

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

Test Report

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Commercial-in-confidence

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

Sponsored Investigation No. FSP 1748

1 Introduction

1.1 Identification of specimen

The sponsor identified the specimen as Snap Retrofit Fire Collars protecting a plasterboard wall penetrated by five (5) PVC, two (2) P-PVC, one (1) C-PVC and one (1) PVC-SC pipe.

1.2 Sponsor

Snap Fire Systems Pty Ltd
Building A, 1343 Wynnum Road
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1.3 Manufacturer

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

1.4 Test standard

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

Section 10: Service Penetrations and control joints

1.5 Reference standard

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

1.6 Test number

CSIRO Reference test number: FS 4569/3954

1.7 Test date

The fire-resistance test was conducted on 2 May 2016.

2 Description of specimen

2.1 General

The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/120/120. Construction comprised 64-mm x 0.55-mm steel studs and noggins installed at nominally 600-mm centres, lined on each side with two (2) layers of 13-mm thick Boral Firestop sheets. The plasterboard sheeting was screw fixed to the steel studs using plasterboard screws at nominally 200-mm centres. The plasterboard wall thickness was 112-mm from exposed face to unexposed face. The wall was penetrated by nine (9) stack pipes protected by a retro-fitted Snap Fire Systems fire collar.

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

- AS/NZS 2053:2001 'Conduits and fittings for electrical installations'
- AS/NZS 1477:2006 'PVC pipes and fittings for pressure applications'
- AS/NZS 1260:2009 'PVC-U pipes and fittings for drain, waste and vent application'.
- Loss Prevention Standard 1260 Issue 3.1 'Plastic pipe and fittings for use in automatic sprinkler systems'.

For the purpose of the test, the specimens were referenced as Penetrations # 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Penetration # 1 – 50R retrofitted fire collar protecting a 32-mm Class 18 Polyvinyl Chloride (P-PVC) Pipe

The SNAP Retrofit 50R fire collar comprised a 0.75-mm steel casing with a 62-mm inner diameter and a 149-mm diameter base flange. The 47-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent wraps lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 43-mm wide x 200-mm long, and 4-mm thick x 43-mm wide x 220-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 210-mm long x 42-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 50R-T dated 4 November 2014, 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 hollow wall anchors.

The penetrating service comprised a 32-mm nominal diameter Class 18 P-PVC Pipe, with a wall thickness of 3.6-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 50-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-A Penetration # 1 – 32-mm Class 18 P-PVC Pipe – 50R Retrofit Collar", dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed and exposed end.

Penetration # 2 – 50R retrofitted fire collar protecting a 1.25 inch Polyvinyl Chloride (C-PVC) Pipe

The SNAP Retrofit 50R fire collar comprised a 0.75-mm steel casing with a 62-mm inner diameter and a 149-mm diameter base flange. The 47-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent wraps lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 43-mm wide x 200-mm long, and 4-mm thick x 43-mm wide x 220-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 210-mm long x 42-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 50R-T dated 4 November 2014, 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 hollow wall anchors.

The penetrating service comprised a 1.25 inch C-PVC Pipe, with a wall thickness of 3.5-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 50-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-A Penetration # 2 – 1.25 inch C-PVC Pipe – 50R Retrofit Collar", dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Penetration # 3 – 32R retrofitted fire collar protecting a 16-mm Polyvinyl Chloride (PVC) Flexi Pipe

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135-mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 12 February 2015, 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 hollow wall anchors.

The penetrating service comprised a 16-mm nominal diameter PVC Flexi Pipe, with a wall thickness of 1.8-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 20-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-A Penetration # 3 – 16-mm PVC Flexi Pipe – 32R Retrofit Collar", dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Penetration # 4 – 32R retrofitted fire collar protecting a 20-mm Polyvinyl Chloride (PVC) Conduit with 3 core cable

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135-mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 12 February 2015, 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 hollow wall anchors.

The penetrating service comprised a 20-mm nominal diameter PVC Conduit with 3 core cable, with a wall thickness of 1.8-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 25-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-A Penetration # 4 – 20-mm PVC Conduit with 3 core cable – 32R Retrofit Collar", dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Penetration # 5 – 32R retrofitted fire collar protecting a 25-mm Polyvinyl Chloride (PVC) Conduit with 3 core cable

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135-mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 12 February 2015, 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 hollow wall anchors.

The penetrating service comprised a 25-mm nominal diameter PVC Conduit with 3 core cable, with a wall thickness of 2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 30-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-A Penetration # 5 – 25-mm PVC Conduit with 3 core cable – 32R Retrofit Collar", dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Penetration # 6 – 32R retrofitted fire collar protecting a 25-mm Polyvinyl Chloride (PVC) Conduit

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesch 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 304 stainless steel mesh 135-mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 12 February 2015, 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 hollow wall anchors.

The penetrating service comprised a 25-mm nominal diameter PVC Conduit, with a wall thickness of 2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 30-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-A Penetration # 6 – 25-mm PVC Conduit – 32R Retrofit Collar", dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Penetration # 7 – 32R retrofitted fire collar protecting a 20-mm Polyvinyl Chloride (PVC) Conduit

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesch 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 304 stainless steel mesh 135-mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 12 February 2015, 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 10g x 38-mm course thread plasterboard screws.

The penetrating service comprised a 20-mm nominal diameter PVC Conduit, with a wall thickness of 2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 25-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-A Penetration # 7 – 20-mm PVC Conduit – 32R Retrofit Collar", dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Penetration # 8 – 32R retrofitted fire collar protecting a 15-mm Polyvinyl Chloride (P-PVC) Class 18 Pipe

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesch 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 304 stainless steel mesh 135-mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 12 February 2015, 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 hollow wall anchors.

The penetrating service comprised a 15-mm nominal diameter P-PVC Class 18 Pipe, with a wall thickness of 1.8-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 20-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-A Penetration # 8 – 15-mm P-PVC Class 18 Pipe – 32R Retrofit Collar", dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Penetration # 9 – 110R retrofitted fire collar protecting a 100-mm Polyvinyl Chloride (PVC-SC) Pipe

The SNAP Retrofit 110R fire collar comprised a 0.75-mm steel casing with a 122-mm inner diameter and a 209-mm diameter base flange. The 62-mm high collar casing incorporated a closing mechanism that was comprised of three soft Intumesch intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 2.5-mm thick x 58-mm wide x 424-mm long, a 2.5-mm thick x 58-mm wide x 407-mm long, and 2.5-mm thick x 58-mm wide x 389-mm long respectively. Between the strips was a layer of 304 stainless steel mesh 415-mm long x 58-mm wide with wire mesh diameter of 0.15-mm, and 398-mm long x 58-mm wide with wire mesh diameter of 0.15-mm respectively as shown in drawing numbered 110R-T dated 9 October 2015, 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 10g x 38-mm course thread plasterboard screws.

The penetrating service comprised a 100-mm nominal diameter PVC-SC Pipe, with a wall thickness of 3.3-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 114-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-A Penetration # 9 – 100-mm PVC-SC Pipe – 110R Retrofit Collar", dated 9 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a PVC End Cap.

2.2 Dimensions

The wall specimen was nominally 1150-mm wide x 1150-mm high x 112-mm thick. All dimensions are nominal.

2.3 Orientation

The wall specimen system was of symmetrical construction.

2.4 Conditioning

The specimen was left to cure for a period longer than 10 days.

3 Documentation

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

Drawing titled “Test Wall W-16-A Penetration # 1 – 32-mm Class 18 P-PVC Pipe – 50R Retrofit Collar”, dated 23 May 2016, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Wall W-16-A Penetration # 2 – 1.25 inch C-PVC Pipe – 50R Retrofit Collar”, dated 23 May 2016, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Wall W-16-A Penetration # 3 – 16-mm PVC Flexi Pipe – 32R Retrofit Collar”, dated 23 May 2016, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Wall W-16-A Penetration # 4 – 20-mm PVC Conduit with 3 core cable – 32R Retrofit Collar”, dated 23 May 2016, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Wall W-16-A Penetration # 5 – 25-mm PVC Conduit with 3 core cable – 32R Retrofit Collar”, dated 23 May 2016, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Wall W-16-A Penetration # 6 – 25-mm PVC Conduit – 32R Retrofit Collar”, dated 23 May 2016, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Wall W-16-A Penetration # 7 – 20-mm PVC Conduit – 32R Retrofit Collar”, dated 23 May 2016, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Wall W-16-A Penetration # 8 – 15-mm P-PVC Class 18 Pipe – 32R Retrofit Collar”, dated 23 May 2016, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Wall W-16-A Penetration # 9 – 100-mm PVC-SC Pipe – 110R Retrofit Collar”, dated 9 October 2015, by Snap Fire Systems Pty Ltd.

Drawing numbered 50R-T dated 4 November 2014, by Snap Fire Systems Pty Ltd.

Drawing numbered 32R-T dated 12 February 2015, by Snap Fire Systems Pty Ltd.

Drawing numbered 110R-T dated 9 October 2015, 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 20°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 121 minutes by the agreement with the sponsor.

8 Test results

8.1 Critical observations

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

Time	Observation
1 minute -	Smoke is visible from base of collar for Penetrations # 1 and # 2. Fluing is visible from end of Penetrations # 4 and # 7.
2 minutes -	Fluing is visible from end of Penetration # 5.
3 minutes -	Fluing is visible from end of Penetration # 9.
4 minutes -	Fluing has ceased on Penetrations # 4 and # 5. Fluing is visible from end of Penetration # 6.

- 5 minutes - Significant fluing is visible from Penetration # 9. All other penetrations have ceased fluing.
- 6 minutes - The base of Penetration # 9 is softening.
- 7 minutes - Fluing from Penetration # 9 has decreased.
- 9 minutes - Fluing from Penetration # 9 has ceased.
- 27 minutes - Slight fluing is visible from end of Penetration # 2 and Penetration # 1 at the collar.
- 60 minutes - Slight fluing is visible from end of Penetration # 1.
- 65 minutes - Slight fluing is visible from end of Penetration # 5.
- 75 minutes - Slight fluing is visible from end of Penetration # 9.
- 85 minutes - Light smoke is being emitted from inside the collar of Penetration # 3.
- 92 minutes - Slight fluing is visible from end of Penetration # 6.
- 100 minutes - Significant smoke is visible from Penetration # 9.
- 105 minutes - Smoke is being emitted from inside the collar of Penetration # 9.
- 111 minutes - Penetration # 2 is softening at the base of the pipe.
- 121 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 maximum temperature versus time associated with Penetration # 1.
 Figure 4 shows the curve of maximum temperature versus time associated with Penetration # 2.
 Figure 5 shows the curve of maximum temperature versus time associated with Penetration # 3.
 Figure 6 shows the curve of maximum temperature versus time associated with Penetration # 4.
 Figure 7 shows the curve of maximum temperature versus time associated with Penetration # 5.
 Figure 8 shows the curve of maximum temperature versus time associated with Penetration # 6.
 Figure 9 shows the curve of maximum temperature versus time associated with Penetration # 7.
 Figure 10 shows the curve of maximum temperature versus time associated with Penetration # 8.
 Figure 11 shows the curve of maximum temperature versus time associated with Penetration # 9.

8.5 Performance

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

Penetration # 1 – 50R retrofitted fire collar protecting a 32-mm Class 18 Polyvinyl Chloride (P-PVC) Pipe

Structural adequacy - not applicable

Integrity - no failure at 121 minutes

Insulation - no failure at 121 minutes

Penetration # 2 – 50R retrofitted fire collar protecting a 1.25 inch Polyvinyl Chloride (C-PVC) Pipe

Structural adequacy - not applicable

Integrity - no failure at 121 minutes

Insulation - no failure at 121 minutes

Penetration # 3 – 32R retrofitted fire collar protecting a 16-mm Polyvinyl Chloride (PVC) Flexi Pipe

Structural adequacy - not applicable

Integrity - no failure at 121 minutes

Insulation - no failure at 121 minutes

Penetration # 4 – 32R retrofitted fire collar protecting a 20-mm Polyvinyl Chloride (PVC) Conduit with 3 core cable

Structural adequacy - not applicable

Integrity - no failure at 121 minutes

Insulation - no failure at 121 minutes

Penetration # 5 – 32R retrofitted fire collar protecting a 25-mm Polyvinyl Chloride (PVC) Conduit with 3 core cable

Structural adequacy - not applicable

Integrity - no failure at 121 minutes

Insulation - no failure at 121 minutes

Penetration # 6 – 32R retrofitted fire collar protecting a 25-mm Polyvinyl Chloride (PVC) Conduit

Structural adequacy - not applicable

Integrity - no failure at 121 minutes

Insulation - no failure at 121 minutes

Penetration # 7 – 32R retrofitted fire collar protecting a 20-mm Polyvinyl Chloride (PVC) Conduit

Structural adequacy - not applicable

Integrity - no failure at 121 minutes

Insulation - no failure at 121 minutes

Penetration # 8 – 32R retrofitted fire collar protecting a 15-mm Polyvinyl Chloride (P-PVC) Class 18 Pipe

Structural adequacy - not applicable

Integrity - no failure at 121 minutes

Insulation - no failure at 121 minutes

Penetration # 9 – 110R retrofitted fire collar protecting a 100-mm Polyvinyl Chloride (PVC-SC) Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 121 minutes
Insulation	-	no failure at 121 minutes

This report details methods of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in this standard. Any significant variation with respect to size, constructional details, loads, stresses, edge or end conditions, other than those allowed under the field of direct application in the relevant test method, is not covered by this report.

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

9 Fire-resistance level (FRL)

For the purpose of building regulations in Australia, the FRL's of the test specimens were as follows:

Penetration # 1	-	-/120/120
Penetration # 2	-	-/120/120
Penetration # 3	-	-/120/120
Penetration # 4	-	-/120/120
Penetration # 5	-	-/120/120
Penetration # 6	-	-/120/120
Penetration # 7	-	-/120/120
Penetration # 8	-	-/120/120
Penetration # 9	-	-/120/120

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

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

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

10 Field of direct application of test results

The results of the fire test contained in this test report are directly applicable, without reference to the testing authority, to similar constructions where one or more changes listed in Clause 10.11 of AS 1530.4-2014, have been made provided no individual component is removed or reduced.

11 Tested by

A handwritten signature in black ink, appearing to read "R. Colli". The signature is written in a cursive style with a large initial "R".

Testing Officer

Appendices

Appendix A – Measurement location

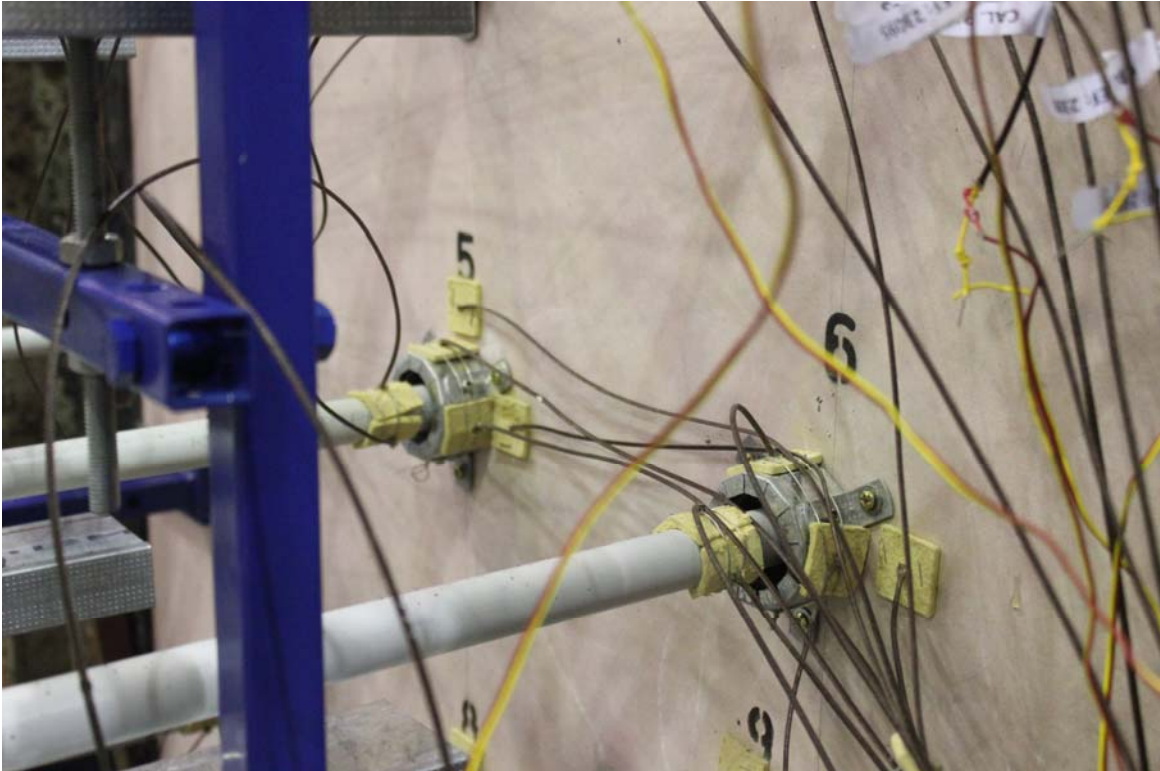
Measurement Location		
Group location	T/C Position	T/C designation
Specimen		
Specimen 1 – white PVC 32mm water pipe protected with Snap 50R	On wall – 25-mm above collar	S1
	On wall – 25-mm beside collar	S2
	On top of collar	S3
	On side of collar	S4
	On top of pipe 25-mm from collar	S5
	On side of pipe 25-mm from collar	S6
Specimen 2 – orange PVC 1.25 inch water pipe protected with Snap 50R	On wall – 25-mm above collar	S7
	On wall – 25-mm beside collar	S8
	On top of collar	S9
	On side of collar	S10
	On top of pipe 25-mm from collar	S11
	On side of pipe 25-mm from collar	S12
Specimen 3 – flexible PVC 16mm conduit pipe protected with Snap 32R	On wall – 25-mm above collar	S13
	On wall – 25-mm beside collar	S14
	On top of collar	S15
	On side of collar	S16
	On top of pipe 25-mm from collar	S17
	On side of pipe 25-mm from collar	S18
Specimen 4 – rigid PVC 20mm conduit pipe protected with Snap 32R	On wall – 25-mm above collar	S19
	On wall – 25-mm beside collar	S20
	On top of collar	S21
	On side of collar	S22
	On top of pipe 25-mm from collar	S23
	On side of pipe 25-mm from collar	S24
Specimen 5 – rigid PVC 25mm conduit pipe protected with Snap 32R	On wall – 25-mm above collar	S25
	On wall – 25-mm beside collar	S26
	On top of collar	S27
	On side of collar	S28
	On top of pipe 25-mm from collar	S29
	On side of pipe 25-mm from collar	S30
Specimen 6 – rigid PVC 25mm conduit pipe protected with Snap 32R	On wall – 25-mm above collar	S31
	On wall – 25-mm beside collar	S32
	On top of collar	S33
	On side of collar	S34
	On top of pipe 25-mm from collar	S35
	On side of pipe 25-mm from collar	S36
Specimen 7 – rigid PVC 20mm conduit pipe protected with Snap 32R	On wall – 25-mm above collar	S37
	On wall – 25-mm beside collar	S38
	On top of collar	S39
	On side of collar	S40
	On top of pipe 25-mm from collar	S41
	On side of pipe 25-mm from collar	S42

Specimen 8 – rigid PVC 15mm conduit pipe protected with Snap 32R	On wall – 25-mm above collar	S43
	On wall – 25-mm beside collar	S44
	On top of collar	S45
	On side of collar	S46
	On top of pipe 25-mm from collar	S47
	On side of pipe 25-mm from collar	S48
Specimen 9 – rigid PVC 100mm water pipe protected with Snap 110R	On wall – 25-mm above collar	S49
	On wall – 25-mm beside collar	S50
	On top of collar	S51
	On side of collar	S52
	On top of pipe 25-mm from collar	S53
	On side of pipe 25-mm from collar	S54

Appendix B – Photographs



PHOTOGRAPH 1 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING



PHOTOGRAPH 2 – SPECIMENS AFTER 60 MINUTES OF TESTING



PHOTOGRAPH 3 – SPECIMENS AFTER 120 MINUTES OF TESTING



PHOTOGRAPH 4 – EXPOSED FACE OF SPECIMENS AT CONCLUSION OF TESTING

Appendix C – Furnace Temperature

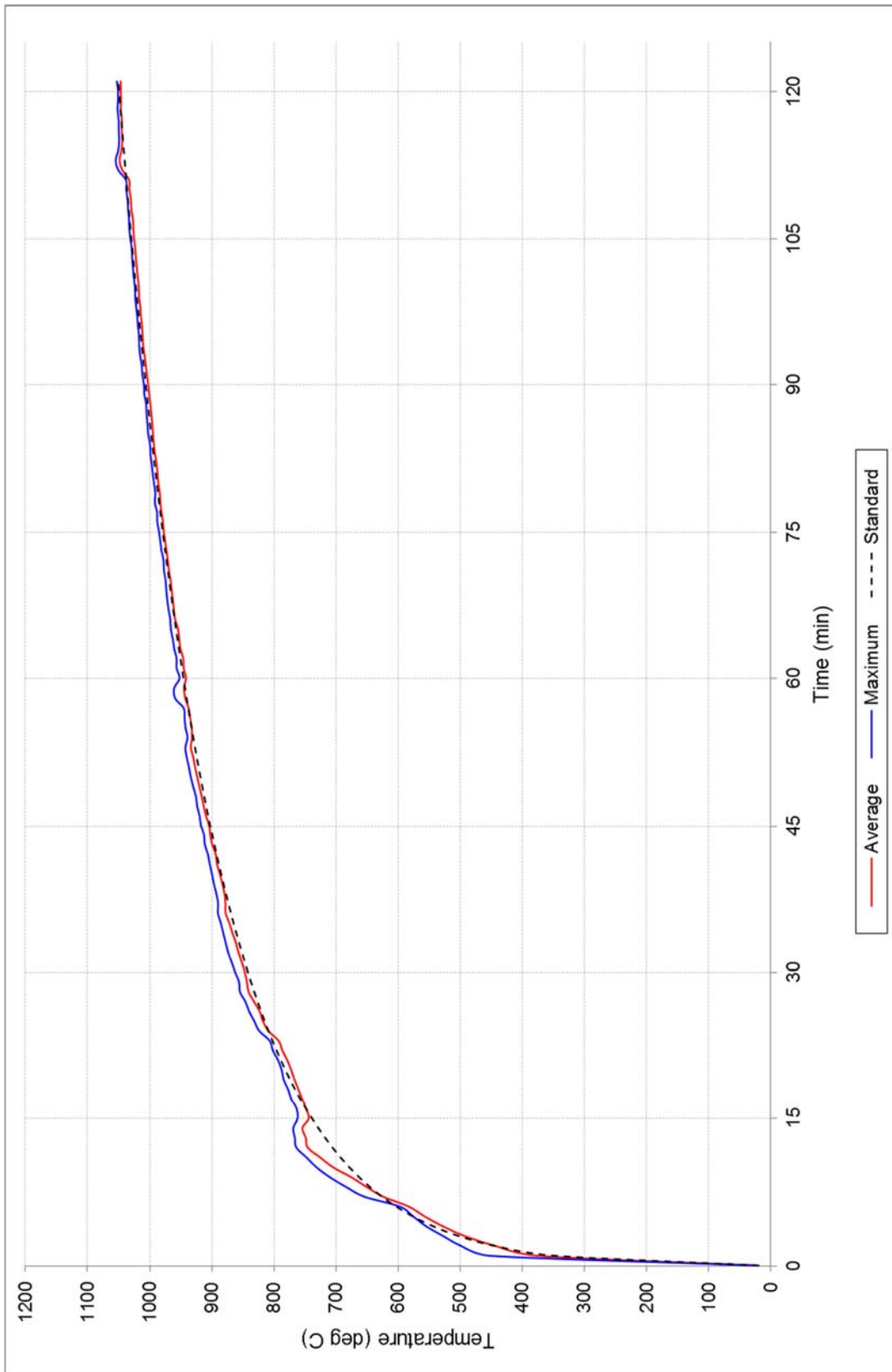


FIGURE 1 – FURNACE TEMPERATURE

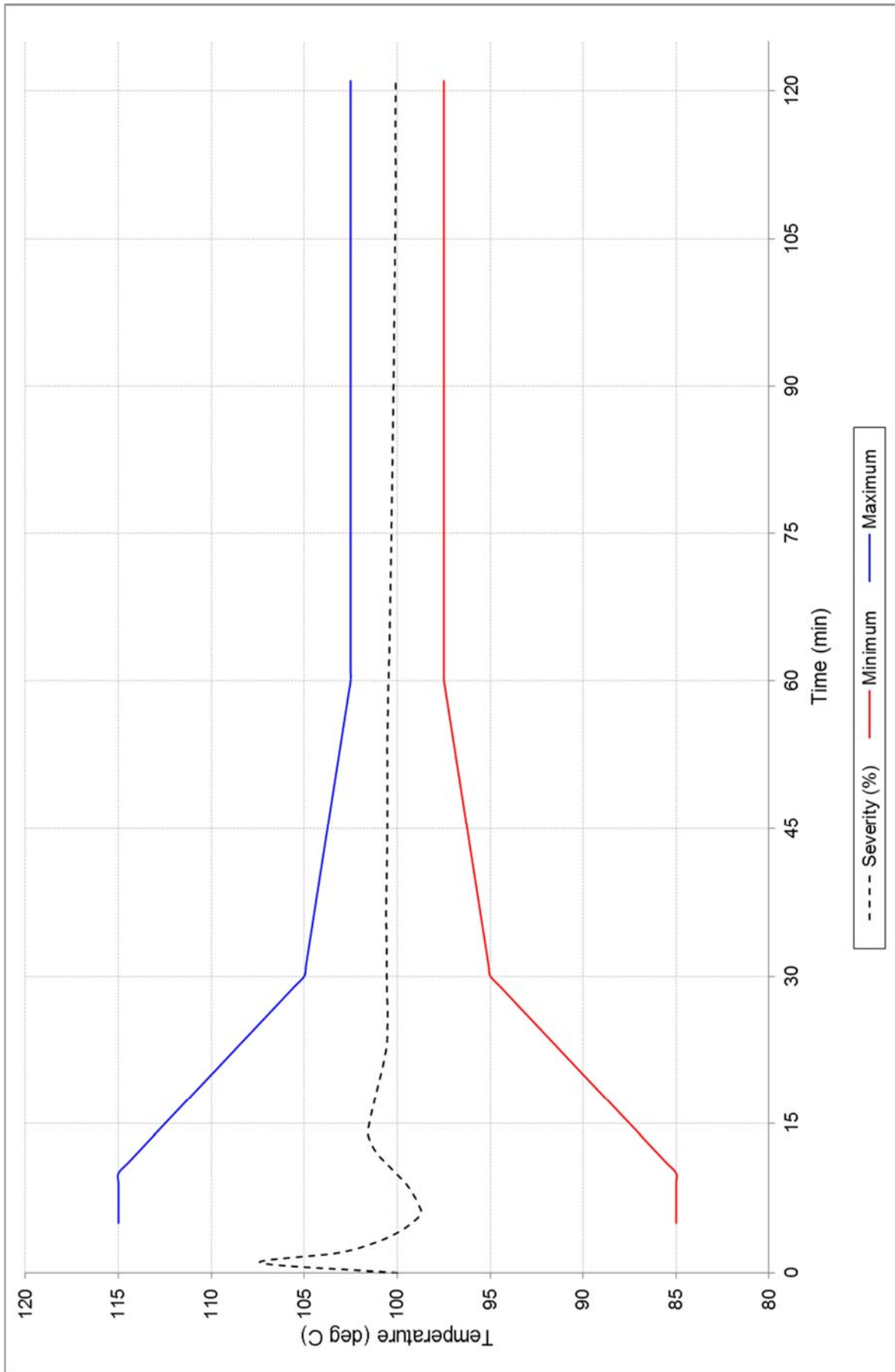


FIGURE 2 – FURNACE SEVERITY

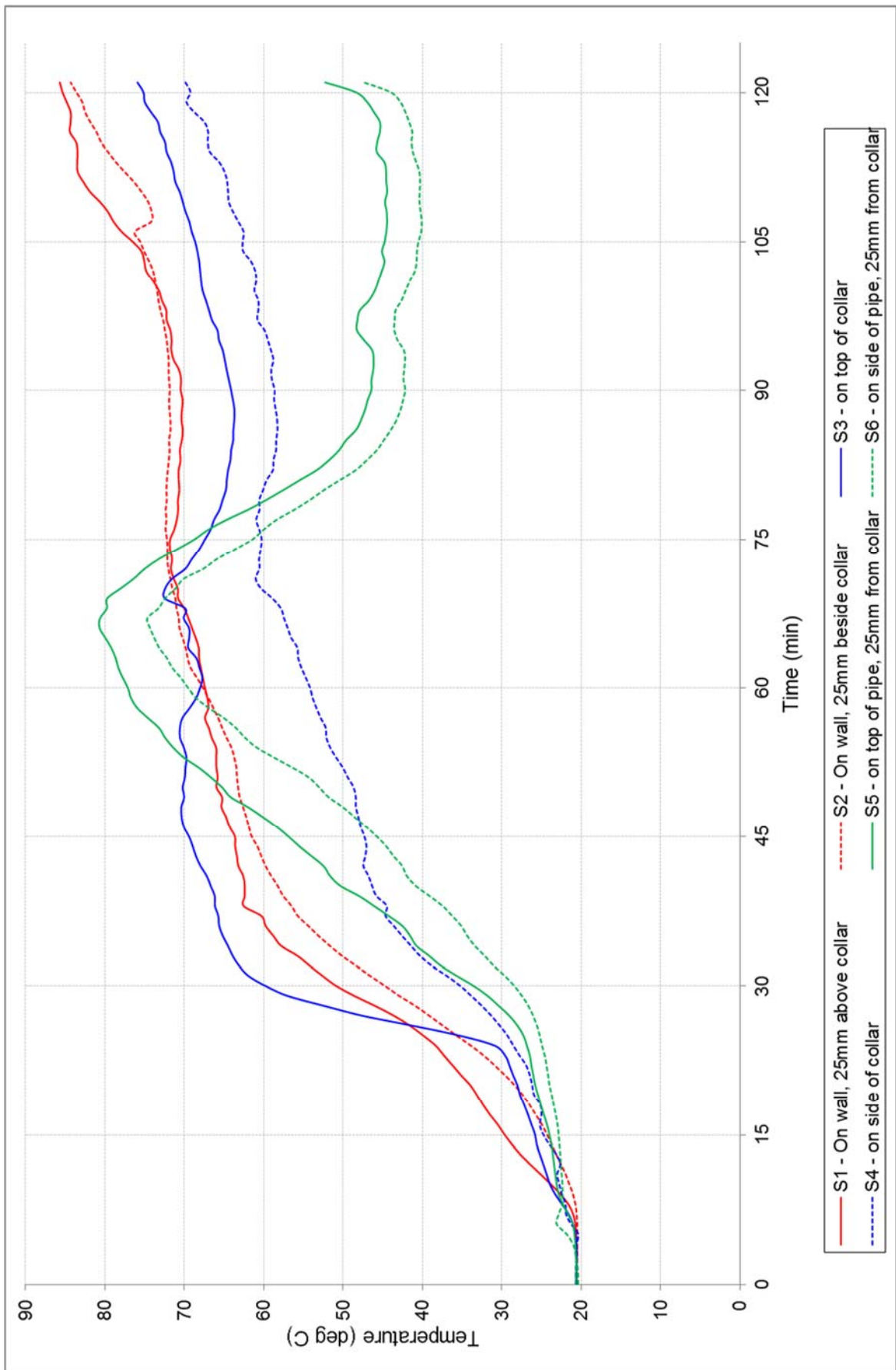


FIGURE 3 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 1

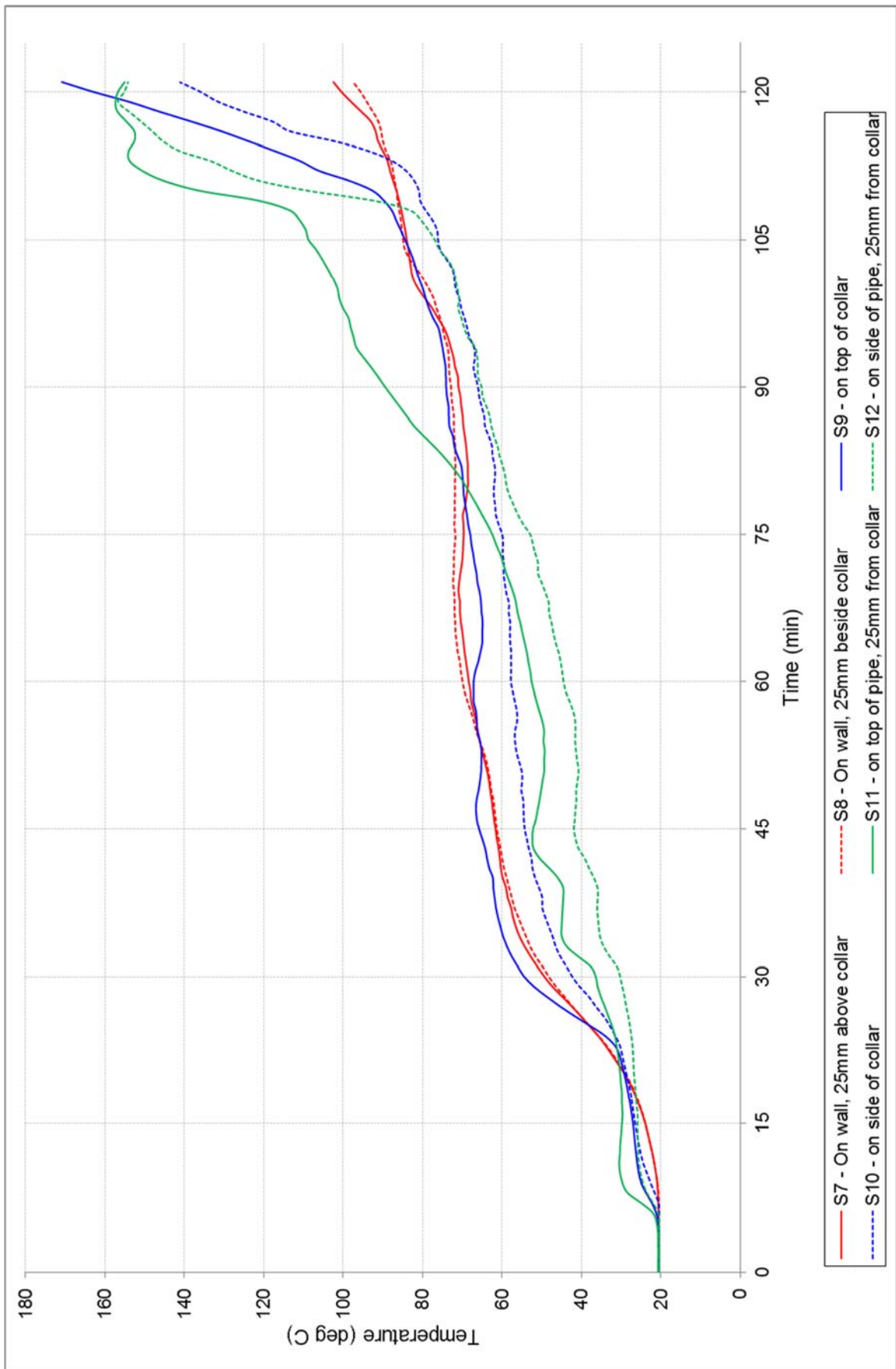


FIGURE 4 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 2

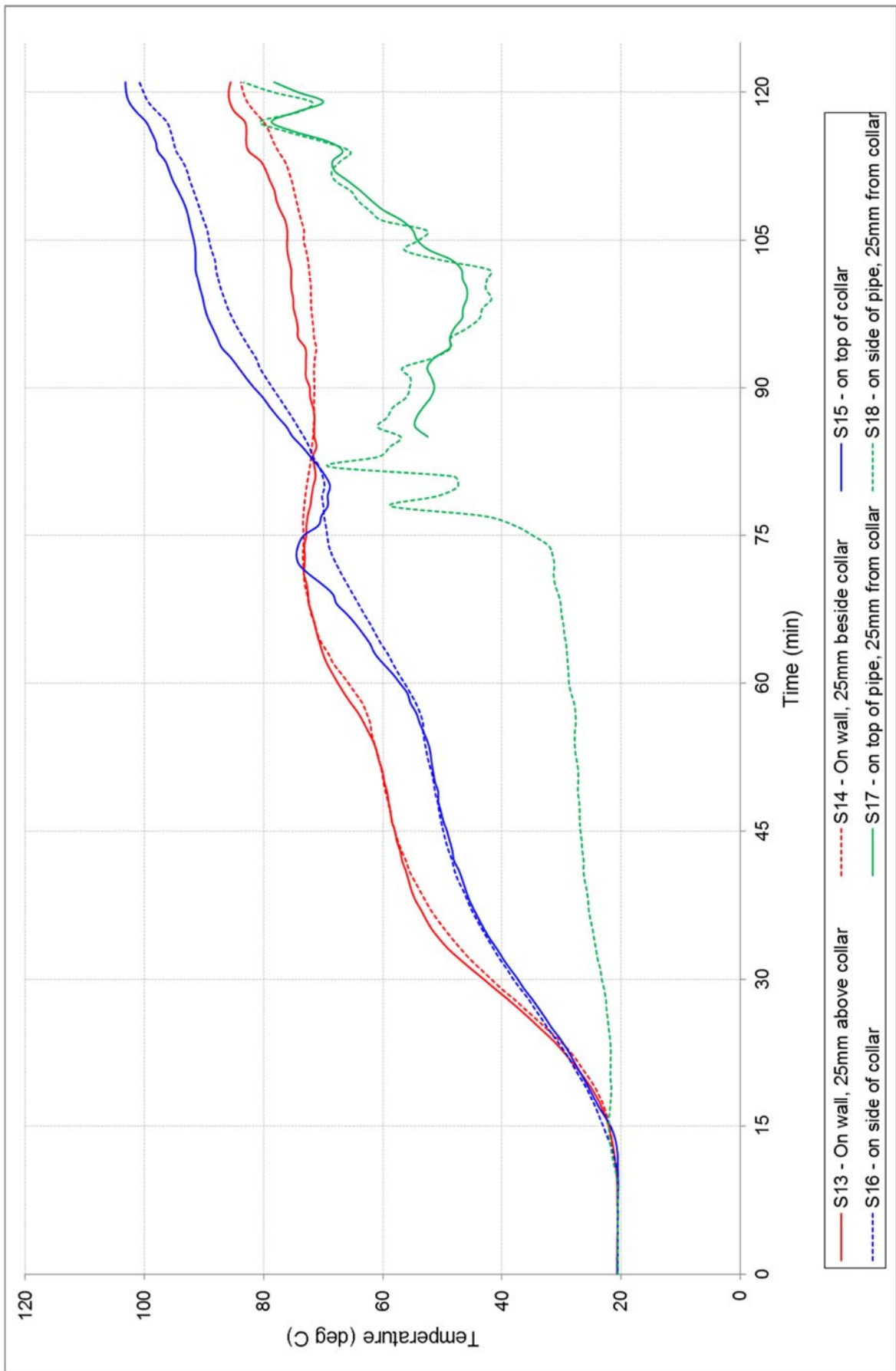


FIGURE 5 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 3

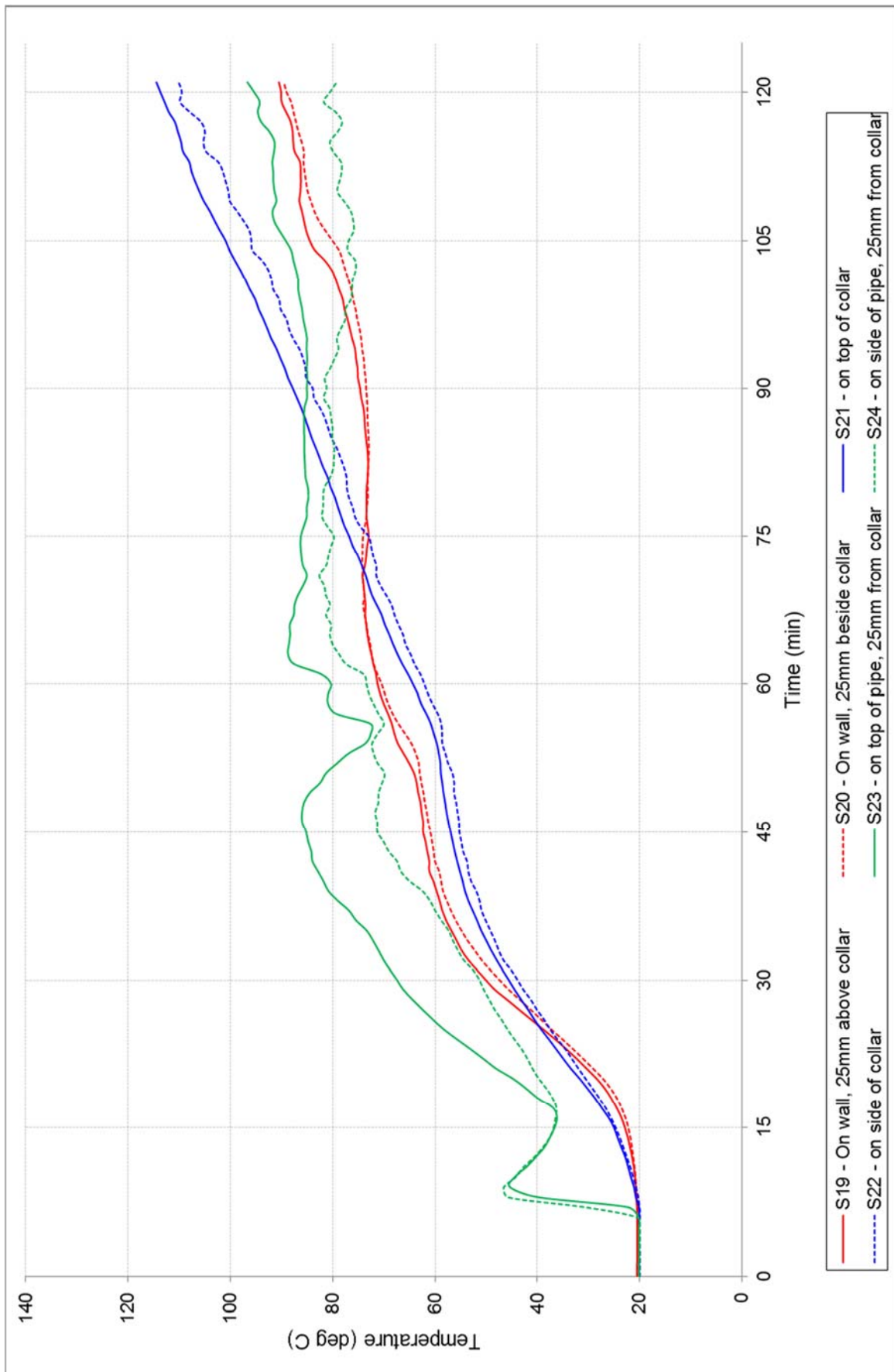


FIGURE 6 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 4

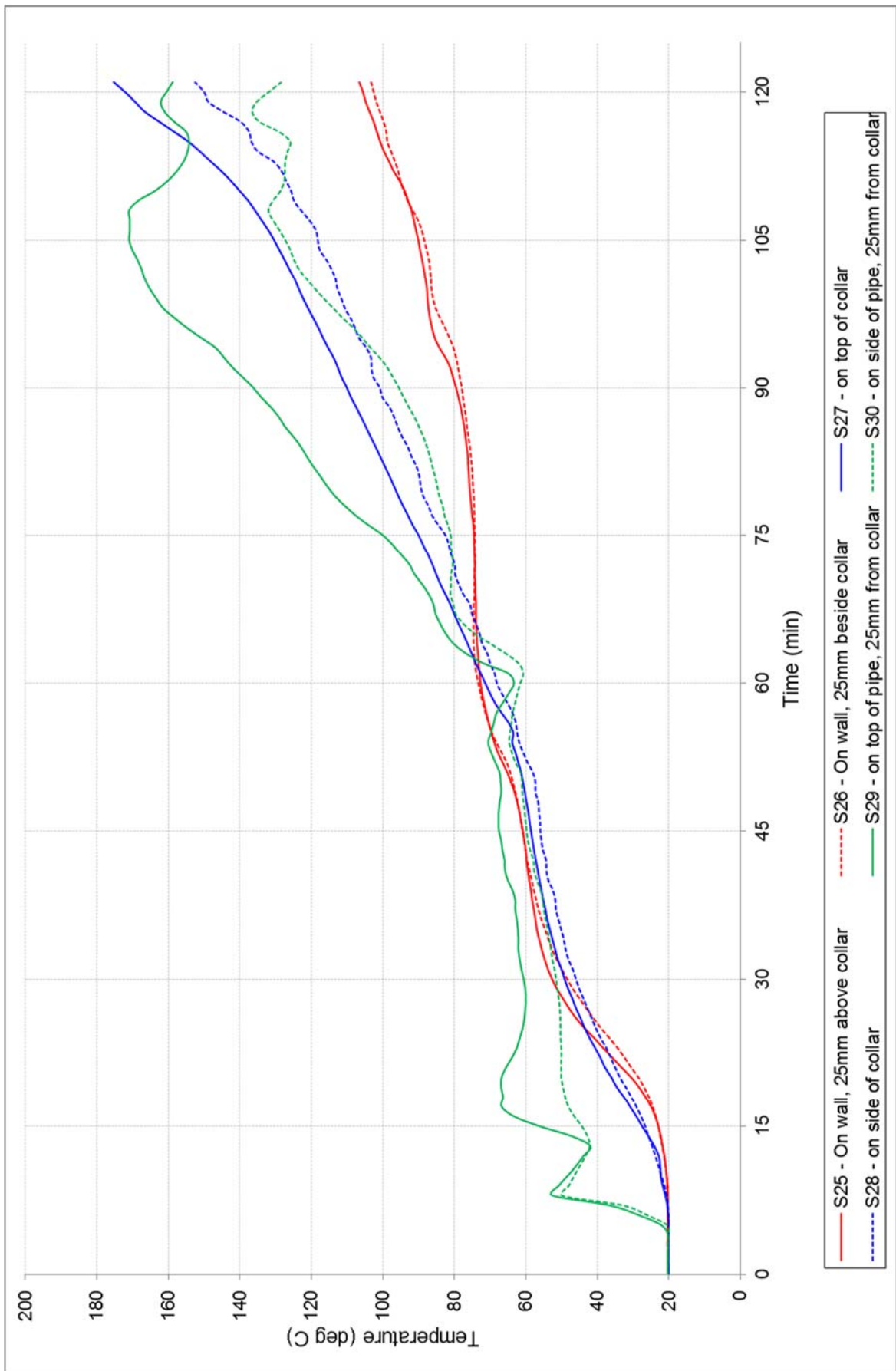


FIGURE 7 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 5

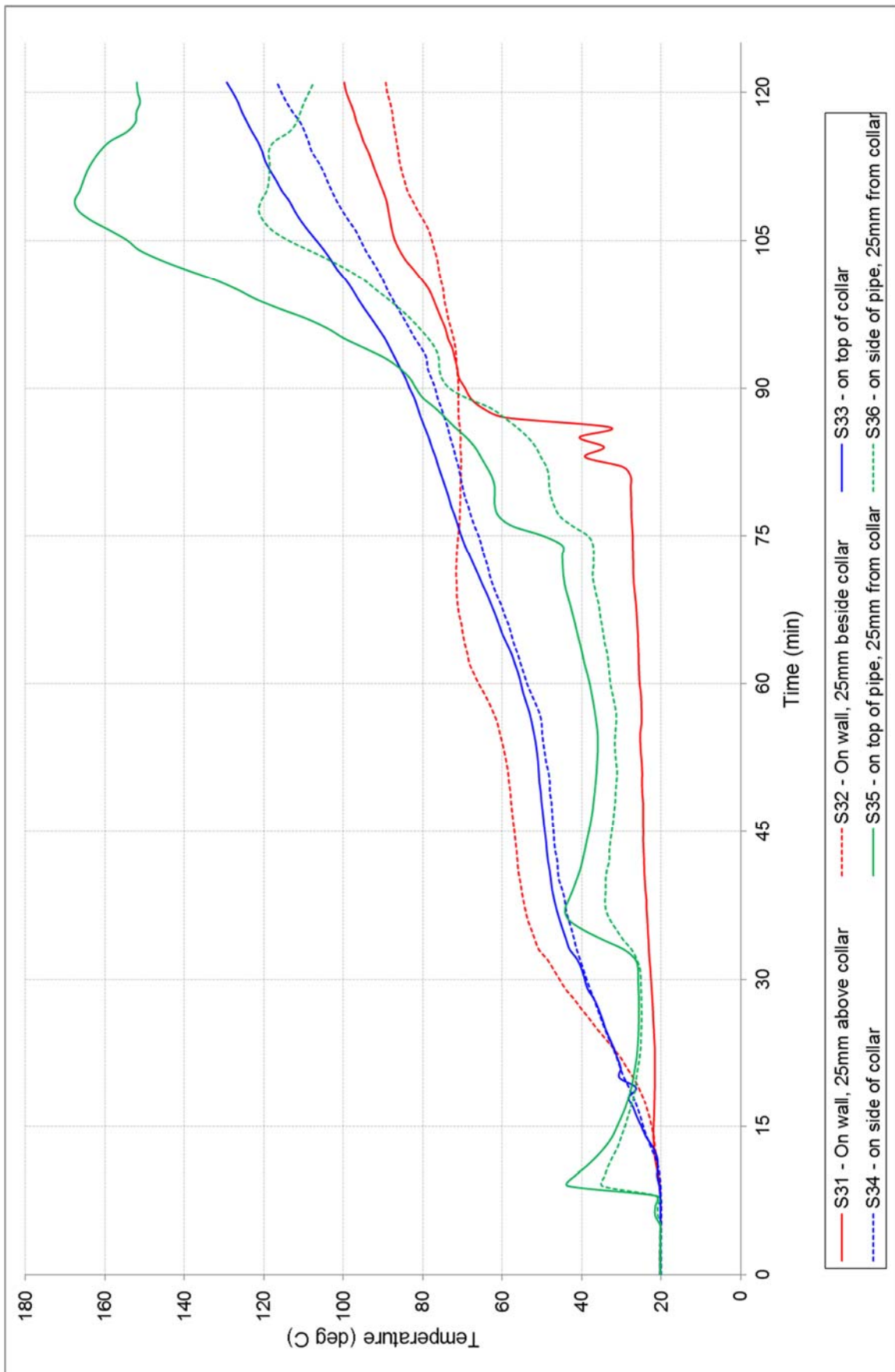


FIGURE 8 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 6

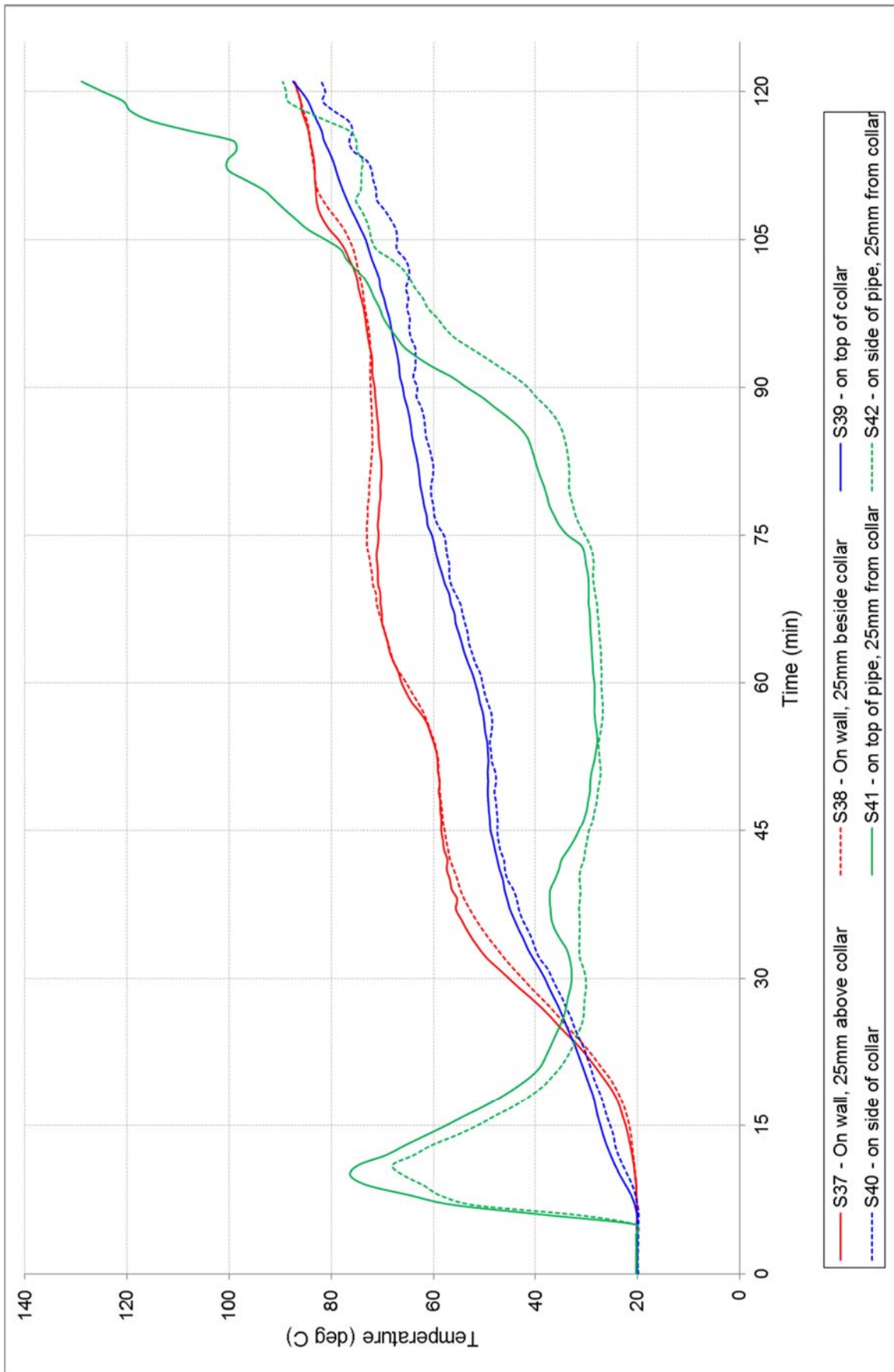


FIGURE 9 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 7

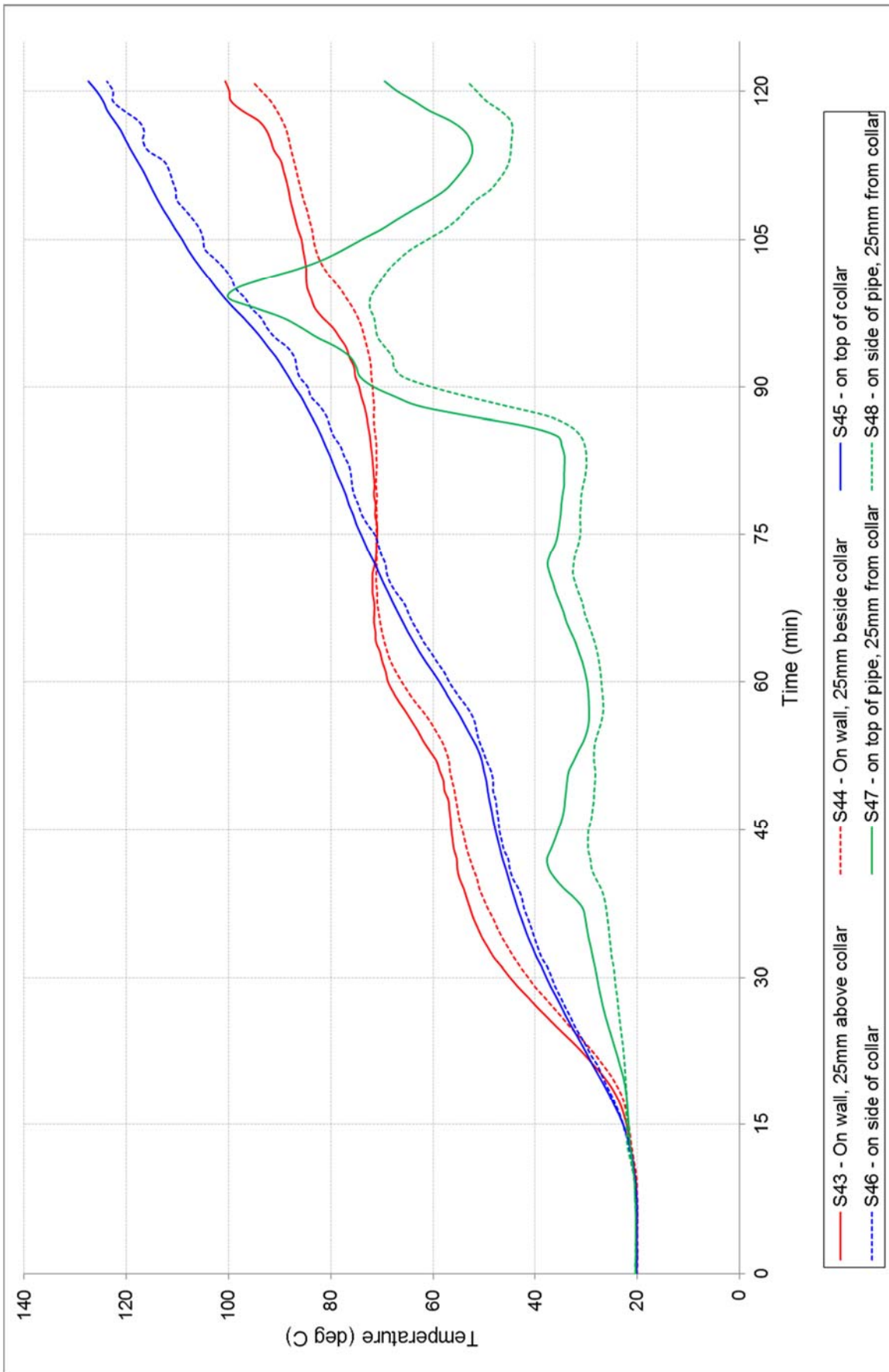


FIGURE 10 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 8

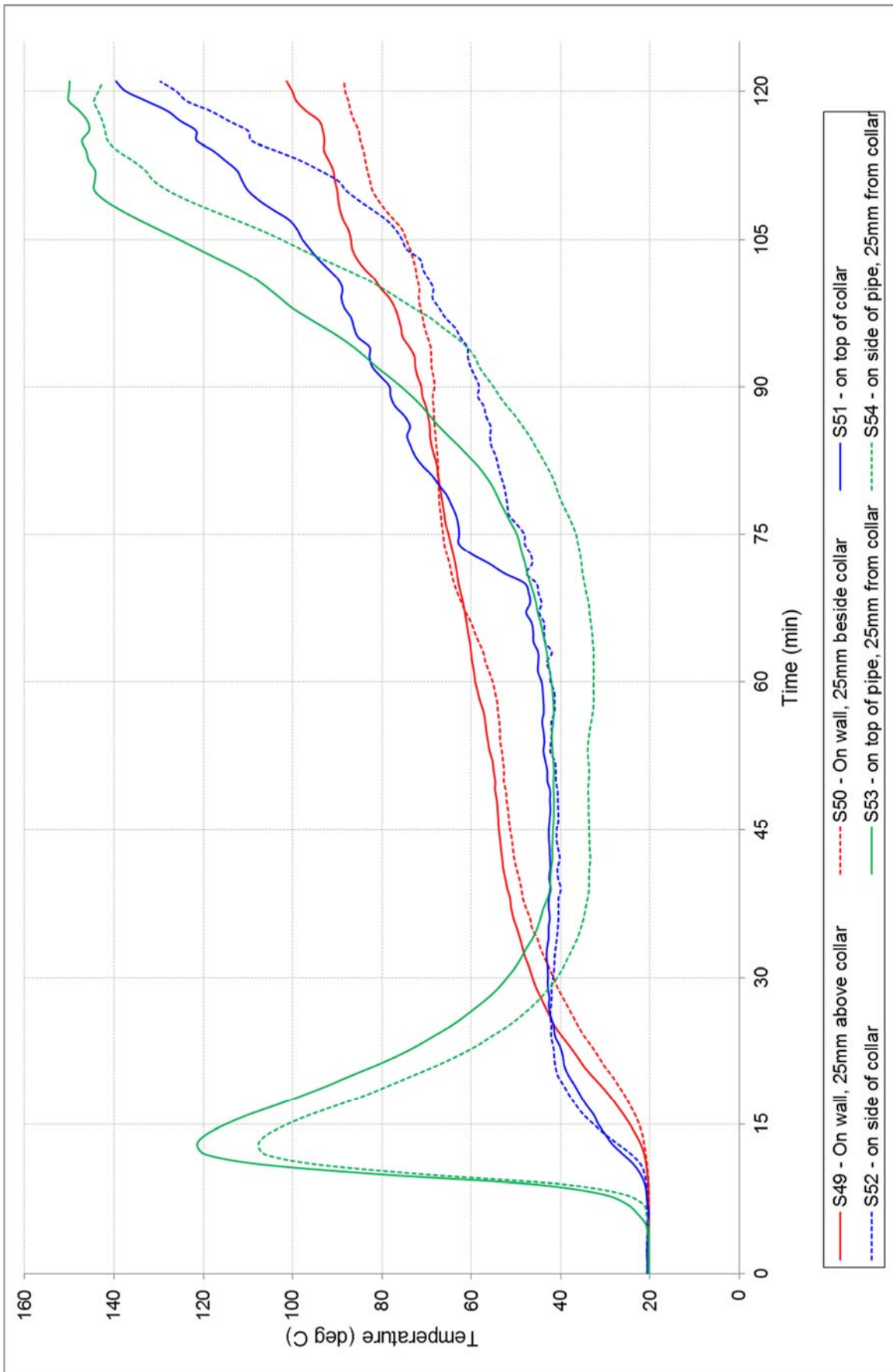
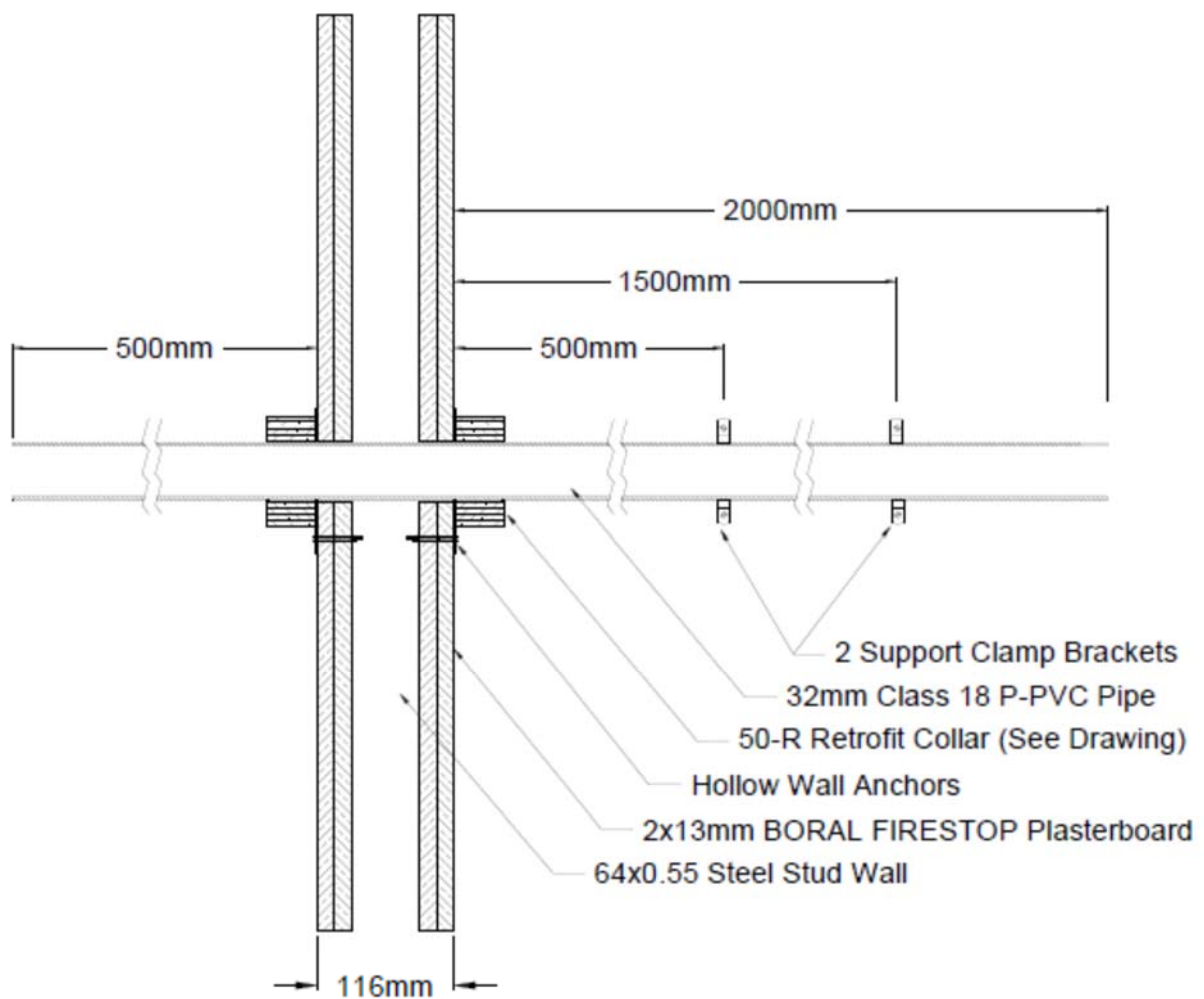


FIGURE 11 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 9

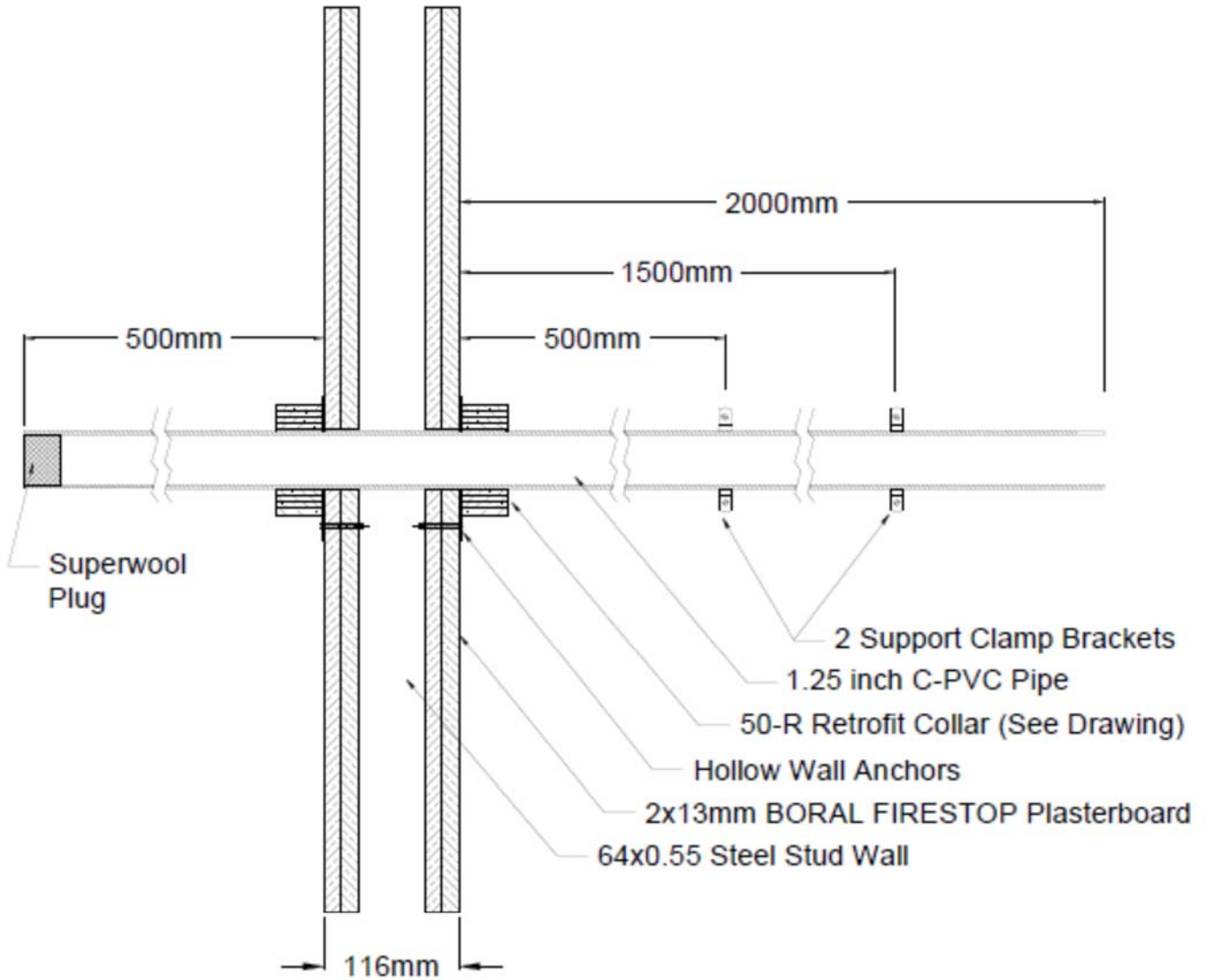
Appendix D – Installation drawings

Test Wall W-16-A Penetration # 1
32mm Class 18 P-PVC Pipe – 50R Retrofit Collar
23 MAY 2016



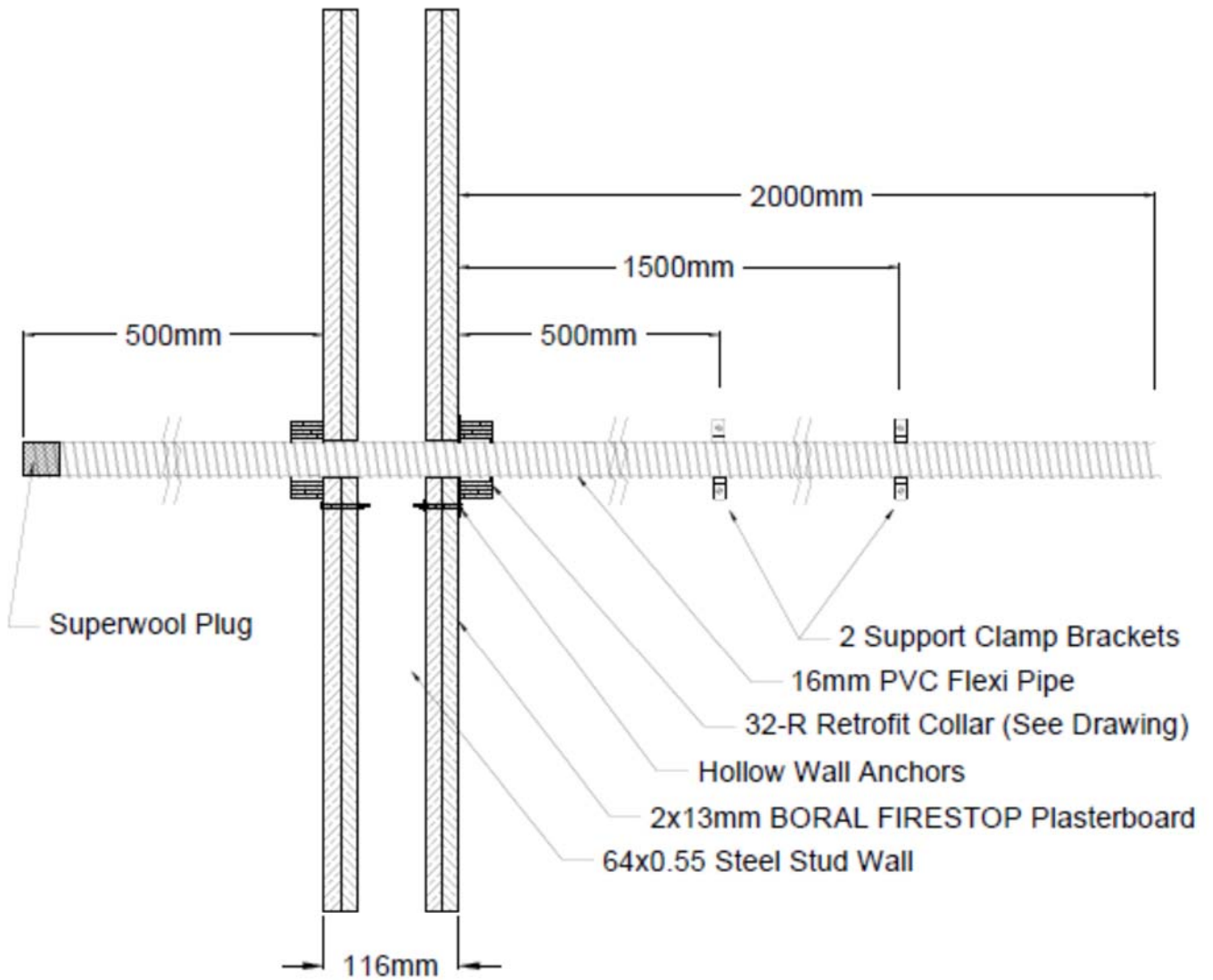
DRAWING TITLED "TEST WALL W-16-A PENETRATION # 1 – 32-MM CLASS 18 P-PVC PIPE – 50R RETROFIT COLLAR", DATED 23 MAY 2016, BY SNAP FIRE SYSTEMS PTY LTD.

Test Wall W-16-A Penetration # 2
1.25 inch C-PVC Pipe – 50R Retrofit Collar
23 MAY 2016



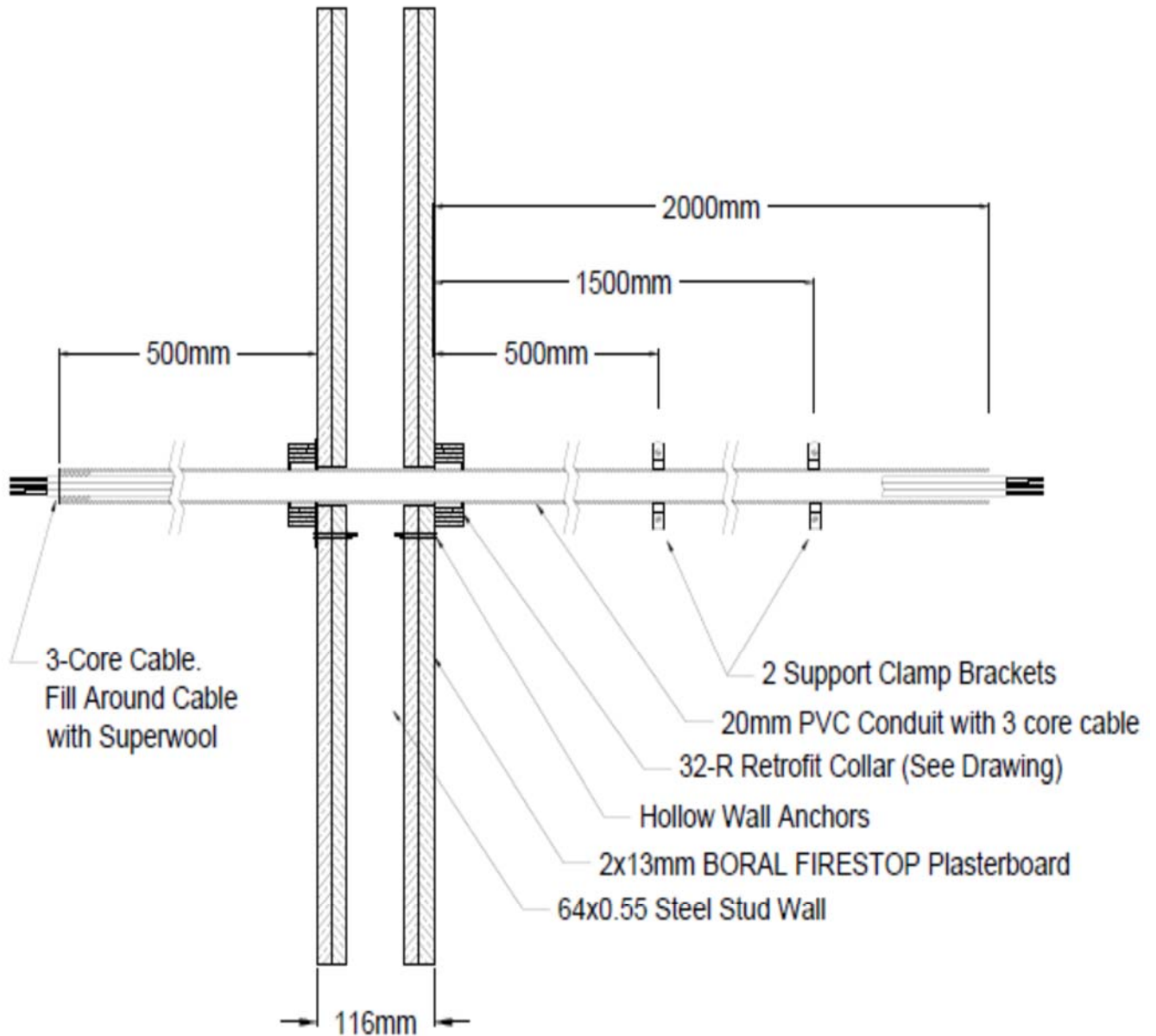
DRAWING TITLED "TEST WALL W-16-A PENETRATION # 2 – 1.25 INCH C-PVC PIPE – 50R RETROFIT COLLAR", DATED 23 MAY 2016, BY SNAP FIRE SYSTEMS PTY LTD.

Test Wall W-16-A Penetration # 3
 16mm PVC Flexi Pipe – 32R Retrofit Collar
 23 MAY 2016



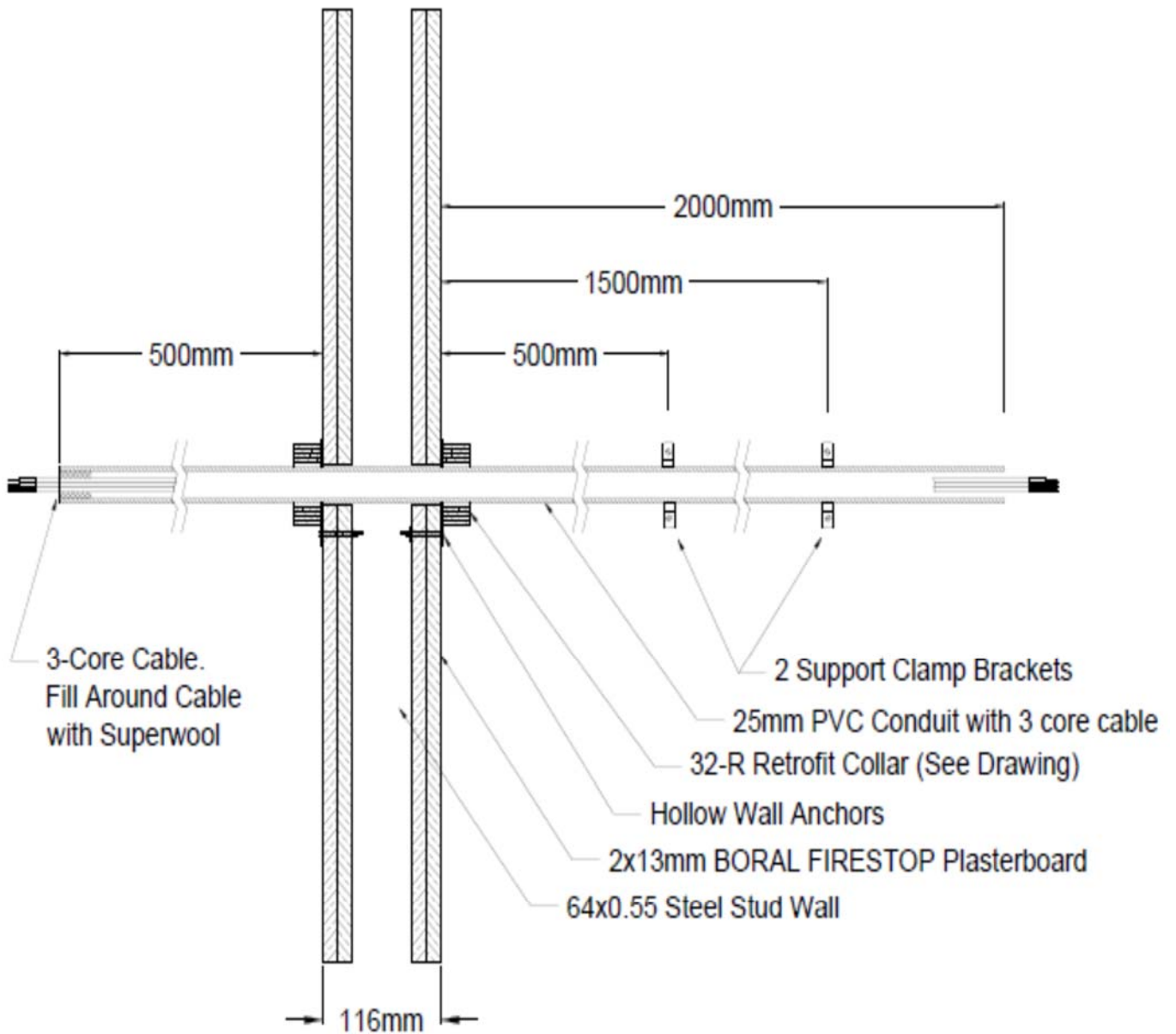
DRAWING TITLED "TEST WALL W-16-A PENETRATION # 3 – 16-MM PVC FLEXI PIPE – 32R RETROFIT COLLAR", DATED 23 MAY 2016, BY SNAP FIRE SYSTEMS PTY LTD.

Test Wall W-16-A Penetration # 4
20mm PVC Conduit with 3 core cable -32R Retrofit collar
23 MAY 2016



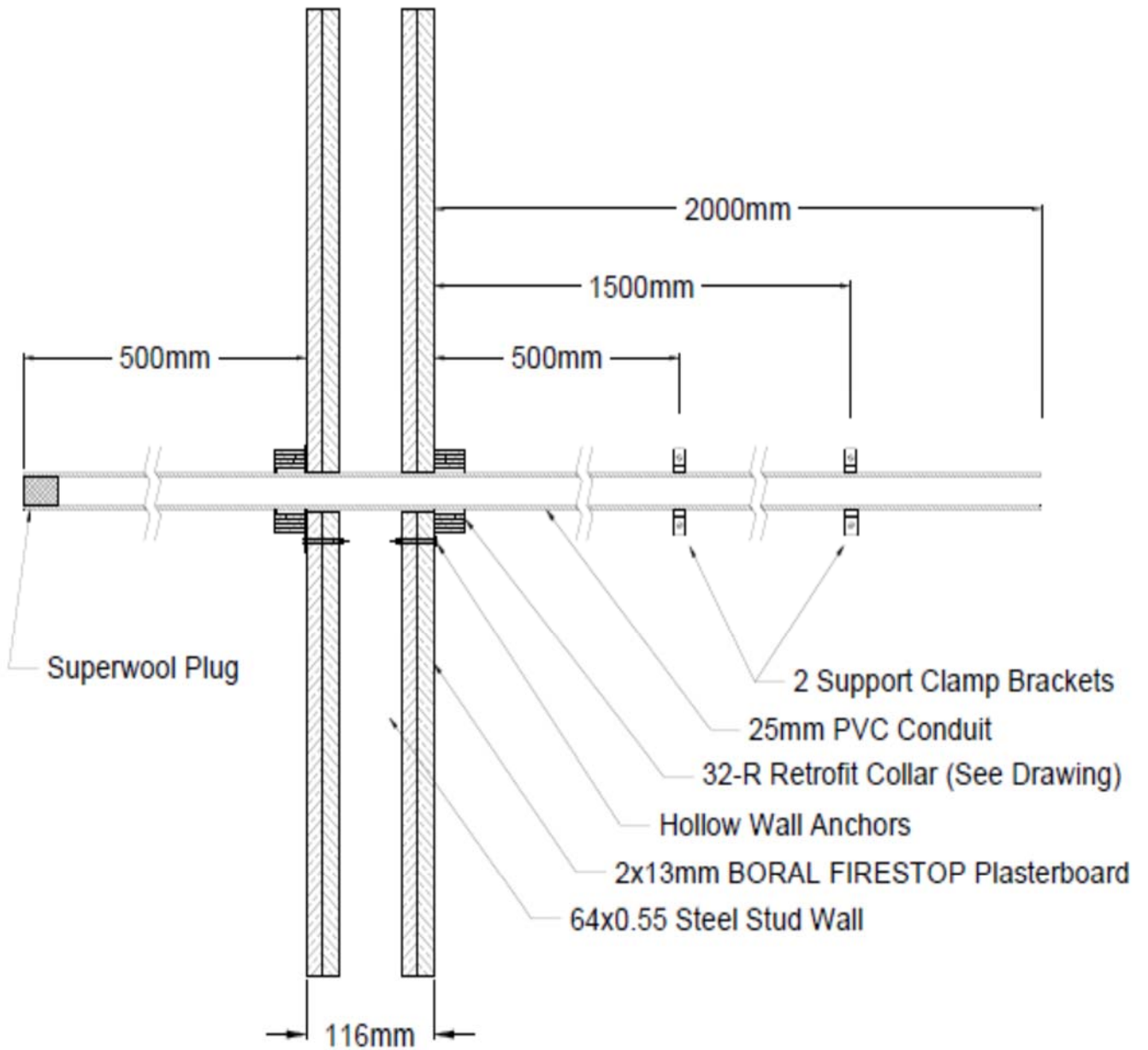
DRAWING TITLED "TEST WALL W-16-A PENETRATION # 4 – 20-MM PVC CONDUIT WITH 3 CORE CABLE – 32R RETROFIT COLLAR", DATED 23 MAY 2016, BY SNAP FIRE SYSTEMS PTY LTD.

Test Wall W-16-A Penetration # 5
 25mm PVC Conduit with 3 core cable -32R Retrofit collar
 23 MAY 2016



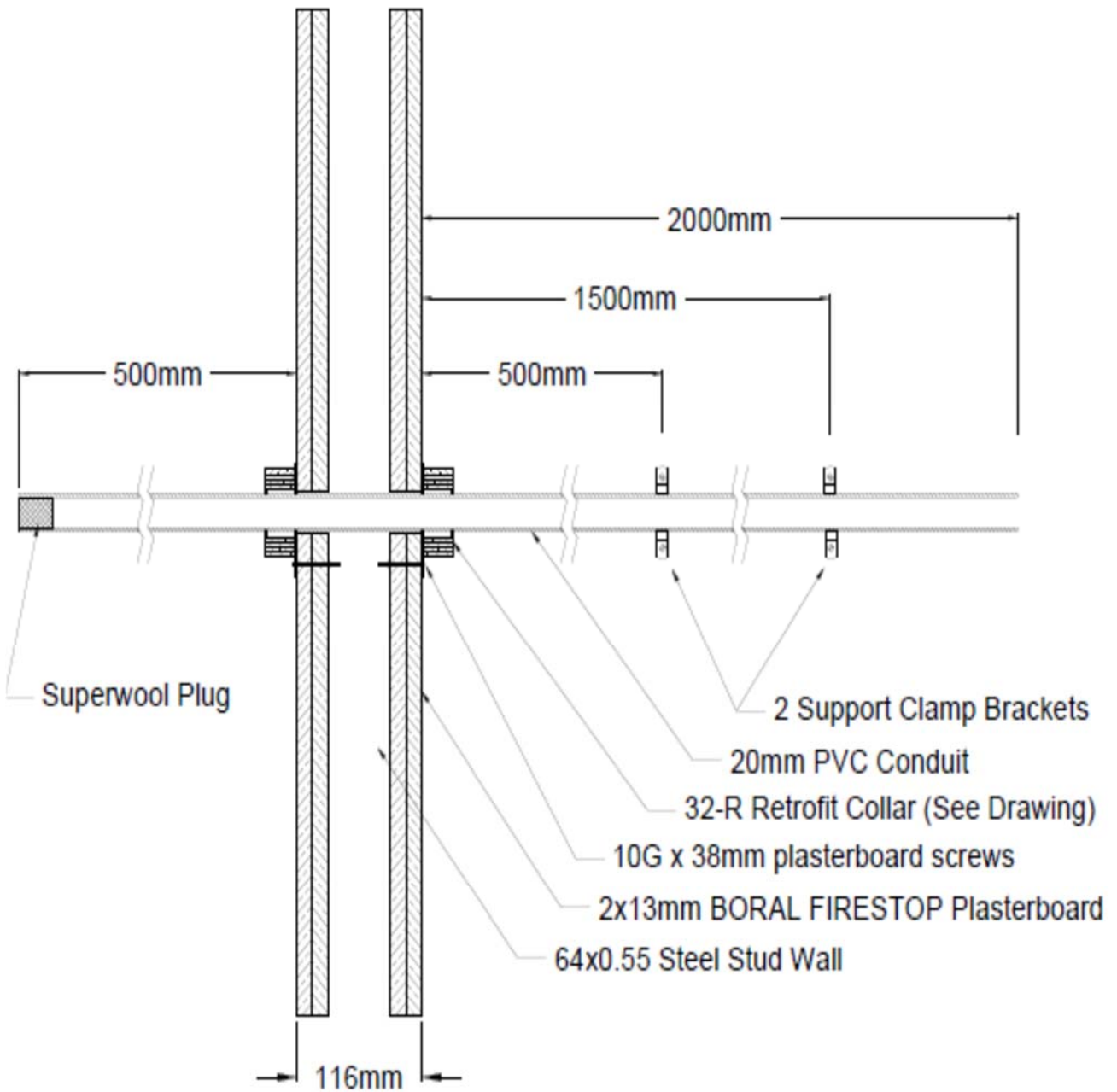
DRAWING TITLED "TEST WALL W-16-A PENETRATION # 5 – 25-MM PVC CONDUIT WITH 3 CORE CABLE – 32R RETROFIT COLLAR", DATED 23 MAY 2016, BY SNAP FIRE SYSTEMS PTY LTD.

Test Wall W-16-A Penetration # 6
 25mm PVC Conduit - 32R Retrofit collar
 23 MAY 2016



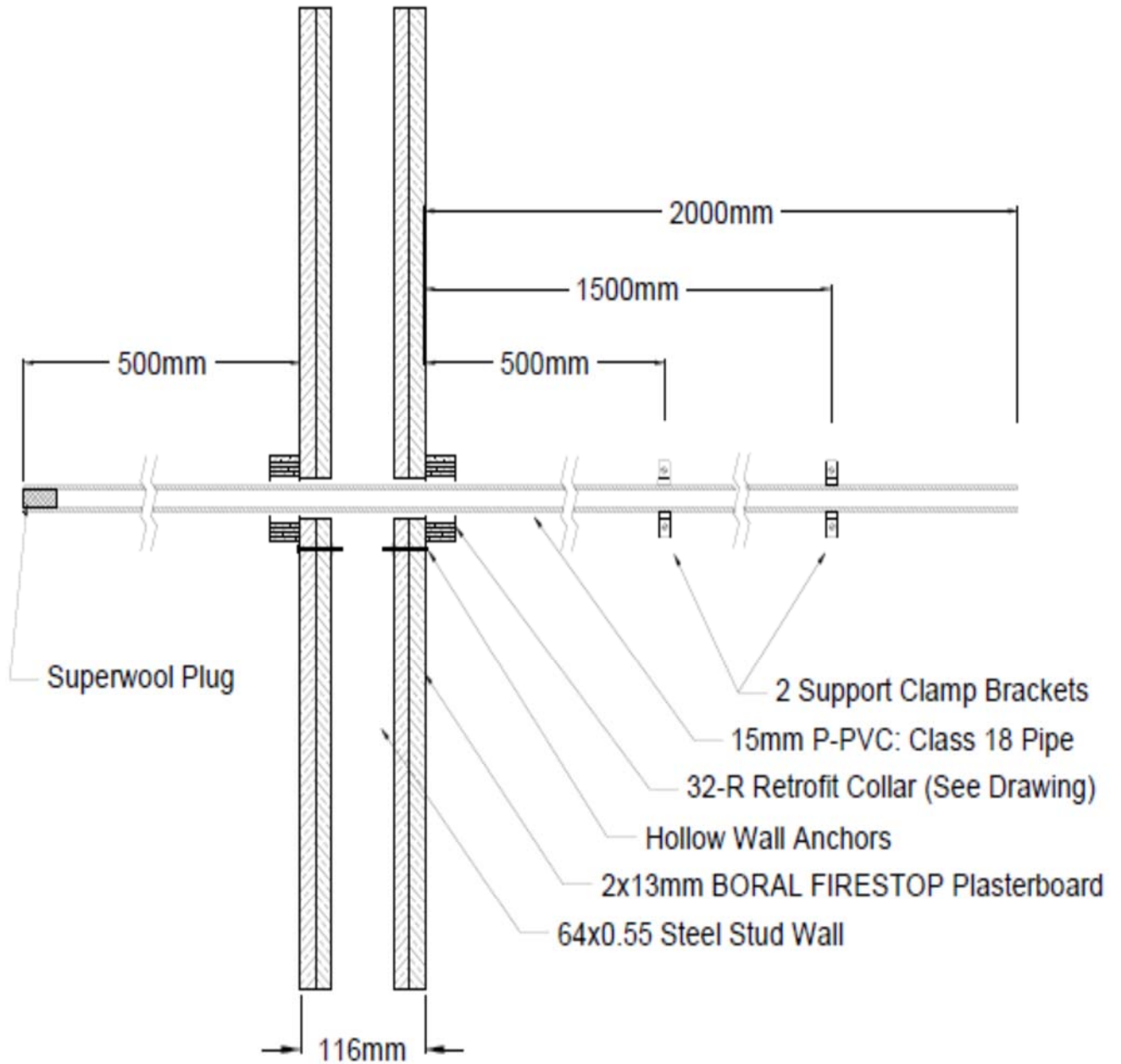
DRAWING TITLED "TEST WALL W-16-A PENETRATION # 6 – 25-MM PVC CONDUIT – 32R RETROFIT COLLAR", DATED 23 MAY 2016, BY SNAP FIRE SYSTEMS PTY LTD.

Test Wall W-16-A Penetration # 7
 20mm PVC Conduit - 32R Retrofit collar
 23 MAY 2016



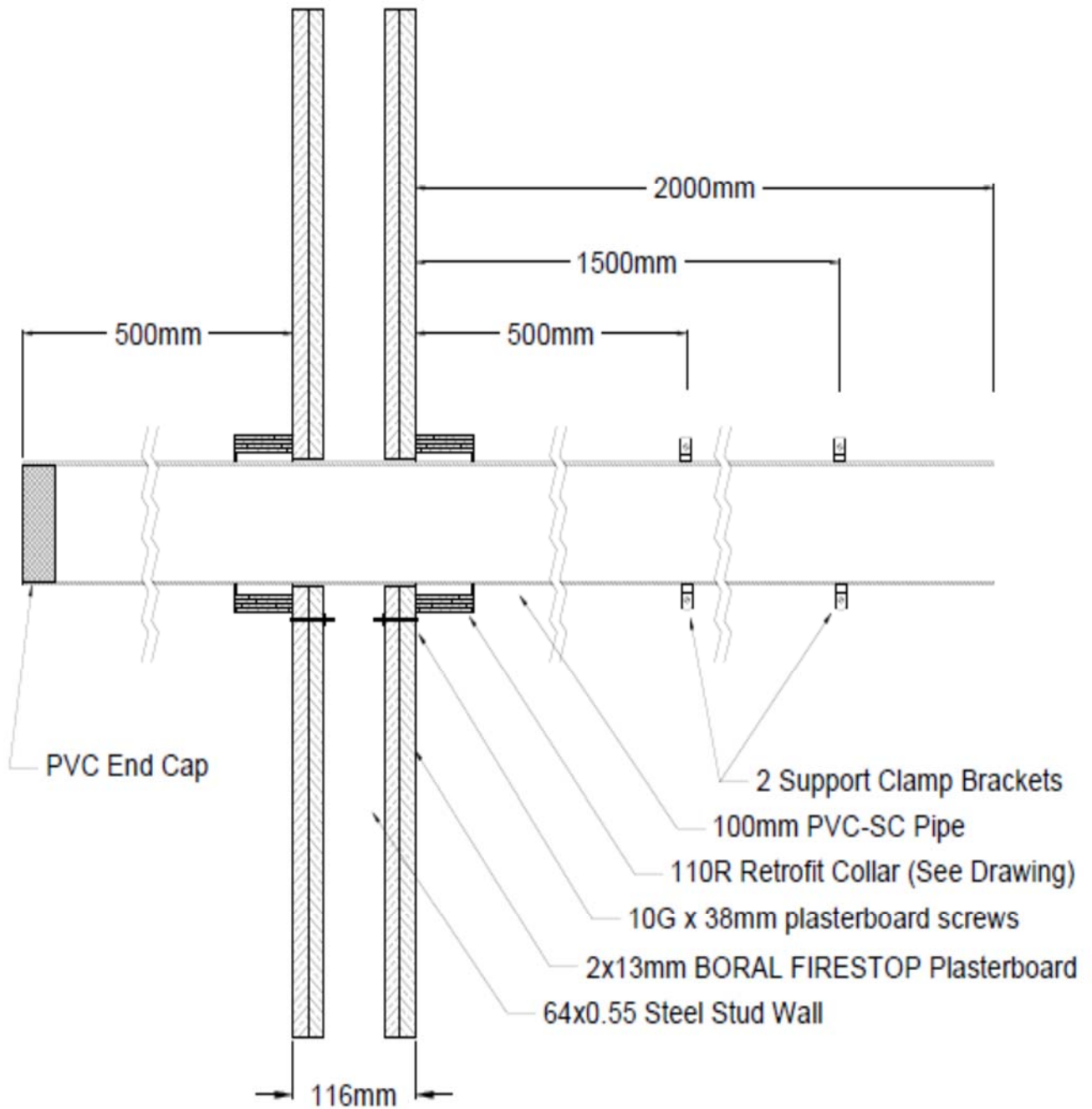
DRAWING TITLED “TEST WALL W-16-A PENETRATION # 7 – 20-MM PVC CONDUIT – 32R RETROFIT COLLAR”, DATED 23 MAY 2016, BY SNAP FIRE SYSTEMS PTY LTD.

Test Wall W-16-A Penetration # 8
 15mm P-PVC: Class 18 Pipe - 32R Retrofit collar
 23 MAY 2016



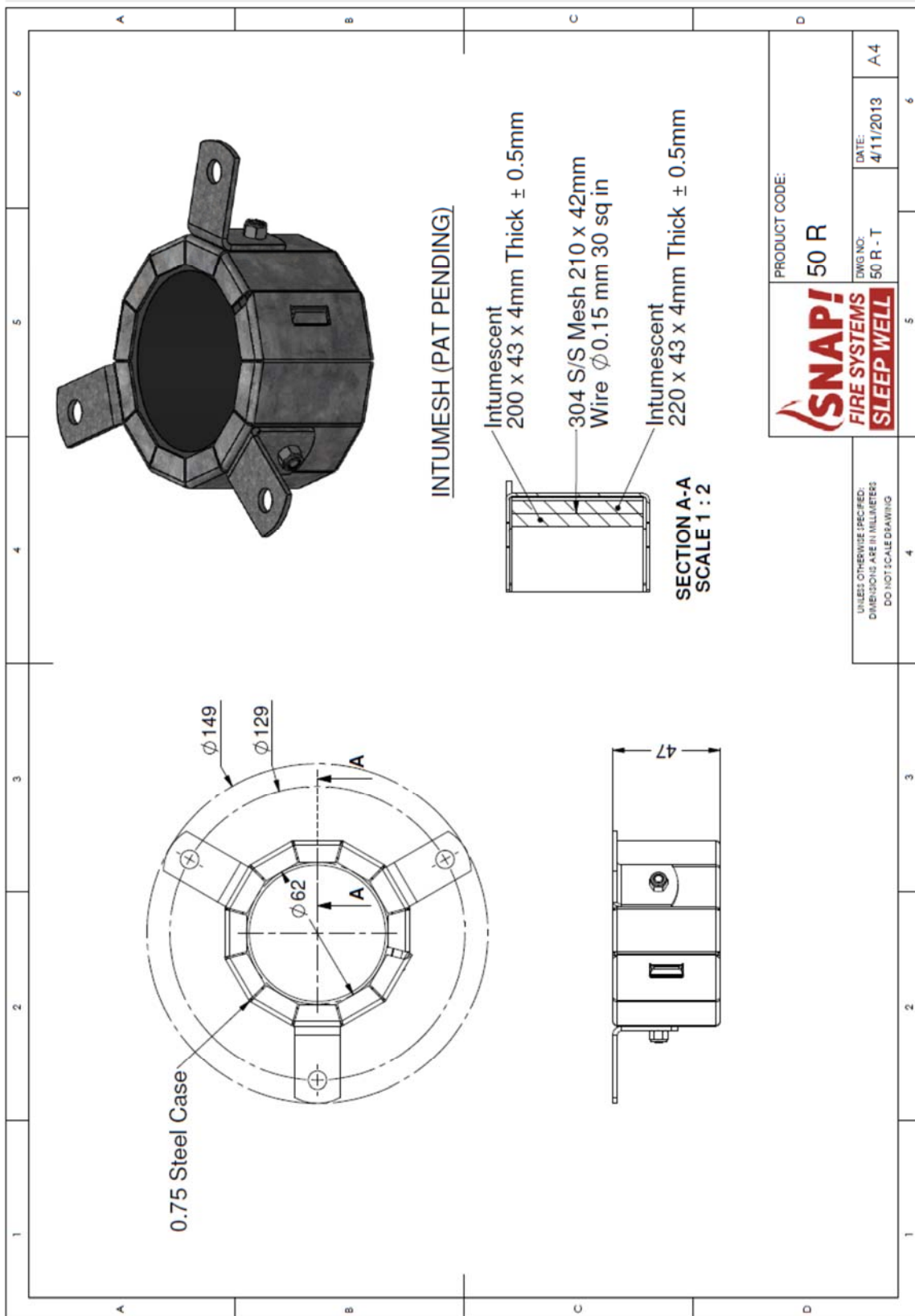
DRAWING TITLED "TEST WALL W-16-A PENETRATION # 8 – 15-MM P-PVC CLASS 18 PIPE – 32R RETROFIT COLLAR", DATED 23 MAY 2016, BY SNAP FIRE SYSTEMS PTY LTD.

Test Wall W-16-A Penetration # 9
 100mm PVC-SC Pipe – 110R Retrofit Collar
 23 MAY 2016

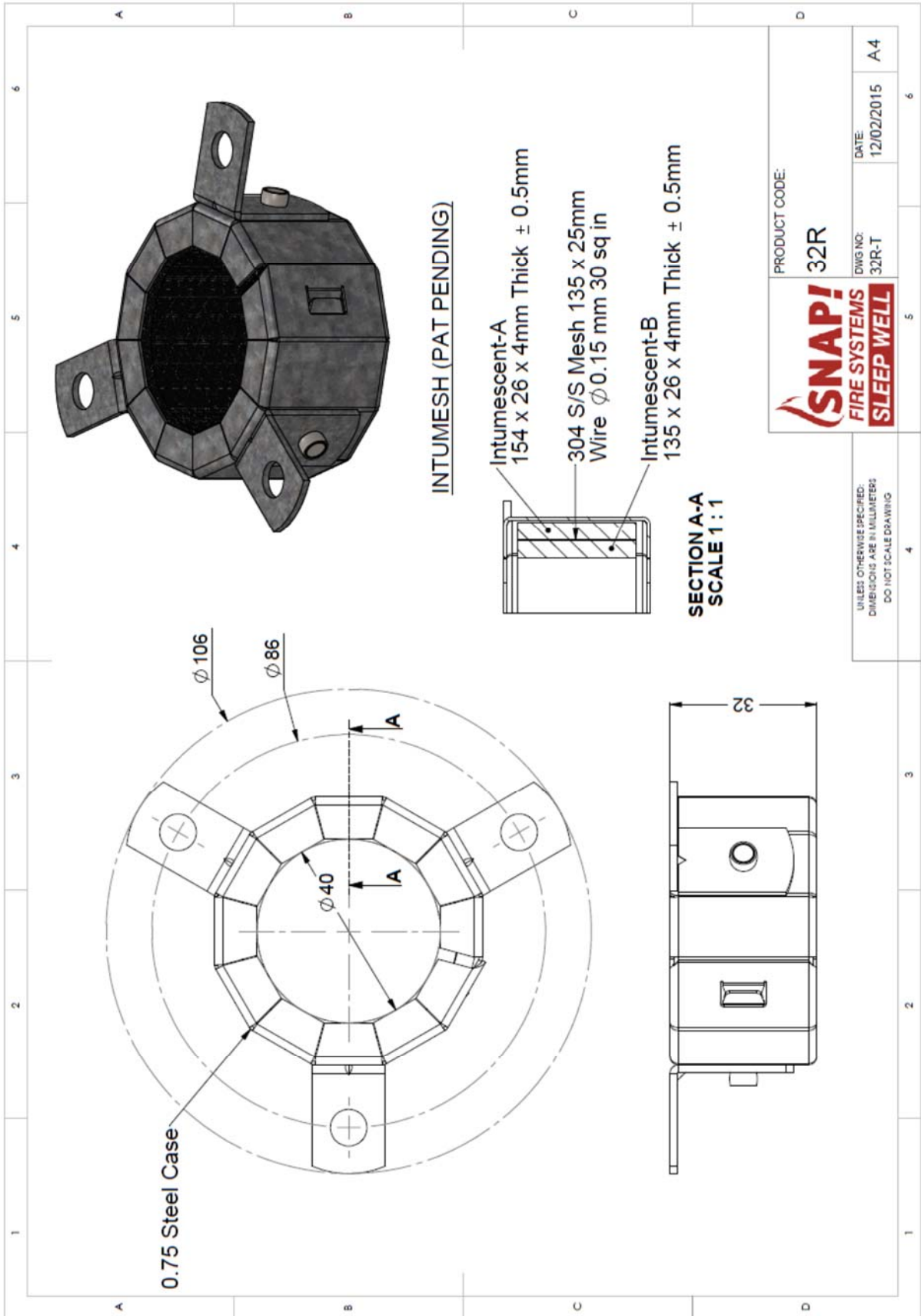


DRAWING TITLED "TEST WALL W-16-A PENETRATION # 9 – 100-MM PVC-SC PIPE – 110R RETROFIT COLLAR", DATED 9 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD.

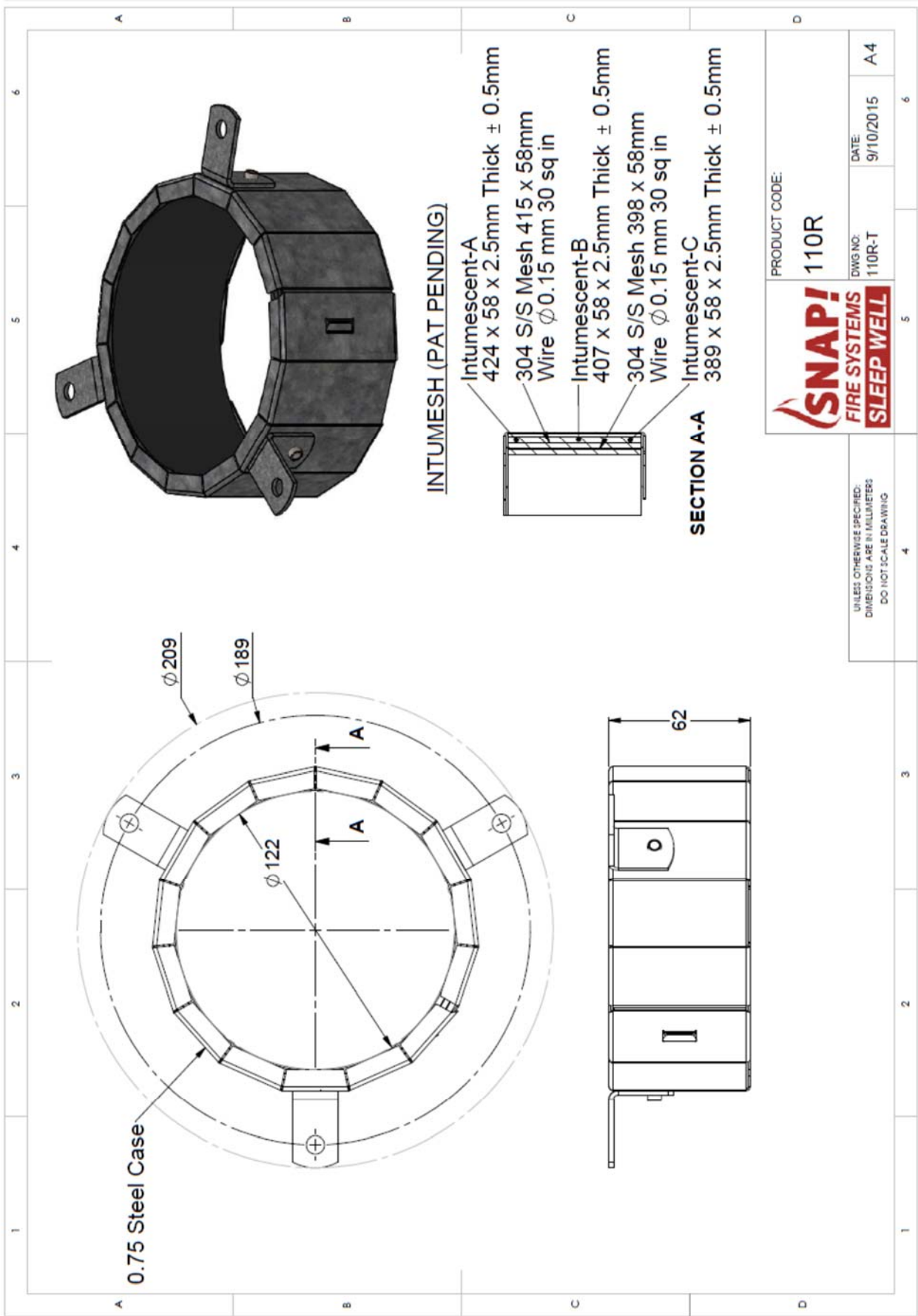
Appendix E – Specimen Drawings



DRAWING NUMBERED 50R-T DATED 4 NOVEMBER 2014, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING NUMBERED 32R-T DATED 12 FEBRUARY 2015, BY SNAP FIRE SYSTEMS PTY LTD.



INTUMESH (PAT PENDING)

- Intumescent-A
424 x 58 x 2.5mm Thick ± 0.5mm
- 304 S/S Mesh 415 x 58mm
Wire φ 0.15 mm 30 sq in
- Intumescent-B
407 x 58 x 2.5mm Thick ± 0.5mm
- 304 S/S Mesh 398 x 58mm
Wire φ 0.15 mm 30 sq in
- Intumescent-C
389 x 58 x 2.5mm Thick ± 0.5mm

SECTION A-A

PRODUCT CODE: **110R**

SNAP!
FIRE SYSTEMS
SLEEP WELL

DWG NO: 110R-T DATE: 9/10/2015 A4

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
DO NOT SCALE DRAWING

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

Appendix F – Certificates

INFRASTRUCTURE TECHNOLOGIES www.csiro.au		
14 Julius Avenue, North Ryde NSW 2113 PO Box 52, North Ryde NSW 1670, Australia T (02) 9490 5444 • ABN 41 687 119 230		
<h2>Certificate of Test</h2>		No. 2853
<small>“Copyright CSIRO 2016 ©” Copying or alteration of this report without written authorisation from CSIRO is forbidden.</small>		
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 on behalf of:		
Snap Fire Systems Pty Ltd Building A, 1343 Wynnum Road Tingalpa QLD 4173		
A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1748.		
Product Name: Penetration # 1 – 50R retrofitted fire collar protecting a 32-mm Class 18 Polyvinyl Chloride (P-PVC) Pipe		
Description: The sponsor identified the specimen as a SNAP Retrofit 50R fire collar protecting a plasterboard wall penetrated by a 32-mm Class 18 Polyvinyl Chloride (P-PVC) Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/120/120. The SNAP Retrofit 50R fire collar comprised a 0.75-mm steel casing with a 62-mm inner diameter and a 149-mm diameter base flange. The 47-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent wraps lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 43-mm wide x 200-mm long, and 4-mm thick x 43-mm wide x 220-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 210-mm long x 42-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 50R-T dated 4 November 2014, 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 hollow wall anchors. The penetrating service comprised a 32-mm nominal diameter Class 18 P-PVC Pipe, with a wall thickness of 3.6-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 50-mm diameter cut-out hole as shown in drawing titled “Test Wall W-16-A Penetration # 1 – 32-mm Class 18 P-PVC Pipe – 50R Retrofit Collar”, dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nom. 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nom. 1000-mm. The pipe was open at the unexposed and exposed end.		
Structural Adequacy	not applicable	
Integrity	no failure at 121 minutes	
Insulation	no failure at 121 minutes	
and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120. The FRL is applicable for exposure to the fire from the same direction as tested. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.		
Testing Officer:	Russell Collins	Date of Test: 2 May 2016
Issued on the 24 th day of October 2016 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	

COPY OF CERTIFICATE OF TEST – NO. 2853



Certificate of Test

No. 2854

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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1748.

Product Name: Penetration # 2 – 50R retrofitted fire collar protecting a 1.25 inch Polyvinyl Chloride (C-PVC) Pipe

Description: The sponsor identified the specimen as a SNAP 50R retrofitted fire collar protecting a plasterboard wall penetrated by a 1.25 inch Polyvinyl Chloride (C-PVC) Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/120/120. The SNAP Retrofit 50R fire collar comprised a 0.75-mm steel casing with a 62-mm inner diameter and a 149-mm diameter base flange. The 47-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent wraps lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 43-mm wide x 200-mm long, and 4-mm thick x 43-mm wide x 220-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 210-mm long x 42-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 50R-T dated 4 November 2014, 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 hollow wall anchors. The penetrating service comprised a 1.25 inch C-PVC Pipe, with a wall thickness of 3.5-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 50-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-A Penetration # 2 – 1.25 inch C-PVC Pipe – 50R Retrofit Collar", dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 121 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120. The FRL is applicable for exposure to the fire from the same direction as tested. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Russell Collins Date of Test: 2 May 2016

Issued on the 24th day of October 2016 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
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Certificate of Test

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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 on behalf of:

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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1748.

Product Name: Penetration # 3 – 32R retrofitted fire collar protecting a 16-mm Polyvinyl Chloride (PVC) Flexi Pipe

Description: The sponsor identified the specimen as a SNAP 32R retrofitted fire collar protecting a plasterboard wall penetrated by a 16-mm Polyvinyl Chloride (PVC) Flexi Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/120/120. The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135-mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 12/02/2015, by Snap Fire Systems P/L. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors. The penetrating service comprised a 16-mm nominal diameter PVC Flexi Pipe, with a wall thickness of 1.8-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 20-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-A Penetration # 3 –16-mm PVC Flexi Pipe – 32R Retrofit Collar", dated 23/5/16, by Snap Fire Systems P/L. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nom. 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nom. 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 121 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120. The FRL is applicable for exposure to the fire from the same direction as tested. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Russell Collins Date of Test: 2 May 2016

Issued on the 24th day of October 2016 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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Accredited for compliance with ISO/IEC 17025

COPY OF CERTIFICATE OF TEST – NO. 2855



Certificate of Test

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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1748.

Product Name: Penetration # 4 – 32R retrofitted fire collar protecting a 20-mm Polyvinyl Chloride (PVC) Conduit with 3 core cable

Description: The sponsor identified the specimen as a SNAP 32R retrofitted fire collar protecting a plasterboard wall penetrated by a 20-mm Polyvinyl Chloride (PVC) Conduit with 3 core cable. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/120/120. The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner dia. and a 106-mm dia. base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135-mm long x 25-mm wide with wire mesh dia. of 0.15-mm, as shown in drawing 32R-T dated 12/02/2015, by Snap Fire Systems P/L. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors. The penetrating service comprised a 20-mm nominal dia. PVC Conduit with 3 core cable, with a wall thickness of 1.8-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 25-mm dia. cut-out hole as shown in drawing "Test Wall W-16-A Penetration # 4 – 20-mm PVC Conduit with 3 core cable – 32R Retrofit Collar", dated 23/05/2016, by Snap Fire Systems P/L. The pipe projected horizontally, approx. 2000-mm away from the unexposed face of the plasterboard wall and approx. 500-mm into the furnace chamber. The pipe was supported at nom. 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nom. 1000-mm. The pipe was open at unexposed end and capped on exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 121 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120. The FRL is applicable for exposure to the fire from the same direction as tested. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Russell Collins **Date of Test:** 2 May 2016

Issued on the 24th day of October 2016 without alterations or additions.

Brett Roddy
Manager, Fire Testing and Assessments



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Certificate of Test

No. 2857

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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 on behalf of:

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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1748.

Product Name: Penetration # 5 – 32R retrofitted fire collar protecting a 25-mm Polyvinyl Chloride (PVC) Conduit with 3 core cable

Description: The sponsor identified the specimen as a SNAP 32R retrofitted fire collar protecting a plasterboard wall penetrated by a 25-mm Polyvinyl Chloride (PVC) Conduit with 3 core cable. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/120/120. The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner dia. and a 106-mm dia. base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135-mm long x 25-mm wide with wire mesh dia. of 0.15-mm, as shown in drawing 32R-T dated 12 February 2015, by Snap Fire Systems P/L. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors. The penetrating service comprised a 25-mm nominal dia. PVC Conduit with 3 core cable, with a wall thickness of 2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 30-mm dia. cut-out hole as shown in drawing "Test Wall W-16-A Penetration # 5 – 25-mm PVC Conduit with 3 core cable – 32R Retrofit Collar", dated 23/05/2016, by Snap Fire Systems P/L. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nom. 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nom. 1000-mm. The pipe was open at unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 121 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120. The FRL is applicable for exposure to the fire from the same direction as tested. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Russell Collins Date of Test: 2 May 2016

Issued on the 24th day of October 2016 without alterations or additions.

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Manager, Fire Testing and Assessments



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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1748.

Product Name: Penetration # 6 – 32R retrofitted fire collar protecting a 25-mm Polyvinyl Chloride (PVC) Conduit

Description: The sponsor identified the specimen as a SNAP 32R retrofitted fire collar protecting a plasterboard wall penetrated by a 25-mm Polyvinyl Chloride (PVC) Conduit. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of $-/120/120$. The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner dia. and a 106-mm dia. base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135-mm long x 25-mm wide with wire mesh dia. of 0.15-mm, as shown in drawing numbered 32R-T dated 12 February 2015, 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 hollow wall anchors. The penetrating service comprised a 25-mm nominal dia. PVC Conduit, with a wall thickness of 2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 30-mm dia. cut-out hole as shown in drawing titled "Test Wall W-16-A Penetration # 6 – 25-mm PVC Conduit – 32R Retrofit Collar", dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 121 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of $-/120/120$. The FRL is applicable for exposure to the fire from the same direction as tested. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Russell Collins **Date of Test:** 2 May 2016

Issued on the 24th day of October 2016 without alterations or additions.

Brett Roddy
Manager, Fire Testing and Assessments



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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1748.

Product Name: Penetration # 7 – 32R retrofitted fire collar protecting a 20-mm Polyvinyl Chloride (PVC) Conduit

Description: The sponsor identified the specimen as a SNAP 32R retrofitted fire collar protecting a plasterboard wall penetrated by a 20-mm Polyvinyl Chloride (PVC) Conduit. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/120/120. The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner dia. and a 106-mm dia. base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135-mm long x 25-mm wide with wire mesh dia. of 0.15-mm, as shown in drawing 32R-T dated 12 February 2015, 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 10g x 38-mm course thread plasterboard screws. The penetrating service comprised a 20-mm nominal dia. PVC Conduit, with a wall thickness of 2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 25-mm dia. cut-out hole as shown in drawing "Test Wall W-16-A Penetration # 7 – 20-mm PVC Conduit – 32R Retrofit Collar", dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 121 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120. The FRL is applicable for exposure to the fire from the same direction as tested. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Russell Collins

Date of Test: 2 May 2016

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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1748.

Product Name: Penetration # 8 – 32R retrofitted fire collar protecting a 15-mm Polyvinyl Chloride (P-PVC) Class 18 Pipe

Description: The sponsor identified the specimen as a SNAP 32R retrofitted fire collar protecting a plasterboard wall penetrated by a 15-mm Polyvinyl Chloride (P-PVC) Class 18 Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/120/120. The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner dia. and a 106-mm dia. base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135-mm long x 25-mm wide with wire mesh dia. of 0.15-mm, as shown in drawing 32R-T dated 12 February 2015, 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 hollow wall anchors. The penetrating service comprised a 15-mm nominal dia. P-PVC Class 18 Pipe, with a wall thickness of 1.8-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 20-mm dia. cut-out hole as shown in drawing “Test Wall W-16-A Penetration # 8 – 15-mm P-PVC Class 18 Pipe – 32R Retrofit Collar”, dated 23 May 2016, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 121 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120. The FRL is applicable for exposure to the fire from the same direction as tested. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Russell Collins **Date of Test:** 2 May 2016

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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1748.

Product Name: Penetration # 9 – 110R retrofitted fire collar protecting a 100-mm Polyvinyl Chloride (PVC-SC) Pipe

Description: The sponsor identified the specimen as a SNAP 110R retrofitted fire collar protecting a plasterboard wall penetrated by a 100-mm Polyvinyl Chloride (PVC-SC) Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/120/120. The SNAP Retrofit 110R fire collar comprised a 0.75-mm steel casing with a 122-mm inner dia. and a 209-mm dia. base flange. The 62-mm high collar casing incorporated a closing mechanism that was comprised of three soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 2.5-mm thick x 58-mm wide x 424-mm long, a 2.5-mm thick x 58-mm wide x 407-mm long, and 2.5-mm thick x 58-mm wide x 389-mm long respectively. Between the strips was a layer of 304 stainless steel mesh 415-mm long x 58-mm wide with wire mesh dia. of 0.15-mm, and 398-mm long x 58-mm wide with wire mesh dia. of 0.15-mm respectively as shown in drawing 110R-T dated 9/10/2015, by Snap Fire Systems P/L. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 10g x 38-mm course thread plasterboard screws. The penetrating service comprised a 100-mm nominal dia. PVC-SC Pipe, with a wall thickness of 3.3-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 114-mm dia. cut-out hole as shown in drawing "Test Wall W-16-A Penetration # 9 – 100-mm PVC-SC Pipe – 110R Retrofit Collar", dated 9/10/2015, by Snap Fire Systems P/L. The pipe projected horizontally, approx. 2000-mm away from the unexposed face of the plasterboard wall and approx. 500-mm into the furnace chamber. The pipe was supported at nom. 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nom. 1000-mm. The pipe was open at unexposed end and capped on exposed end with a PVC End Cap.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 121 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120. The FRL is applicable for exposure to the fire from the same direction as tested. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Russell Collins Date of Test: 2 May 2016

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References

The following informative documents are referred to in this Report:

AS 1530.4-2014	Methods for fire tests on building materials, components and structures part 4: fire-resistance tests of elements of building construction.
AS 4072.1-2005	Components for the protection of openings in fire-resistant separating elements. Part 1: service penetrations and control joints.
AS/NZS 1477:2006	PVC Pipes and fittings for pressure applications.
AS/NZS 1260:2009	PVC-U pipes and fittings for drain, waste and vent application
AS/NZS 2053:2001	Conduits and fittings for electrical installations.
Loss Prevention Standard 1260 Issue 3.1	Plastic pipe and fittings for use in automatic sprinkler systems

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