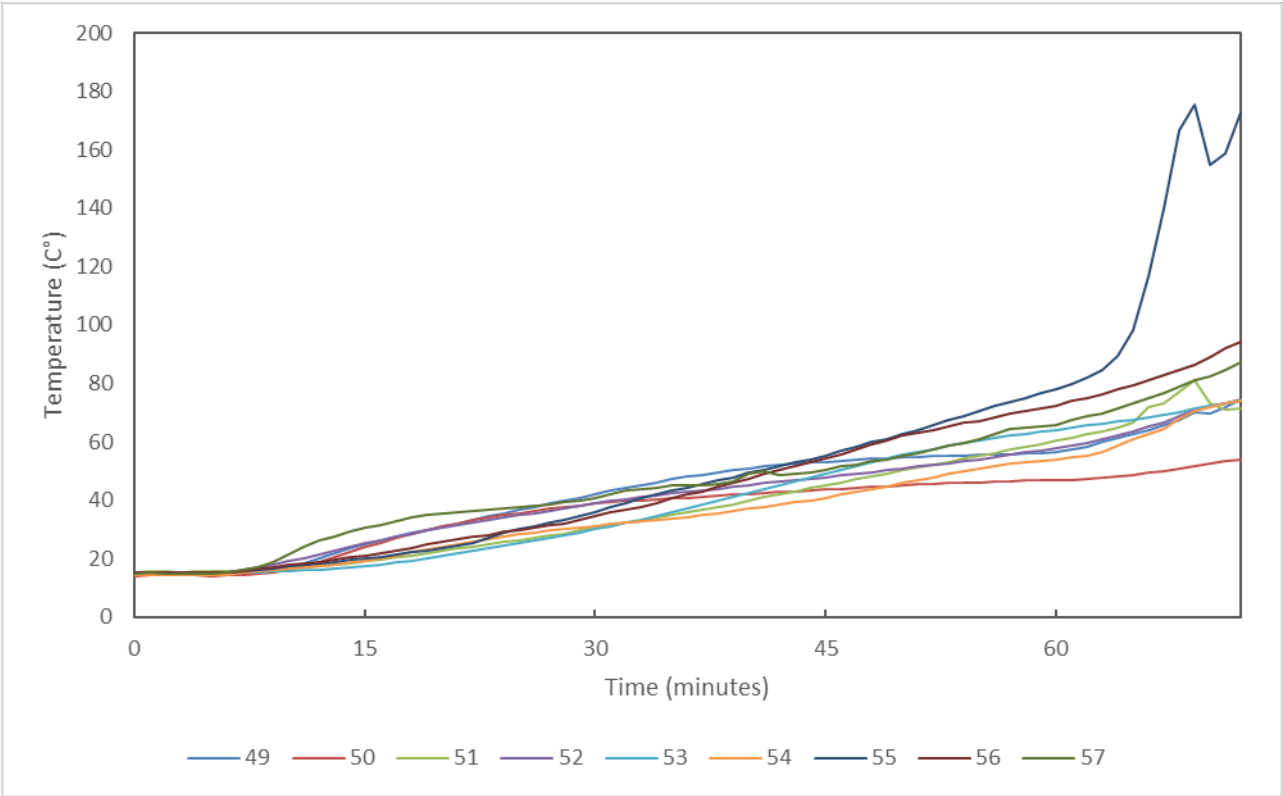


Individual temperatures recorded on the unexposed face of Specimen B1

Time (min)	Chan 40 (°C)	Chan 41 (°C)	Chan 42 (°C)	Chan 43 (°C)	Chan 44 (°C)	Chan 45 (°C)	Chan 46 (°C)	Chan 47 (°C)	Chan 48 (°C)
0	15	15	15	15	15	15	15	15	15
1	15	15	15	15	15	14	15	15	15
2	15	15	15	15	15	15	15	15	15
3	15	15	15	15	15	15	15	15	15
4	15	15	15	15	15	14	15	15	15
5	15	15	15	15	15	14	15	15	15
6	15	15	15	15	15	14	15	15	15
7	15	15	15	15	15	15	15	15	15
8	15	15	16	16	15	15	15	15	15
9	15	15	16	16	16	15	16	16	16
10	16	16	17	17	17	16	16	16	16
11	16	16	18	18	19	17	16	17	17
12	17	17	20	19	21	19	17	18	18
13	17	18	22	21	22	20	17	19	19
14	18	18	25	23	24	22	18	20	20
15	19	19	27	25	26	24	19	21	22
16	20	19	28	26	28	25	20	22	23
17	20	20	30	27	29	27	21	24	24
18	21	21	31	29	31	29	22	25	26
19	22	21	32	30	32	30	23	26	28
20	23	22	33	31	34	31	24	27	29
21	24	22	34	31	35	32	25	28	29
22	25	22	35	32	36	33	27	29	30
23	26	23	36	33	38	34	28	30	30
24	28	23	38	33	39	35	29	31	31
25	29	24	38	34	40	35	31	32	32
26	30	25	40	35	41	36	32	33	32
27	31	25	40	35	42	36	34	34	33
28	33	26	41	35	43	37	35	34	34
29	34	27	42	36	44	37	37	35	34
30	36	28	43	37	44	38	38	37	36
31	37	28	44	38	45	39	39	37	37
32	39	29	45	38	46	39	41	38	38
33	40	30	45	39	47	39	42	39	39
34	42	30	46	39	47	40	43	40	39
35	44	31	47	40	48	40	45	41	40
36	45	32	48	41	48	41	46	41	41
37	47	32	48	41	49	41	48	42	41
38	48	34	49	43	49	42	49	43	43
39	50	34	50	43	50	43	51	44	44
40	51	35	51	44	50	43	52	45	45
41	52	36	52	45	50	44	53	46	46
42	54	37	52	46	51	44	54	47	47
43	54	38	53	47	51	45	55	48	48
44	55	39	54	48	52	45	56	49	50

Time (min)	Chan 40 (°C)	Chan 41 (°C)	Chan 42 (°C)	Chan 43 (°C)	Chan 44 (°C)	Chan 45 (°C)	Chan 46 (°C)	Chan 47 (°C)	Chan 48 (°C)
45	56	40	55	49	52	46	57	50	50
46	57	41	55	50	53	47	58	52	51
47	58	42	56	51	53	47	58	52	52
48	59	43	57	51	54	48	59	53	52
49	60	44	57	52	54	49	59	54	53
50	61	45	58	53	55	50	60	56	53
51	62	46	59	54	55	51	60	56	54
52	63	47	60	55	56	52	61	57	54
53	64	48	61	56	58	53	61	58	55
54	65	49	62	58	59	54	62	59	56
55	66	50	63	58	60	55	62	60	58
56	67	51	64	60	61	56	63	60	59
57	67	52	65	61	62	57	63	61	61
58	68	52	66	62	63	58	64	62	62
59	68	53	67	63	64	60	65	63	62
60	69	53	68	64	65	61	65	63	63
61	69	54	69	65	67	62	66	64	65
62	70	55	70	67	68	63	67	65	66
63	70	55	70	68	69	64	67	65	67
64	70	55	71	69	70	64	68	66	67
65	71	55	72	70	71	65	69	68	68
66	71	57	74	72	72	66	70	69	70
67	71	57	75	74	73	67	71	70	71
68	72	58	77	76	74	68	72	72	72
69	73	59	79	78	75	69	72	73	73
70	73	60	81	79	76	70	73	74	74
71	74	61	83	81	78	70	74	76	75
72	74	62	84	83	79	71	75	77	76

Graph showing individual temperatures recorded on the unexposed face of Specimen B2

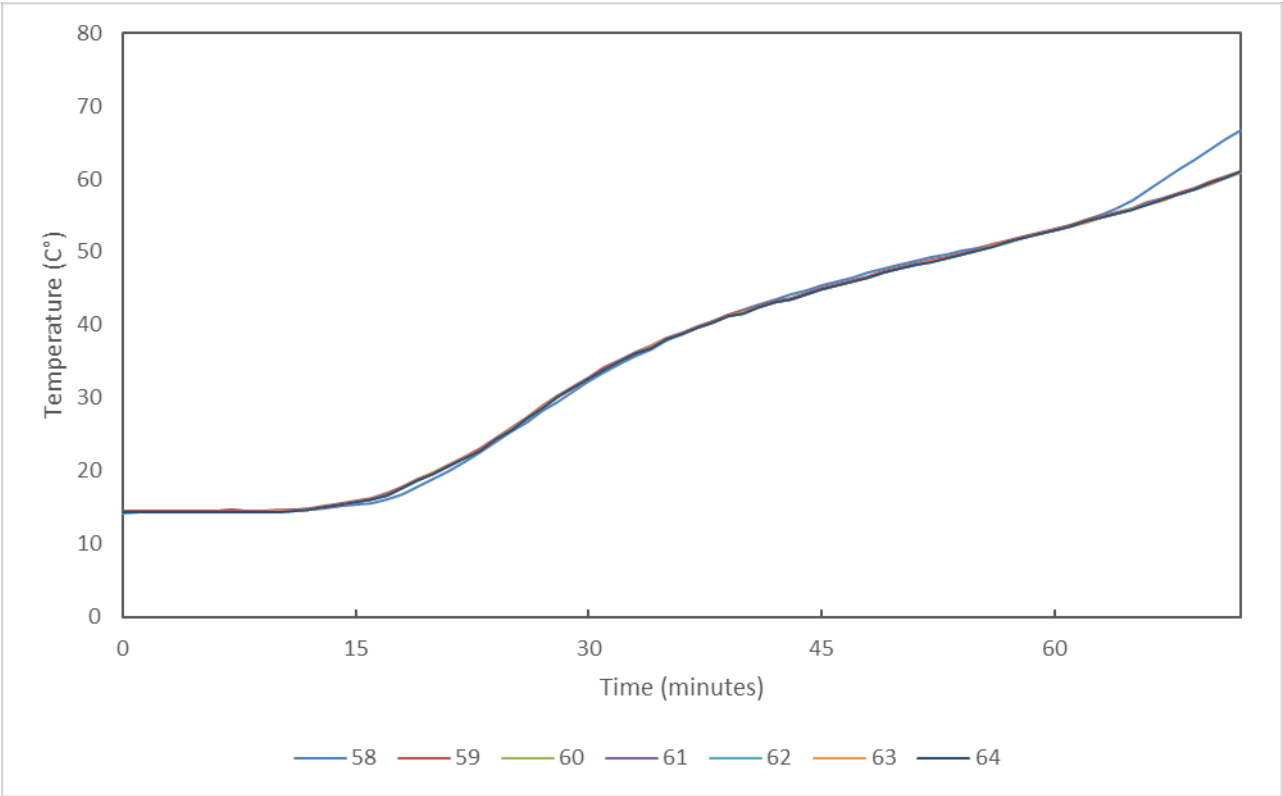


Individual temperatures recorded on the unexposed face of Specimen B2

Time (min)	Chan 49 (°C)	Chan 50 (°C)	Chan 51 (°C)	Chan 52 (°C)	Chan 53 (°C)	Chan 54 (°C)	Chan 55 (°C)	Chan 56 (°C)	Chan 57 (°C)
0	15	14	15	15	15	14	15	15	15
1	15	14	15	15	15	14	15	15	15
2	15	14	15	15	15	14	15	15	15
3	15	14	15	15	15	14	15	15	15
4	15	14	15	15	15	14	15	15	15
5	15	14	15	15	15	14	15	15	15
6	15	14	16	15	15	15	15	15	15
7	15	14	16	16	15	15	16	16	16
8	15	15	16	17	15	16	16	16	17
9	16	15	16	18	15	16	17	17	19
10	17	16	17	19	16	17	17	18	22
11	19	17	17	20	16	17	18	18	24
12	20	19	17	22	16	18	18	19	26
13	22	21	18	23	17	18	19	20	28
14	23	22	19	24	17	19	20	20	29
15	25	24	19	25	18	19	20	21	31
16	26	25	20	26	18	20	21	22	32
17	27	27	20	27	19	21	21	23	33
18	29	28	21	28	19	22	22	24	34
19	30	30	22	30	20	23	23	25	35
20	31	31	23	30	21	24	24	26	35
21	32	32	23	31	22	25	24	26	36
22	33	33	24	32	23	26	25	27	36
23	34	34	25	33	23	27	27	28	37
24	36	35	26	34	24	28	29	29	37
25	37	36	26	35	25	28	30	30	38
26	38	36	27	36	26	29	31	31	38
27	39	37	28	36	27	30	32	32	39
28	40	37	29	37	28	30	33	32	39
29	41	38	30	38	29	31	35	33	40
30	42	39	30	39	30	31	36	35	41
31	43	39	31	40	31	32	37	36	42
32	44	40	32	40	32	32	39	37	43
33	45	40	33	41	33	33	41	38	44
34	46	40	34	42	35	33	42	39	44
35	47	41	35	42	36	34	43	40	45
36	48	41	36	43	37	34	44	42	45
37	49	41	37	43	38	35	46	43	45
38	50	42	38	44	40	36	47	45	46
39	50	42	39	45	41	36	48	46	46
40	51	42	40	45	42	37	49	47	49
41	52	43	41	46	44	38	50	49	50
42	52	43	42	46	45	39	52	50	49
43	52	43	43	47	47	39	53	52	49
44	53	43	44	47	48	40	54	53	50

Time (min)	Chan 49 (°C)	Chan 50 (°C)	Chan 51 (°C)	Chan 52 (°C)	Chan 53 (°C)	Chan 54 (°C)	Chan 55 (°C)	Chan 56 (°C)	Chan 57 (°C)
45	53	44	45	48	49	41	55	54	50
46	54	44	46	48	50	42	57	56	52
47	54	44	47	49	52	43	58	57	52
48	54	44	48	50	53	44	60	59	54
49	54	45	49	50	54	45	61	61	54
50	55	45	50	51	55	46	63	62	55
51	55	45	51	52	57	47	64	63	56
52	55	46	52	52	58	48	66	64	57
53	55	46	53	53	59	49	68	65	59
54	55	46	54	53	60	50	69	66	60
55	55	46	55	54	60	51	71	67	61
56	56	46	56	55	61	52	72	69	63
57	56	47	57	56	62	52	74	70	64
58	56	47	58	56	63	53	75	70	65
59	56	47	59	57	64	53	77	71	65
60	57	47	60	58	64	54	78	72	66
61	57	47	61	59	65	55	80	74	68
62	58	47	62	60	66	55	82	75	69
63	60	48	64	61	66	57	85	76	70
64	61	48	65	62	67	59	89	78	71
65	63	49	67	64	68	61	98	79	73
66	64	49	72	65	68	63	116	81	75
67	66	50	73	67	69	64	140	83	77
68	68	51	77	69	70	68	167	85	79
69	70	52	81	71	71	71	176	87	81
70	70	52	73	72	72	72	155	89	83
71	72	53	71	73	73	73	159	92	85
72	74	54	72	74	74	74	173	94	87

Graph showing individual temperatures recorded on the unexposed face of Specimen B3



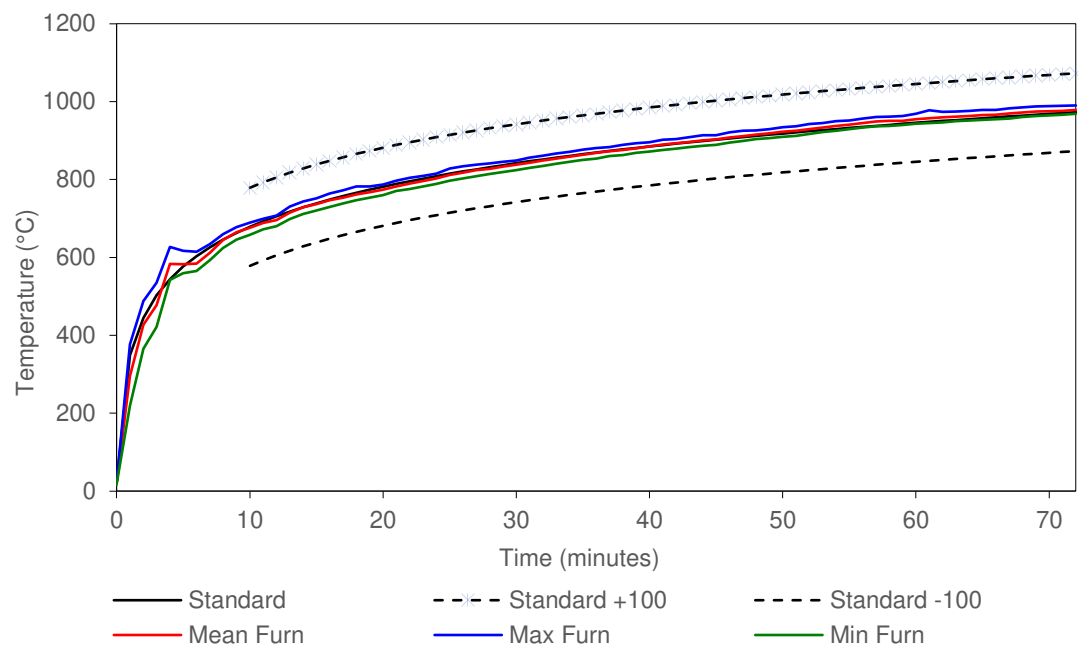
Individual temperatures recorded on the unexposed face of Specimen B3

Time (min)	Chan 58 (°C)	Chan 59 (°C)	Chan 60 (°C)	Chan 61 (°C)	Chan 62 (°C)	Chan 63 (°C)	Chan 64 (°C)
0	14	14	14	14	14	14	14
1	14	15	14	14	14	14	14
2	14	15	14	14	14	14	14
3	14	15	14	14	14	14	14
4	14	14	14	14	14	14	14
5	14	15	14	14	14	14	14
6	14	15	14	14	14	14	14
7	15	15	14	14	14	14	14
8	14	14	14	14	14	14	14
9	15	15	14	14	14	14	14
10	15	15	14	14	14	14	14
11	15	15	15	15	15	15	15
12	15	15	15	15	15	15	15
13	15	15	15	15	15	15	15
14	15	16	15	15	15	15	15
15	15	16	16	16	16	16	16
16	16	16	16	16	16	16	16
17	16	17	17	17	17	17	17
18	17	18	18	18	18	18	18
19	18	19	19	19	19	19	19
20	19	20	20	20	20	20	20
21	20	21	21	21	21	21	21
22	21	22	22	22	22	22	22
23	23	23	23	23	23	23	23
24	24	25	24	24	24	24	24
25	25	26	26	26	26	26	26
26	27	27	27	27	27	27	27
27	28	29	29	29	29	29	29
28	29	30	30	30	30	30	30
29	31	32	31	31	31	31	31
30	32	33	33	33	33	33	33
31	33	34	34	34	34	34	34
32	35	35	35	35	35	35	35
33	36	36	36	36	36	36	36
34	37	37	37	37	37	37	37
35	38	38	38	38	38	38	38
36	39	39	39	39	39	39	39
37	40	40	40	40	40	40	40
38	41	41	40	40	40	40	40
39	41	41	41	41	41	41	41
40	42	42	42	42	42	42	42
41	43	43	42	42	42	42	42
42	44	43	43	43	43	43	43
43	44	44	44	44	44	44	44
44	45	44	44	44	44	44	44

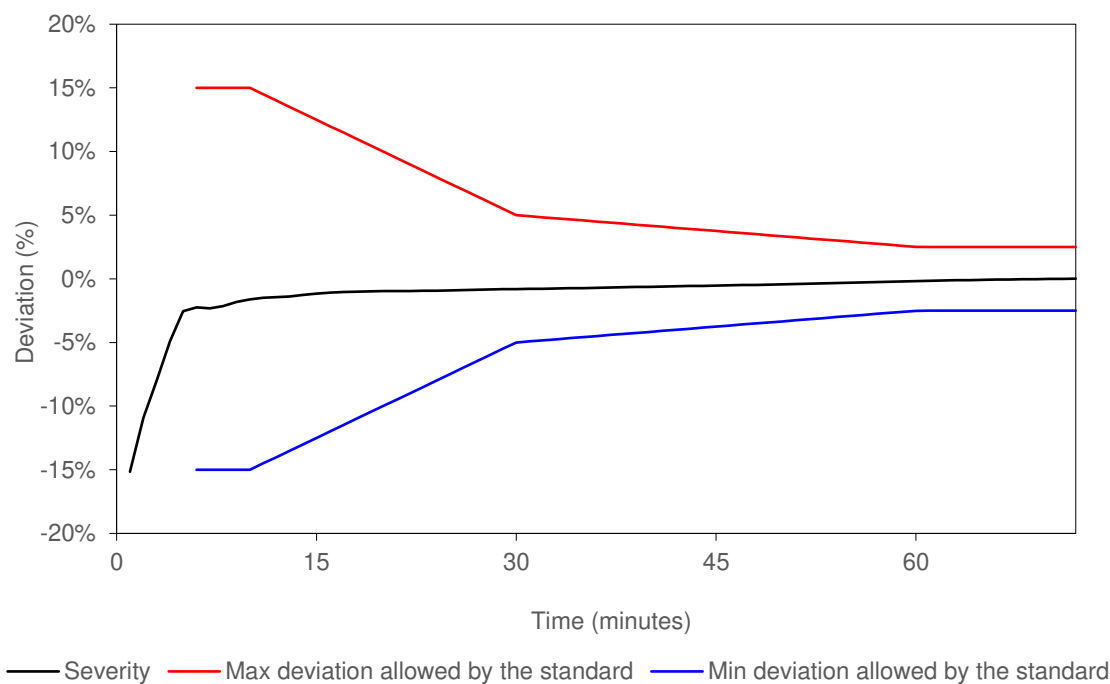
Time (min)	Chan 58 (°C)	Chan 59 (°C)	Chan 60 (°C)	Chan 61 (°C)	Chan 62 (°C)	Chan 63 (°C)	Chan 64 (°C)
45	45	45	45	45	45	45	45
46	46	46	45	45	45	45	45
47	46	46	46	46	46	46	46
48	47	47	46	46	46	46	46
49	48	47	47	47	47	47	47
50	48	48	48	48	48	48	48
51	49	48	48	48	48	48	48
52	49	49	49	49	49	49	49
53	50	49	49	49	49	49	49
54	50	50	50	50	50	50	50
55	51	50	50	50	50	50	50
56	51	51	51	51	51	51	51
57	51	51	51	51	51	51	51
58	52	52	52	52	52	52	52
59	53	53	52	52	52	52	52
60	53	53	53	53	53	53	53
61	54	54	54	54	54	54	54
62	54	54	54	54	54	54	54
63	55	55	55	55	55	55	55
64	56	55	55	55	55	55	55
65	57	56	56	56	56	56	56
66	58	57	57	57	57	57	57
67	60	57	57	57	57	57	57
68	61	58	58	58	58	58	58
69	63	59	59	59	59	59	59
70	64	60	59	59	59	59	59
71	65	60	60	60	60	60	60
72	67	61	61	61	61	61	61

Furnace Temperature

Graph showing mean furnace temperature, together with the temperature/time relationship and associated tolerances specified in BS EN 1363-1: 2020

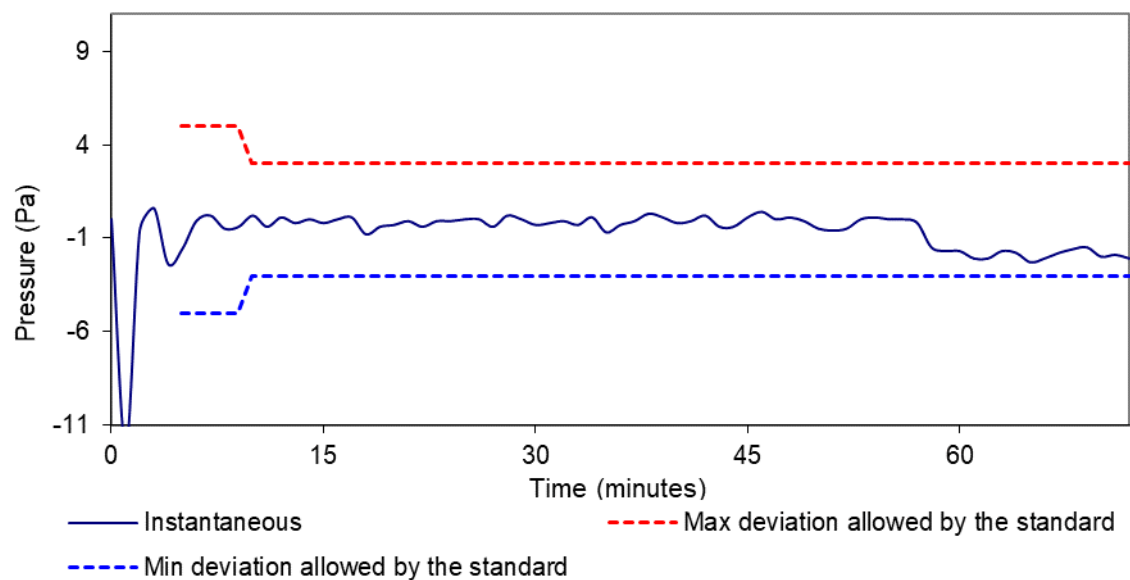


Graph showing percentage temperature deviation, together with the associated tolerances specified in BS EN 1363-1: 2020



Furnace Pressure

Graph showing recorded furnace pressure at 0.5m from the furnace floor



On-going Implications

Limitations	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 procedures outlined in BS EN 1363-1, using the test method stated in BS EN 1366-4: 2021, Fire resistance test for service installations – Part 4: Linear joint seals. Any significant deviation with respect to size, construction 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. The results only relate to the behaviour of the element of construction under the particular conditions of test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they reflect the actual behaviour in fires. The specification and interpretation of fire test methods are the subject of ongoing development and refinement. Changes in associated legislation may also occur. For these reasons it is recommended that the relevance of test reports over 5 years old should be considered by the user. Warringtonfire will be able to offer, on behalf of the legal owner, a review of the procedures adopted for a particular test to ensure that they are consistent with current practices, and if required may endorse the test 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. This test was not conducted under the requirements of UKAS accreditation.
EGOLF	Certain aspects of some fire test specifications are open to different interpretations. EGOLF have identified a number of such areas and have agreed Resolutions which define common agreement of interpretations between fire test laboratories which are members of the Groups. Where such Resolutions are applicable to this test they have been followed.

Field of Direct Application

BS EN 1363-1:2020, Fire resistance tests - Part 1: General requirements, states within Section 12.1, Clause v) that “The field of direct application of the results taken from the appropriate standard (or the test method) for the specimen being evaluated, either in the form of the full text from the appropriate standard or only those clauses which are relevant for the specimen tested” shall be included within the test report. The full text of the field of direct application for the results of the specimen being evaluated herein, can be found within the appropriate test standard, which is referenced on the front cover of this report. The field of direct application has been applied for the tested elements referenced as A1, A2, B2 & B3 and can be found within Annex A of this report. Specimens A3 and B1 deviate from the requirements of the test standard and therefore, no direct field of application is applicable.

Annex A: Field of Direct Application

Specimens A1, A2, B2 & B3

Specimens A1, A2, B2 & B3 consisted of the same linear joint sealing material proposed to be used to seal the gap between the back of timber fire doorset frames and the supporting construction. Due to the dimensions of the timber element the seal has been identified as asymmetric and therefore, two additional samples are included within this group.

Soudal (UK) Ltd, Soudafoam FR HY

In order to maximise the scope of the field of direct application the tested specimens were arranged as detailed below:

Specimen Reference	Orientation	Length of Seal (mm)	Width of Seal (mm)	Depth of Seal (mm)	Flushness	Integrity Performance (minutes)	Insulation Performance (minutes)
A1	Horizontal	900	15	85	Unexposed face	72	72
A2	Horizontal	900	15	85	Exposed face	72	72
B2	Vertical	900	15	85	Exposed face	68	68
B3	Vertical	900	15	85	Unexposed face	72	72
Supporting construction thickness: 100mm							
Timber element section size: 85mm x 28mm							

(Full information on the tested elements and their associated performance is detailed within the main body of the report)

The following table provides information on the field of direct application which is applicable to the tested construction and provides information on the scope of the application in accordance with each of the rules found within BS EN 1366-4: 2021, Specifically the national annex (NA).

As defined in BS EN 1366-4: 2021 (NA.3), this test methodology is only intended to evaluate the linear joint seal materials and not the packer and fixing materials. For this reason the DIAP below is based upon the use of non-combustible packers only.

Clause No.	Clause Text	Field of Direct Application
NA.5.1	The seal length may be increased and used around the perimeter of fire doorset frames, provided successful results from both the vertical and horizontal (in a vertical test construction) tests are achieved in terms of both integrity and insulation performance.	The tested arrangements included horizontal and vertical arrangements and achieved in excess of 60 minutes integrity and insulation performance. Therefore, the tested Soudal (UK) Ltd, Soudafoam FR HY as installed may be increased and utilised around the perimeter of fire doorset frames for up to 60 minutes performance.
NA.5.2	The seal width may be reduced provided the linear joint seal design and depth remains as tested. The seal width should not be increased.	The tested width of the Soudal (UK) Ltd, Soudafoam FR HY was 15mm, dimensions smaller than 15mm are therefore permitted, providing the depth remains no less than 85mm. The seal width shall not exceed 15mm.

Clause No.	Clause Text	Field of Direct Application
NA.5.3	The timber door frame section size and supporting construction thickness may be increased but not reduced, provided the linear joint seal material is also increased to suit. In the case where the linear joint seal material is applied from each side separately with an air gap present at the centre, the timber door frame section and supporting construction may be increased and the linear joint seals remain as tested, with only the air gap increasing in size.	The tested door frame section size was 85mm x 28mm, while the supporting construction thickness was 100mm. An increase in the thickness of the door frame section and/or the supporting construction thickness is therefore permissible, providing that the linear joint seal material is also increased to suit.
NA.5.4	The type/density of the timber door frame may be increased in accordance with Table A.1 of BS EN 15269-3, but not reduced.	The elements were tested with a hardwood framing material with a density of 746kg/m ³ . Alternative hardwoods may therefore be used with the Soudal (UK) Ltd, Soudafoam FR HY in accordance with Table A.1 of BS EN 15269-3 as detailed below: Hardwood excluding Beech (Fagus species) with a density $\geq 746\text{kg/m}^3$
NA.5.5	Tests carried out with a flexible supporting construction cover rigid constructions of the same or greater thickness, but not vice versa.	The elements were tested in a flexible supporting construction 100mm thick. A rigid supporting construction as defined by BS EN 1363-1 2020 with a thickness of 100mm or greater is therefore permissible.
NA.5.6	Tests carried out on an unlined flexible supporting construction may – in practice – be used with a lined aperture, but not vice versa.	The elements were tested in a flexible supporting construction with an unlined aperture around the tested element. In practice therefore a lined aperture may be used around the tested elements.
NA.5.7	Any timber or alternative solid cellulose-based architrave material may be fitted over a linear joint seal that has been tested without architrave and achieved integrity and insulation performance.	The tested arrangements did not include architraves over the Soudal (UK) Ltd, Soudafoam FR HY linear joint seals. Therefore, any timber or alternative solid cellulose-based architrave may be used with the tested elements.
NA.5.8	Tested architraves, along with the overlap dimension, can be increased in width and/or thickness, but not reduced.	The tested arrangements did not include architraves over the Soudal (UK) Ltd, Soudafoam FR HY linear joint seals; therefore, this clause is not applicable.
NA.5.9	NA.5.9 The density of tested architrave may be increased in accordance with Table A.1 of BS EN 15269-3, but not decreased.	The tested arrangements did not include architraves over the Soudal (UK) Ltd, Soudafoam FR HY linear joint seals; therefore, this clause is not applicable.
NA.5.10	Tested architrave cannot be removed.	The tested arrangements did not include architraves over the Soudal (UK) Ltd, Soudafoam FR HY linear joint seals; therefore, this clause is not applicable.

Clause No.	Clause Text	Field of Direct Application
NA.5.11	For seals that use backing materials, test results on backing material made of Polyethylene/Polyurethane may be replaced with backing material made of glass wool, slag wool, stone wool or ceramic wool. In cases where mineral wool is used in the test as backing material, the density of the mineral wool in practice may be increased but not decreased.	The tested arrangements did not use backing materials due to the properties of the linear joint seal; therefore, this clause is not applicable.
NA.5.12	Symmetrical seal systems tested from one side only may be used in both directions.	The linear joint seal system has been tested from both directions with regards to fire exposure; therefore this clause is not applicable.
NA.5.13	Tested asymmetrical seal systems may only be used if they have been tested in both directions.	The linear joint seal system has been tested in both directions with regards to symmetry and therefore is permitted in either orientation.