



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

Test Report

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

Sponsored Investigation No. FSP 2206

1 Introduction

1.1 Identification of specimen

The sponsor identified the specimen as retrofit fire collars protecting a steel framed plasterboard wall penetrated by two (2) polyvinyl chloride (PVC) pipes, a chlorinated polyvinyl chloride (CPVC) pipe, four (4) cross-linked high-density polyethylene (PE-Xa) pipes and a composite cross-linked high-density polyethylene (Pex-Al-Pex) pipe.

1.2 Sponsor

IG6 Pty Ltd as trustee for the IG6 IP Trust
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1.3 Manufacturer

Snap Fire Systems Pty Ltd
Building A, 1343 Wynnum Road
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Australia

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 5097/4603

1.7 Test date

The fire-resistance test was conducted on 8 June 2021.

2 Description of specimen

2.1 General

The plasterboard wall was constructed in accordance with Boral Firestop system SB120.1 with an established fire resistance level (FRL) of -/120/120 as detailed in the document titled “Plasterboard Fire and Acoustic Systems Australia”, revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd.

Construction comprised of 64-mm x 0.55-mm steel studs installed at nominally 600-mm centres, lined on each side with two layers of 13-mm thick Boral Firestop plasterboard sheets. The plasterboard sheeting was screw fixed to the steel studs using 6-gauge x 32-mm long plasterboard screws at nominally 200-mm centres. The plasterboard wall thickness was 116-mm from exposed face to unexposed face. The wall was penetrated by nine (9) pipes protected by retro-fitted Snap Fire Systems fire collars.

For the purpose of the test, the penetrations are referenced as Specimen 1, 2, 3, 4, 5, 6, 7, 8 and 9. Specimens 1, 2, 3, 4, 5, 6, 8 and 9 are the subject of this report. 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:

- Copper pipe - AS 1432:2004 Copper tubes for plumbing, gas fitting and drainage applications;
- AS/NZS 1477:2017: PVC pipes and fittings for pressure applications;
- PE-Xa pipes - AS/NZS 2492:2007: Cross-linked polyethylene (PE-X) pipes for pressure applications;
- Pex/Al/Pex pipe - AS 4176.1-2010: Multilayer pipes for pressure applications - Multilayer piping systems for hot and cold-water plumbing applications – General.

Specimen 1 - SNAP 50R Retrofit fire collars protecting a nominal 40 (48.25-mm OD) PN12 PVC pipe penetrating a 50-mm diameter aperture

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. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 10 gauge 38-mm long coarse thread laminating screws.

The penetrating service comprised a Iplex PN12 PVC 48.25-mm outside diameter pipe, with a wall thickness of 3.46-mm fitted through the collar's sleeve and penetrated the wall through a 50-mm diameter cut-out hole as shown in drawing titled 'Specimen #1, 40 PN12 PVC Stack & 50R', dated 03 February 2021, 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 plugged with ceramic fibre (Superwool) on the exposed end.

Specimen 2 - SNAP 32R Retrofit fire collars protecting a nominal 1-inch (33.5-mm OD) CPVC pipe penetrating a 35-mm diameter aperture

The SNAP 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 which comprised two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 316 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing titled "SNAP 32 Retro", dated 5 October 2017, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using 10 gauge 38-mm long coarse thread laminating screws.

The penetrating service comprised a Blazemaster CPVC 33.5-mm outside diameter pipe, with a wall thickness of 2.9-mm fitted through the collar's sleeve and penetrated the wall through a 35-mm diameter cut-out hole as shown in drawing titled 'Specimen #2, 1 inch C-PVC Stack & 32R', dated 3 February 2021, 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 plugged with ceramic fibre (Superwool) on the exposed end.

Specimen 3 - SNAP 32R Retrofit fire collars protecting a nominal 32-mm PE-Xa Rehau Rautitan pipe penetrating a 40-mm diameter aperture

The SNAP 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 which comprised 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 a wire mesh diameter of 0.15-mm, as shown in drawing titled "SNAP 32 Retro", dated 5 October 2017, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 10 gauge 38-mm long coarse threaded laminating screws.

The penetrating service comprised a Rehau Rautitan PE-Xa 32.2-mm outside diameter pipe, with a wall thickness of 4.6-mm fitted through the collar's sleeve and penetrated the wall through a 40-mm diameter cut-out hole as shown in drawing titled 'Specimen #3, 32 Pex-a Stack & 32R', dated 03 February 2021, 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 plugged with ceramic fibre (Superwool) on the exposed end.

Specimen 4 - SNAP 32R Retrofit fire collars protecting a nominal 25-mm PE-Xa Rehau Rautitan pipe penetrating a 32-mm diameter aperture

The SNAP 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 which comprised two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long and 4-mm thick x 26-mm wide x 154-mm long respectively. Between the strips was a layer of 316 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing titled "SNAP 32 Retro", dated 5 October 2017, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 10 gauge 38-mm long coarse threaded laminating screws.

The penetrating service comprised a Rehau Rautitan PE-Xa 25.1-mm outside diameter pipe, with a wall thickness of 3.73-mm fitted through the collar's sleeve and penetrated the wall through a 32-mm diameter cut-out hole as shown in drawing titled 'Specimen #4, 25 Pex-a Stack & 32R', dated 3 February 2021, 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 plugged with ceramic fibre (Superwool) on the exposed end.

Specimen 5 - SNAP 32R Retrofit fire collars protecting a nominal 20-mm PE-Xa Rehau Rautitan pipe penetrating a 29-mm diameter aperture

The SNAP 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 which comprised two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 316 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing titled "SNAP 32 Retro", dated 5 October 2017, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 10 gauge 38-mm long coarse threaded laminating screws.

The penetrating service comprised a Rehau Rautitan PE-Xa 20.2-mm outside diameter pipe, with a wall thickness of 3.5-mm fitted through the collar's sleeve and penetrated the wall through a 29-mm diameter cut-out hole as shown in drawing titled 'Specimen #5, 20 Pex-a Stack & 32R', dated 3 February 2021, 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 plugged with ceramic fibre (Superwool) on the exposed end.

Specimen 6 - SNAP 32R Retrofit fire collars protecting a nominal 16-mm PE-Xa Rehau Rautitan pipe penetrating a 25-mm diameter aperture

The SNAP 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 which comprised two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 316 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing titled "SNAP 32 Retro", dated 5 October 2017, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 10 gauge 38-mm long coarse threaded laminating screws.

The penetrating service comprised a Rehau Rautitan PE-Xa 16.1-mm outside diameter pipe, with a wall thickness of 2.6-mm fitted through the collar's sleeve and penetrated the wall through a 25-mm diameter cut-out hole as shown in drawing titled 'Specimen #6, 16 Pex-a Stack & 32R', dated 3 February 2021, 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 plugged with ceramic fibre (Superwool) on the exposed end.

Specimen 8 - SNAP 32R Retrofit fire collars protecting a nominal 25-mm Pex-Al-Pex pipe penetrating a 32-mm diameter aperture

The SNAP 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 which comprised two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 316 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing titled "SNAP 32 Retro", dated 5 October 2017, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 10 gauge 38-mm long coarse thread laminating screws.

The penetrating service comprised a CXL Pex-Al-Pex 25.15-mm outside diameter pipe, with a wall thickness of 2.75-mm fitted through the collar's sleeve and penetrated the wall through a 32-mm diameter cut-out hole as shown in drawing titled 'Specimen #8 25 Pex-Al-Pex Stack & 32R', dated 3 February 2021, 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 plugged with ceramic fibre (Superwool) on the exposed end.

Specimen 9 - SNAP MS70R Multi Services Retrofit fire collars protecting a nominal 32 (42.2-mm OD) PN12 PVC pipe with 19-mm thick fire rated lagging penetrating a 70-mm diameter aperture

The SNAP MS70R Multi Service Retrofit fire collar comprised a 0.75-mm thick steel casing with a 69-mm inner diameter and a 0.95-mm thick steel base flange with a 162-mm diameter. The 95-mm high collar casing incorporated a 4-mm thick x 90-mm wide x 250-mm long soft Intumesh intumescent wrap lined within the internal circumference of the collar casing. The closing mechanism comprised three stainless steel springs, a nylon fuse link and a 258-mm long x 88-mm wide 316 stainless steel mesh located around the intumescent strip, as shown in drawing titled 'SNAP 70 Multi Service Retro', dated 23 September 2019, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three M4 expandable steel hollow wall anchors with stainless steel washers.

The penetrating service comprised a Iplex PN12 PVC 42.2-mm outside diameter pipe, with a wall thickness of 2.57-mm covered with 19-mm thick Armaflex FR foam lagging. The lagged pipe was fitted through the collar's sleeve and penetrated the wall through a 70-mm diameter cut-out hole as shown in drawing titled 'Specimen #9 32 PN12 PVC Pipe with 19mm F/R Lagging & MS70R Collar', dated 3 February 2021, by Snap Fire Systems Pty Ltd.

The lagged pipe projected horizontally 2000-mm away from the unexposed face of the wall and approximately 500-mm into the furnace chamber. The lagged pipe was supported at 500-mm and 1500-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed end and plugged with ceramic fibre (Superwool) on the exposed end.

2.2 Dimensions

The plasterboard wall was nominally 1150-mm wide x 1150-mm high x 116-mm thick.

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 18 May 2021 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-21-B Layout', dated 3 February 2021, by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #1, 40 PN12 PVC Stack & 50R', dated 03 February 2021, provided by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #2, 1-inch C-PVC Stack & 32R', dated 3 February 2021, provided by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #3, 32 Pex-a Stack & 32R', dated 03 February 2021, provided by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #4, 25 Pex-a Stack & 32R', dated 3 February 2021, provided by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #5, 20 Pex-a Stack & 32R', dated 3 February 2021, provided by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #6, 16 Pex-a Stack & 32R', dated 3 February 2021, provided by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #8, 25 Pex-Al-Pex Stack & 32R', dated 3 February 2021, provided by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #9, 32 PN12 PVC Pipe with 19mm F/R Lagging & MS70R Collar', dated 3 February 2021, provided by Snap Fire Systems Pty Ltd.

Drawing titled 'SNAP 32 Retro', dated 5 October 2017, by Snap Fire Systems Pty Ltd.

Drawing titled 'SNAP 50 Retro', dated 18 January 2019, by Snap Fire Systems Pty Ltd.

Drawing titled 'SNAP 70 Multi Service Retro', dated 23 September 2019, by Snap Fire Systems Pty Ltd.

4 Equipment

4.1 Furnace

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

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

4.2 Temperature

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

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

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

4.3 Measurement system

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

5 Ambient temperature

The temperature of the test area was 16°C at the commencement of the test.

6 Departure from standard

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

7 Termination of test

The test was terminated at 181 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 minutes -	Smoke is being emitted between the collar and the pipe of at the base of Specimens 4, 5, 6 and 8.
2 minutes -	Smoke is being emitted between the collar and the pipe of Specimen 2. Smoke has begun fluing from the end of the pipes of Specimens 1, 2 and 6.
3 minutes -	Smoke has begun fluing from the end of the pipes of Specimens 3 and 4.
4 minutes -	Smoke has begun fluing from the end of the pipes of Specimens 8 and 9.
4½ minutes -	Smoke has begun fluing from the end of the pipe of all specimen 5.

- 6 minutes - Smoke has ceased fluing from the collars at the base of Specimens 2, 4, 5, 6, 8 and 9.
- 8 minutes - Light smoke has resumed fluing from the end of the pipe of specimens 4 and 9.
- 44 minutes - Smoke is being emitted from the collar at the base of Specimens 8.
- 48 minutes - The lagging has begun to swell at the base of Specimen 8.
- 56 minutes - Smoke is being emitted from the collar at the base of Specimen 6.
- 85 minutes - Smoke has resumed fluing from the end of the pipe of Specimen 4.
- 90 minutes - Smoke has resumed fluing from the end of the pipe of Specimens 3, 4, 5, and 6.
- 128 minutes - Smoke continues fluing from the end of the pipes of Specimens 1, 2, 3 and 5.
- 142 minutes - Insulation failure of Specimen 5 – maximum temperature rise of 180K is exceeded on the top of the pipe, 25-mm from the collar.
The collars of Specimens 4, 5 and 6 have begun to discolour.
- 150 minutes - The intumescent material inside the fire collar on the unexposed face of Specimen 5 has begun to swell.
- 159 minutes - Insulation failure of Specimen 8 – maximum temperature rise of 180K is exceeded on the top of the collar.
- 160 minutes - The plasterboard wall around the collars of Specimens 5 and 8 have begun to discolour.
- 163 minutes - Insulation Failure of Specimen 4 – maximum temperature rise of 180K is exceeded on the top of the pipe, 25-mm from the collar.
- 165 minutes - The intumescent from the exposed collar of Specimen 8 has begun to activate.
- 169 minutes - The intumescent material inside the fire collar on the unexposed face of Specimen 6 has begun to swell.
- 173 minutes - The plasterboard wall around the collars of Specimens 1, 2, and 3 has begun to discolour.
- 175 minutes - Insulation Failure of Specimen 6 – maximum temperature rise of 180K is exceeded on the top of the pipe, 25-mm from the collar.
- 181 minutes - Insulation Failure of Specimen 9 – maximum temperature rise of 180K is exceeded on the plasterboard wall 25-mm above the collar.
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 5.

Figure 8 shows the curve of temperature versus time associated with Specimen 6.

Figure 9 shows the curve of temperature versus time associated with Specimen 8.

Figure 10 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 50R Retrofit fire collars protecting a nominal 40 (48.25-mm OD) PN12 PVC pipe penetrating a 50-mm diameter aperture

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	no failure at 181 minutes

Specimen 2 - SNAP 32R Retrofit fire collars protecting a nominal 1-inch (33.5-mm OD) CPVC pipe penetrating a 35-mm diameter aperture

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	no failure at 181 minutes

Specimen 3 - SNAP 32R Retrofit fire collars protecting a nominal 32-mm PE-Xa Rehau Rautitan pipe penetrating a 40-mm diameter aperture

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	no failure at 181 minutes

Specimen 4 - SNAP 32R Retrofit fire collars protecting a nominal 25-mm PE-Xa Rehau Rautitan pipe penetrating a 32-mm diameter aperture

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	163 minutes

Specimen 5 - SNAP 32R Retrofit fire collars protecting a nominal 20-mm PE-Xa Rehau Rautitan pipe penetrating a 29-mm diameter aperture

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	142 minutes

Specimen 6 - SNAP 32R Retrofit fire collars protecting a nominal 16-mm PE-Xa Rehau Rautitan pipe penetrating a 25-mm diameter aperture

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	175 minutes

Specimen 8 - SNAP 32R Retrofit fire collars protecting a nominal 25-mm PE-Xa/Al/PE pipe penetrating a 32-mm diameter aperture

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	159 minutes

Specimen 9 - SNAP MS70R Multi Services Retrofit fire collars protecting a nominal 32 (42.2-mm OD) PN12 PVC pipe with 19-mm thick fire rated lagging penetrating a 70-mm diameter aperture.

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	181 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 AS 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	-/120/120
Specimen 2	-/120/120
Specimen 3	-/120/120
Specimen 4	-/120/120
Specimen 5	-/120/120
Specimen 6	-/120/120
Specimen 8	-/120/120
Specimen 9	-/120/120

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 -/120/120. 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	THERMCOUPLE POSITION	DESIGNATION
Specimen 1 - SNAP 50R Retrofit fire collars protecting a nominal 40 (48.25-mm OD) PN12 PVC pipe penetrating a 50-mm diameter aperture.	On P/B wall, 25-mm above of collar	S1
	On P/B wall, 25-mm below of collar (S/E)	S2
	On collar top right side	S3
	On collar bottom right side	S4
	On top left of pipe, 25-mm from collar	S5
	On bottom right of pipe, 25-mm from collar	S6
Specimen 2 - SNAP 32R Retrofit fire collars protecting a nominal 1-inch (33.5-mm OD) CPVC pipe penetrating a 35-mm diameter aperture.	On P/B wall, 25-mm from collar left side	S7
	On P/B wall, 25-mm from collar right side	S8
	On collar left side	S9
	On collar right side	S10
	On top of pipe, 25-mm from collar	S11
	On bottom of pipe, 25-mm from collar	S12
Specimen 3 - SNAP 32R Retrofit fire collars protecting a nominal 32-mm PE-Xa Rehau Rautitan pipe penetrating a 40-mm diameter aperture.	On P/B wall, 25-mm left of collar	S13
	On P/B wall, 25-mm right of collar	S14
	On collar left side	S15
	On collar right side	S16
	On top of pipe, 25-mm from collar	S17
	On right side of pipe, 25-mm from collar	S18
Specimen 4 - SNAP 32R Retrofit fire collars protecting a nominal 25-mm PE-Xa Rehau Rautitan pipe penetrating a 32-mm diameter aperture.	On P/B wall, 25-mm above collar	S19
	On P/B wall, 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
Specimen 5 - SNAP 32R Retrofit fire collars protecting a nominal 20-mm PE-Xa Rehau Rautitan pipe penetrating a 29-mm diameter aperture.	On P/B wall, 25-mm left collar	S25
	On P/B wall, 25-mm right of collar	S26
	On collar top side	S27
	On collar bottom side	S28
	On top of pipe, 25-mm from collar	S29
	On bottom of pipe, 25-mm from collar	S30

SPECIMEN	THERMOCOUPLE POSITION	DESIGNATION
Specimen 6 - SNAP 32R Retrofit fire collars protecting a nominal 16-mm PE-Xa Rehau Rautitan pipe penetrating a 25-mm diameter aperture.	On P/B wall, 25-mm left collar	S31
	On P/B wall, 25-mm right of collar	S32
	On collar top side	S33
	On collar bottom side	S34
	On top of pipe, 25-mm from collar	S35
	On bottom of pipe, 25-mm from collar	S36
Specimen 8 - SNAP 32R Retrofit fire collars protecting a nominal 25-mm Pex/Al/Pex pipe penetrating a 32-mm diameter aperture.	On P/B wall, 25-mm above collar	S43
	On P/B wall, 25-mm below of collar	S44
	On collar top right side	S45
	On collar bottom right side	S46
	On top of pipe, 25-mm from collar	S47
	On bottom of pipe, 25-mm from collar	S48
Specimen 9 SNAP MS70R Multi Services Retrofit fire collars protecting a nominal 32 (42.2-mm OD) PN12 PVC pipe with 19-mm thick fire rated lagging penetrating a 70-mm diameter aperture.	On P/B wall, 25-mm above collar	S49
	On P/B wall, 25-mm below of collar	S50
	On collar top right side	S51
	On collar left side	S52
	On top of lagged pipe, 25-mm from collar	S53
	On bottom of lagged pipe, 25-mm from collar	S54
Roving thermocouple		S55
Ambient thermocouple		S56

Appendix B – Photographs



PHOTOGRAPH 1 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING



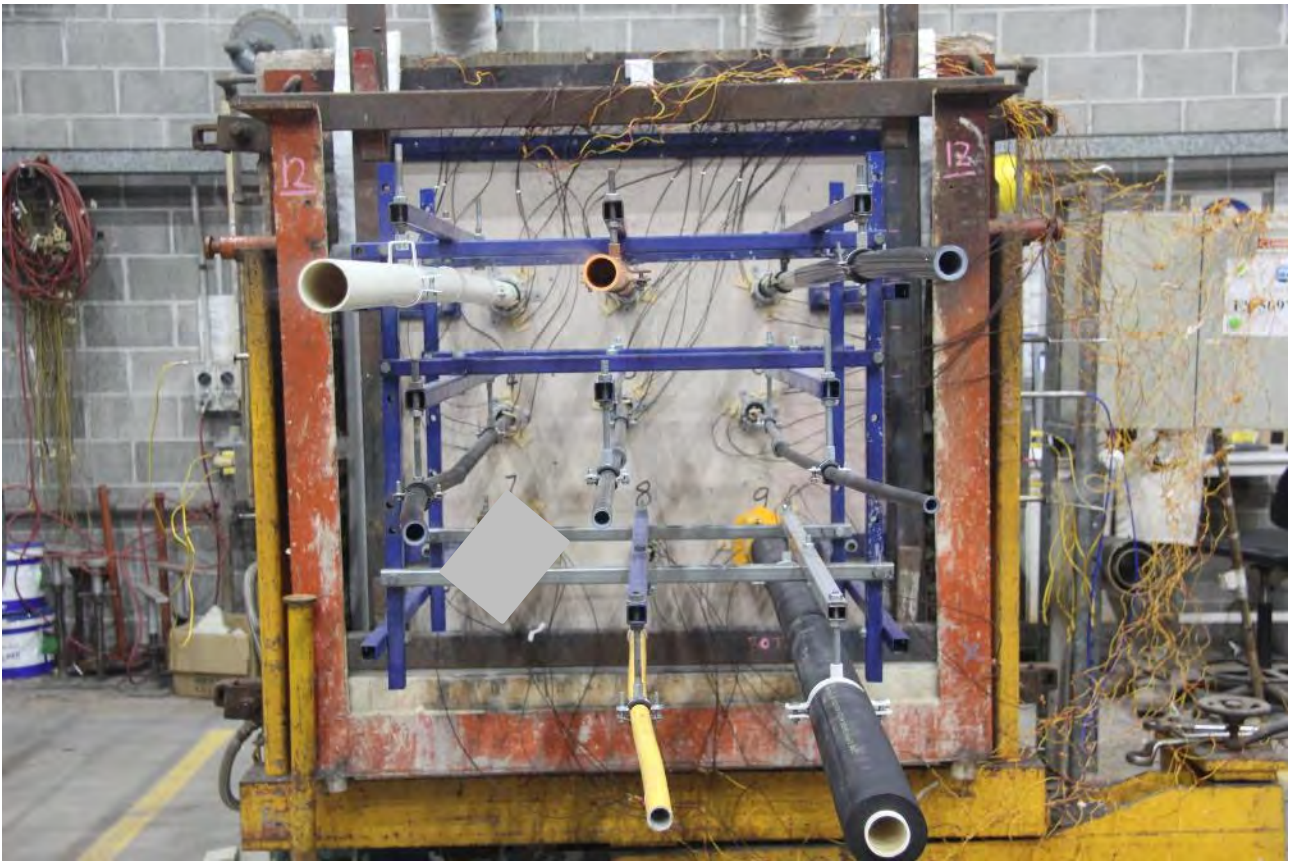
PHOTOGRAPH 2 – EXPOSED FACE OF SPECIMENS PRIOR TO TESTING



PHOTOGRAPH 3 – SPECIMENS AFTER 4 MINUTES OF TESTING



PHOTOGRAPH 4 – SPECIMENS AFTER 5 MINUTES OF TESTING



PHOTOGRAPH 5 – SPECIMENS AFTER 30 MINUTES OF TESTING



PHOTOGRAPH 6 – SPECIMENS AFTER 60 MINUTES OF TESTING



PHOTOGRAPH 7 – SPECIMENS AFTER 90 MINUTES OF TESTING



PHOTOGRAPH 8 – SPECIMENS AFTER 120 MINUTES OF TESTING



PHOTOGRAPH 9 – SPECIMENS AFTER 150 MINUTES OF TESTING



PHOTOGRAPH 10 – SPECIMENS AFTER 180 MINUTES OF TESTING



PHOTOGRAPH 11 – EXPOSED FACE OF SPECIMENS AT CONCLUSION OF TESTING

Appendix C – Test data charts

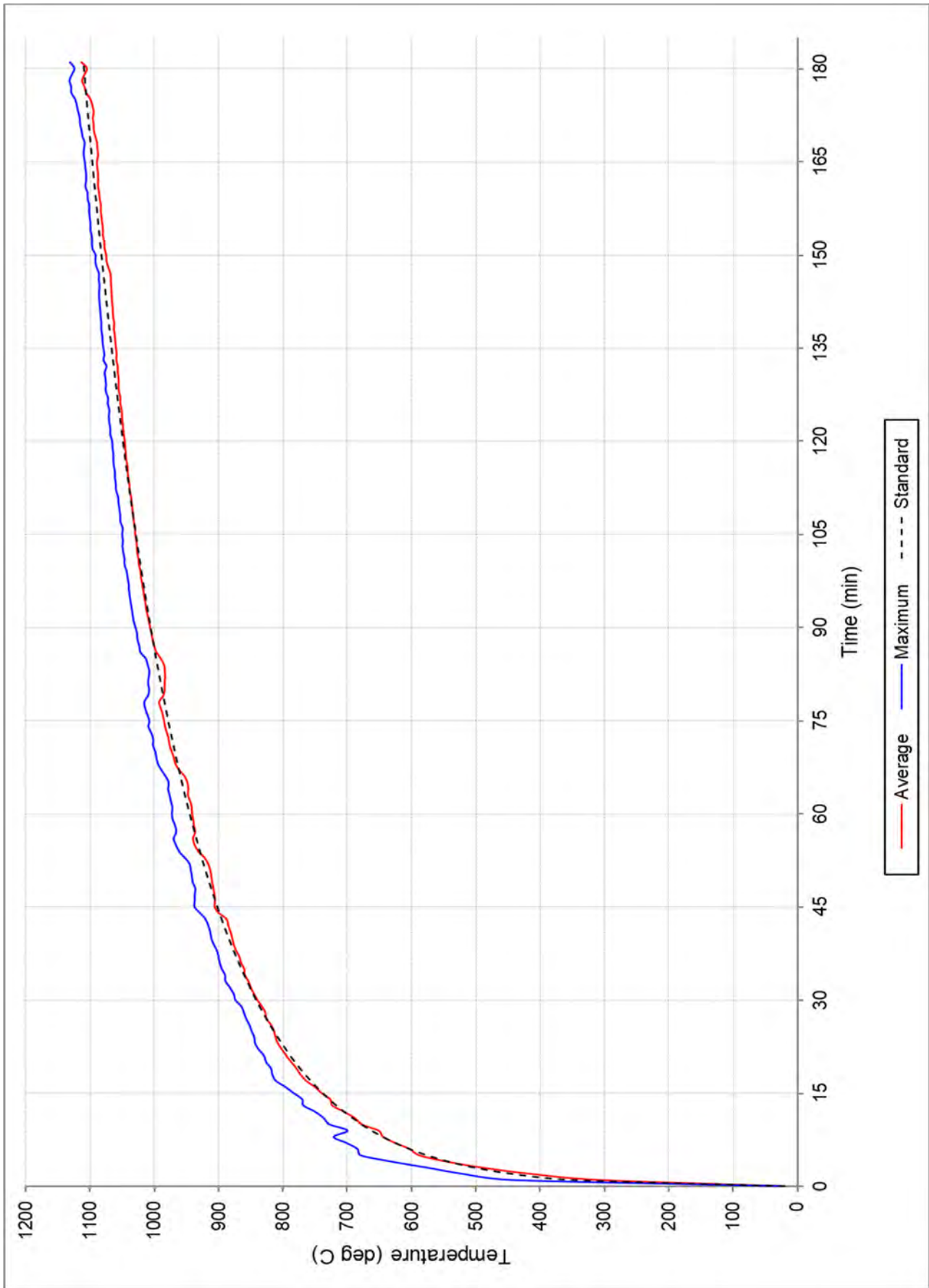


FIGURE 1 – FURNACE TEMPERATURE

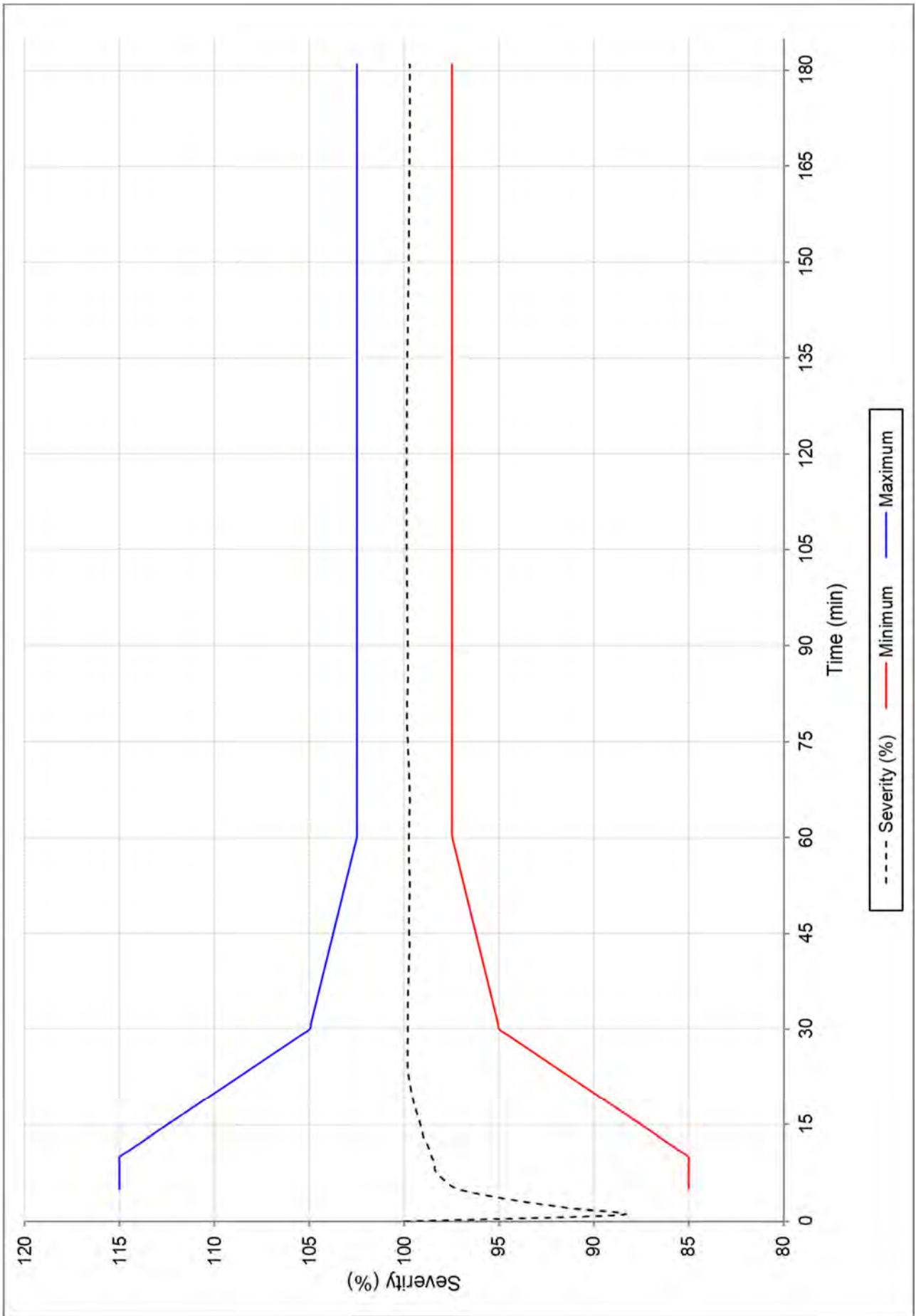


FIGURE 2 – FURNACE SEVERITY

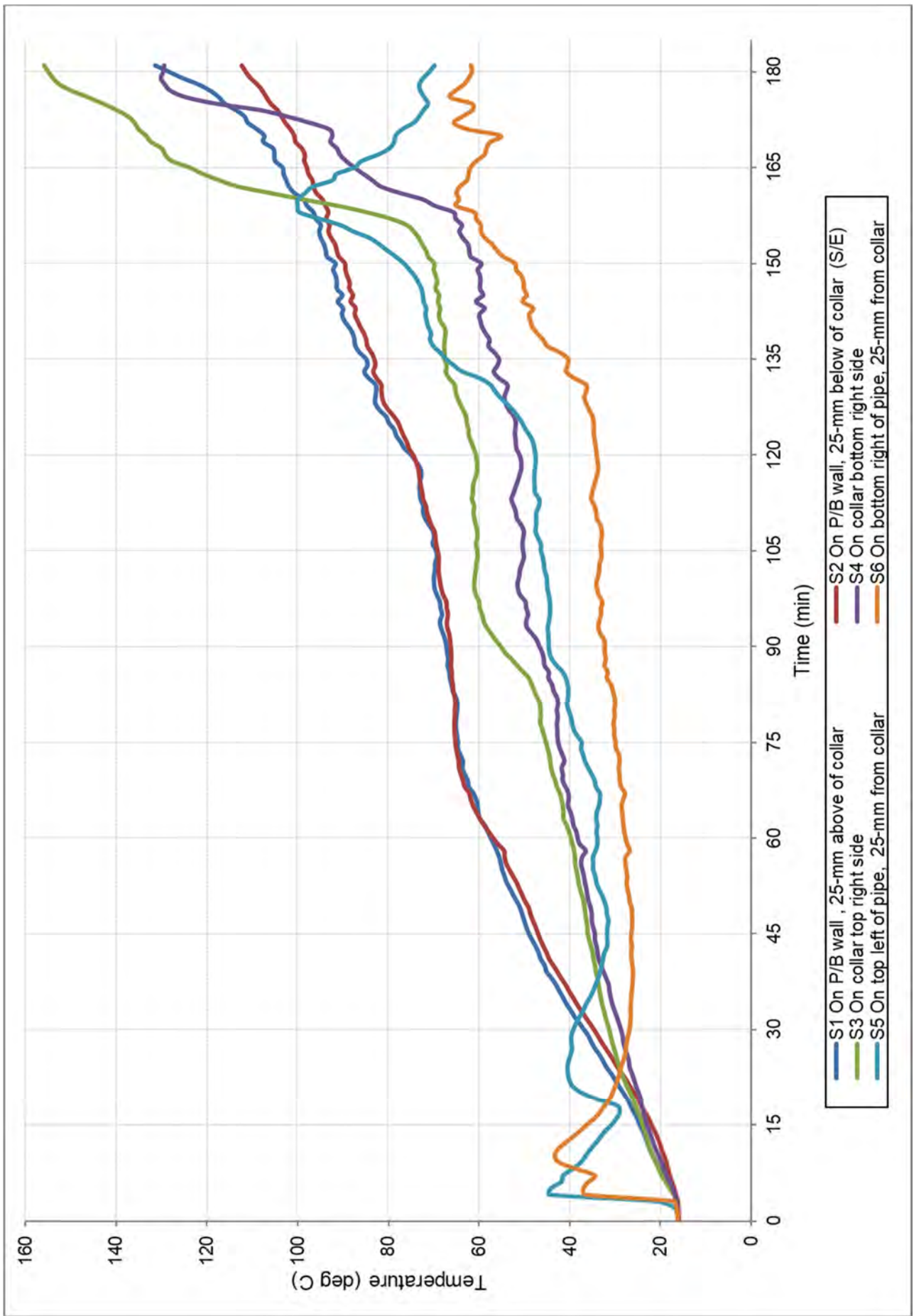


FIGURE 3 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN #1

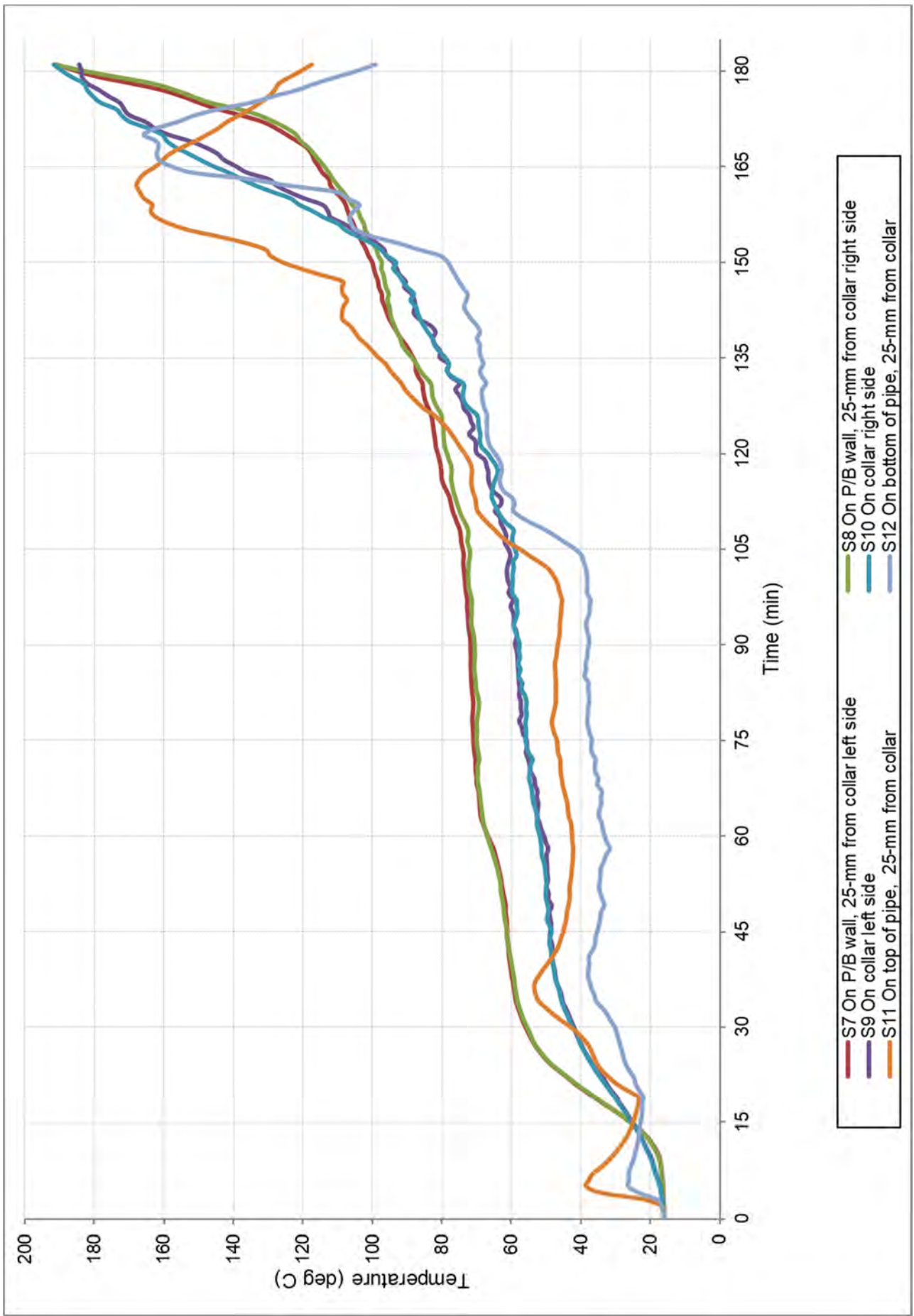


FIGURE 4 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN #2

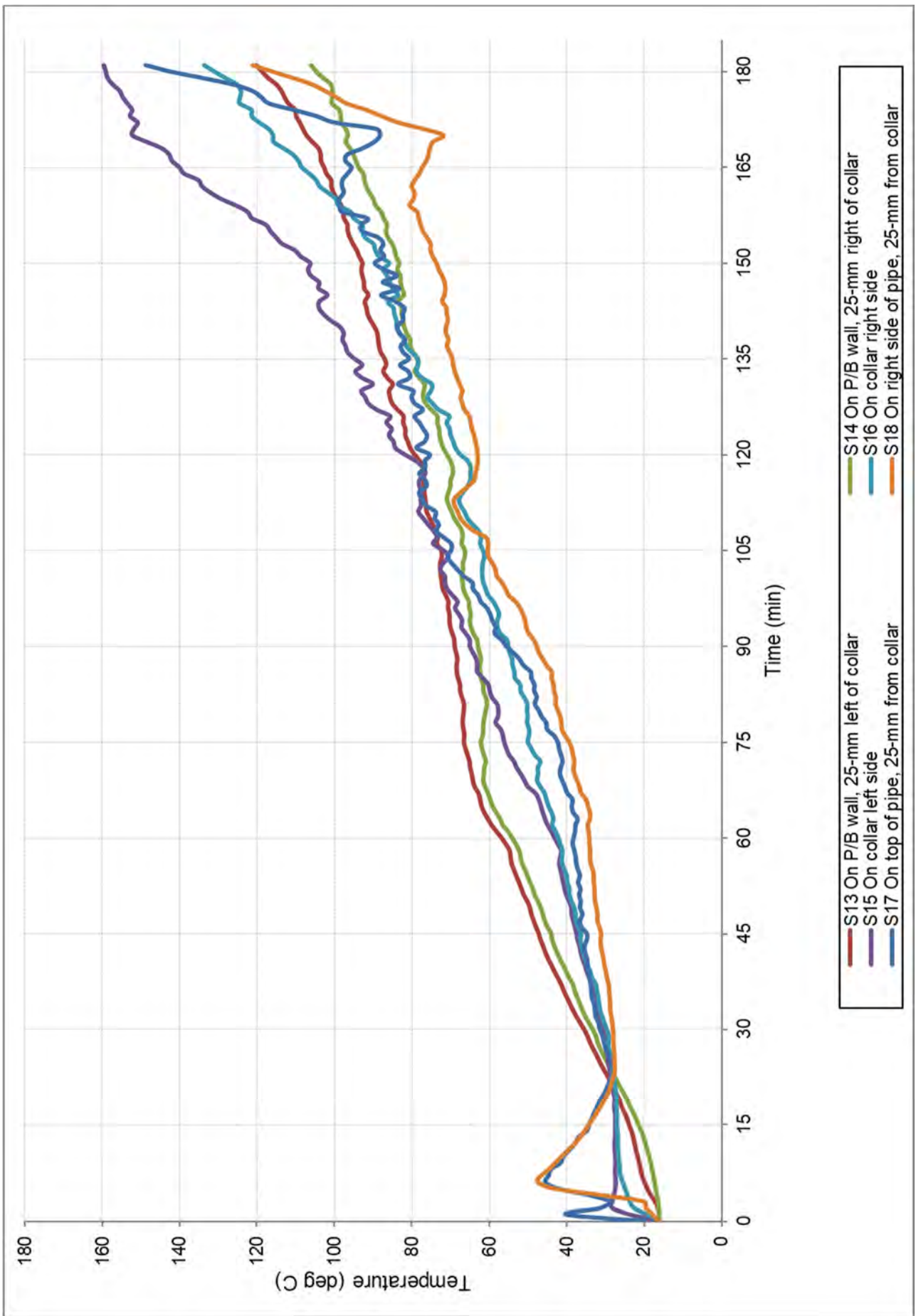


FIGURE 5 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN #3

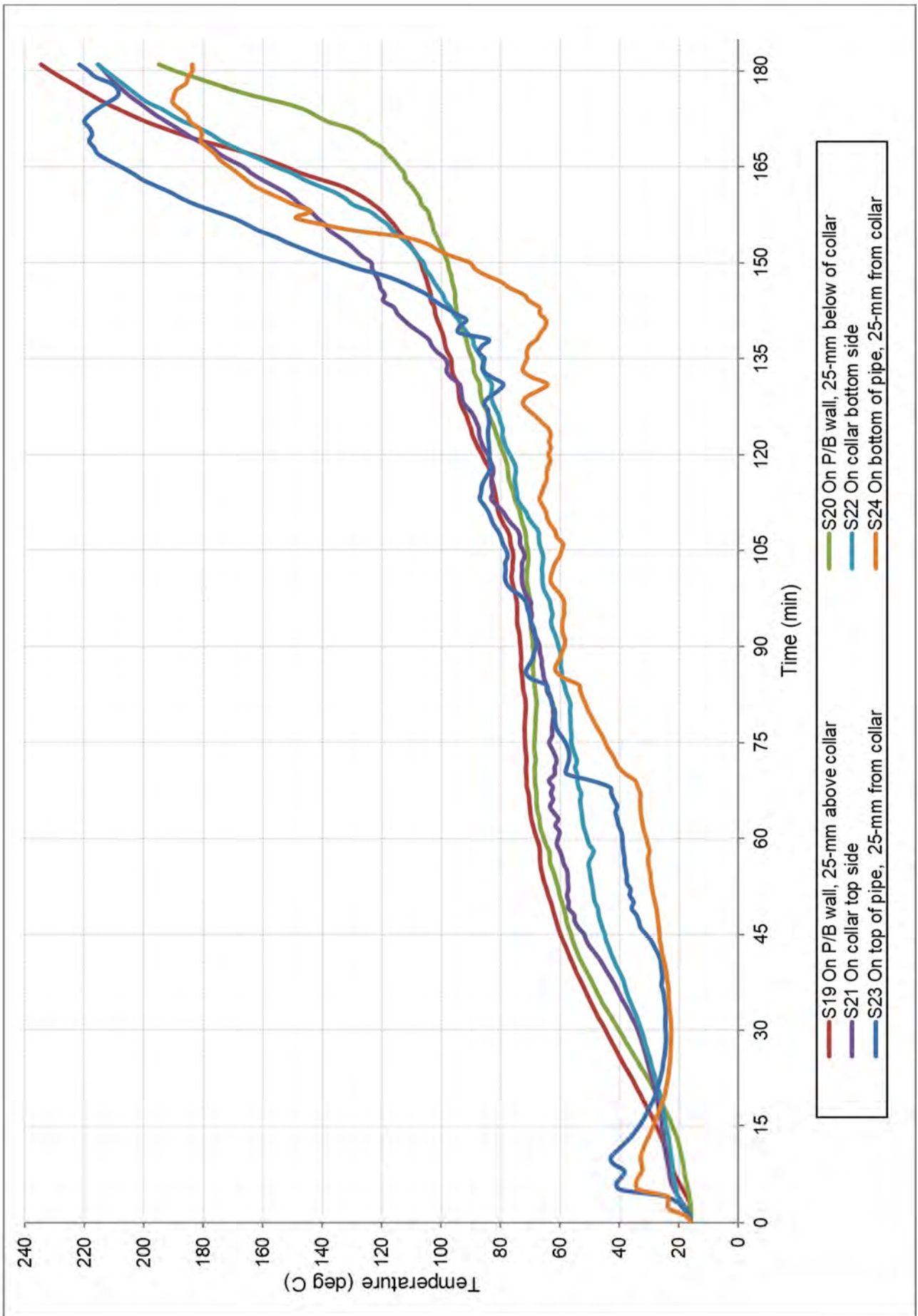


FIGURE 6 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN #4

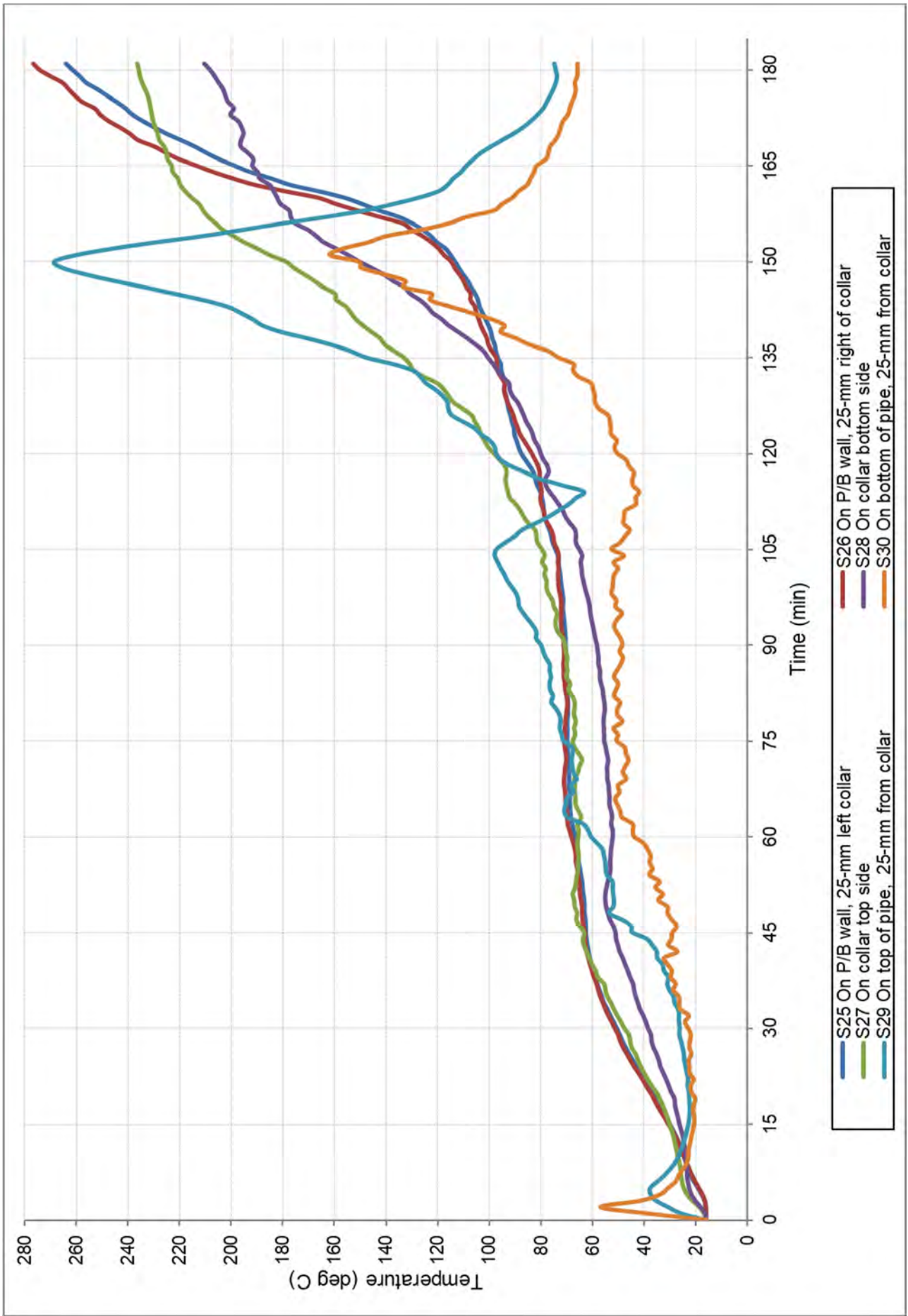


FIGURE 7 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN #5

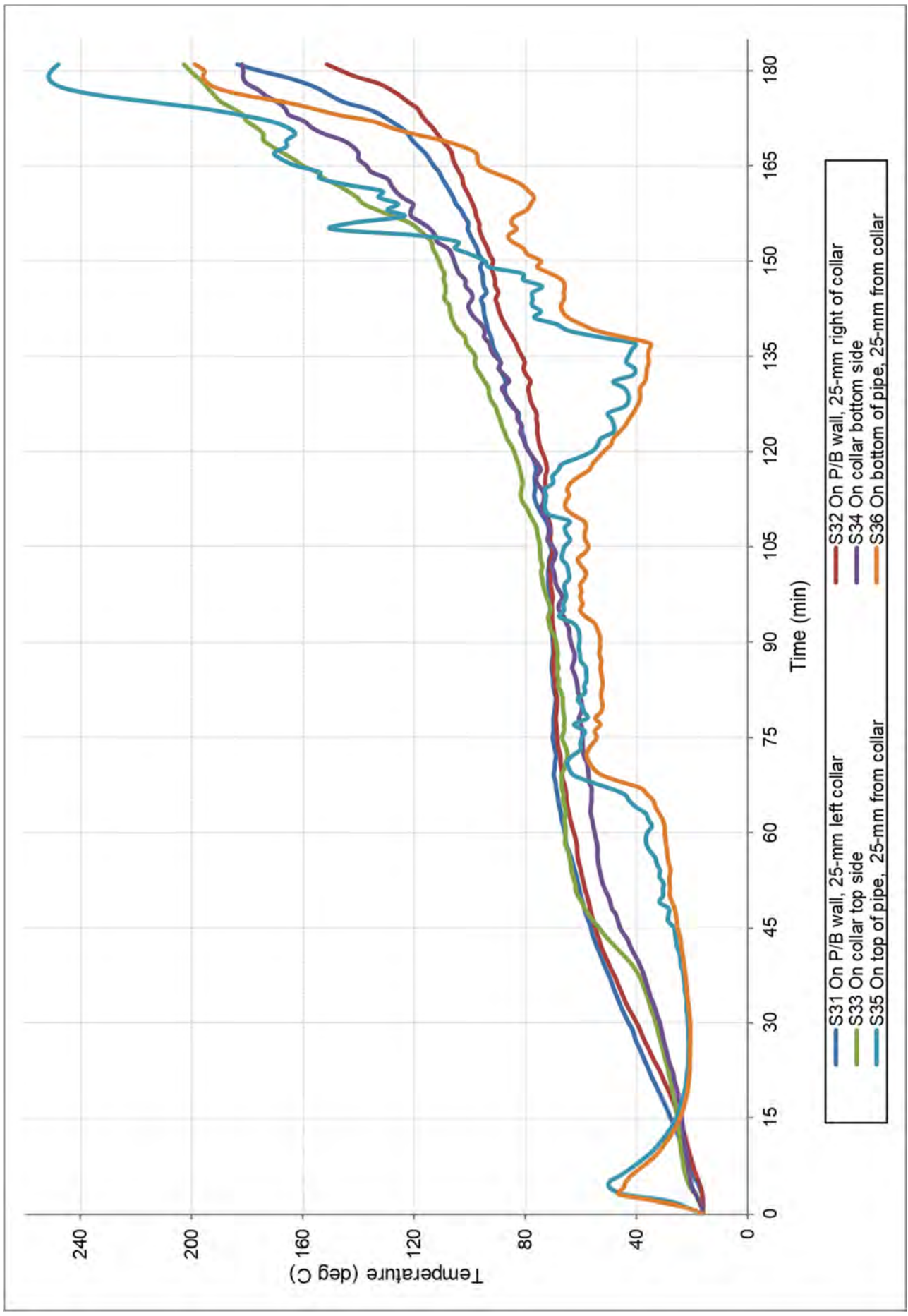


FIGURE 8 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN #6

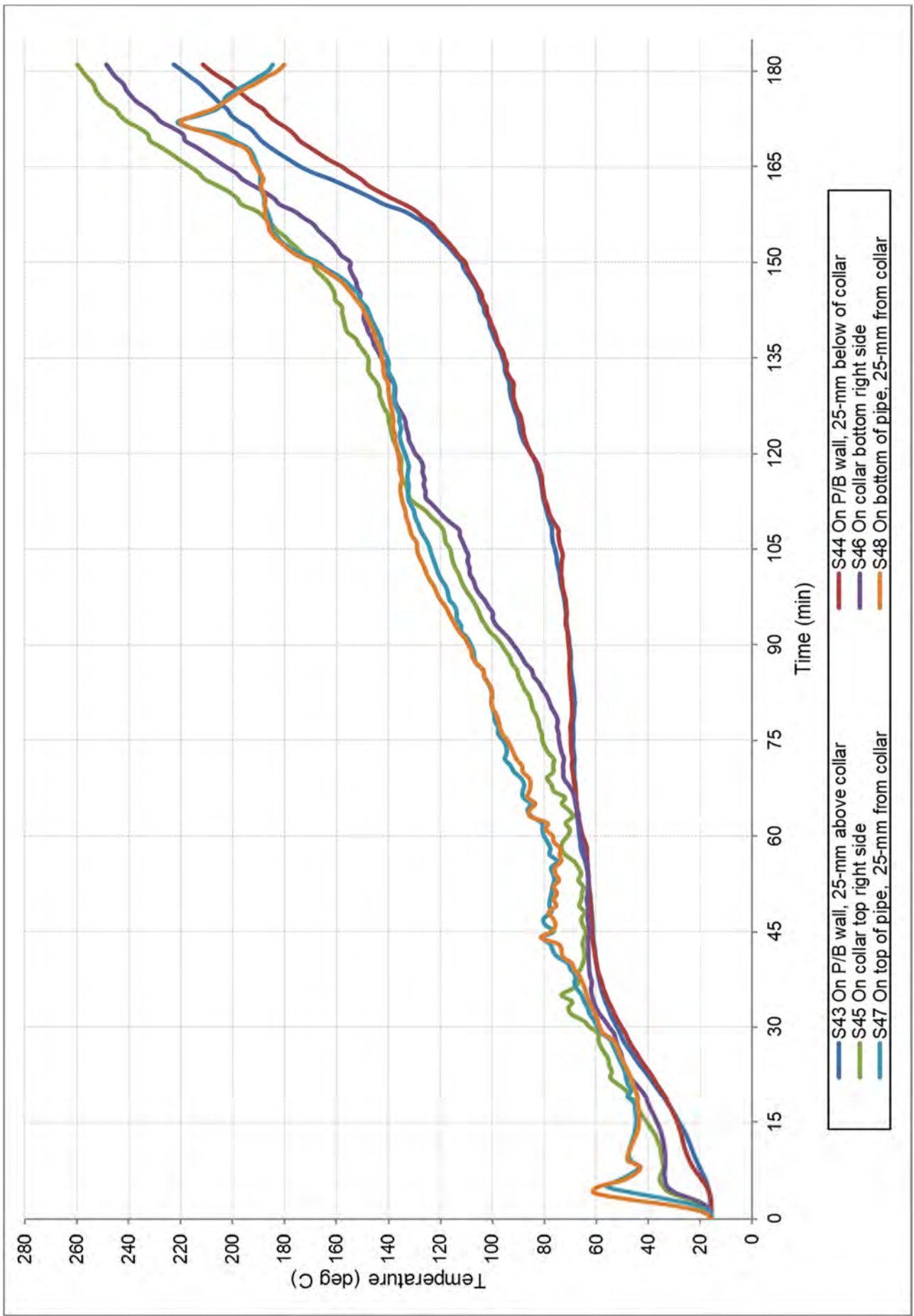


FIGURE 9 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN #8

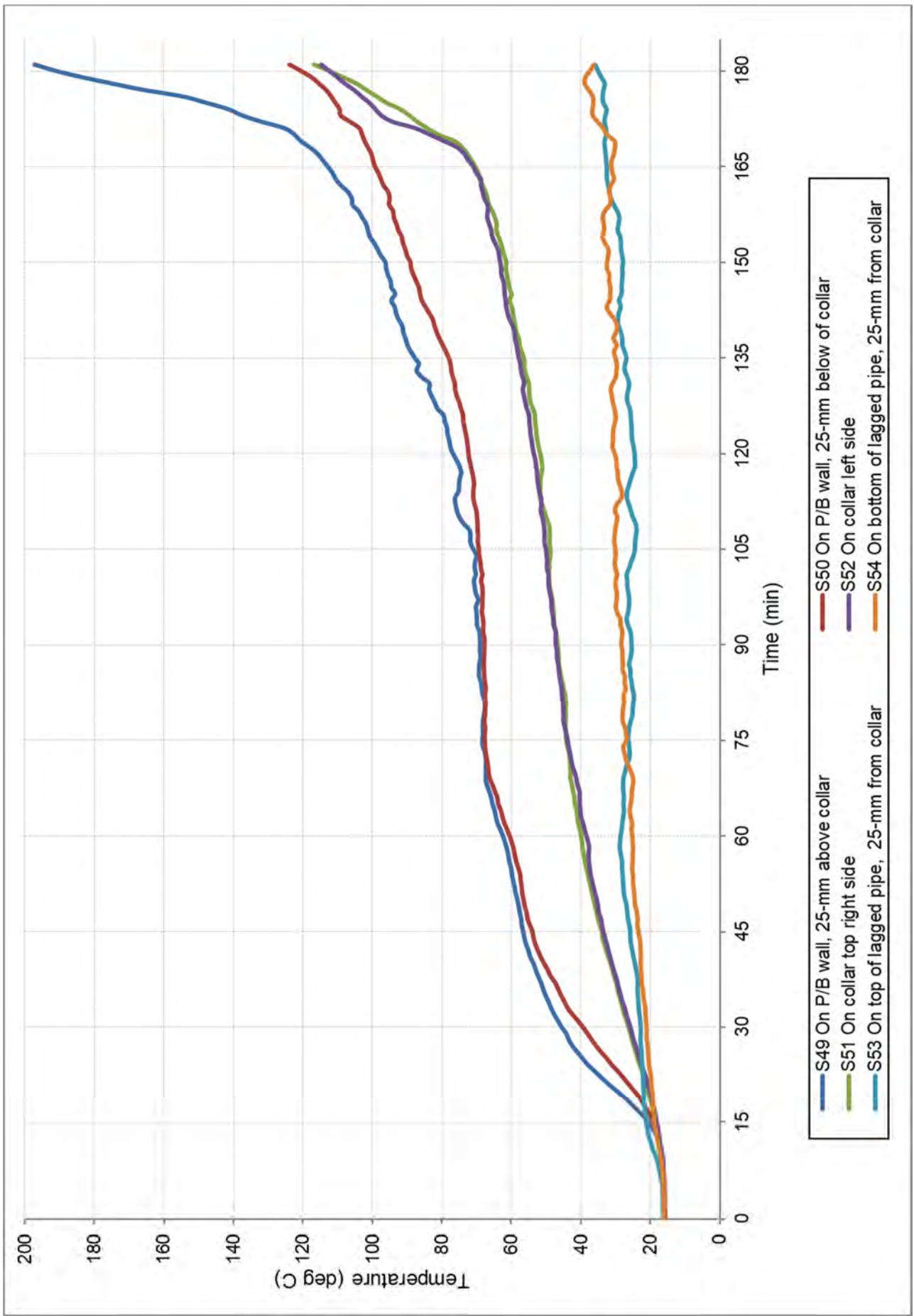


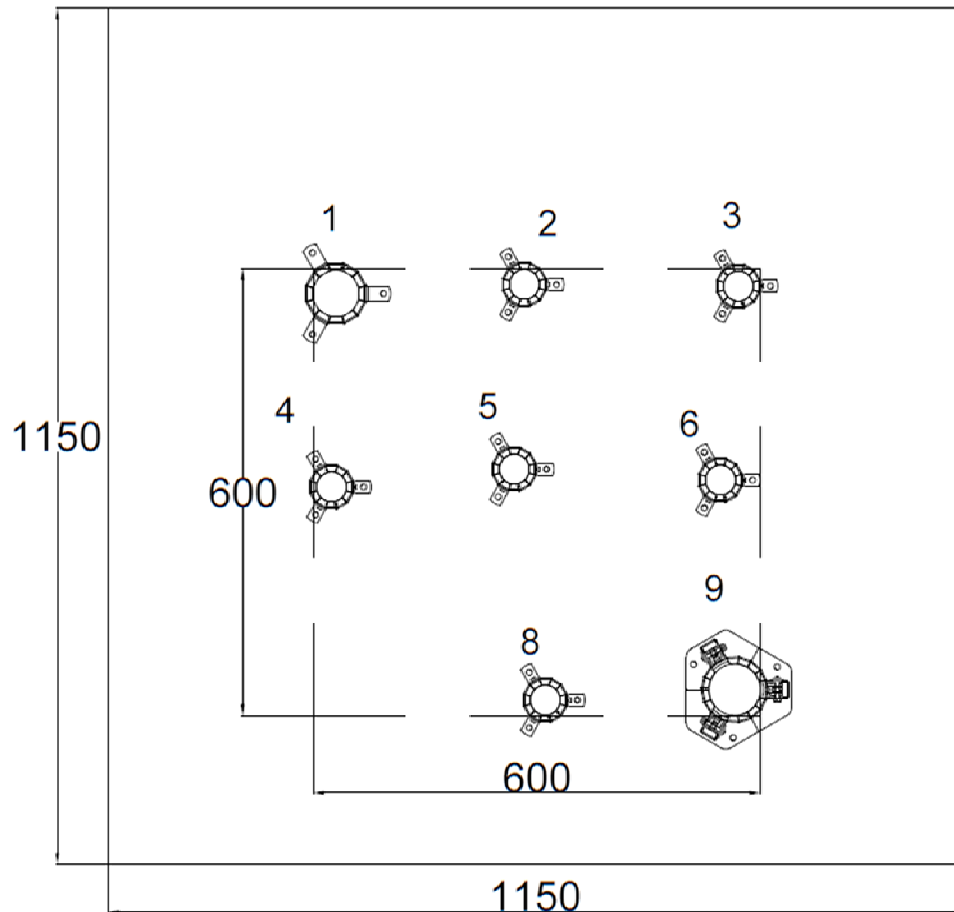
FIGURE 10 - TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN #9

Appendix D – Layout and installation drawings

Snap Fire Systems Pty Ltd

Test Wall W-21-B Layout

Date: 03 FEB 2021



Penetration	Collar Code	Pipe Type	Pipe Diameter
1	50R	PVC PN12	40
2	32R	C-PVC	1 in
3	32R	PEX-a	32
4	32R	PEX-a	25
5	32R	PEX-a	20
6	32R	PEX-a	16
8	32R	PEX-AI-PEX	25
9	MS70R	PVC PN12 + Armaflex Lagging	32 (19mm Lagging)

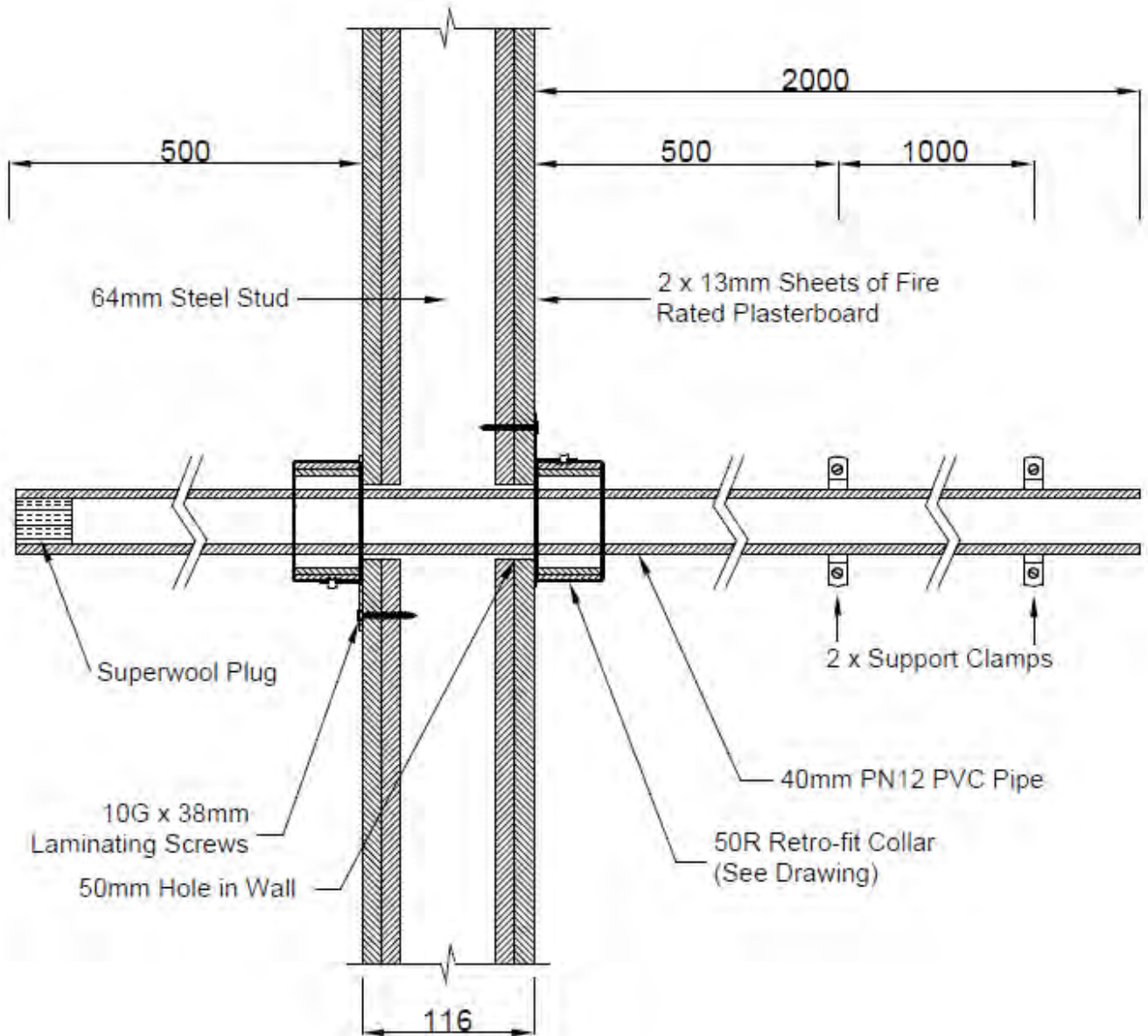
DRAWING TITLED 'TEST WALL W-21-B LAYOUT, DATED 3 FEBRUARY 2021, BY SNAP FIRE SYSTEMS PTY LTD.

Snap Fire Systems Pty Ltd

Specimen #1

40 PN12 PVC Stack & 50R

Date: 03 FEB 2021



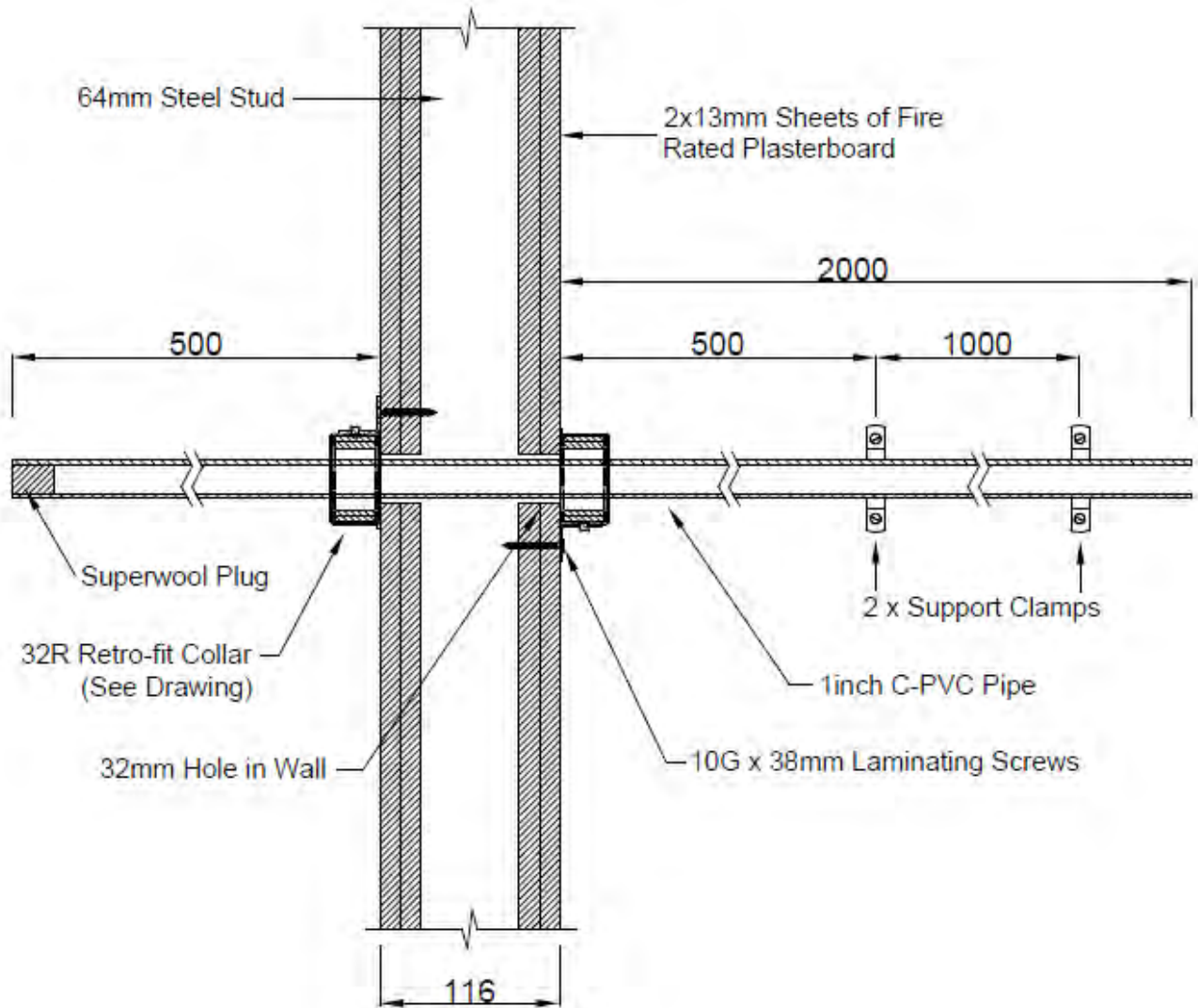
DRAWING TITLED 'SPECIMEN #1 40 PN12 PVC STACK & 50R', DATED 3 FEBRUARY 2021, BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #2

1inch C-PVC Stack & 32R

Date: 03 FEB 2021



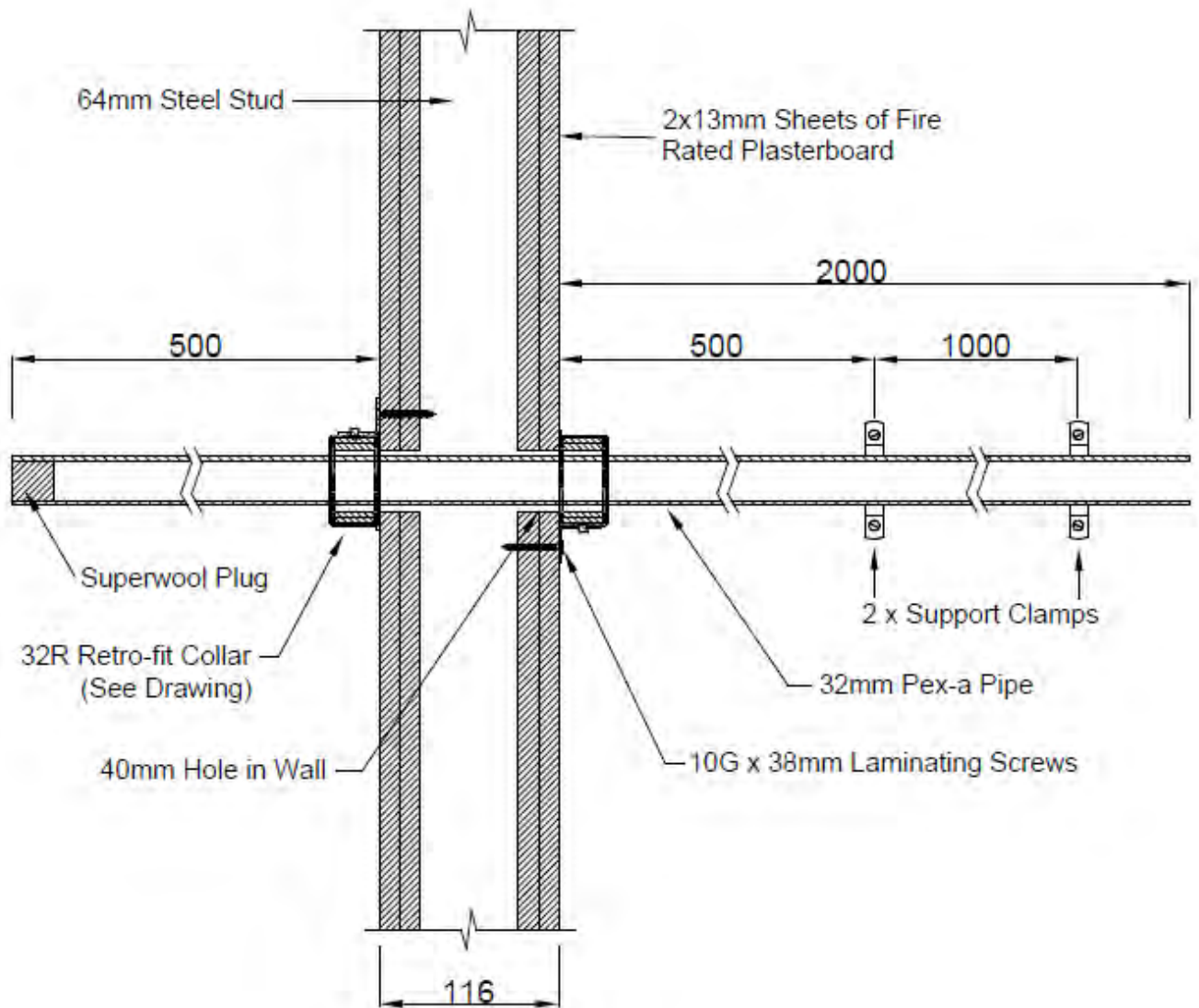
DRAWING TITLED 'SPECIMEN #2 1INCH C-PVC STACK & 32R', DATED 3 FEBRUARY 2021, BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #3

32 Pex-a Stack & 32R

Date: 03 FEB 2021



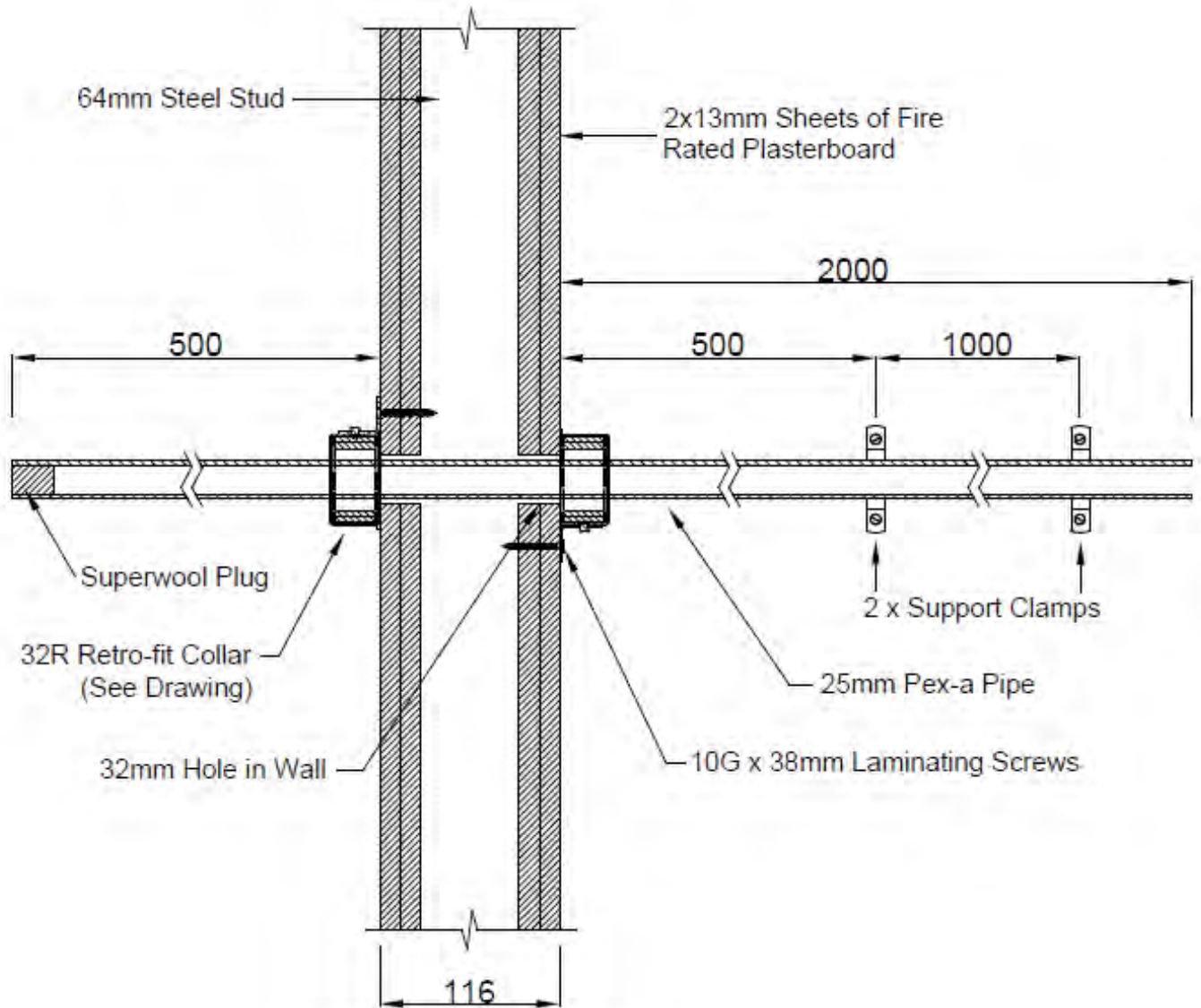
DRAWING TITLED 'SPECIMEN #3 32 PEX-A STACK & 32R', DATED 3 FEBRUARY 2021, BY SNAP FIRE SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #4

25 Pex-a Stack & 32R

Date: 03 FEB 2021



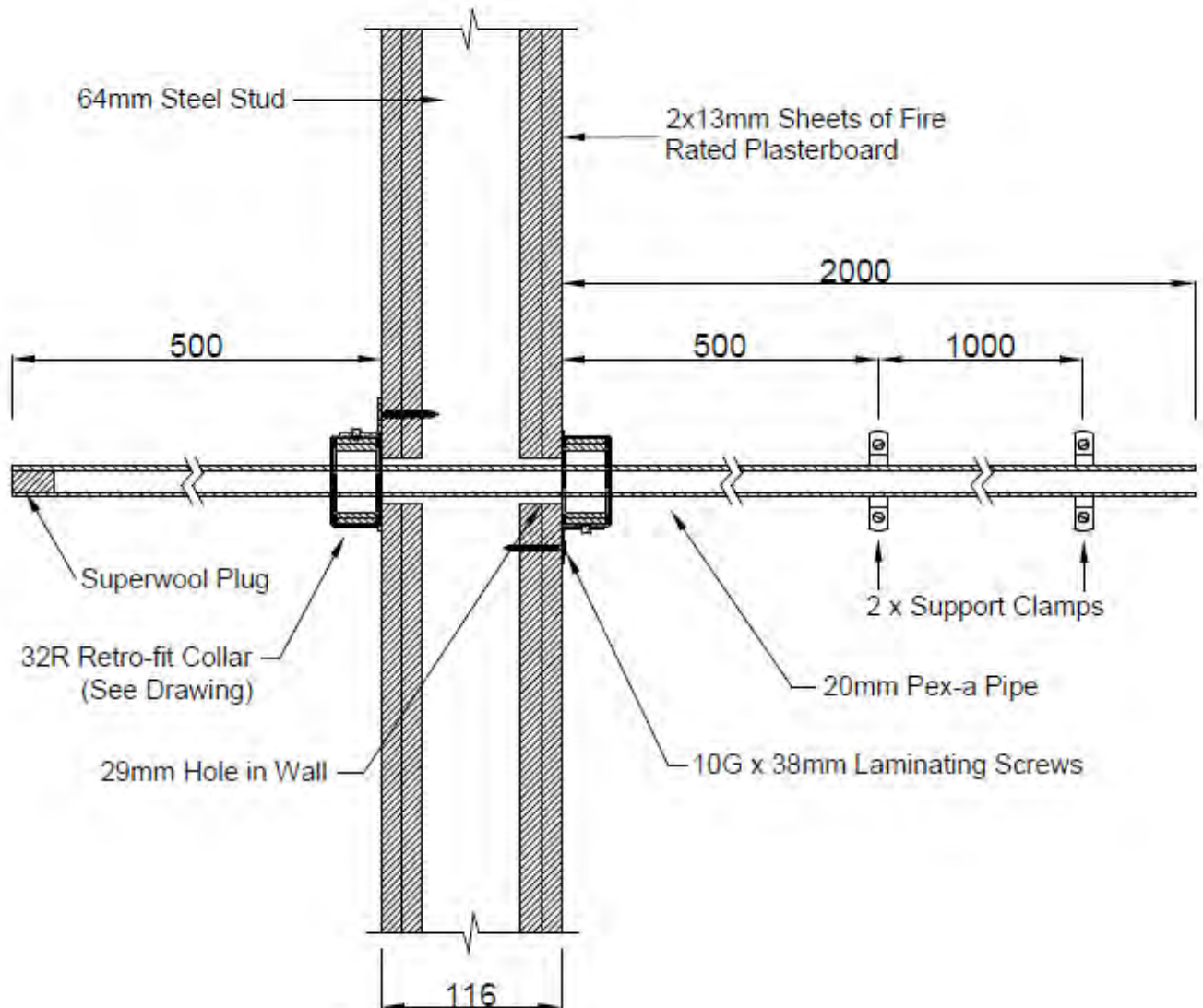
DRAWING TITLED 'SPECIMEN #4 25 PEX-A STACK & 32R', DATED 3 FEBRUARY 2021, BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #5

20 Pex-a Stack & 32R

Date: 03 FEB 2021



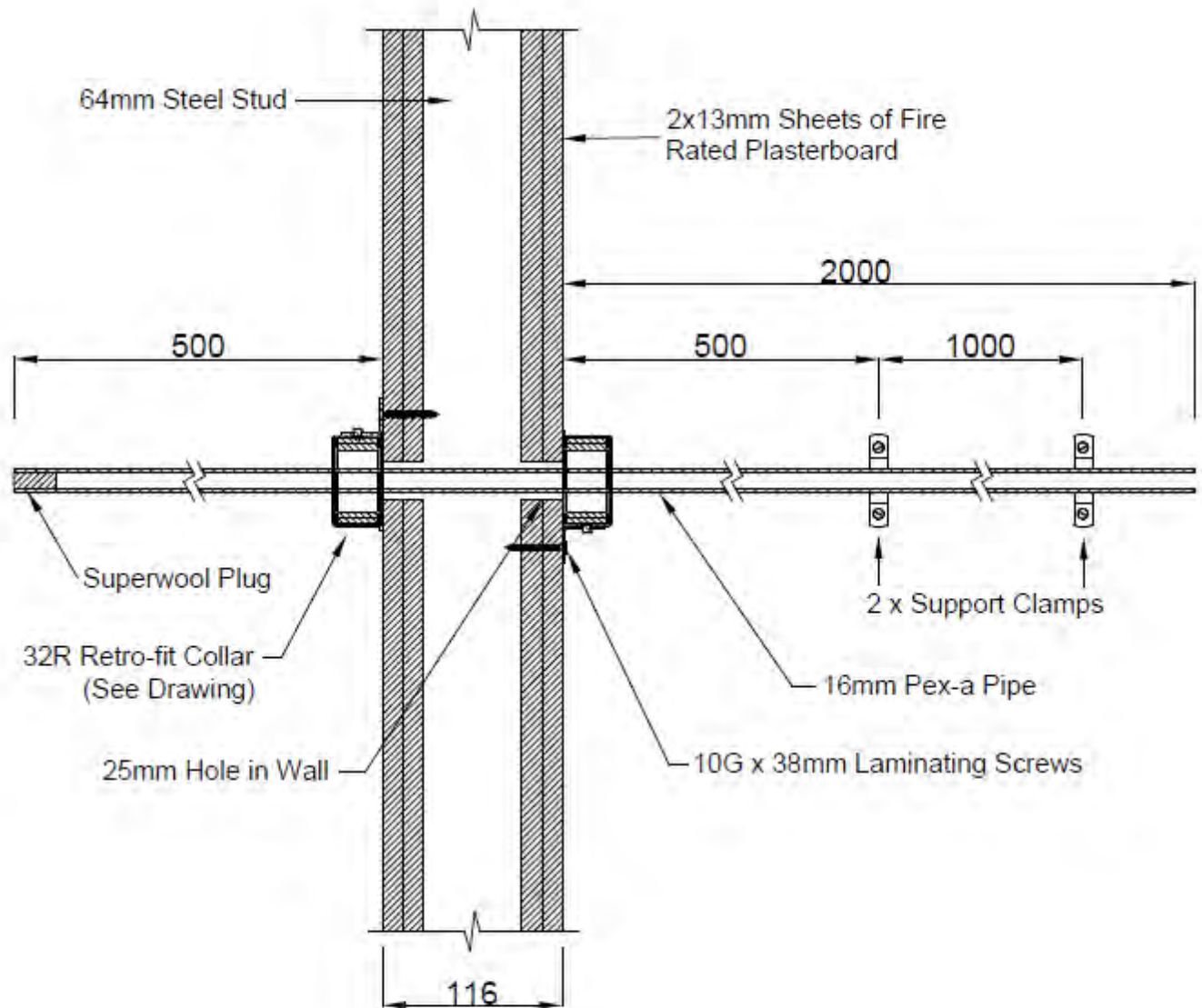
DRAWING TITLED 'SPECIMEN #5 20 PEX-A STACK & 32R', DATED 3 FEBRUARY 2021, BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #6

16 Pex-a Stack & 32R

Date: 03 FEB 2021



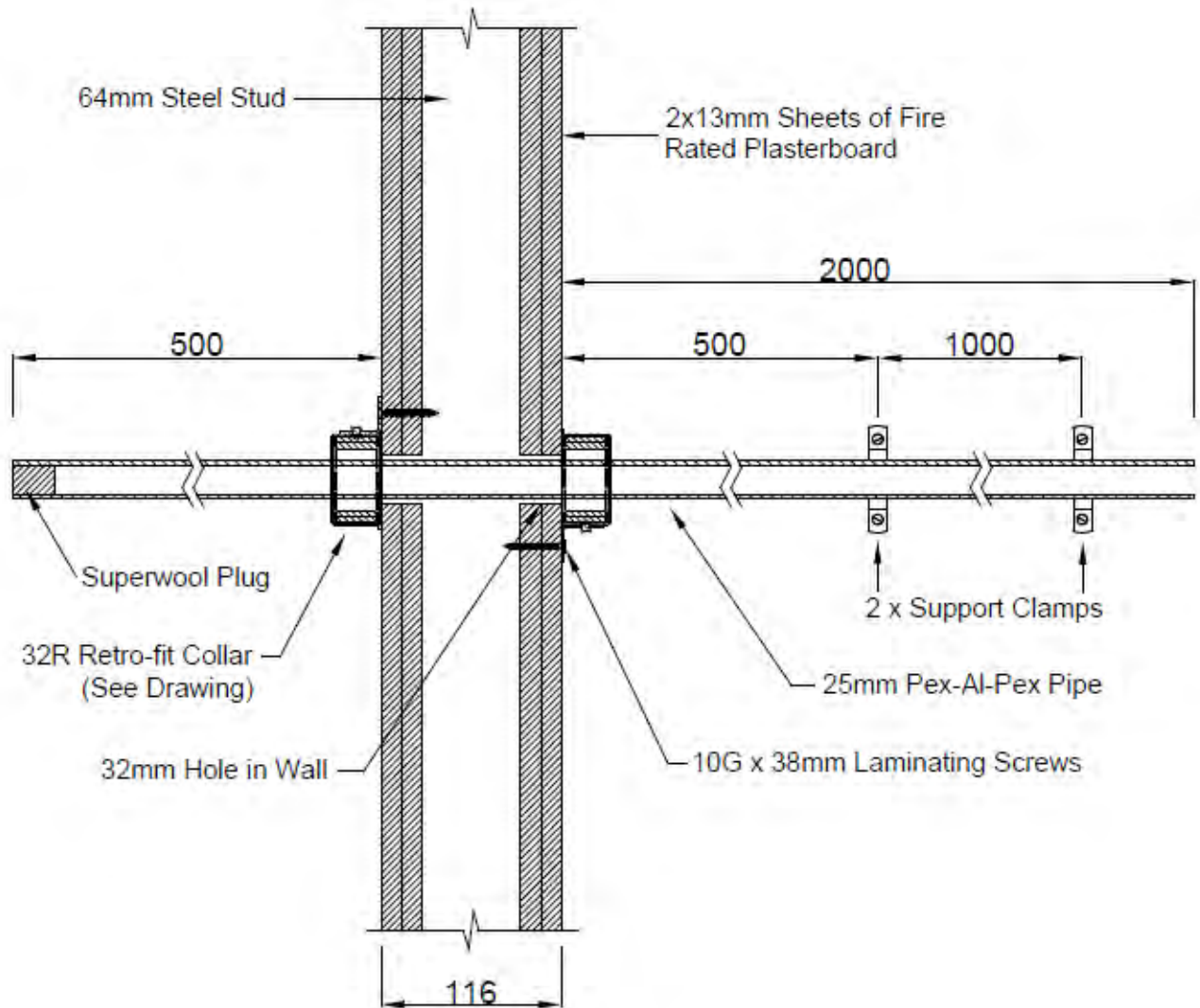
DRAWING TITLED 'SPECIMEN #6 16 PEX-A STACK & 32R', DATED 3 FEBRUARY 2021, BY SNAP FIRE SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #8

25 Pex-Al-Pex Stack & 32R

Date: 03 FEB 2021



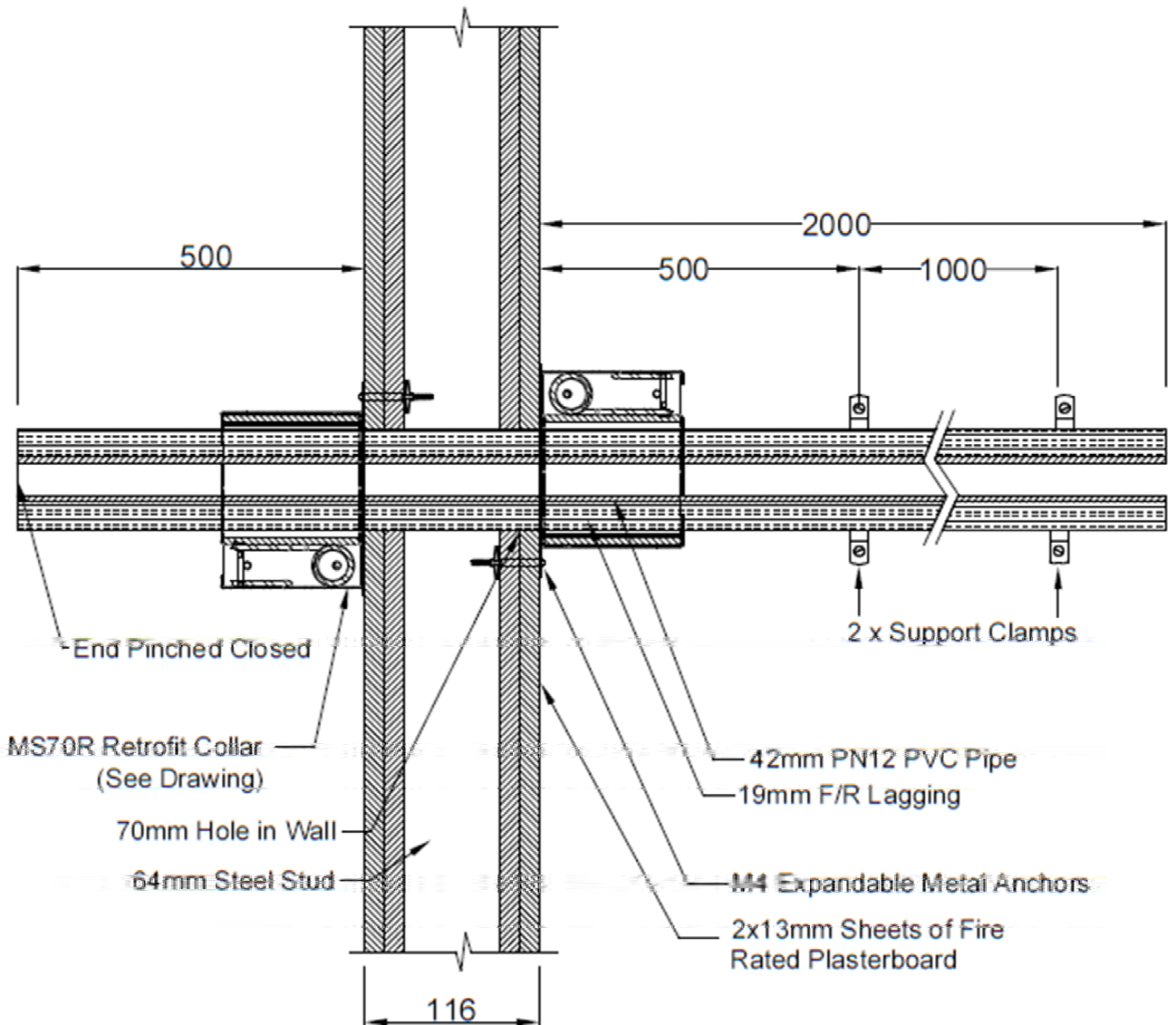
**DRAWING TITLED 'SPECIMEN #8 25 PEX-A-PEX STACK & 32R', DATED 3 FEBRUARY 2021, BY SNAP FIRE
SNAP FIRE SYSTEMS PTY LTD**

Snap Fire Systems Pty Ltd

Specimen #9

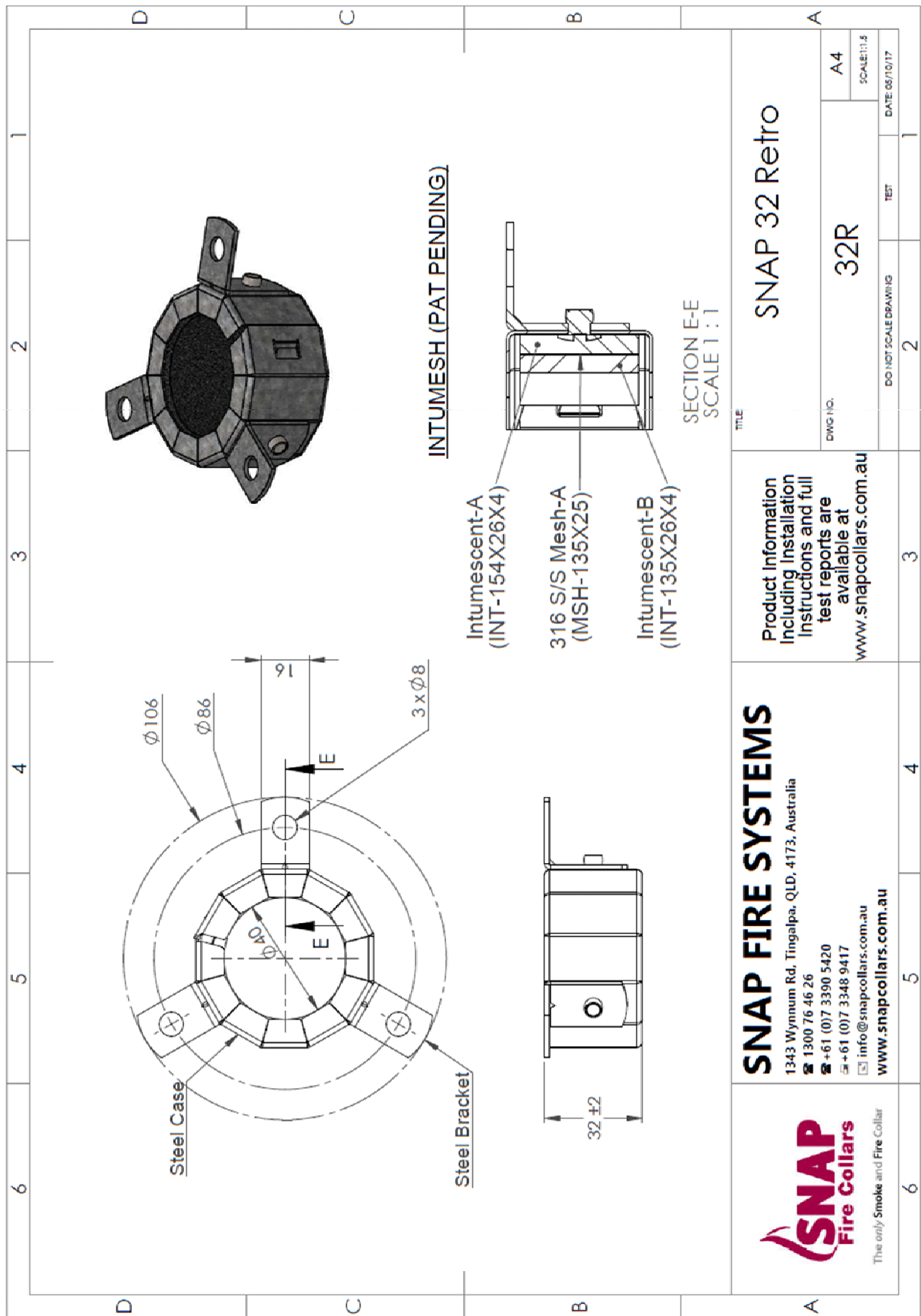
32 PN12 PVC Pipe with 19mm F/R Lagging & MS70R Collar

Date: 03 FEB 2021

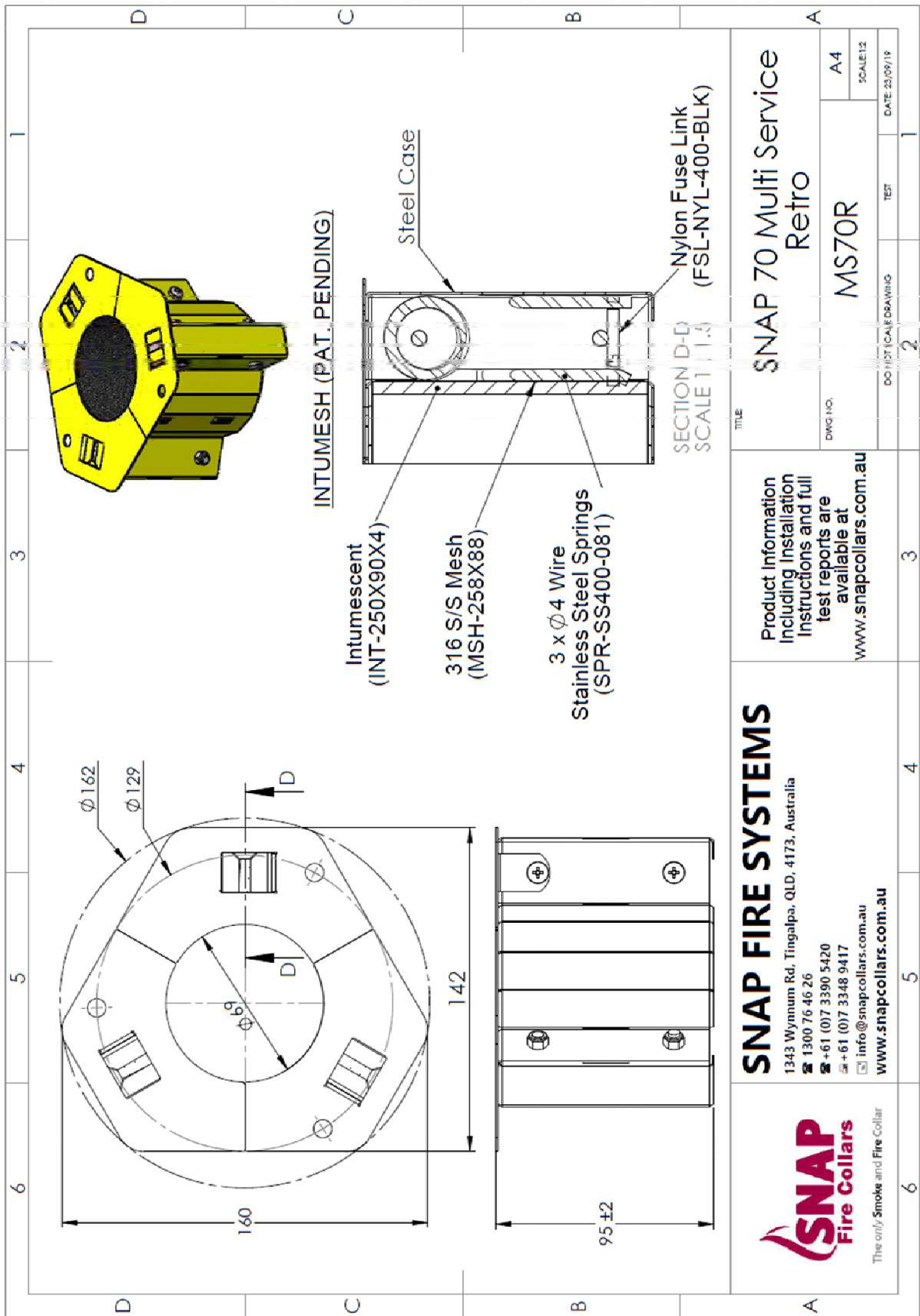


DRAWING TITLED 'SPECIMEN #9 32 PN12 PVC PIPEWITH 19MM F/R LAGGING STACK & MS70R COLLAR',
DATED 3 FEBRUARY 2021, BY SNAP FIRE SNAP FIRE SYSTEMS PTY LTD

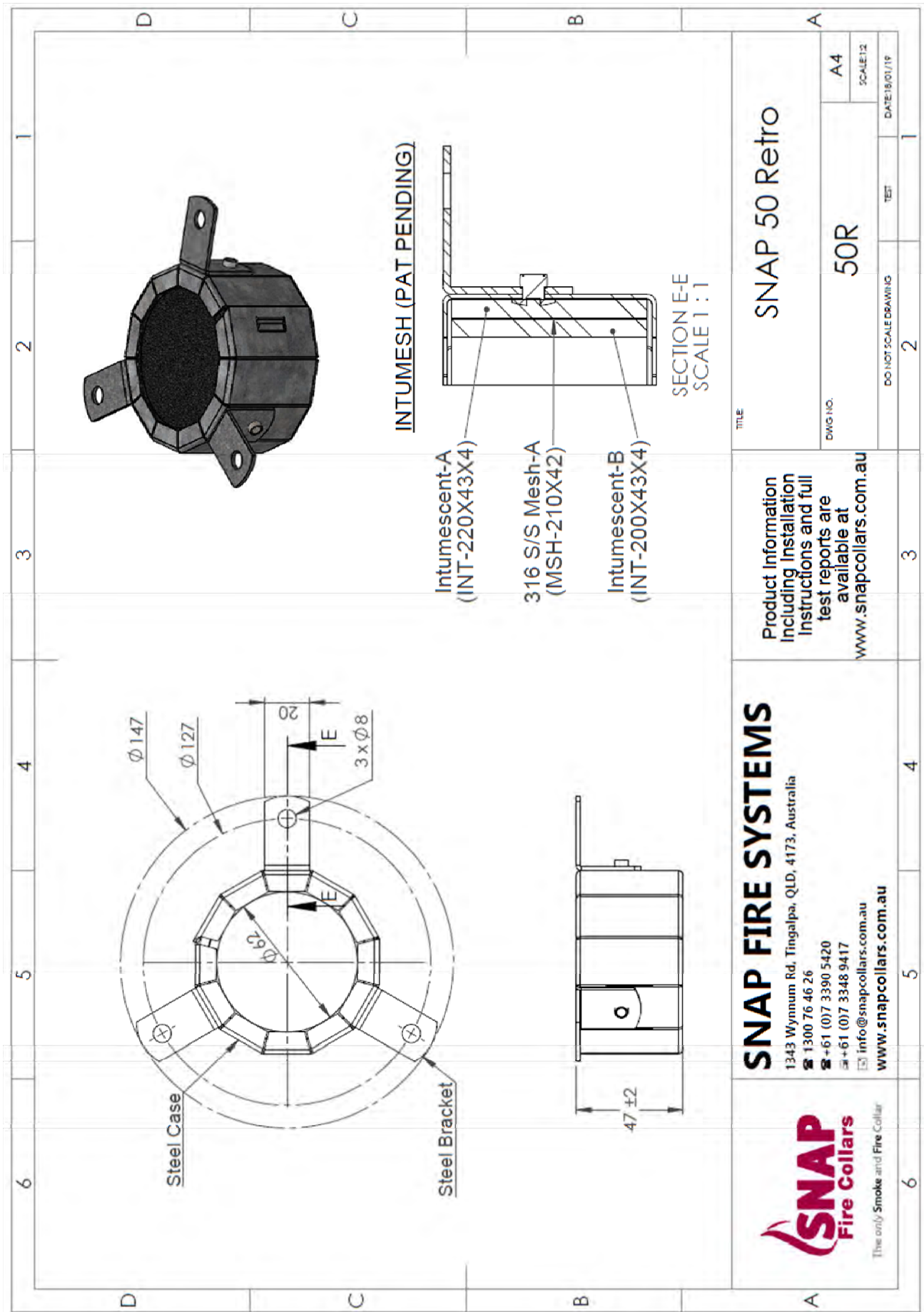
Appendix E – Specimen Drawings



DRAWING TITLED 'SNAP 32 RETRO', DATED 5 OCTOBER 2017, BY SNAP FIRE SYSTEMS.



DRAWING TITLED 'SNAP 70 MULTI SERVICE RETRO', DATED 23 SEPTEMBER 2019, BY SNAP FIRE SYSTEMS.



DRAWING TITLED 'SNAP 50 RETRO', DATED 18 JANUARY 2019, BY SNAP FIRE SYSTEMS.



Certificate of Test

No. 3614

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 2206.

Product Name: SNAP 32R Retrofit fire collars protecting a nominal 1-inch (33.5-mm OD) CPVC pipe penetrating a 35-mm diameter aperture (Specimen 2)

Description: The sponsor identified the specimen as retrofit fire collars protecting a steel framed plasterboard wall penetrated nine (9) pipes. The plasterboard wall was constructed in accordance with Boral Firestop system SB120.1 with an established fire resistance level (FRL) of -/120/120. Specimen 2 is the subject of this Certificate. The SNAP 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 which comprised 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. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using 10 gauge 38-mm long coarse thread laminating screws. The penetrating service comprised a Blazemaster CPVC 33.5-mm outside diameter pipe, with a wall thickness of 2.9-mm fitted through the collar's sleeve and penetrated the wall through a 35 mm diameter cut-out hole. The pipe projected horizontally, 2000-mm away from the unexposed face of the wall and approximately 500 mm into the furnace chamber. The pipe was supported at nominally 500-mm and 1500-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed end and plugged with ceramic fibre (Superwool) on the exposed end. The Sponsor provided document titled 'Plasterboard Fire and Acoustic Systems Australia', revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd, drawing titled 'Specimen #2, 1 inch C-PVC Stack & 32R', dated 3 February 2021, by Snap Fire Systems Pty Ltd and drawing titled "SNAP 32 Retro", dated 5 October 2017, by Snap Fire Systems Pty Ltd as a complete description of the specimen and should be read in conjunction with this Certificate.

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


Structural Adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	no failure at 181 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120.

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 -/120/120. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it was installed. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon Date of Test: 8 June 2021

Issued on the 25th day of October 2021 without alterations or additions.


 Brett Roddy | Manager, Fire Testing and Assessments

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This document is issued in accordance with NATA's accreditation requirements.
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 Accredited for compliance with ISO/IEC 17025 - Testing



Certificate of Test

No. 3615

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 2206.

Product Name: SNAP 32R Retrofit fire collars protecting a nominal 32-mm PE-Xa Rehau Rautitan pipe penetrating a 40-mm diameter aperture (Specimen 3)

Description: The sponsor identified the specimen as retrofit fire collars protecting a steel framed plasterboard wall penetrated nine (9) pipes. The plasterboard wall was constructed in accordance with Boral Firestop system SB120.1 with an established fire resistance level (FRL) of -/120/120. Specimen 3 is the subject of this Certificate. The SNAP 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 which comprised 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 a wire mesh diameter of 0.15-mm. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 10 gauge 38-mm long coarse threaded laminating screws. The penetrating service comprised a Rehau Rautitan PE-Xa 32.2-mm outside diameter pipe, with a wall thickness of 4.6-mm fitted through the collar's sleeve and penetrated the wall through a 40 mm diameter cut-out hole. The pipe projected horizontally, 2000-mm away from the unexposed face of the wall and approximately 500 mm into the furnace chamber. The pipe was supported at nominally 500-mm and 1500-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed end and plugged with ceramic fibre (Superwool) on the exposed end. The Sponsor provided document titled 'Plasterboard Fire and Acoustic Systems Australia', revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd, drawing titled 'Specimen #3, 32 Pex-a Stack & 32R', dated 03 February 2021, by Snap Fire Systems Pty Ltd and drawing titled "SNAP 32 Retro", dated 5 October 2017, by Snap Fire Systems Pty Ltd as a complete description of the specimen and should be read in conjunction with this Certificate.

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


Structural Adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	no failure at 181 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120.

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 -/120/120. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it was installed. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon Date of Test: 8 June 2021

Issued on the 25th day of October 2021 without alterations or additions.


Brett Roddy | Manager, Fire Testing and Assessments

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Certificate of Test

No. 3616

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 2206.

Product Name: SNAP 32R Retrofit fire collars protecting a nominal 25-mm PE-Xa Rehau Rautitan pipe penetrating a 32-mm diameter aperture (Specimen 4)

Description: The sponsor identified the specimen as retrofit fire collars protecting a steel framed plasterboard wall penetrated nine (9) pipes. The plasterboard wall was constructed in accordance with Boral Firestop system SB120.1 with an established fire resistance level (FRL) of -/120/120. Specimen 4 is the subject of this Certificate. The SNAP 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 which comprised 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. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 10 gauge 38-mm long coarse threaded laminating screws. The penetrating service comprised a Rehau Rautitan PE-Xa 25.1-mm outside diameter pipe, with a wall thickness of 3.73-mm fitted through the collar's sleeve and penetrated the wall through a 32 mm diameter cut-out hole. The pipe projected horizontally, 2000-mm away from the unexposed face of the wall and approximately 500 mm into the furnace chamber. The pipe was supported at nominally 500-mm and 1500-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed end and plugged with ceramic fibre (Superwool) on the exposed end. The Sponsor provided document titled 'Plasterboard Fire and Acoustic Systems Australia', revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd, drawing titled 'Specimen #4, 25 Pex-a Stack & 32R', dated 3 February 2021, by Snap Fire Systems Pty Ltd and drawing titled "SNAP 32 Retro", dated 5 October 2017, by Snap Fire Systems Pty Ltd as a complete description of the specimen and should be read in conjunction with this Certificate.

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


Structural Adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	163 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120.

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 -/120/120. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it was installed. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon Date of Test: 8 June 2021

Issued on the 25th day of October 2021 without alterations or additions.


 Brett Roddy | Manager, Fire Testing and Assessments

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Certificate of Test

No. 3617

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 2206.

Product Name: SNAP 32R Retrofit fire collars protecting a nominal 20-mm PE-Xa Rehau Rautitan pipe penetrating a 29-mm diameter aperture (Specimen 5)

Description: The sponsor identified the specimen as retrofit fire collars protecting a steel framed plasterboard wall penetrated nine (9) pipes. The plasterboard wall was constructed in accordance with Boral Firestop system SB120.1 with an established fire resistance level (FRL) of -/120/120. Specimen 5 is the subject of this Certificate. The SNAP 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 which comprised 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. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 10 gauge 38-mm long coarse threaded laminating screws. The penetrating service comprised a Rehau Rautitan PE-Xa 20.2-mm outside diameter pipe, with a wall thickness of 3.5-mm fitted through the collar's sleeve and penetrated the wall through a 29 mm diameter cut-out hole. The pipe projected horizontally, 2000-mm away from the unexposed face of the wall and approximately 500 mm into the furnace chamber. The pipe was supported at nominally 500-mm and 1500-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed end and plugged with ceramic fibre (Superwool) on the exposed end. The Sponsor provided document titled 'Plasterboard Fire and Acoustic Systems Australia', revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd, drawing titled 'Specimen #5, 20 Pex-a Stack & 32R', dated 3 February 2021, by Snap Fire Systems Pty Ltd and drawing titled "SNAP 32 Retro", dated 5 October 2017, by Snap Fire Systems Pty Ltd as a complete description of the specimen and should be read in conjunction with this Certificate.

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


Structural Adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	142 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120.

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 -/120/120. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it was installed. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon Date of Test: 8 June 2021

Issued on the 25th day of October 2021 without alterations or additions.


Brett Roddy | Manager, Fire Testing and Assessments

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Certificate of Test

No. 3618

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 2206.

Product Name: SNAP 32R Retrofit fire collars protecting a nominal 16-mm PE-Xa Rehau Rautitan pipe penetrating a 25-mm diameter aperture (Specimen 6)

Description: The sponsor identified the specimen as retrofit fire collars protecting a steel framed plasterboard wall penetrated nine (9) pipes. The plasterboard wall was constructed in accordance with Boral Firestop system SB120.1 with an established fire resistance level (FRL) of -/120/120. Specimen 6 is the subject of this Certificate. The SNAP 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 which comprised 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. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 10 gauge 38-mm long coarse threaded laminating screws. The penetrating service comprised a Rehau Rautitan PE-Xa 16.1-mm outside diameter pipe, with a wall thickness of 2.6-mm fitted through the collar's sleeve and penetrated the wall through a 25 mm diameter cut-out hole. The pipe projected horizontally, 2000-mm away from the unexposed face of the wall and approximately 500 mm into the furnace chamber. The pipe was supported at nominally 500-mm and 1500-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed end and plugged with ceramic fibre (Superwool) on the exposed end. The Sponsor provided document titled 'Plasterboard Fire and Acoustic Systems Australia', revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd, drawing titled 'Specimen #6, 16 Pex-a Stack & 32R', dated 3 February 2021, by Snap Fire Systems Pty Ltd and drawing titled "SNAP 32 Retro", dated 5 October 2017, by Snap Fire Systems Pty Ltd as a complete description of the specimen and should be read in conjunction with this Certificate.

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


Structural Adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	175 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120.

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 -/120/120. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it was installed. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon Date of Test: 8 June 2021

Issued on the 25th day of October 2021 without alterations or additions.


Brett Roddy | Manager, Fire Testing and Assessments

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Certificate of Test

No. 3619

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 2206.

Product Name: SNAP 32R Retrofit fire collars protecting a nominal 25-mm Pex-Al-Pex pipe penetrating a 32-mm diameter aperture (Specimen 8)

Description: The sponsor identified the specimen as retrofit fire collars protecting a steel framed plasterboard wall penetrated nine (9) pipes. The plasterboard wall was constructed in accordance with Boral Firestop system SB120.1 with an established fire resistance level (FRL) of -/120/120. Specimen 8 is the subject of this Certificate. The SNAP 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 which comprised 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. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 10 gauge 38-mm long coarse thread laminating screws. The penetrating service comprised a CXL Pex-Al-Pex 25.15-mm outside diameter pipe, with a wall thickness of 2.75-mm fitted through the collar's sleeve and penetrated the wall through a 32-mm diameter cut-out hole. The pipe projected horizontally, 2000-mm away from the unexposed face of the wall and approximately 500 mm into the furnace chamber. The pipe was supported at nominally 500-mm and 1500-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed end and plugged with ceramic fibre (Superwool) on the exposed end. The Sponsor provided document titled 'Plasterboard Fire and Acoustic Systems Australia', revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd, drawing titled 'Specimen #8 25 Pex-Al-Pex Stack & 32R', dated 3 February 2021, by Snap Fire Systems Pty Ltd and drawing titled "SNAP 32 Retro", dated 5 October 2017, by Snap Fire Systems Pty Ltd as a complete description of the specimen and should be read in conjunction with this Certificate.

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


Structural Adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	159 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120.

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 -/120/120. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it was installed. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon Date of Test: 8 June 2021

Issued on the 25th day of October 2021 without alterations or additions.


 Brett Roddy | Manager, Fire Testing and Assessments

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Certificate of Test

No. 3620

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 2206.

Product Name: SNAP MS70R Multi Services Retrofit fire collars protecting a nominal 32 (42.2-mm OD) PN12 PVC pipe with 19-mm thick fire rated lagging penetrating a 70-mm diameter aperture (Specimen 9)

Description: The sponsor identified the specimen as retrofit fire collars protecting a steel framed plasterboard wall penetrated nine (9) pipes. The plasterboard wall was constructed in accordance with Boral Firestop system SB120.1 with an established fire resistance level (FRL) of -/120/120. Specimen 9 is the subject of this Certificate. The SNAP MS70R Multi Service Retrofit fire collar comprised a 0.75-mm thick steel casing with a 69-mm inner diameter and a 0.95-mm thick steel base flange with a 162-mm diameter. The 95 mm high collar casing incorporated a 4-mm thick x 90-mm wide x 250-mm long soft Intumescent wrap lined within the internal circumference of the collar casing. The closing mechanism comprised three stainless steel springs, a nylon fuse link and a 258-mm long x 88-mm wide 316 stainless steel mesh located around the intumescent strip. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three M4 expandable steel hollow wall anchors with stainless steel washers. The penetrating service comprised a Iplex PN12 PVC 42.2-mm outside diameter pipe, with a wall thickness of 2.57-mm covered with 19-mm thick Armaflex FR foam lagging. The lagged pipe was fitted through the collar's sleeve and penetrated the wall through a 70-mm diameter cut-out hole. The lagged pipe projected horizontally 2000-mm away from the unexposed face of the wall and approximately 500 mm into the furnace chamber. The lagged pipe was supported at 500 mm and 1500-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed end and plugged with ceramic fibre (Superwool) on the exposed end. The Sponsor provided document titled 'Plasterboard Fire and Acoustic Systems Australia', revision UB1231-SYS 12/18, by USG Boral Building Products Pty Ltd, drawing titled 'Specimen #9 32 PN12 PVC Pipe with 19mm F/R Lagging & MS70R Collar', dated 3 February 2021, by Snap Fire Systems Pty Ltd and drawing titled 'SNAP 70 Multi Service Retro', dated 23 September 2019, by Snap Fire Systems Pty Ltd as a complete description of the specimen and should be read in conjunction with this Certificate.

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

Structural Adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	181 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120.

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 -/120/120. The maximum FRL of any test specimen cannot exceed the FRL achieved by the wall system in which it was installed. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon

Date of Test: 8 June 2021

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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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