

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

Test Report

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Date: 22 August 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 2024

1 Introduction

1.1 Identification of specimen

The sponsor identified the specimen as four (4) sets of 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 4894/4400

1.7 Test date

The fire-resistance test was conducted on 11 July 2019.

2 Description of specimen

2.1 General

The wall system was described as a 90-mm thick plasterboard lined steel framed wall comprising a single layer of 13-mm thick Boral Firestop plasterboard on each side of 64-mm deep metal studs, with an established FRL of -/60/60, Boral system reference SB60.1.

The wall was penetrated by four (4) services and protected by various first stopping systems.

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 7671:2010 Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings — Polypropylene (PP).

Specimen 1 - SNAP 50R Retrofit fire collar protecting a nominal 40-mm polypropylene (Raupiano Plus) 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 Intumesh 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 around the pipe and plasterboard on both sides of the wall was filled with a bead H.B Fullers Firesound sealant.

The penetrating service comprised a 40.2-mm outside diameter polypropylene pipe, with a wall thickness of 2.21-mm which penetrated the wall through a 40-mm diameter cut-out hole as shown in drawing titled “Specimen #1, 40 Raupiano Stack & 50R”, dated 26 June 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 a Superwool plug on the exposed end.

Specimen 2 - SNAP 50R Retrofit fire collar protecting a nominal 40-mm polypropylene (Triplus) 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 Intumesh 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 38-mm (10g) coarse thread laminating screws.

The annular gap around the pipe and plasterboard on both sides of the wall was filled with a bead H.B Fullers Firesound sealant.

The penetrating service comprised a 40.2-mm outside diameter polypropylene pipe, with a wall thickness of 2.1-mm which penetrated the wall through a 40-mm diameter cut-out hole as shown in drawing titled "Specimen #2, 40 Triplus Stack & 50R", dated 26 June 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 polypropylene end cap on the exposed end.

Specimen 3 - SNAP 110R Retrofit fire collar protecting a nominal 110-mm polypropylene (Raupiano Plus) 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 316 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 fire 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 around the pipe and plasterboard on both sides of the wall was filled with a bead H.B Fullers Firesound sealant.

The penetrating service comprised a 110.5-mm outside diameter polypropylene pipe, with a wall thickness of 3.13-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, 110 Raupiano Stack & 110R", dated 26 June 2019, provided by Snap Fire Systems Pty Ltd. The pipe was open at the unexposed end and capped with a Superwool plug on the exposed end.

Specimen 4 - SNAP 110R Retrofit fire collar protecting a nominal 110-mm Polypropylene (Triplus) 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 316 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 fire 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 around the pipe and plasterboard on both sides of the wall was filled with a bead H.B Fullers Firesound sealant.

The penetrating service comprised a 110-mm outside diameter polypropylene pipe, with a wall thickness of 3.43-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 #4, 110 Triplus Stack & 110R”, dated 26 June 2019, provided by Snap Fire Systems Pty Ltd. The pipe was open on the unexposed end and capped on the exposed end with a polypropylene end cap.

2.2 Dimensions

The wall specimen was 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 was delivered on 25 June 2019 and left under standard laboratory atmospheric conditions until the test date.

2.5 Selection, construction and installation of the specimen and the supporting construction

The supporting wall construction and specimen installation was organised by the sponsor. CSIRO was not involved in the selection of the materials.

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-D Layout”, dated 26 June 2019.
- Drawing titled “Specimen #1, 40 Raupiano Stack & 50R”, dated 26 June 2019, by Snap Fire Systems Pty Ltd.
- Drawing titled “Specimen #2, 40 Triplus Stack & 50R”, dated 26 June 2019, provided by Snap Fire Systems Pty Ltd.
- Drawing titled “Specimen #3, 110 Raupiano Stack & 110R”, dated 26 June 2019, provided by Snap Fire Systems Pty Ltd.
- Drawing titled “Specimen #4, 110 Triplus Stack & 110R”, dated 26 June 2019, provided by Snap Fire Systems Pty Ltd.
- Drawing titled “SNAP 110 Retro”, dated 16 January 2019, by Snap Fire Systems Pty Ltd.
- Drawing titled “SNAP 50 Retro”, dated 18 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 16°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 91 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 the end of pipe of Specimen 2.
4 minutes -	Smoke is fluing from the end of pipes of Specimens 3 and 4. The level of smoke fluing from Specimen 2 has reduced.
5 minutes -	The glow of the furnace is visible down the pipe of Specimen 4, prior to intumescent closing off the pipe.
6 minutes -	The base of pipe near the collar of Specimen 3 has distorted. Smoke has ceased fluing from Specimen 2.
8 minutes -	The base of pipe near the collar of Specimen 4 has distorted. The level of smoke fluing from Specimen 4 has reduced.
11 minutes -	The level of smoke fluing from end of Specimens 2 and 3 has almost ceased.
15 minutes -	Smoke has ceased fluing from Specimen 2. Specimens 3 and 4 continue to flue.
20 minutes -	Smoke has ceased fluing from Specimen 4. Smoke continues fluing from the end of the pipe of Specimens 3.
23 minutes -	Smoke is being emitted from the base of Specimen 4.
27 minutes -	Light smoke is fluing from the ends of pipes of Specimens 3 and 4.
30 minutes -	Light smoke is being emitted from the base of Specimens 3 and 4.
40 minutes -	Smoke is fluing from the end of the pipe of Specimen 4 has increased.
49 minutes -	Liquid is dripping out from the end of the pipe of Specimen 4.
58 minutes -	The base of the pipe inside the collar of Specimen 4 has melted and smoke has resumed being emitted from the collar.
60 minutes -	A red glow in to the furnace can be seen through the collar. Cotton wool pad test applied between the pipe and collar. No ignition noted at this time.
62 minutes -	Intumescent material from the outside collar of Specimen 4 has begun to swell. Light smoke has resumed fluing from the end of pipe of Specimen 4.
66 minutes -	<u>Insulation Failure of Specimen 4</u> – maximum temperature rise of 180K is exceeded on the plasterboard 25-mm above the collar of Specimen 4. The pipe inside the collar of Specimen 2 has started to melt and a red glow in to the furnace can be seen through the collar.

- 68 minutes - Cotton wool pad test applied between the pipe and collar of Specimen 2. No ignition noted at this time.
- 71 minutes - Insulation Failure of Specimen 2 – maximum temperature rise of 180K is exceeded on top of the pipe 25-mm from the collar of Specimen 2.
- 71 minutes - The unexposed face of the plasterboard wall has begun discolouring with charring around screw heads visible.
- 74 minutes - Insulation Failure of Specimen 3 – maximum temperature rise of 180K is exceeded on the plasterboard 25-mm above the collar of Specimen 3.
- 75 minutes - Cotton wool pad test applied between the pipe and collar of Specimen 2. No ignition noted at this time.
- 76 minutes - Insulation Failure of Specimen 1 – maximum temperature rise of 180K is exceeded on the plasterboard 25-mm above the collar of Specimen 1.
- 91 minutes - Smoke is being emitted from the base of Specimens 1 and 4.
- 92 minutes - 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 40-mm polypropylene (Raupiano Plus) pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 91 minutes
Insulation	-	76 minutes

Specimen 2 - SNAP 50R Retrofit fire collar protecting a nominal 40-mm polypropylene (Triplus) pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 91 minutes
Insulation	-	71 minutes

Specimen 3 - SNAP 110R Retrofit fire collar protecting a nominal 110-mm polypropylene (Raupiano Plus) pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 91 minutes
Insulation	-	74 minutes

Specimen 4 - SNAP 110R Retrofit fire collar protecting a nominal 110-mm Polypropylene (Triplus) pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 91 minutes
Insulation	-	66 minutes

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, 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's of the test specimens were as follows:

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 test was conducted on a wall system with an established FRL of -/60/60. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it was installed.

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 10.11 of AS 1530.4-2014, have been made provided no individual component is removed or reduced.

11 Tested by

A handwritten signature in blue ink, appearing to read 'Peter Gordon', with a stylized flourish at the end.

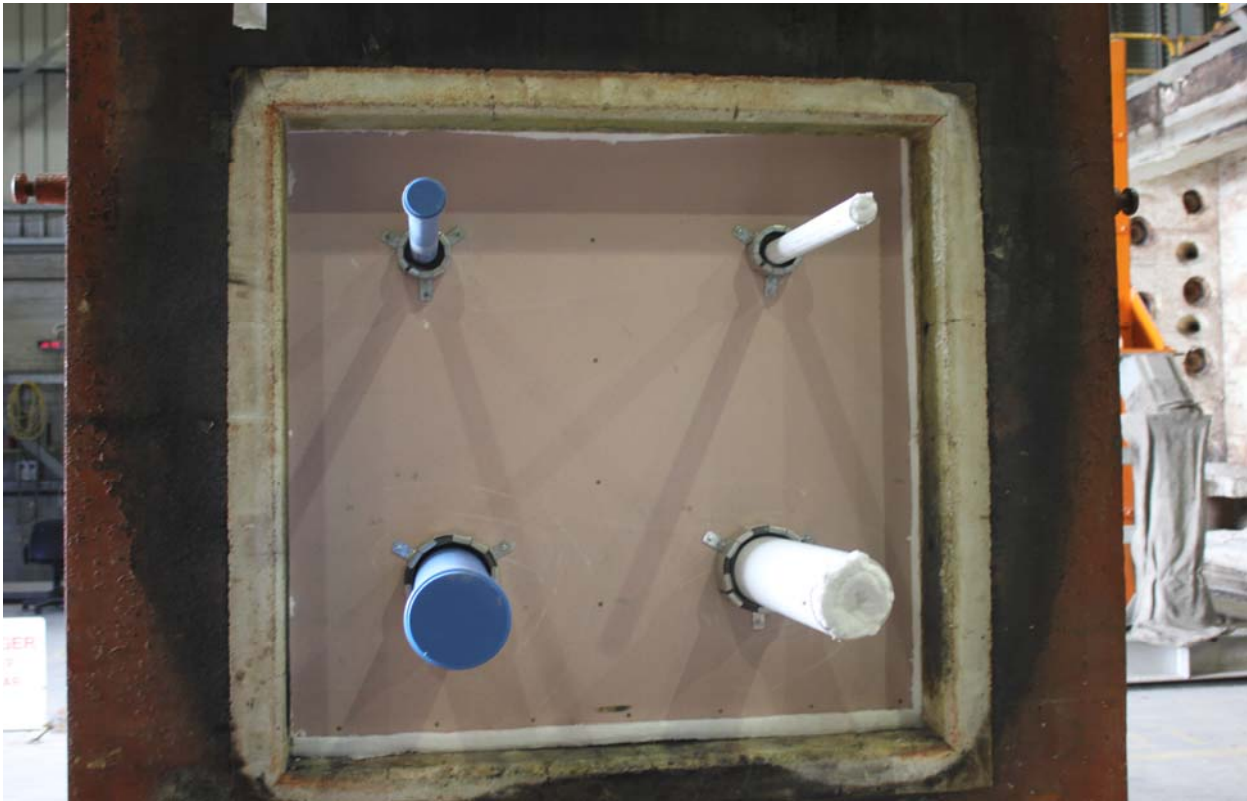
Peter Gordon
Testing Officer

Appendices

Appendix A – Measurement location

Specimen	T/C Position	T/C designation
SPECIMEN 1 – 40.18-mm OD Rehau pipe Raupiano Plus (polypropylene) with a wall thickness of 2.21-mm protected with Snap 50R Fire collars retro-fitted to both sides of the wall. Hole size: 40-mm; Service: annular gap sealed seal with a bead of Firesound sealant.	On P/B, 25 mm above collar	S1
	On P/B, 25 mm right of collar	S2
	On collar top	S3
	On collar right side	S4
	On pipe right side, 25-mm from collar	S5
	On bottom of pipe, 25-mm from collar	S6
SPECIMEN 2 – 40.2-mm OD Triplus pipe (polypropylene) having a wall thickness of 2.1-mm, protected with Snap 50R Fire collars retro-fitted to both sides of the wall. Hole size: 40-mm; Service: annular gap sealed seal with a bead of Firesound sealant.	On P/B, 25 mm above collar	S7
	On P/B, 25 mm below collar	S8
	On collar top	S9
	On collar bottom	S10
	On top of pipe, 25-mm from collar	S11
	On bottom of pipe, 25-mm from collar	S12
SPECIMEN 3 – 110-mm OD Rehau-Raupiano Plus pipe (polypropylene), having a wall thickness of 3.13-mm protected with Snap 110R Fire collars retro-fitted to both sides of the wall. Hole size: 114-mm; Service: annular gap sealed seal with a bead of Firesound sealant.	On P/B, 25 mm above collar	S13
	On P/B, 25 mm right of collar	S14
	On collar top	S15
	On collar bottom right side	S16
	On top of pipe, 25-mm from collar	S17
	On pipe right side 25-mm from collar	S18
SPECIMEN 4 – 110-mm OD Triplus pipe (polypropylene) having a wall thickness of 3.43-mm protected with Snap 110R Fire collars retro-fitted to both sides of the wall. Hole size: 114-mm; Service: annular gap sealed seal with a bead of Firesound sealant.	On P/B, 25 mm above collar	S19
	On P/B, 25 mm left of collar	S20
	On collar top	S21
	On collar left side	S22
	On pipe top side, 25-mm from collar	S23
	On pipe left side, 25-mm from collar	S24
Rover		S25
Ambient		S26

Appendix B – Photographs



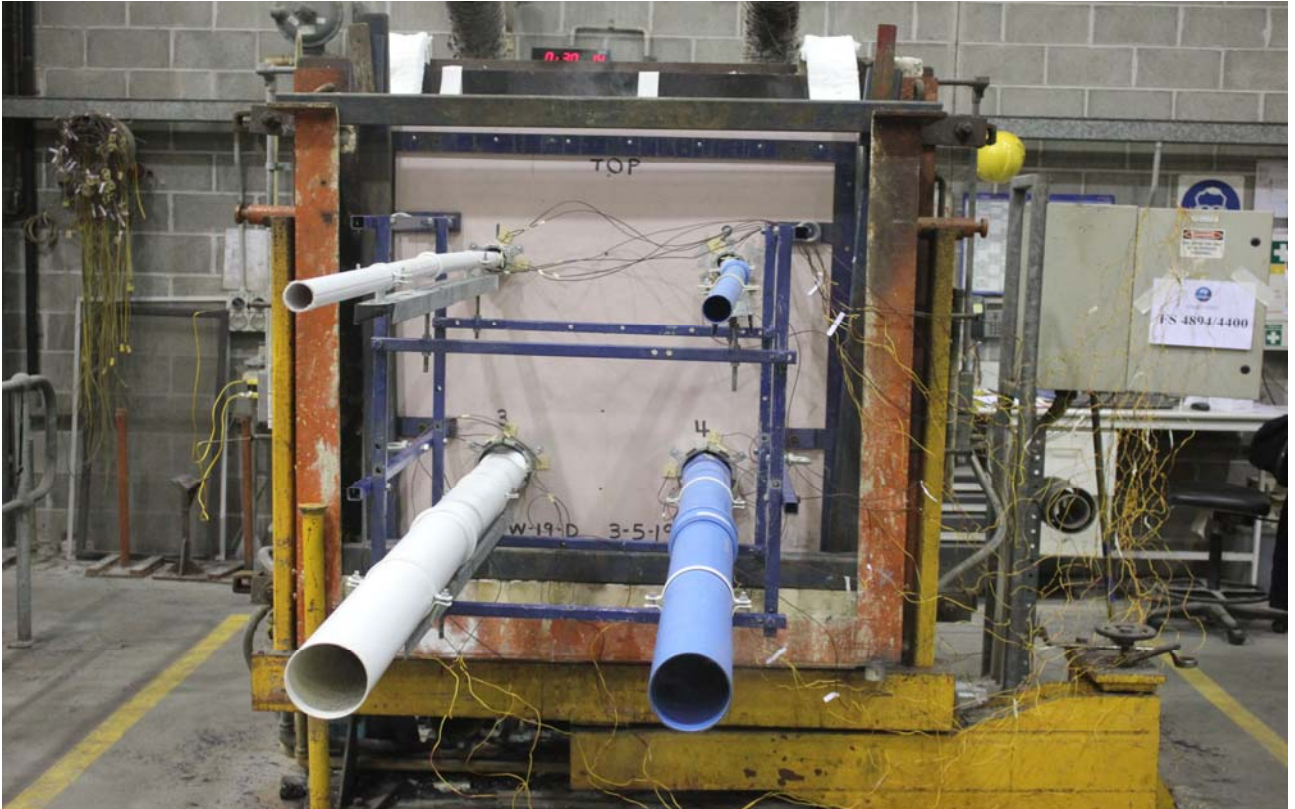
PHOTOGRAPH 1 – EXPOSED FACE OF SPECIMENS PRIOR TO TESTING



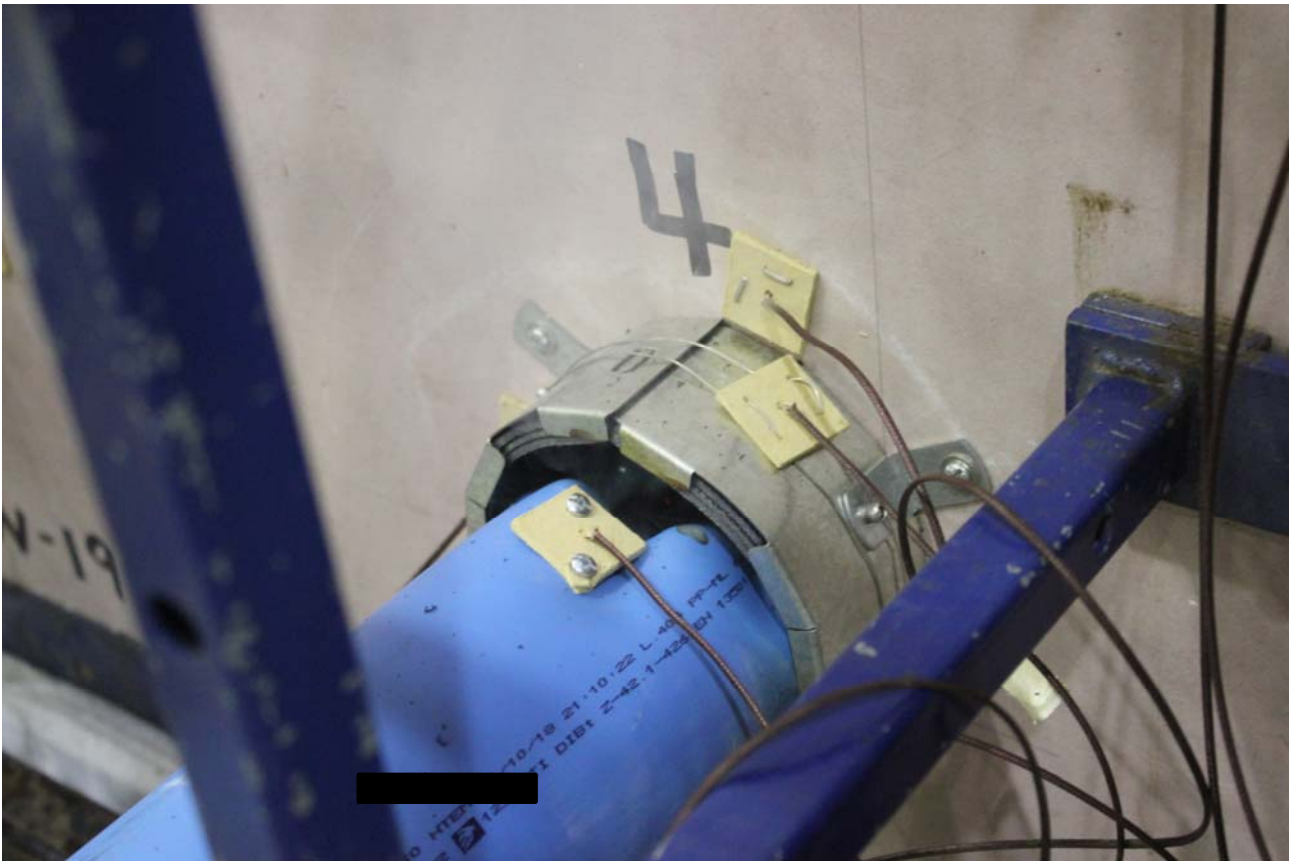
PHOTOGRAPH 2 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING



PHOTOGRAPH 3 – SPECIMENS 3 AND 4 AFTER 4 MINUTES OF TESTING



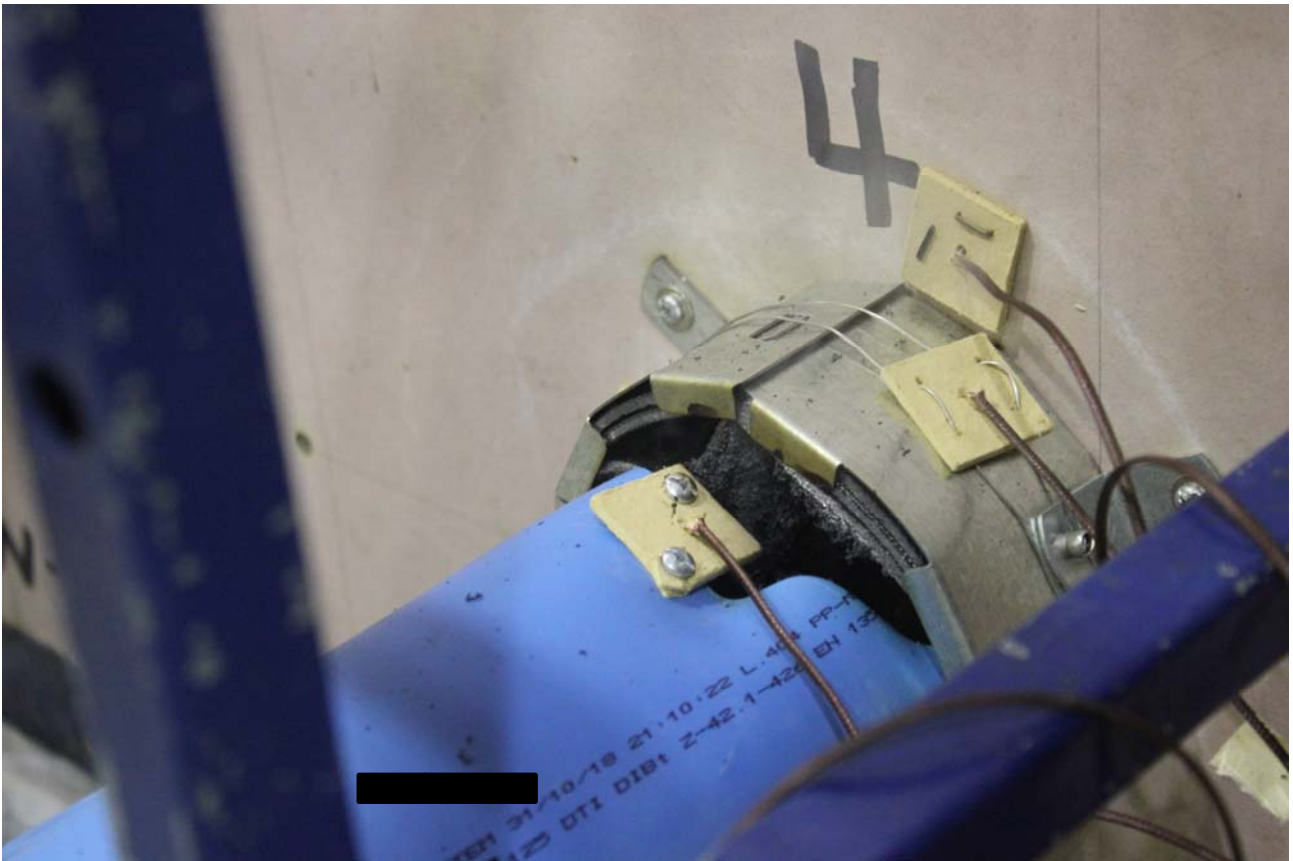
PHOTOGRAPH 4 – SPECIMENS AFTER 30 MINUTES OF TESTING



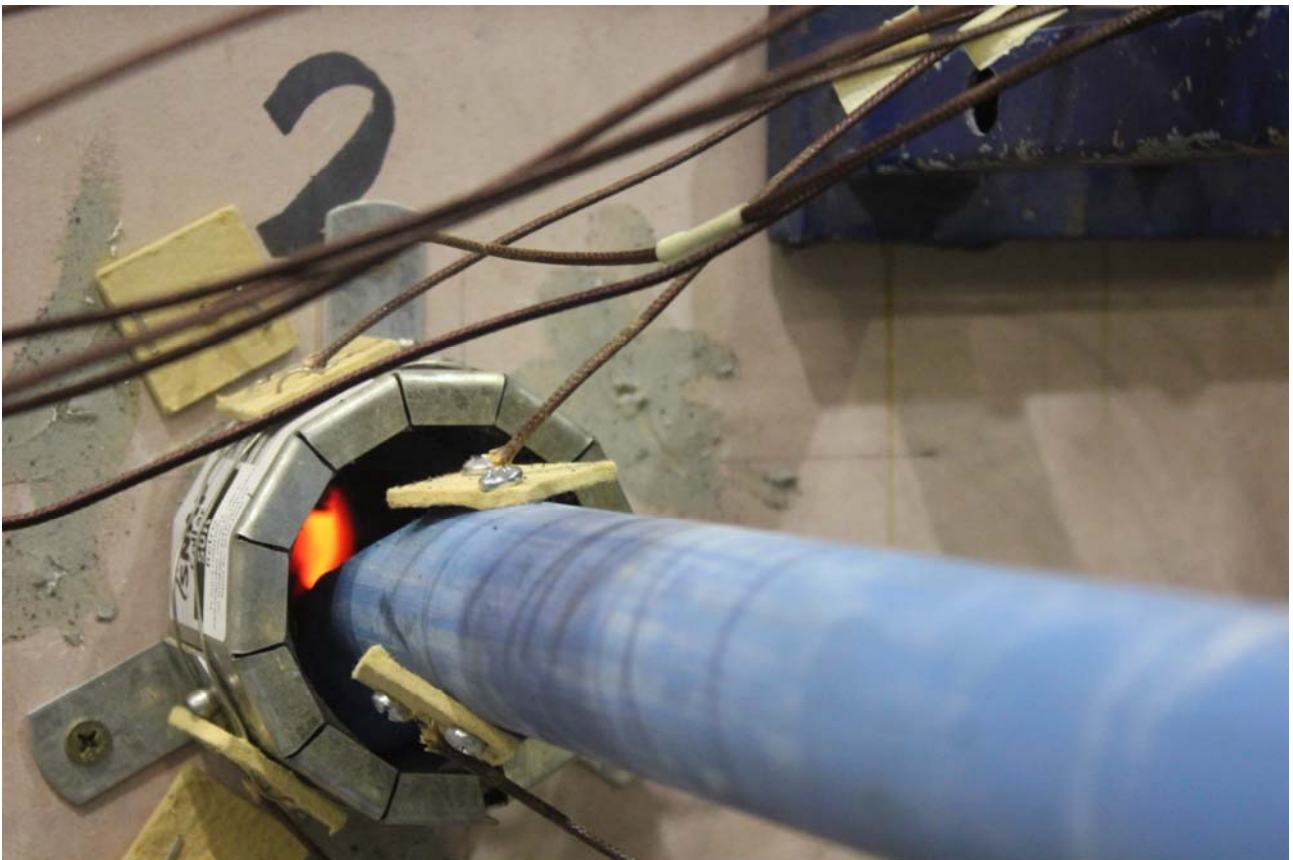
PHOTOGRAPH 5 – SPECIMEN 4 AFTER 58 MINUTES OF TESTING



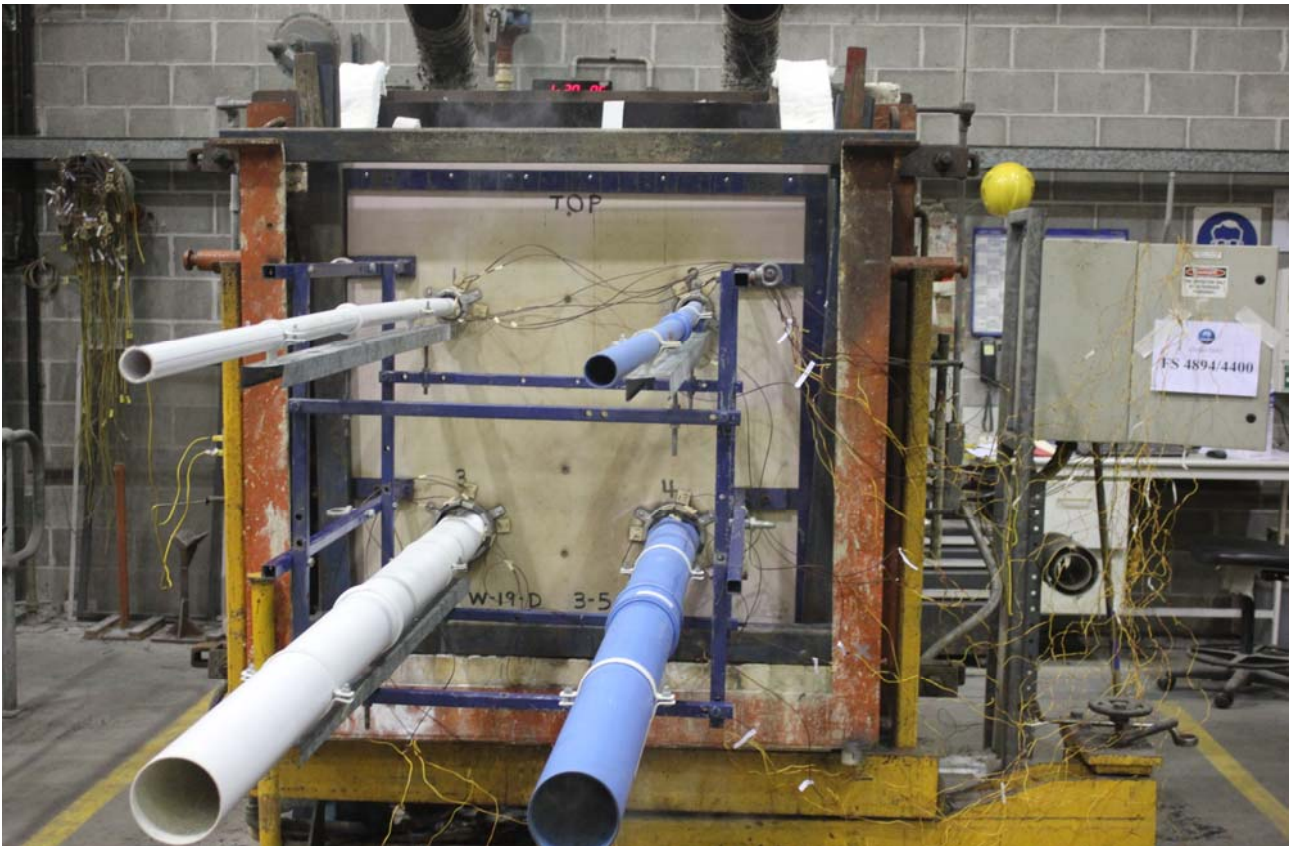
PHOTOGRAPH 6 – SPECIMENS AFTER 60 MINUTES OF TESTING



PHOTOGRAPH 7 – SPECIMEN 4 AFTER 62 MINUTES OF TESTING



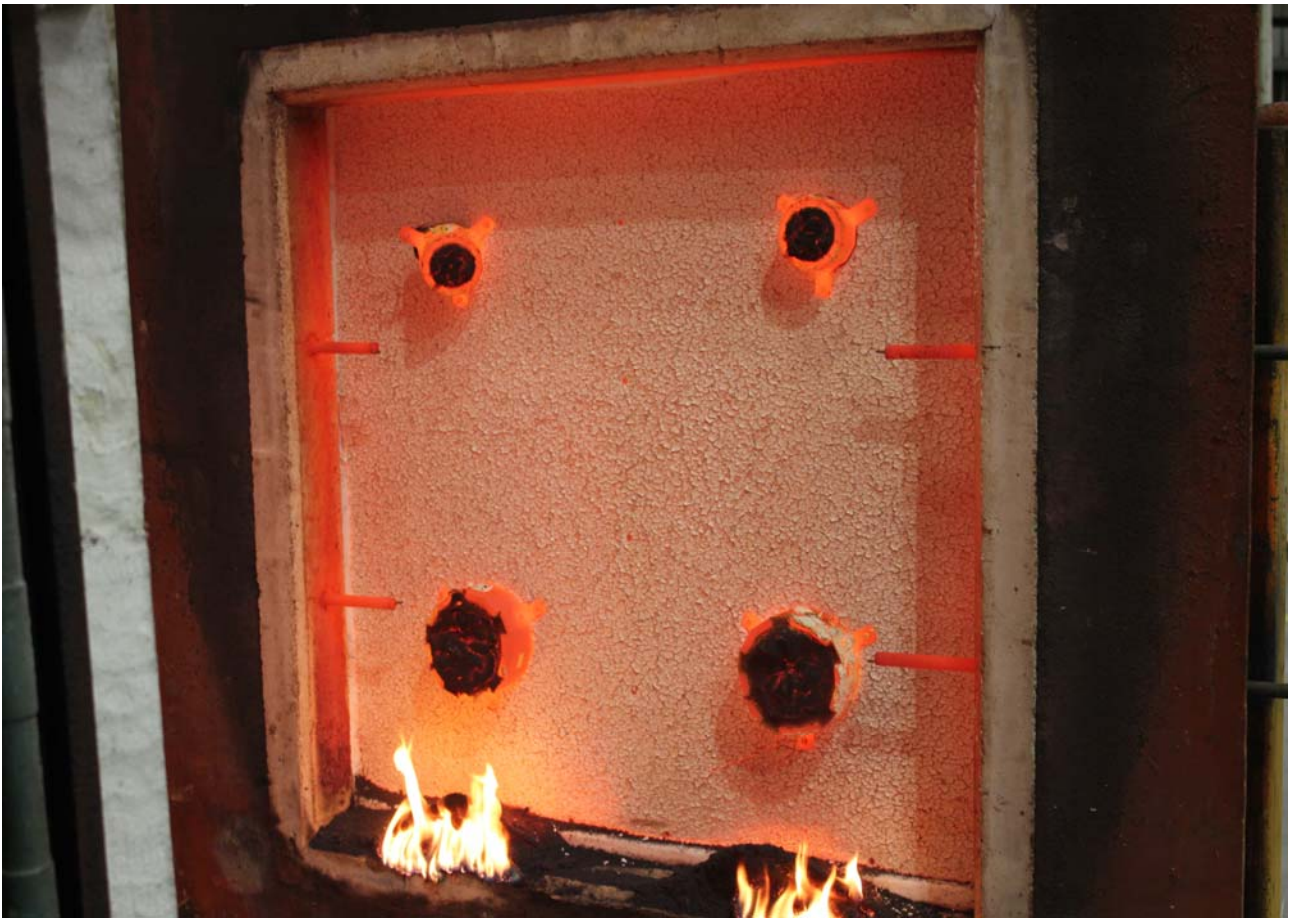
PHOTOGRAPH 8 – SPECIMEN 2 AFTER 68 MINUTES OF TESTING



PHOTOGRAPH 9 – SPECIMENS AFTER 90 MINUTES OF TESTING



PHOTOGRAPH 10 – SPECIMENS AT CONCLUSION OF TESTING



PHOTOGRAPH 11 – EXPOSED FACE OF SPECIMENS AT CONCLUSION OF TESTING

Appendix C – Furnace Temperature

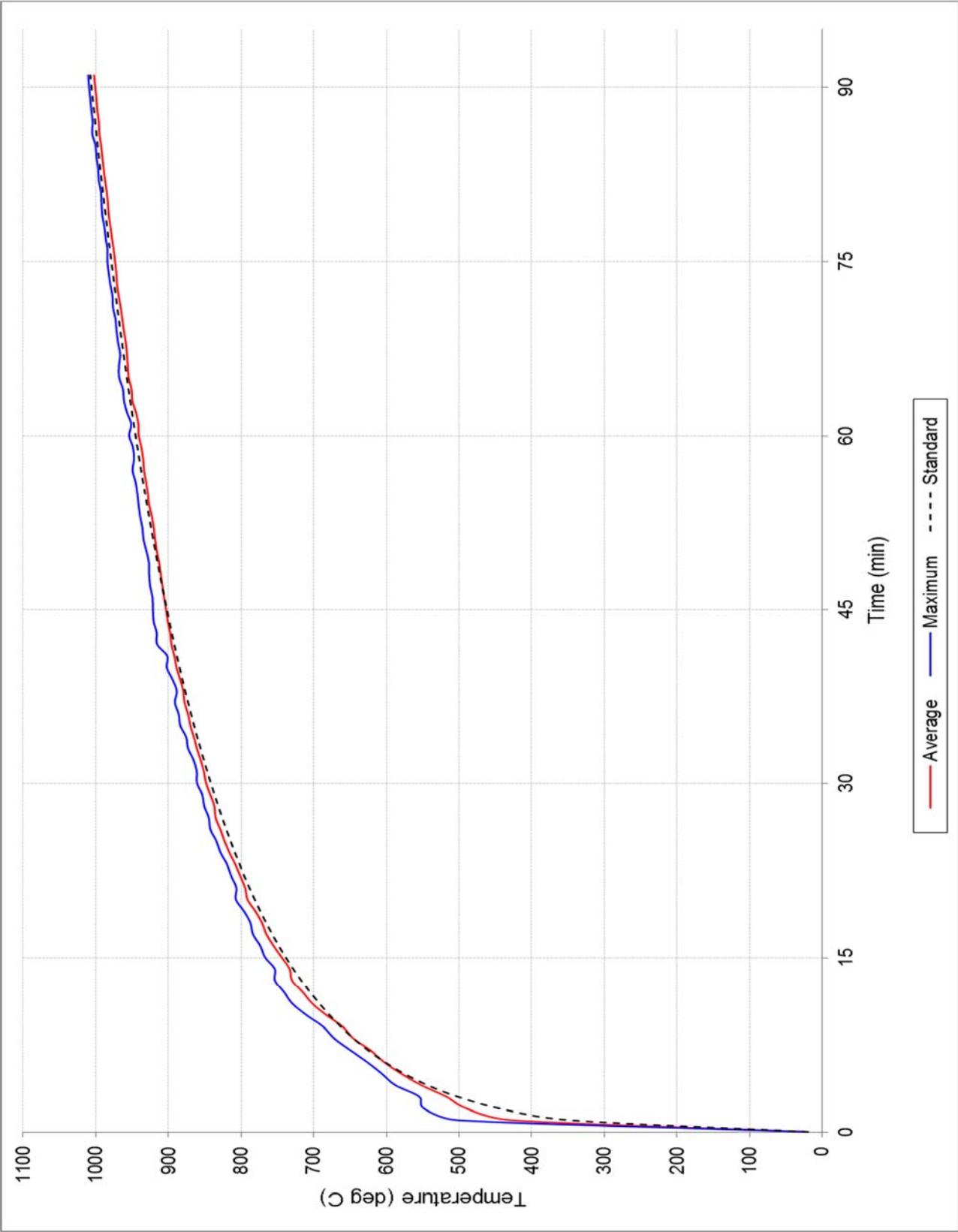


FIGURE 1 – FURNACE TEMPERATURE

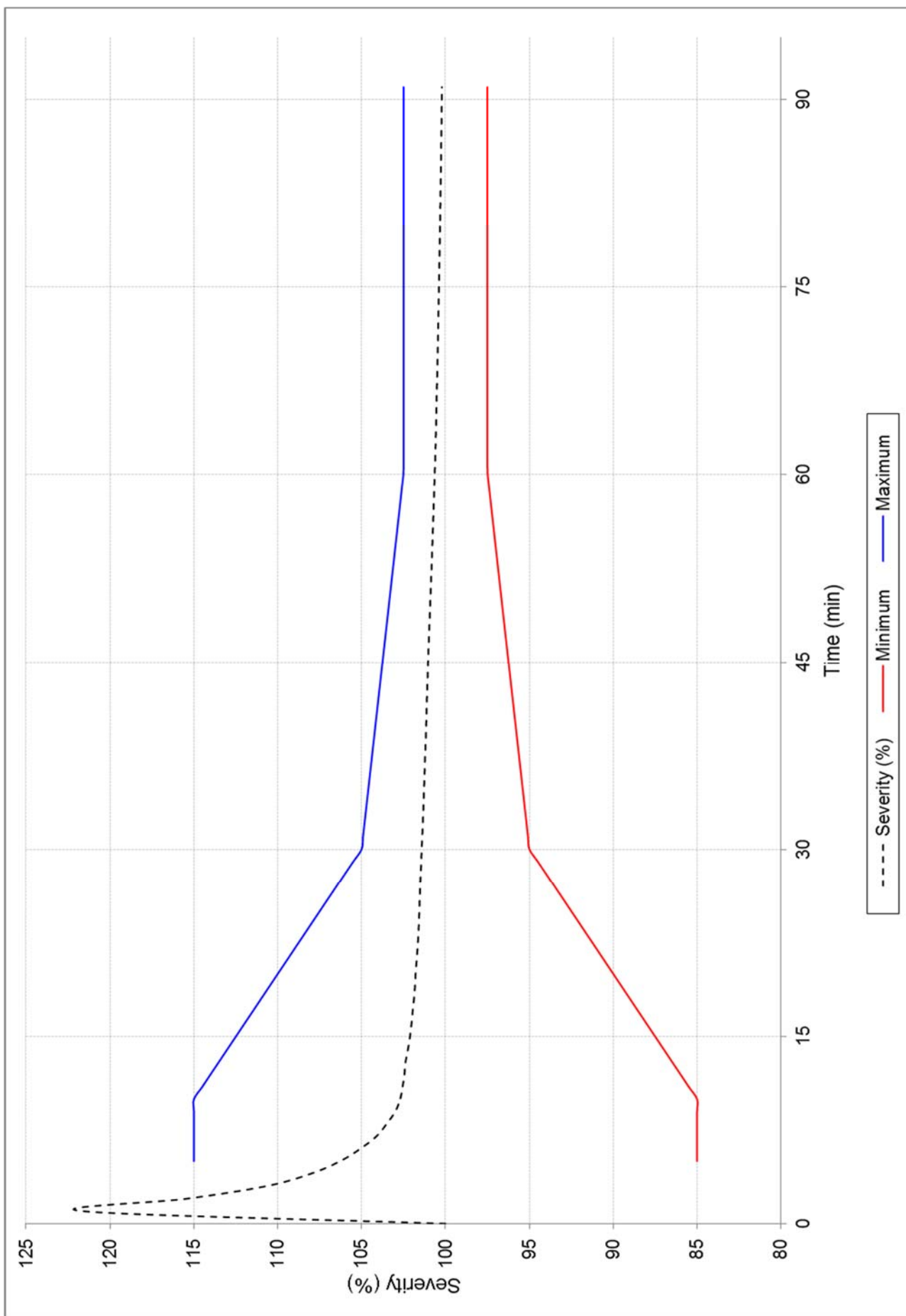


FIGURE 2 – FURNACE SEVERITY

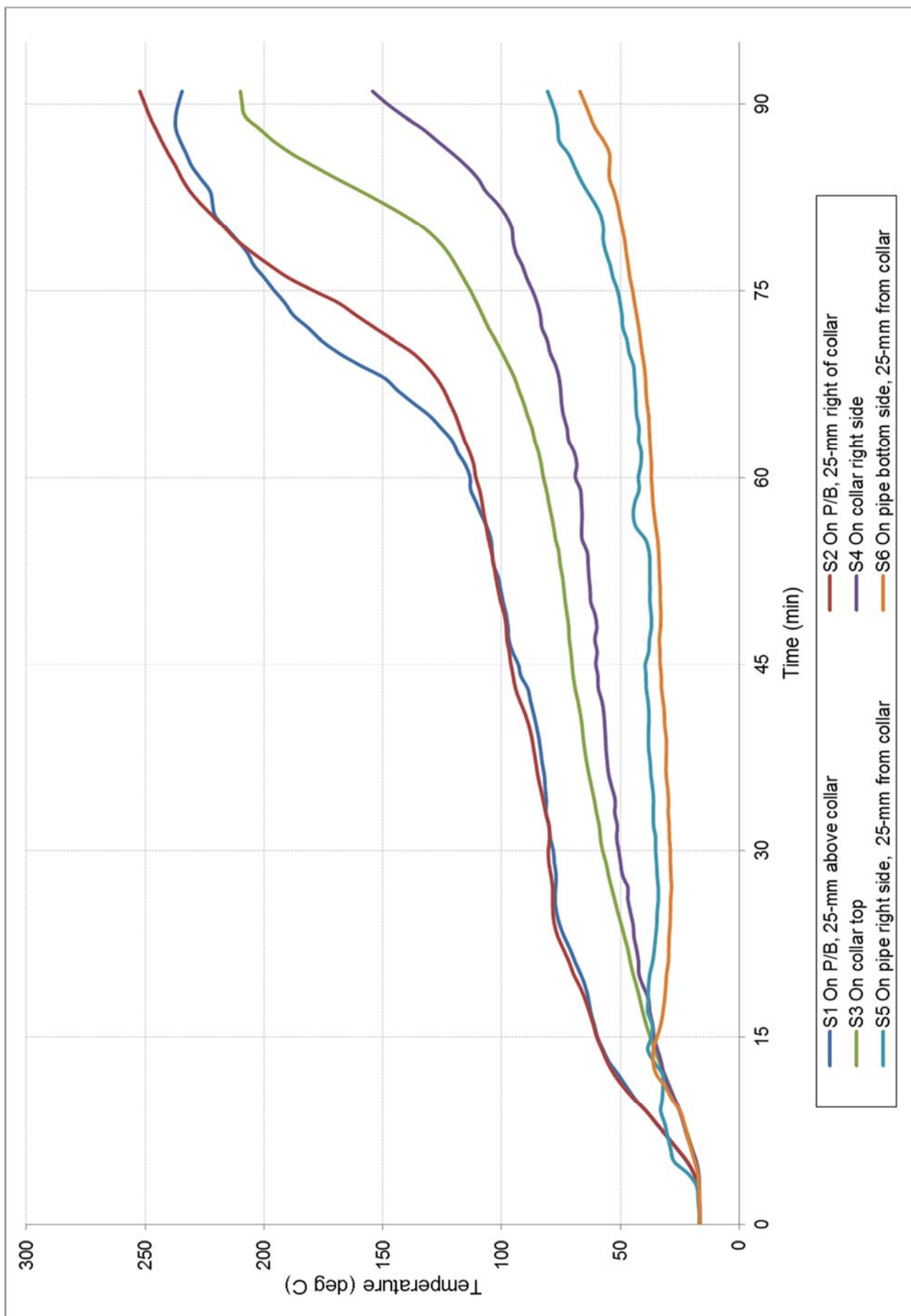


FIGURE 3 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 1

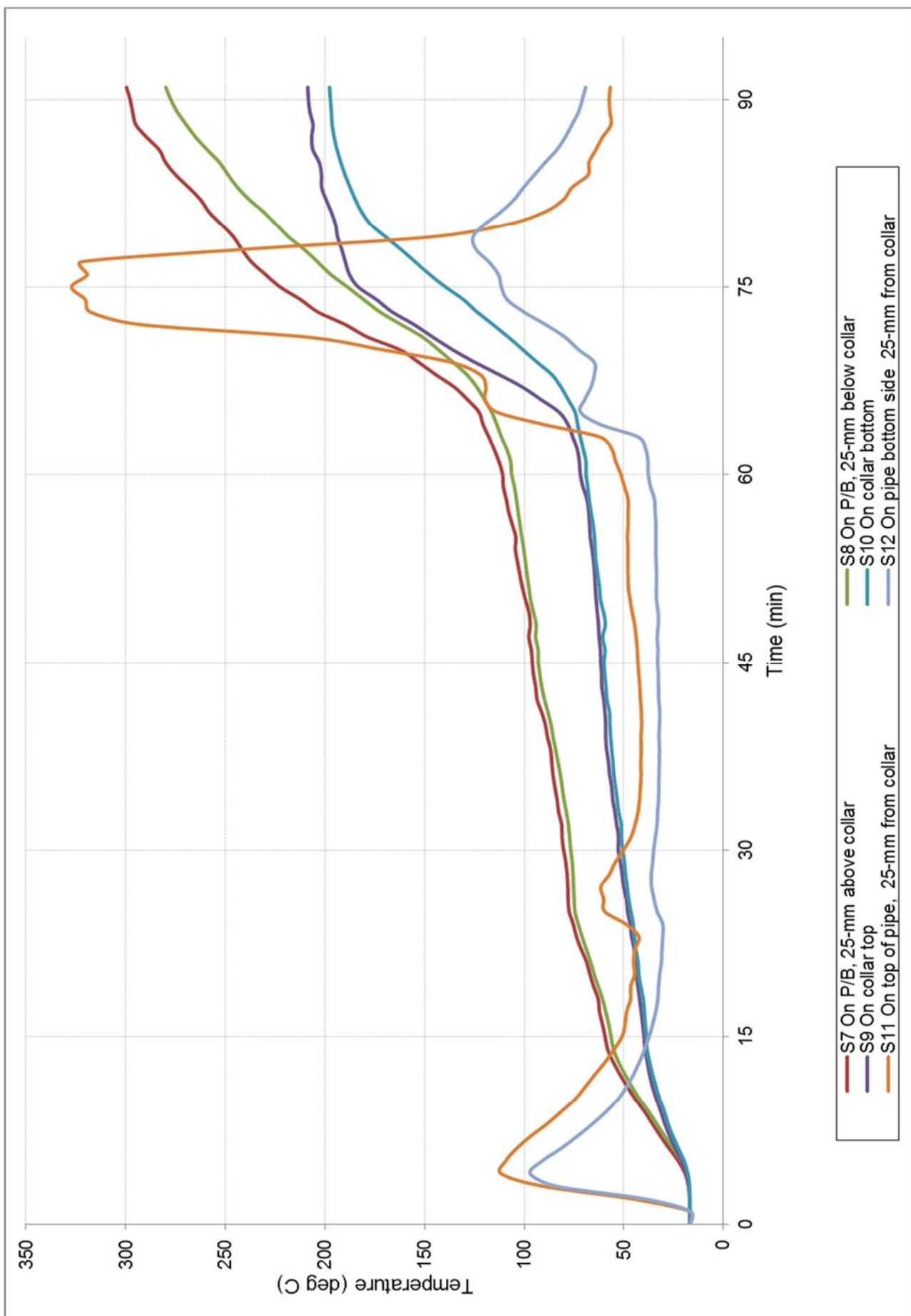


FIGURE 4 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 2

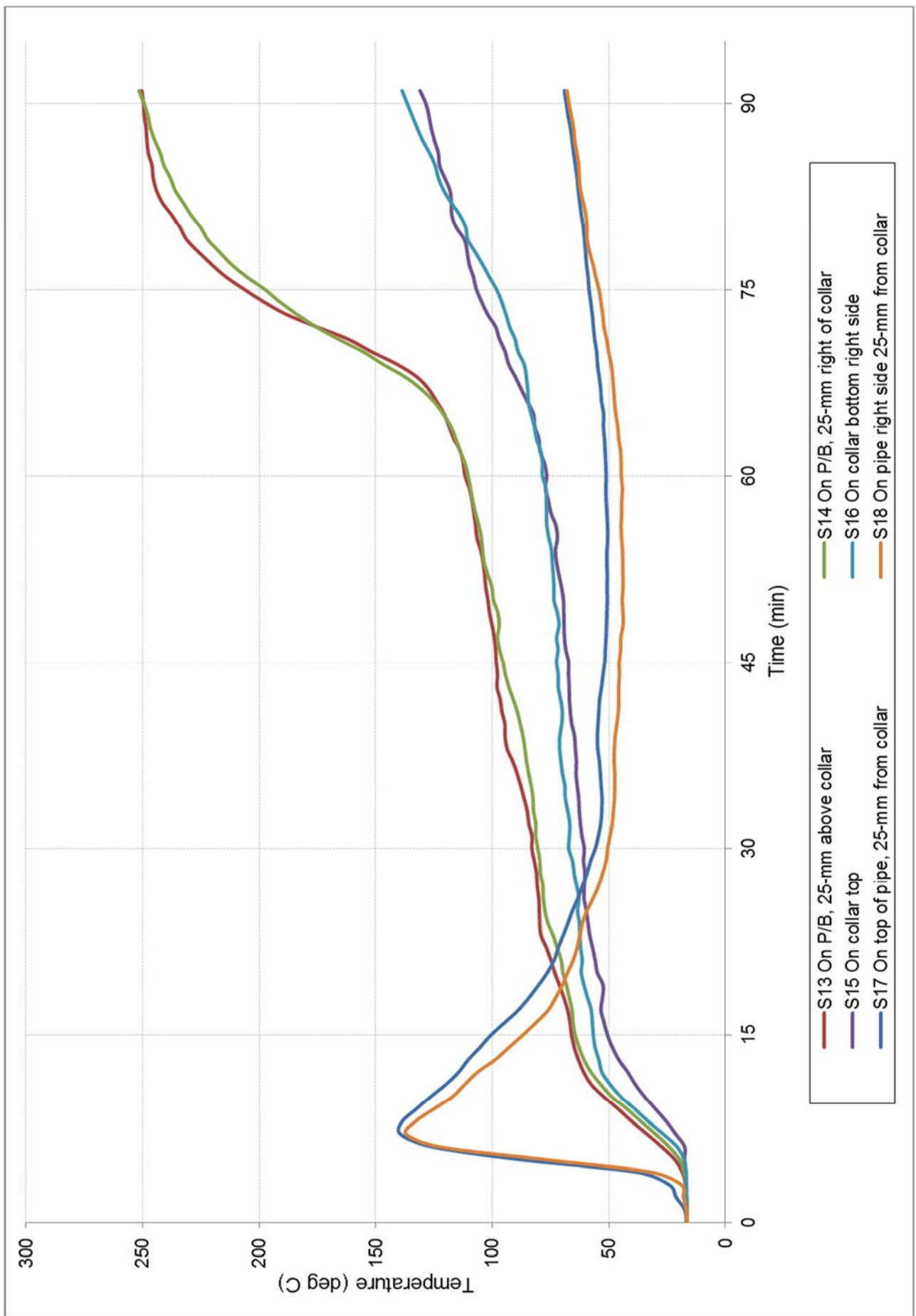


FIGURE 5 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 3

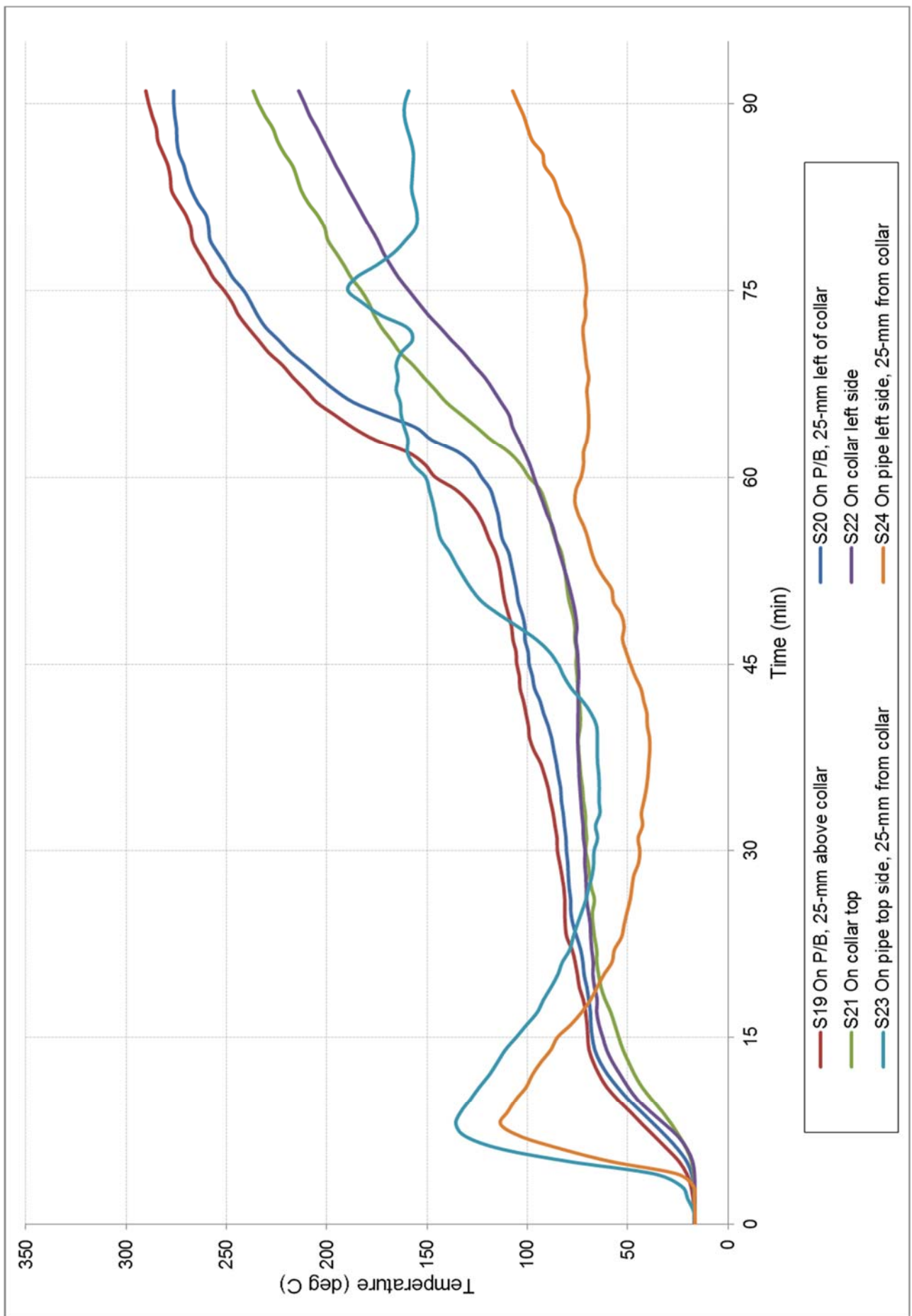
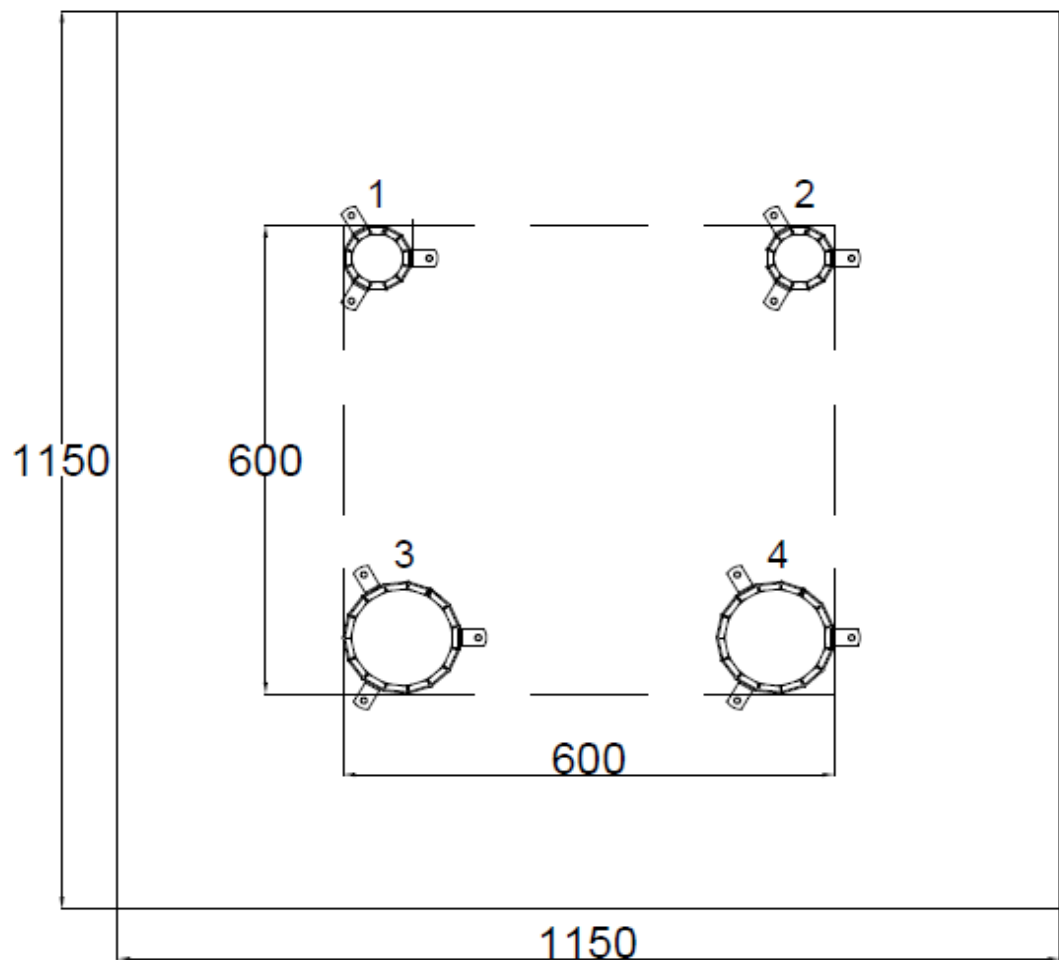


FIGURE 6 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 4

Appendix D – Layout and installation drawings

Snap Fire Systems Pty Ltd
Test Wall W-19-D Layout
Date: 26 JUN 2019



Penetration	Collar Code	Pipe Type	Pipe Diameter (mm)	Sealant
1	50R	Raupiano	40	Firesound
2	50R	Triplus	40	Firesound
3	110R	Raupiano	110	Firesound
4	110R	Triplus	110	Firesound

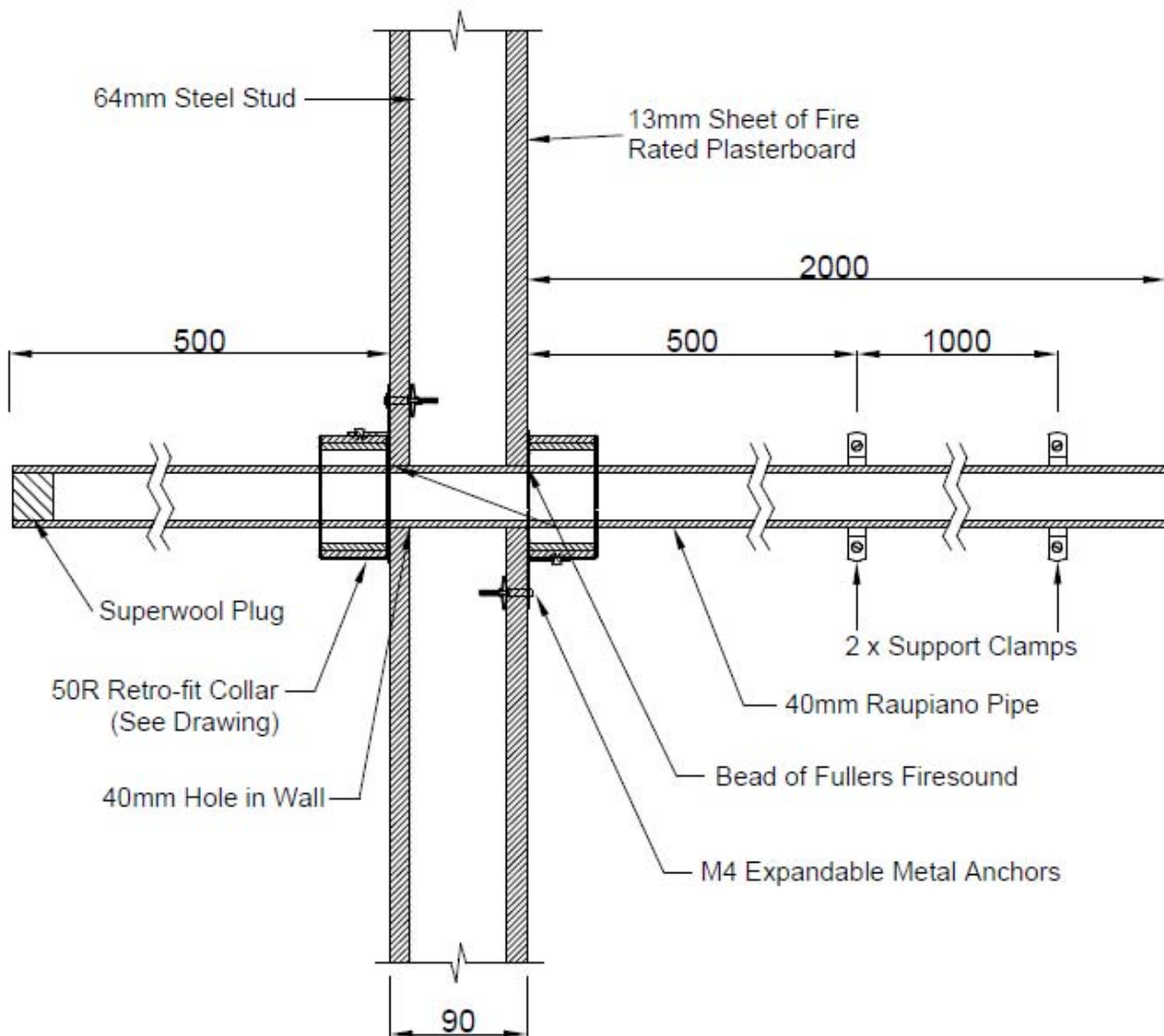
DRAWING TITLED “TEST WALL W-19-D LAYOUT, DATED 26 JUNE 2019, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD.

Snap Fire Systems Pty Ltd

Specimen #1

40 Raupiano Stack & 50R

Date: 26 JUNE 2019



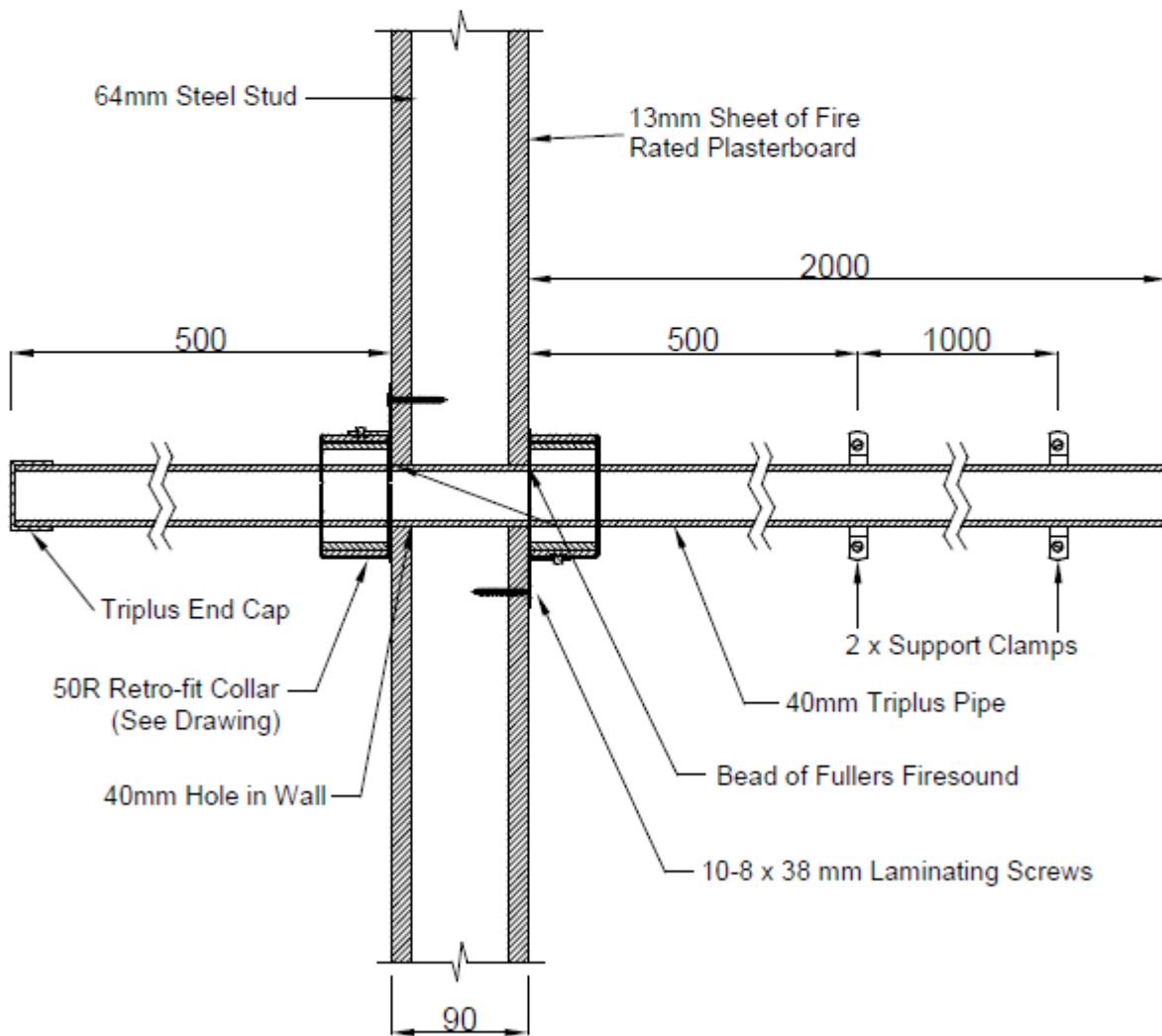
**DRAWING TITLED "SPECIMEN # 1, 40 RAUPIANO STACK PIPE & 50R", DATED 26 JUNE 2019, PROVIDED BY
SNAP FIRE SYSTEMS PTY LTD**

Snap Fire Systems Pty Ltd

Specimen #2

40 Triplus Stack & 50R

Date: 26 JUNE 2019



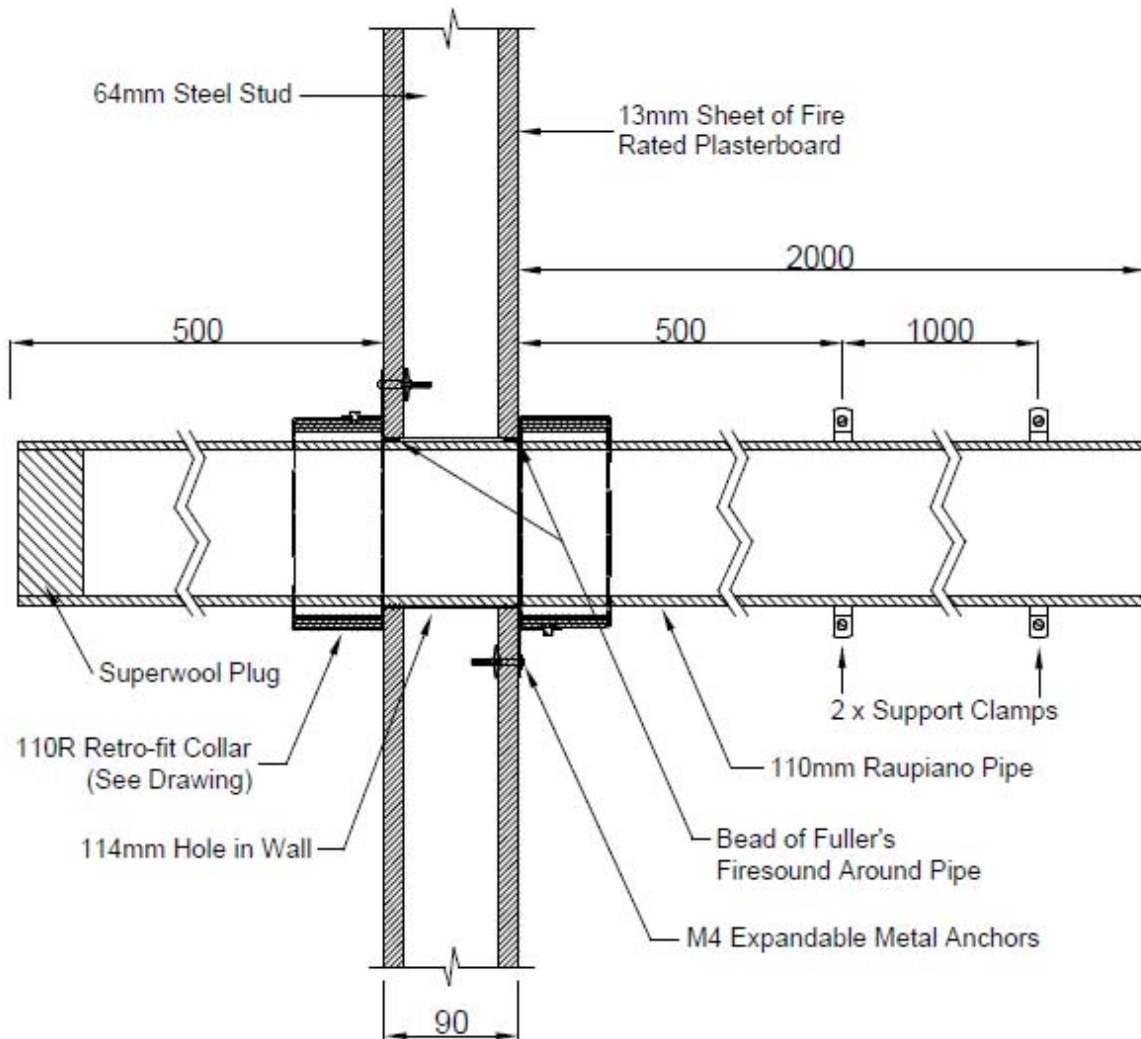
DRAWING TITLED "SPECIMEN # 2, 40 TRIPLUS STACK & 50R", DATED 26 JUNE 2019, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #3

110 Raupiano Stack & 110R

Date: 26 JUN 2019



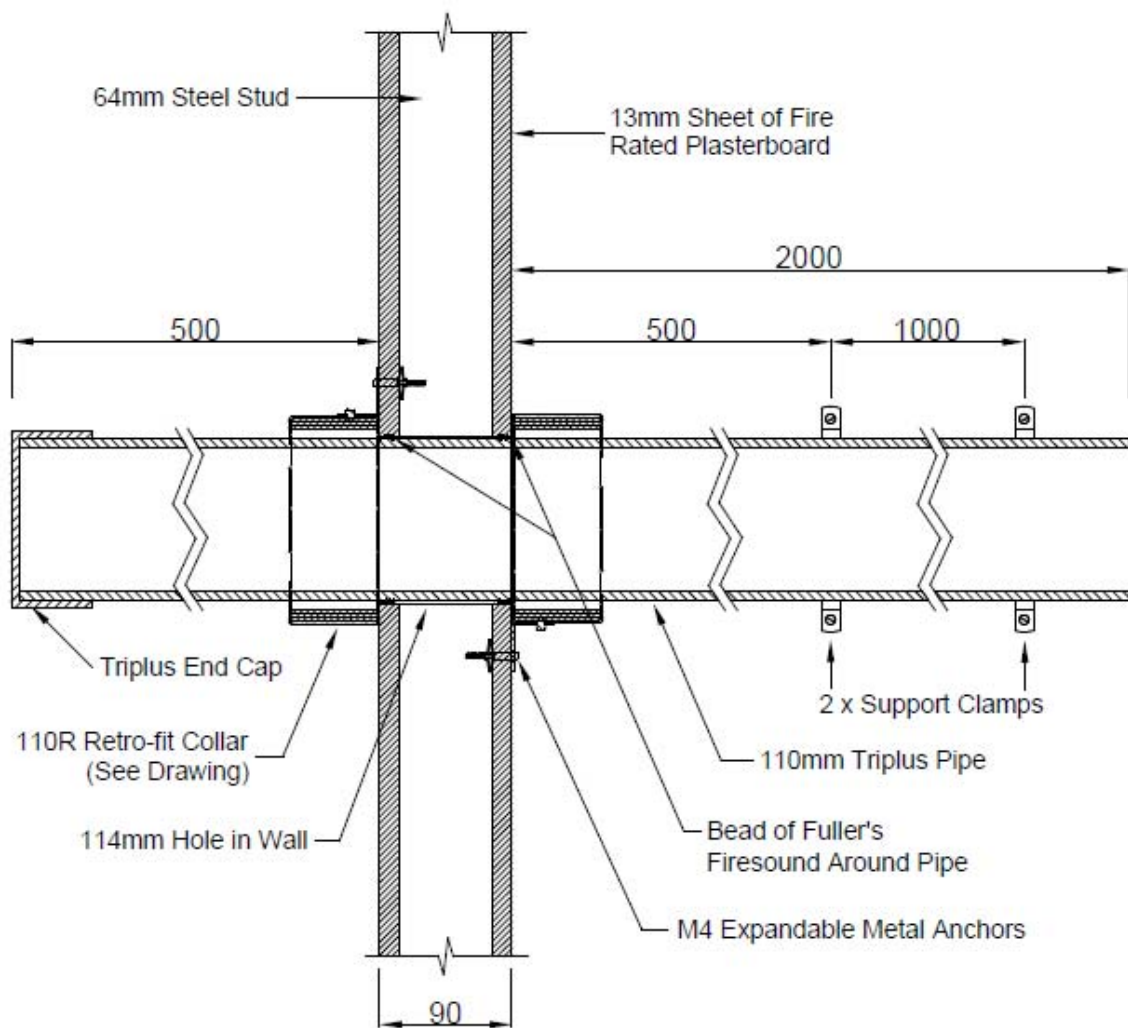
DRAWING TITLED "SPECIMEN # 3, 110 RAUPIANO STACK & 110R", DATED 26 JUNE 2019, PROVIDED BY
SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #4

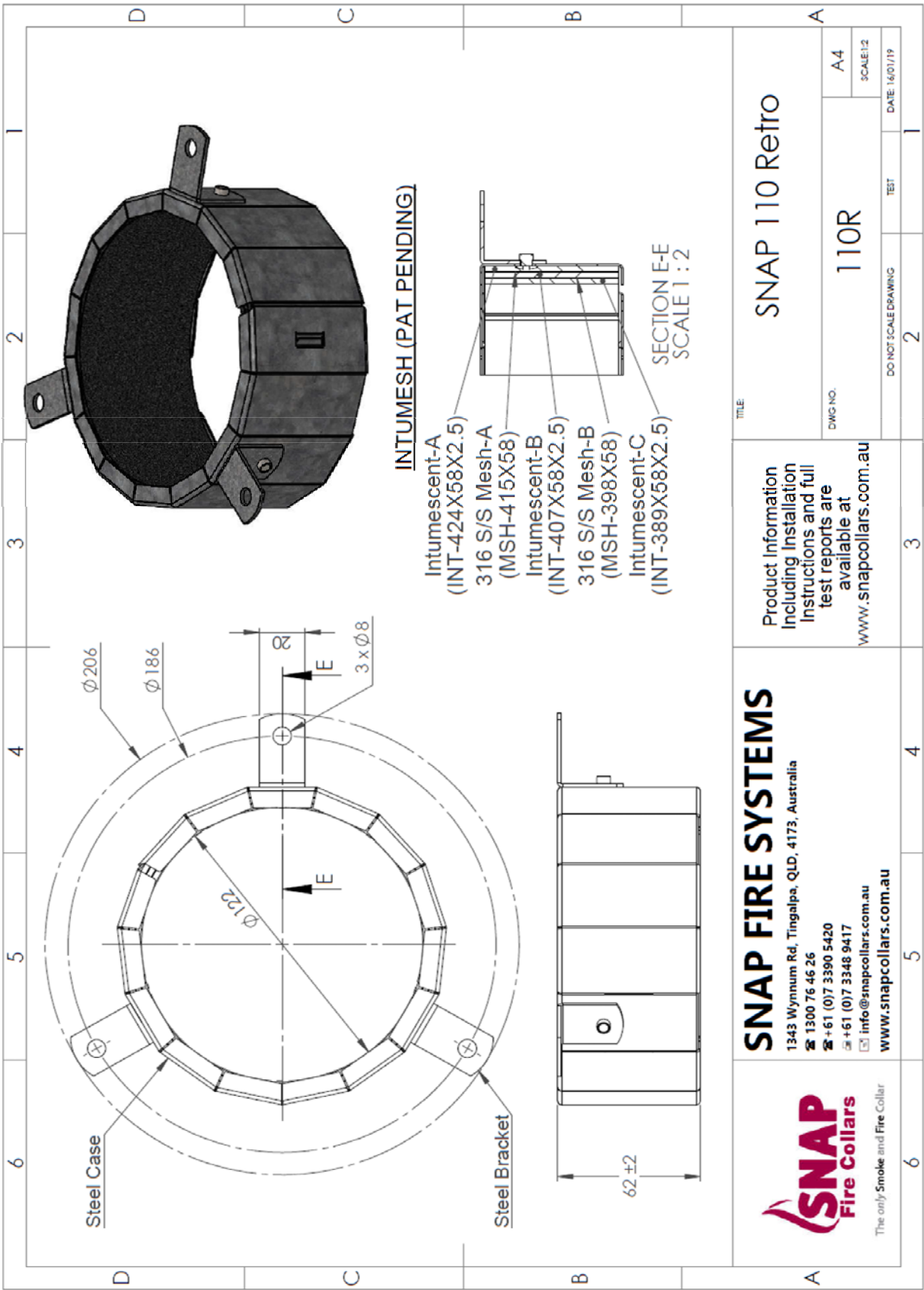
110 Triplus Stack & 110R

Date: 26 JUN 2019



DRAWING TITLED "SPECIMEN # 4, 110 TRIPLUS STACK & 110R", DATED 26 JUNE 2019, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Appendix E – Specimen Drawings



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

Appendix F – 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. 3306											
<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 2024.</p> <p>Product Name: SNAP 50R Retrofit fire collar protecting a nominal 40-mm polypropylene (Raupiano Plus) pipe (Specimen 1)</p> <p>Description: The wall system was described as a 90 mm thick plasterboard lined steel framed wall comprising a single layer of 13 mm thick Boral Firestop plasterboard on each side of 64 mm deep metal studs, with an established FRL of -/60/60, Boral system reference SB60.1. The wall was penetrated by a nominal 40-mm polypropylene (Raupiano Plus) pipe and protected by SNAP 50R Retrofit fire collar. 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 around the pipe and plasterboard on both sides of the wall was filled with a bead H.B Fullers Firesound sealant. The penetrating service comprised a 40.2-mm outside diameter polypropylene pipe, with a wall thickness of 2.21 mm which penetrated the wall through a 40-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 a Superwool plug 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>-</td><td>not applicable</td></tr><tr><td>Integrity</td><td>-</td><td>no failure at 91 minutes</td></tr><tr><td>Insulation</td><td>-</td><td>76 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 FRL is applicable when the system is exposed to fire from either direction. The test was conducted on a wall system with an established FRL of -/60/60. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it was installed. 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. 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: 11 July 2019</p> <p>Issued on the 22nd day of August 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><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 91 minutes	Insulation	-	76 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
Structural Adequacy	-	not applicable											
Integrity	-	no failure at 91 minutes											
Insulation	-	76 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												

COPY OF CERTIFICATE OF TEST – NO. 3306



Certificate of Test

No. 3307

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 2024.

Product Name: SNAP 50R Retrofit fire collar protecting a nominal 40-mm polypropylene (Triplus) pipe (Specimen 2)

Description: The wall system was described as a 90 mm thick plasterboard lined steel framed wall comprising a single layer of 13 mm thick Boral Firestop plasterboard on each side of 64 mm deep metal studs, with an established FRL of -/60/60, Boral system reference SB60.1. The wall was penetrated by a nominal 40-mm polypropylene (Triplus) pipe and protected by SNAP 50R Retrofit fire collar. 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 Intumesh 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 38-mm (10g) course thread laminating screws. The annular gap around the pipe and plasterboard on both sides of the wall was filled with a bead H.B Fullers Firesound sealant. The penetrating service comprised a 40.2-mm outside diameter polypropylene pipe, with a wall thickness of 2.1 mm which penetrated the wall through a 40-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 polypropylene end cap on the exposed end.

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

Structural Adequacy	-	not applicable
Integrity	-	no failure at 91 minutes
Insulation	-	71 minutes

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

The FRL is applicable when the system is exposed to fire from either direction. The test was conducted on a wall system with an established FRL of -/60/60. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it was installed. 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. 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: 11 July 2019

Issued on the 22nd day of August 2019 without alterations or additions.

B. Roddy

Brett Roddy | Manager, Fire Testing and Assessments

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Certificate of Test

No. 3308

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 2024.

Product Name: SNAP 110R Retrofit fire collar protecting a nominal 110-mm polypropylene (Raupiano Plus) pipe (Specimen 3)

Description: The wall system was described as a 90 mm thick plasterboard lined steel framed wall comprising a single layer of 13 mm thick Boral Firestop plasterboard on each side of 64 mm deep metal studs, with an established FRL of -/60/60, Boral system reference SB60.1. The wall was penetrated by a nominal 110-mm polypropylene (Raupiano Plus) pipe and protected by SNAP 110R Retrofit fire collar. 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 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 316 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. The Snap fire 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 around pipe and plasterboard on both sides of the wall was filled with a bead H.B Fullers Firesound sealant. The penetrating service comprised a 110.5-mm outside dia. polypropylene pipe, with a wall thickness of 3.13 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 the unexposed face of the wall and approx. 500 mm into the furnace chamber. The pipe was supported at nominally 500 mm, and 1500-mm from unexposed face of the wall. The pipe was open at the unexposed end 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 91 minutes
Insulation	-	74 minutes

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

The FRL is applicable when the system is exposed to fire from either direction. The test was conducted on a wall system with an established FRL of -/60/60. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it was installed. 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. 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: 11 July 2019

Issued on the 22nd day of August 2019 without alterations or additions.

Brett Roddy | Manager, Fire Testing and Assessments

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Certificate of Test

No. 3309

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 2024.

Product Name: SNAP 110R Retrofit fire collar protecting a nominal 110-mm Polypropylene (Triplus) pipe (Specimen 4)

Description: The wall system was described as a 90 mm thick plasterboard lined steel framed wall comprising a single layer of 13 mm thick Boral Firestop plasterboard on each side of 64 mm deep metal studs, with an established FRL of -/60/60, Boral system reference SB60.1. The wall was penetrated by a nominal 110-mm Polypropylene (Triplus) pipe and protected by SNAP 110R Retrofit fire collar. 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 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 316 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. The Snap fire 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 around the pipe and plasterboard on both sides of the wall was filled with a bead H.B Fullers Firesound sealant. The penetrating service comprised a 110-mm outside dia. polypropylene pipe, with a wall thickness of 3.43 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 the 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 wall. The pipe was open on unexposed end and capped on the exposed end with a polypropylene end cap.

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

Structural Adequacy	-	not applicable
Integrity	-	no failure at 91 minutes
Insulation	-	66 minutes

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

The FRL is applicable when the system is exposed to fire from either direction. The test was conducted on a wall system with an established FRL of -/60/60. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it was installed. 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. 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: 11 July 2019

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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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FOR FURTHER INFORMATION

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