H.B. FULLER AUSTRALIA PTY LTD

FIRE RESISTANCE TEST REPORT

Test standard: Sections 2 and 10 of AS 1530.4:2014
Reference Standard: AS 4072.1-2005 AMDT 1 (Rec:2016)
Test sponsor**:** H.B. Fuller Australia Pty Ltd
Products: HB Fuller Fulaflex FR sealant
Job number**:** FRT56967300
Revision: R1.1 Test date: 20 September 2018

Accredited for compliance with ISO/IEC 17025 – Testing

JENSEN HUGHES

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ilac-MRA NATA Accreditation No. 3277

Quality management

Revision	Date	Revision description		
R1.0	26 July 2017	Initial issue.		
		Prepared	**Reviewed**	**Authorised**
		Patrick Chan	Mandeep Kamal	Mandeep Kamal
R1.1	27 June 2025	Report rebranding and reference to AS 4072.1-2005		
		Prepared	**Reviewed**	**Authorised**
		Patrick Chan	Mandeep Kamal	Mandeep Kamal
				

Jensen Hughes Fire Testing Pty Ltd
ABN 81 050 241 524
Formerly Warringtonfire Australia Pty Ltd[1]

[1] Warringtonfire Australia Pty Ltd was acquired by Jensen Hughes in December 2023. Jensen Hughes Fire Testing Pty Ltd is not affiliated, associated, authorised, or endorsed by Warringtonfire Australia Pty Ltd, Warringtonfire Testing and Certification Limited or its "Warringtonfire" or "Certifire" brands.

Executive summary

This report documents the findings of the fire resistance test of control joints in accordance with sections 2 and 10 of AS 1530.4:2014 with reference to AS 4072.1–2005 AMDT 1 (Rec:2016). The testing was done on 20 September 2018.

Exova Warringtonfire performed the test at the request of H.B. Fuller Australia Pty Ltd.

Table 1 provides details of the test assembly, and Table 2 provides a summary of the test specimen. A summary of the results is provided in Table 3.

Table 1 Test assembly

Item	Detail	
Separating element	13 mm plasterboard wall system	
Nominal separating element size	Width	1200 mm
	Height	1161 mm
	Thickness	116 mm
Number of control joints	Four	
Restraint conditions	Restrained on all edges	

Table 2 Test specimen

control joint	Service	Local fire-stopping protection	Backing material	Sealant depth	Local aperture size
A	Vertical control joint	HB Fuller Fulaflex FR Sealant	Open cell PE backing rod	20mm depth	1161 mm long × 19 mm wide
B	Horizontal control joint	HB Fuller Fulaflex FR Sealant	Deflection head track	26mm depth	1200 mm long × 20 mm wide
C	Vertical control joint	HB Fuller Fulaflex FR Sealant	Steel stud	26mm depth	1161 mm long × 13 mm wide
D	Horizontal control joint	HB Fuller Fulaflex FR Sealant	Steel stud	26mm depth	1200 mm long × 10 mm wide

Table 3 Test results

Control joint	Criteria	Results	Fire resistance level (FRL)
A	Structural adequacy	Not applicable	**-/120/120**
	Integrity	Failure at 171 minutes	
	Insulation	Failure at 133 minutes	
B	Structural adequacy	Not applicable	**-/120/120**
	Integrity	No failure at 181 minutes	
	Insulation	Failure at 167 minutes	
C	Structural adequacy	Not applicable	**-/120/120**

Control joint	Criteria	Results	Fire resistance level (FRL)
	Integrity	No failure at 181 minutes	
	Insulation	Failure at 173 minutes	
D	Structural adequacy	Not applicable	
	Integrity	No failure at 181 minutes	**-/120/120**
	Insulation	No failure at 181 minutes	

Note: the FRLs are limited by the FRL of the separating element.

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1.0 Introduction

This report documents the findings of the fire resistance test of control joints in accordance with sections 2 and 10 of AS 1530.4:2014 with reference to AS 4072.1–2005 AMDT 1 (Rec:2016). The testing was done on 20 September 2018.

Exova Warringtonfire performed the test at the request of the test sponsor listed in Table 4.

Table 4 Test sponsor details

Test sponsor	Address
H.B. Fuller Australia Pty Ltd	16-22 Redgum Dr. Dandenong South VIC 3175 Australia

2.0 Test specimen

2.1 Schedule of components

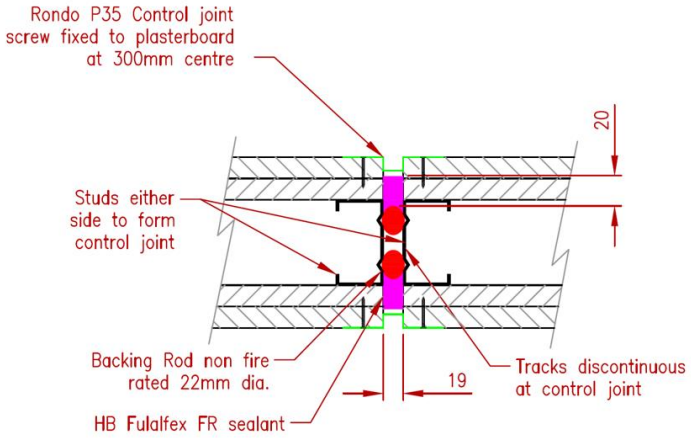
Table 5 describes the test specimen and lists the schedule of components.

All measurements were done by Jensen Hughes – unless indicated otherwise.

Detailed drawings of the test specimen are provided in Appendix A.

Table 5 Schedule of components

Item	Description		
Separating element (SE)			
1.	Item name	Wall system	
	Product name	+ USG Boral Firestop® plasterboard + Rondo 64 steel studs + Rondo 64 steel noggings + Rondo 64 steel track + Rondo P35 plasterboard expansion joint	
	Density	Plasterboard	923 kg/m³
	Size	Rondo 64 steel studs	64 mm × 36 mm × 0.5 BMT
		Rondo 64 steel noggings	64 mm × 28 mm × 0.75 BMT
		Rondo 64 steel tracks	64 mm × 28 mm × 0.5 BMT
		Plasterboard	13 mm
		Rondo P35 plasterboard expansion joint	48 mm wide
SE	Overall size	1200 mm wide × 1161 mm high × 116 mm thick	
	Restraint conditions	Restrained on all edges	
	Installation	+ The wall system comprised of 64mm thick steel stud system with 4-off steel studs, deflection head track and bottom track. + The steel frame was secured to the concrete brickwork and lintel with 6.5mm masonry anchors. + The masonry anchors were installed at middle of the tracks and 30mm in from either end of the tracks. + The wall system was clad with two layers of 13mm fire rated plasterboard on the exposed and the unexposed side using 6g self-drilling, bugle head, 45mm plasterboard screws. The fixings were nominal at 600mm centres on the inner layer and 300mm centre on the outer layer. + There was a 19mm gap at the centre of the wall system between 2 centre studs. + There was a 20mm gap between the top edge of the plasterboard and the head lintel. + There was a 13mm gap on the east vertical edge between the plasterboard and the concrete blockwork. + There was a 10mm gap between the bottom edge of the plasterboard and the concrete sill.	

Item	Description		
		+ Rondo P35 control joint covered the centre gap after the HB Fuller Fulaflex FR sealant (item 2) applied into the centre gap.	
Fire-stopping protections			
Sealant			
2.	Item name	Fire rated sealant	
	Product name	HB Fuller Fulaflex FR Sealant	
	Density	Wet	1400 kg/m³
		Dry	1503 kg/m³
Penetration system A			
3.	Service	Vertical control joint	
	Service detail	The control joint was covered with Rondo P35 plasterboard expansion joint on both exposed and unexposed sides after local fire-stopping protection was installed. It was located at the centre of the separating element.	
	Aperture size	1161 mm long × 19 mm wide × 116 mm deep	
	Local fire-stopping protection		
	Protection	The fire rated sealant (item 2) was applied to the control joint on both exposed and unexposed side. The sealant was 20mm deep on each side and backed by the open cell backing rod.  See Figure 1, Figure 2 and Figure 6 in Appendix A for more details.	
Penetration system B			
4.	Service	Horizontal control joint	
	Service detail	On the top edge of the wall system between the plasterboard edge and head lintel.	
	Aperture size	1200 mm long × 20 mm high × 26 mm deep	
	Local fire-stopping protection		
	Protection	The fire rated sealant (item 2) was applied to the control joint on both exposed and unexposed side. The sealant was 26mm deep on each side and backed by the deflection head track. See Figure 1 to Figure 3 in Appendix A for more details.	

Item	Description	
Penetration system C		
5.	Service	Vertical control joint
	Service detail	On the east edge of the wall, between the plasterboards and concrete blockwork.
	Aperture size	1161mm long × 13mm wide, 26mm depth
	Local fire-stopping protection	
	Protection	The fire rated sealant (item 2) was applied to the control joint on both exposed and unexposed side. The sealant was 26mm depth on each side and backed by the steel stud. See Figure 1, Figure 2 and Figure 4 in Appendix A for more details.
Penetration system D		
6.	Service	Horizontal control joint
	Service detail	On the bottom edge of the wall system between the plasterboard and concrete blockworks.
	Aperture size	1200mm long × 10mm high, 26mm deep.
	Local fire-stopping protection	
	Protection	The fire rated sealant (item 2) was applied to the control joint on both exposed and unexposed side. The sealant was 26mm depth on each side and backed by the steel track. See Figure 1, Figure 2 and Figure 5 in Appendix A for more details.

2.2 Installation details

Table 6 lists the installation details for the test specimen.

Table 6 Installation details

Item	Detail
Completion date for constructing and installing the test specimen	6 September 2018
Separating element constructed by	Representatives of Exova Warringtonfire
Fire-stopping protection for control joints installed by	Representatives of the test sponsor
Symmetry	Symmetrical

3.0 Test procedure

Table 7 details the test procedure for this fire resistance test.

Table 7 Test procedure

Item	Detail	
Statement of compliance	The test was performed in accordance with the requirements of sections 2 and 10 of AS 1530.4:2014 appropriate for penetration systems/control joints.	
Variations	+ The 2005 revision of AS 4072.1 has all testing requirements removed from it and placed in AS 1530.4-2005 however the reference in the construction code was not updated to reflect this and still erroneously calls for testing to be in accordance with AS 4072.1. To accommodate this oversight, reference is made to AS 4072.1-2005 AMDT 1 (Rec:2016). + During this test it was observed that the pressure was 3Pa below the limits stated in AS 1530.4-2014 between 150 - 160 minutes due to deteriorating condition of specimen A. It is confirmed that furnace pressure remained within the limits specified in AS1530.4-20154 for the duration of the test. It is confirmed that these transient variations in furnace pressure have not reduced the validity of the results of this test.	
Pre-test conditioning	The construction and installation of the test specimen was completed on 6 September 2018. The test specimen was subjected to normal laboratory temperatures and conditions between the completion of construction of the test specimen and the start of the test.	
Sampling / specimen selection	The laboratory was not involved in sampling or selecting the test specimen for the fire resistance test. The results obtained during the test only apply to the test samples as received and tested by Exova Warringtonfire.	
Ambient laboratory temperature	Start of the test	18 °C
	Minimum temperature	18 °C
	Maximum temperature	20 °C
Test duration	181 minutes	
Instrumentation and equipment	The instrumentation was provided in accordance with AS 1530.4:2014 as follows: + The furnace temperature was measured by four mineral insulated metal sheathed (MIMS) Type K thermocouples – with wire diameters not greater than 1 mm, an overall diameter of 3 mm, and the measuring junction insulated from the sheath. The thermocouples protruded a minimum of 25 mm from steel supporting tubes. + The unexposed side specimen temperatures were measured by Type K thermocouples with wire diameters less than 0.5 mm soldered to 12 mm diameter × 0.2 mm thick copper discs covered by 30 mm × 30 mm × 2.0 mm thick inorganic insulating pads. + The thermocouple positions are shown in Table 10 and in Figure 7 to Figure 10 in Appendix D. + A roving thermocouple was available to measure temperatures at positions that appeared hotter than the positions monitored by the fixed thermocouples. + Cotton pads were available during the test to assess the performance of the specimen under the criteria of integrity.	

Item	Detail
	+ The furnace pressure was measured at approximately 530 mm below the top control joint. It was monitored using a differential pressure transmitter. + All electronic data was sampled at 5 second intervals.

4.0 Test measurements and results

Table 8 summarises the results the specimen achieved against the performance criteria listed in sections 2 and 10 of AS 1530.4:2014.

Appendix E includes details of the measurements taken during the test.

Table 9 in Appendix B includes observations of any significant behaviour of the specimen and details of the occurrence of the various performance criteria specified in AS 1530.4:2014.

Appendix D includes instrumentation details of the specimen.

Photographs of the specimen are included in Appendix F.

Table 8 Test results

Control joint	Criteria	Results	Fire resistance level (FRL)
A	Structural adequacy	Not applicable	**-/120/120**
	Integrity	Failure at 171 minutes	
	Insulation	Failure at 133 minutes	
B	Structural adequacy	Not applicable	**-/120/120**
	Integrity	No failure at 181 minutes	
	Insulation	Failure at 167 minutes	
C	Structural adequacy	Not applicable	**-/120/120**
	Integrity	No failure at 181 minutes	
	Insulation	Failure at 173 minutes	
D	Structural adequacy	Not applicable	**-/120/120**
	Integrity	No failure at 181 minutes	
	Insulation	No failure at 181 minutes	

Note: the FRLs are limited by the FRL of the separating element.

5.0 Application of test results

5.1 Test limitations

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

These results only relate to the behaviour of the specimen of the element of 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, and they do not necessarily reflect the actual behaviour in fires.

5.2 Variations from the tested specimen

This report details methods of construction, the test conditions and the results obtained when the specific element of construction described here was tested following the procedure outlined in AS 1530.4:2014. Any significant variation with respect to size, construction details, loads, stresses, edge or end conditions, other than that allowed under the field of direct application in the relevant test method, is not covered by this report.

It is recommended that any proposed variation to the tested configuration – other than as permitted under the field of direct application specified in Appendix C – should be referred to the test sponsor. They should then obtain appropriate documentary evidence of compliance from Jensen Hughes Fire Testing or another accredited testing authority.

5.3 Uncertainty of measurements

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 for the result.

Appendix A Drawings of test assembly

The drawings of the test assembly in Figure 7 to Figure 10 were provided by the test sponsor.

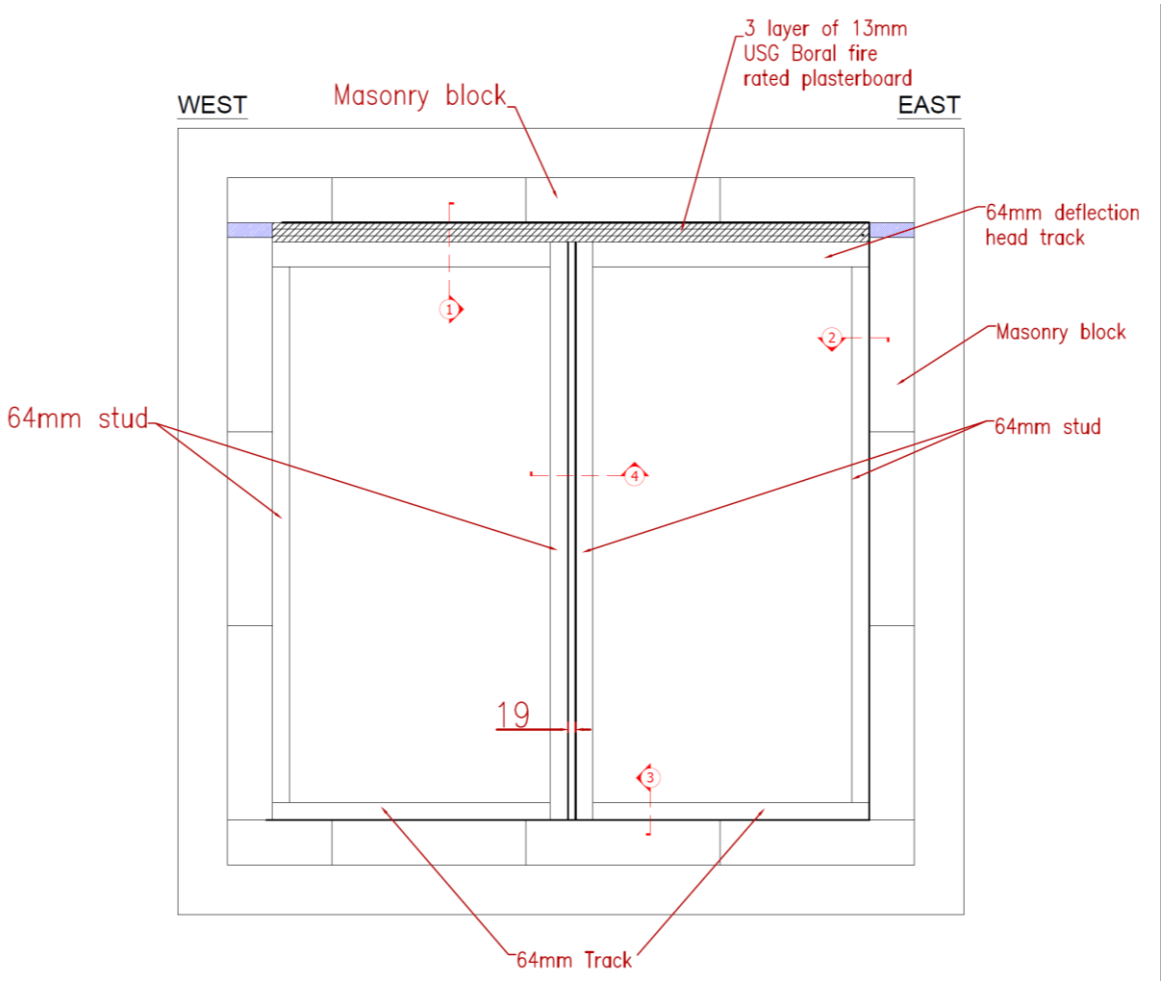


Figure 1 Elevation view of wall frame (unexposed side)

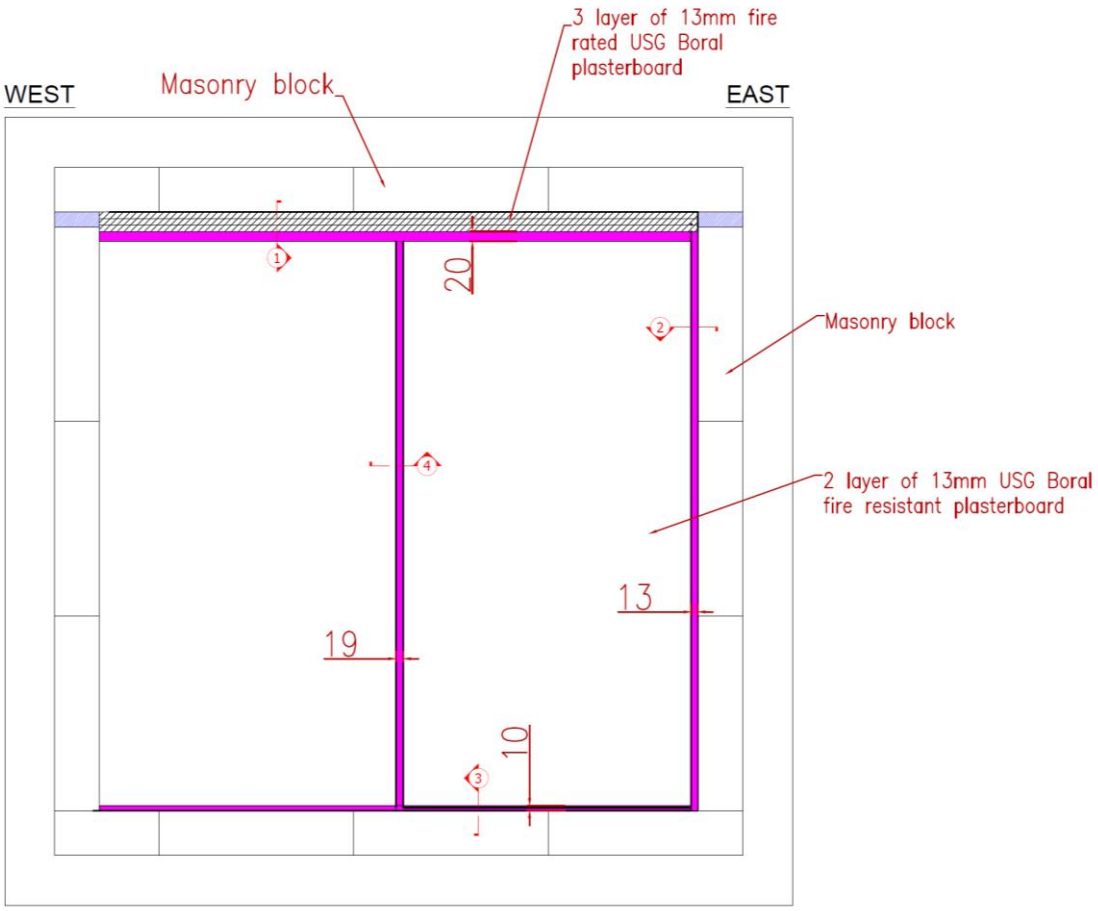


Figure 2 Elevation view of test specimen (unexposed side)

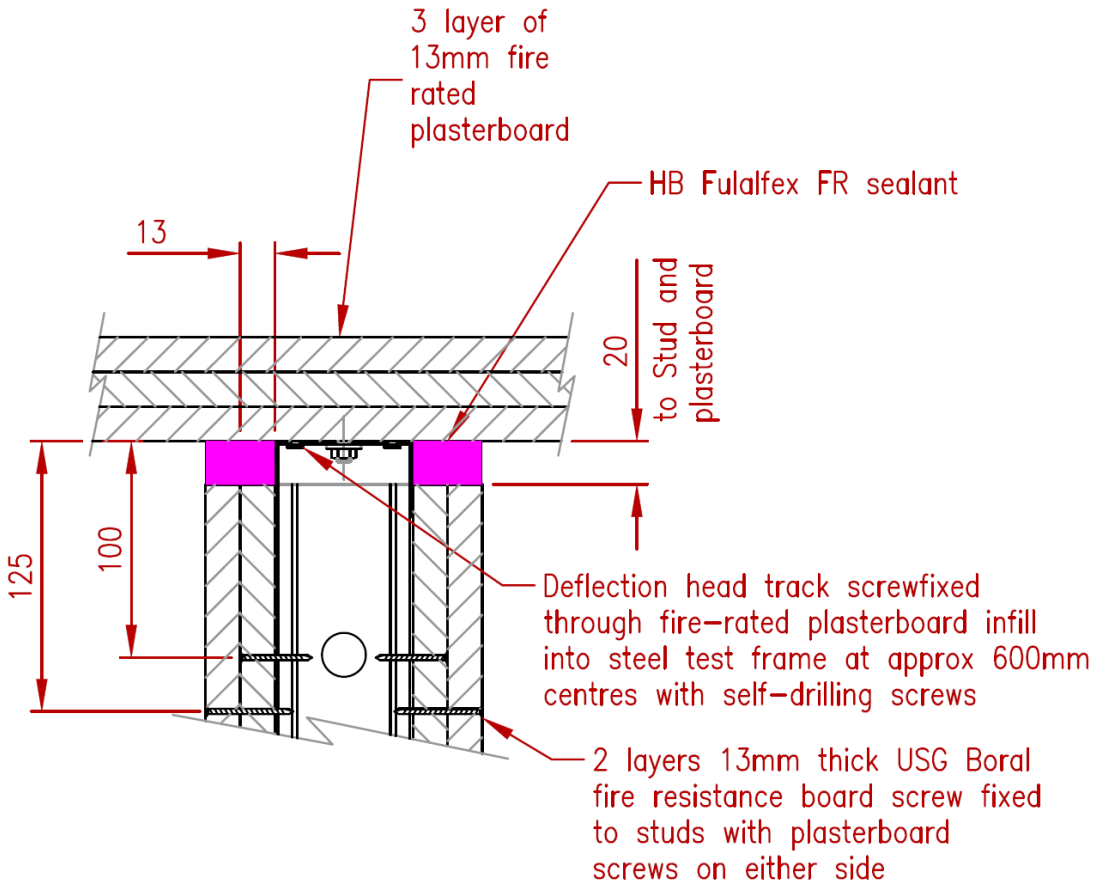


Figure 3 Cross-section 1-1

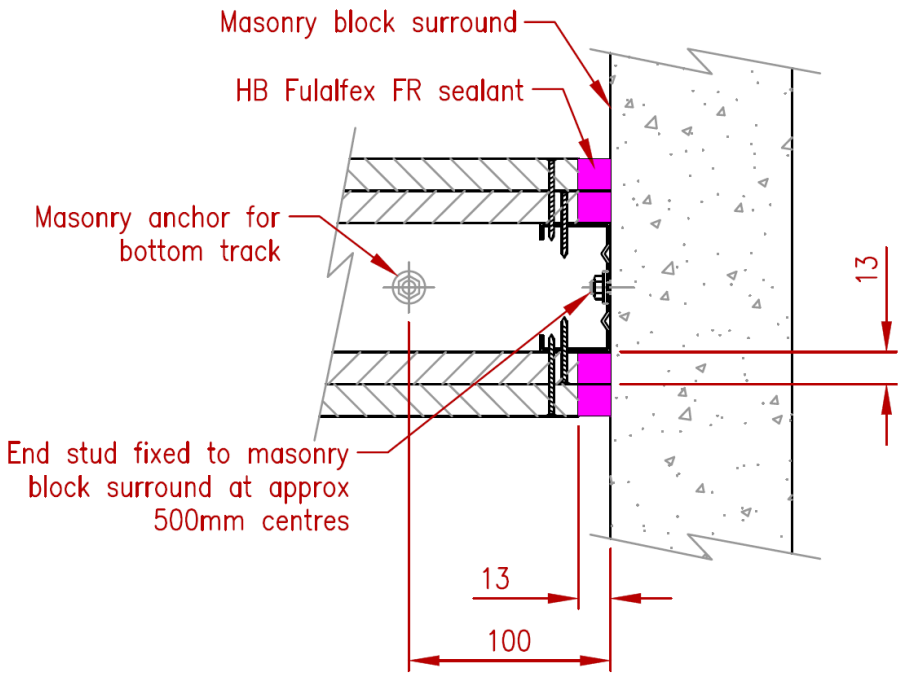


Figure 4 Cross-section 2-2

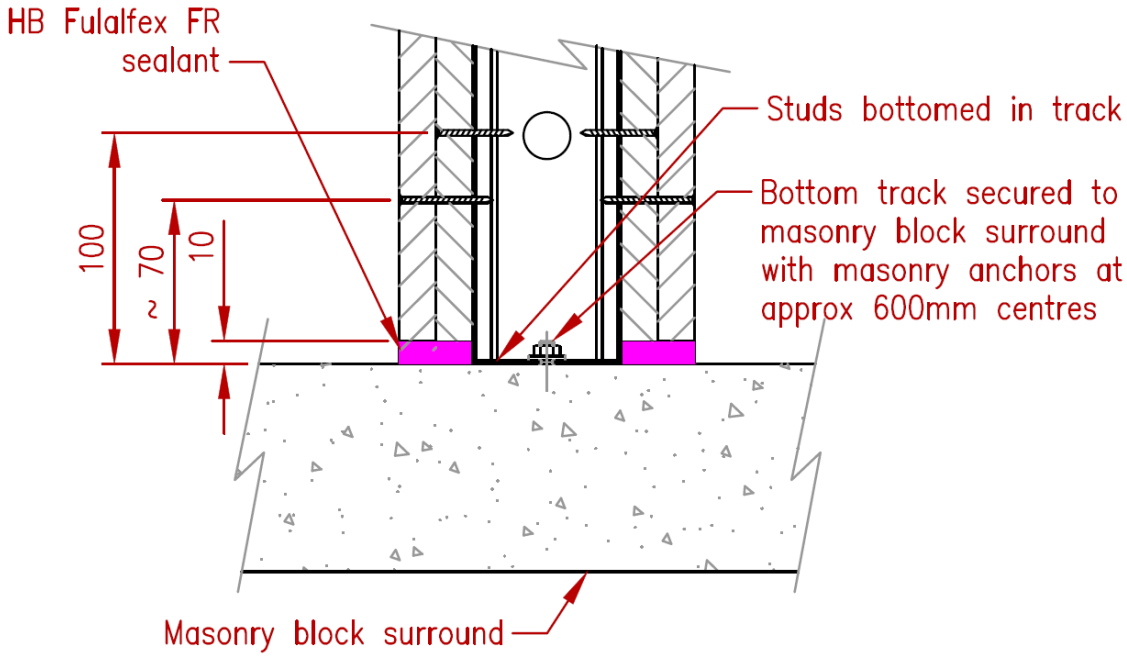


Figure 5 Cross-section 3-3

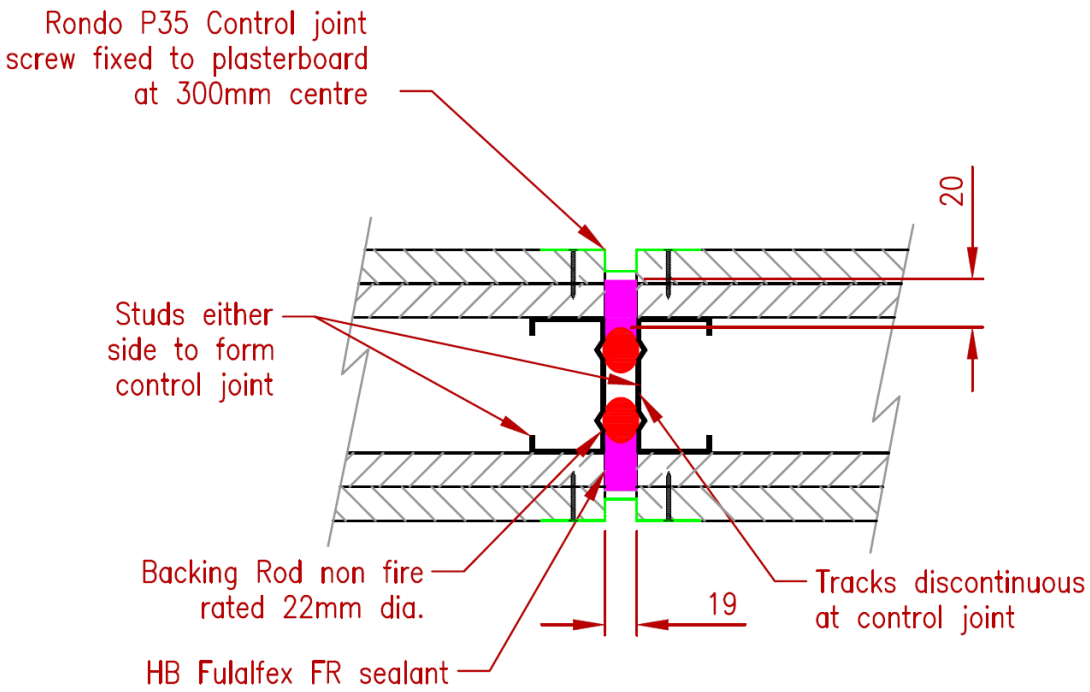


Figure 6 Cross-section 4-4

Appendix B Test observations

Table 9 shows the observations of any significant behaviour of the specimen during the test.

Table 9 Test observations

Time		Observation
Min	Sec	
Penetration system A		
00	00	Fire resistance test commenced and the average initial temperature of the specimen was approximately 20°C.
15	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
30	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
45	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
60	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
90	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
115	52	Smoke emission had become evident at the mid-height of the control joint
120	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
126	11	Discoloration appeared on the smoke emission area. Hole had formed on the sealant.
126	42	Smoke emission had appeared on the other location of the control joint
131	25	The sealant had expanded on the top section of the control joint
132	50	The expanded sealant had partially close one of the holes
133	**25**	**TC 015 on the Rondo P35 control joint, 25mm away from the control joint recorded a temperature of 201°C.** **Failure of insulation in accordance with AS 1530.4-2014 clause 2.13.3(b), where the maximum temperature of Thermocouple TC 015 exceeded the initial temperature by more than 180°C.**
142	20	The width of the control joint on the top side had increased
150	50	A 30 second cotton pad test was carried out in accordance with AS 1530.4-2014. No glowing or flaming had become evident
160	50	A 30 second cotton pad test was carried out in accordance with AS 1530.4-2014. No glowing or flaming had become evident
171	**00**	**A 30 second cotton pad test was carried out on top section of the control joint resulting in flaming of the cotton pad. Failure of integrity of the specimen in accordance with AS 1530.4-2014, clause 2.13.2.2, where ignition of the cotton had occurred.**
Penetration system B		
00	00	Fire resistance test commenced and the average initial temperature of the specimen was approximately 20°C.
30	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
43	25	Sealant had begun to expand
60	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
80	45	Discoloration had become evident on the sealant
90	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
120	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014

Time		Observation
Min	Sec	
167	**00**	**TC 025 on the plasterboard, 25mm away from the control joint recorded a temperature of 201°C.** **Failure of insulation in accordance with AS 1530.4-2014 clause 2.13.3(b), where the maximum temperature of Thermocouple TC 025 exceeded the initial temperature by more than 180°C.**
180	00	The specimen had continued to maintain integrity in accordance with AS 1530.4-2014
181	00	Test stopped
Penetration system C		
00	00	Fire resistance test commenced and the average initial temperature of the specimen was approximately 19°C.
15	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
30	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
43	25	Sealant had begun to expand
45	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
60	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
90	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
120	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
173	**40**	**TC 034 on the plasterboard, 25mm away from the control joint recorded a temperature of 201°C.** **Failure of insulation in accordance with AS 1530.4-2014 clause 2.13.3(b), where the maximum temperature of Thermocouple TC 034 exceeded the initial temperature by more than 180°C.**
180	00	The specimen had continued to maintain integrity in accordance with AS 1530.4-2014
181	00	Test stopped
Penetration system D		
00	00	Fire resistance test commenced and the average initial temperature of the specimen was approximately 19°C.
15	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
30	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
45	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
60	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
90	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
120	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
124	37	Discoloration had become evident on the sealant near the mid-width
180	00	The specimen had continued to maintain integrity and insulation in accordance with AS 1530.4-2014
181	00	Test stopped.

Appendix C Direct field of application

The text, figures and tables in this appendix have been taken from section 10 of AS 1530.4:2014.

C.1 General

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 set out in clauses 10.12.2 and 10.12.6 of AS 1530.4:2014 have been made.

C.2 Separating elements

Results obtained for sealing systems in various types of masonry and concrete construction may be applied as follows:

+ For elements manufactured from similar types of concrete or masonry, the results of the prototype test may be applied to materials of density within ±15% of the tested specimen. For greater variations, the opinion of a registered testing authority shall be obtained.
+ Test results obtained in conjunction with hollow concrete blocks may be used in a solid concrete element of the same overall thickness. The reverse does not apply.
+ Results obtained from framed wall systems may be applied to the performance of a system in concrete, masonry or solid gypsum blocks of greater or equal thickness to that of the tested prototype. The reverse does not apply.
+ Results obtained from framed wall systems may be applied to similar walls having studs of the same material with sizes greater than the tested prototype.
+ Results obtained from a prototype test may be applied to framed wall systems of similar construction but having thicker facings of the same material applied to the studs.

C.3 Control joints

The following variations are permitted:

+ Results obtained from single test on a butt joints may be applied to contoured joints, provided the joints have —
  - equal width and equal or greater depth of sealant; and
  - equal or greater thickness of fire-separating element.
  - Note: Examples of butt and contoured control joints are shown in figure 10.12.6 of AS 1530.4:2014.
+ Facings may be applied to the surface of the fire-stopping system.

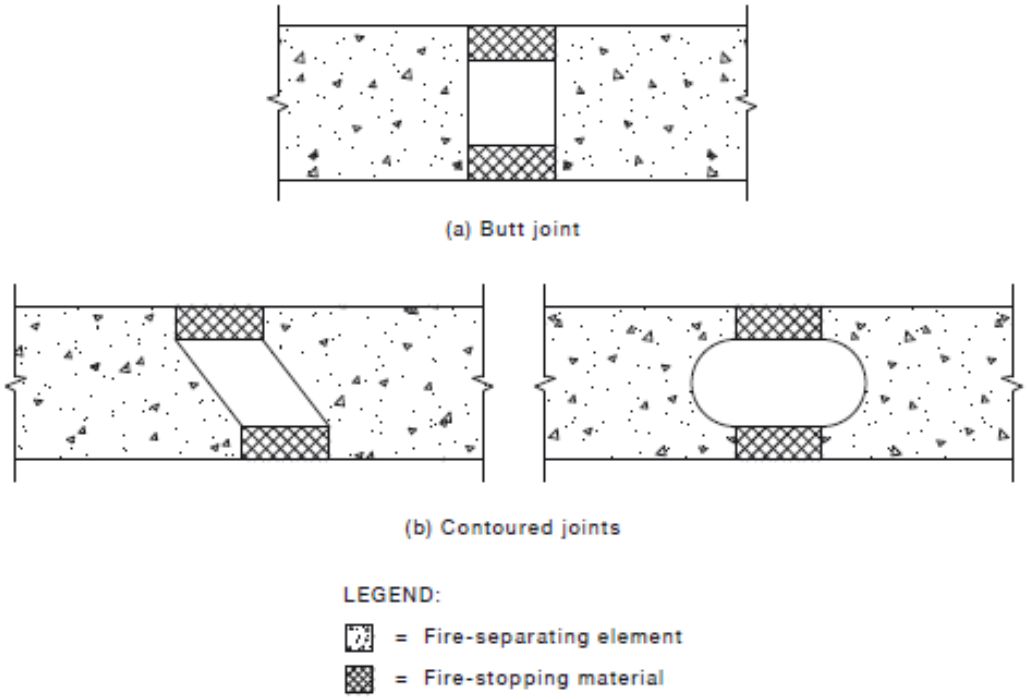


FIGURE 10.12.6 CONTOURED CONTROL JOINTS

Appendix D Instrumentation locations

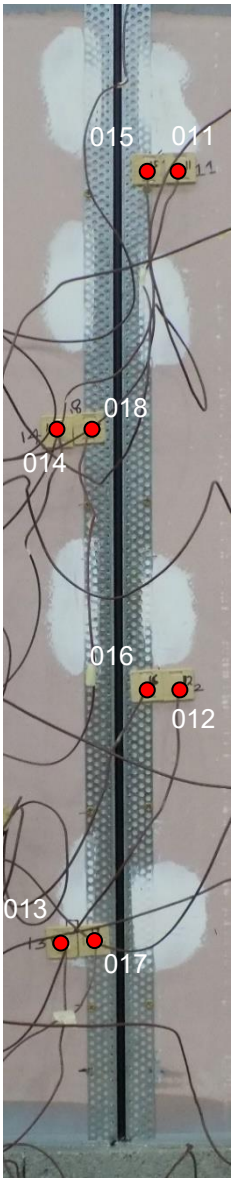


Figure 7 Penetration system A

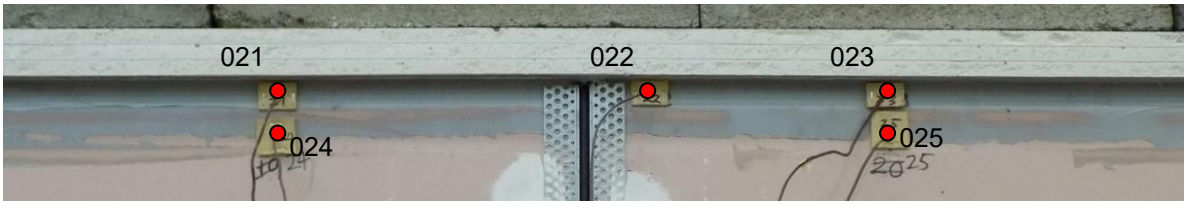


Figure 8 Penetration system B

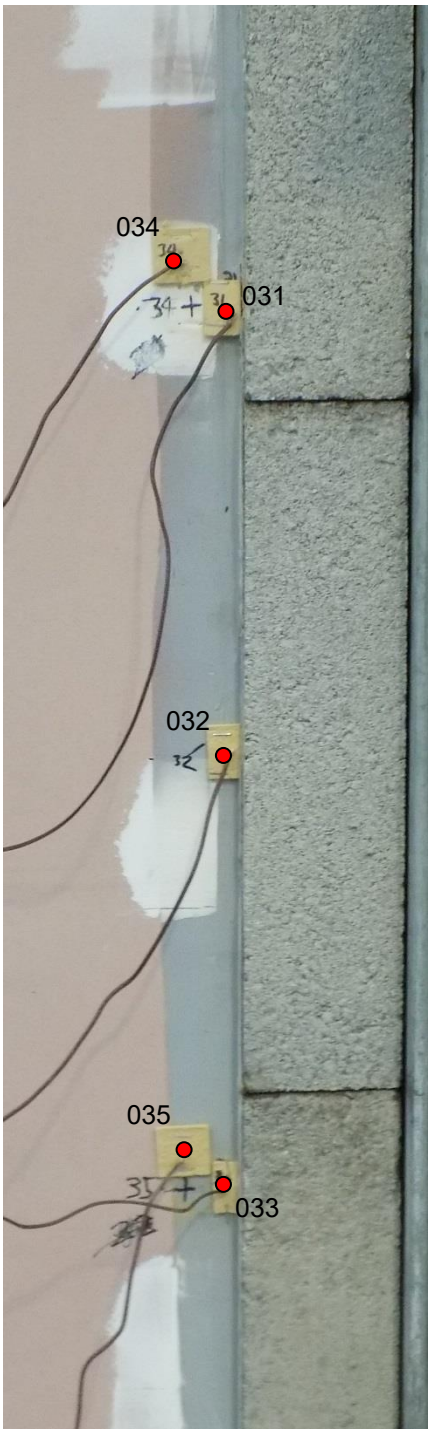


Figure 9 Penetration system C

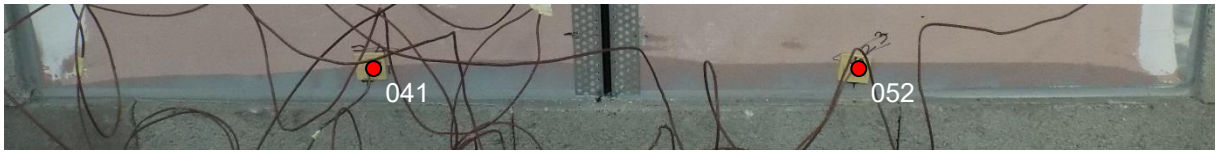


Figure 10 Penetration system D

Table 10 Thermocouple locations

Control joint	TC No.	Description
A	011	On the plasterboard, 25mm away from the Rondo P35 control joint, at 205mm away from the top edge
	012	On the plasterboard, 25mm away from the Rondo P35 control joint, at 705mm away from the top edge
	013	On the plasterboard, 25mm away from the Rondo P35 control joint, at 205mm away from the bottom edge
	014	On the plasterboard, 25mm away from the Rondo P35 control joint, at 705mm away from the top edge
	015	On the Rondo P35 control joint, 25mm away from the sealant, at 205mm away from the top edge
	016	On the Rondo P35 control joint, 25mm away from the sealant, at 705mm away from the top edge
	017	On the Rondo P35 control joint, 25mm away from the sealant, at 205mm away from the bottom edge
	018	On the Rondo P35 control joint, 25mm away from the sealant, at 705mm away from the bottom edge
B	021	On the sealant, 350mm away from the west edge
	022	On the sealant, 25mm away from the Rondo P35 control joint
	023	On the sealant, 850mm away from the west edge
	024	On the plasterboard, 25mm away from the sealant, 350mm away from the west edge.
	025	On the plasterboard, 25mm away from the sealant, 850mm away from the west edge.
C	031	On the sealant, 330mm away from the top edge
	032	On the sealant, at the mid-height of the control joint
	033	On the sealant, 830mm away from the top edge
	034	On the plasterboard, 25mm away from the sealant, 315mm away from the top edge
	035	On the plasterboard, 25mm away from the sealant, 815mm away from the top edge
D	041	On the plasterboard, 25mm away from the sealant, 350mm away from the west edge.
	042	On the plasterboard, 25mm away from the sealant, 850mm away from the west edge.

Appendix E Test data

E.1 Furnace temperature and severity

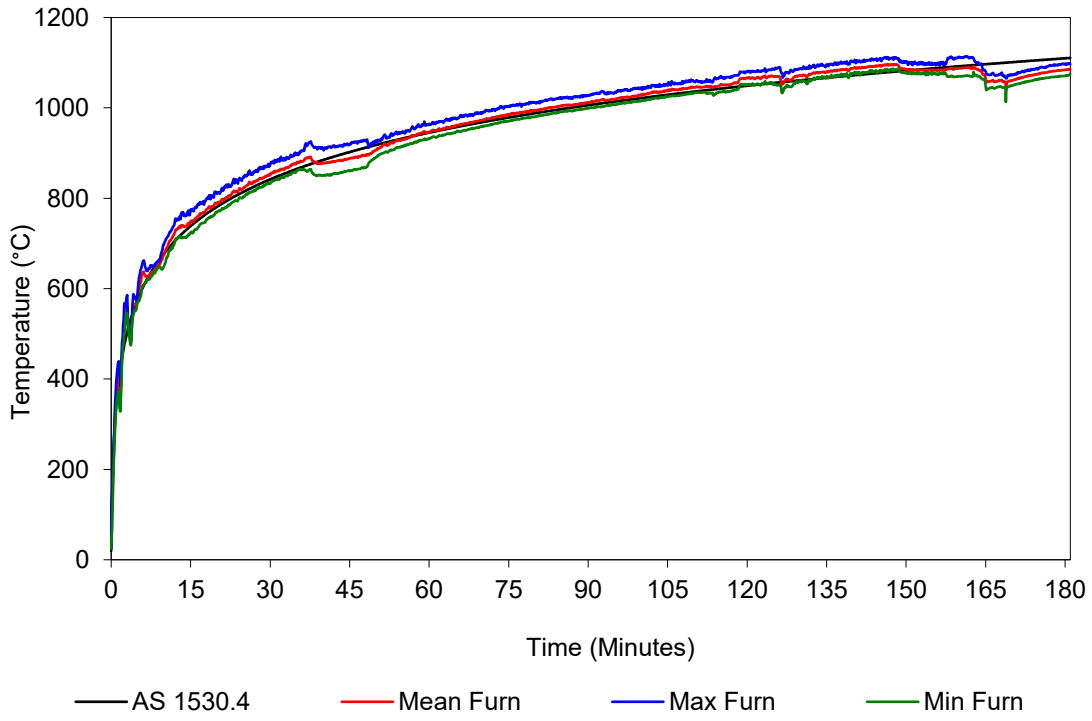


Figure 11 Furnace thermocouple temperature vs time

E.2 Furnace pressure

The furnace pressure was measured at 530mm below the top control joint. The pressure in table below have been adjusted to reflect pressure at the centre of the specimen A.

Table 11 Furnace pressure

Time (minutes)	Average pressure (Pa)	Time (minutes)	Average pressure (Pa)	Time (minutes)	Average pressure (Pa)
5-10	16	65-70	16	125-130	16
10-15	17	70-75	16	130-135	16
15-20	17	75-80	15	135-140	16
20-25	16	80-85	16	140-145	15
25-30	16	85-90	16	145-150	14
30-35	16	90-95	17	150-155	9
35-40	15	95-100	17	155-160	11
40-45	15	100-105	15	160-165	15
45-50	15	105-110	15	165-170	16
50-55	16	110-115	15	170-175	15
55-60	16	115-120	16	175-180	14
60-65	16	120-125	16		

E.3 Specimen temperatures

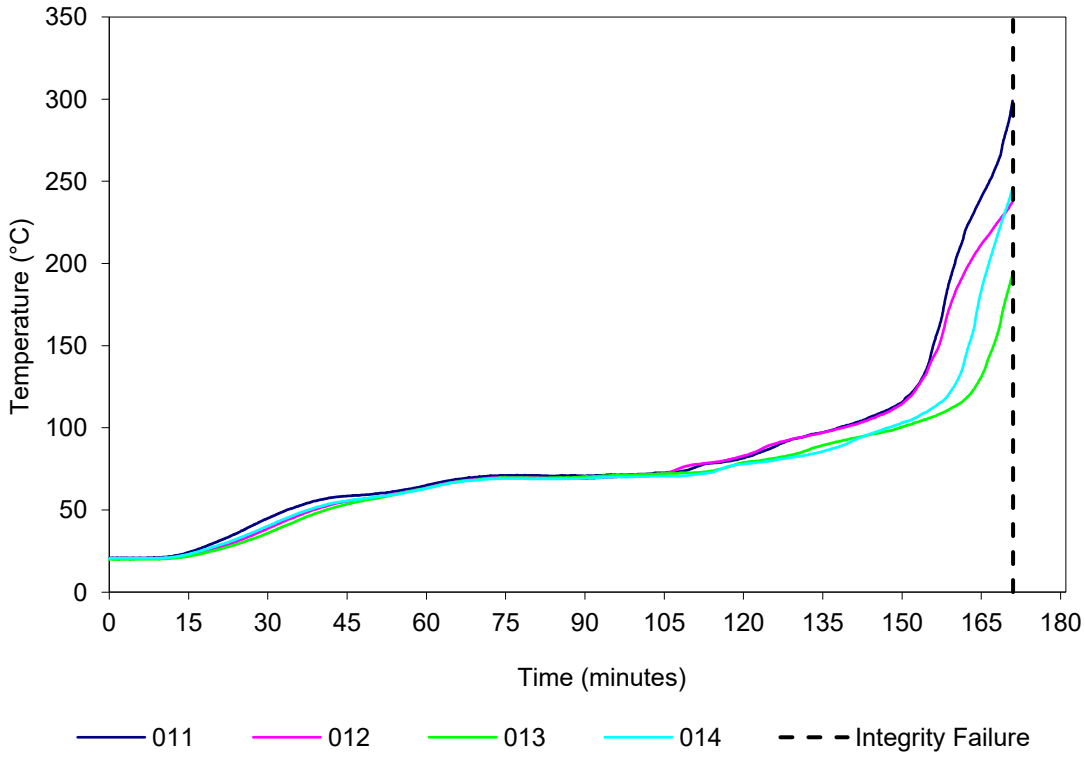


Figure 12 Penetration system A – temperature vs time

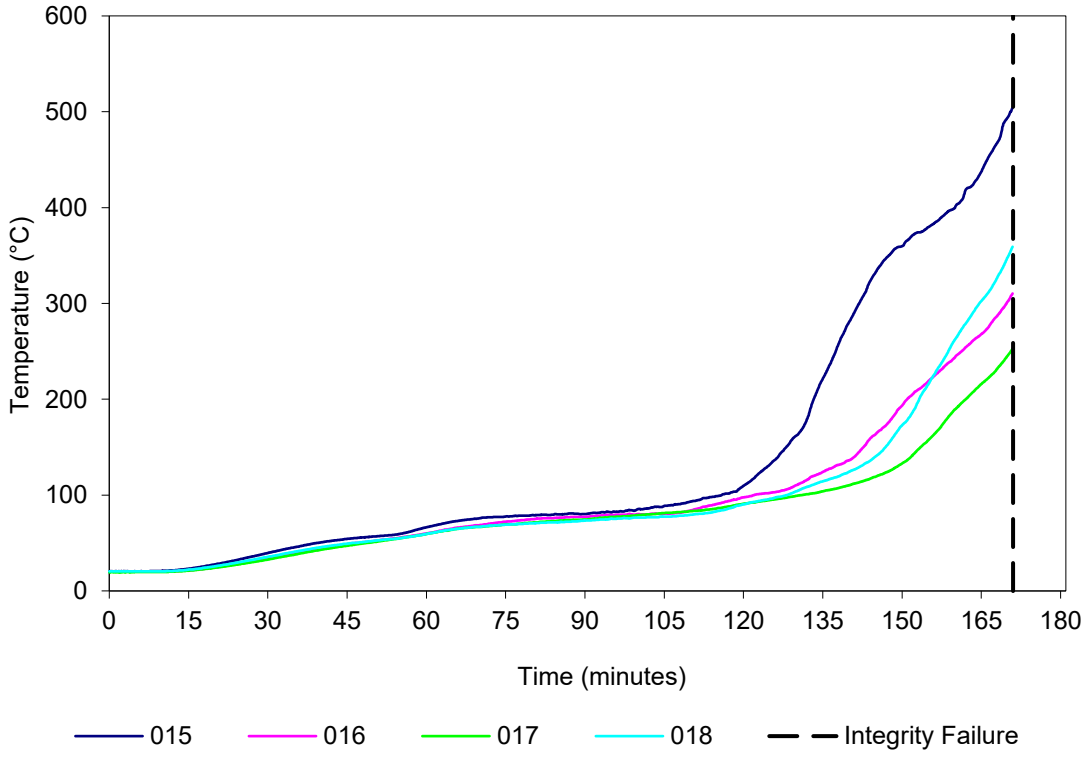


Figure 13 Penetration system A– temperature vs time

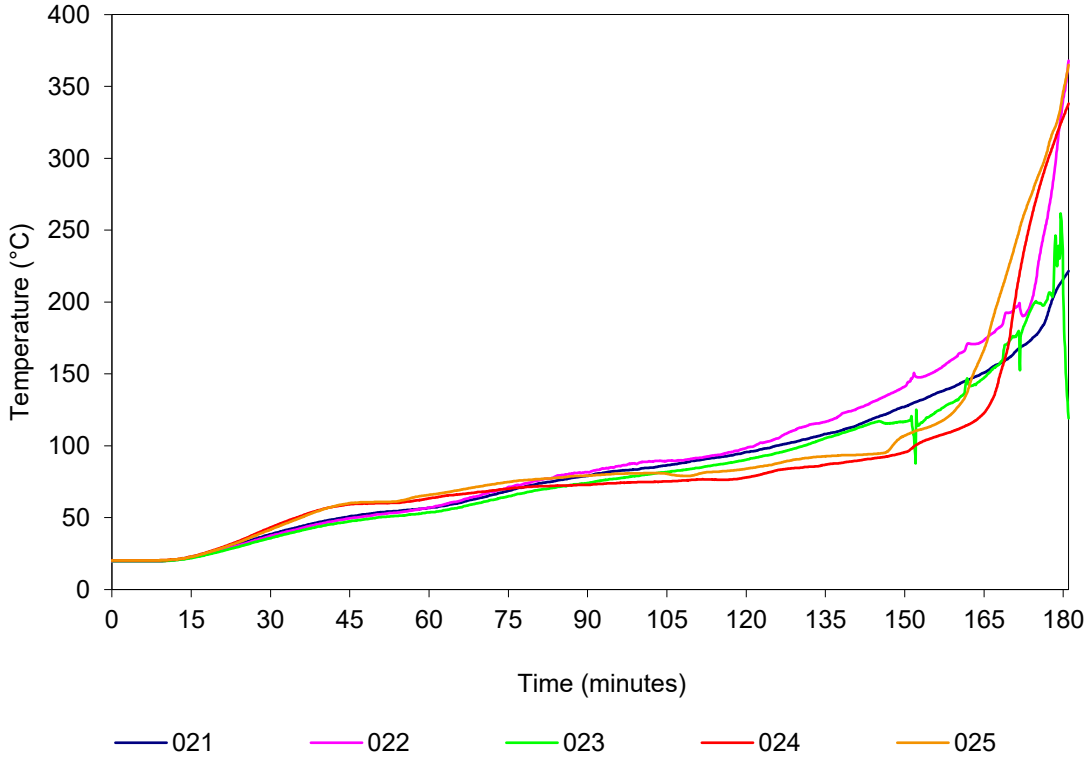


Figure 14 Penetration system B – temperature vs time

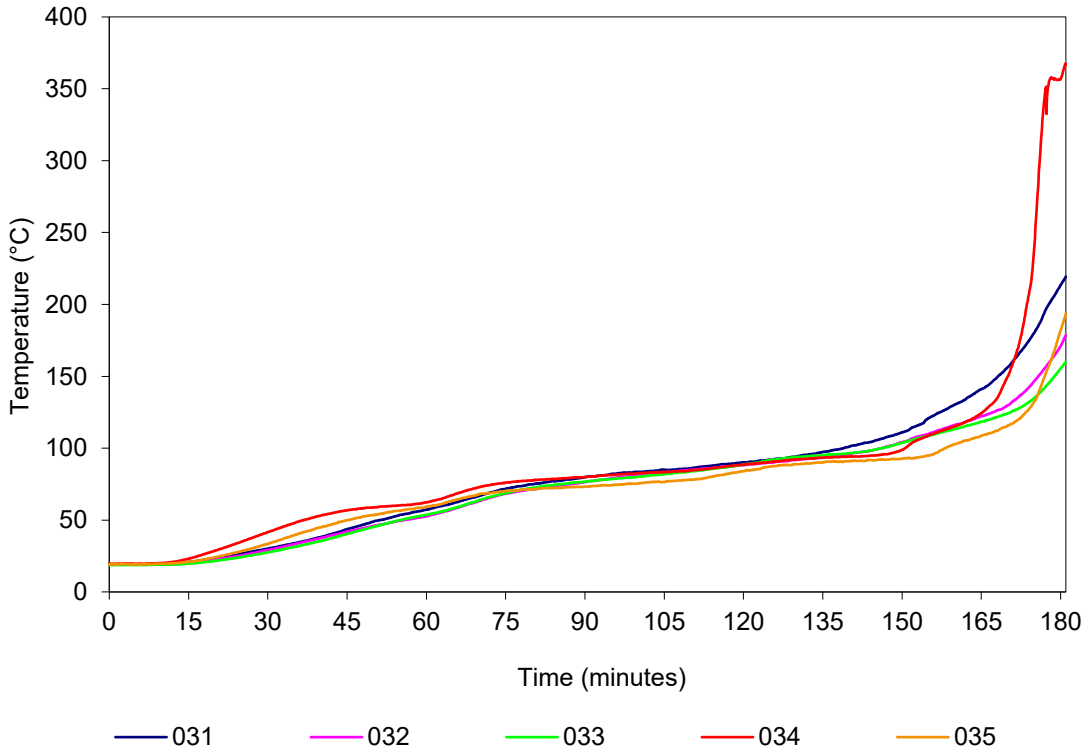


Figure 15 Penetration system C – temperature vs time

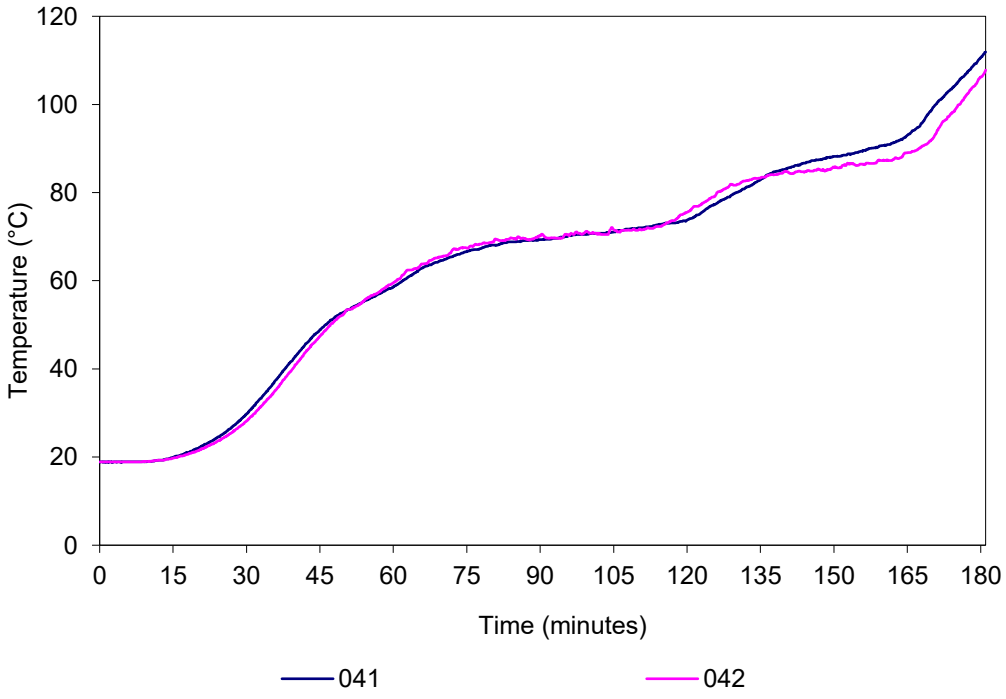


Figure 16 Penetration system D – temperature vs time

Table 12 Test specimen temperatures

Control joint	TC No.	Description[1]	Temp (°C) at t (minutes)					Limit[2] (minutes)
			t=0	t=60	t=90	t=120	t=180	
A	011	On the plastic board	21	65	71	82	*	160
	012	On the plastic board	20	64	69	83	*	162
	013	On the plastic board	20	64	70	79	*	-
	014	On the plastic board	20	64	69	78	*	166
	015	On the Rondo P35 control joint	21	67	80	111	*	133
	016	On the Rondo P35 control joint	20	60	77	98	*	151
	017	On the Rondo P35 control joint	20	60	74	91	*	162
	018	On the Rondo P35 control joint	20	60	73	91	*	153
B	021	On the sealant	20	57	79	96	215	177
	022	On the sealant	20	57	82	99	334	174
	023	On the sealant	20	54	74	91	249	174
	024	On the plasterboard	20	64	73	78	326	170
	025	On the plasterboard	20	66	79	84	341	167
C	031	On the sealant	19	58	80	90	212	177
	032	On the sealant	19	53	76	89	170	-
	033	On the sealant	19	54	77	89	154	-
	034	On the plasterboard	20	63	80	89	356	173
	035	On the plasterboard	19	60	73	85	179	-
D	041	On the plasterboard	19	59	69	74	110	-
	042	On the plasterboard	19	60	70	76	106	-

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 180 K above the initial temperature.

2 Refer to Table 10 for the locations of thermocouples as only a generic description is included in the table.

3 No insulation failure before thermocouple malfunction.

Thermocouple malfunction.

* Integrity failure of the penetration systems/control joints.

^ Integrity failure of the service and penetration system. (only for multi service penos)

‘ ’ – 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 F Photographs

West

East

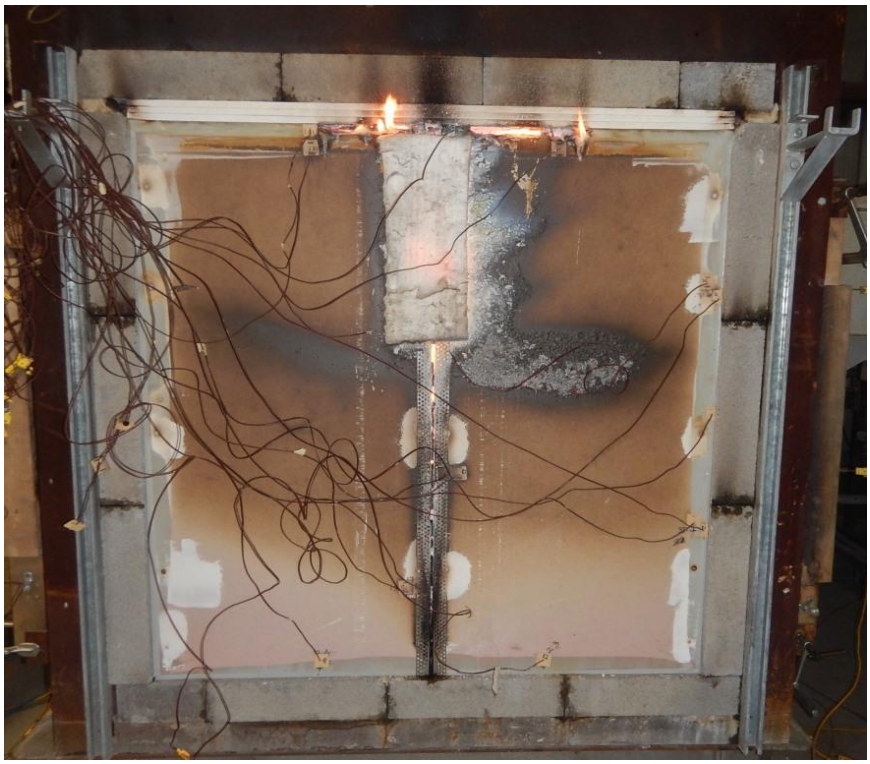
Figure 17 Unexposed face of the specimen before the start of the test

East

West

Figure 18 Exposed face of the specimen before the start of the test

West



East

Figure 19 Unexposed face of the specimen at the end of the test

East

West

Figure 20 Exposed face of the specimen at the end of the test

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