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EWFA CERTIFICATE OF TEST	CERTIFICATE No.: SFC 43878800c.1 Page 1 of 1
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Report Sponsor	Summary Issue Date
Aalseal Marketing Sdn. Bhd. Lot 2291, Jalan Kampung Baru, Kg. Baru, Sungai Buloh, 47000 Selangor DE, Malaysia	3/10/2017

Introduction
The element of construction described below was tested by this laboratory on behalf of the test sponsor in accordance with the stated test standard and achieved the results stated below. Refer to the referenced test report for more information.

Referenced Report	Test Date	Test Standard
EWFA 38838800d.1	5/12/2016	EN 1366-4:2006
EWFA 43878800d.1	15/06/2017	EN 1366-4:2006

Description of Services

The EWFA 38838800 test assembly comprised a nominal 1600mm long x 1600mm wide x 250mm thick Hebel Wall, that was penetrated by three vertical control joints at a nominal length of 1000mm. Starting from the eastern side the vertical joints were 12mm, 30mm and 50mm wide respectively. The control joints were protected by AS-1001 Aalseal Fire Retardant Sealant and were sealed from the both the exposed and unexposed side at a depth of half the width of the control joint with a backing rod placed in the control joint.

Service	Description	Fire Protection System	Integrity	Insulation
A	50mm wide	Aalseal AS-1001 Fire Retardant Sealant	No Failure at 301 minutes	No Failure at 301 minutes
B	30mm wide	Aalseal AS-1001 Fire Retardant Sealant	No Failure at 301 minutes	No Failure at 301 minutes
C	12mm wide	Aalseal AS-1001 Fire Retardant Sealant	No Failure at 301 minutes	No Failure at 301 minutes

The EWFA 43878800 test assembly comprised a nominal 1584mm long x 1600mm wide x 250mm thick Hebel floor, that was penetrated by three control joints at a nominal length of 1000mm. Starting from the western side the joints were 12mm, 30mm and 50mm wide respectively. The control joints were protected by AS-1001 Aalseal Fire Retardant Sealant and were sealed from the unexposed side at a depth of half the width of the control joint with a backing rod placed in the control joint.

Service	Description	Fire Protection System	Integrity	Insulation
A	12mm wide	Aalseal AS-1001 Fire Retardant Sealant	Failure at 265 minutes	Failure at 184 minutes
B	30mm wide	Aalseal AS-1001 Fire Retardant Sealant	Failure at 266 minutes	Failure at 98 minutes
C	50mm wide	Aalseal AS-1001 Fire Retardant Sealant	Failure at 239 minutes	Failure at 98 minutes

Notes

THIS CERTIFICATE IS PROVIDED FOR GENERAL INFORMATION ONLY AND DOES NOT COMPLY WITH THE REGULATORY REQUIREMENTS FOR EVIDENCE OF COMPLIANCE.

Reference should be made to the relevant test report to determine the applicability of the test result to a proposed installation and for a full description of the tested construction.

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

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TEST REPORT

Fire resistance test in accordance with EN 1366-4:2006 of three control joints in a Hebel block wall (AAC) protected with Alseal AS-1001 Fire Retardant Sealant.

EWFA Report No:

38838800d.1

Report Sponsor:

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1 CONSTRUCTION DETAILS

TEST ASSEMBLY

The test assembly comprised of three control joints in a nominally 1600mm wide × 1600mm high × 250mm thick wall constructed of Hebel blocks.

TEST SPECIMENS

The Hebel wall was penetrated by three vertical control joints at a nominal length of 1000mm. Starting from the eastern side were vertical control joints that were 12mm, 30mm, and 50mm wide, respectively. These were protected by AS-1001 Aseal Fire Retardant Sealant. The control joints were sealed from both the exposed and unexposed side at a depth of half the width of the control joint with a backing rod placed in the control joint.

The full description of the specimen is provided in Figures A1.1 to A1.2 and the 'Schedule of Components' in Section 2.

ASSEMBLY AND INSTALLATION METHODS

The Hebel blocks were cut into sections and installed into a restraint frame by representative of EWFA. The backing rods and sealant were installed by representative of EWFA on the 3 November 2016.

ORIENTATION

The assembly was symmetrical.

2 SCHEDULE OF COMPONENTS

Item	Description	
CONTROL JOINTS		
1	SERVICE A	
	Dimensions	The control joint was nominally 50mm wide x 1000mm high.
	Sealant	Fire Retardant Sealant (item 7)
	Backing Rod	Open Cell (item 5)
	Installation	A backing rod the full length of the control joint was installed on the exposed and unexposed side at a depth of 25mm. The sealant was then applied on the exposed and unexposed side to a depth of 25mm. The sealant was installed such that the surface was flush with the face of the Hebel blocks (item 4) at the time of the installation.
2	SERVICE B	
	Dimensions	The control joint was nominally 30mm wide x 1000mm high.
	Sealant	Fire Retardant Sealant (item 7)
	Backing Rod	Open Cell (item 5)
	Installation	A backing rod the full length of the control joint was installed on the exposed and unexposed side at a depth of 15mm. The sealant was then applied on the exposed and unexposed side to a depth of 15mm. The sealant was installed such that the surface was flush with the face of the Hebel blocks (item 4) at the time of the installation.
3	SERVICE C	
	Dimensions	The control joint was nominally 12mm wide x 1000mm high.
	Sealant	Fire Retardant Sealant (item 7)
	Backing Rod	Close Cell (item 6)
	Installation	A backing rod the full length of the control joint was installed on the exposed and unexposed side at a depth of 6mm. The sealant was then applied on the exposed and unexposed side to a depth of 6mm. The sealant was installed such that the surface was flush with the face of the Hebel blocks (item 4) at the time of the installation.
SEPERATING ELEMENT		
4	Item Name	Hebel Blocks
	Product Name	CSR Hebel Thermoblock AAC Masonry
	Size	200mm wide x 250mm deep x 600mm high
	Density	558 kg/m ³ (measured)
	Installation	Installed as per Figure A1.1
BACKING ROD		
5	Item Name	Open Cell Polyethylene foam backing rod
	Size	Ø50mm
6	Item Name	Close Cell Polyethylene foam backing rod
	Size	Ø12mm
SEALANT		
7	Item Name	Fire Retardant Sealant

Item	Description	
	Product Name	Aseal AS-1001 Fire Retardant Sealant
	Density	1410 kg/m ³ (measured)

3 TEST PROCEDURE

STATEMENT OF COMPLIANCE

The test was performed in accordance with the requirements of EN 1366-4:2006 subject to the variations below.

VARIATIONS TO TEST METHOD

None.

PRE-TEST CONDITIONING

The construction of the specimen was finished on the 3 November 2016 and was tested on the 5 December 2016. During this period the test specimen was subject to normal laboratory temperatures and relative humidity conditions.

SAMPLING / SPECIMEN SELECTION

The laboratory was not involved in the sampling or selection of the test specimen for the fire resistance test.

AMBIENT TEMPERATURE

The ambient temperature at the start of the test was 22°C and varied between 22°C and 30°C during the test.

TEST DURATION

The test duration was 301 minutes.

INSTRUMENTATION AND EQUIPMENT

The instrumentation was provided in accordance with EN 1363-1:2012 and as detailed below:
The furnace temperature was measured by 4-off 100mm × 100mm × 0.7 mm plate thermocouples with mineral insulated metal sheathed Type K thermocouples with an overall diameter of 1mm with the measuring junction insulated from the sheath. The plate thermocouples included 97mm × 97mm × 10mm inorganic insulating pads.

The non-fire side specimen temperatures were measured by Type K thermocouples with wire diameters less than 0.5mm soldered to 12mm diameter × 0.2mm thick copper discs covered by 30mm × 30mm × 2.0 mm inorganic insulating pads. The thermocouple positions are described in Table A4.1, and are shown on Figure A4.1 in Appendix 4.

A roving thermocouple was available to measure temperatures at positions that appeared hotter than the positions monitored by the fixed thermocouples.

The furnace pressure was measured at the mid-height of the control joint.

Cotton pad were available during the test to assess the performance under the criteria for integrity.

4 TEST MEASUREMENTS

FURNACE TEMPERATURE AND PRESSURE MEASUREMENTS

Furnace temperature and pressure data are provided in Figure A5.1 and Table A5.1 in Appendix 5.

SPECIMEN TEMPERATURES

Specimen temperature data is provided in A 5.3 and Table A5.2 in Appendix 5.

OBSERVATIONS

A table that includes observations of the significant behaviour of the specimen and details of the occurrence of the various performance criteria specified in EN 1366-4:2006 (EN 1363-1) is provided in Appendix 2. Photographs of the specimen are included in Appendix 6.

5 TEST RESULTS

The specimens listed below achieved the following performance when tested in accordance with EN1366-4:2006, subject to the variations listed in Section 3.

Service	Criteria	Result
A	Structural Adequacy	Not applicable
	Integrity	No failure at 301 minutes
	Insulation	No failure at 301 minutes
B	Structural Adequacy	Not applicable
	Integrity	No failure at 301 minutes
	Insulation	No failure at 301 minutes
C	Structural Adequacy	Not applicable
	Integrity	No failure at 301 minutes
	Insulation	No failure at 301 minutes

6 APPLICATION OF TEST RESULTS

TEST LIMITATIONS

The results of this fire test 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. The results only relate to the behaviour of the specimen of the element of the construction under the particular conditions of the test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they necessarily reflect the actual behaviour in fires.

VARIATIONS FROM THE TESTED SPECIMENS

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in EN 1363-1, and where appropriate EN 1363-2. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report. It is recommended that any proposed variation to the tested configuration other than as permitted under the field of direct application specified in Appendix 3 should be referred to the test sponsor in the first instance to obtain appropriate documentary evidence of compliance from Exova Warringtonfire Aus Pty Ltd or another Registered Testing Authority.

UNCERTAINTY OF MEASUREMENT

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.

APPENDIX 1 DRAWINGS OF TEST ASSEMBLY

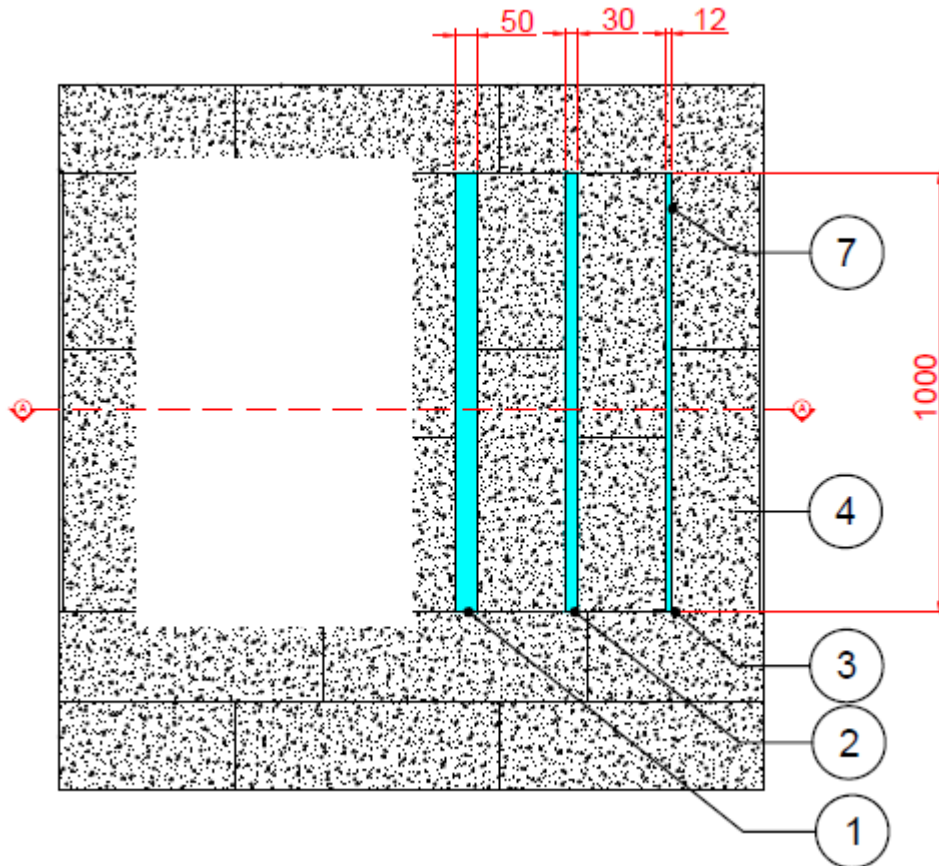


Figure A1.1: Elevation of Test Specimen, Unexposed side

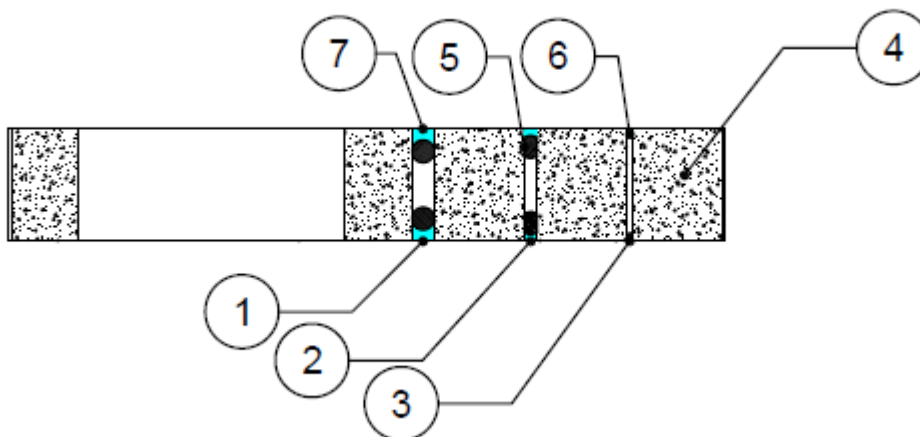


Figure A1.2: Horizontal Cross-Section A-A

APPENDIX 2 TEST OBSERVATIONS

The following include observations of the significant behaviour of the specimen.

Time		Observations
min	sec	
Service A		
0	00	Fire resistance test commenced and the ambient temperature was approximately 22°C
53	00	Sealant on the exposed side beginning to crack.
60	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
90	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
180	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
240	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
287	35	Moisture appearing 25mm from the top through the sealant had become evident.
300	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
301	00	Test terminated at the request of the sponsor.
Service B		
0	00	Fire resistance test commenced and the ambient temperature was approximately 22°C
60	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
90	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
180	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
240	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
300	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
301	00	Test terminated at the request of the sponsor.
Service C		
0	00	Fire resistance test commenced and the ambient temperature was approximately 22°C
60	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
90	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
180	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
240	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
300	00	Specimen continued to maintain integrity and insulation in accordance with EN1366-4:2006.
301	00	Test terminated at the request of the sponsor.

APPENDIX 3 DIRECT FIELD OF APPLICATION

Reference Note: References in this section refer to those found in the standard and not this report.

A 3.1 GENERAL

EN 1366-4:2006 indicates that the results of the fire test contained in the test report are directly applicable without reference to the testing authority to similar constructions where one or more of the changes have been made:

A 3.2 ORIENTATION

The field of application regarding the orientation of the linear joint is given in Table 1. The possible orientation of linear joints (A to E) and of the specimens in the test (A to C) is illustrated in Figure 12.

Table 1 – Field of application regarding orientation

Tested Orientation	Application
A	A, D, E ^a
B	B
C	C, D ^b
a	Orientation E will only be covered by test orientation A if shear movement was chosen and one face of the joint was fixed and the other face was removed.
b	Orientation D will only be covered by test orientation C if shear movement was chosen and one face of the joint was fixed and the other face was moved.

Key

A linear joint in a horizontal test construction

B vertical linear joint in a vertical test construction

C horizontal linear joint in a vertical test construction

D horizontal wall joint abutting a floor, ceiling or roof

E horizontal floor joint abutting a wall

Table 1 only applies when both the supporting construction and the location of the seal within the linear joint remain unchanged. See 13.3

A 3.3 SUPPORTING CONSTRUCTION

Results obtained with autoclaved aerated concrete standard supporting constructions apply to concrete, block work and masonry separating elements of a thickness and density equal to or greater than that tested.

Results obtained with normal concrete standard supporting constructions apply to concrete and block work separating elements of a thickness and density equal to or greater than that tested.

Results obtained with timber standard supporting construction apply to timber separating elements of a thickness and density equal to or greater than that tested.

Results obtained with the steel angle standard supporting construction as described in 7.2.2.3 apply to separating element constructions made of metals with a melting point higher than 1000 °C.

Results obtained with a combination of a standard supporting construction as described in 7.2.2.1 and a standard supporting construction as described in 7.2.2.3 apply to concrete, block work and masonry separating elements of a thickness and density equal to or greater than that tested forming one joint face and separating element constructions made of metals with a melting point higher than 1000 °C forming the other joint face.

A fire resistance time obtained on a specific non-standard supporting construction applies only to that particular construction.

A 3.4 SEAL POSITION

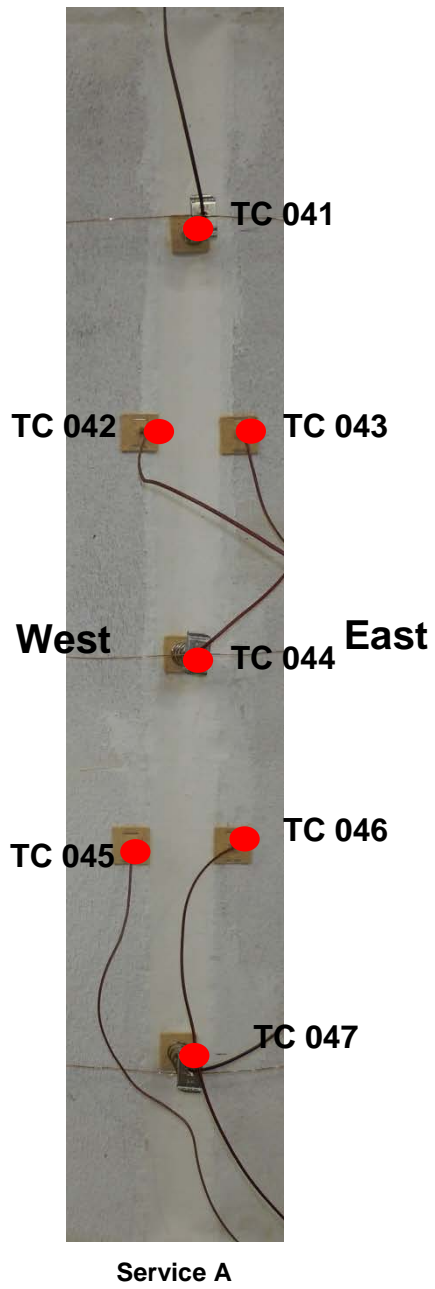
Test results are valid only for the position (see Figure 3) in which the seal was tested, except that where the linear joint seal was fitted flush with the surface of the supporting construction and is exposed to the fire (see Figure 3, test specimen B), the result will also be applicable to test specimen C and E.

A 3.5 MECHANICALLY INDUCED MOVEMENT

If the movement capability of a linear joint seal is less than $\pm 7,5$ %, the linear joint seal may be tested without mechanically induced movement and the result applies to the movement capability reported.

Results obtained with mechanically induced movement prior to or during the tests are only valid for the movement capability tested or lower.

APPENDIX 4 INSTRUMENTATION POSITIONS



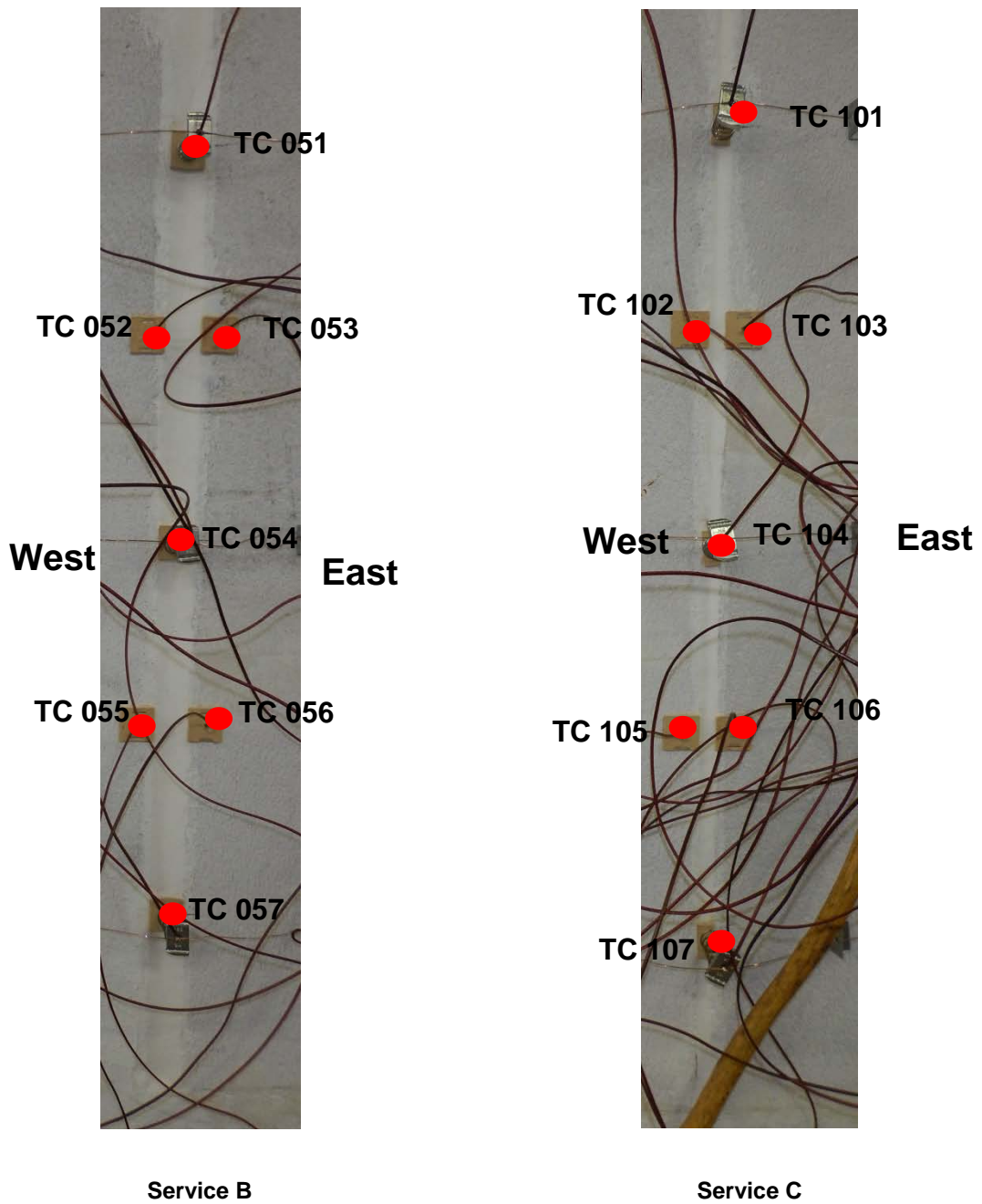


Figure A4.1: Unexposed surface thermocouple locations

Table A4.1: Thermocouple Locations

Service	T/C No.	Description
A	041	At the centre of the control joint, 167mm from the top of the control joint.
	042	On the west side of the control joint, 334mm from the top of the control joint.
	043	On the east side of the control joint, 334mm from the top of the control joint.
	044	At the centre of the control joint, 500mm from the top of the control joint.
	045	On the west side of the control joint, 667mm from the top of the control joint.
	046	On the east side of the control joint, 667mm from the top of the control joint.
	047	At the centre of the control joint, 833mm from the top of the control joint.
B	051	At the centre of the control joint, 167mm from the top of the control joint.
	052	On the west side of the control joint, 334mm from the top of the control joint.
	053	On the east side of the control joint, 334mm from the top of the control joint.
	054	At the centre of the control joint, 500mm from the top of the control joint.
	055	On the west side of the control joint, 667mm from the top of the control joint.
	056	On the east side of the control joint, 667mm from the top of the control joint.
	057	At the centre of the control joint, 833mm from the top of the control joint.
C	101	At the centre of the control joint, 167mm from the top of the control joint.
	102	On the west side of the control joint, 334mm from the top of the control joint.
	103	On the east side of the control joint, 334mm from the top of the control joint.
	104	At the centre of the control joint, 500mm from the top of the control joint.
	105	On the west side of the control joint, 667mm from the top of the control joint.
	106	On the east side of the control joint, 667mm from the top of the control joint.
	107	At the centre of the control joint, 833mm from the top of the control joint.

APPENDIX 5 TEST DATA

A 5.1 FURNACE TEMPERATURE

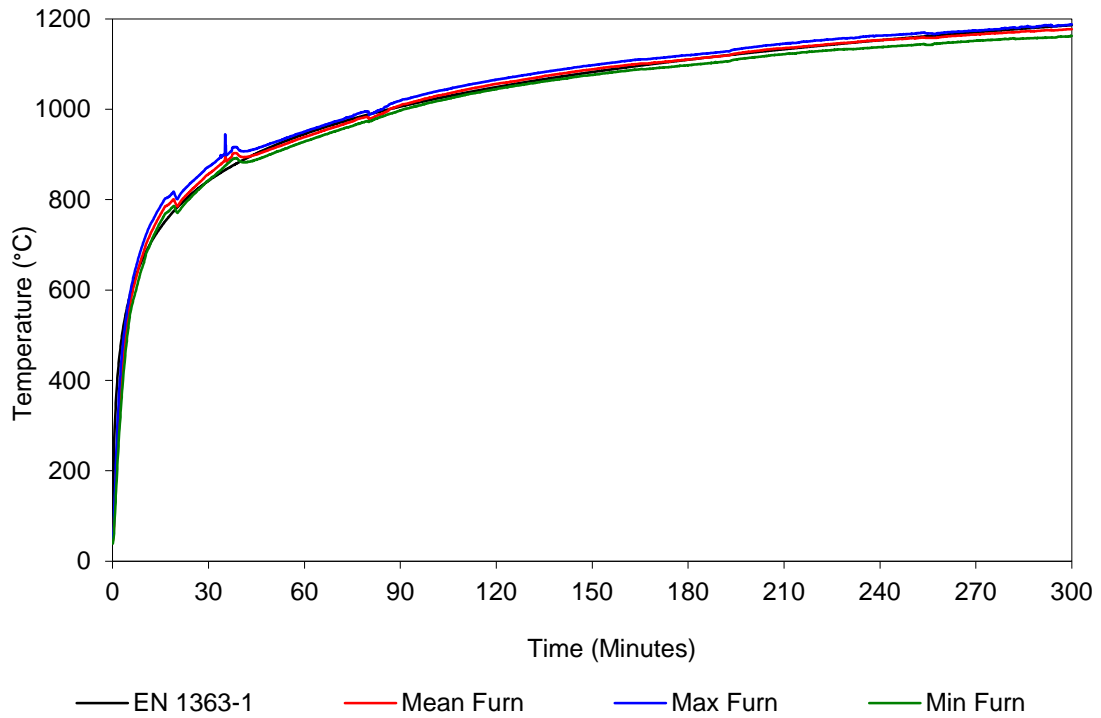


Figure A5.1: Furnace Temperatures vs. Time

A 5.2 FURNACE PRESSURE

The furnace pressure was measured at the mid-height of the control joints.

Table A5.1: Pressure

Time (minutes)	Pressure (Pa) Avg.	Time (minutes)	Pressure (Pa) Avg.	Time (minutes)	Pressure (Pa) Avg.
5-10	20	105-110	16	205-210	21
10-15	17	110-115	16	210-215	15
15-20	15	115-120	17	215-220	16
20-25	15	120-125	16	220-225	16
25-30	29	125-130	16	225-230	16
30-35	19	130-135	18	230-235	17
35-40	15	135-140	18	235-240	19
40-45	16	140-145	19	240-245	16
45-50	18	145-150	19	245-250	14
50-55	16	150-155	18	250-255	16
55-60	16	155-160	16	255-260	17
60-65	17	160-165	18	260-265	17
65-70	19	165-170	16	265-270	16
70-75	19	170-175	16	270-275	17
75-80	20	175-180	16	275-280	17
80-85	14	180-185	16	280-285	17
85-90	15	185-190	17	285-290	15
90-95	15	190-195	18	290-295	17
95-100	18	195-200	15	295-300	16
100-105	17	200-205	19		

A 5.3 SPECIMEN TEMPERATURES

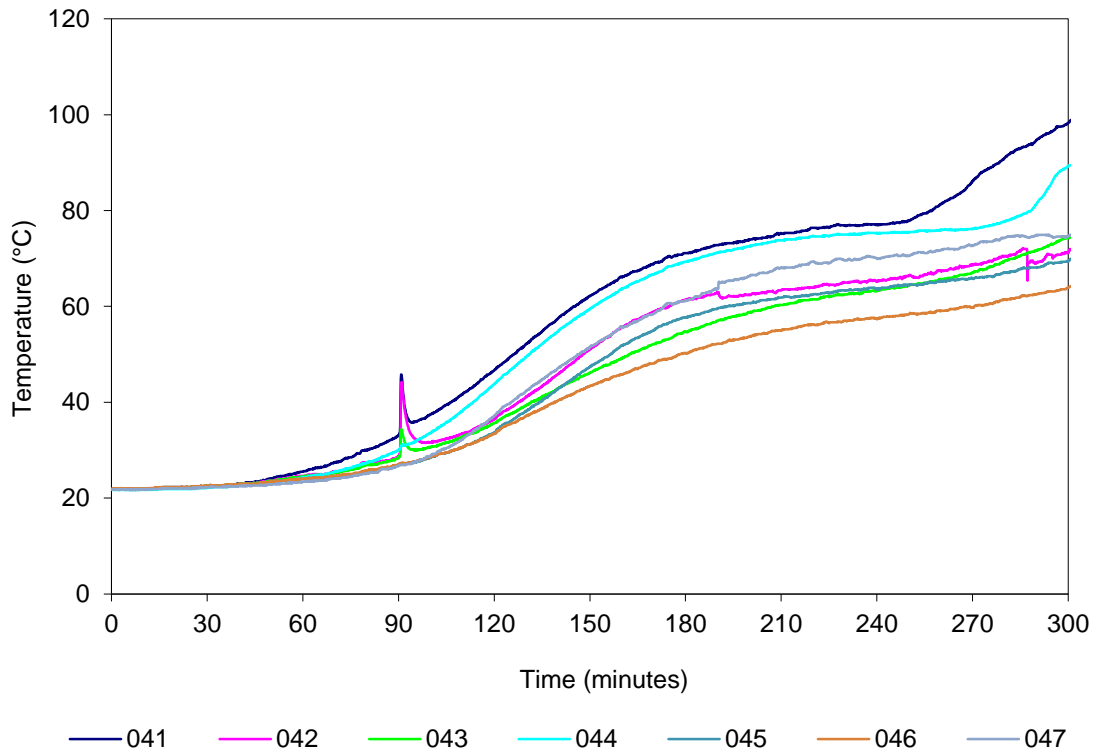


Figure A5.2: Service A. Temperatures vs. time

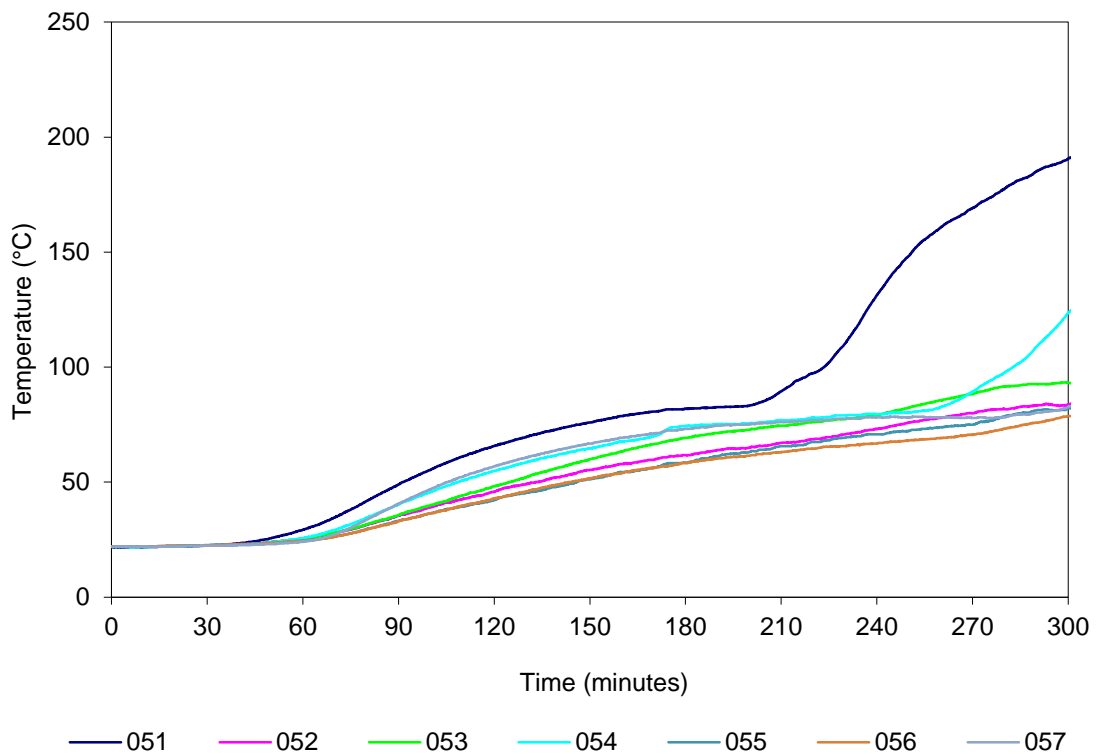


Figure A5.3: Service B. Temperatures vs. time

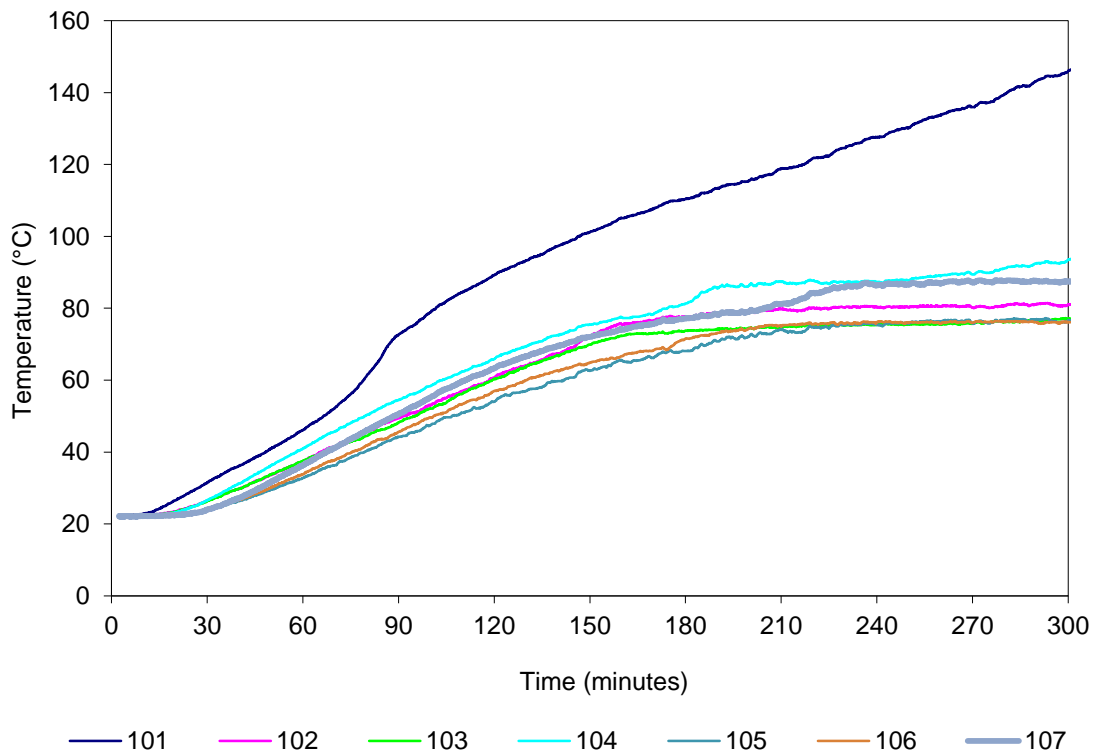


Figure A5.4: Service C. Temperatures vs. time

Table A5.2: Test Specimen Temperatures

Service	T/C No.	Description ²	Temp (°C) at t (minutes)						Limit ¹ (Mins)	
			t=0	t=30	t=60	t=120	t=180	t=240		t=300
A	041	At the centre of the control joint, 167mm from the top of the control joint.	22	22	26	47	71	77	98	#
	042	On the west side of the control joint, 334mm from the top of the control joint.	22	23	25	37	61	65	71	#
	043	On the east side of the control joint, 334mm from the top of the control joint.	22	23	25	36	55	63	74	#
	044	At the centre of the control joint, 500mm from the top of the control joint.	22	22	24	44	69	75	89	-
	045	On the west side of the control joint, 667mm from the top of the control joint.	22	22	24	34	58	64	69	-
	046	On the east side of the control joint, 667mm from the top of the control joint.	22	23	24	34	50	57	64	-
	047	At the centre of the control joint, 833mm from the top of the control joint.	22	22	23	37	61	70	75	-

B	051	At the centre of the control joint, 167mm from the top of the control joint.	22	22	29	66	82	131	191	-
	052	On the west side of the control joint, 334mm from the top of the control joint.	22	22	25	46	62	73	84	-
	053	On the east side of the control joint, 334mm from the top of the control joint.	22	22	26	48	69	79	93	-
	054	At the centre of the control joint, 500mm from the top of the control joint.	22	22	26	55	74	80	124	-
	055	On the west side of the control joint, 667mm from the top of the control joint.	22	23	25	42	59	71	82	-
	056	On the east side of the control joint, 667mm from the top of the control joint.	22	23	25	43	58	67	79	-
	057	At the centre of the control joint, 833mm from the top of the control joint.	22	22	24	57	73	78	83	-
C	101	At the centre of the control joint, 167mm from the top of the control joint.	23	32	46	89	110	128	146	-
	102	On the west side of the control joint, 334mm from the top of the control joint.	22	27	37	61	78	80	81	-
	103	On the east side of the control joint, 334mm from the top of the control joint.	22	26	38	60	74	76	77	-
	104	At the centre of the control joint, 500mm from the top of the control joint.	22	27	41	66	81	87	94	-
	105	On the west side of the control joint, 667mm from the top of the control joint.	22	24	33	54	68	75	77	-
	106	On the east side of the control joint, 667mm from the top of the control joint.	22	24	34	57	72	76	76	-
	107	At the centre of the control joint, 833mm from the top of the control joint.	22	24	36	63	77	87	88	-

- Notes**
- ¹ Limit time is the time to the nearest whole minute, rounded down to the nearest minute, at which the temperature recorded by the thermocouple does not rise by more than 180K above the initial temperature.
 - ² Refer to Appendix 4 for locations of thermocouples as only a generic description is included in the table.
 - ³ No insulation failure prior to thermocouple failure.
 - # Thermocouple failure.
 - * Service failure
 - Under Limit column indicates the temperature limit was not exceeded during the test period or up until the time of integrity failure if a failure occurred.

APPENDIX 6 PHOTOGRAPHS

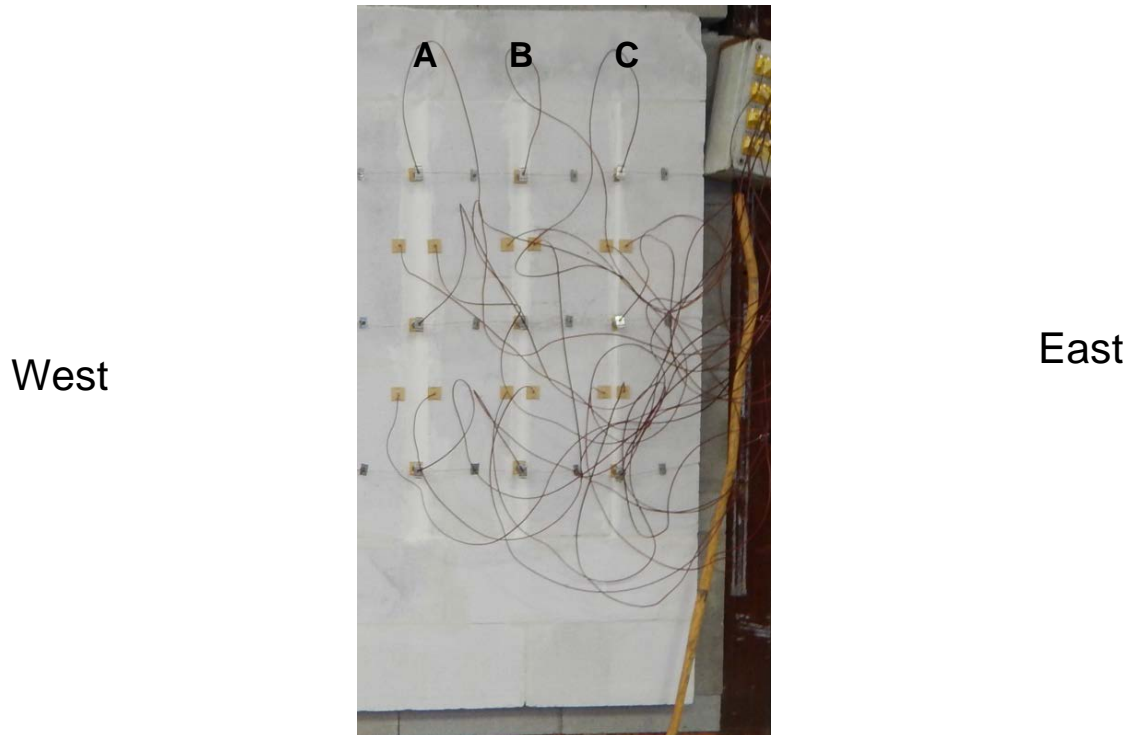


Figure A6.1: Unexposed face of specimen before commencement of the fire-resistance test



Figure A6.2: Exposed face of specimen before commencement of the fire-resistance test

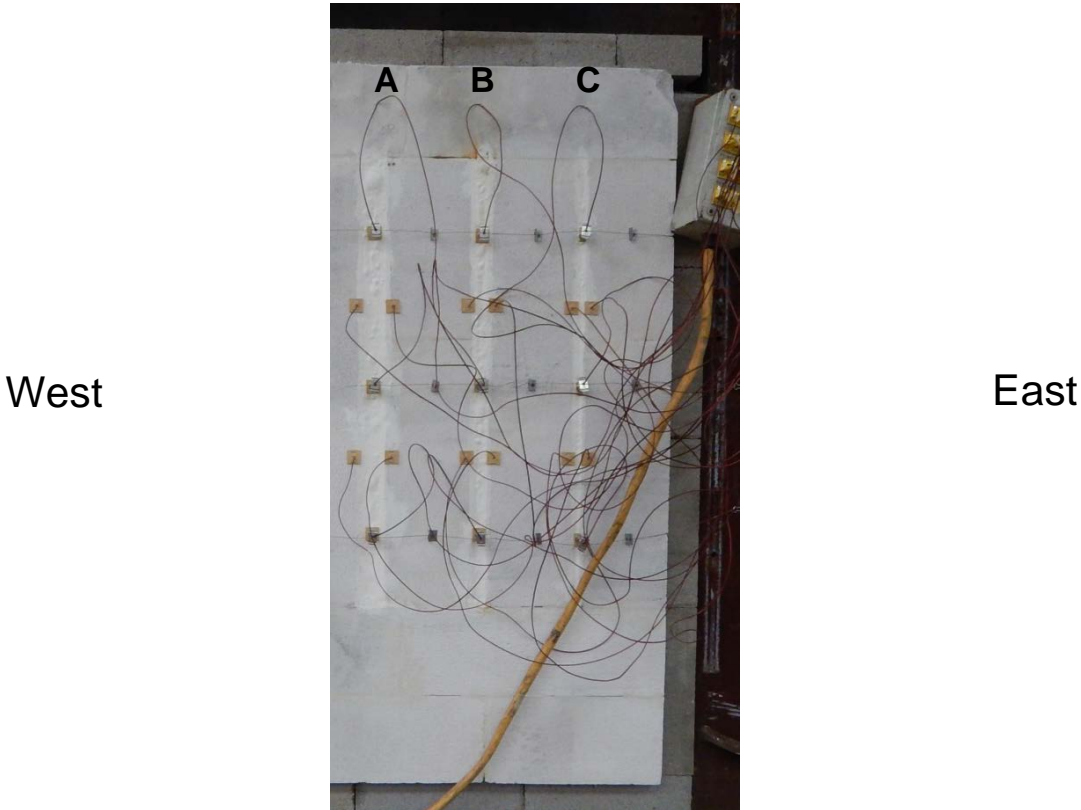


Figure A6.3: Unexposed face of specimen at the end of the test.

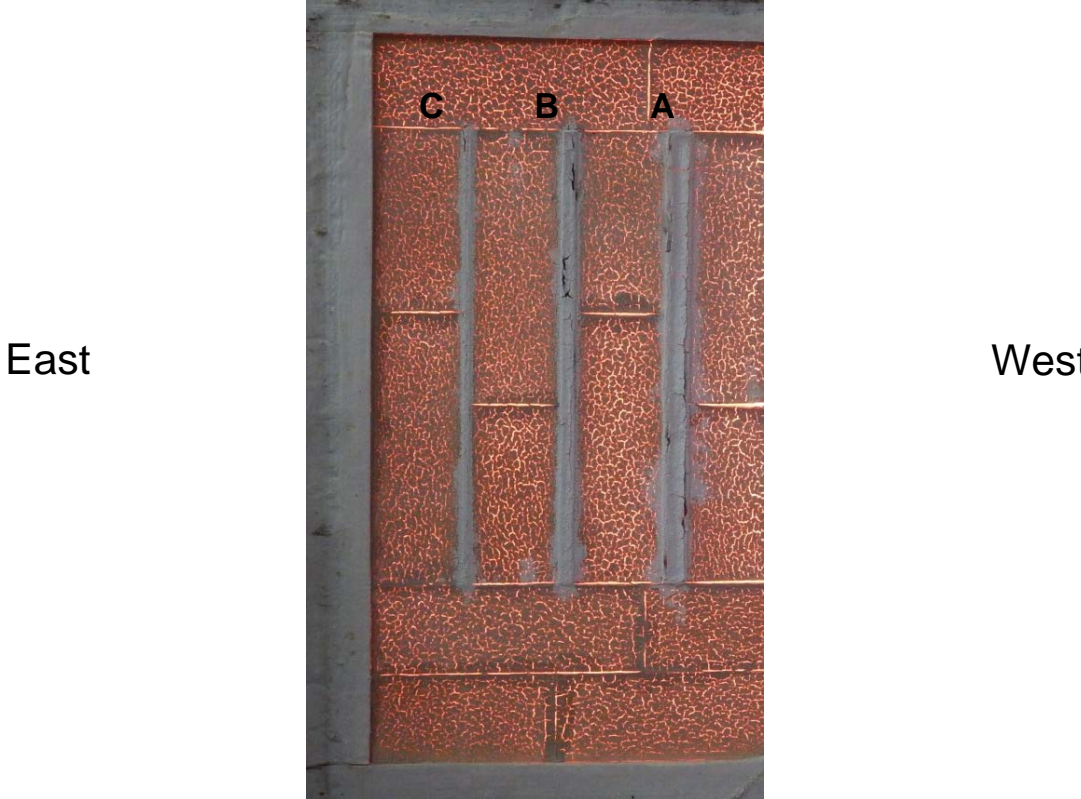


Figure A6.4: Exposed face of specimen at the end of the test.



TEST REPORT

Fire resistance test in accordance with EN 1366-4:2006 of three control joints in a Hebel panel Floor (AAC) protected with Aseal AS-1001 Fire Retardant Sealant.

EWFA Report No:

43878800d.1

Report Sponsor:

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1 CONSTRUCTION DETAILS

TEST ASSEMBLY

The test assembly comprised of six control joints in a nominally 1584mm wide × 1600mm long × 250mm thick floor constructed of Hebel panels.

TEST SPECIMENS

The Hebel floor was penetrated by three horizontal control joints at a nominal length of 1000mm. Starting from the western side there were three control joints 12mm, 30mm, and 50mm wide, respectively. These were protected by Alseal AS-1001 Fire Retardant Sealant. The control joints were sealed from the unexposed side at a depth of half the width of the control joint with a backing rod placed in the control joint.

The full description of the specimen is provided in Figures A1.1 to A1.2 and the 'Schedule of Components' in Section 2.

ASSEMBLY AND INSTALLATION METHODS

The Hebel blocks were cut into sections and installed into a restraint frame by representative of EWFA. The backing rods and sealant were installed by representative of EWFA on the 15th of May 2017.

ORIENTATION

The assembly was asymmetrical. The control joints were only protected on the unexposed side only.

2 SCHEDULE OF COMPONENTS

Item	Description	
CONTROL JOINTS		
1	SERVICE A	
	Dimensions	The control joint was nominally 12mm wide x 1000mm long.
	Sealant	Aleseal Fire Retardant sealant (item 7)
	Backing Rod	Close Cell (item 6)
	Installation	A backing rod the full length of the control joint was installed on the unexposed side at a depth of 6mm. The sealant was applied on the unexposed side at a depth of 6mm. The sealant was installed such that the surface was flush with the face of the Hebel blocks (item 7) at the time of the installation.
2	SERVICE B	
	Dimensions	The control joint was nominally 30mm wide x 1000mm long.
	Sealant	Aleseal Fire Retardant sealant (item 7)
	Backing Rod	Close Cell (item 6)
	Installation	A backing rod the full length of the control joint was installed on the unexposed side at a depth of 15mm. The sealant was applied on the unexposed side at a depth of 15mm. The sealant was installed such that the surface was flush with the face of the Hebel blocks (item 4) at the time of the installation.
3	SERVICE C	
	Dimensions	The control joint was nominally 50mm wide x 1000mm long.
	Sealant	Aleseal Fire Retardant sealant (item 7)
	Backing Rod	Open Cell (item 5)
	Installation	A backing rod the full length of the control joint was installed on the unexposed side at a depth of 25mm. The sealant was applied on the unexposed side at a depth of 25mm. The sealant was installed such that the surface was flush with the face of the Hebel blocks (item 4) at the time of the installation.
SEPERATING ELEMENT		
4	Item Name	Hebel Blocks
	Product Name	CSR Hebel Thermoblock AAC Masonry
	Size	200mm wide x 250mm deep x 1600mm high
	Density	558 kg/m ³ (measured)
	Installation	Installed as per Figure A1.1
BACKING ROD		
5	Item Name	Open Cell Polyethylene foam backing rod
	Size	Ø50mm
6	Item Name	Close Cell Polyethylene foam backing rod
	Size	Ø20mm (Double up when inserted into 30mm gap)
SEALANT		

Item	Description	
7	Item Name	Fire Retardant Sealant
	Product Name	Aalseal AS-1001 Fire Retardant Sealant
	Density	1410 kg/m ³ (measured)

3 TEST PROCEDURE

STATEMENT OF COMPLIANCE

The test was performed in accordance with the requirements of EN 1366-4:2006 subject to the variations below.

VARIATIONS TO TEST METHOD

The pressure for the 5-30, 60-65, 75-85, 110-115, 209-240, 270-275 minute period was above the limits prescribed in BS EN 1366-4 2006 up to 10 Pa. This exceeded the pressure requirement of the standard and was therefore more severe than required by the standard. Based on the above the results of this test remain valid.

The furnace pressure was below the limits stated in BS EN 1366-4 2006 by 10Pa between 135-145 minutes due to deterioration of the specimen. See table A5.2 for details. Due to the state of the specimen at that time, the reduction in pressure is unlikely to have invalidated the result.

PRE-TEST CONDITIONING

The construction of the specimen was finished on the 15 May 2017 and was tested on the 14 June 2017. During this period the test specimen was subject to normal laboratory temperatures and relative humidity conditions.

SAMPLING / SPECIMEN SELECTION

The laboratory was not involved in the sampling or selection of the test specimen for the fire resistance test.

AMBIENT TEMPERATURE

The ambient temperature at the start of the test was 15°C and varied between 15°C and 21°C during the test.

TEST DURATION

The test duration was 301 minutes.

INSTRUMENTATION AND EQUIPMENT

The instrumentation was provided in accordance with EN 1363-1:2012 and as detailed below:

The furnace temperature was measured by 4-off 100mm x 100mm x 0.7 mm plate thermocouples with mineral insulated metal sheathed Type K thermocouples with an overall diameter of 1mm with the measuring junction insulated from the sheath. The plate thermocouples included 97mm x 97mm x 10mm inorganic insulating pads.

The non-fire side specimen temperatures were measured by Type K thermocouples with wire diameters less than 0.5mm soldered to 12mm diameter x 0.2mm thick copper discs covered by 30mm x 30mm x 2.0 mm inorganic insulating pads. The thermocouple positions are described in Table A4.1, and are shown on Figure A4.1 in Appendix 4.

A roving thermocouple was available to measure temperatures at positions that appeared hotter than the positions monitored by the fixed thermocouples.

The furnace pressure was measured at the mid-height of the control joint.

Cotton pad were available during the test to assess the performance under the criteria for integrity.

4 TEST MEASUREMENTS

FURNACE TEMPERATURE AND PRESSURE MEASUREMENTS

Furnace temperature and pressure data are provided in Figure A5.1 and Table A5.1 in Appendix 5.

SPECIMEN TEMPERATURES

Specimen temperature data is provided in A 5.3 and Table A5.2 in Appendix 5.

OBSERVATIONS

A table that includes observations of the significant behaviour of the specimen and details of the occurrence of the various performance criteria specified in EN 1366-4:2006 (EN 1363-1) is provided in Appendix 2. Photographs of the specimen are included in Appendix 6.

5 TEST RESULTS

The specimens listed below achieved the following performance when tested in accordance with EN1366-4:2006, subject to the variations listed in Section 3.

Service	Criteria	Result
A	Structural Adequacy	Not applicable
	Integrity	Failure at 265 minutes
	Insulation	Failure at 184 minutes
B	Structural Adequacy	Not applicable
	Integrity	Failure at 266 minutes
	Insulation	Failure at 98 minutes
C	Structural Adequacy	Not applicable
	Integrity	Failure at 239 minutes
	Insulation	Failure at 98 minutes

6 APPLICATION OF TEST RESULTS

TEST LIMITATIONS

The results of this fire test 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. The results only relate to the behaviour of the specimen of the element of the construction under the particular conditions of the test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they necessarily reflect the actual behaviour in fires.

VARIATIONS FROM THE TESTED SPECIMENS

This report details the method of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in EN 1363-1, and where appropriate EN 1363-2. Any significant deviation with respect to size, constructional details, loads, stresses, edge or end conditions other than those allowed under the field of direct application in the relevant test method is not covered by this report. It is recommended that any proposed variation to the tested configuration other than as permitted under the field of direct application specified in Appendix 3 should be referred to the test sponsor in the first instance to obtain appropriate documentary evidence of compliance from Exova Warringtonfire Aus Pty Ltd or another Registered Testing Authority.

UNCERTAINTY OF MEASUREMENT

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.

APPENDIX 1 DRAWINGS OF TEST ASSEMBLY

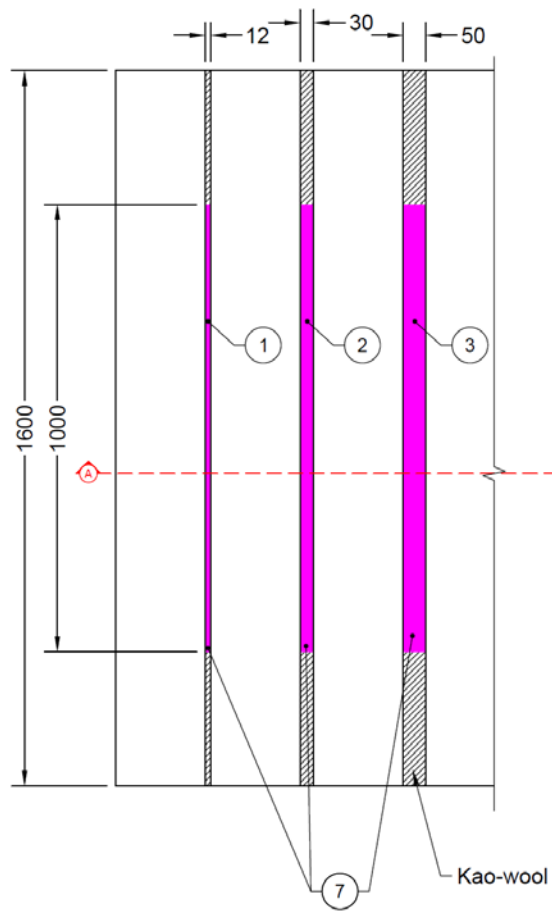


Figure A1.1: Elevation of Test Specimen, Unexposed side

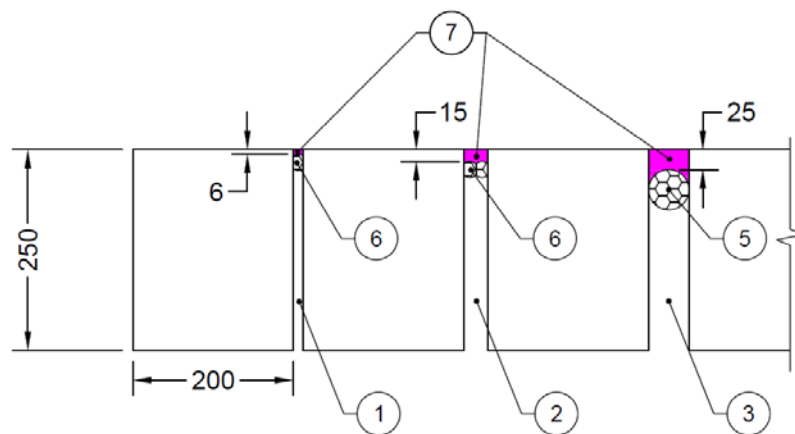


Figure A1.2: Horizontal Cross-Section A-A

APPENDIX 2 TEST OBSERVATIONS

The following include observations of the significant behaviour of the specimen.

Time		Observations
min	sec	
Service A		
00	00	Fire resistance test commenced and the ambient temperature was approximately 15°C.
30	00	The specimen had continued to maintain integrity and insulation in accordance with EN 1366-4
60	00	The specimen had continued to maintain integrity and insulation in accordance with EN 1366-4
90	00	The specimen had continued to maintain integrity and insulation in accordance with EN 1366-4
120	00	The specimen had continued to maintain integrity and insulation in accordance with EN 1366-4
180	00	The specimen had continued to maintain integrity and insulation in accordance with EN 1363-1
184	50	TC 011, at the centre of the northern section of the control joint recorded a temperature of 194°C. Failure of insulation in accordance with EN 1363-1 clause 11.3, where the maximum temperature of Thermocouple TC 011 exceeded the initial temperature by more than 180°C.
265	00	A 30 second cotton pad test was carried out on top of the control joint crack on the interface between the Hebel block and mastic resulting in flaming of the cotton pad. Failure of integrity of the specimen in accordance with EN 1363-1, clause 11.2 (a), where ignition of the cotton had occurred.
Service B		
00	00	Fire resistance test commenced and the ambient temperature was approximately 15°C.
02	40	Smoke emission appeared from the joint on the north edge
30	00	The specimen had continued to maintain integrity and insulation in accordance with EN 1366-4
43	56	The mastic had expanded.
60	00	The specimen had continued to maintain integrity and insulation in accordance with EN 1366-4
72	00	Blistering appeared on the surface of the mastic
90	00	The specimen had continued to maintain integrity and insulation in accordance with EN 1366-4
98	00	TC 021, at the centre of the northern section of the control joint recorded a temperature of 194°C. Failure of insulation in accordance with EN 1363-1 clause 11.3, where the maximum temperature of Thermocouple TC 021 exceeded the initial temperature by more than 180°C.
120	00	The specimen had continued to maintain integrity in accordance with EN 1366-4
164	00	Discoloration appeared on the surface of control joint.
180	00	The specimen had continued to maintain integrity in accordance with EN 1363-1
240	00	The specimen had continued to maintain integrity in accordance with EN 1366-4
266	30	Flaming for greater than 10 seconds had become evident at on the gap between the mastic and the Hebel block.

		Integrity failure in accordance with EN 1363-1 Clause 11.2 (c) due to flaming for more than 10 seconds on the unexposed side.
Service C		
00	00	Fire resistance test commenced and the ambient temperature was approximately 15°C.
01	32	Smoke emission appeared from the joint on the north edge
30	00	The specimen had continued to maintain integrity and insulation in accordance with EN 1366-4
43	56	The mastic had expanded.
60	00	The specimen had continued to maintain integrity and insulation in accordance with EN 1366-4
72	00	Blistering appeared on the surface of the mastic
90	00	The specimen had continued to maintain integrity and insulation in accordance with EN 1366-4
98	15	TC 031, at the centre of the northern section of the control joint recorded a temperature of 194°C. Failure of insulation in accordance with EN 1363-1 clause 11.3, where the maximum temperature of Thermocouple TC 031 exceeded the initial temperature by more than 180°C.
120	00	The specimen had continued to maintain integrity in accordance with EN 1366-4
164	00	Discoloration appeared on the surface of control joint.
180	00	The specimen had continued to maintain integrity in accordance with EN 1363-1
200	27	Amount of smoke emission had increased.
239	30	A 30 second cotton pad test was carried out on top of the control joint crack on the interface between the Hebel block and mastic resulting in flaming of the cotton pad. Failure of integrity of the specimen in accordance with EN 1363-1, clause 11.2 (a), where ignition of the cotton had occurred.

APPENDIX 3 DIRECT FIELD OF APPLICATION

Reference Note: References in this section refer to those found in the standard and not this report.

A 3.1 GENERAL

EN 1366-4:2006 indicates that the results of the fire test contained in the test report are directly applicable without reference to the testing authority to similar constructions where one or more of the changes have been made:

A 3.2 ORIENTATION

The field of application regarding the orientation of the linear joint is given in Table 1. The possible orientation of linear joints (A to E) and of the specimens in the test (A to C) is illustrated in Figure 12.

Table 1 – Field of application regarding orientation

Tested Orientation	Application
A	A, D, E ^a
B	B
C	C, D ^b
a	Orientation E will only be covered by test orientation A if shear movement was chosen and one face of the joint was fixed and the other face was removed.
b	Orientation D will only be covered by test orientation C if shear movement was chosen and one face of the joint was fixed and the other face was moved.

Key

A linear joint in a horizontal test construction

B vertical linear joint in a vertical test construction

C horizontal linear joint in a vertical test construction

D horizontal wall joint abutting a floor, ceiling or roof

E horizontal floor joint abutting a wall

Table 1 only applies when both the supporting construction and the location of the seal within the linear joint remain unchanged. See 13.3

A 3.3 SUPPORTING CONSTRUCTION

Results obtained with autoclaved aerated concrete standard supporting constructions apply to concrete, block work and masonry separating elements of a thickness and density equal to or greater than that tested.

Results obtained with normal concrete standard supporting constructions apply to concrete and block work separating elements of a thickness and density equal to or greater than that tested.

Results obtained with timber standard supporting construction apply to timber separating elements of a thickness and density equal to or greater than that tested.

Results obtained with the steel angle standard supporting construction as described in 7.2.2.3 apply to separating element constructions made of metals with a melting point higher than 1000 °C.

Results obtained with a combination of a standard supporting construction as described in 7.2.2.1 and a standard supporting construction as described in 7.2.2.3 apply to concrete, block work and masonry separating elements of a thickness and density equal to or greater than that tested forming one joint face and separating element constructions made of metals with a melting point higher than 1000 °C forming the other joint face.

A fire resistance time obtained on a specific non-standard supporting construction applies only to that particular construction.

A 3.4 SEAL POSITION

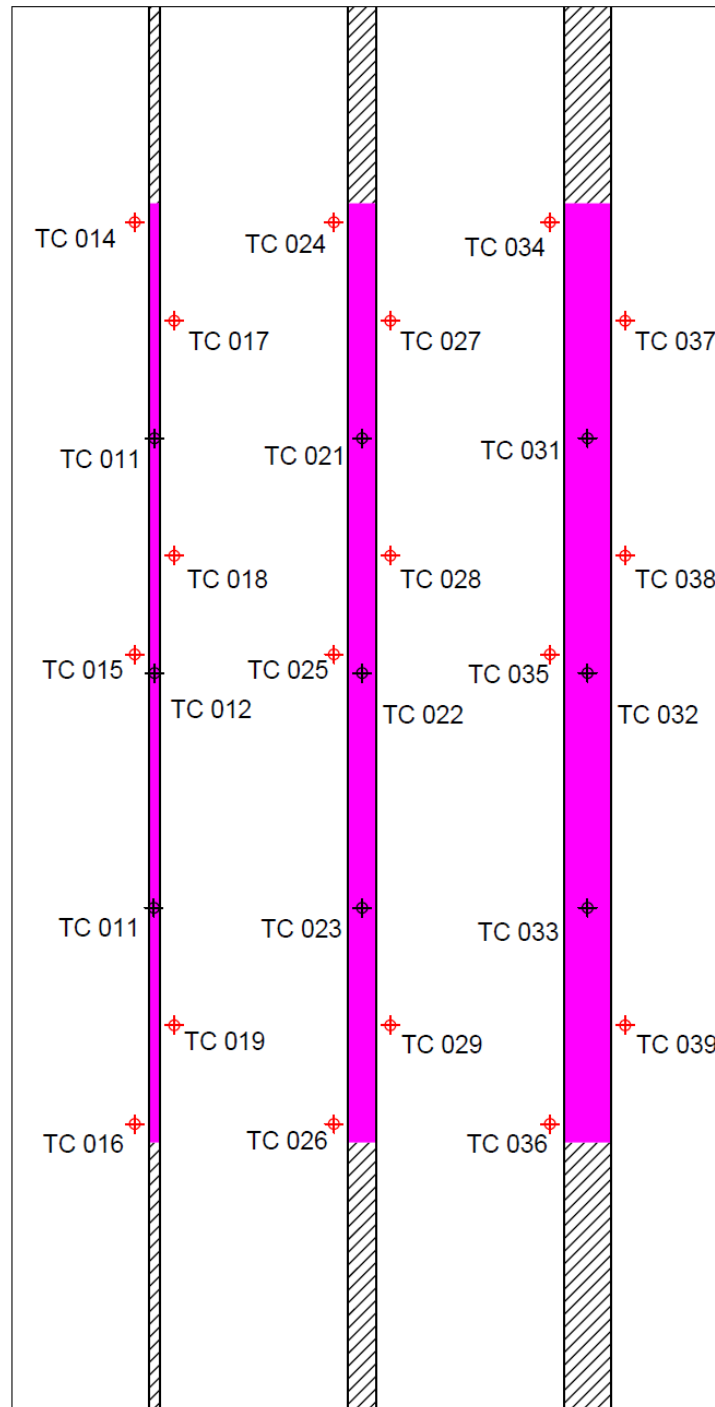
Test results are valid only for the position (see Figure 3) in which the seal was tested, except that where the linear joint seal was fitted flush with the surface of the supporting construction and is exposed to the fire (see Figure 3, test specimen B), the result will also be applicable to test specimen C and E.

A 3.5 MECHANICALLY INDUCED MOVEMENT

If the movement capability of a linear joint seal is less than ± 7.5 %, the linear joint seal may be tested without mechanically induced movement and the result applies to the movement capability reported.

Results obtained with mechanically induced movement prior to or during the tests are only valid for the movement capability tested or lower.

APPENDIX 4 INSTRUMENTATION POSITIONS



Specimen A Specimen B Specimen C
Figure A4.1: Unexposed surface thermocouple locations

Table A4.1: Thermocouple Locations

Service	T/C No.	Description
A	011	At the centre of the control joint, 250mm from the north of the control joint.
	012	At the centre of the control joint, 500mm from the north of the control joint.
	013	At the centre of the control joint, 750mm from the north of the control joint.
	014	On the west side of the control joint, 20mm from the north of the control joint
	015	On the west side of the control joint, 480mm from the north of the control joint.
	016	On the west side of the control joint, 20mm from the south of the control joint.
	017	On the east side of the control joint, 150mm from the north of the control joint.
	018	On the east side of the control joint, 350mm from the north of the control joint.
	019	On the east side of the control joint, 150mm from the south of the control joint.
B	021	At the centre of the control joint, 250mm from the north of the control joint.
	022	At the centre of the control joint, 500mm from the north of the control joint.
	023	At the centre of the control joint, 750mm from the north of the control joint.
	024	On the west side of the control joint, 20mm from the north of the control joint
	025	On the west side of the control joint, 480mm from the north of the control joint.
	026	On the west side of the control joint, 20mm from the south of the control joint.
	027	On the east side of the control joint, 150mm from the north of the control joint.
	028	On the east side of the control joint, 350mm from the north of the control joint.
	029	On the east side of the control joint, 150mm from the south of the control joint.
C	031	At the centre of the control joint, 250mm from the north of the control joint.
	032	At the centre of the control joint, 500mm from the north of the control joint.
	033	At the centre of the control joint, 750mm from the north of the control joint.
	034	On the west side of the control joint, 20mm from the north of the control joint
	035	On the west side of the control joint, 480mm from the north of the control joint.
	036	On the west side of the control joint, 20mm from the south of the control joint.
	037	On the east side of the control joint, 150mm from the north of the control joint.
	038	On the east side of the control joint, 350mm from the north of the control joint.
	039	On the east side of the control joint, 150mm from the south of the control joint.

APPENDIX 5 TEST DATA

A 5.1 FURNACE TEMPERATURE

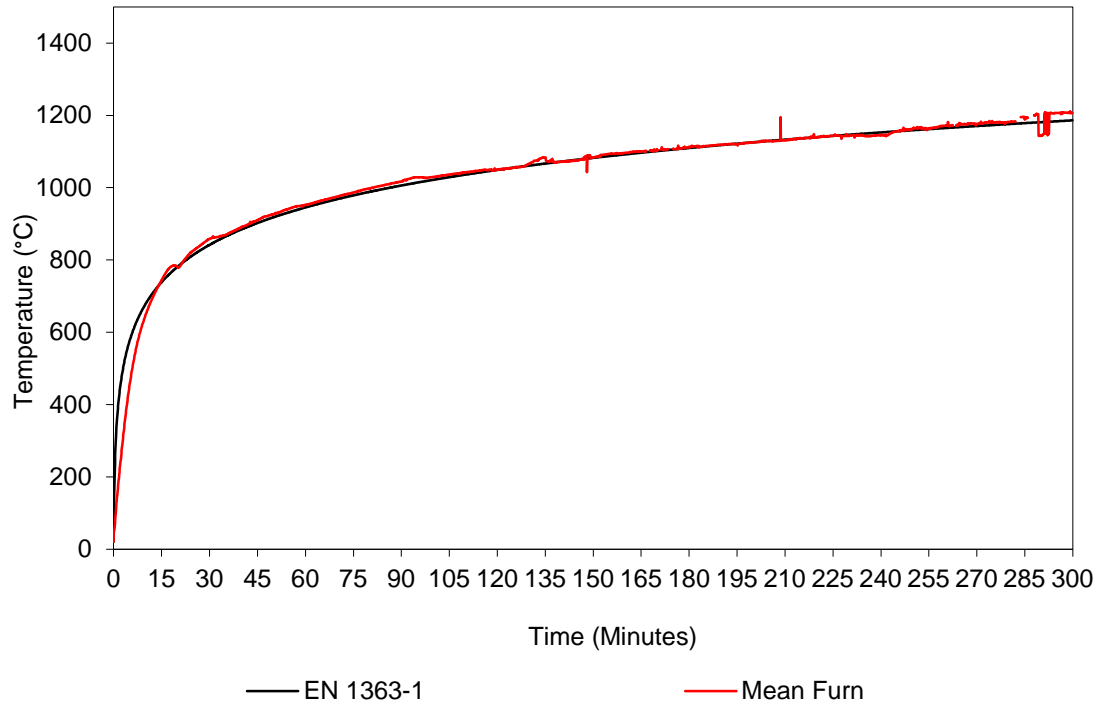


Figure A5.1: Furnace Temperatures vs. Time

A 5.2 FURNACE PRESSURE

The furnace pressure was measured 100mm below the separating element.

Table A5.1: Pressure

Time (minutes)	Pressure (Pa) Avg.	Time (minutes)	Pressure (Pa) Avg.	Time (minutes)	Pressure (Pa) Avg.
5-10	30	105-110	23	205-210	18
10-15	27	110-115	23	210-215	29
15-20	25	115-120	21	215-220	38
20-25	25	120-125	20	220-225	32
25-30	24	125-130	22	225-230	36
30-35	18	130-135	22	230-235	25
35-40	19	135-140	7	235-240	24
40-45	19	140-145	6	240-245	22
45-50	20	145-150	17	245-250	21
50-55	20	150-155	18	250-255	16
55-60	20	155-160	18	255-260	22
60-65	24	160-165	19	260-265	18
65-70	22	165-170	19	265-270	19
70-75	22	170-175	20	270-275	24
75-80	23	175-180	19	275-280	13
80-85	23	180-185	18	280-285	21
85-90	22	185-190	18	285-290	19
90-95	23	190-195	19	290-295	17
95-100	21	195-200	18	295-300	18
100-105	23	200-205	19		

A 5.3 SPECIMEN TEMPERATURES

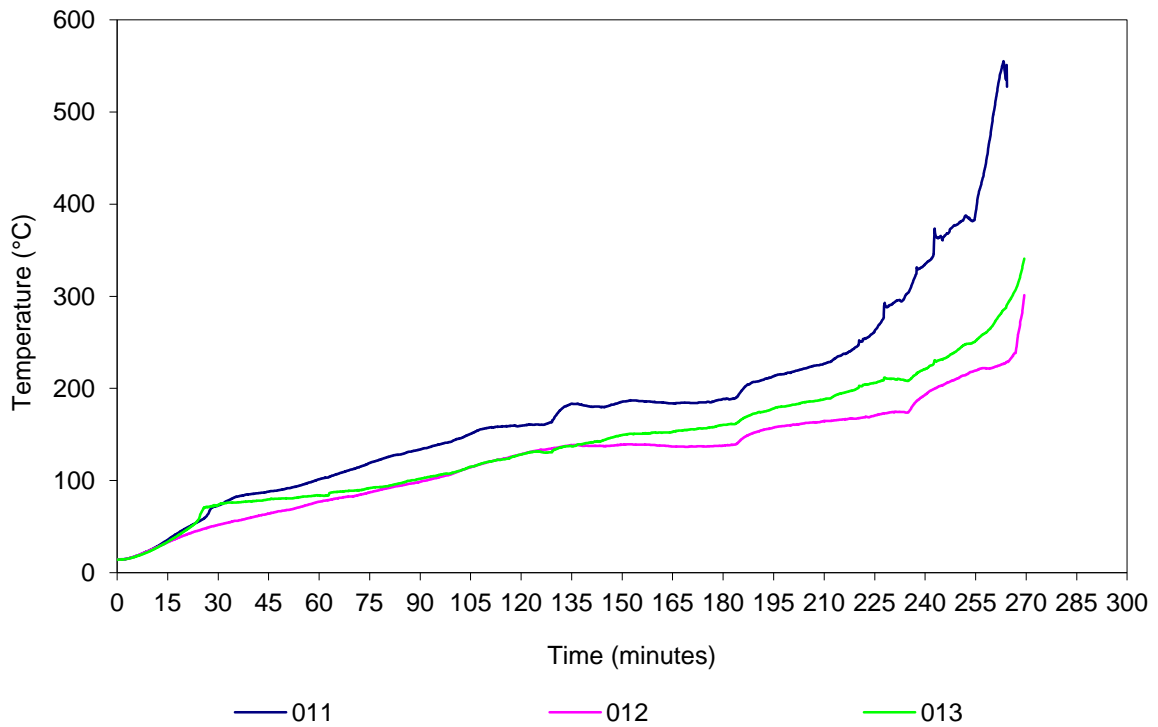


Figure A5.2: Service A on the Hebel (west side of the control joint). Temperatures vs. time

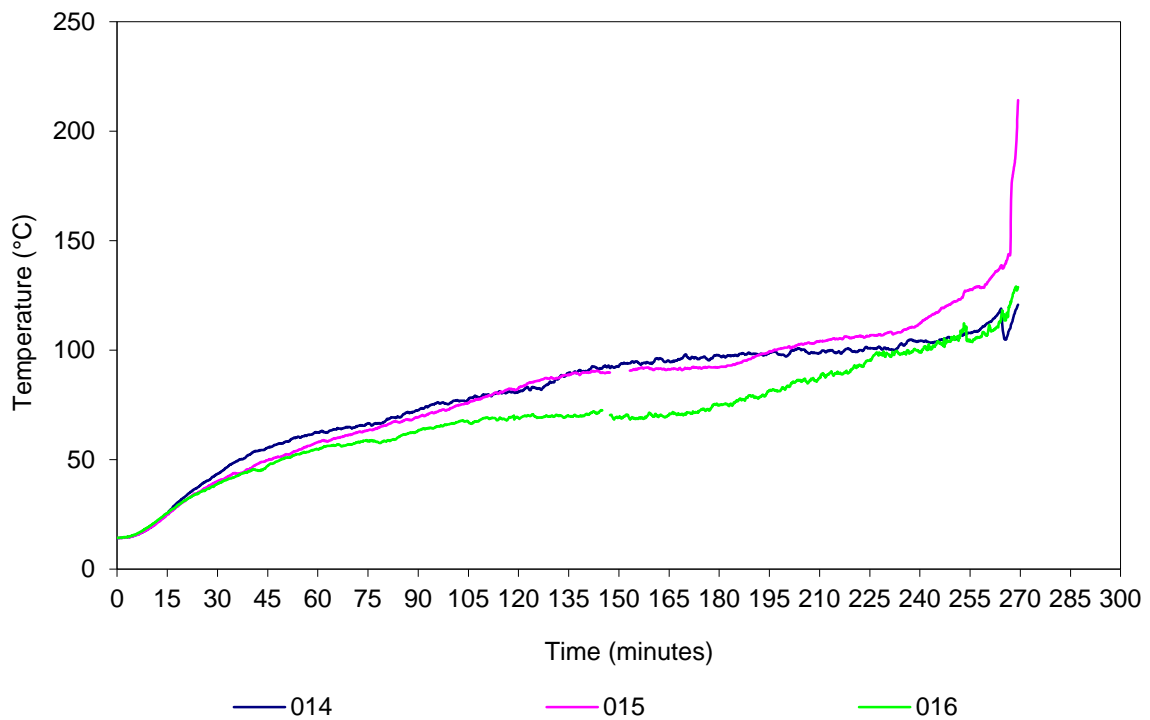


Figure A5.3: Service A on the sealant (mid-wide of the control joint). Temperatures vs. time

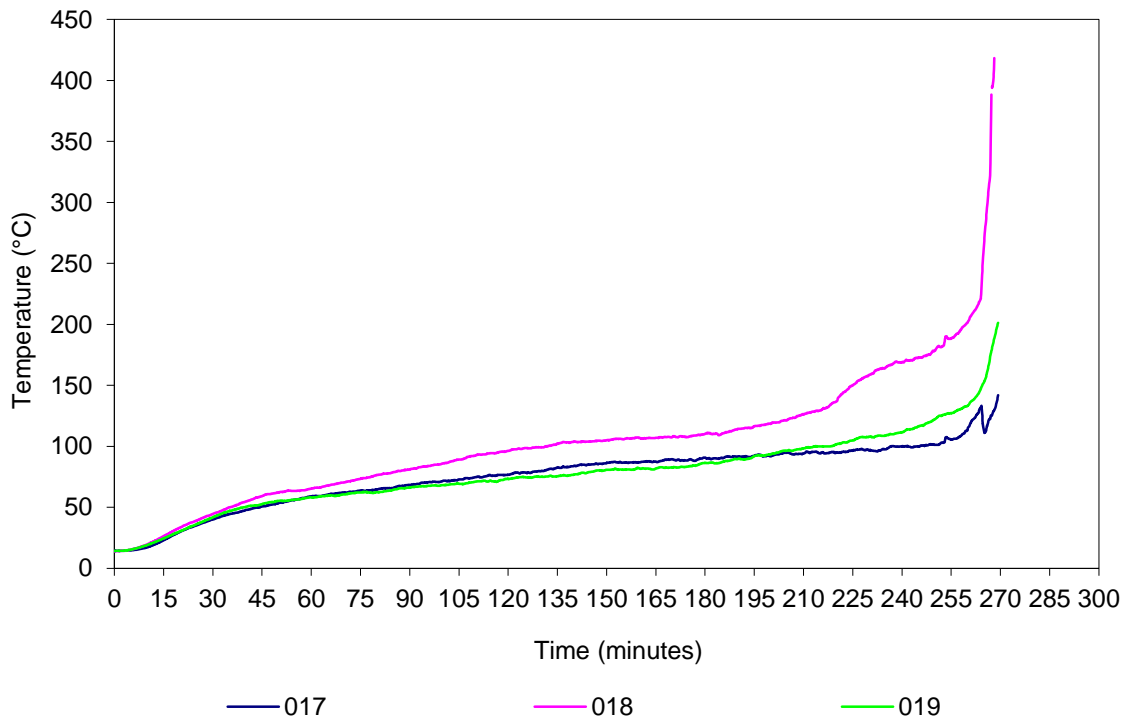


Figure A5.4: Service A on the Hebel (east side of the control joint). Temperatures vs. time

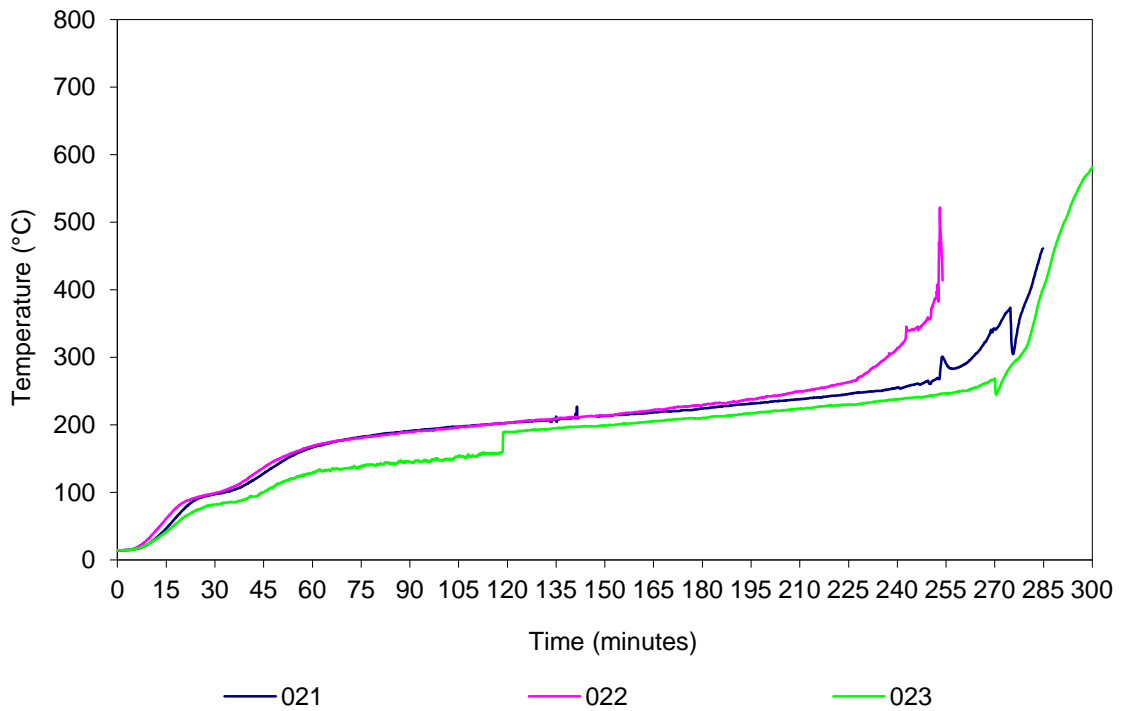


Figure A5.5: Service B on the Hebel (west side of the control joint). Temperatures vs. time

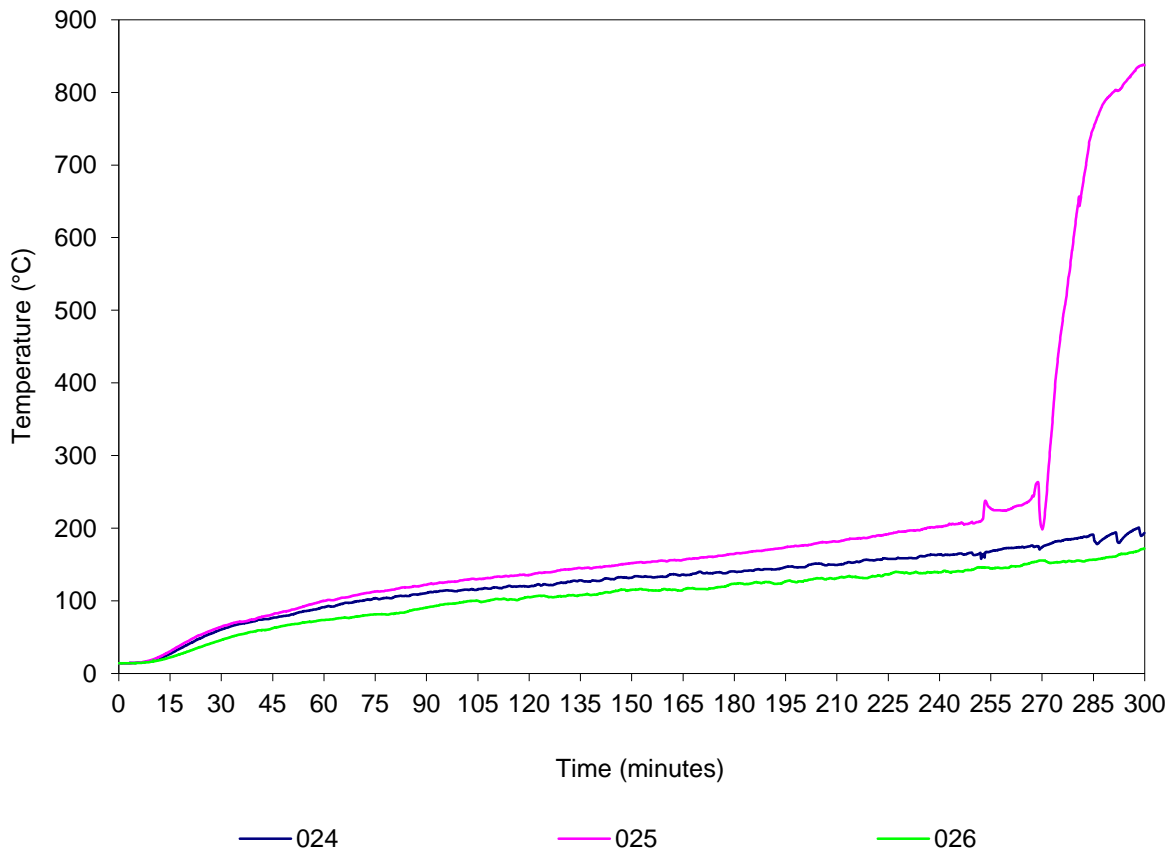


Figure A5.6: Service B on the sealant (mid-wide of the control joint). Temperatures vs. time

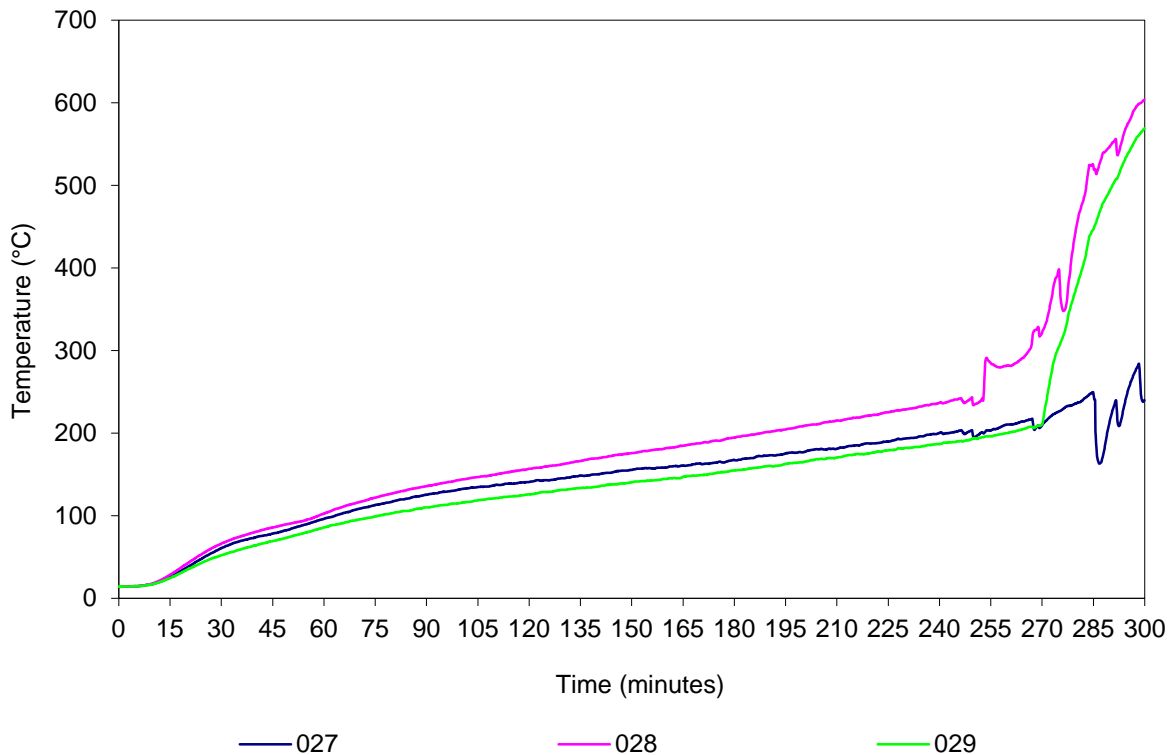


Figure A5.7: Service B on the Hebel (east side of the control joint). Temperatures vs. time

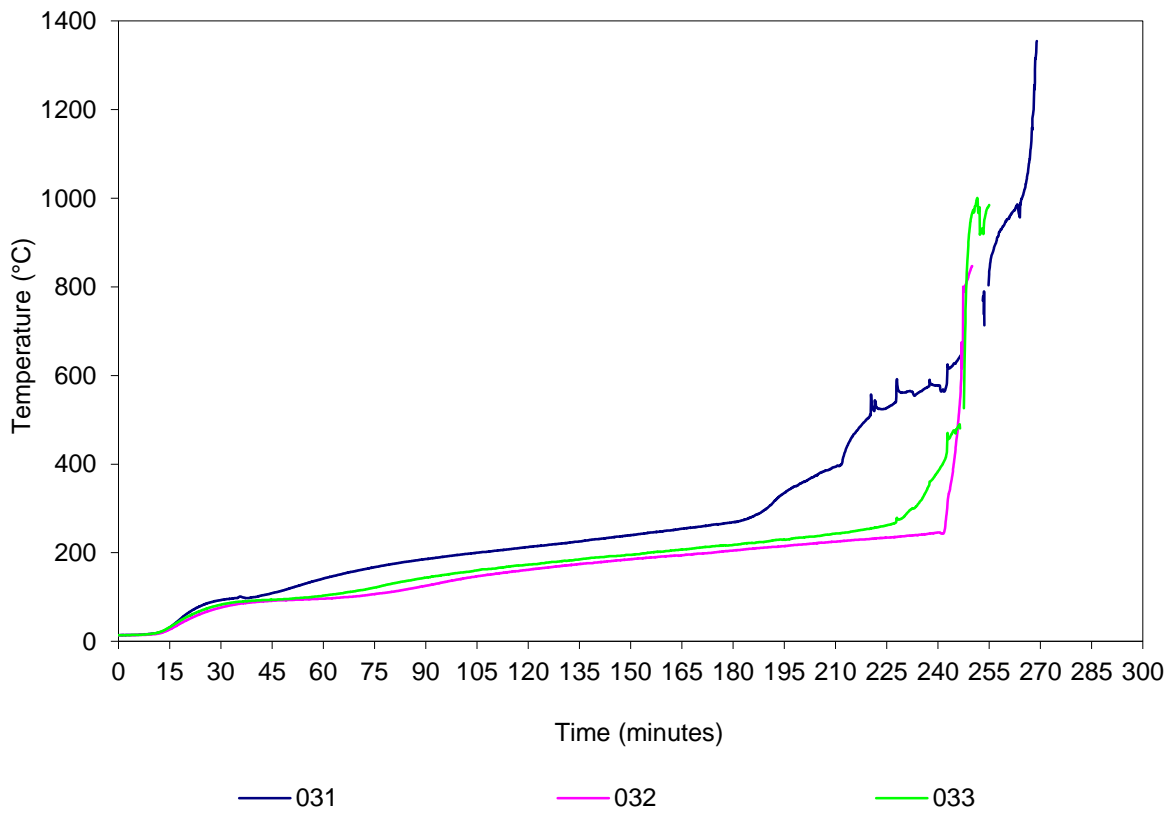


Figure A5.8: Service C on the Hebel (west side of the control joint). Temperatures vs. time

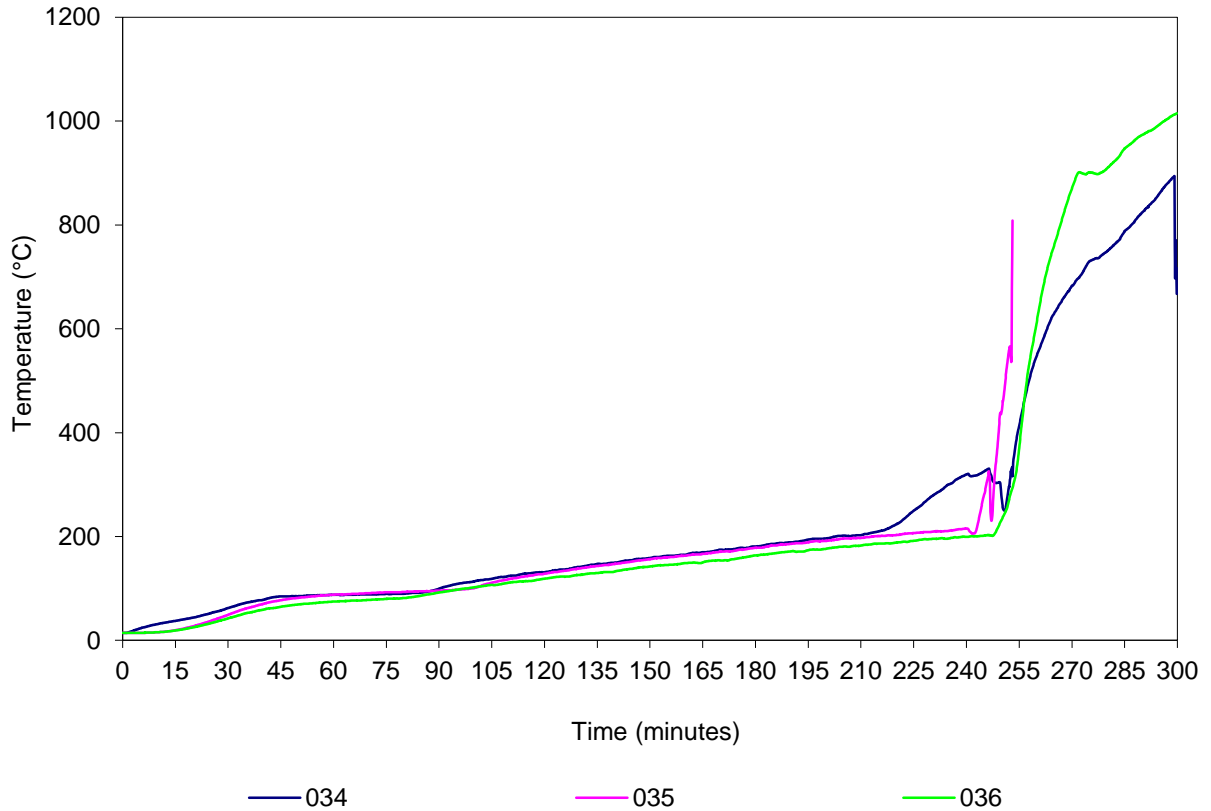


Figure A5.9: Service C on the sealant (mid-wide of the control joint). Temperatures vs. time

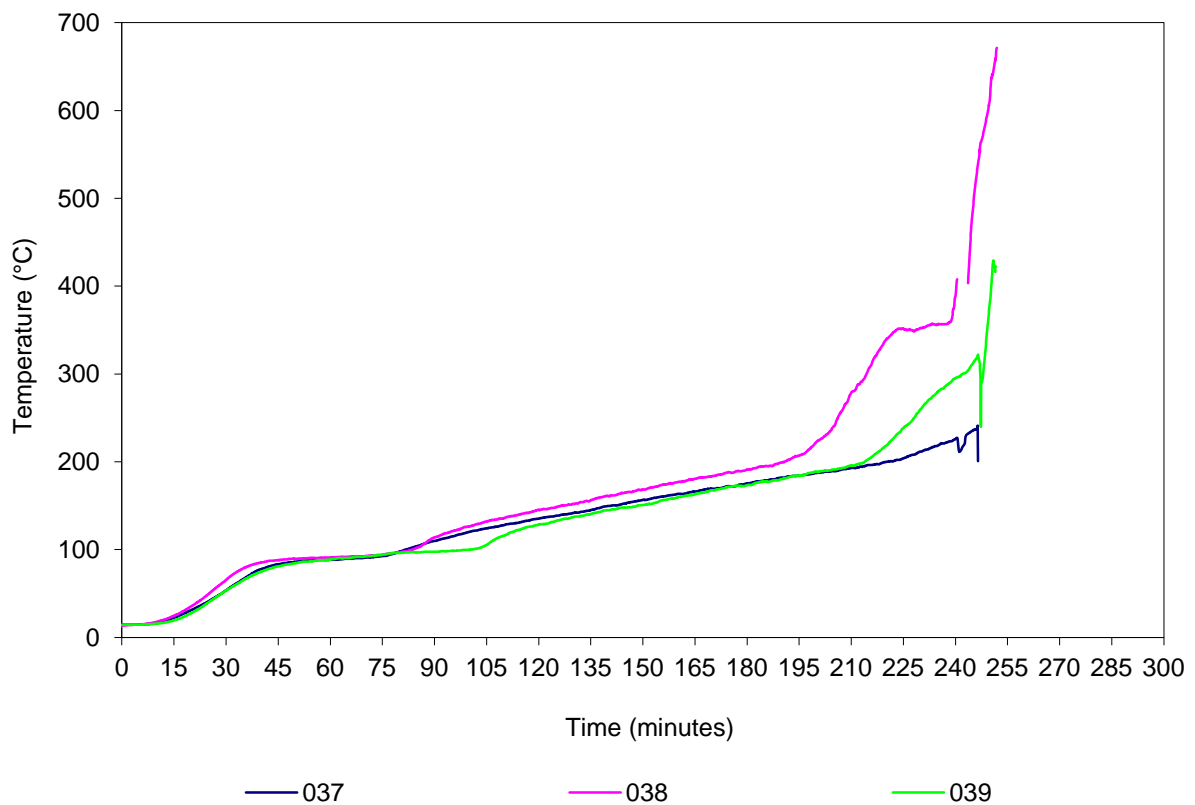


Figure A5.10: Service C on the Hebel (east side of the control joint). Temperatures vs. time

Table A5.2: Test Specimen Temperatures

Service	T/C No.	Description ²	Temp (°C) at t (minutes)						Limit ¹ (Mins)	
			t=0	t=30	t=60	t=120	t=180	t=240		t=300
A	011	At the centre of the control joint, 250mm from the north of the control joint.	14	73	101	160	189	335	#	184
	012	At the centre of the control joint, 500mm from the north of the control joint.	14	52	77	128	138	193	#	240
	013	At the centre of the control joint, 750mm from the north of the control joint.	14	74	84	128	160	221	#	214
	014	On the west side of the control joint, 20mm from the north of the control joint	14	44	62	81	98	104	#	269 ³
	015	On the west side of the control joint, 480mm from the north of the control joint.	14	40	58	83	92	112	#	268
	016	On the west side of the control joint, 20mm from the south of the control joint.	14	39	55	69	75	100	#	269 ³

	017	On the east side of the control joint, 150mm from the north of the control joint.	14	40	59	77	91	100	#	269 ³
	018	On the east side of the control joint, 350mm from the north of the control joint.	14	45	65	96	110	169	#	257
	019	On the east side of the control joint, 150mm from the south of the control joint.	14	42	58	73	86	112	#	268
B	021	At the centre of the control joint, 250mm from the north of the control joint.	14	98	166	203	224	255	#	98
	022	At the centre of the control joint, 500mm from the north of the control joint.	14	99	168	203	229	313	#	101
	023	At the centre of the control joint, 750mm from the north of the control joint.	14	82	129	189	210	238	581	133
	024	On the west side of the control joint, 20mm from the north of the control joint	14	61	91	120	141	164	195	291
	025	On the west side of the control joint, 480mm from the north of the control joint.	14	65	100	136	165	202	837	227
	026	On the west side of the control joint, 20mm from the south of the control joint.	14	47	74	106	124	140	172	-
	027	On the east side of the control joint, 150mm from the north of the control joint.	14	61	96	141	168	200	241	231
	028	On the east side of the control joint, 350mm from the north of the control joint.	14	66	102	157	195	237	604	179
	029	On the east side of the control joint, 150mm from the south of the control joint.	14	52	85	126	155	187	569	251
C	031	At the centre of the control joint, 250mm from the north of the control joint.	14	94	141	213	269	577	#	98
	032	At the centre of the control joint, 500mm from the north of the control joint.	14	77	96	161	205	246	#	164
	033	At the centre of the control joint, 750mm from the north of the control joint.	14	83	103	173	217	385	#	148
	034	On the west side of the control joint, 20mm from the north of the control joint	14	63	88	131	181	320	#	195
	035	On the west side of the control joint, 480mm from the north of the control joint.	14	50	88	128	178	215	#	203

	036	On the west side of the control joint, 20mm from the south of the control joint.	14	43	75	119	164	199	#	227
	037	On the east side of the control joint, 150mm from the north of the control joint.	14	54	88	135	175	226	#	212
	038	On the east side of the control joint, 350mm from the north of the control joint.	13	66	91	145	191	390	#	182
	039	On the east side of the control joint, 150mm from the south of the control joint.	14	54	89	128	173	296	#	208

- Notes**
- ¹ Limit time is the time to the nearest whole minute, rounded down to the nearest minute, at which the temperature recorded by the thermocouple does not rise by more than 180K above the initial temperature.
 - ² Refer to Appendix 4 for locations of thermocouples as only a generic description is included in the table.
 - ³ No insulation failure prior to thermocouple failure.
 - # Thermocouple failure.
 - * Service failure
 - '-' Under Limit column indicates the temperature limit was not exceeded during the test period or up until the time of integrity failure if a failure occurred.

APPENDIX 6 PHOTOGRAPHS

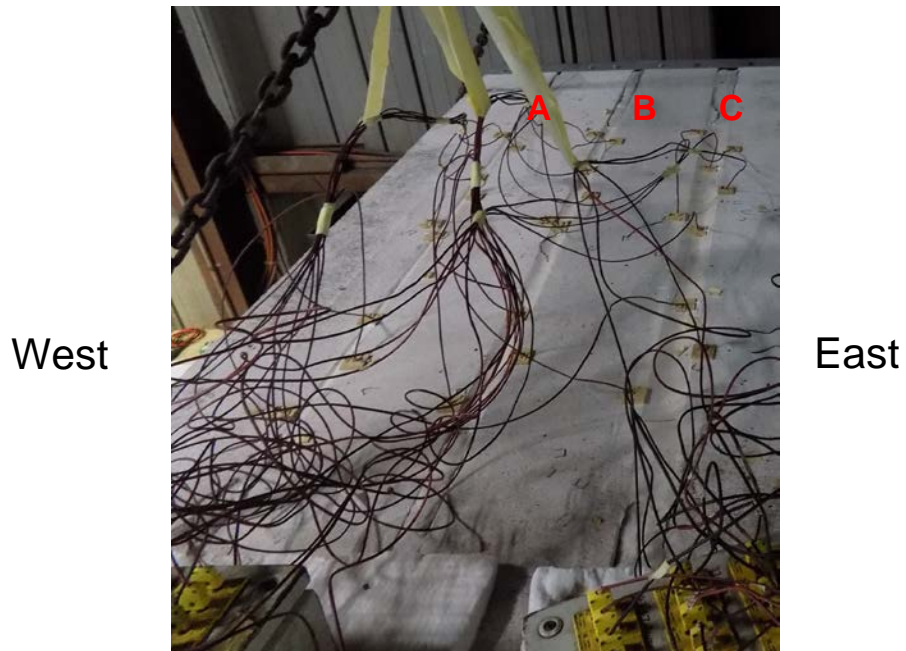


Figure A6.1: Unexposed face of specimen before commencement of the fire-resistance test



Figure A6.2: Exposed face of specimen before commencement of the fire-resistance test



Figure A6.3: Unexposed face of specimen at the end of the test.



Figure A6.4: Exposed face of specimen at the end of the test.