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

Test Report

Author: Peter Gordon
Report number: FSP 1932
Date: 13 December 2018

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

Commercial-in-confidence

Inquiries should be address to:

Fire Testing and Assessments	Author	The Client
NATA Registered Laboratory 14 Julius Avenue North Ryde, NSW 2113 Telephone +61 2 9490 5444	Infrastructure Technologies 14 Julius Avenue North Ryde, NSW 2113 Telephone +61 2 9490 5500	IG6 Pty Ltd as trustee for the IG6 IP Trust 3 Skirmish Court Victoria Point Qld 4165

Report Status and Revision History:

VERSION	STATUS	DATE	DISTRIBUTION	ISSUE NUMBER
Revision A	Draft for review	16/10/2018	CSIRO / Client	FSP 1932
Revision B	Draft	5 /11/2018	CSIRO / Client	FSP 1932
Revision C	Final for issue	13/12/2018	CSIRO / Client	FSP 1932

Report Authorization:

AUTHOR	REVIEWED BY	AUTHORISED BY
Peter Gordon	Glenn Williams	Brett Roddy
		
13 December 2018	13 December 2018	13 December 2018

Use of this Report

Use of Reports – Testing

This report is subject to binding obligations under which it was prepared. In particular, the Report must not be used:

- *as a means of endorsement; or*
- *in a company prospectus or notification to a Stock Exchange document for capital raising, without the prior written consent of CSIRO.*

The Report may be published verbatim and in full, provided that a statement is included on the publication that it is a copy of the Report issued by CSIRO.

Excerpts of the Report may not be published.

Use of Reports – Consultancy

This report is subject to binding obligations under which it was prepared. In particular, the Report may only be used for the following purposes:

- *the information in the Report may be used by the party that commissioned the Report for its internal business operations (but not licensing to third parties);*
- *the report may be copied for distribution within the organisation that commissioned the Report;*
- *copies of the Report (or extracts of the Report) may be distributed to contractors and agents of the organisation that commissioned the Report who have a need for the Report for its internal business operations. Any extracts of the Report distributed for this purpose must clearly note that the extract is part of a larger Report held by the organisation that commissioned the Report and which has been prepared by CSIRO.*

The name, trade mark or logo of the CSIRO must not be used without the prior written consent of CSIRO.

The Report must not be used as a means of endorsement without the prior written consent of CSIRO.

Copyright and disclaimer

Important disclaimer

CSIRO advises that the information contained in this publication comprises general statements based on scientific research. The reader is advised and needs to be aware that such information may be incomplete or unable to be used in any specific situation. No reliance or actions must therefore be made on that information without seeking prior expert professional, scientific and technical advice. To the extent permitted by law, CSIRO (including its employees and consultants) excludes all liability to any person for any consequences, including but not limited to all losses, damages, costs, expenses and any other compensation, arising directly or indirectly from using this publication (in part or in whole) and any information or material contained in it.

Contents

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

Sponsored Investigation No. FSP 1932

1 Introduction

1.1 Identification of specimen

The sponsor identified the specimen as nine (9) 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 4790/4247

1.7 Test date

The fire-resistance test was conducted on 14 August 2018.

2 Description of specimen

2.1 General

The wall system is 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 as described as system SB60.1.

The wall was penetrated by nine (9) services and protected by various first stopping systems.

For the purpose of the test, the specimens were referenced as Specimen 1, 2, 3, 4, 5, 6, 7, 8 and 9. Only seven (7) specimens are the subject of this report (Specimen 1, 2, 3, 4, 6, 7 and 9). 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 1260 'PVC-U pipes and fittings for drain, waste and vent application';
- AS/NZS 2492:2007 'Cross-linked polyethylene (PE-X) pipes for pressure applications';
- AS 4176.8-2010 'Multilayer pipes for pressure applications - Multilayer pipe systems for consumer gas installations with a maximum operating pressure up to and including 5 bar (500 kPa) - Specifications for systems' and
- AS/NZS 1477:2006 PVC pipes and fittings for pressure applications.

<u>Specimen 1 – SNAP 110R Retrofit fire collar protecting a nominal 100-mm Polyvinyl Chloride sandwich construction (PVC-SC) pipe incorporating a coupling inside the collar.</u>

The SNAP Retrofit 110R fire collar comprised a 0.75-mm steel casing with a 122-mm inner diameter and a 209-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 398-mm long x 58-mm wide and between intumescent strips B and C was a layer of 304 stainless steel mesh 398-mm long x 58-mm wide both had wire mesh diameters of 0.15-mm, as shown in drawing numbered 110R-T dated 9 October 2015, 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) course thread laminating screws.

The penetrating service comprised a 110-mm outside diameter PVC-SC pipe with a wall thickness of 3.2-mm and a PVC coupling with a total wall thickness of 6.4-mm fitted through the collar's sleeve penetrating the plasterboard wall through a 114-mm diameter cut-out hole as shown in drawing titled "Specimen # 1, 110 PVC-SC Pipe & 110R", dated 21 June 2018, provided by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard 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 closed with a PVC end cap on the exposed end.

Specimen 2 – SNAP 32R Retrofit fire collar protecting a nominal 16-mm Pex-Al-Pex 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 numbered 32R-T 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 16-mm Pex-Al-Pex pipe, with a wall thickness of 2.3-mm, penetrating the wall through a 20-mm diameter cut-out hole as shown in drawing titled "Specimen # 2, 16 Pex-Al-Pex Pipe & 32R", dated 21 June 2018, 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 1000-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 32R Retrofit fire collar protecting a nominal 20-mm Pex-Al-Pex 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 numbered 32R-T 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 20-mm Pex-Al-Pex pipe, with a wall thickness of 2.3-mm, penetrating the wall through a 25-mm diameter cut-out hole as shown in drawing titled "Specimen # 3, 20 Pex-Al-Pex Pipe & 32R", dated 21 June 2018, 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 1000-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 4 – SNAP 32R Retrofit fire collar protecting a nominal 16-mm 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 numbered 32R-T 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 16-mm Pex-B pipe, with a wall thickness of 2.4-mm, penetrating the wall through a 20-mm diameter cut-out hole as shown in drawing titled "Specimen # 4, 16 Pex-B Pipe & 32R", dated 21 June 2018, 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 1000-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 6 – SNAP 32R Retrofit fire collar protecting a nominal 25-mm 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 numbered 32R-T 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 25-mm Pex-B pipe, with a wall thickness of 3.2-mm, penetrating the wall through a 32-mm diameter cut-out hole as shown in drawing titled "Specimen # 6, 25 Pex-B Pipe & 32R", dated 21 June 2018, 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 1000-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 7 – SNAP 32R Retrofit fire collar protecting a nominal 16-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 numbered 32R-T 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 38-mm (10g) course thread laminating screws.

The penetrating service comprised a 22-mm P-PVC pipe, with a wall thickness of 2.0-mm, penetrating the wall through a 25-mm diameter cut-out hole as shown in drawing titled "Specimen # 7, 16 – P-PVC Pipe & 32R", dated 21 June 2018, 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 1000-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 9 - SNAP 50R Retrofit fire collar protecting a nominal 50-mm Polyvinyl Chloride (PVC) pipe incorporating a coupling inside the 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 that was comprised of 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 stainless steel mesh 210-mm long x 42-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 50R-T dated 31 March 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 38-mm (10g) course thread laminating screws.

The penetrating service comprised a 56-mm PVC pipe with al wall thickness of 2.3-mm and a PVC coupling with a total wall thickness of 4.6-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 60-mm diameter cut-out hole as shown in drawing titled "Specimen # 9, 50 PVC & 50R", dated 21 June 2018, provided by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm and 1000-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed and capped with a PVC end cap 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 was delivered on 17th July 2018 and left under standard 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-18-A Layout", dated 21 June 2018.

Drawing titled "Specimen # 1, 110 PVC-SC Pipe & 110R", dated 21 June 2018, provided by Snap Fire Systems Pty Ltd.

Drawing titled "Specimen # 2, 16 Pex-Al-Pex Pipe & 32R", dated 21 June 2018, provided by Snap Fire Systems Pty Ltd.

Drawing titled “Specimen # 3, 20 Pex-Al-Pex Pipe & 32R”, dated 21 June 2018, provided by Snap Fire Systems Pty Ltd.

Drawing titled “Specimen # 4, 16 Pex-B Pipe & 32R”, dated 21 June 2018, provided by Snap Fire Systems Pty Ltd.

Drawing titled “Specimen # 6, 25 Pex-B Pipe & 32R”, dated 21 June 2018, provided by Snap Fire Systems Pty Ltd.

Drawing titled “Specimen # 7, 16 – P-PVC Pipe & 32R”, dated 21 June 2018, provided by Snap Fire Systems Pty Ltd.

Drawing titled “Specimen # 9, 50 PVC & 50R”, dated 21 June 2018, provided by Snap Fire Systems Pty Ltd.

Drawing numbered 110R-T dated 9 October 2015, by Snap Fire Systems Pty Ltd.

Drawing numbered 50R-T dated 31 March 2017, by Snap Fire Systems Pty Ltd.

Drawing numbered 32R-T dated 5 October 2017, 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 17°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 62 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
1 minute -	Smoke is being emitted from the collars of all 9 specimens.
2 minutes -	Smoke is fluing from Specimens 1.
4 minutes -	The pipe from Specimen 1 has distorted.
5 minutes -	Smoke is fluing from Specimen 9.
6 minutes -	Smoke has ceased fluing from Specimen 1.
11 minutes -	Smoke continues to be emitted from around the collar of Specimen 7, with no smoke fluing from the end of pipe.
17 minutes -	Smoke continues to be emitted from the collars of all 9 specimens.
30 minutes -	No further visible change to specimens.
37 minutes -	Smoke is fluing from the end of pipes of Specimens 4 and 6.
42 minutes -	Discolouration to the pipe of Specimen 9.
45 minutes -	Smoke is fluing from the end of pipes of Specimens 4 and 6.
49 minutes -	Smoke is fluing from the end of pipes of Specimen 6.
60 minutes -	Insulation Failure - Specimens 1 and 6 – maximum temperature rise of 180K is exceeded on the plasterboard 25-mm from the collars of Specimens 1 and 6. Plasterboard starting to discolour.
61 minutes -	Insulation Failure - Specimen 4 – maximum temperature rise of 180K is exceeded on the plasterboard 25-mm from the collar of Specimen 4.
62 minutes -	Insulation Failure Specimens 2 and 7 – maximum temperature rise of 180K is exceeded on the plasterboard 25-mm from the collars of Specimens 2 and 7. 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.

Figure 7 shows the curve of temperature versus time associated with Specimen 6.

Figure 8 shows the curve of temperature versus time associated with Specimen 7.

Figure 9 shows the curve of temperature versus time associated with Specimen 9.

8.5 Performance

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

Specimen 1 – SNAP 110R Retrofit fire collar protecting a nominal 100-mm Polyvinyl Chloride sandwich construction (PVC-SC) pipe incorporating a coupling inside the collar.

Structural adequacy	-	not applicable
Integrity	-	no failure at 62 minutes
Insulation	-	60 minutes

Specimen 2 – SNAP 32R Retrofit fire collar protecting a nominal 16-mm Pex-Al-Pex pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 62 minutes
Insulation	-	62 minutes

Specimen 3 – SNAP 32R Retrofit fire collar protecting a nominal 20-mm Pex-Al-Pex pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 62 minutes
Insulation	-	no failure at 62 minutes

Specimen 4 – SNAP 32R Retrofit fire collar protecting a nominal 16 Pex-B pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 62 minutes
Insulation	-	61 minutes

Specimen 6 – SNAP 32R Retrofit fire collar protecting a nominal 25-mm Pex-B pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 62 minutes
Insulation	-	60 minutes

Specimen 7 – SNAP 32R Retrofit fire collar protecting a nominal 16-mm P-PVC pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 62 minutes
Insulation	-	62 minutes

Specimen 9 SNAP 50R Retrofit fire collar protecting a nominal 50-mm PVC 56-mm pipe incorporating a coupling inside the collar.

Structural adequacy	-	not applicable
Integrity	-	no failure at 62 minutes
Insulation	-	no failure at 62 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

Specimen 6 - -/60/60

Specimen 7 - -/60/60

Specimen 9 - -/60/60

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

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

Glenn Williams
Testing Officer

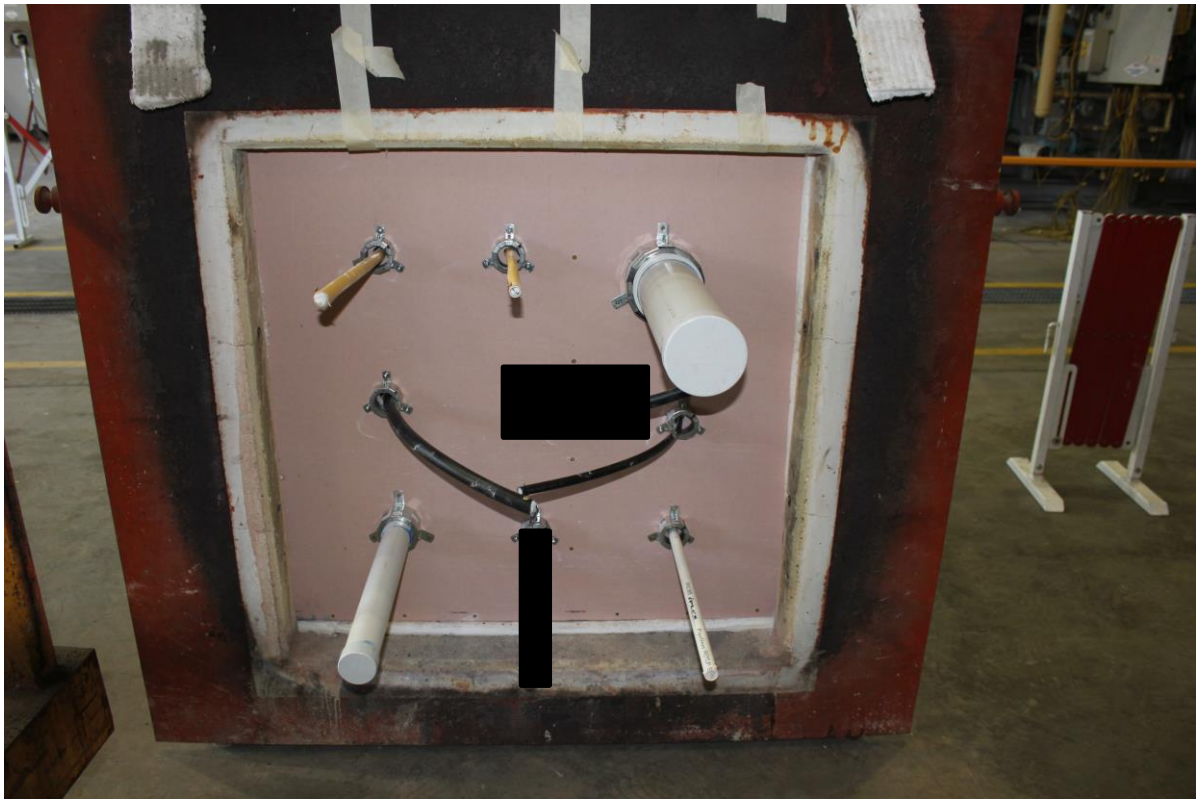
Appendices

Appendix A – Measurement location

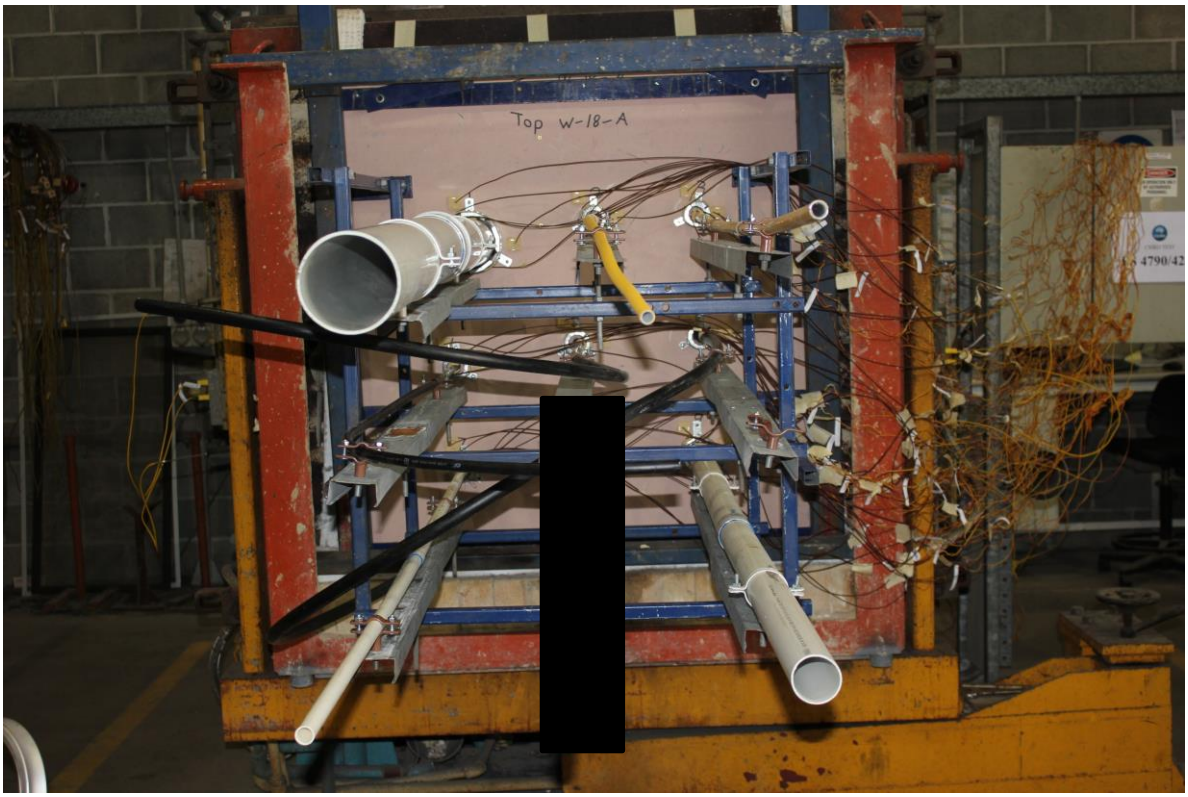
Specimen	T/C Position	T/C designation
Specimen 1	On p/b, 25-mm above collar	S1
	On p/b, 25-mm right of collar	S2
	On collar top	S3
	On collar bottom	S4
	On pipe 25-mm from collar top	S5
	On pipe 25-mm from collar left	S6
Specimen 2	On p/b, 25-mm above collar	S7
	On p/b, 25-mm right collar	S8
	On collar top	S9
	On collar bottom	S10
	On pipe 25-mm from collar right	S11
	On pipe 25-mm from collar left	S12
Specimen 3	On p/b, 25-mm above collar	S13
	On p/b, 25-mm right of collar	S14
	On collar top	S15
	On collar right	S16
	On pipe 25-mm from collar right	S17
	On pipe 25-mm from collar left	S18
Specimen 4	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 bottom	S24
Specimen 6	On p/b, 25-mm above collar	S31
	On p/b, 25-mm right of collar	S32
	On collar top	S33
	On collar right	S34
	On pipe 25-mm from collar top	S35
	On pipe 25-mm from collar bottom	S36

Specimen	T/C Position	T/C designation
Specimen 7	On p/b, 25-mm above collar	S37
	On p/b, 25-mm right of collar	S38
	On collar top	S39
	On collar right	S40
	On pipe 25-mm from collar right	S41
	On pipe 25-mm from collar left	S42
Specimen 9	On p/b, 25-mm above collar	S49
	On p/b, 25-mm right of collar	S50
	On collar top	S51
	On collar right	S52
	On pipe 25-mm from collar top	S53
	On pipe 25-mm from collar right	S54
Rover		S55
Ambient		S56

Appendix B – Photographs



PHOTOGRAPH 1 – EXPOSED FACE OF SPECIMENS PRIOR TO TESTING

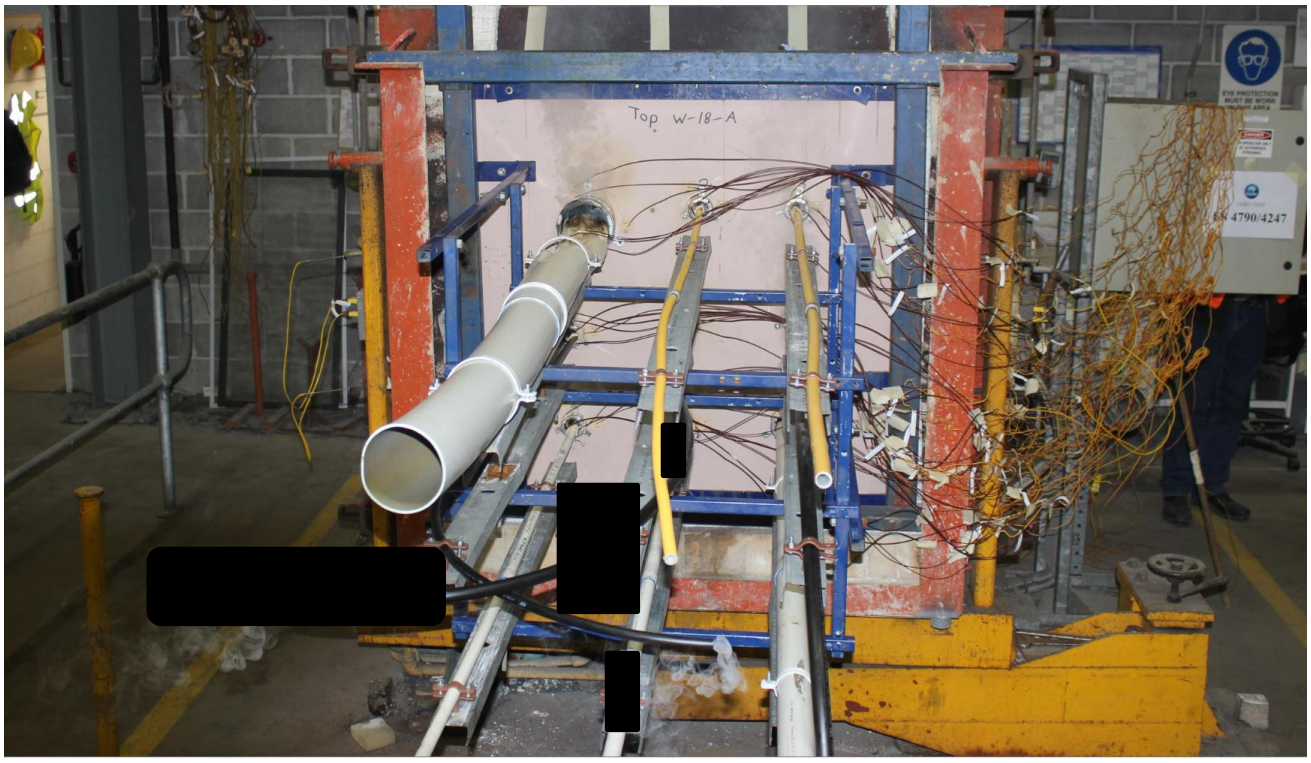


PHOTOGRAPH 2 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING

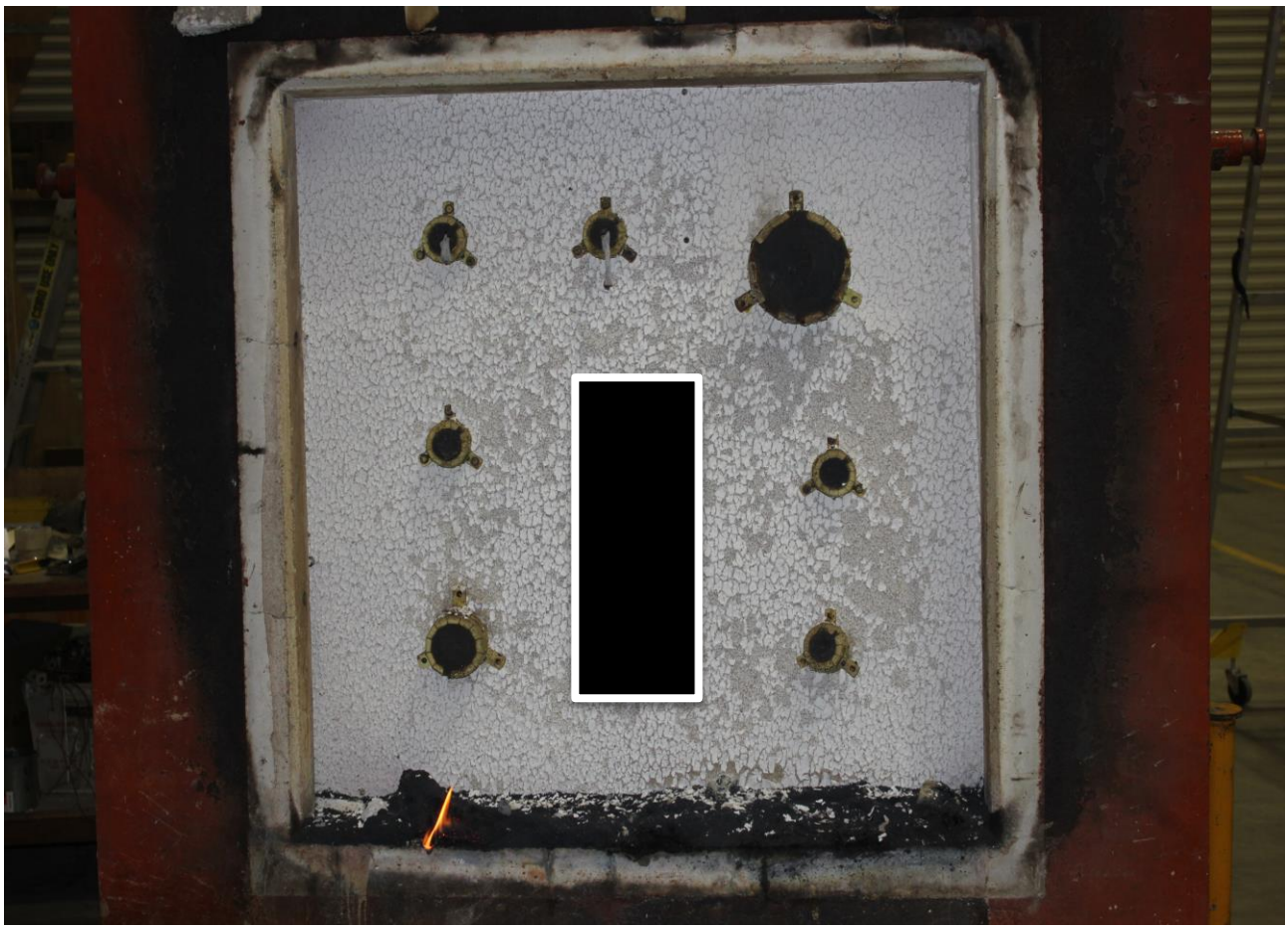
PHOTOGRAPH 3 – SPECIMEN 1 AFTER 4 MINUTES OF TESTING

PHOTOGRAPH 4 – SPECIMENS AFTER 30 MINUTES OF TESTING

PHOTOGRAPH 5 – SPECIMENS AFTER 60 MINUTES OF TESTING



PHOTOGRAPH 6 – SPECIMENS AT CONCLUSION OF TESTING



PHOTOGRAPH 7 – EXPOSED FACE OF SPECIMENS AT CONCLUSION OF TESTING

Appendix C – Furnace Temperature

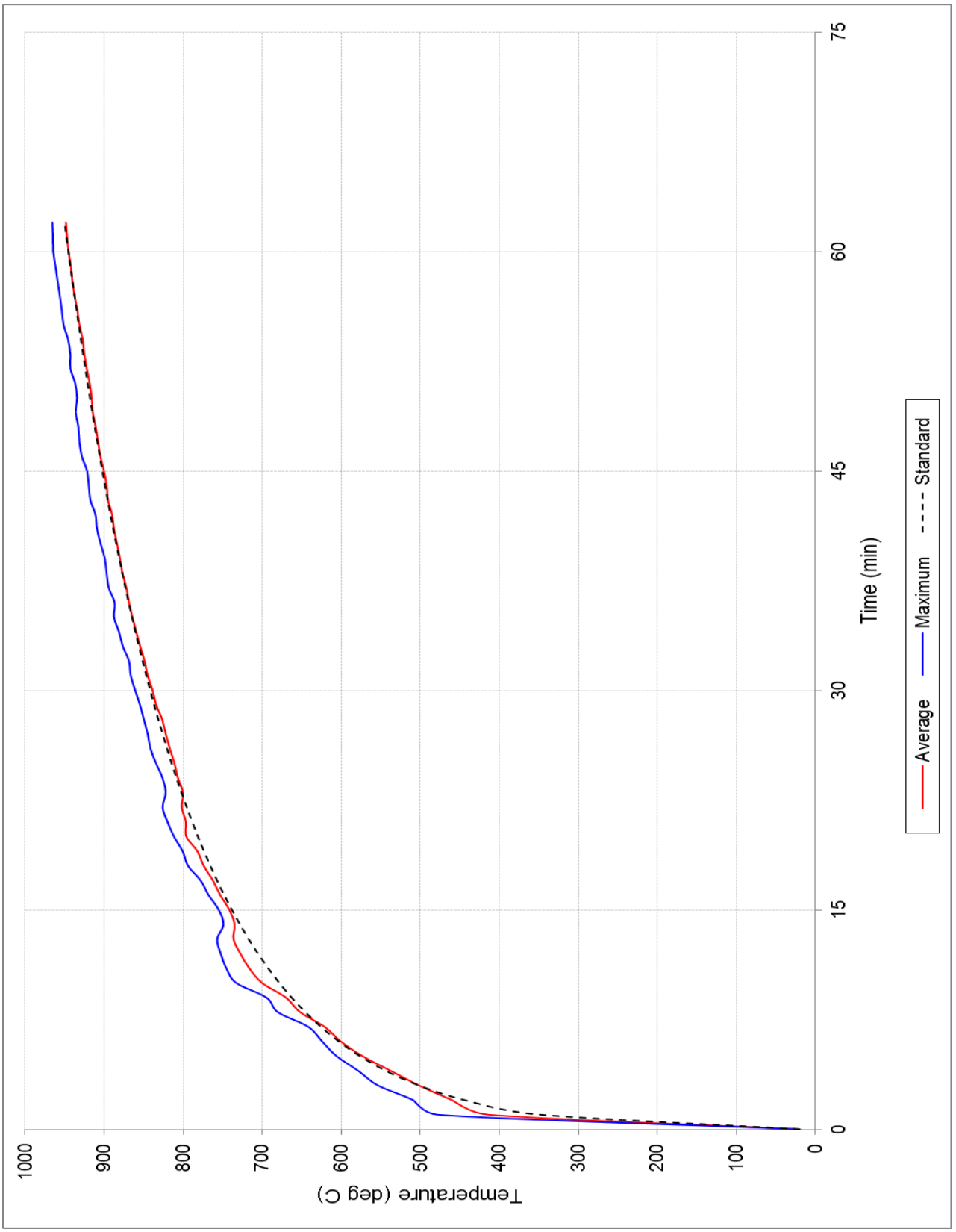


FIGURE 1 – FURNACE TEMPERATURE

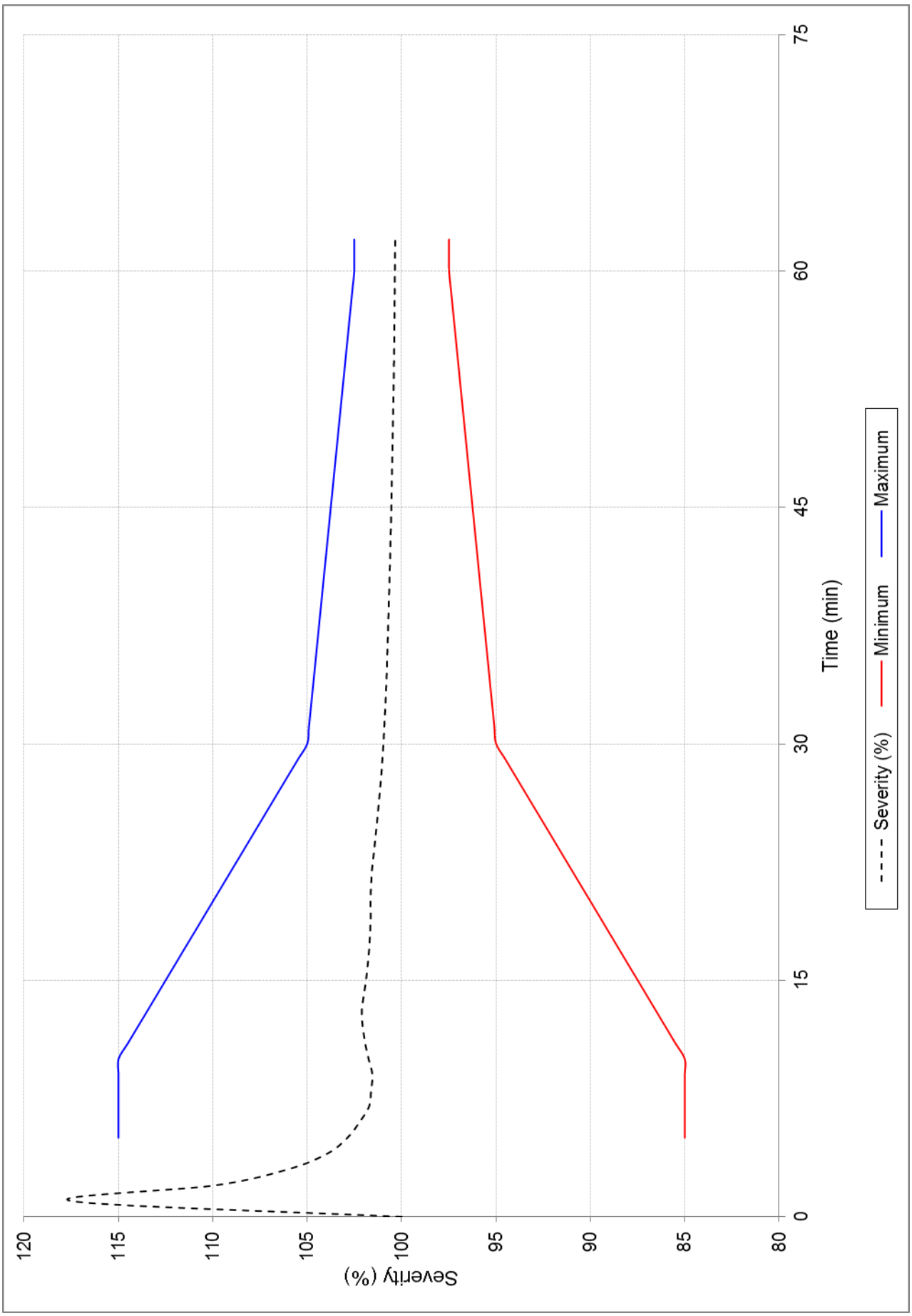


FIGURE 2 – FURNACE SEVERITY

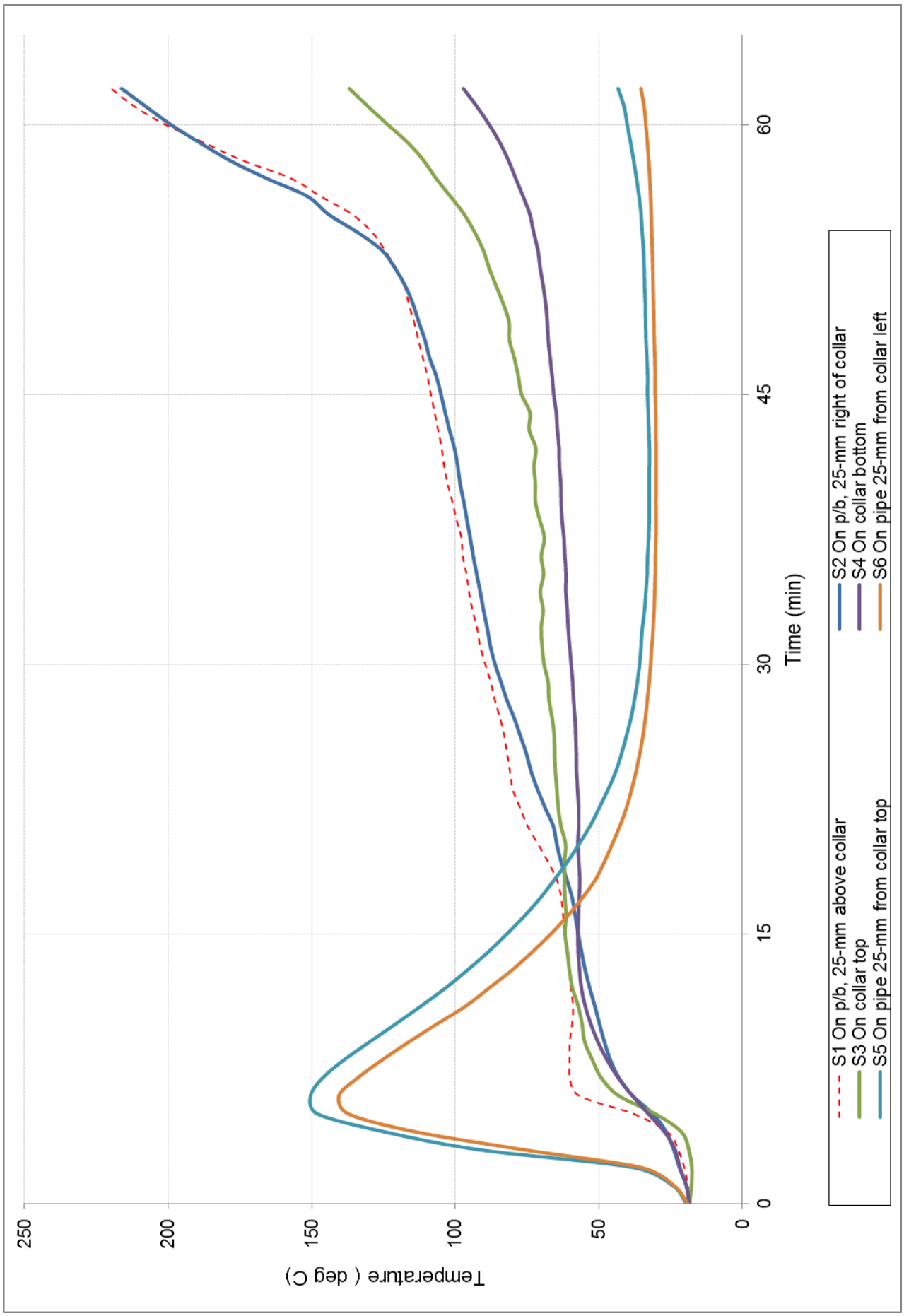


FIGURE 3 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 1

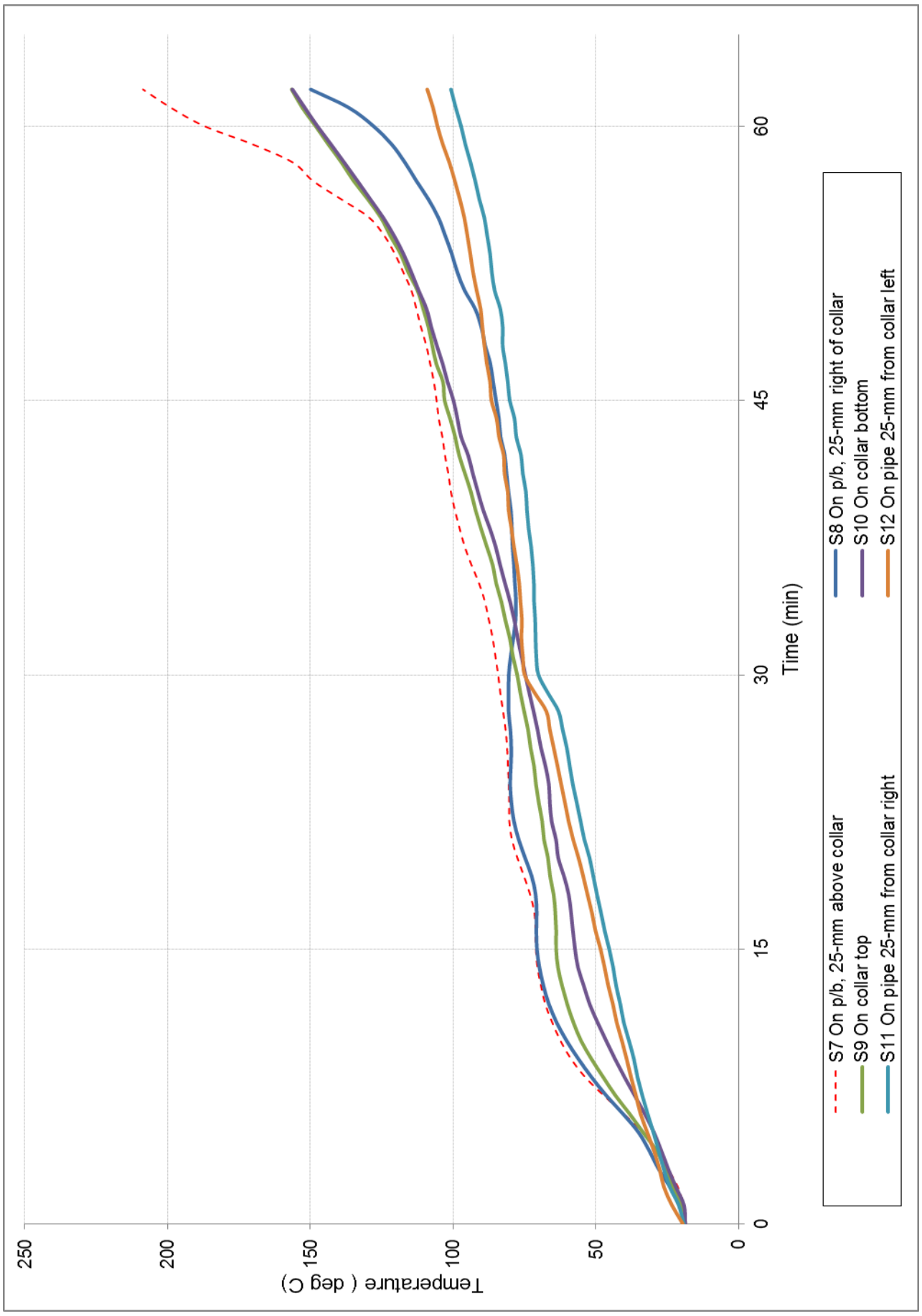


FIGURE 4 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 2

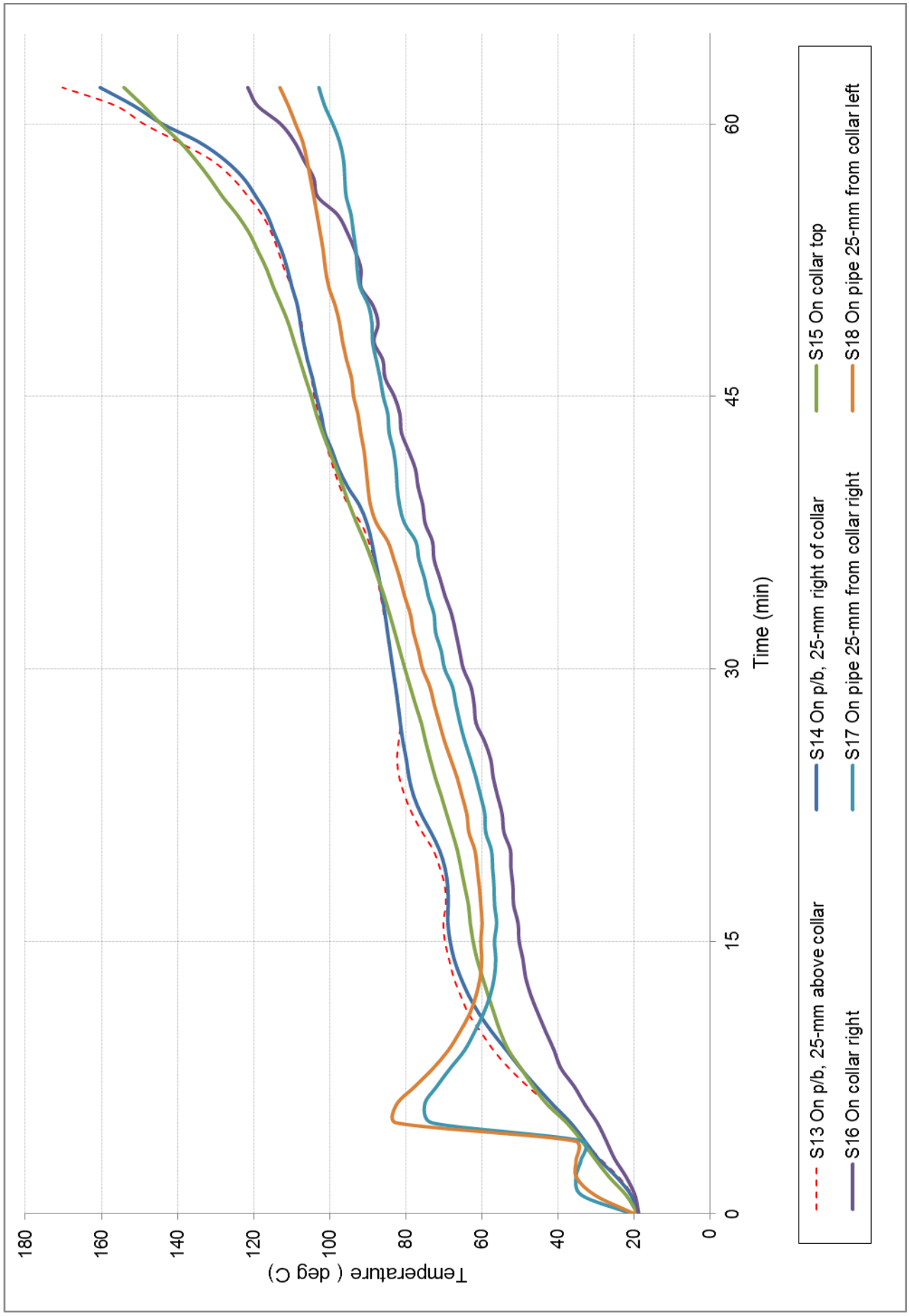


FIGURE 5 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 3

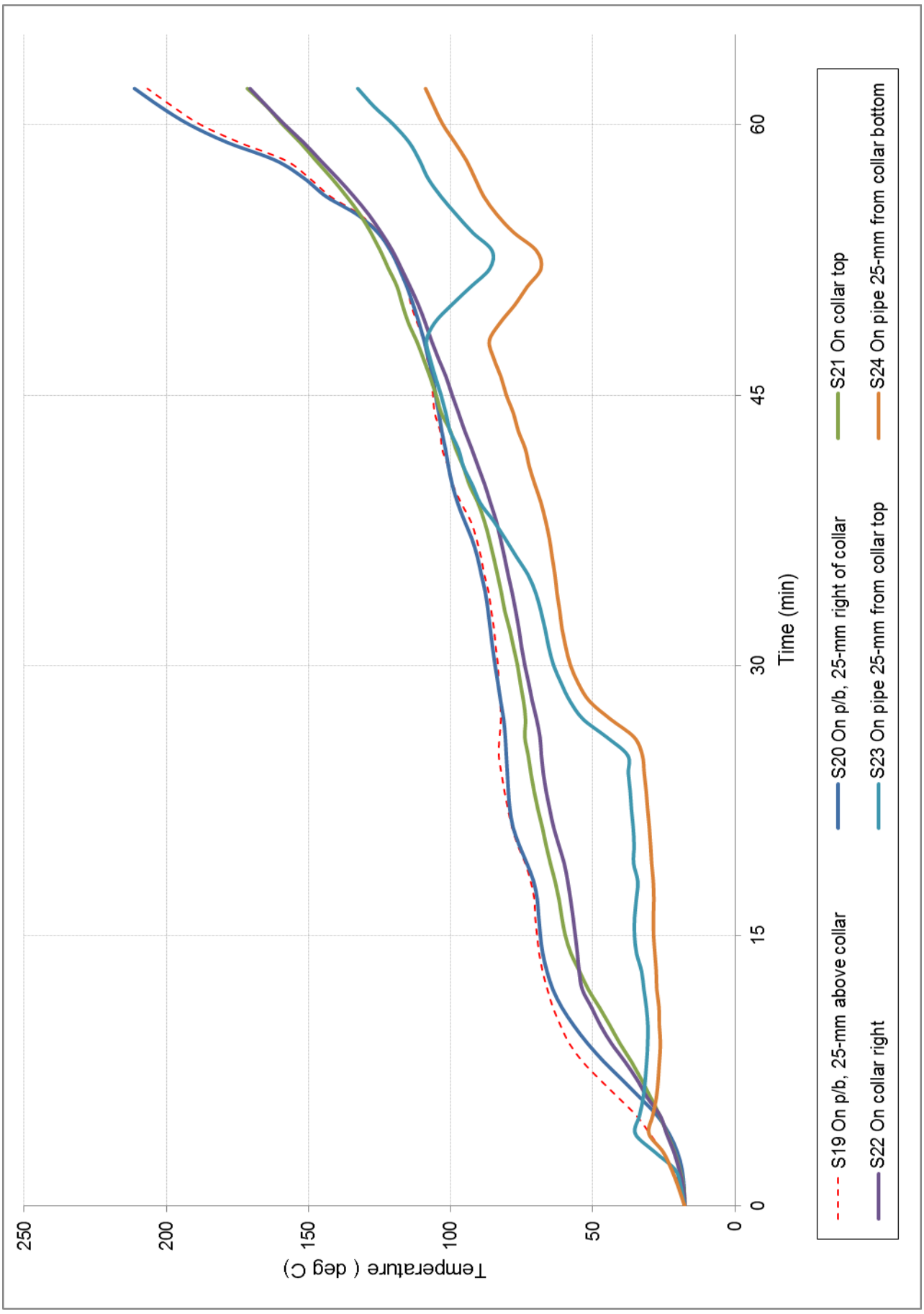


FIGURE 6 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 4

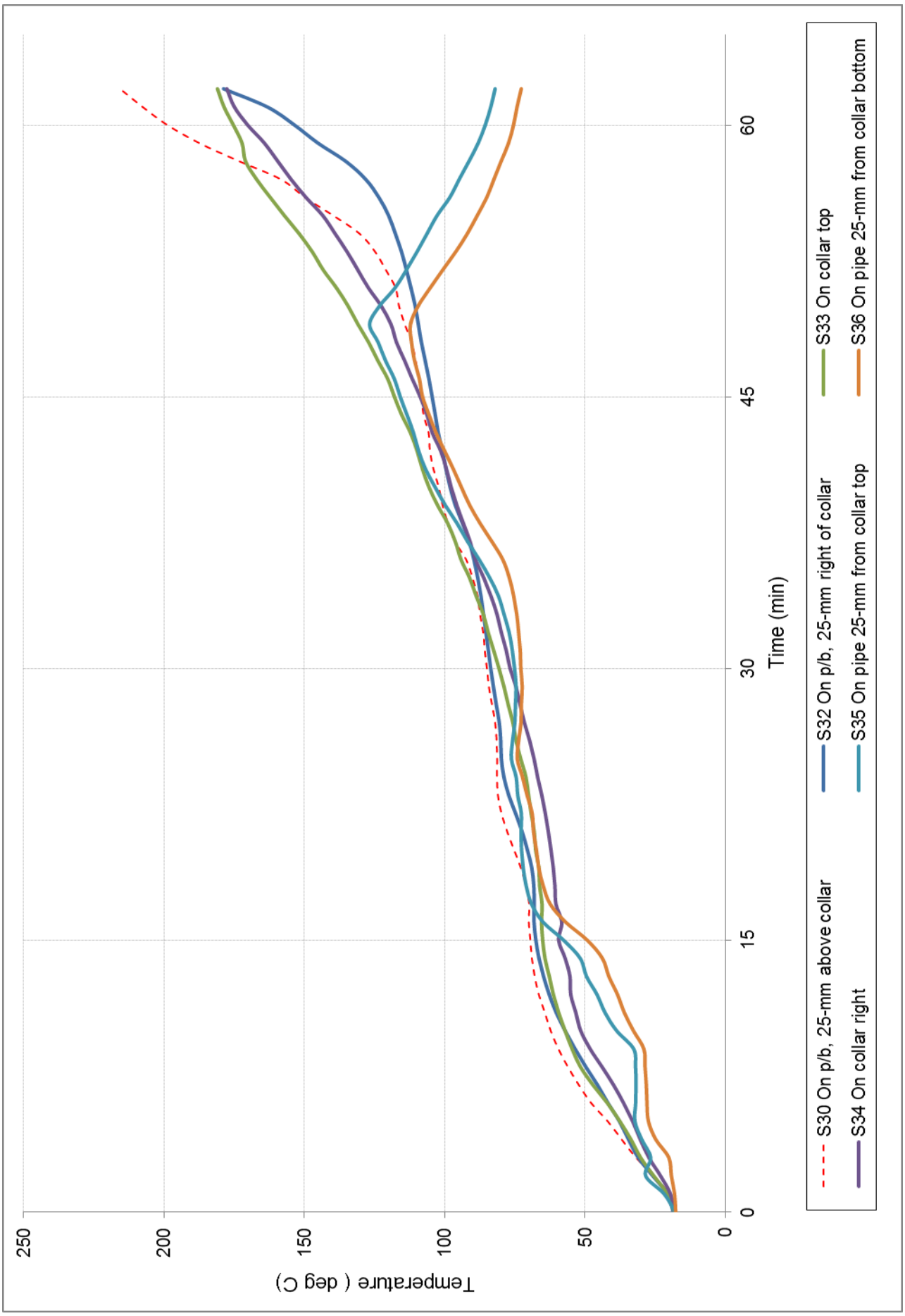


FIGURE 7 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN #6

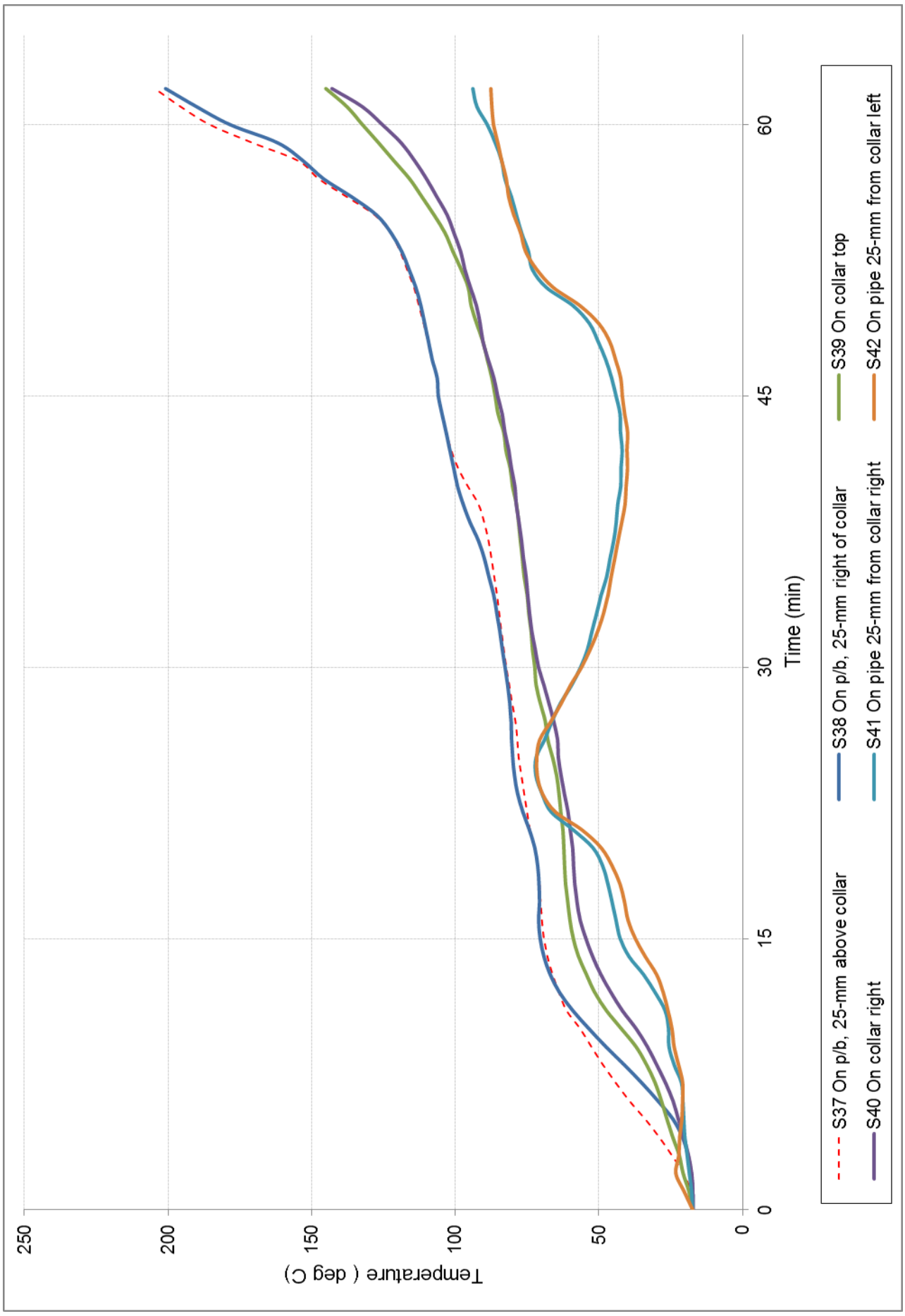


FIGURE 8 -TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 7

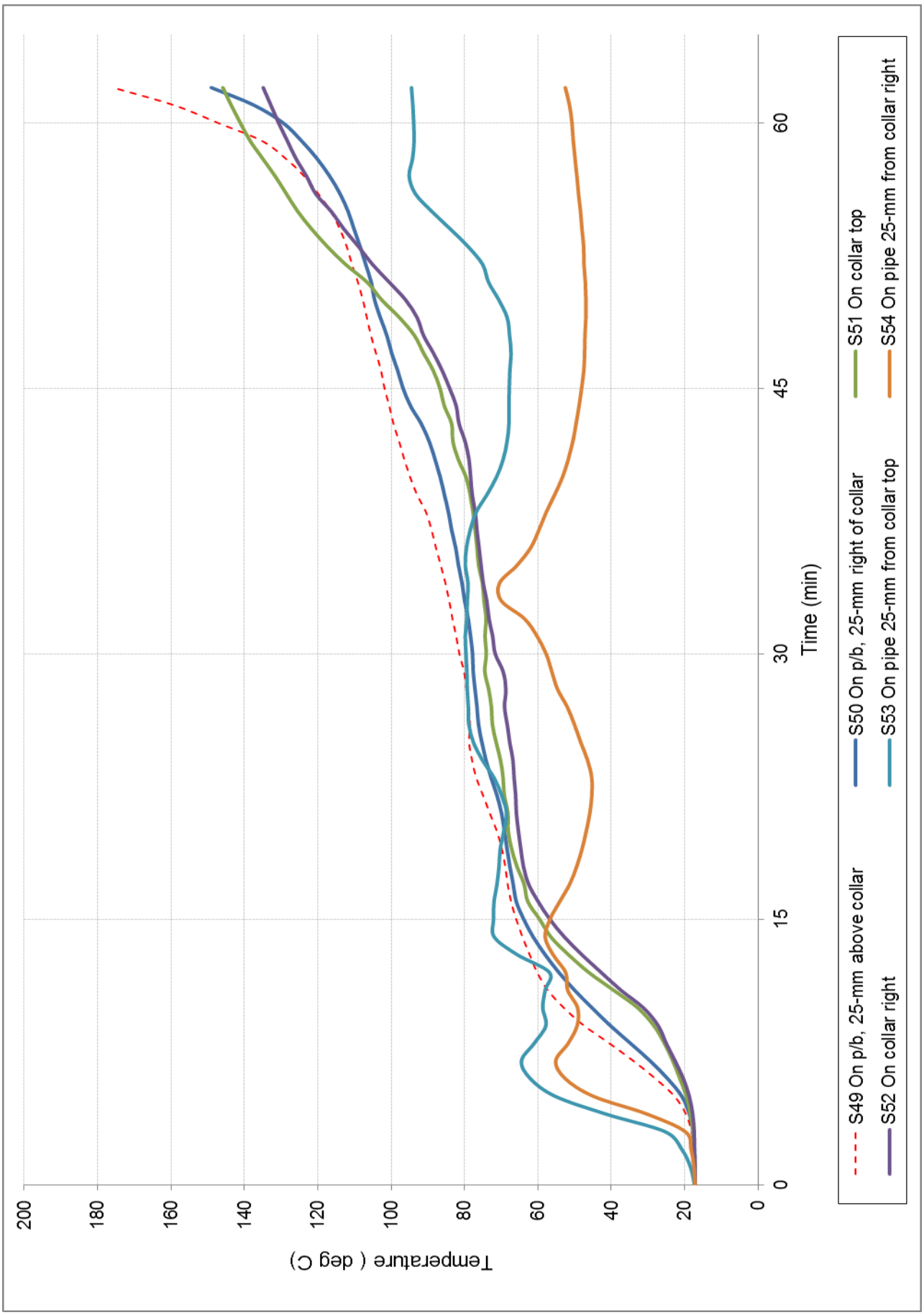
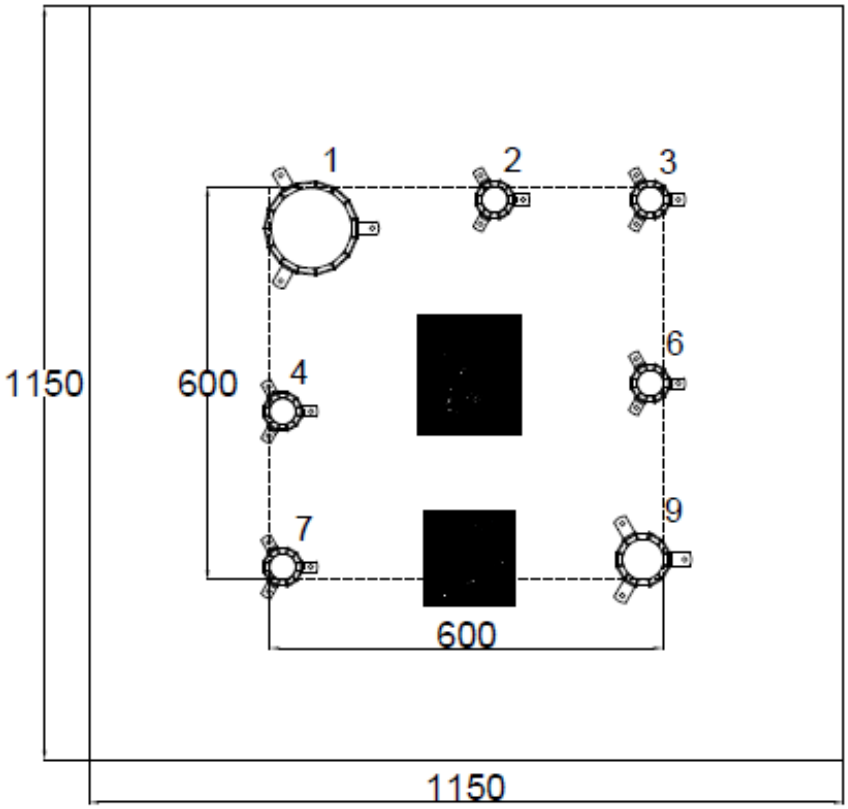


FIGURE 9 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 9

Appendix D – Layout and installation drawings

Snap Fire Systems Pty Ltd
Test Wall W-18-A Layout
Date: 21 JUN 2018

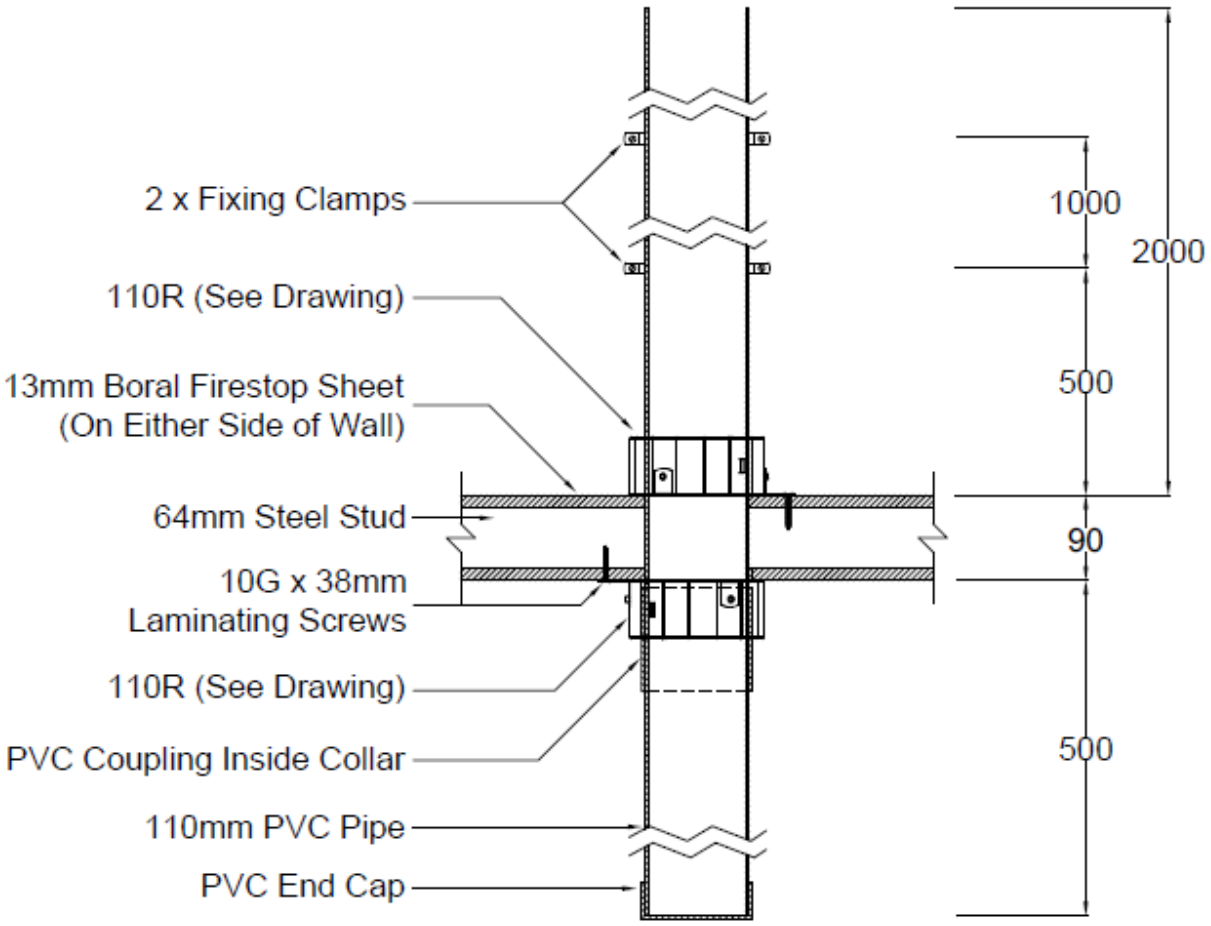


Penetration	Collar Code	Pipe Type	Pipe Diameter (mm)
1	110R	PVC-SC	100
2	32R	Pex-Al-Pex	16
3	32R	Pex-Al-Pex	20
4	32R	Pex-B	16
[redacted]			
6	32R	Pex-B	25
7	32R	P-PVC	16
[redacted]			
9	50R	PVC	50

DRAWING TITLED "TEST WALL W-18-A LAYOUT, DATED 21 JUNE 2018, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD.

Snap Fire Systems Pty Ltd

Specimen #1
110 PVC-SC Pipe & 110R
Date: 21 JUN 2018



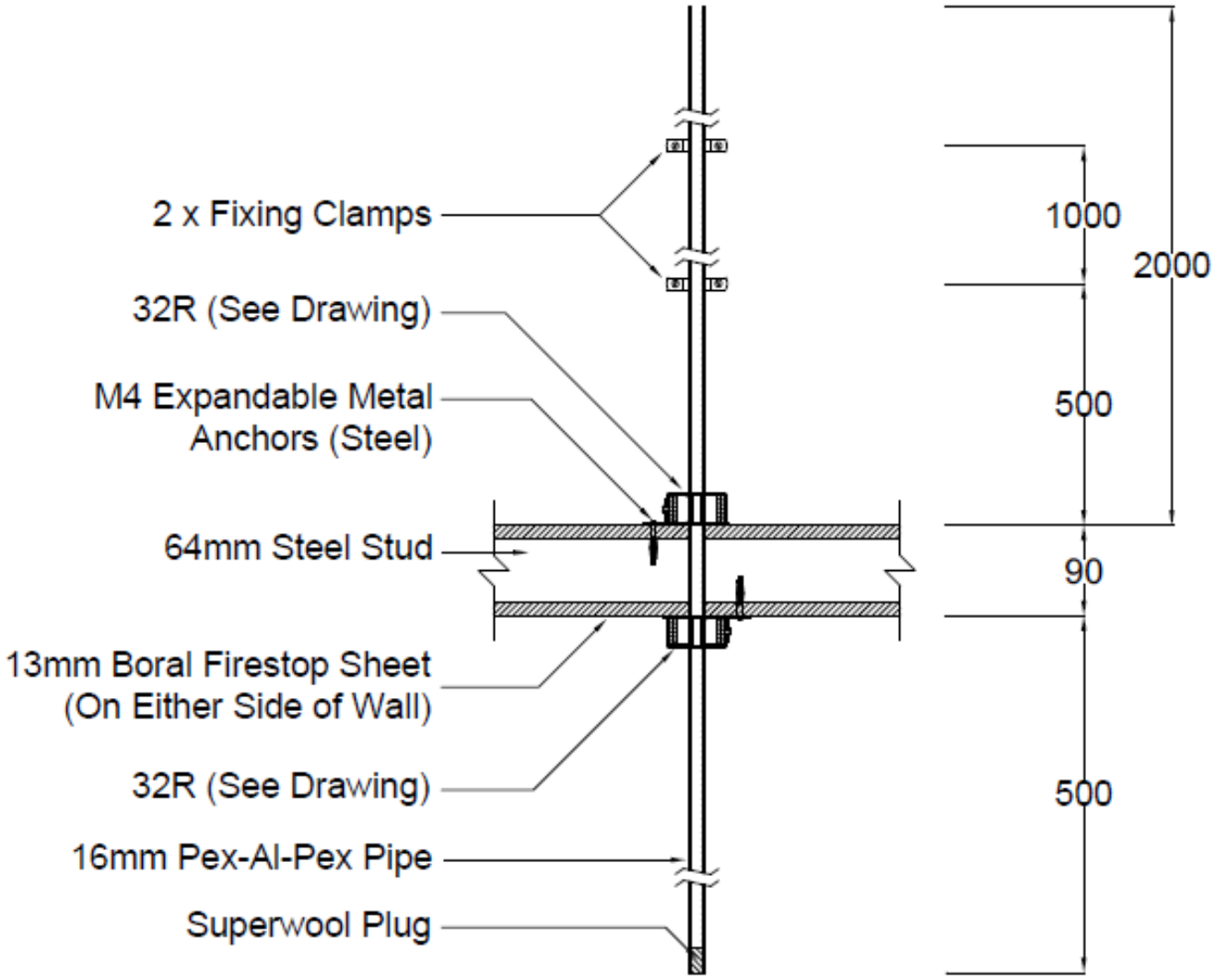
DRAWING TITLED "SPECIMEN # 1, 110 PVC-SC PIPE & 110R", DATED 21 JUNE 2018, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #2

16 Pex-Al-Pex Pipe & 32R

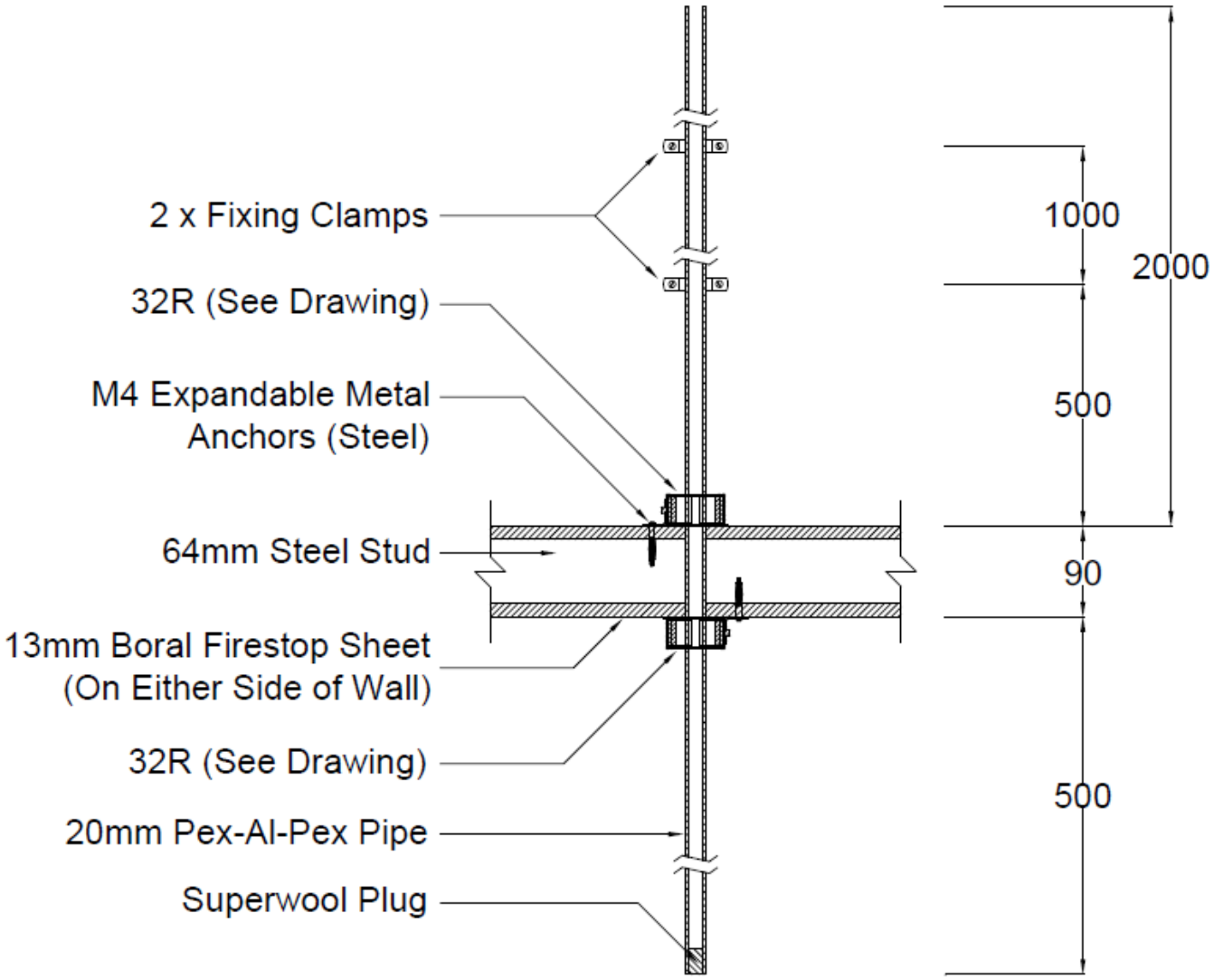
Date: 21 JUN 2018



DRAWING TITLED "SPECIMEN # 2, 16 PEX-AL-PEX PIPE & 32R", DATED 21 JUNE 2018, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #3
20 Pex-Al-Pex Pipe & 32R
Date: 21 JUN 2018



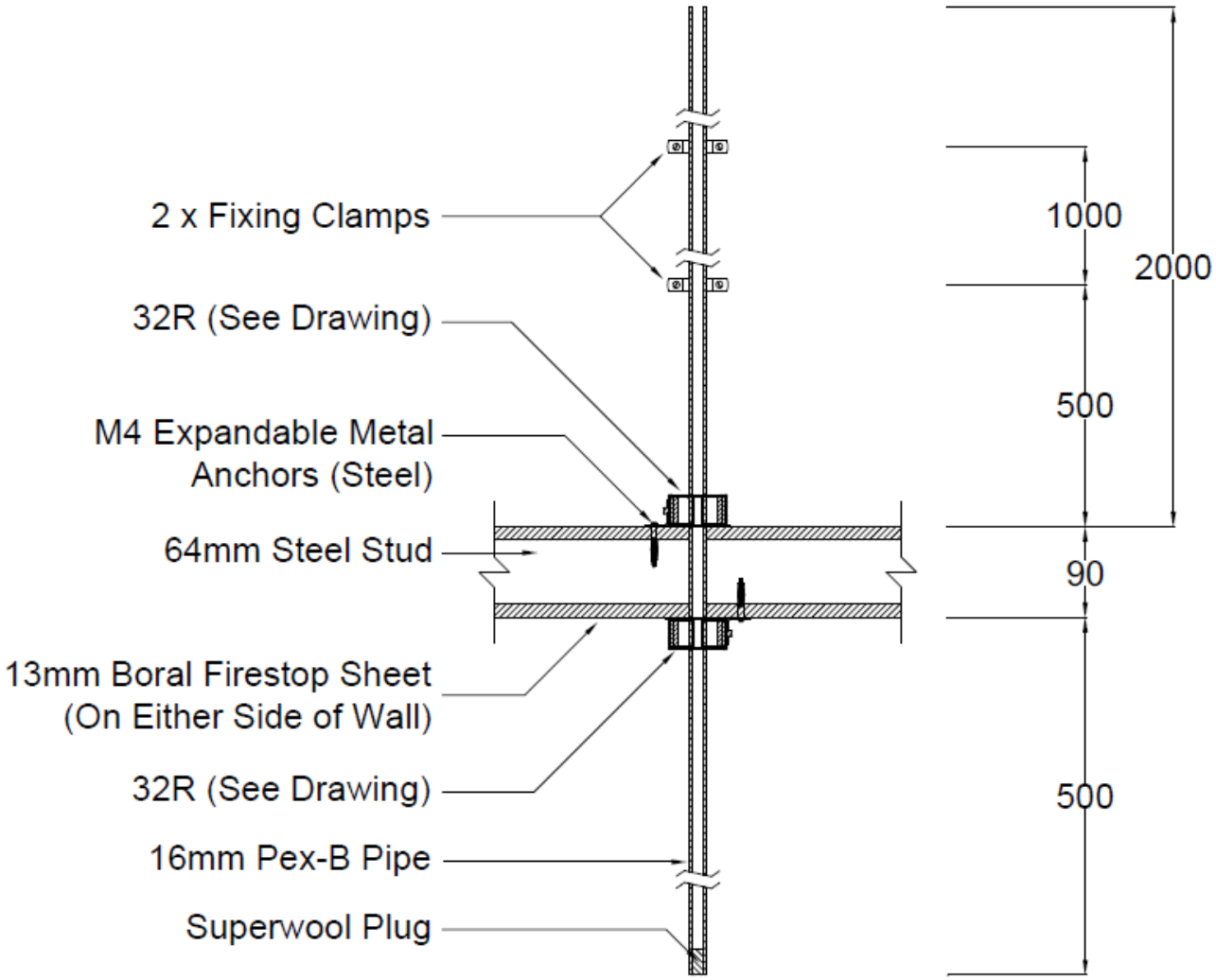
DRAWING TITLED "SPECIMEN # 3, 20 PEX-AL-PEX PIPE & 32R", DATED 21 JUNE 2018, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #4

16 Pex-B Pipe & 32R

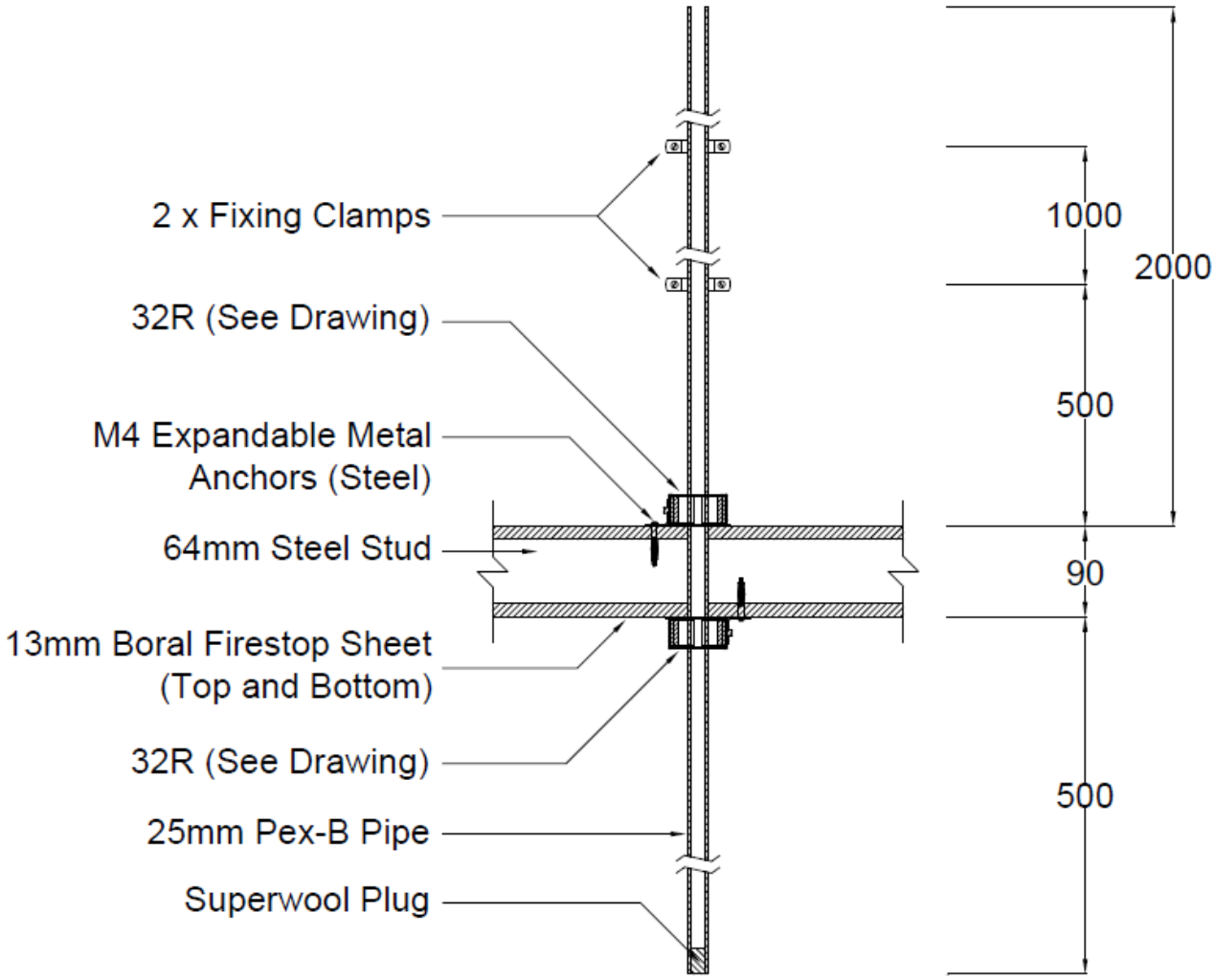
Date: 21 JUN 2018



DRAWING TITLED "SPECIMEN # 4, 16 PEX-B PIPE & 32R", DATED 21 JUNE 2018, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

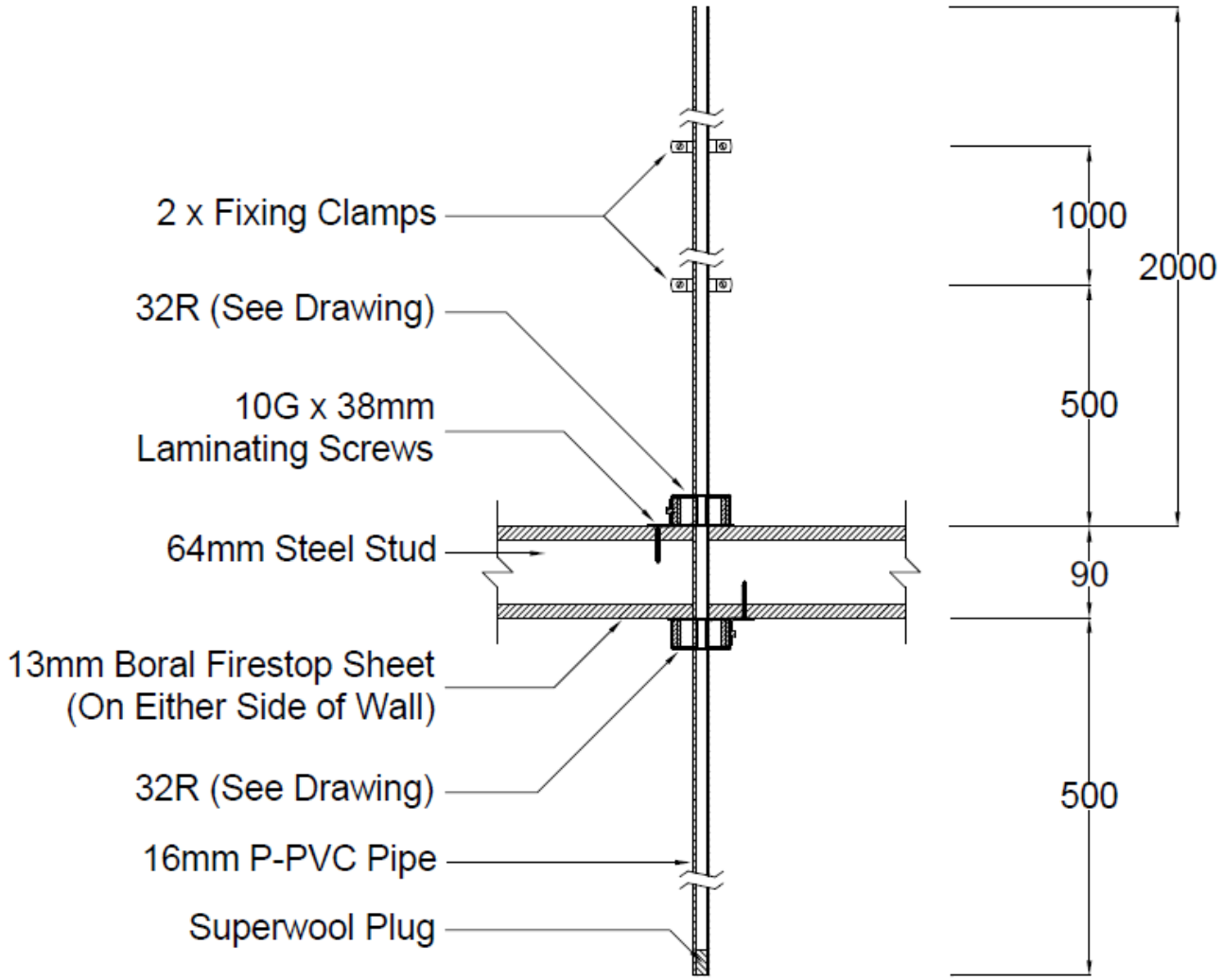
Specimen #6
25 Pex-B & 32R
Date: 21 JUN 2018



DRAWING TITLED "SPECIMEN # 6, 25 PEX-B PIPE & 32R", DATED 21 JUNE 2018, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

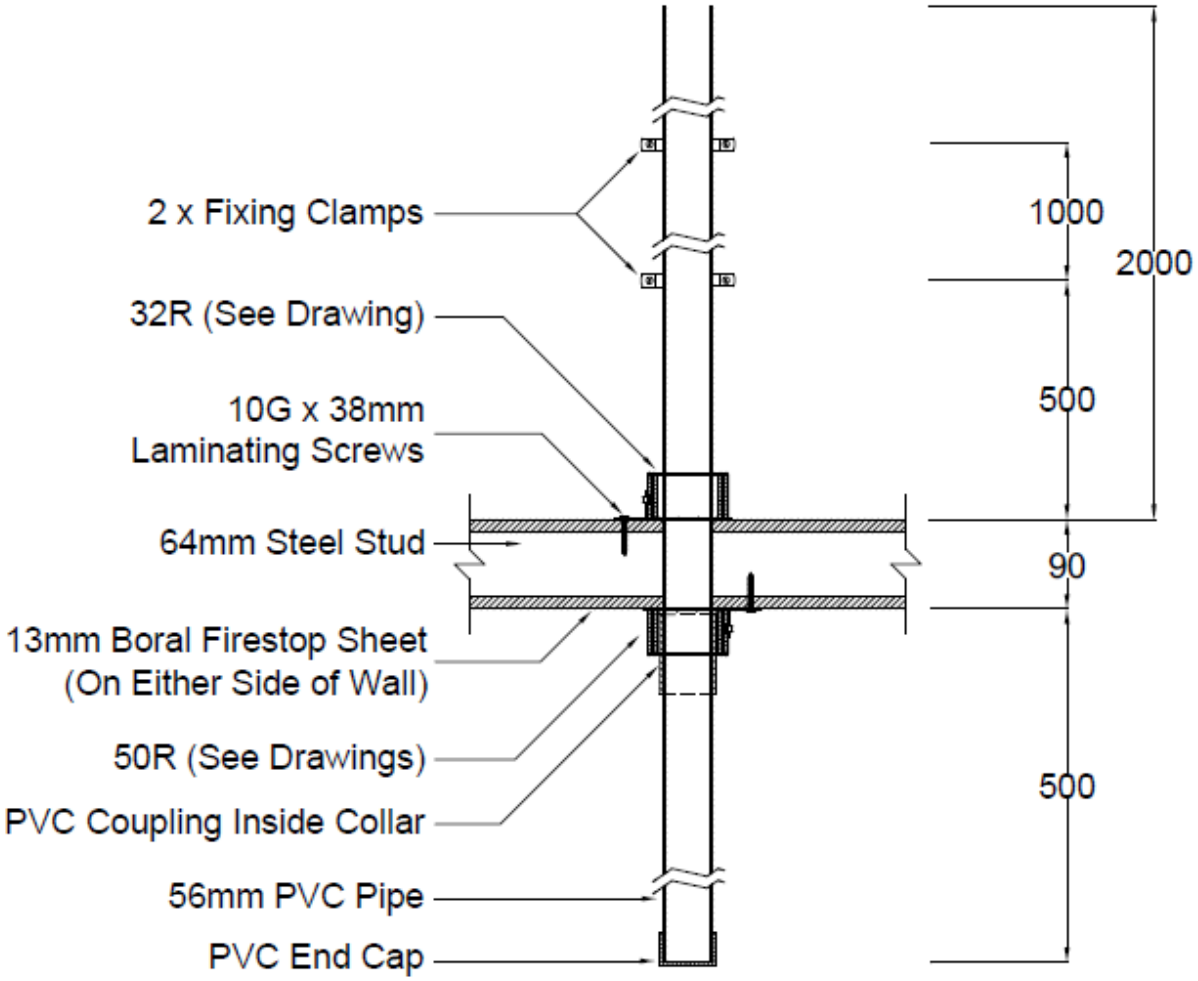
Specimen #7
16 P-PVC Pipe & 32R
Date: 21 JUN 2018



DRAWING TITLED "SPECIMEN # 7, 16 – P-PVC PIPE & 32R", DATED 21 JUNE 2018, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

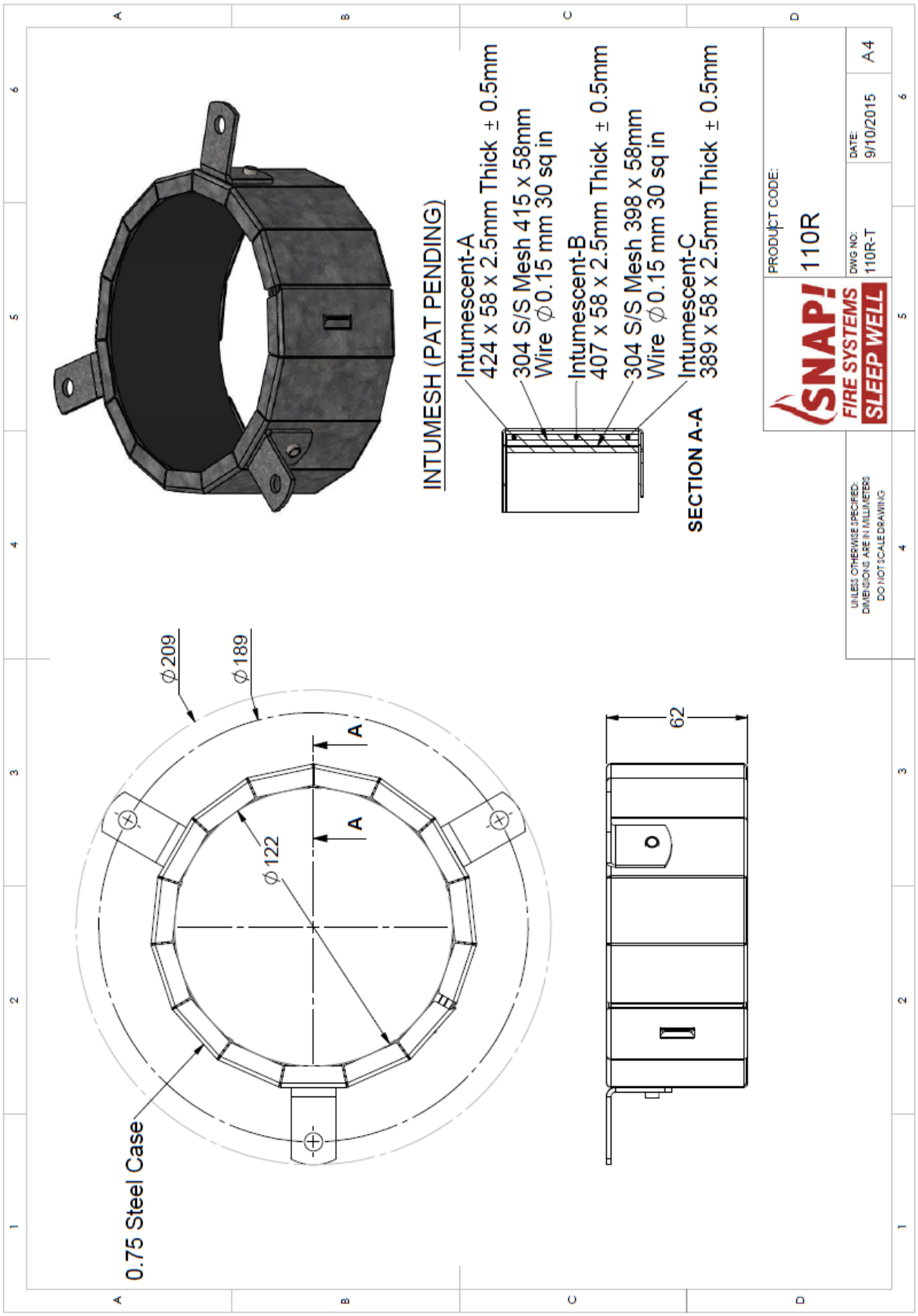
Snap Fire Systems Pty Ltd

Specimen #9
50 PVC Pipe & 50R
Date: 31 MAY 2018

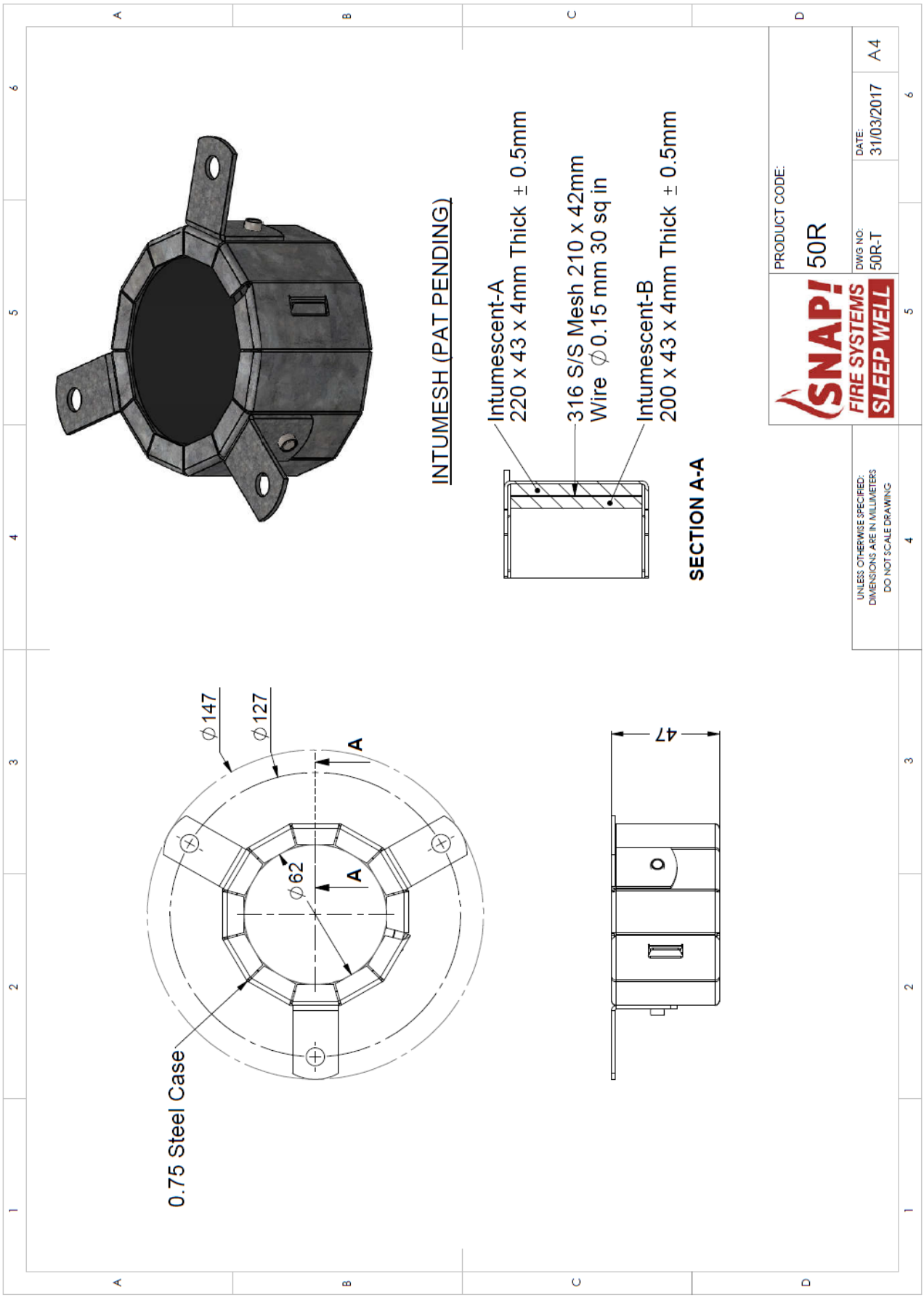


DRAWING TITLED "SPECIMEN # 9, 50 PVC & 50R", DATED 21 JUNE 2018, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

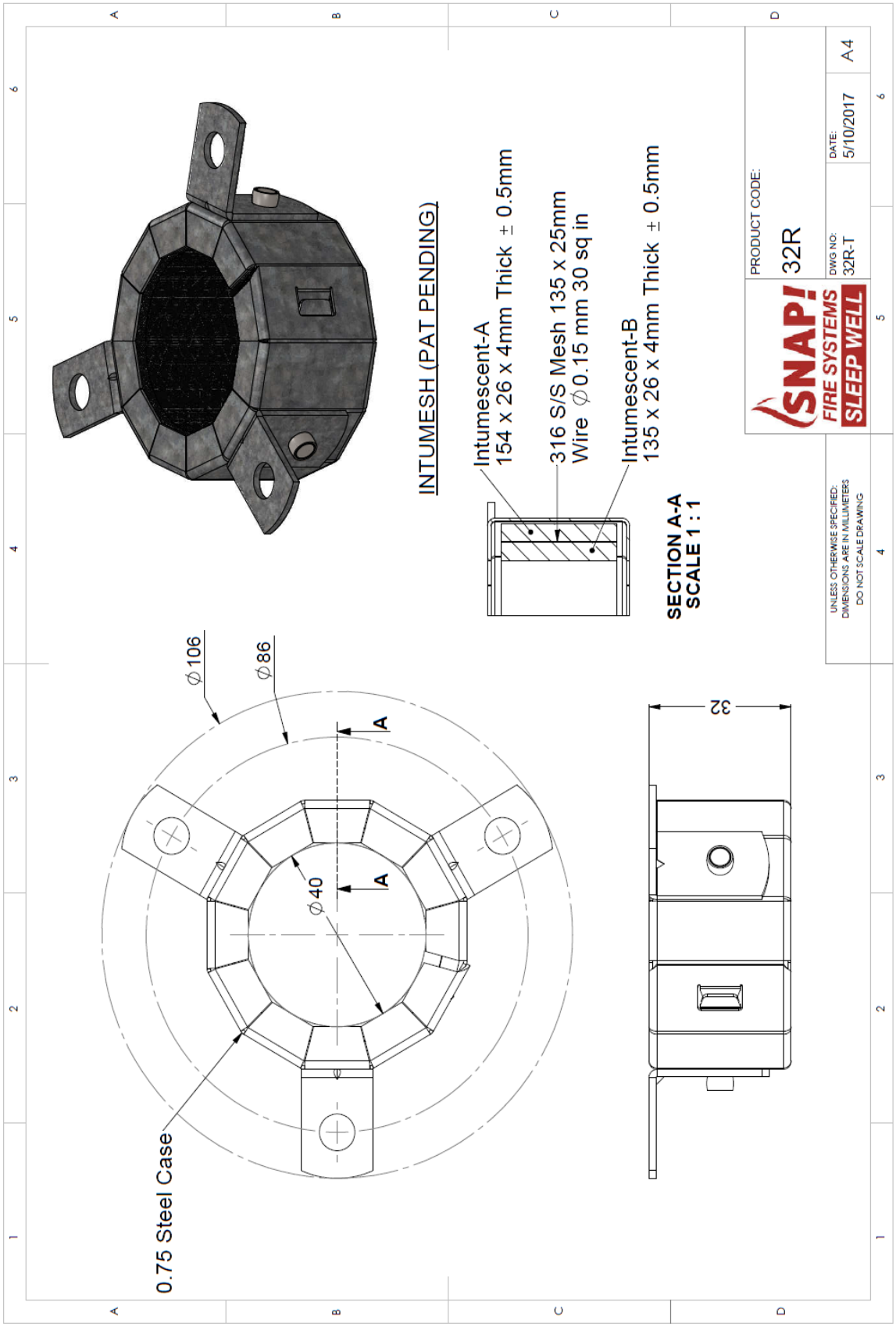
Appendix E – Specimen Drawings



DRAWING NUMBERED 110R-T DATED 9 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING NUMBERED 50 R-T DATED 31 MARCH 2017, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING NUMBERED 32R-T DATED 5 OCTOBER 2017, 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

Certificate of Test

No. 3195

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 Sponsored Investigation report numbered FSP 1932.

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

Description: The specimen comprised a service penetrating 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 as described as system S860.1. SNAP Retrofit 110R fire collar comprised a 0.75-mm steel casing with a 122 mm inner diameter and a 209-mm diameter base flange. 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 398-mm long x 58-mm wide and between intumescent strips B and C was a layer of 304 stainless steel mesh 398-mm long x 58-mm wide both had wire mesh diameters of 0.15-mm, as shown in drawing numbered 110R-T dated 9 October 2015, by Snap Fire Systems Pty Ltd. 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. Penetrating service comprised a 110-mm outside diameter PVC-SC pipe with a wall thickness of 3.2-mm and a PVC coupling with a total wall thickness of 6.4 mm fitted through the collar's sleeve penetrating the plasterboard wall through a 114-mm diameter cut-out hole as shown in drawing titled "Specimen # 1, 110 PVC-SC Pipe & 110R", dated 21 June 2018, by Snap Fire Systems Pty Ltd. Pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. Pipe was supported at nominally 500-mm and 1500-mm from the unexposed face of the plasterboard wall. Pipe was open at the unexposed end and closed with a PVC 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 62 minutes
Insulation	60 minutes

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

The fire-resistance level of the specimens is applicable when the system is exposed to fire from either. 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 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: 14 August 2018

Issued on the 14th day of December 2018 without alterations or additions.

Brett Roddy
Manager, Fire Testing and Assessments

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. 3195

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

Certificate of Test

No. 3196

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 Sponsored Investigation report numbered FSP 1932.

Product Name: SNAP 32R Retrofit fire collar protecting a nominal 16-mm Pex-Al-Pex pipe.

Description: The specimen comprised a service penetrating 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 establis hed FRL of -/60/60 as described as system SB60.1. 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 numbered 32R-T 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 16-mm Pex-Al-Pex pipe, with a wall thickness of 2.3-mm, penetrating the wall through a 20-mm diameter cut-out hole as shown in drawing titled "Specimen # 2, 16 Pex-Al-Pex Pipe & 32R", dated 21 June 2018, 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 1000-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 62 minutes
Insulation	62 minutes

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

The fire-resistance level of the specimens is applicable when the system is exposed to fire from either.
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 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: 14 August 2018

Issued on the 14th day of December 2018 without alterations or additions.

Brett Roddy
Manager, Fire Testing and Assessments

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. 3196

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

Certificate of Test

No. 3197

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 Sponsored Investigation report numbered FSP 1932.

Product Name: SNAP 32R Retrofit fire collar protecting a nominal 20-mm Pex-Al-Pex pipe.

Description: The specimen comprised a service penetrating 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 as described as system SB60.1. 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 numbered 32R-T 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 20-mm Pex-Al-Pex pipe, with a wall thickness of 2.3-mm, penetrating the wall through a 25-mm diameter cut-out hole as shown in drawing titled "Specimen # 3, 20 Pex-Al-Pex Pipe & 32R", dated 21 June 2018, 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 1000-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 62 minutes
Insulation	No failure at 62 minutes

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

The fire-resistance level of the specimens is applicable when the system is exposed to fire from either.
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 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: 14 August 2018

Issued on the 14th day of December 2018 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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. 3197

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

Certificate of Test

No. 3198

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 Sponsored Investigation report numbered FSP 1932.

Product Name: SNAP 32R Retrofit fire collar protecting a nominal 16-mm Pex-B pipe.

Description: The specimen comprised a service penetrating 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 as described as system SB60.1. 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 numbered 32R-T 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 16-mm Pex-B pipe, with a wall thickness of 2.4-mm, penetrating the wall through a 20-mm diameter cut-out hole as shown in drawing titled "Specimen # 4, 16 Pex-B Pipe & 32R", dated 21 June 2018, 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 1000-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 62 minutes
Insulation	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 of the specimens is applicable when the system is exposed to fire from either.

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 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: 14 August 2018

Issued on the 14th day of December 2018 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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. 3198

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

Certificate of Test

No. 3199

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 Sponsored Investigation report numbered FSP 1932.

Product Name: SNAP 32R Retrofit fire collar protecting a nominal 25-mm Pex-B pipe.

Description: The specimen comprised a service penetrating 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 as described as system SB60.1. 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 numbered 32R-T 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 25-mm Pex-B pipe, with a wall thickness of 3.2-mm, penetrating the wall through a 32-mm diameter cut-out hole as shown in drawing titled "Specimen # 6, 25 Pex-B Pipe & 32R", dated 21 June 2018, 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 1000-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 62 minutes
Insulation	60 minutes

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

The fire-resistance level of the specimens is applicable when the system is exposed to fire from either.
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 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: 14 August 2018

Issued on the 14th day of December 2018 without alterations or additions.

Brett Roddy
Manager, Fire Testing and Assessments

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. 3199

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

Certificate of Test

No. 3200

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 Sponsored Investigation report numbered FSP 1932.

Product Name: SNAP 32R Retrofit fire collar protecting a nominal 16 mm P-PVC pipe.

Description: The specimen comprised a service penetrating 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 as described as system SB60.1. 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 numbered 32R-T 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 38-mm (10g) course thread laminating screws. The penetrating service comprised a 22-mm P-PVC pipe, with a wall thickness of 2.0-mm, penetrating the wall through a 25-mm diameter cut-out hole as shown in drawing titled "Specimen # 7, 16 – P-PVC Pipe & 32R", dated 21 June 2018, 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 1000-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 62 minutes
Insulation	62 minutes

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

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

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 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: 14 August 2018

Issued on the 14th day of December 2018 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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. 3200

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

Certificate of Test

No. 3201

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 Sponsored Investigation report numbered FSP 1932.

Product Name: SNAP 50R Retrofit fire collar protecting a nominal 50-mm PVC 56 mm pipe incorporating a coupling inside the collar.

Description: The specimen comprised a service penetrating 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 as described as S860.1. 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 that was comprised of 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 stainless steel mesh 210-mm long x 42-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 50R-T dated 31 March 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 38-mm (10g) course thread laminating screws. The penetrating service comprised a 56-mm PVC pipe with a wall thickness of 2.3-mm and a PVC coupling with a total wall thickness of 4.6-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 60-mm diameter cut-out hole as shown in drawing titled "Specimen # 9, 50 PVC & 50R", dated 21 June 2018, provided by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm and 1000-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed and capped with a PVC 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 62 minutes
Insulation	No failure at 62 minutes

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

The fire-resistance level of the specimens is applicable when the system is exposed to fire from either.
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 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: 14 August 2018

Issued on the 14th day of December 2018 without alterations or additions.

Brett Roddy
Manager, Fire Testing and Assessments

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. 3201

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.

CONTACT US

t 1300 363 400
+61 3 9545 2176
e enquiries@csiro.au
w www.csiro.au

YOUR CSIRO

Australia is founding its future on science and innovation. Its national science agency, CSIRO, is a powerhouse of ideas, technologies and skills for building prosperity, growth, health and sustainability. It serves governments, industries, business and communities across the nation.

FOR FURTHER INFORMATION

Infrastructure Technologies
Brett Roddy
Team Leader, Fire Testing and Assessments
t +61 2 94905449
e brett.roddy@csiro.au
w www.csiro.au/Organisation-Structure/Divisions/CMSE/Infrastructure-Technologies/Fire-safety.aspx