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

Test Report

Author: Peter Gordon
Report number: FSP 2100
Date: 30 August 2020

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

Commercial-in-confidence

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30 August 2020	30 August 2020	30 August 2020

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Contents

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

Sponsored Investigation No. FSP 2100

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 for 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 4981/4526

1.7 Test date

The fire-resistance test was conducted on 29 April 2020.

2 Description of specimen

2.1 General

The specimen comprised an 1150-mm x 1150-mm x 90-mm thick plasterboard lined steel framed wall system penetrated by four (4) services protected by retro-fitted Snap Fire Systems fire collars.

The wall was constructed in accordance with Boral Firestop system SB60.1 with an established fire resistance level (FRL) of -/60/60 as detailed in the document titled "Plasterboard Fire and Acoustic Systems Australia", revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd. Wall construction comprised 64-mm x 0.55-mm steel studs installed at nominally 600-mm centres, lined on each side with one layer of 13-mm thick Boral Firestop plasterboard. The wall cavity was filled with a single layer of 50-mm thick Acoustigard 11 insulation. The plasterboard was screw fixed to the steel studs using plasterboard screws at nominally 200-mm centres.

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 1260 'PVC-U pipes and fittings for drain, waste and vent application'; and
- AS/NZS 4401 Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings - Polyethylene (PE).

Specimen 1 - SNAP 50R Retrofit fire collars protecting a nominal 40-mm PVC pipe.

The SNAP Retrofit 50R fire collar comprised a 0.75-mm steel casing with a 62-mm inner diameter and a 147-mm diameter base flange. The 47-mm high collar casing incorporated a closing mechanism which comprised two soft 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 a 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 with stainless steel washes.

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

The penetrating service comprised a 42.83-mm outside diameter Iplex PVC pipe, with a wall thickness of 2.07-mm which penetrated the wall through a 44-mm diameter cut-out hole as shown in drawing titled "Specimen #1, 40 PVC Stack & 50R", dated 21 April 2020, 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 PVC end cap on the exposed end.

Specimen 2 - SNAP 65-80R Retrofit fire collars protecting a nominal 65-mm PVC pipe.

The SNAP Retrofit 65-80R fire collar comprised a 0.75-mm steel casing with a 94-mm inner diameter and a 178-mm diameter base flange. The 61.5-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 55-mm wide x 325-mm long, and Intumescent B was 4-mm thick x 55-mm wide x 300-mm long. Between the strips was a layer of 316 stainless steel mesh 300-mm long x 55-mm wide with a wire mesh diameter of 0.15-mm, as shown in drawing titled "SNAP 65-80 Retro" dated 25 March 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 with stainless steel washers.

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

The penetrating service comprised a 68.61-mm outside diameter Iplex PVC pipe, with a wall thickness of 2.77-mm which penetrated the wall through a 70-mm diameter cut-out hole as shown in drawing titled "Specimen #2, 65 PVC Stack & 65-80R", dated 21 April 2020, 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 PVC end cap on the exposed end.

Specimen 3 - SNAP 65-80R Retrofit fire collars protecting a nominal 80-mm PVC pipe.

The SNAP Retrofit 65-80R fire collar comprised a 0.75-mm steel casing with a 94-mm inner diameter and a 178-mm diameter base flange. The 61.5-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 55-mm wide x 325-mm long, and Intumescent B was 4-mm thick x 55-mm wide x 300-mm long. Between the strips was a layer of 316 stainless steel mesh 300-mm long x 55-mm wide with a wire mesh diameter of 0.15-mm, as shown in drawing titled "SNAP 65-80 Retro" dated 25 March 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) course thread laminating screws.

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

The penetrating service comprised a 82-mm outside diameter Iplex PVC pipe, with a wall thickness of 3.08 mm which penetrated the wall through an 83-mm diameter cut-out hole as shown in drawing titled "Specimen #3, 80 PVC Stack & 65-80R", dated 21 April 2020, 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 PVC end cap on the exposed end.

Specimen 4 - SNAP 110R Retrofit fire collars protecting a nominal 110-mm HDPE (PE100) 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 with stainless steel washers.

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

The penetrating service comprised a 110-mm outside diameter Vinidex HDPE (PE100) pipe, with a wall thickness of 4.6-mm which penetrated the wall through an 111-mm diameter cut-out hole as shown in drawing titled "Specimen #4, 110 HDPE Stack & 110R", dated 21 April 2020, 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.

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 20 April 2020 and stored 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:

- Documents titled “Plasterboard Fire and Acoustic Systems Australia”, revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd.
- Drawing titled “Test Wall W-20-C Layout”, dated 8 April 2020.
- Drawing titled “Specimen #1, 40 PVC Stack & 50R”, dated 21 April 2020, provided by Snap Fire Systems Pty Ltd.
- Drawing titled “Specimen #2, 65 PVC Stack & 65-80R”, dated 21 April 2020, provided by Snap Fire Systems Pty Ltd.
- Drawing titled “Specimen #3, 80 PVC Stack & 65-80R”, dated 21 April 2020, provided by Snap Fire Systems Pty Ltd.
- Drawing titled “Specimen #4, 110 HDPE Stack & 110R”, dated 21 April 2020, provided by Snap Fire Systems Pty Ltd.
- Drawing titled “SNAP 65-80 Retro” dated 25 March 2019, by Snap Fire Systems Pty Ltd.
- Drawing titled “SNAP 50 Retro”, dated 18 January 2019, by Snap Fire Systems Pty Ltd.
- Drawing titled “SNAP 110 Retro”, dated 16 January 2019, by Snap Fire Systems Pty Ltd.

4 Equipment

4.1 Furnace

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

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

4.2 Temperature

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

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

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

4.3 Measurement system

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

5 Ambient temperature

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

6 Departure from standard

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

7 Termination of test

The test was terminated at 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
3 minutes -	Smoke is fluing from the end of the pipe of Specimen 4.
4 minutes -	Smoke is fluing from the ends of the pipes of Specimens 1 and 3.
5 minutes -	Smoke is fluing from the end of the pipe of Specimen 2.
6 minutes -	Smoke is venting from the collar and the pipe at the base of the Specimen 3, some minor distortion of the pipe is also noted.
8 minutes -	Smoke has ceased fluing from Specimen 2.
9 minutes -	Smoke has ceased fluing from Specimens 1 and 3.
19 minutes -	Smoke has ceased fluing from Specimen 4.
25 minutes -	Smoke has resumed fluing from the end of the pipe of Specimen 3.
35 minutes -	Light smoke is fluing from the collar at the base of Specimen 4.
36 minutes -	Light smoke is fluing from the collar at the base of Specimen 3.
38 minutes -	Smoke has resumed fluing from the end of the pipe of Specimen 2.
51 minutes -	Smoke fluing from the end of the pipe of Specimen 3 has increased and change to a yellow -green colour.
49 minutes -	Liquid is dripping out from the end of the pipe of Specimen 4.
58 minutes -	The plasterboard wall and fixing screw heads have begun to discolour.
65 minutes -	Fluid is dripping from the end of the pipe of Specimen 1.
66 minutes -	Fluid is dripping from the end of the pipe of Specimen 3.
68 minutes -	Fluid is dripping from the end of the pipe of Specimen 2.

70 minutes - Insulation Failure of Specimen 3 – maximum temperature rise of 180K is exceeded on the plasterboard 25-mm above the collar.

71 minutes - The pipe inside the collar of Specimen 2 has started to distort and the void between the collar and pipe is being filled with black intumescent material.

72 minutes - Black intumescent material is being expelled between the collar and pipe of Specimen 4.

68 minutes - Cotton wool pad test applied between the pipe and collar of Specimen 2. No ignition noted at this time.

70 minutes - Insulation Failure of Specimen 3 – maximum temperature rise of 180K is exceeded on the plasterboard wall 25-mm below the collar.

74 minutes - Insulation Failure of Specimen 1 – maximum temperature rise of 180K is exceeded on the plasterboard wall 25-mm below the collar.

78 minutes - Insulation Failure of Specimen 4 – maximum temperature rise of 180K is exceeded on the top of the collar.

84 minutes - Insulation Failure of Specimen 2 – maximum temperature rise of 180K is exceeded on the plasterboard wall 25-mm below the collar.
Smoke has ceased fluing from Specimens 3 and 4.

87 minutes - Black intumescent material is being expelled between the collar and the pipe of Specimen 1.

91 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 collars protecting a nominal 40-mm PVC pipe.

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

Specimen 2 - SNAP 65-80R Retrofit fire collars protecting a nominal 65-mm PVC pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 91 minutes
Insulation	-	84 minutes

Specimen 3 - SNAP 65-80R Retrofit fire collars protecting a nominal 80-mm PVC pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 91 minutes
Insulation	-	70 minutes

Specimen 4 - SNAP 110R Retrofit fire collars protecting a nominal 110-mm HDPE (PE100) pipe.

Structural adequacy	-	not applicable
Integrity	-	no failure at 91 minutes
Insulation	-	78 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 1530.4. 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 10.12 of AS 1530.4-2014, have been made provided no individual component is removed or reduced.

11 Tested by

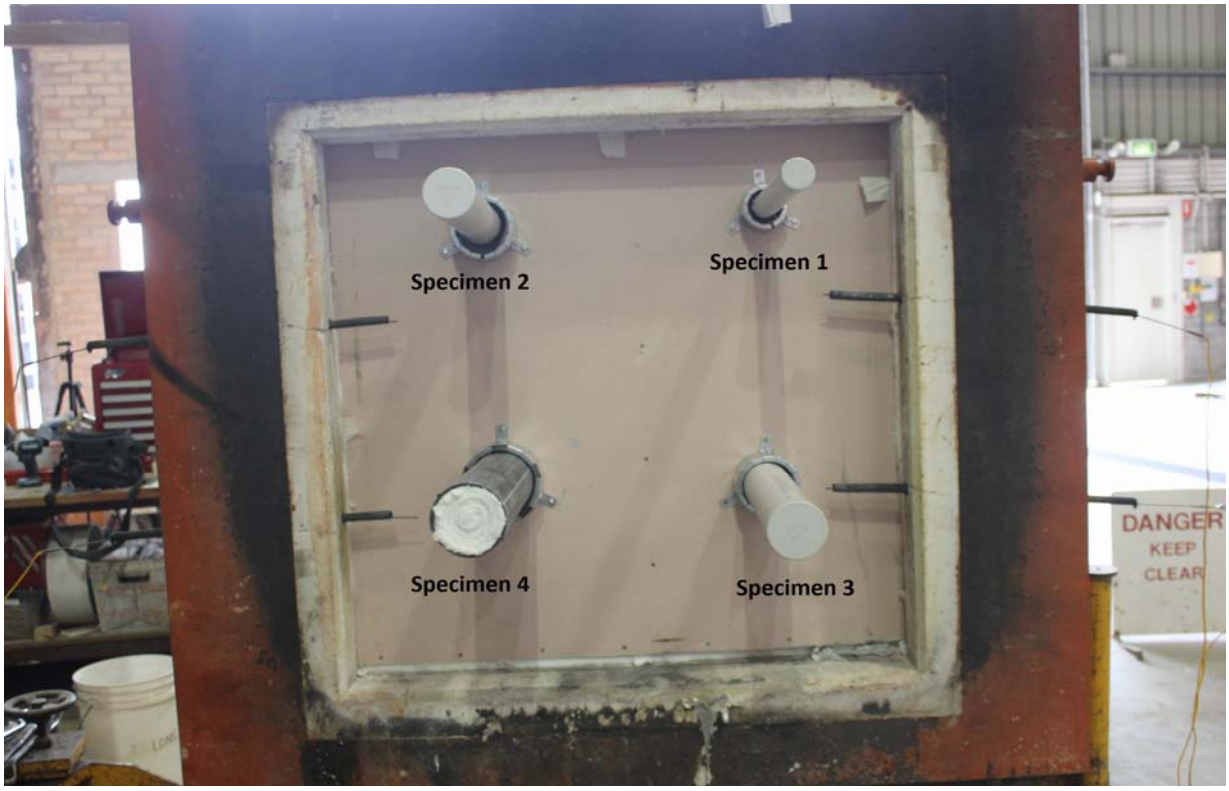
Peter Gordon
Testing Officer

Appendices

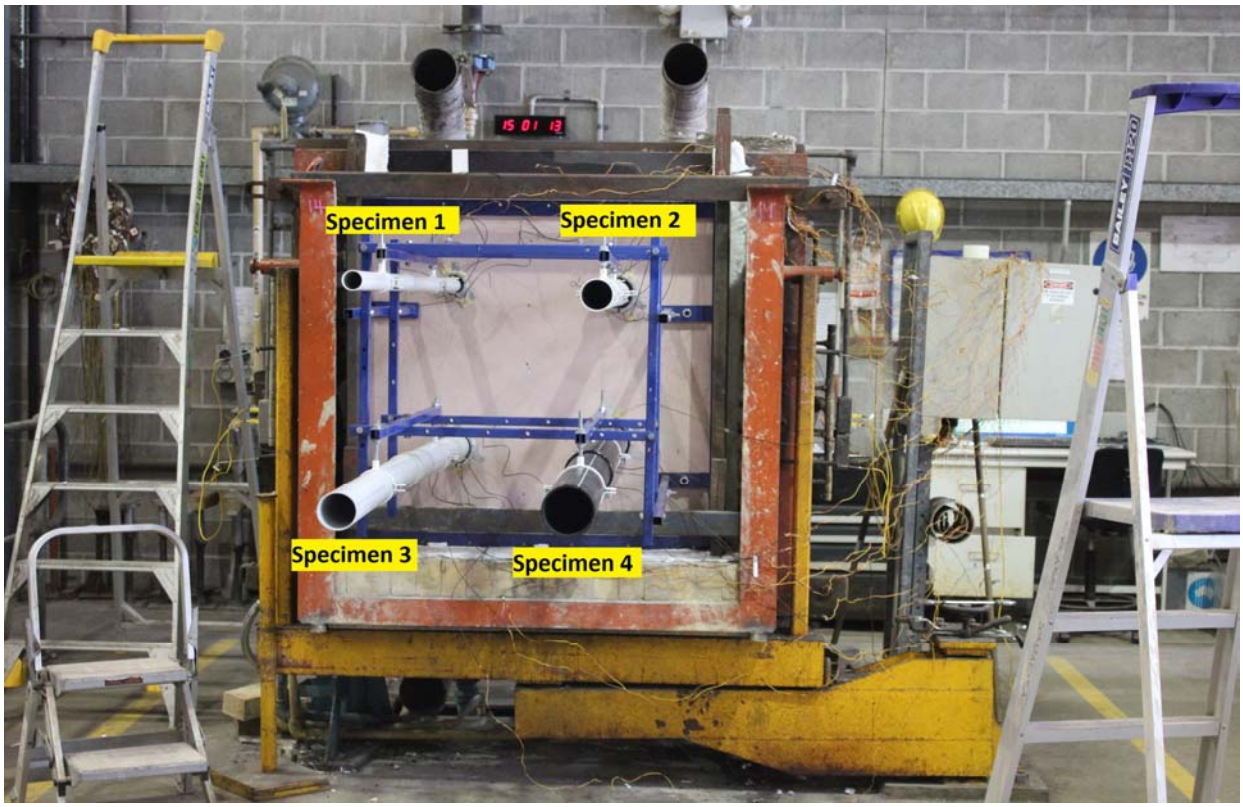
Appendix A – Measurement location

Specimen	T/C Position	T/C designation
Specimen 1 - SNAP 50R Retrofit fire collars protecting a nominal 40-mm PVC pipe.	On P/B, 25 mm above collar	S1
	On P/B, 25 mm below of collar	S2
	On collar top side	S3
	On collar bottom side	S4
	On top of pipe, 25-mm from collar	S5
	On bottom of pipe, 25-mm from collar	S6
Specimen 2 - SNAP 65-80R Retrofit fire collars protecting a nominal 65-mm PVC pipe.	On P/B, 25 mm above collar	S7
	On P/B, 25 mm below of collar	S8
	On collar top side	S9
	On collar bottom side	S10
	On top of pipe, 25-mm from collar	S11
	On bottom of pipe, 25-mm from collar	S12
Specimen 3 - SNAP 65-80R Retrofit fire collars protecting a nominal 80- mm PVC pipe.	On P/B, 25 mm above collar	S13
	On P/B, 25 mm below of collar	S14
	On collar top side	S15
	On collar bottom side	S16
	On top of pipe, 25-mm from collar	S17
	On bottom of pipe, 25-mm from collar	S18
Specimen 4 - SNAP 110R Retrofit fire collars protecting a nominal 110-mm HDPE (PE100) pipe.	On P/B, 25 mm above collar	S19
	On P/B, 25 mm below of collar	S20
	On collar top side	S21
	On collar bottom side	S22
	On top of pipe, 25-mm from collar	S23
	On bottom of pipe, 25-mm from collar	S24
Rover		S25
Ambient		S26

Appendix B – Photographs



PHOTOGRAPH 1 – EXPOSED FACE OF SPECIMENS PRIOR TO TESTING

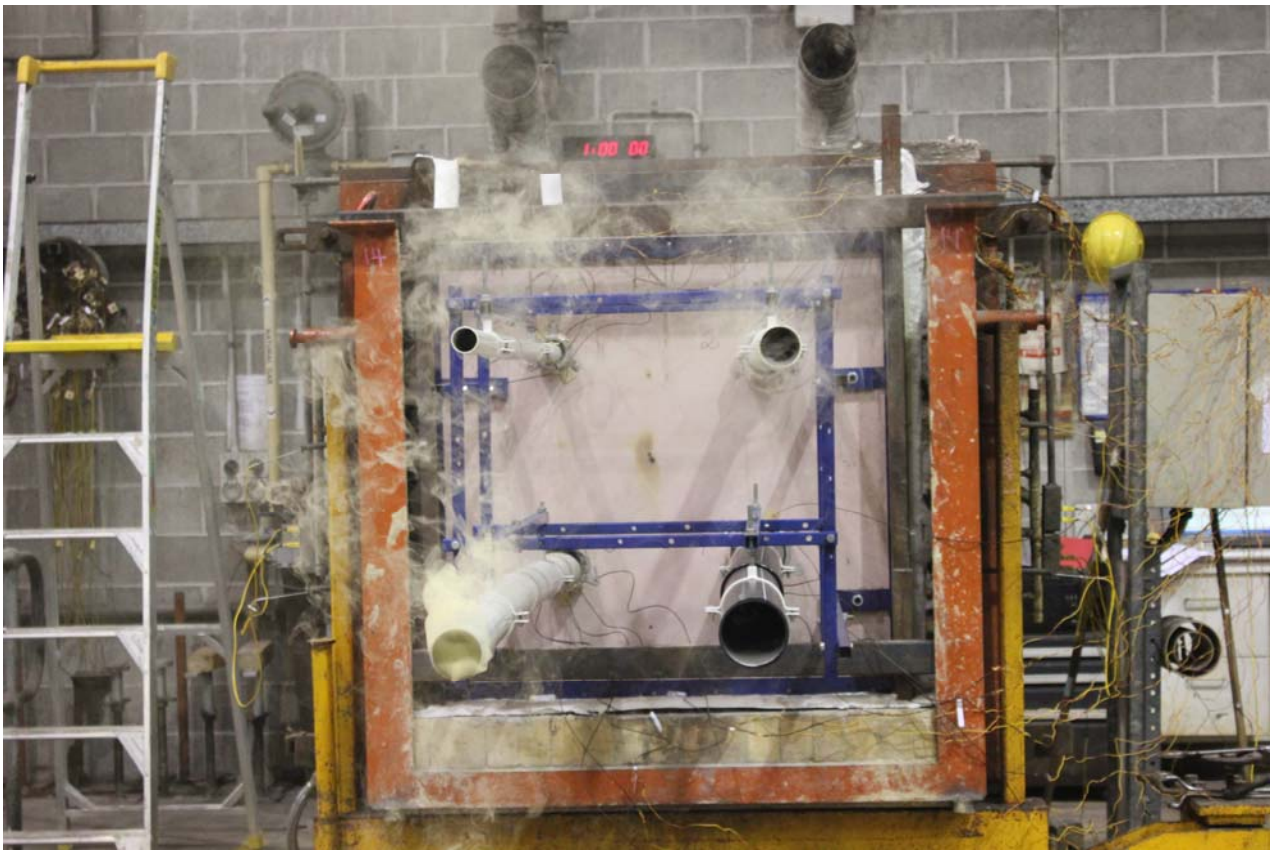


PHOTOGRAPH 2 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING

PHOTOGRAPH 3 – SPECIMEN 3 AFTER 10 MINUTES OF TESTING

PHOTOGRAPH 4 – SPECIMENS AFTER 30 MINUTES OF TESTING

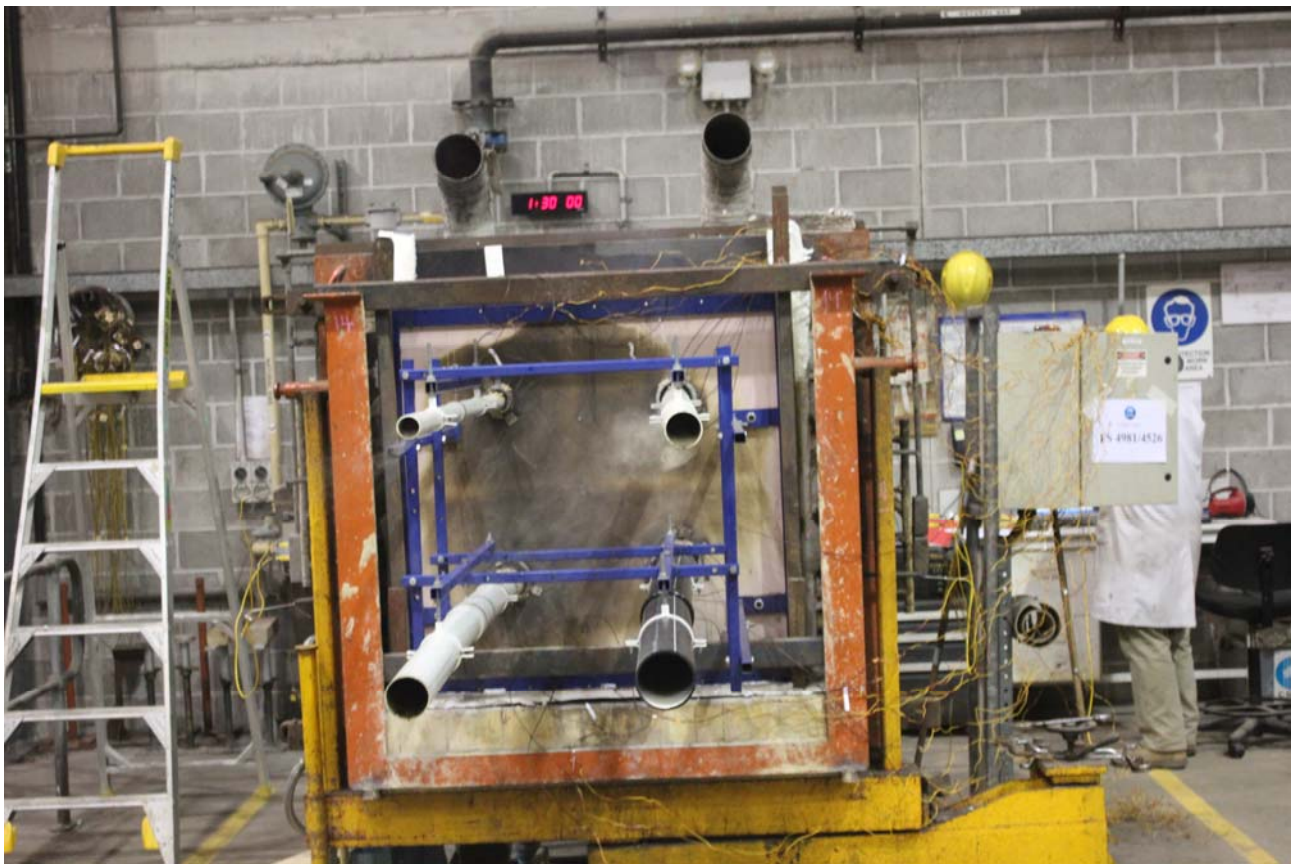
PHOTOGRAPH 5 – SPECIMEN 3 AFTER 36 MINUTES OF TESTING



PHOTOGRAPH 6 – SPECIMEN 3 AFTER 60 MINUTES OF TESTING

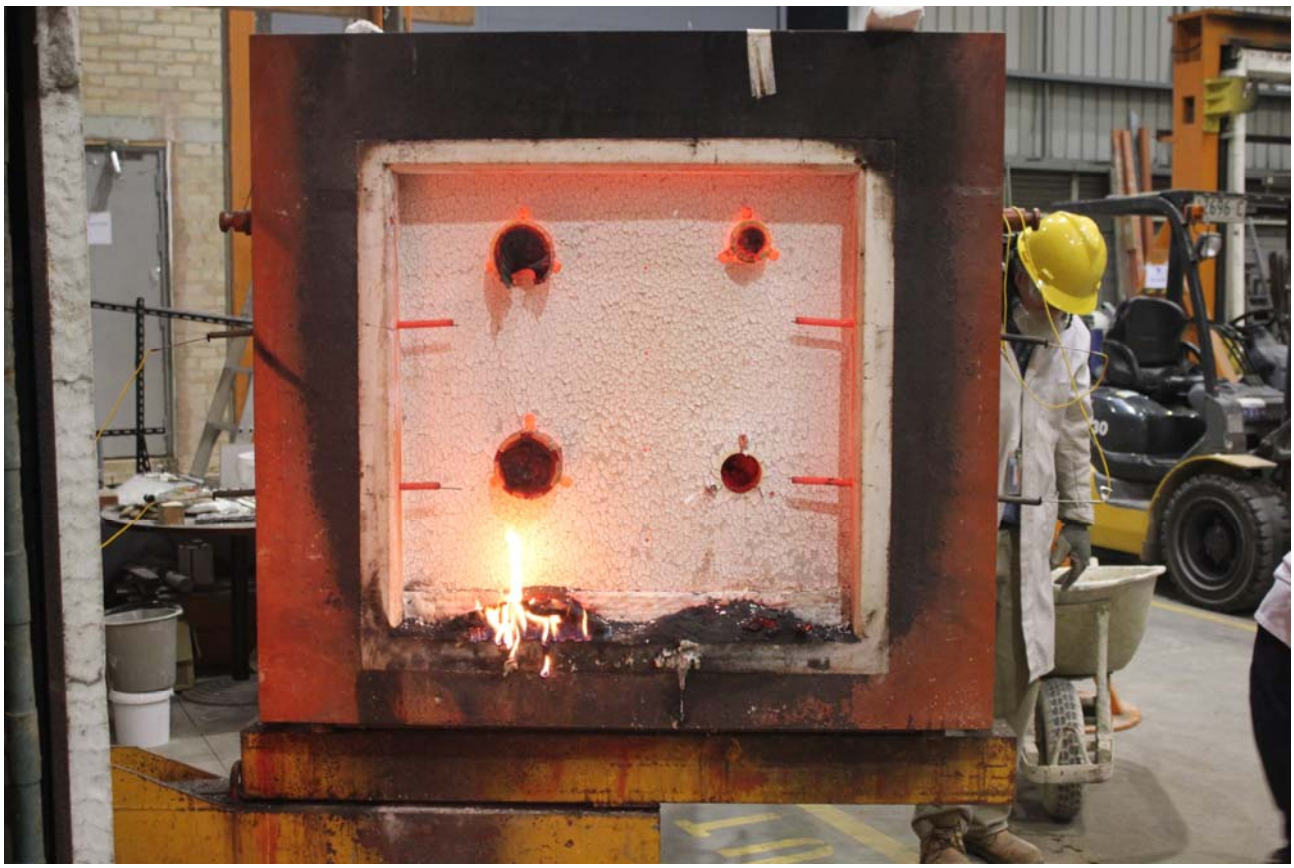
PHOTOGRAPH 7 – SPECIMEN 3 AFTER 73 MINUTES OF TESTING

PHOTOGRAPH 8 – SPECIMENS 3 AND 4 AFTER 80 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

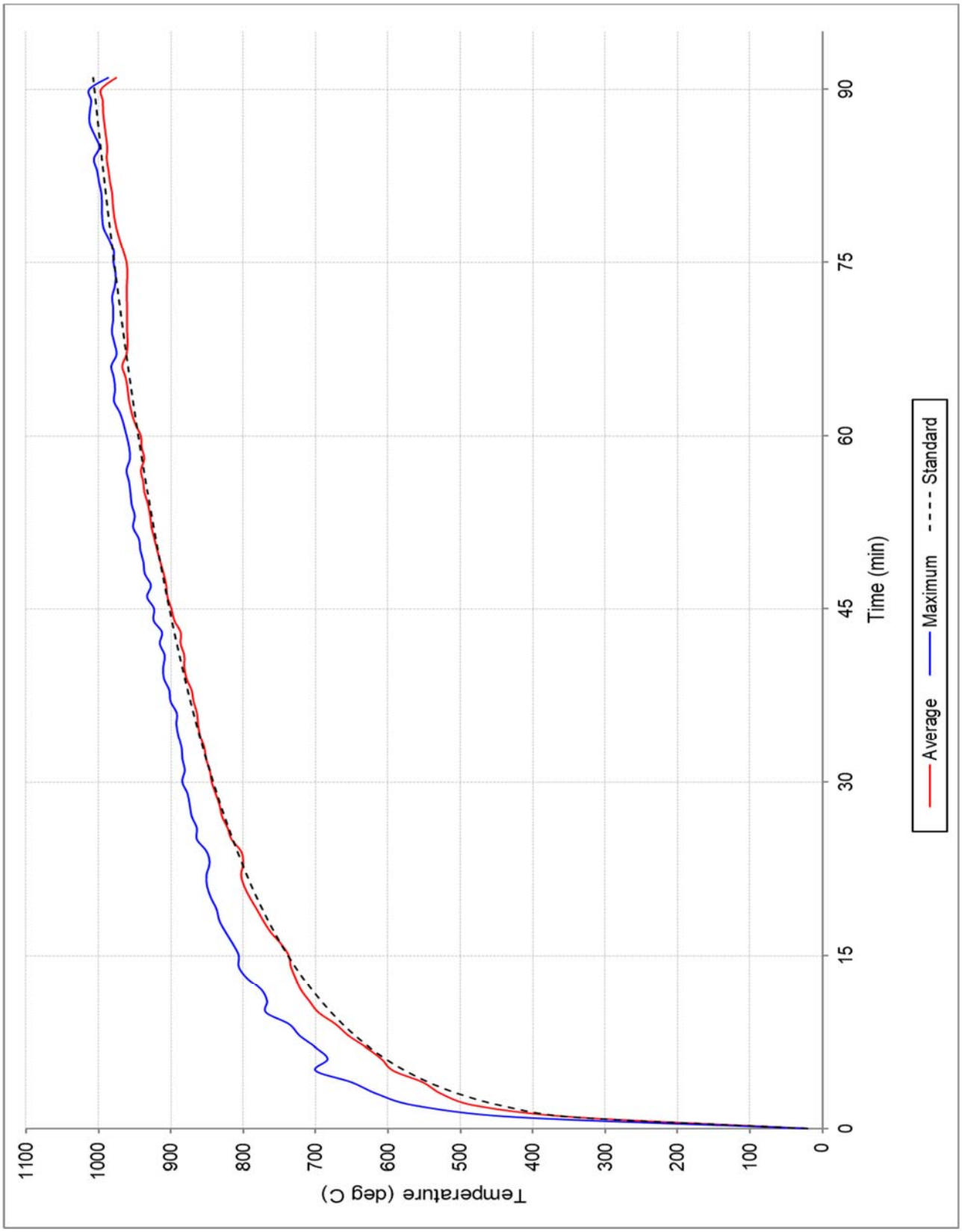


FIGURE 1 – FURNACE TEMPERATURE

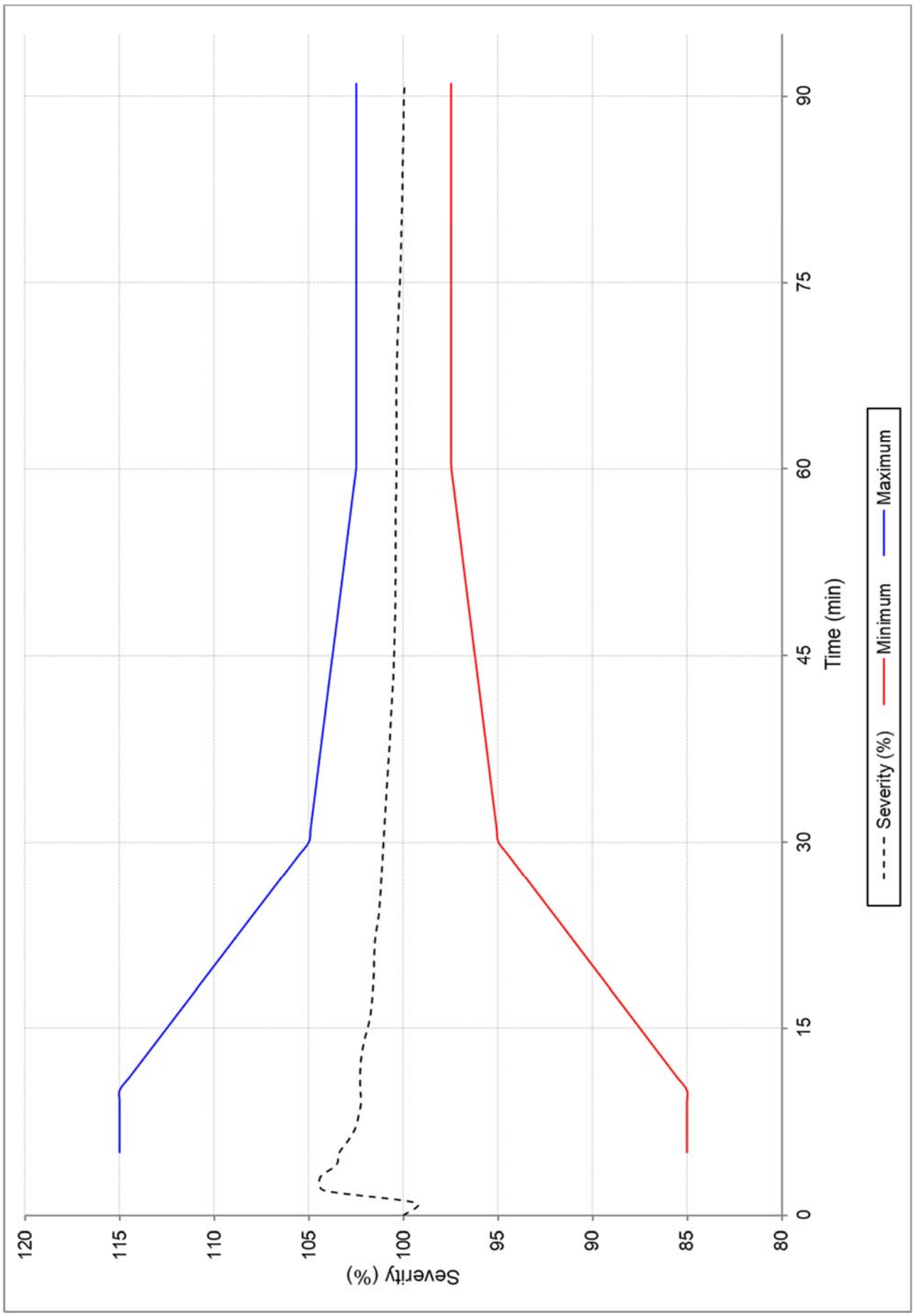


FIGURE 2 – FURNACE SEVERITY

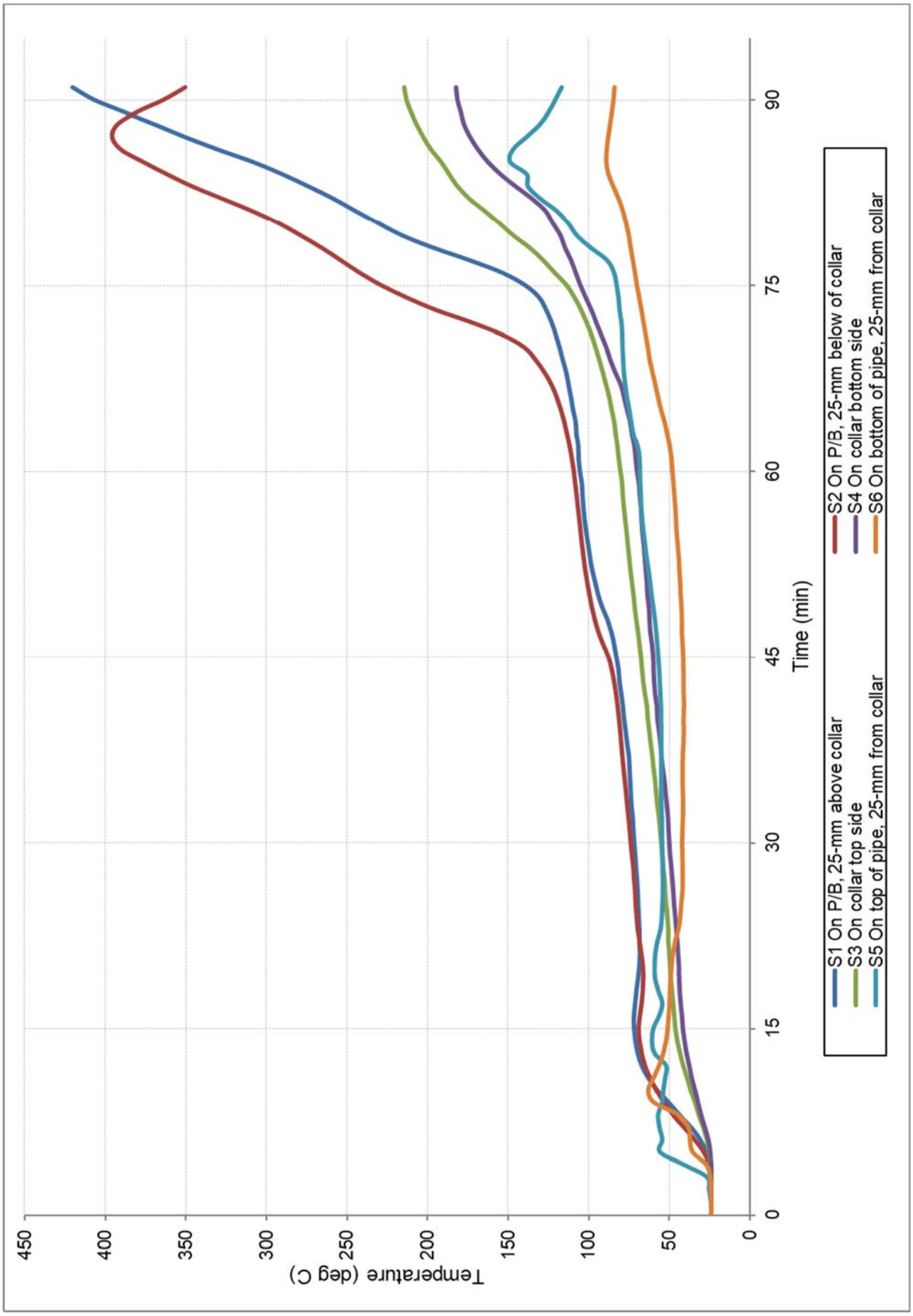


FIGURE 3 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 1

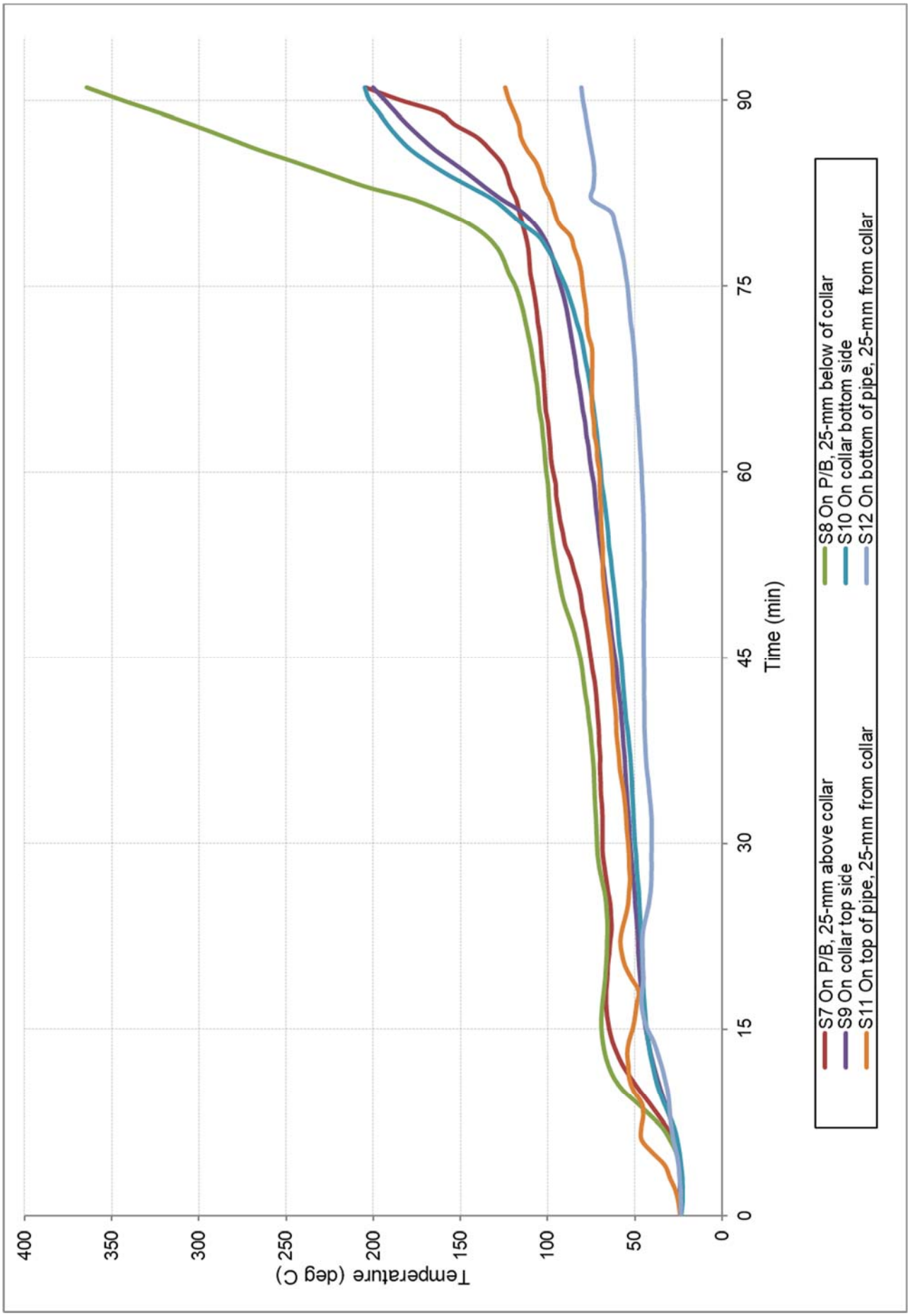


FIGURE 4 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 2

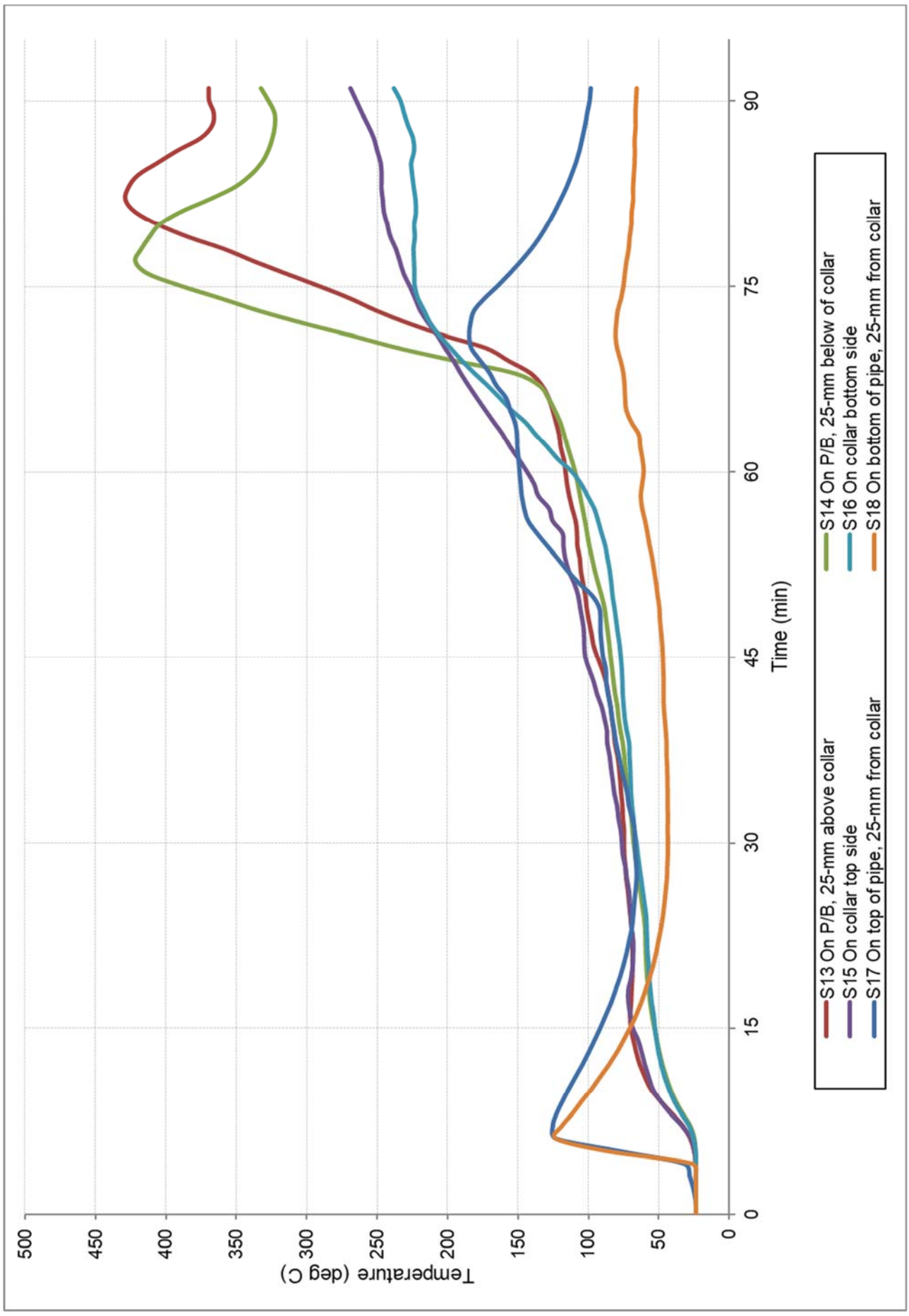


FIGURE 5 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 3

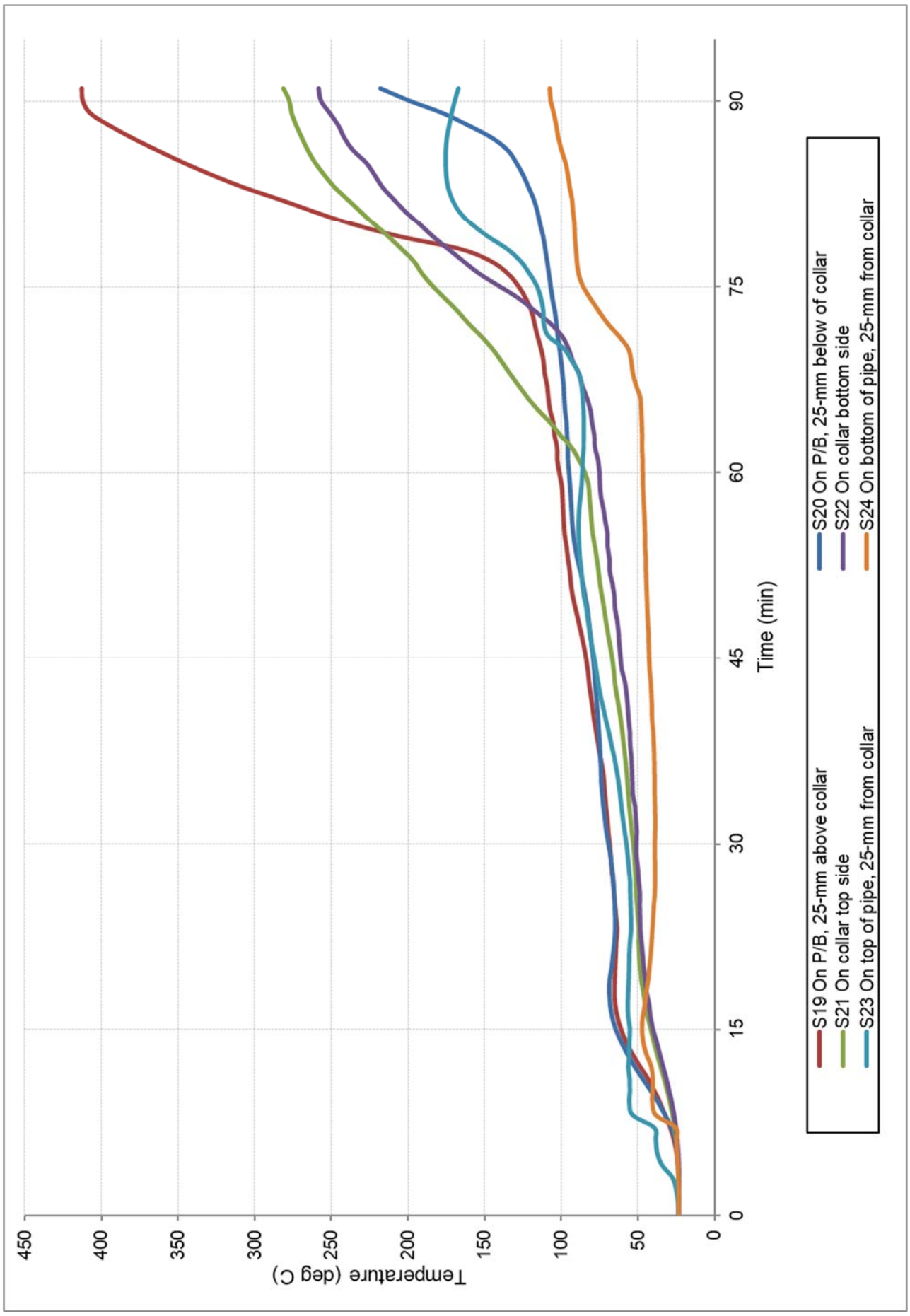


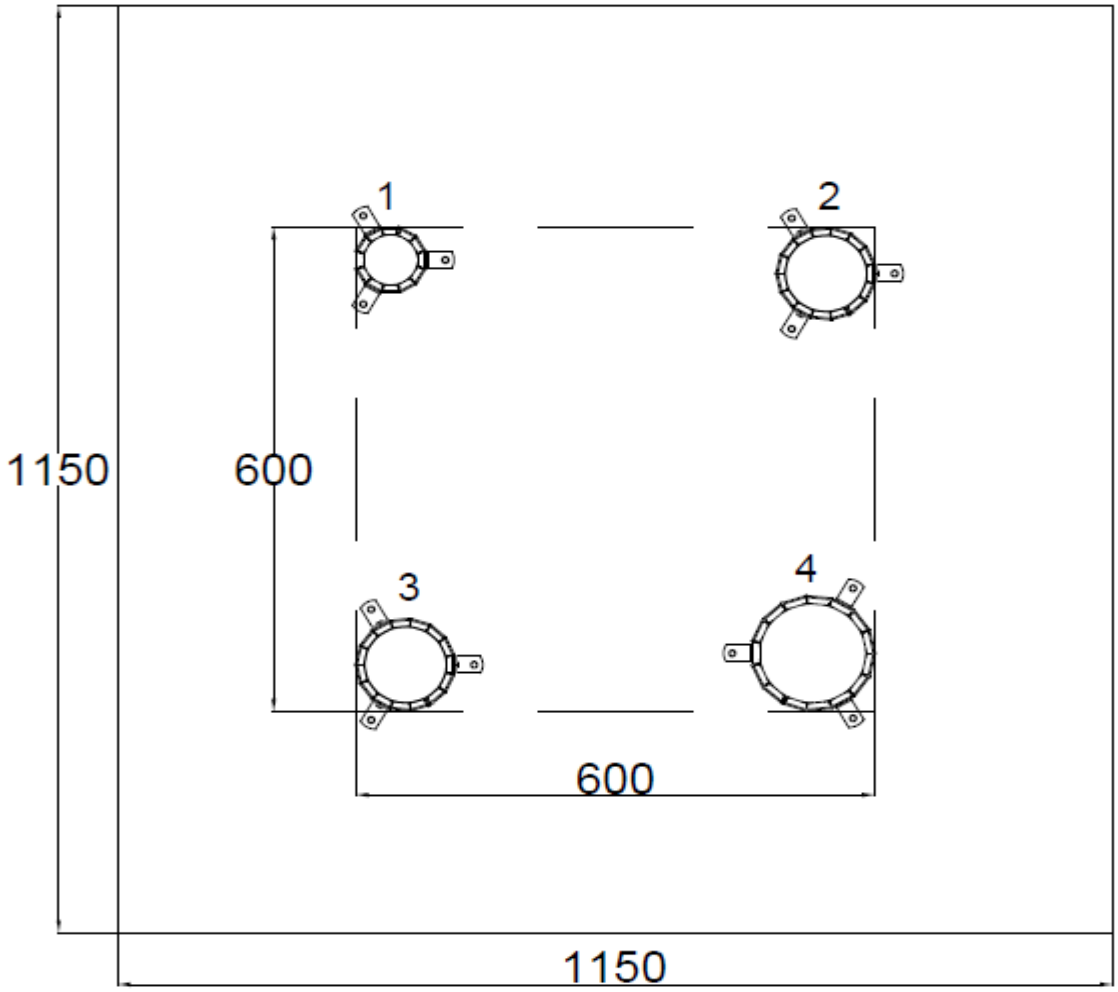
FIGURE 6 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN # 4

Appendix D – Layout and installation drawings

Snap Fire Systems Pty Ltd

Test Wall W-20-C Layout

Date: 08 APR 2020



Penetration	Collar Code	Pipe Type	Pipe Diameter (mm)
1	50R	PVC	40
2	65-80R	PVC	65
3	65-80R	PVC	80
4	110R	HDPE	110

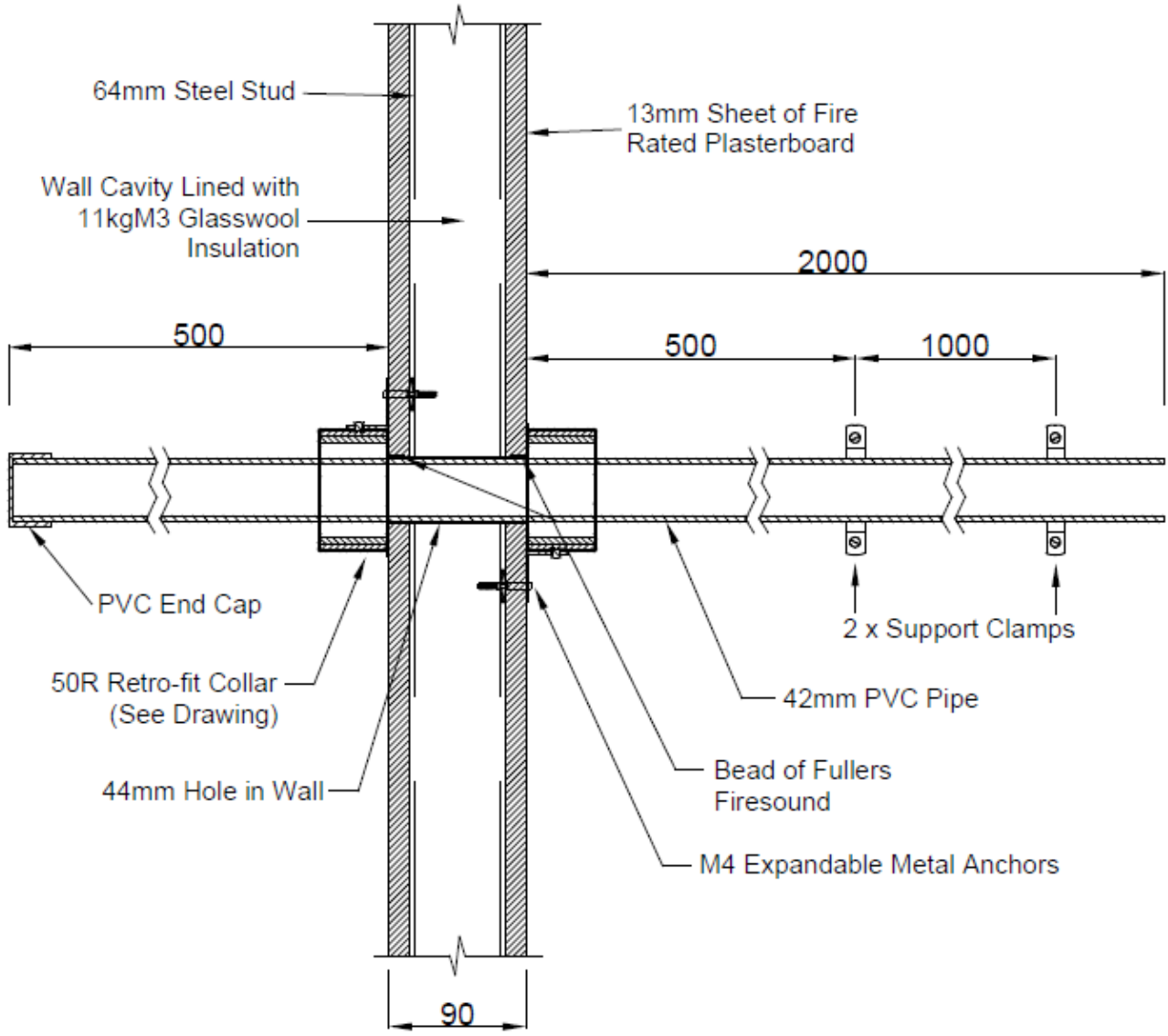
DRAWING TITLED "TEST WALL W-20-C LAYOUT, DATED 08 APRIL 2020, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD.

Snap Fire Systems Pty Ltd

Specimen #1

40 PVC Stack & 50R

Date: 21 APR 2020



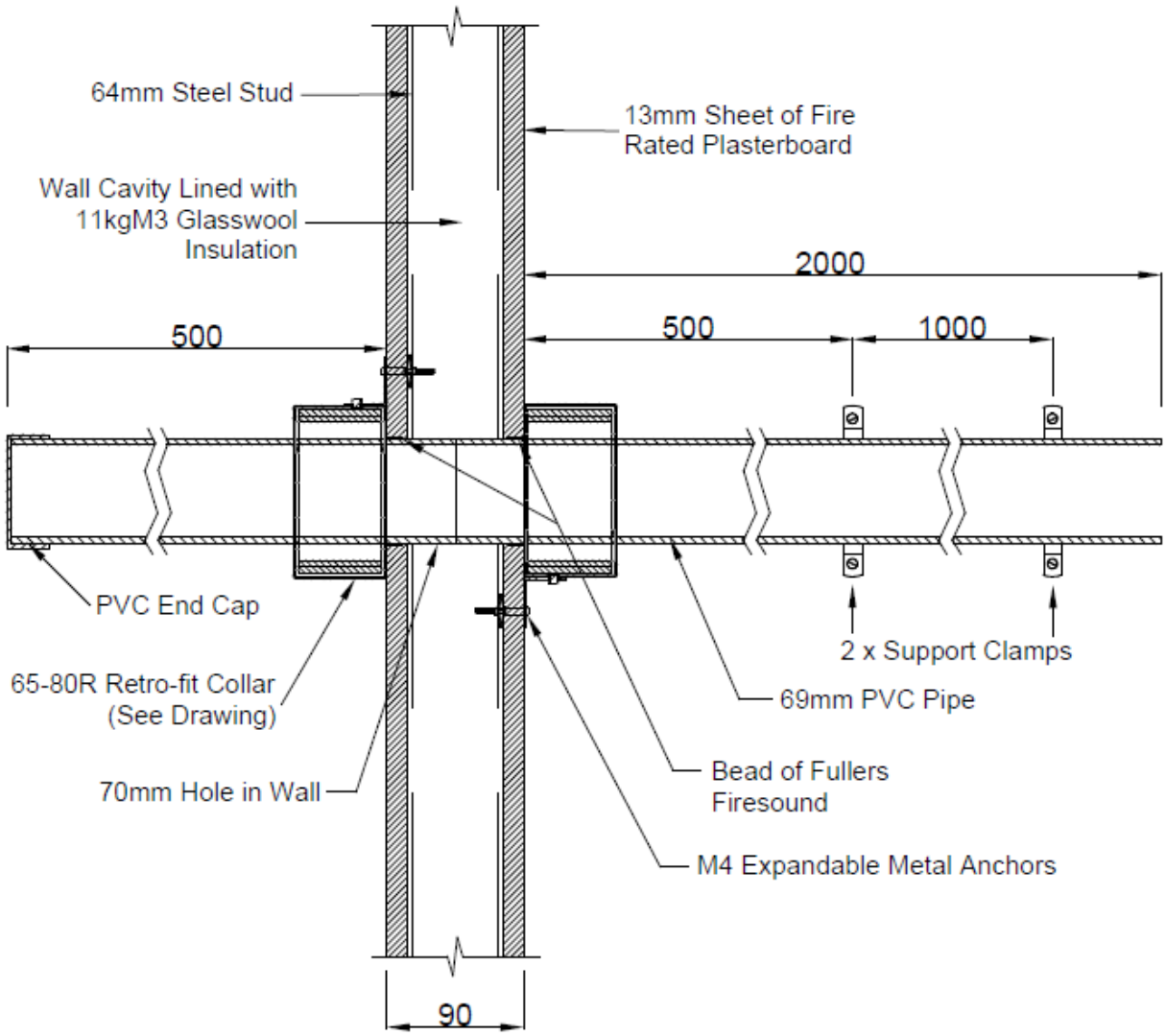
DRAWING TITLED "SPECIMEN #1, 40 PVC STACK & 50R", DATED 21 APRIL 2020, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #2

65 PVC Stack & 65-80R

Date: 21 APR 2020



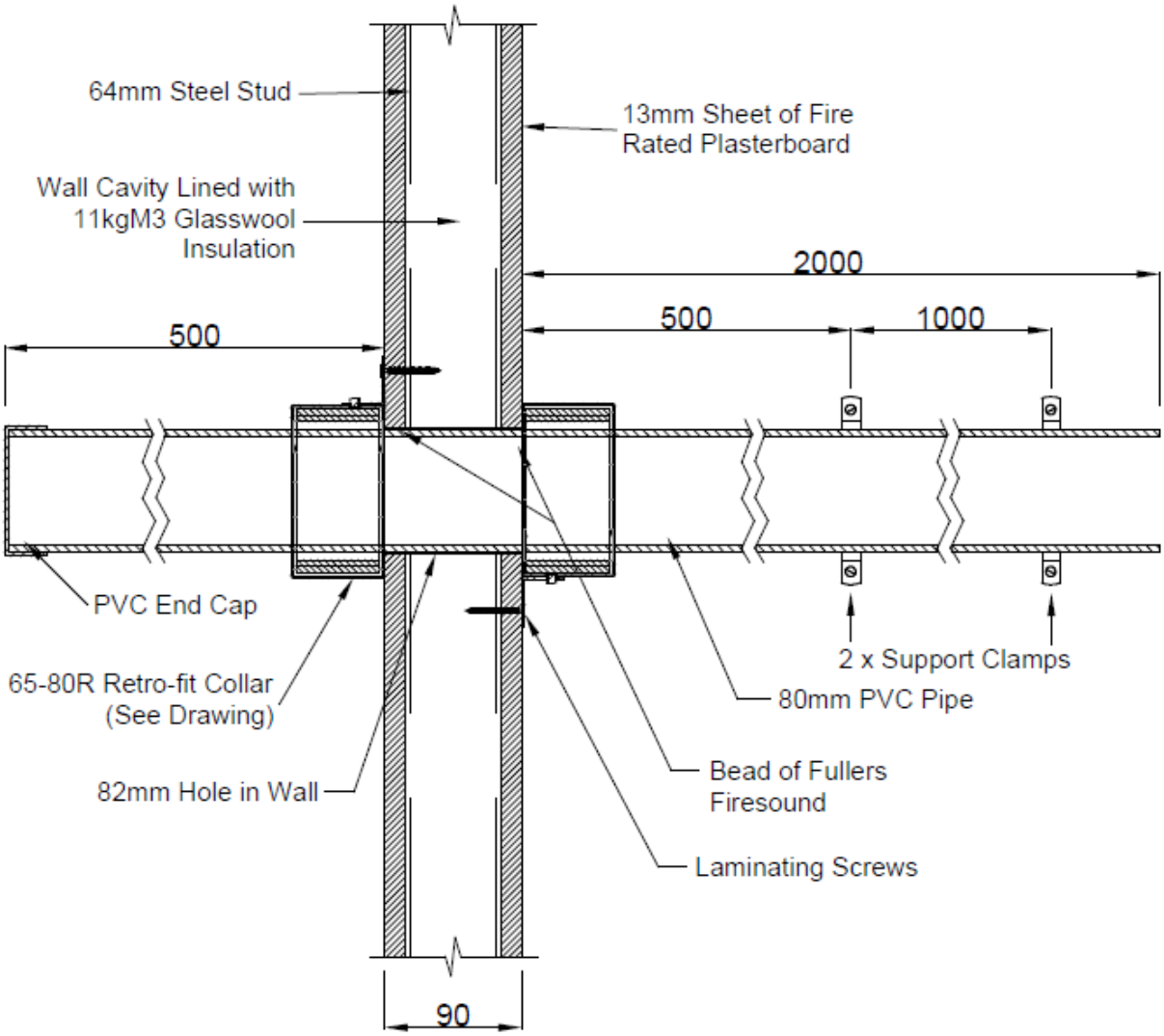
DRAWING TITLED "SPECIMEN # 2, 65 PVC STACK & 65-80R", DATED 21 APRIL 2020, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #3

80 PVC Stack & 65-80R

Date: 21 APR 2020



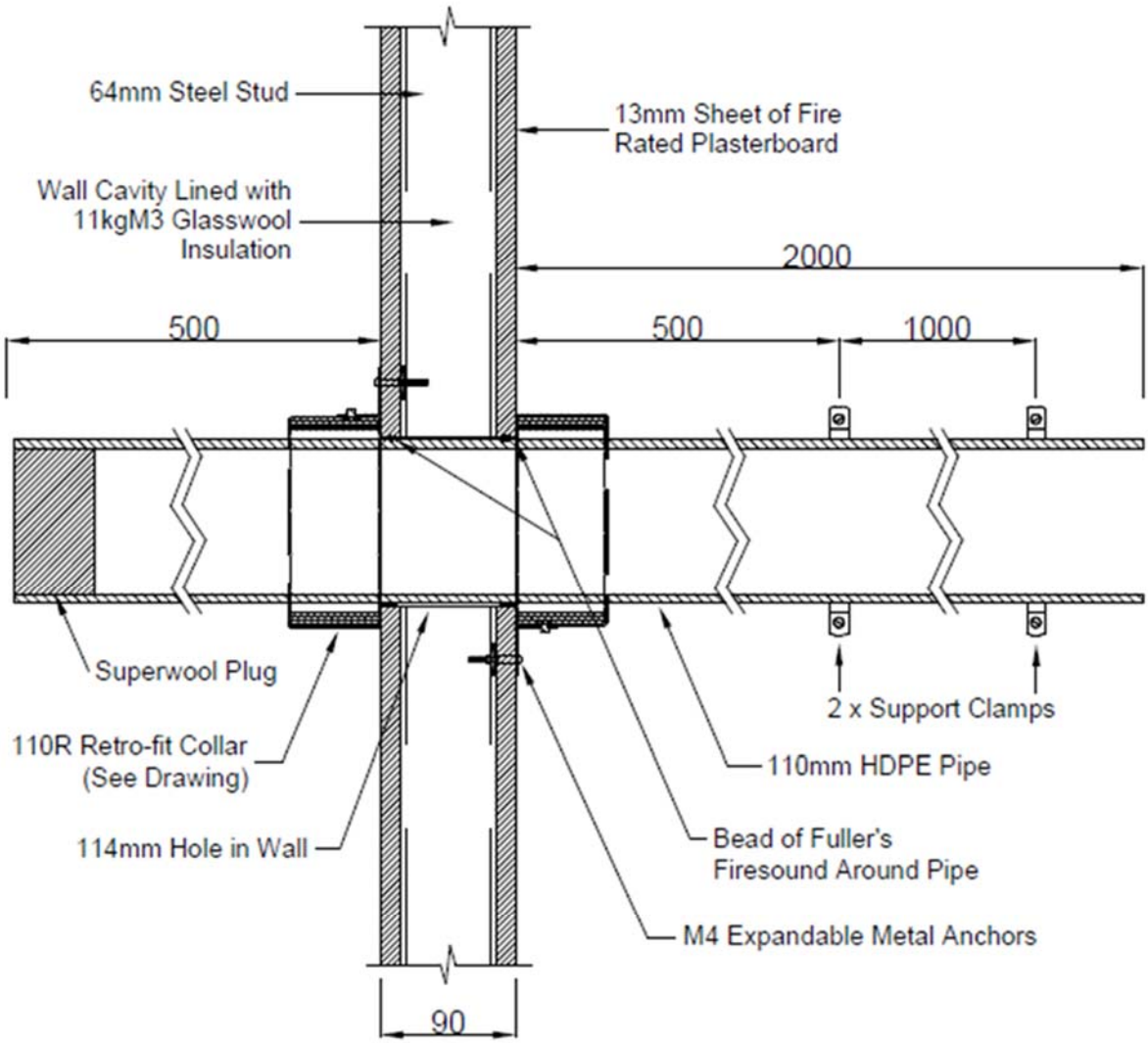
DRAWING TITLED "SPECIMEN # 3, 65 PVC STACK & 65-80R", DATED 21 APRIL 2020, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #4

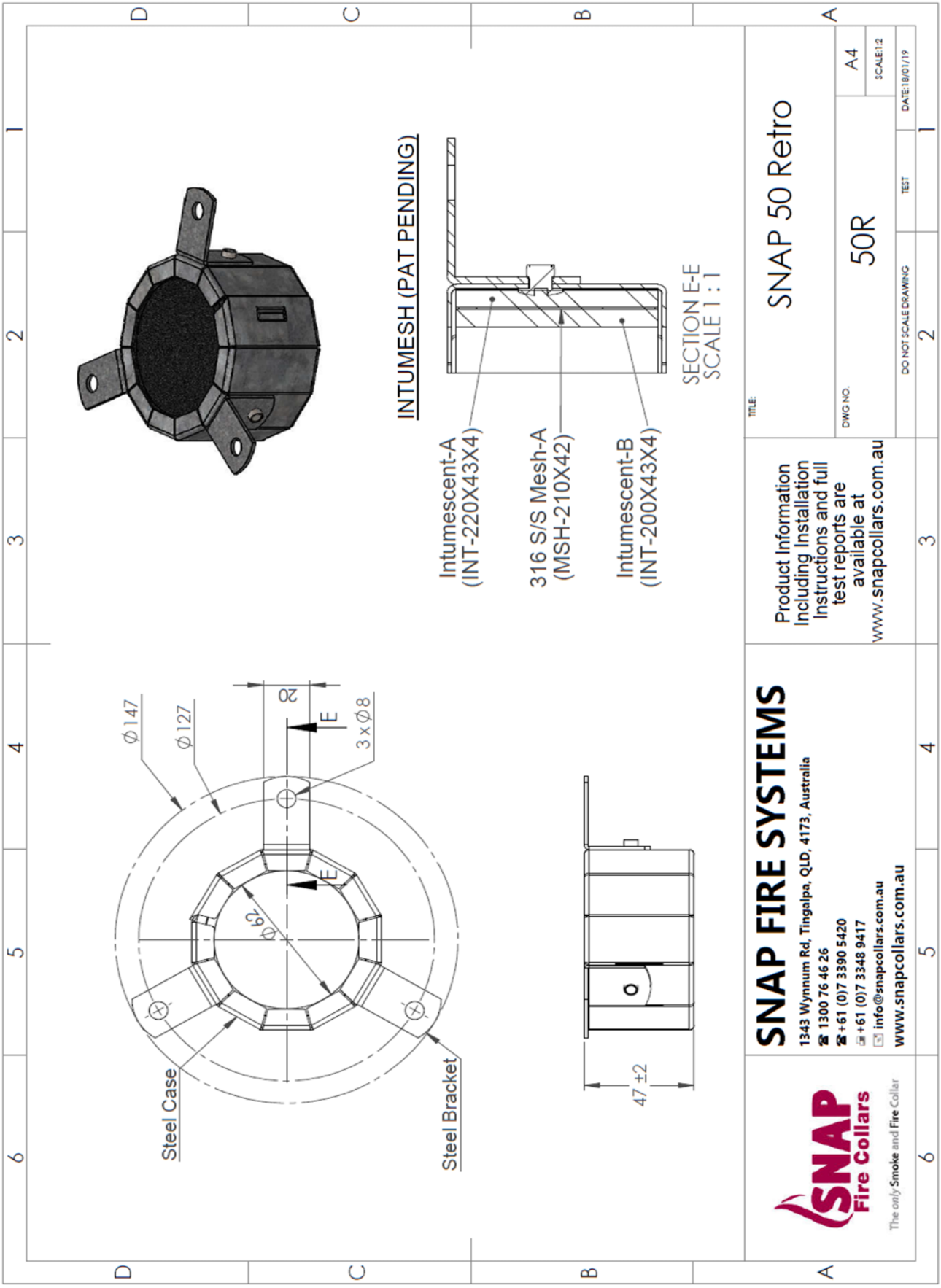
110 HDPE Stack & 110R

Date: 21 APR 2020

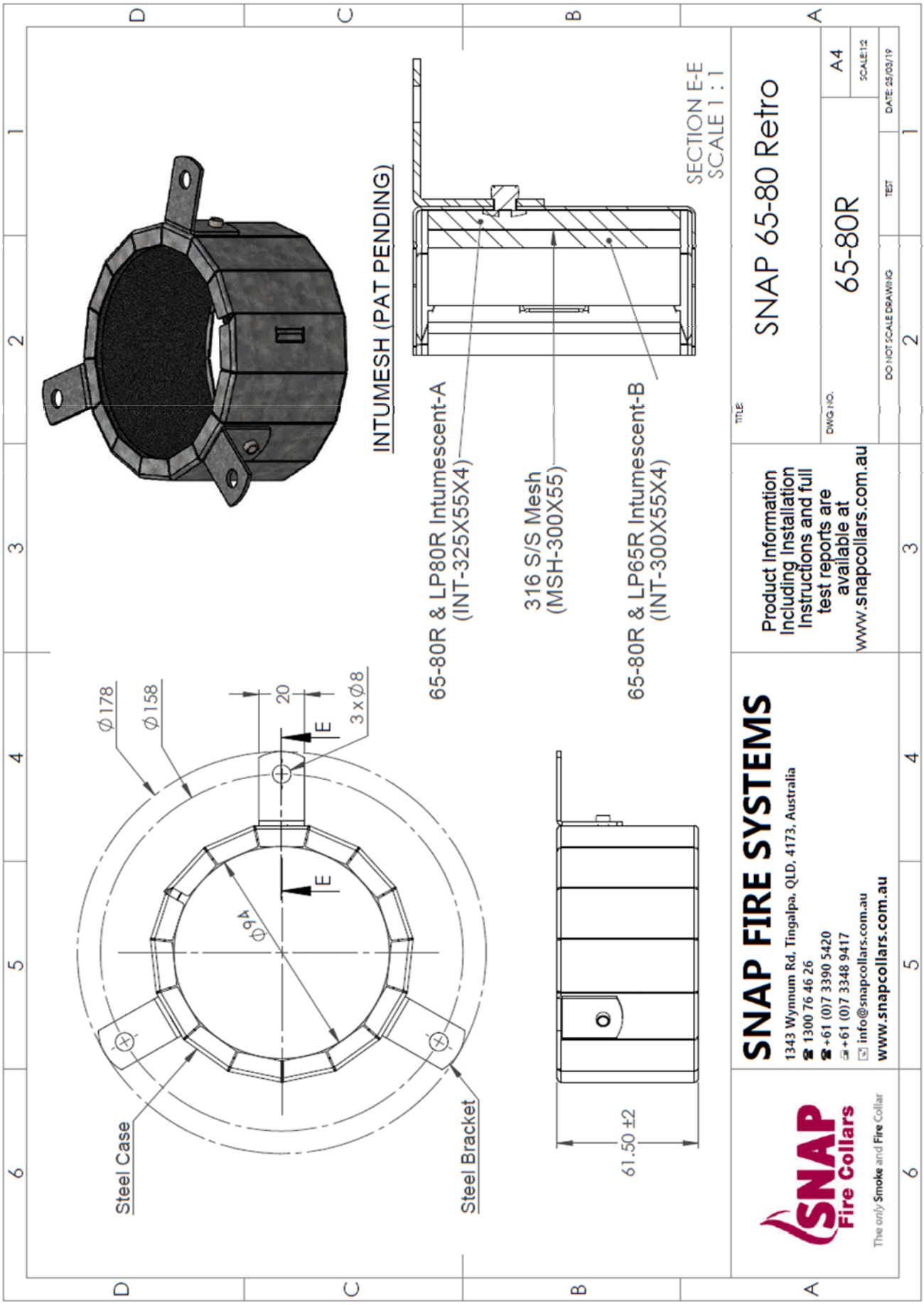


DRAWING TITLED "SPECIMEN # 4, 110 HDPE STACK & 110R", DATED 21 APRIL 2020, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

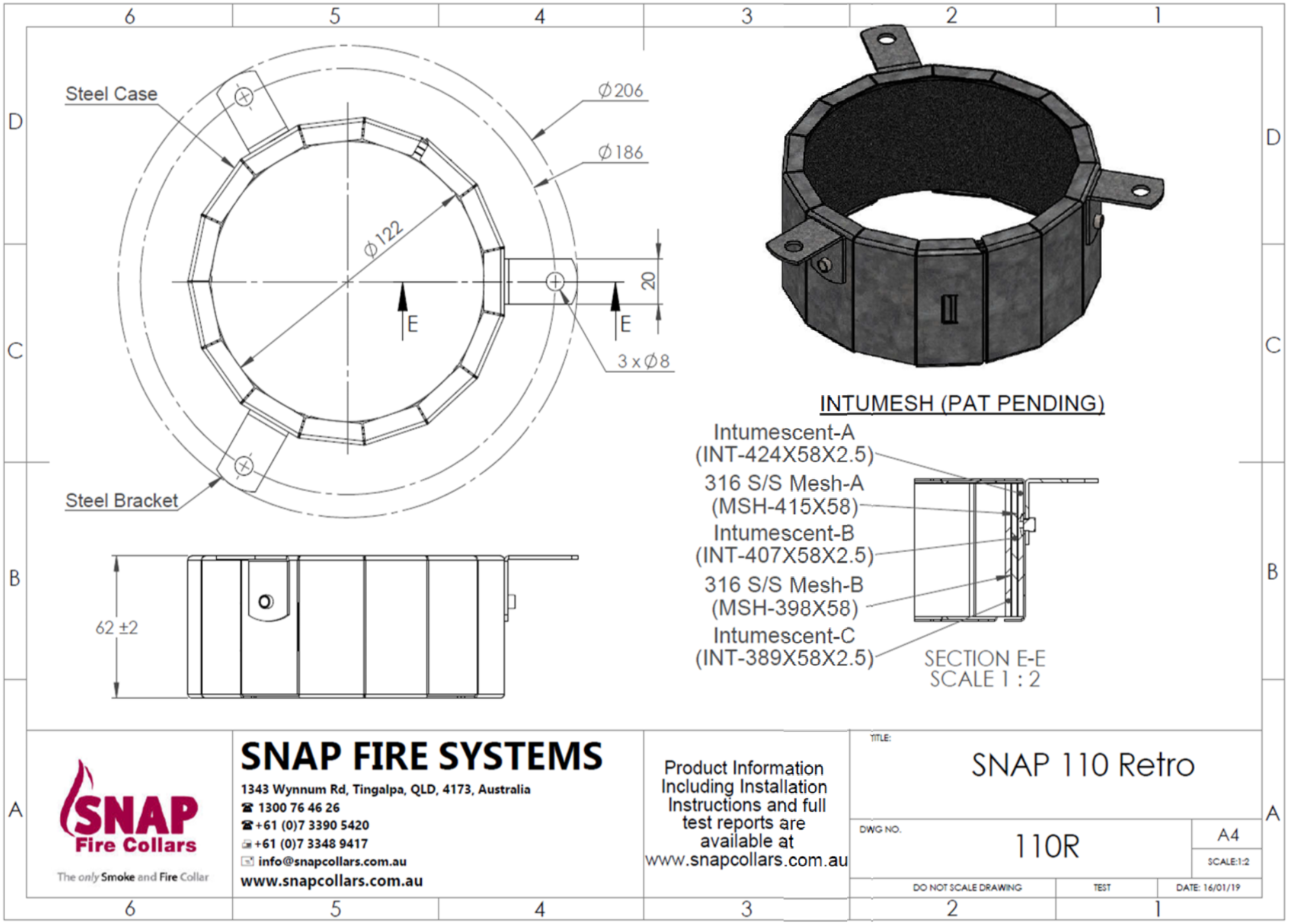
Appendix E – Specimen Drawings



DRAWING NUMBERED 50R, SNAP 50 RETRO, DATED 18 JANUARY 2019, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING TITLED "SNAP 65-80 RETRO" DATED 25 MARCH 2019, BY SNAP FIRE SYSTEMS PTY LTD.



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

Appendix F – Certificate(s) of Test

INFRASTRUCTURE TECHNOLOGIES
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PO Box 52, North Ryde NSW 1670, Australia
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Certificate of Test

No. 3466

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 2100.

Product Name: SNAP 50R Retrofit fire collars protecting a nominal 40-mm PVC pipe (Specimen 1)

Description: The specimen comprised an 1150-mm x 1150-mm x 90-mm thick plasterboard lined steel framed wall system penetrated by a service protected by a retro-fitted Snap Fire Systems fire collar. The wall was constructed in accordance with Boral Firestop system SB60.1 with an established fire resistance level (FRL) of -/60/60 as detailed in the document titled "Plasterboard Fire and Acoustic Systems Australia", revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd. Wall construction comprised 64-mm x 0.55-mm steel studs installed at nominally 600-mm centres, lined on each side with one layer of 13-mm thick Boral Firestop plasterboard. The wall cavity was filled with a single layer of 50-mm thick Acoustigard 11 insulation. The plasterboard was screw fixed to the steel studs using plasterboard screws at nominally 200-mm centres. 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 a 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 with stainless steel washes. The annular gap around the pipe and plasterboard on both sides of the wall was filled with a bead of H.B Fullers Firesound sealant. The penetrating service comprised a 42.83-mm outside diameter Iplex PVC pipe, with a wall thickness of 2.07 mm which penetrated the wall through a 44-mm diameter cut-out hole as shown in drawing titled "Specimen #1, 40 PVC Stack & 50R", dated 21 April 2020, 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 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 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 fire-resistance level (FRL) of the specimen is applicable when the system is exposed to fire from either direction. The maximum FRL of any test specimen cannot exceed the FRL achieved by the 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: 29 April 2020

Issued on the 30th day of August 2020 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. 3466

INFRASTRUCTURE TECHNOLOGIES
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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. 3467

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 2100.

Product Name: SNAP 65-80R Retrofit fire collars protecting a nominal 65-mm PVC pipe (Specimen 2)

Description: The specimen comprised an 1150-mm x 1150-mm x 90-mm thick plasterboard lined steel framed wall system penetrated by a service protected by a retro-fitted Snap Fire Systems fire collar. The wall was constructed in accordance with Boral Firestop system SB60.1 with an established fire resistance level (FRL) of -/60/60 as detailed in the document titled "Plasterboard Fire and Acoustic Systems Australia", revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd. Wall construction comprised 64-mm x 0.55-mm steel studs installed at nominally 600-mm centres, lined on each side with one layer of 13-mm thick Boral Firestop plasterboard. The wall cavity was filled with a single layer of 50-mm thick Acoustigard 11 insulation. The plasterboard was screw fixed to the steel studs using plasterboard screws at nominally 200-mm centres. The SNAP Retrofit 65-80R fire collar comprised a 0.75-mm steel casing with a 94-mm inner diameter and a 178-mm diameter base flange. The 61.5-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 55-mm wide x 325-mm long, and Intumescent B was 4-mm thick x 55-mm wide x 300-mm long. Between the strips was a layer of 316 stainless steel mesh 300-mm long x 55-mm wide with a wire mesh diameter of 0.15-mm, as shown in drawing titled "SNAP 65-80 Retro" dated 25 March 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 with stainless steel washers. The annular gap around the pipe and plasterboard on both sides of the wall was filled with a bead of H.B Fullers Firesound sealant. The penetrating service comprised a 68.61-mm outside diameter Iplex PVC pipe, with a wall thickness of 2.77 mm which penetrated the wall through a 70-mm diameter cut-out hole as shown in drawing titled "Specimen #2, 65 PVC Stack & 65-80R", dated 21 April 2020, 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 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 91 minutes
Insulation	-	84 minutes

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

The fire-resistance level (FRL) of the specimen is applicable when the system is exposed to fire from either direction. The maximum FRL of any test specimen cannot exceed the FRL achieved by the 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: 29 April 2020

Issued on the 30th day of August 2020 without alterations or additions.

B. Roddy

Brett Roddy | Manager, Fire Testing and Assessments

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PO Box 52, North Ryde NSW 1670, Australia
T (02) 9490 5444 • **ABN** 41 687 119 230

Certificate of Test

No. 3468

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 2100.

Product Name: SNAP 65-80R Retrofit fire collars protecting a nominal 80-mm PVC pipe (Specimen 3)

Description: The specimen comprised an 1150-mm x 1150-mm x 90-mm thick plasterboard lined steel framed wall system penetrated by a service protected by a retro-fitted Snap Fire Systems fire collar. The wall was constructed in accordance with Boral Firestop system SB60.1 with an established fire resistance level (FRL) of -/60/60 as detailed in the document titled "Plasterboard Fire and Acoustic Systems Australia", revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd. Wall construction comprised 64-mm x 0.55-mm steel studs installed at nominally 600-mm centres, lined on each side with one layer of 13-mm thick Boral Firestop plasterboard. The wall cavity was filled with a single layer of 50-mm thick Acoustigard 11 insulation. The plasterboard was screw fixed to the steel studs using plasterboard screws at nominally 200-mm centres. The SNAP Retrofit 65-80R fire collar comprised a 0.75-mm steel casing with a 94-mm inner diameter and a 178-mm diameter base flange. The 61.5-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 55-mm wide x 325-mm long, and Intumescent B was 4-mm thick x 55-mm wide x 300-mm long. Between the strips was a layer of 316 stainless steel mesh 300-mm long x 55-mm wide with a wire mesh diameter of 0.15-mm, as shown in drawing titled "SNAP 65-80 Retro" dated 25 March 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) course thread laminating screws. The annular gap around the pipe and plasterboard on both sides of the wall was filled with a bead of H.B Fullers Firesound sealant. The penetrating service comprised a 82-mm outside diameter Iplex PVC pipe, with a wall thickness of 3.08 mm which penetrated the wall through an 83-mm diameter cut-out hole as shown in drawing titled "Specimen #3, 80 PVC Stack & 65-80R", dated 21 April 2020, 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 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 91 minutes
Insulation	-	70 minutes

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

The fire-resistance level (FRL) of the specimen is applicable when the system is exposed to fire from either direction. The maximum FRL of any test specimen cannot exceed the FRL achieved by the 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: 29 April 2020

Issued on the 30th day of August 2020 without alterations or additions.

Brett Roddy | Manager, Fire Testing and Assessments

This document is issued in accordance with NATA's accreditation requirements.
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Certificate of Test

No. 3469

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 2100.

Product Name: SNAP 110R Retrofit fire collars protecting a nominal 110-mm HDPE (PE100) pipe (Specimen 4)

Description: The specimen comprised an 1150-mm x 1150-mm x 90-mm thick plasterboard lined steel framed wall system penetrated by a service protected by a retro-fitted Snap Fire Systems fire collar. The wall was constructed in accordance with Boral Firestop system SB60.1 with an established fire resistance level (FRL) of -/60/60 as detailed in the document titled "Plasterboard Fire and Acoustic Systems Australia", revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd. Wall construction comprised 64-mm x 0.55-mm steel studs installed at nominally 600-mm centres, lined on each side with one layer of 13-mm thick Boral Firestop plasterboard. The wall cavity was filled with a single layer of 50-mm thick Acoustigard 11 insulation. The plasterboard was screw fixed to the steel studs using plasterboard screws at nominally 200-mm centres. 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 with stainless steel washers. The annular gap around the pipe and plasterboard on both sides of the wall was filled with a bead of H.B Fullers Firesound sealant. The penetrating service comprised a 110-mm outside diameter Vinidex HDPE (PE100) pipe, with a wall thickness of 4.6-mm which penetrated the wall through an 111-mm diameter cut-out hole as shown in drawing titled "Specimen #4, 110 HDPE Stack & 110R", dated 21 April 2020, provided by Snap Fire Systems Pty Ltd. The pipe projected horizontally, 2000-mm away from the unexposed face of wall and approximately 500 mm into furnace chamber. The pipe was supported at nominally 500-mm and 1500-mm from unexposed face of plasterboard wall. The pipe was open at 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	-	78 minutes

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

The fire-resistance level (FRL) of the specimen is applicable when the system is exposed to fire from either direction. The maximum FRL of any test specimen cannot exceed the FRL achieved by the 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: 29 April 2020

Issued on the 30th day of August 2020 without alterations or additions.

B. Roddy

Brett Roddy | Manager, Fire Testing and Assessments

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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 for 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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