

Fire-resistance test on fire collars protecting a plasterboard wall penetrated by services

Test Report

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Report number: FSP 1985

Date: 7 May 2019

Client: IG6 Pty Ltd as trustee for the IG6 IP Trust

Commercial-in-confidence

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Fire-resistance test on fire collars protecting a plasterboard wall penetrated by services

Sponsored Investigation No. FSP 1985

1 Introduction

1.1 Identification of specimen

The sponsor identified the specimen as four (4) retrofit fire collars protecting a steel framed plasterboard wall system.

1.2 Sponsor

IG6 Pty Ltd as trustee for the IG6 IP Trust
3 Skirmish Court
Victoria Point Qld 4165

1.3 Manufacturer

Snap Fire Systems Pty Ltd
Building A, 1343 Wynnum Road
Tingalpa QLD 4173

1.4 Test standard

Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-2014, Fire-resistance tests of elements of construction.

Section 10: Service penetrations and control joints

1.5 Reference standard

Australian Standard 4072, Components for the protection of openings in fire-resistant separating elements, Part 1 - 2005, Service penetrations and control joints.

1.6 Test number

CSIRO Reference test number: FS 4844/4344

1.7 Test date

The fire-resistance test was conducted on 21 February 2019.

2 Description of specimen

2.1 General

The specimen comprised an 1150-mm x 1150-mm x 90-mm thick wall penetrated by four (4) pipes protected by retrofitted Snap Fire Systems fire collars.

The wall system is described as a 90-mm thick plasterboard lined steel framed wall comprising a layer of 13-mm thick Firestop plasterboard on each side of 64-mm deep metal studs with the cavity filled with 11Kg/m³ Glasswool insulation. The wall was constructed in accordance with Boral reference SB60.1A with an established FRL of -/60/60.

For the purpose of the test, the specimens were referenced as Specimen 1, 2, 3 and 4.

Documents containing a complete description of each specimen were supplied by the sponsor and are retained on file.

The pipes used in the test are stated to be manufactured in accordance with:

- AS/NZS 2492:2007 'Cross-linked polyethylene (PE-X) pipes for pressure applications';
- AS/NZS 1260 'PVC-U pipes and fittings for drain, waste and vent application'; and
- AS/NZS1477:2006 PVC pipes and fittings for pressure applications.

Specimen 1 - SNAP 50R Retrofit fire collar protecting a nominal 50-mm Polyvinyl Chloride (PVC) pipe.

The SNAP Retrofit 50R fire collar comprised a 0.75-mm steel casing with a 62-mm inner diameter and a 147-mm diameter base flange. The 47-mm high collar casing incorporated a closing mechanism which comprised two soft Intumescent intumescent wraps lined within the internal circumference of the collar. Intumescent A was 4-mm thick x 43-mm wide x 220-mm long, and Intumescent B was 4-mm thick x 43-mm wide x 200-mm long. Between the strips was a layer of 316 grade stainless steel mesh 210-mm long x 42-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing titled "SNAP 50 Retro", dated 18 January 2019, by Snap Fire Systems Pty Ltd. The Snap collars were surface mounted around the pipe on both the exposed and unexposed face of the wall and fixed through 3 mounting brackets using M4 expandable steel anchors.

The annular gap between the pipe and plasterboard on both sides of the wall was protected with a bead of Bostic Fireban One sealant.

The penetrating service comprised a 56-mm diameter PVC pipe, with a wall thickness of 2.45-mm which penetrated the wall through a 64-mm diameter cut-out hole as shown in drawing titled "Specimen #1, 50 PVC Stack & 50R", dated 6 January 2019, provided by Snap Fire Systems Pty Ltd. The pipe projected horizontally, 2000-mm away from the unexposed face of the wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm and 1500-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed end and capped with PVC end cap on the exposed end.

Specimen 2 – SNAP 32R Retrofit fire collar protecting a nominal 25-mm P-PVC pipe.

The 32R Retrofit collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 316 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing titled “SNAP 32 Retro”, dated 5 October 2017, by Snap Fire Systems Pty Ltd. The Snap collars were surface mounted around the pipe on both the exposed and unexposed face of the wall and fixed through 3 mounting brackets using M4 expandable steel anchors.

The penetrating service comprised a 27-mm P-PVC pipe, with a wall thickness of 1.7-mm, penetrating the wall through a 32-mm diameter cut-out hole as shown in drawing titled “Specimen #2, 25 P-PVC Pipe & 32R” dated 6 February 2019, provided by Snap Fire Systems Pty Ltd. The pipes projected horizontally, 2000-mm away from the unexposed face of the wall and approximately 500-mm into the furnace chamber. The pipes were supported at nominally 500-mm and 1500-mm from the unexposed face of the plasterboard wall. The pipes were open at the unexposed and capped with a Superwool plug on the exposed end.

Specimen 3 – SNAP 110R Retrofit fire collar protecting a nominal 100-mm Polyvinyl Chloride sandwich construction (PVC-SC) pipe.

The SNAP Retrofit 110R fire collar comprised a 0.75-mm steel casing with a 122-mm inner diameter and a 206-mm diameter base flange. The 62-mm high collar casing incorporated a closing mechanism that was comprised of three soft Intumesh intumescent wraps and wire meshes lined within the internal circumference of the collar. Intumescent A was 2.5-mm thick x 58-mm wide x 424-mm long, Intumescent B was 2.5-mm thick x 58-mm wide x 407-mm long and Intumescent C was 2.5-mm thick x 58-mm wide x 389-mm long. Between intumescent strips A and B was a layer of 304 stainless steel mesh 415-mm long x 58-mm wide and between intumescent strips B and C was a layer of 316 stainless steel mesh 398-mm long x 58-mm wide both had wire mesh diameters of 0.15-mm, as shown in drawing titled “SNAP 110 Retro”, dated 16 January 2019, by Snap Fire Systems Pty Ltd. The Snap collars were surface mounted around the pipe on both the exposed and unexposed face of the wall and fixed through 3 mounting brackets using M4 expandable steel anchors.

The annular gap between the pipe and plasterboard on both sides of the wall was protected with a bead of Fullers Firesound sealant.

The penetrating service comprised a 110-mm PVC-SC pipe, with a wall thickness of 3.46-mm fitted through the collar’s sleeve. The pipe penetrated the wall through a 114-mm diameter opening and projected horizontally 2000-mm away from the unexposed face of the wall and approximately 500 mm into the furnace chamber. The pipe was supported at nominally 500-mm, and 1500-mm from the unexposed face of the plasterboard wall, as shown in drawing titled “Specimen #3, 100 PVC-SC Stack & 110R”, dated 6 February 2019, provided by Snap Fire Systems Pty Ltd. The pipe was open on the unexposed end and capped on the exposed end with a PVC end cap.

Specimen 4 – SNAP 32R Retrofit fire collar protecting a nominal 20mm PEX-b pipe.

The 32R Retrofit collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 316 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing titled “SNAP 32 Retro”, dated 12 January 2017, by Snap Fire Systems Pty Ltd. The Snap collars were surface mounted around the pipe on both the exposed and unexposed face of the wall and fixed through 3 mounting brackets using M4 expandable steel anchors.

The annular gap between the pipe and plasterboard on both sides of the wall was protected with a bead of Fullers Firesound sealant.

The penetrating service comprised a 20-mm PEX-b pipe, with a wall thickness of 2.46-mm, penetrating the wall through a 25-mm diameter cut-out hole as shown in drawing titled “Specimen #4, 20 PEX-b Stack & 32R”, dated 6 February 2019, provided by Snap Fire Systems Pty Ltd. The pipes projected horizontally, 2000-mm away from the unexposed face of the wall and approximately 500-mm into the furnace chamber. The pipes were supported at nominally 500-mm and 1500-mm from the unexposed face of the plasterboard wall. The pipes were open at the unexposed and capped with a Superwool plug on the exposed end.

2.2 Dimensions

The wall specimen was nominally 1150-mm wide x 1150-mm high x 90-mm thick. All dimensions are nominal.

2.3 Orientation

The plasterboard wall was placed vertically against the furnace chamber and subjected to fire exposure from one side only.

2.4 Conditioning

The specimen wall was delivered on 14th January 2019 and stored under laboratory atmospheric conditions until the test date.

3 Documentation

The following documents were supplied or referenced by the sponsor as a complete description of the specimen and should be read in conjunction with this report:

- Drawing titled “Test Wall W-19-A Layout”, dated 25 February 2019, by Snap Fire Systems Pty Ltd
- Drawing titled “Specimen #1, 50 PVC Stack & 50R”, dated 6 January 2019, provided by Snap Fire Systems Pty Ltd.
- Drawing titled “Specimen #2, 25 P-PVC Pipe & 32R” dated 6 February 2019, provided by Snap Fire Systems Pty Ltd.
- Drawing titled “Specimen #3, 100 PVC-SC Stack & 110R”, dated 6 February 2019, provided by Snap Fire Systems Pty Ltd.
- Drawing titled “Specimen #4, 20 PEX-b Stack & 32R”, dated 6 February 2019, provided by Snap Fire Systems Pty Ltd.
- Drawing titled “SNAP 32 Retro”, dated 5 October 2017, by Snap Fire Systems Pty Ltd.
- Drawing titled “SNAP 50 Retro”, dated 18 January 2019, by Snap Fire Systems Pty Ltd.
- Drawing titled “SNAP 110 Retro”, dated 16 January 2019, by Snap Fire Systems Pty Ltd.

4 Equipment

4.1 Furnace

The furnace had a nominal opening of 1000-mm x 1000-mm for attachment of vertical or horizontal specimens.

The furnace was lined with refractory bricks and materials with the thermal properties as specified in AS 1530.4-2014 and was heated by combustion of a mixture of natural gas and air.

4.2 Temperature

The temperature in the furnace chamber was measured by four type K, 3-mm diameter, and 310 stainless steel Mineral Insulated Metal Sheathed (MIMS) thermocouples. Each thermocouple was housed in high-nickel steel tubes opened at the exposed end.

The temperatures of the specimen were measured by glass-fibre insulated and sheathed K-type thermocouples with a wire diameter of 0.5-mm.

Location of the thermocouples on the unexposed face of the specimen are described in Appendix A.

4.3 Measurement system

The primary measurement system comprised a multiple-channel data logger, scanning at one-minute intervals during the test.

5 Ambient temperature

The temperature of the test area was 23°C at the commencement of the test.

6 Departure from standard

There were no departures from the requirements of AS 1530.4-2014.

7 Termination of test

The test was terminated at 61 minutes by the agreement with the sponsor.

8 Test results

8.1 Critical observations

The following observations were made during the fire-resistance test:

Time	Observation
2 minutes -	Smoke is fluing from Specimen 1.
3 minutes -	Smoke is being emitted from the collars of Specimens 3 and 4.
4 minutes -	Smoke is fluing from the end of Specimen 3.
5 minutes -	Smoke is fluing from the end of Specimen 4.
7 minutes -	Smoke has ceased fluing from the end of Specimens 1 and 4.
8 minutes -	Smoke is being emitted from the furnace flues.
9 minutes -	Smoke has ceased fluing from the end of Specimen 3.
10 minutes -	Smoke is being emitted from the furnace flues.
15 minutes -	A small amount of smoke is fluing from the collars of Specimens 2 and 3.
17 minutes -	A small amount of smoke is fluing from Specimen 3.
25 minutes -	A small amount of smoke is fluing from Specimens 1, 3 and 4.
31 minutes -	Discolouration at the base of pipe of Specimen 3.
39 minutes -	Smoke now fluing from the end of all specimens.
40 minutes -	Smoke fluing from the collars of all specimens.
53 minutes -	The pipe of Specimen 2 near collar has started charring.
58 minutes -	The screw heads showing through plasterboard wall.
61 minutes -	<u>Insulation Failure of Specimen 4</u> – maximum temperature rise of 180K is exceeded on the top of pipe 25-mm away from collar on the unexposed face. Test terminated.

8.2 Furnace temperature

Figure 1 shows the standard curves of temperature versus time for heating the furnace chamber and the actual curves of average and maximum temperature versus time recorded during the heating period.

8.3 Furnace severity

Figure 2 shows the curve of furnace severity versus time during the heating period.

8.4 Specimen temperature

Figure 3 shows the curve of temperature versus time associated with Specimen 1.

Figure 4 shows the curve of temperature versus time associated with Specimen 2.

Figure 5 shows the curve of temperature versus time associated with Specimen 3.

Figure 6 shows the curve of temperature versus time associated with Specimen 4.

8.5 Performance

Performance observed in respect of the following AS 1530.4-2014 criteria:

Specimen 1 - SNAP 50R Retrofit fire collar protecting a nominal 50-mm Polyvinyl Chloride (PVC) pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 61 minutes
Insulation	-	no failure at 61 minutes

Specimen 2 – SNAP 32R Retrofit fire collar protecting a nominal 25-mm P-PVC pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 61 minutes
Insulation	-	no failure at 61 minutes

Specimen 3 – SNAP 110R Retrofit fire collar protecting a nominal 100-mm Polyvinyl Chloride sandwich construction (PVC-SC) pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 61 minutes
Insulation	-	no failure at 61 minutes

Specimen 4 – SNAP 32R Retrofit fire collar protecting a nominal 20mm PEX-b pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 61 minutes
Insulation	-	61 minutes

The fire-resistance level of the specimens is applicable when the system is exposed to fire from either direction.

This report details methods of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in this standard. Any significant variation with respect to size, constructional details, loads, stresses, and 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.

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.

9 Fire-resistance level (FRL)

For the purpose of building regulations in Australia, the FRL of the test specimen was: -

Specimen 1	-	-/60/60
Specimen 2	-	-/60/60
Specimen 3	-	-/60/60
Specimen 4	-	-/60/60

The fire-resistance level is applicable when the system is exposed to fire from either direction.

The fire-resistance level (FRL) is limited to that of the separating element.

For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions.

10 Field of direct application of test results

The results of the fire test contained in this test report are directly applicable, without reference to the testing authority, to similar constructions where one or more changes listed in Clause 10.12 of AS 1530.4-2014, have been made provided no individual component is removed or reduced.

11 Tested by



Glenn Williams
Testing Officer

Appendices

Appendix A – Measurement location

Specimen	T/C Position	T/C designation
SPECIMEN 1 – 56-mm OD Iplex pipe (PVC) with a wall thickness of 2.45-mm protected with Snap 50R Fire collars retro-fitted to both sides of the wall.	On p/b, 25-mm collar right side	S1
	On p/b, 25-mm below of collar	S2
	On collar top	S3
	On collar right side	S4
	On pipe 25-mm from collar right	S5
	On pipe 25-mm from collar left	S6
SPECIMEN 2 – 27-mm OD Pipemaster pipe (P-PVC) having a wall thickness of 1.70-mm, protected with Snap 32R Fire collars retro-fitted to both sides of the wall.	On p/b, 25-mm above collar left side	S7
	On p/b, 25-mm right collar	S8
	On collar top	S9
	On collar bottom	S10
	On pipe 25-mm from collar top left	S11
	On pipe 25-mm from collar top right	S12
SPECIMEN 3 – 110-mm OD Iplex pipe (PVC), having a wall thickness of 3.46-mm protected with Snap 110R Fire collars retro-fitted to both sides of the wall.	On p/b, 25-mm above collar top left	S13
	On p/b, 25-mm right of collar top right	S14
	On collar top left	S15
	On collar bottom right	S16
	On pipe 25-mm from collar left	S17
	On pipe 25-mm from collar right	S18
SPECIMEN 4 – 20-mm OD CXL pipe (Pex-B) having a wall thickness of 2.46-mm protected with Snap 32R Fire collars retro-fitted to both sides of the wall.	On p/b, 25-mm above collar	S19
	On p/b, 25-mm right of collar	S20
	On collar top	S21
	On collar right	S22
	On pipe 25-mm from collar top	S23
	On pipe 25-mm from collar right	S24
Rover		S25
Ambient		S26

Appendix B – Photographs



PHOTOGRAPH 1 – EXPOSED FACE OF SPECIMENS PRIOR TO TESTING



PHOTOGRAPH 2 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING



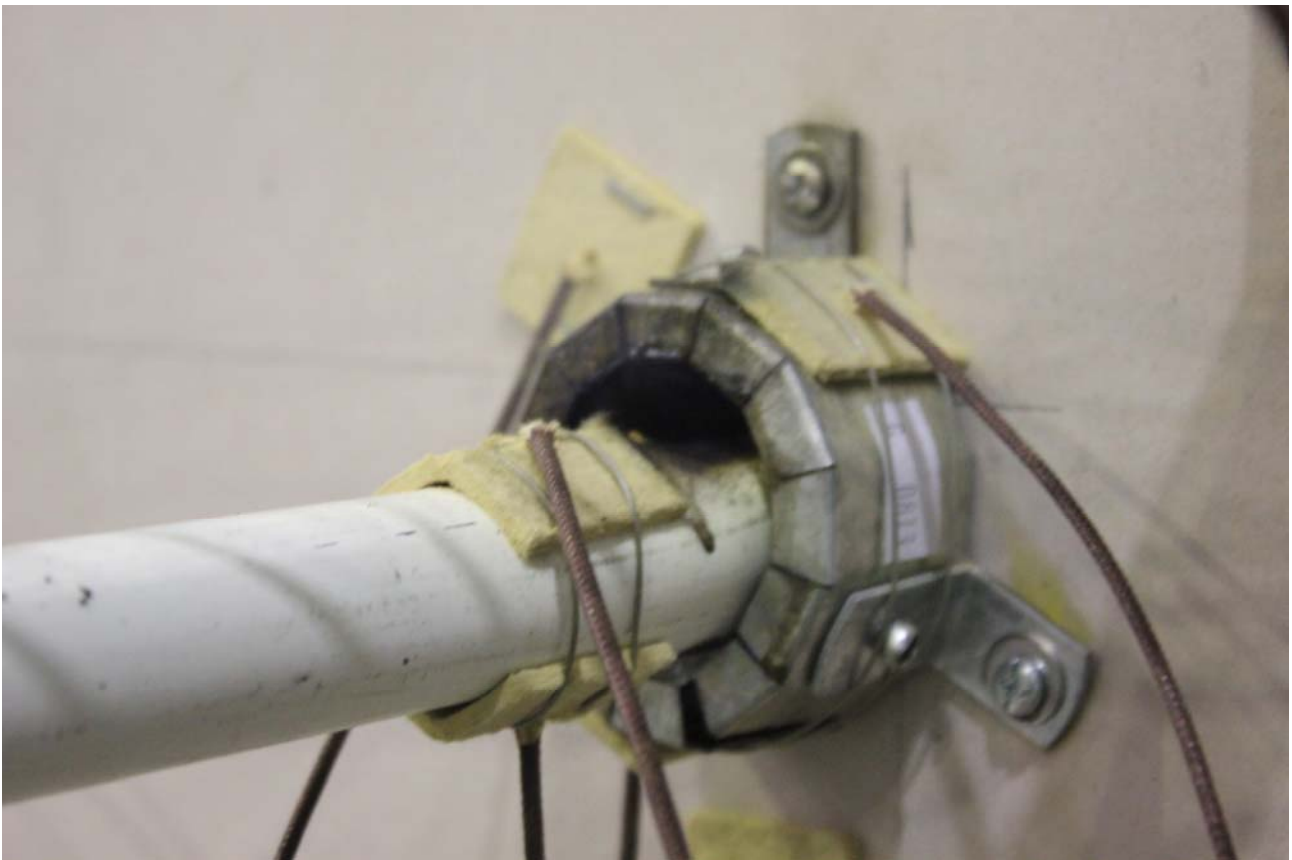
PHOTOGRAPH 3 – SPECIMENS AFTER 30 MINUTES OF TESTING



PHOTOGRAPH 4 – SPECIMEN 3 AFTER 31 MINUTES OF TESTING



PHOTOGRAPH 5 – SPECIMENS AFTER 39 MINUTES OF TESTING



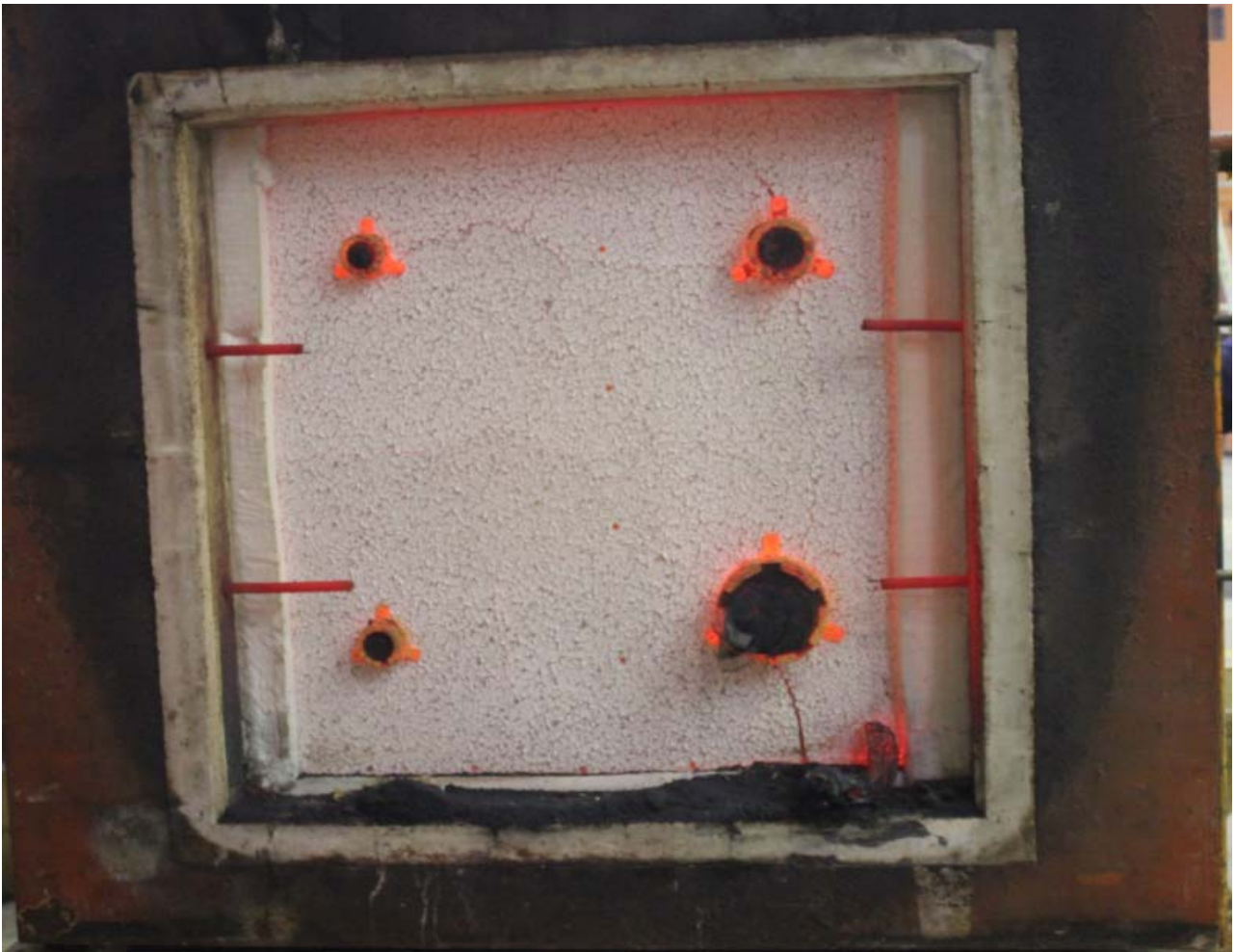
PHOTOGRAPH 6 – SPECIMEN 2 AFTER 54 MINUTES OF TESTING



PHOTOGRAPH 7 – SPECIMENS AFTER 60 MINUTES OF TESTING



PHOTOGRAPH 8 – UNEXPOSED FACE OF SPECIMENS AT THE CONCLUSION OF TESTING



PHOTOGRAPH 9– EXPOSED FACE OF SPECIMENS AT CONCLUSION OF TESTING

Appendix C – Furnace Temperature

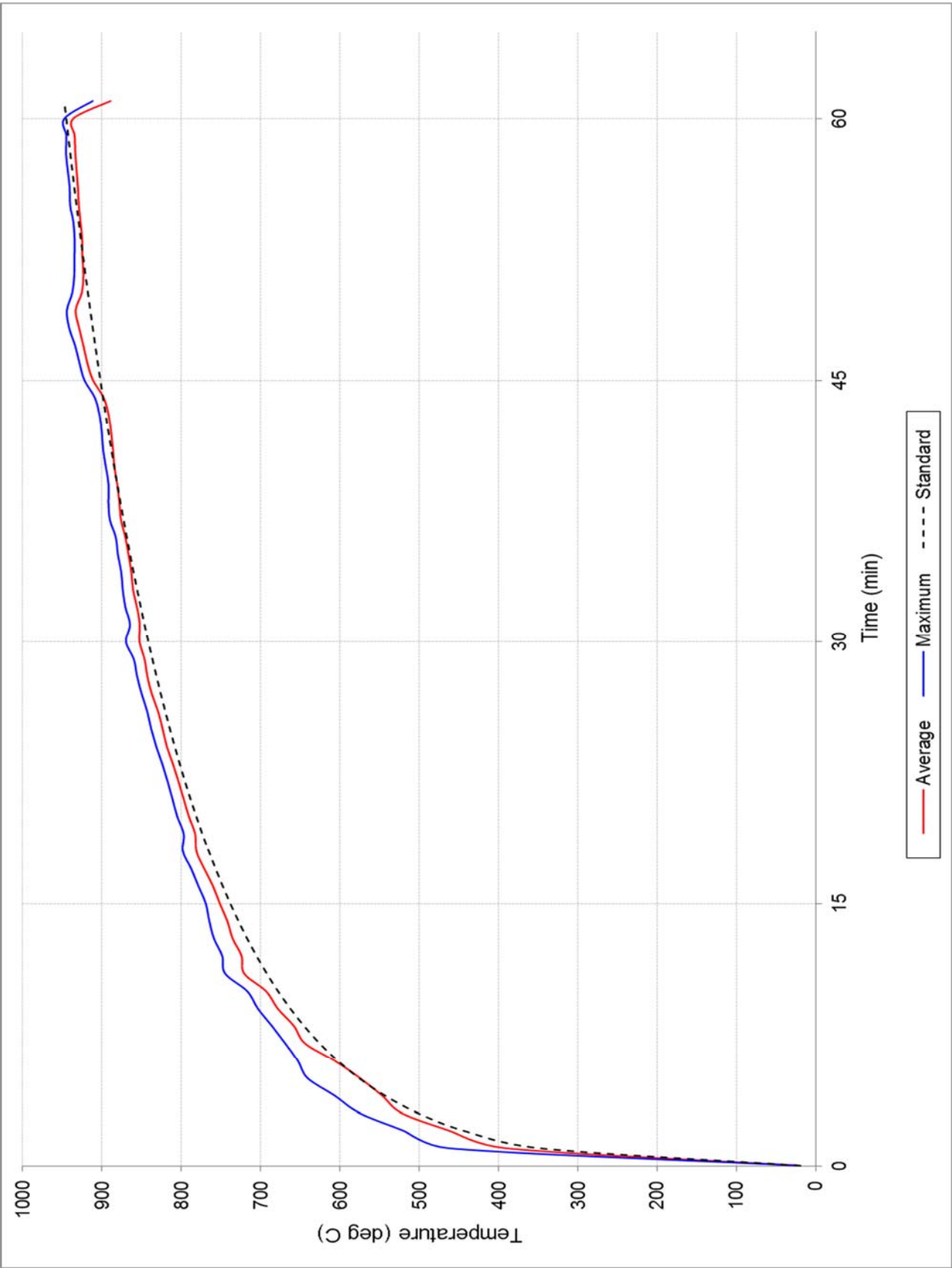


FIGURE 1 – FURNACE TEMPERATURE

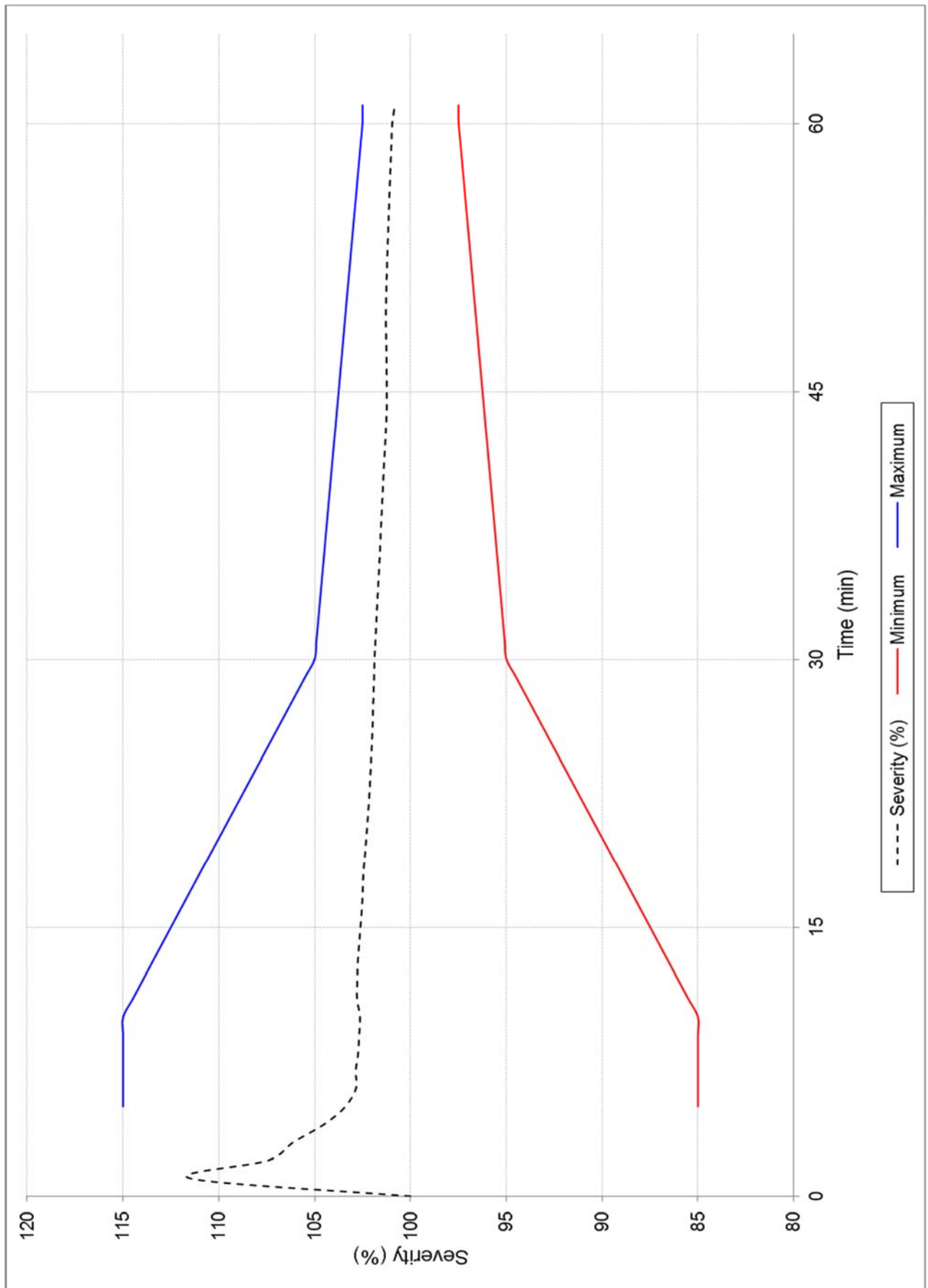


FIGURE 2 – FURNACE SEVERITY

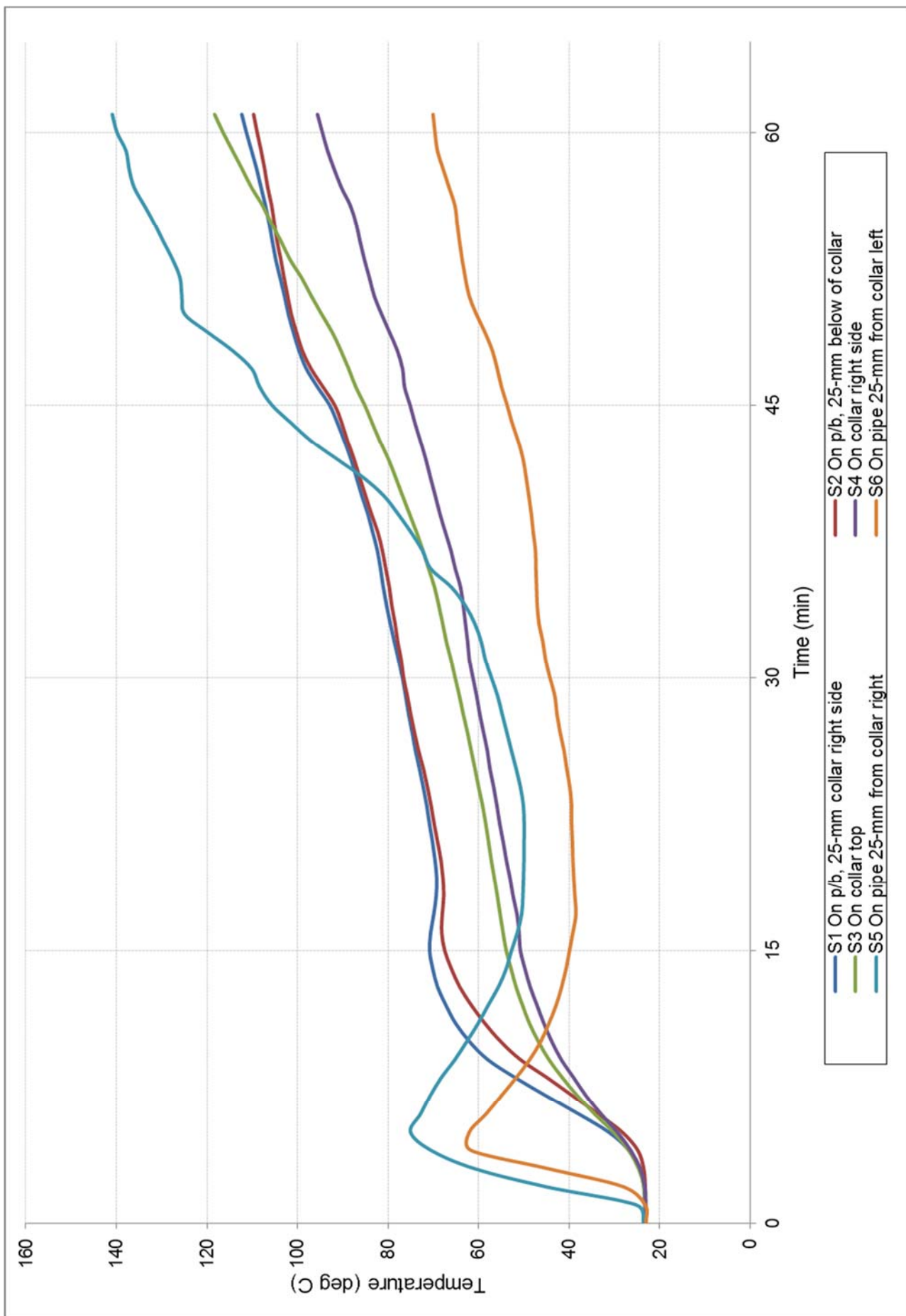


FIGURE 3 - SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN # 1

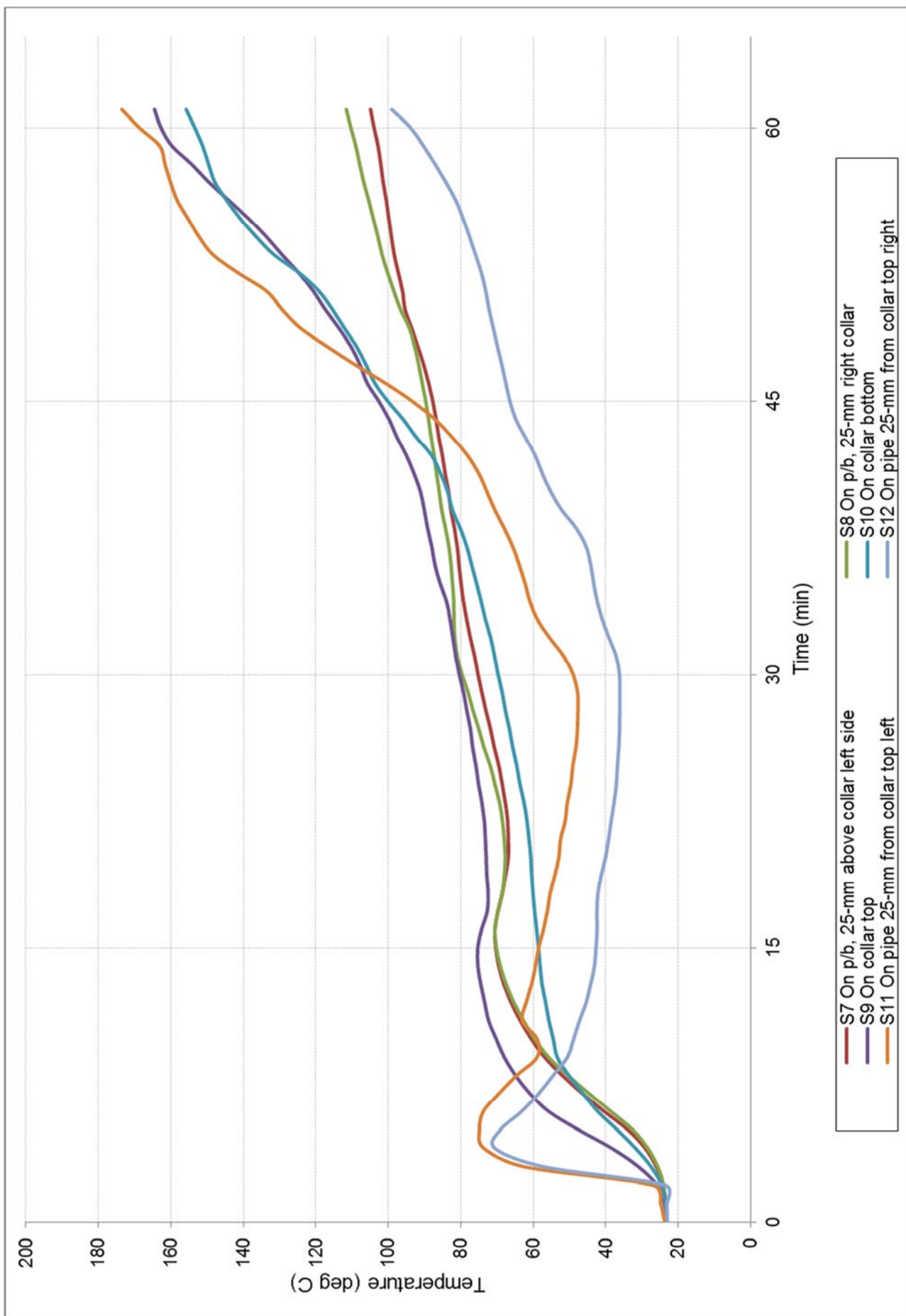


FIGURE 4 - SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN # 2

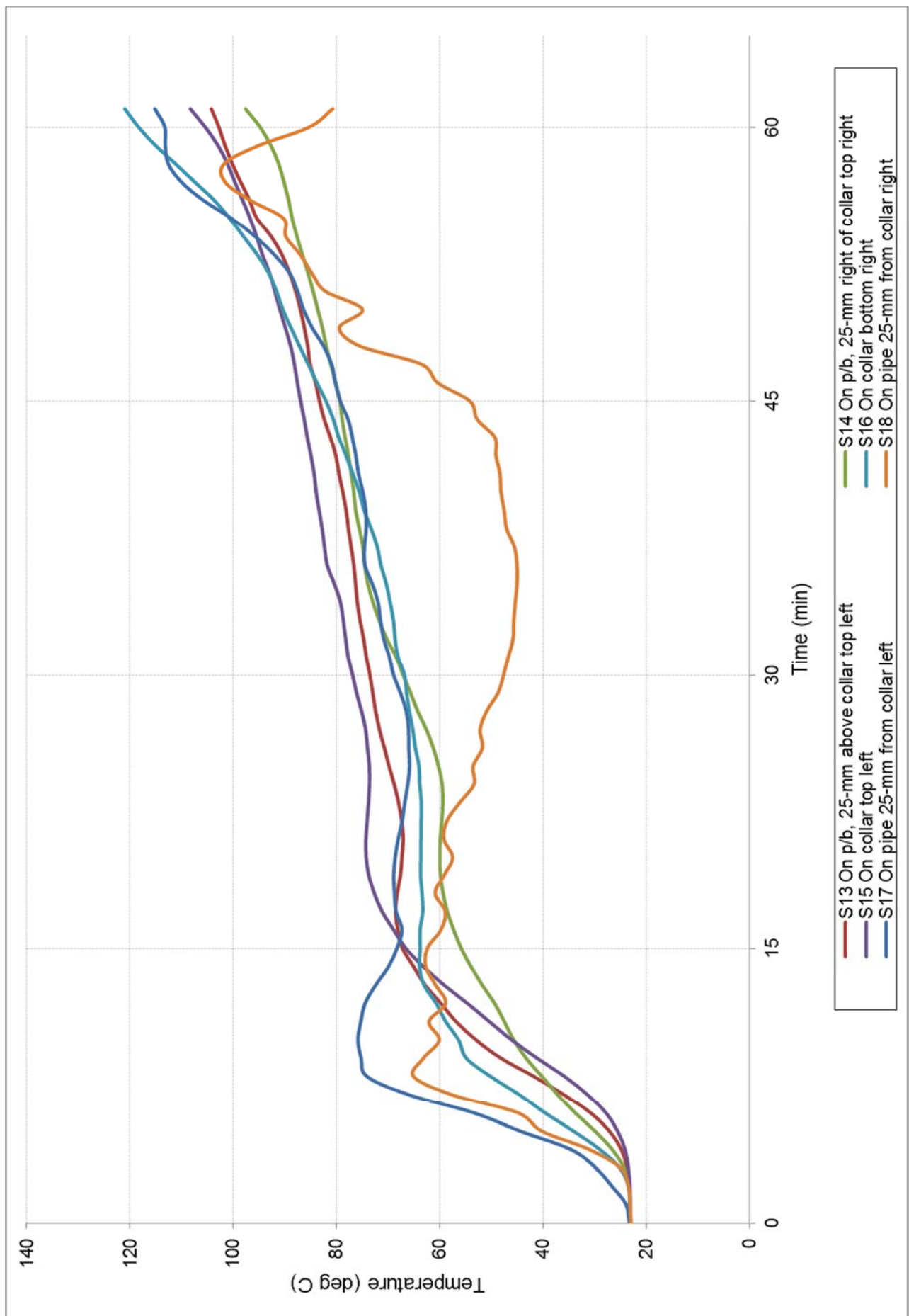


FIGURE 5 - SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN # 3

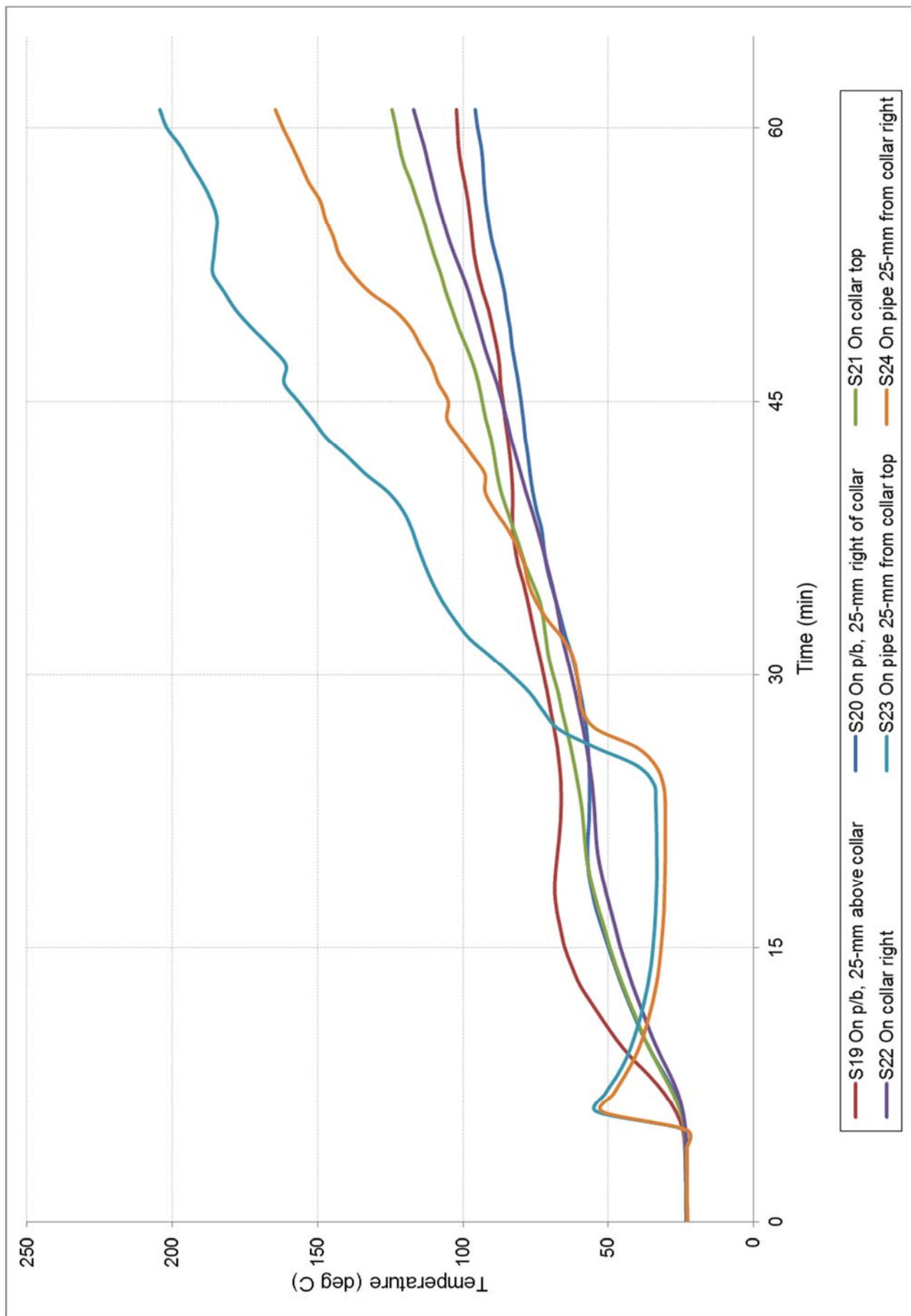


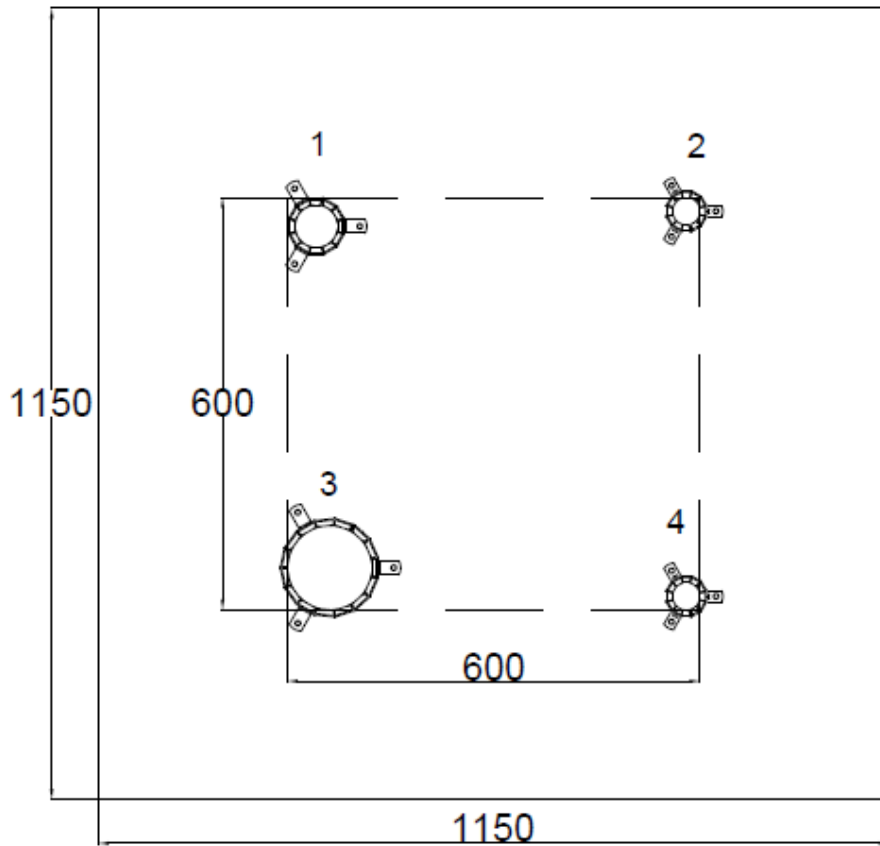
FIGURE 6 - SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN # 4

Appendix D – Specimen layout and installation drawings

Snap Fire Systems Pty Ltd

Test Wall W-19-A Layout

Date: 25 FEB 2019



Penetration	Collar Code	Pipe Type	Pipe Diameter (mm)	Sealant
1	50R	PVC	56	Fireban One
2	32R	P-PVC	27	N/A
3	110R	PVC-SC	110	Firesound
4	32R	Pex-B	20	Firesound

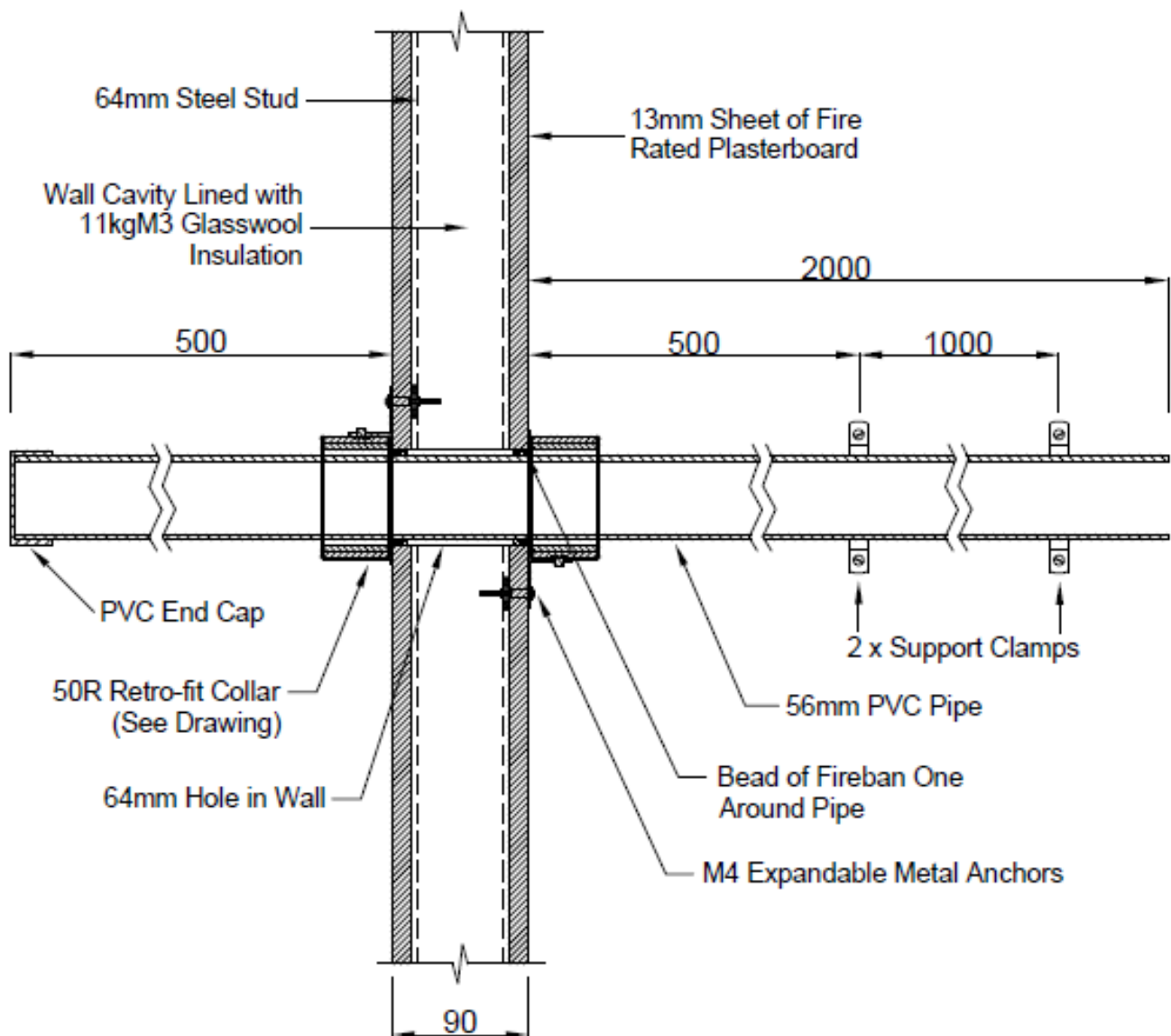
DRAWING TITLED “TEST WALL W-19-A LAYOUT” DATED 25 FEBRUARY 2019, BY SNAP FIRE SYSTEMS PTY LTD.

Snap Fire Systems Pty Ltd

Specimen #1

50 PVC Stack & 50R

Date: 06 FEB 2019



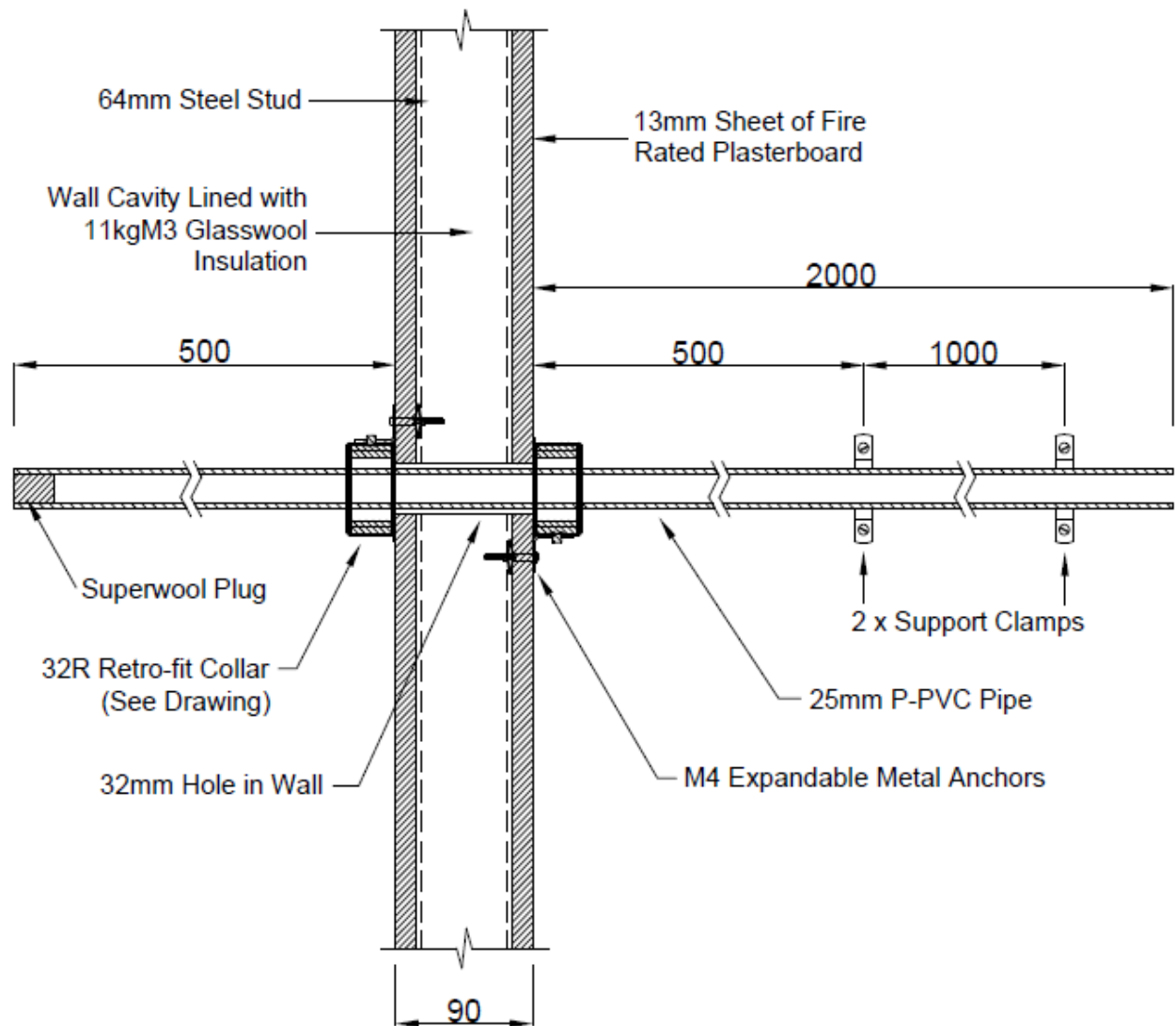
DRAWING TITLED "SPECIMEN #1 50 PVC STACK & 50R" DATED 6 FEBRUARY 2019, BY SNAP FIRE SYSTEMS PTY LTD.

Snap Fire Systems Pty Ltd

Specimen #2

25 P-PVC Stack & 32R

Date: 06 FEB 2019



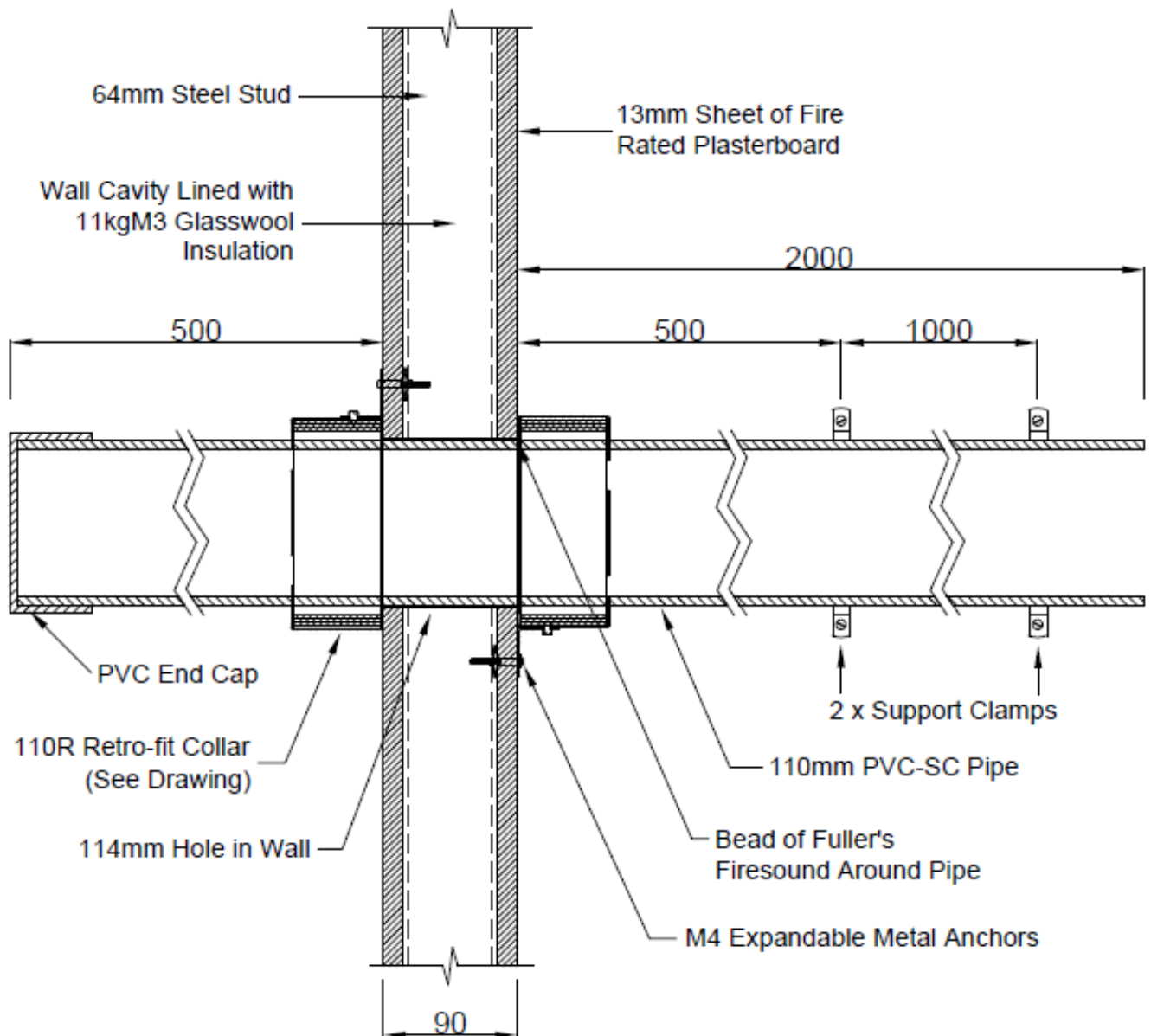
DRAWING TITLED "SPECIMEN #2 25 P-PVC STACK & 32R", DATED 6 FEBRUARY 2019, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD.

Snap Fire Systems Pty Ltd

Specimen #3

100 PVC-SC Stack & 110R

Date: 06 FEB 2019



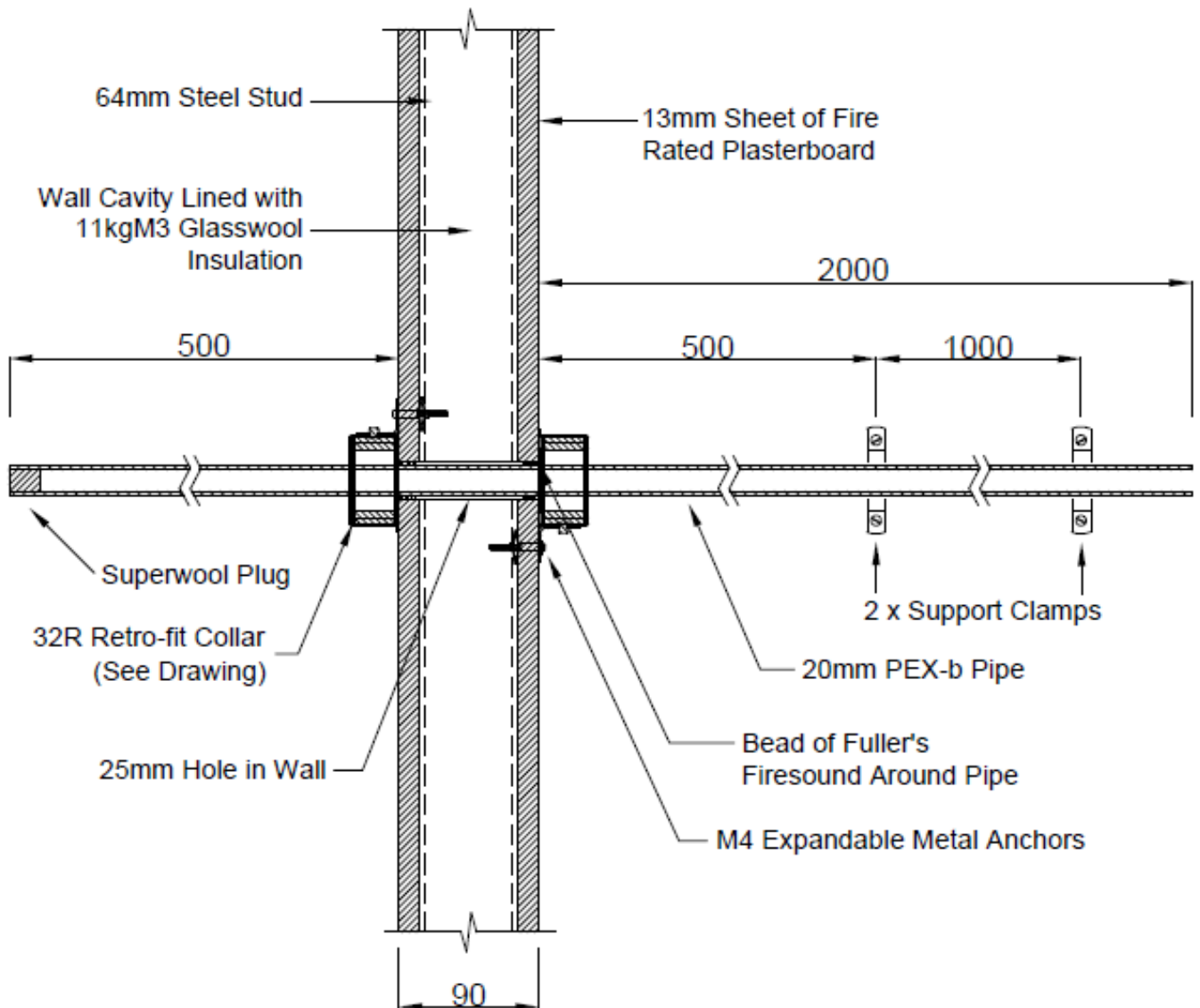
DRAWING TITLED "SPECIMEN #3 100 PVC-SC STACK & 110R", DATED 6 FEBRUARY 2019, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD.

Snap Fire Systems Pty Ltd

Specimen #4

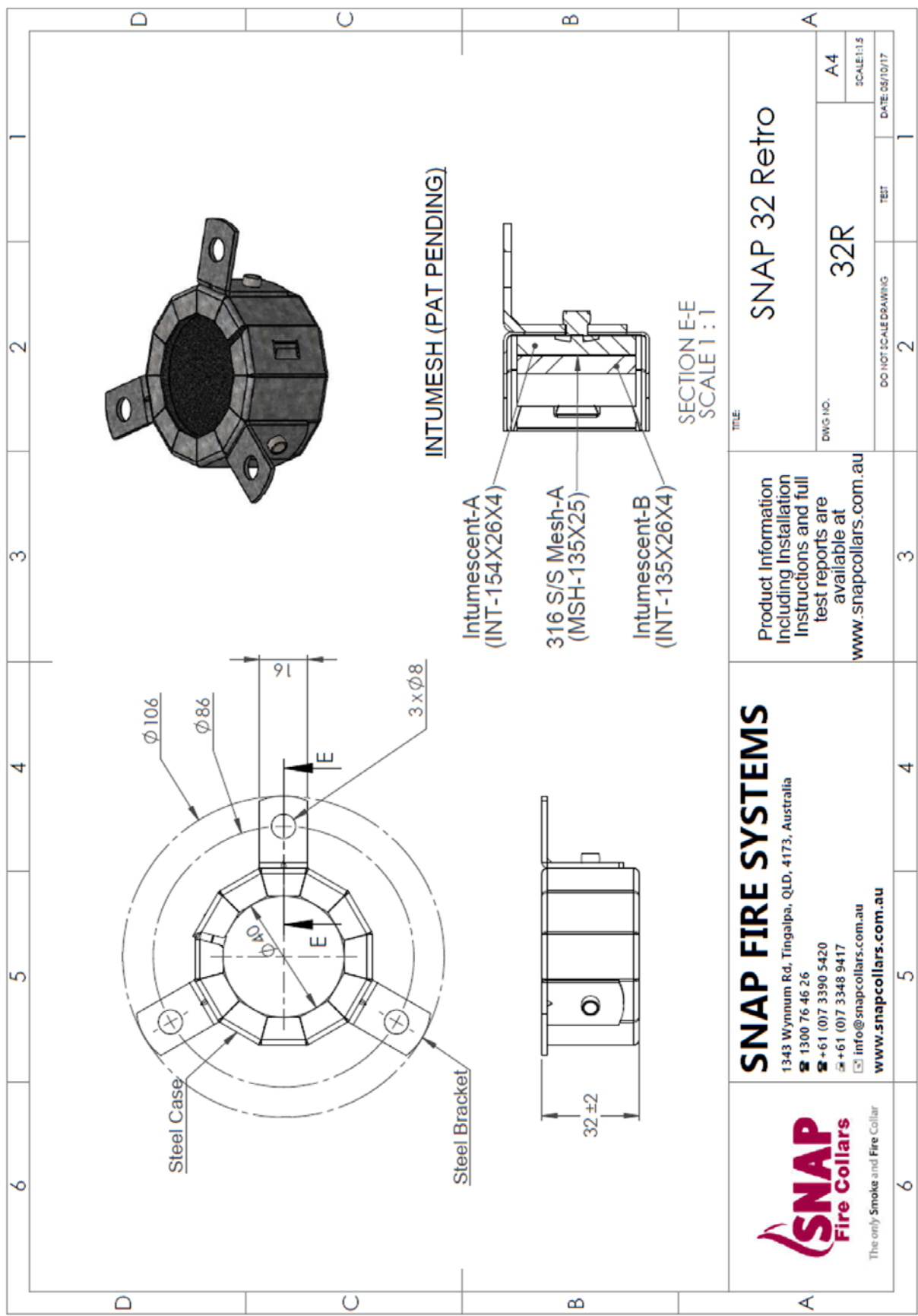
20 PEX-b Stack & 32R

Date: 06 FEB 2019

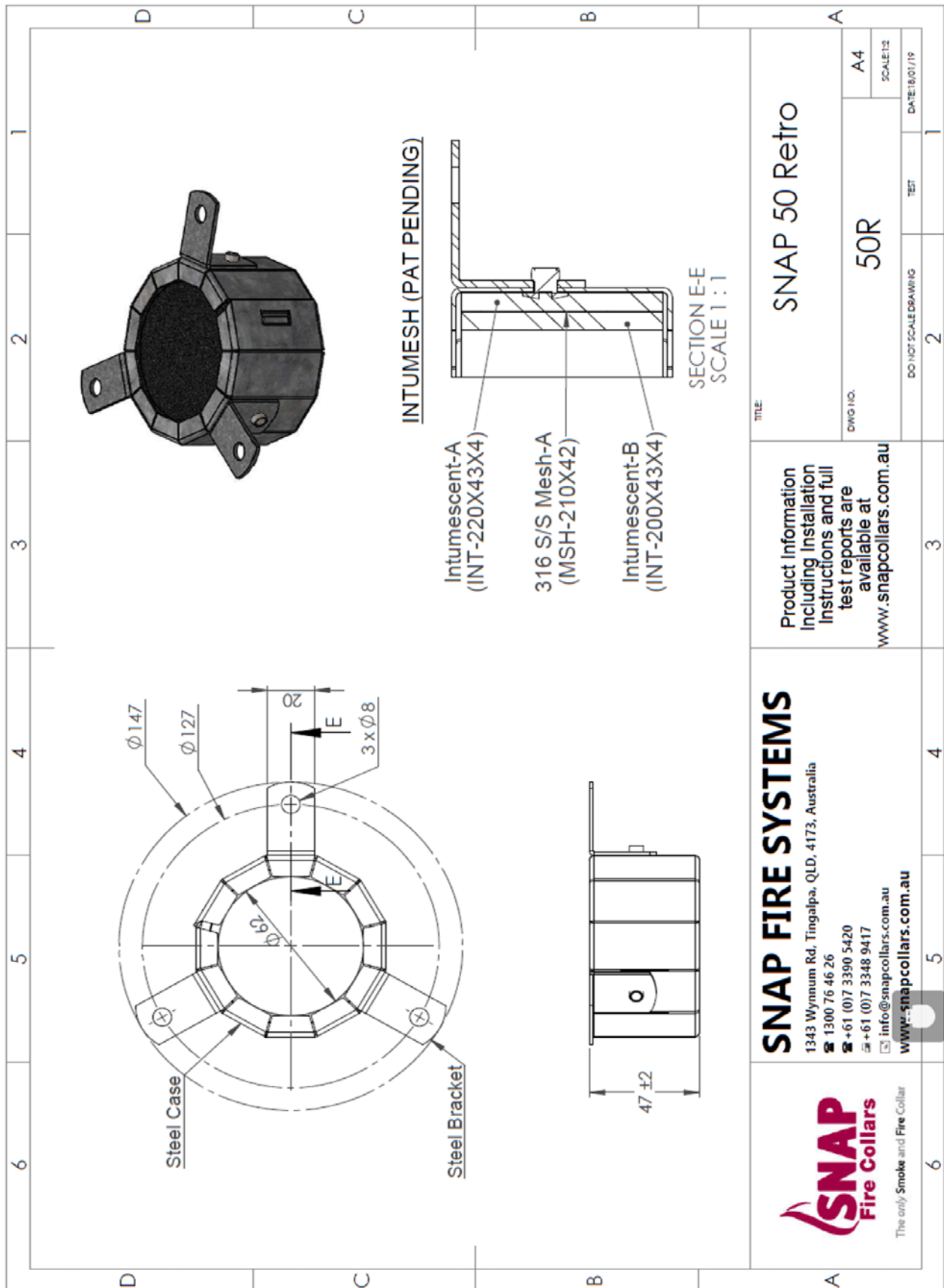


DRAWING TITLED "SPECIMEN #4 20 PEX-B STACK & 32R", DATED 6 FEBRUARY 2019, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD.

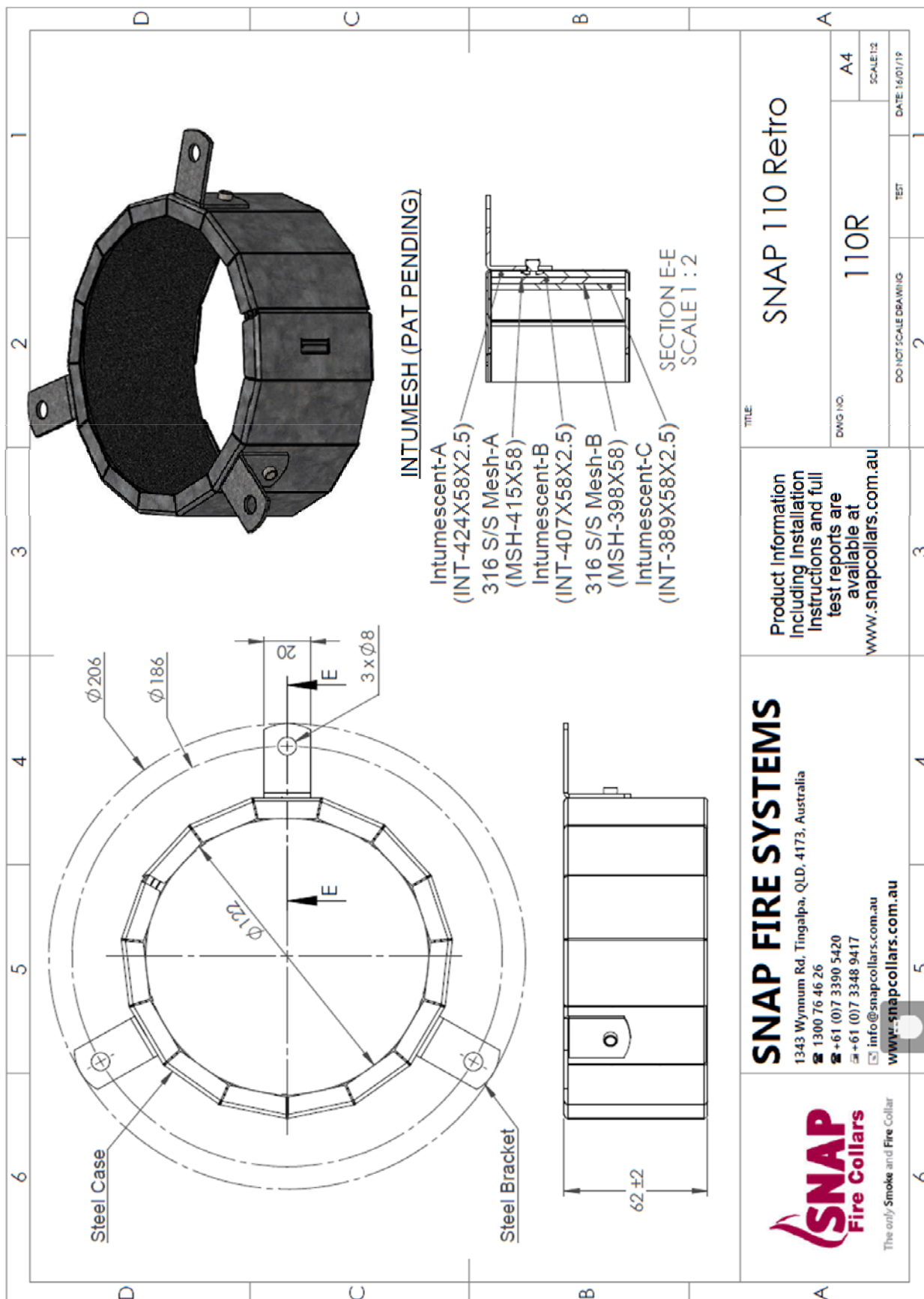
Appendix E – Specimen Drawings



DRAWING NUMBERED 32R, TITLED “SNAP 32 RETRO”, DATED 5 OCTOBER 2017, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING NUMBERED 50R, TITLED "SNAP 50 RETRO", DATED 12 JANUARY 2019, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING NUMBERED 110R, TITLED "SNAP 110 RETRO", DATED 16 JANUARY 2019, BY SNAP FIRE SYSTEMS PTY LTD.

Appendix F – Copy of Certificate(s) of Test

INFRASTRUCTURE TECHNOLOGIES www.csiro.au										
14 Julius Avenue, North Ryde NSW 2113 PO Box 52, North Ryde NSW 1670, Australia T (02) 9490 5444 • ABN 41 687 119 230										
<h3>Certificate of Test</h3>										
		No. 3234								
<p>This is to certify that the element of construction described below was tested by CSIRO Infrastructure Technologies in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4 Fire-resistance tests of elements of construction, 2014 (Section 10, Service penetrations and control joints), on behalf of:</p> <p>IG6 Pty Ltd as trustee for the IG6 IP Trust 3 Skirmish Court Victoria Point Qld 4165</p> <p>A full description of the test specimen and the complete test results are detailed in the Division's report numbered FSP 1985.</p> <p>Product Name: SNAP 50R Retrofit fire collar protecting a nominal 50-mm Polyvinyl Chloride (PVC) pipe</p> <p>Description: The specimen comprised an 1150-mm x 1150-mm x 90-mm thick wall penetrated by nominal 50-mm Polyvinyl Chloride (PVC) pipe protected by SNAP 50R Retrofit fire collar. The wall system is described as a 90 mm thick plasterboard lined steel framed wall comprising a layer of 13 mm thick Firestop plasterboard on each side of 64 mm deep metal studs with the cavity filled with 11Kg/m3 Glasswool insulation. The wall was constructed in accordance with Boral reference SB60.1A with an established FRL of -/60/60. The SNAP Retrofit 50R fire collar comprised a 0.75-mm steel casing with a 62 mm inner diameter and a 147-mm diameter base flange. The 47-mm high collar casing incorporated a closing mechanism which comprised two soft Intumescent intumescent wraps lined within the internal circumference of the collar. Intumescent A was 4-mm thick x 43-mm wide x 220-mm long, and Intumescent B was 4 mm thick x 43-mm wide x 200-mm long. Between the strips was a layer of 316 grade stainless steel mesh 210-mm long x 42-mm wide with wire mesh diameter of 0.15-mm. The Snap collars were surface mounted around the pipe on both the exposed and unexposed face of the wall and fixed through 3 mounting brackets using M4 expandable steel anchors. The annular gap between the pipe and plasterboard on both sides of the wall was protected with a bead of Bostic Fireban One sealant. The penetrating service comprised a 56-mm diameter PVC pipe, with a wall thickness of 2.45 mm which penetrated the wall through a 64-mm diameter cut-out hole. The pipe projected horizontally, 2000-mm away from the unexposed face of the wall and approximately 500 mm into the furnace chamber. The pipe was supported at nominally 500-mm and 1500-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed end and capped with PVC end cap on the exposed end.</p> <p>Performance observed in respect of the following AS 1530.4-2014 criteria:</p> <table><tbody><tr><td>Structural Adequacy</td><td>not applicable</td></tr><tr><td>Integrity</td><td>no failure at 61 minutes</td></tr><tr><td>Insulation</td><td>no failure at 61 minutes</td></tr></tbody></table> <p>and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60.</p> <p>The fire-resistance level is applicable when the system is exposed to fire from either direction. The fire-resistance level (FRL) is limited to that of the separating element. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be recognized that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.</p> <p>Testing Officer: Peter Gordon Date of Test: 21 February 2019</p> <p>Issued on the 7th day of May 2019 without alterations or additions.</p> <p> Brett Roddy Manager, Fire Testing and Assessments</p> <p>"Copyright CSIRO 2019 ©" Copying or alteration of this report without written authorisation from CSIRO is forbidden</p> <table border="1"><tbody><tr><td></td><td>This document is issued in accordance with NATA's accreditation requirements. Accreditation No. 165 – Corporate Site No. 3625 Accredited for compliance with ISO/IEC 17025 - Testing</td></tr></tbody></table>			Structural Adequacy	not applicable	Integrity	no failure at 61 minutes	Insulation	no failure at 61 minutes		This document is issued in accordance with NATA's accreditation requirements. Accreditation No. 165 – Corporate Site No. 3625 Accredited for compliance with ISO/IEC 17025 - Testing
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	This document is issued in accordance with NATA's accreditation requirements. Accreditation No. 165 – Corporate Site No. 3625 Accredited for compliance with ISO/IEC 17025 - Testing									

COPY OF CERTIFICATE OF TEST – NO. 3234



Certificate of Test

No. 3235

This is to certify that the element of construction described below was tested by CSIRO Infrastructure Technologies in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4 Fire-resistance tests of elements of construction, 2014 (Section 10, Service penetrations and control joints), on behalf of:

IG6 Pty Ltd as trustee for the IG6 IP Trust
 3 Skirmish Court
 Victoria Point Qld 4165

A full description of the test specimen and the complete test results are detailed in the Division's report numbered FSP 1985.

Product Name: SNAP 32R Retrofit fire collar protecting a nominal 25-mm P-PVC pipe

Description: The specimen comprised an 1150-mm x 1150-mm x 90-mm thick wall penetrated by nom. 25-mm P-PVC pipe protected by SNAP 32R Retrofit fire collar. The wall system is described as a 90 mm thick plasterboard lined steel framed wall comprising a layer of 13 mm thick Firestop plasterboard on each side of 64 mm deep metal studs with the cavity filled with 11Kg/m³ Glasswool insulation. The wall was constructed in accordance with Boral reference SB60.1A with an established FRL of -/60/60. The 32R Retrofit collar comprised a 0.75-mm steel casing with a 40 mm inner dia. and 106 mm dia. base flange. The 32-mm high collar casing incorporated a closing mechanism that comprised two soft Intumescent strips lined within internal circumference of the collar. Inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 316 stainless steel mesh 135 mm long x 25-mm wide with wire mesh dia. of 0.15-mm. Snap collars were surface mounted around pipe on both exposed and unexposed face of the wall and fixed through 3 mounting brackets using M4 expandable steel anchors. The penetrating service comprised a 27-mm P-PVC pipe, with wall thickness of 1.7-mm, penetrating the wall through a 32-mm dia. cut-out hole. Pipes projected horizontally, 2000-mm away from unexposed face of wall and approx. 500 mm into furnace chamber. The pipes were supported at nom. 500-mm and 1500-mm from unexposed face of the plasterboard wall. Pipes were open at unexposed and capped with a Superwool plug on exposed end.

Performance observed in respect of the following AS 1530.4-2014 criteria:

Structural Adequacy	not applicable
Integrity	no failure at 61 minutes
Insulation	no failure at 61 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60.

The fire-resistance level is applicable when the system is exposed to fire from either direction. The fire-resistance level (FRL) is limited to that of the separating element. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be recognized that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon

Date of Test: 21 February 2019

Issued on the 7th day of May 2019 without alterations or additions.

B. Roddy

Brett Roddy
 Manager, Fire Testing and Assessments

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COPY OF CERTIFICATE OF TEST – NO. 3235



Certificate of Test

No. 3236

This is to certify that the element of construction described below was tested by CSIRO Infrastructure Technologies in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4 Fire-resistance tests of elements of construction, 2014 (Section 10, Service penetrations and control joints), on behalf of:

IG6 Pty Ltd as trustee for the IG6 IP Trust
 3 Skirmish Court
 Victoria Point Qld 4165

A full description of the test specimen and the complete test results are detailed in the Division's report numbered FSP 1985.

Product Name: SNAP 110R Retrofit fire collar protecting a nom. 100-mm Polyvinyl Chloride sandwich construction (PVC-SC) pipe

Description: The specimen comprised an 1150-mm x 1150-mm x 90-mm thick wall penetrated by nom. 100-mm Polyvinyl Chloride sandwich construction (PVC-SC) pipe protected by SNAP 110R Retrofit fire collar. The wall system is described as a 90 mm thick plasterboard lined steel framed wall comprising a layer of 13 mm thick Firestop plasterboard on each side of 64 mm deep metal studs with the cavity filled with 11Kg/m³ Glasswool insulation. The wall was constructed in accordance with Boral reference SB60.1A with an established FRL of -/60/60. The SNAP Retrofit 110R fire collar comprised a 0.75-mm steel casing with a 122 mm inner dia. and a 206-mm dia. base flange. The 62-mm high collar casing incorporated a closing mechanism that comprised three soft Intumesh Intumescent wraps and wire meshes lined within internal circumference of the collar. Intumescent A was 2.5-mm thick x 58-mm wide x 424-mm long, Intumescent B was 2.5-mm thick x 58-mm wide x 407-mm long and Intumescent C was 2.5-mm thick x 58-mm wide x 389-mm long. Between intumescent strips A and B was a layer of 304 stainless steel mesh 415-mm long x 58-mm wide and between intumescent strips B and C was a layer of 316 stainless steel mesh 398-mm long x 58-mm wide both had wire mesh dia. of 0.15-mm. Snap collars were surface mounted around the pipe on both exposed and unexposed face of the wall and fixed through 3 mounting brackets using M4 expandable steel anchors. The annular gap between pipe and plasterboard on both sides of the wall was protected with a bead of Fullers Firesound sealant. The penetrating service comprised a 110-mm PVC-SC pipe, with a wall thickness of 3.46 mm fitted through the collar's sleeve. The pipe penetrated the wall through a 114 mm dia. opening and projected horizontally 2000-mm away from unexposed face of the wall and approx. 500 mm into furnace chamber. The pipe was supported at nominally 500 mm, and 1500-mm from unexposed face of the plasterboard wall. The pipe was open on unexposed end and capped on exposed end with a PVC end cap.

Performance observed in respect of the following AS 1530.4-2014 criteria:

Structural Adequacy	not applicable
Integrity	no failure at 61 minutes
Insulation	no failure at 61 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60.

The fire-resistance level is applicable when the system is exposed to fire from either direction. The fire-resistance level (FRL) is limited to that of the separating element. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be recognized that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon

Date of Test: 21 February 2019

Issued on the 7th day of May 2019 without alterations or additions.

Brett Roddy
 Manager, Fire Testing and Assessments

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COPY OF CERTIFICATE OF TEST – NO. 3236



Certificate of Test

No. 3237

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IG6 Pty Ltd as trustee for the IG6 IP Trust
3 Skirmish Court
Victoria Point Qld 4165

A full description of the test specimen and the complete test results are detailed in the Division's report numbered FSP 1985.

Product Name: SNAP 32R Retrofit fire collar protecting a nominal 20mm PEX-b pipe

Description: The specimen comprised an 1150-mm x 1150-mm x 90-mm thick wall penetrated by nom. 20mm PEX-b pipe protected by SNAP 32R Retrofit fire collar. The wall system is described as a 90 mm thick plasterboard lined steel framed wall comprising a layer of 13 mm thick Firestop plasterboard on each side of 64 mm deep metal studs with the cavity filled with 11Kg/m³ Glasswool insulation. The wall was constructed in accordance with Boral reference SB60.1A with an established FRL of -/60/60. The 32R Retrofit collar comprised a 0.75-mm steel casing with a 40 mm inner diameter and a 106 mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 316 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm. The Snap collars were surface mounted around the pipe on both the exposed and unexposed face of the wall and fixed through 3 mounting brackets using M4 expandable steel anchors. The annular gap between the pipe and plasterboard on both sides of the wall was protected with a bead of Fullers Firesound sealant. The penetrating service comprised a 20-mm PEX-b pipe, with a wall thickness of 2.46-mm, penetrating the wall through a 25-mm diameter cut-out hole. The pipes projected horizontally, 2000-mm away from the unexposed face of the wall and approximately 500 mm into the furnace chamber. The pipes were supported at nominally 500-mm and 1500-mm from the unexposed face of the plasterboard wall. The pipes were open at the unexposed and capped with a Superwool plug on the exposed end.

Performance observed in respect of the following AS 1530.4-2014 criteria:

Structural Adequacy	not applicable
Integrity	no failure at 61 minutes
Insulation	no failure at 61 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60.

The fire-resistance level is applicable when the system is exposed to fire from either direction. The fire-resistance level (FRL) is limited to that of the separating element. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be recognized that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon

Date of Test: 21 February 2019

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COPY OF CERTIFICATE OF TEST – NO 3237

References

The following informative documents are referred to in this Report:

- | | |
|----------------|---|
| AS 1530.4-2014 | Methods for fire tests on building materials, components and structures Part 4: Fire-resistance tests of elements of building construction. |
| AS 4072.1-2005 | Components for the protection of openings in fire-resistant separating elements. Part 1: Service penetrations and control joints. |

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