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

Test Report

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

Sponsored Investigation No. FSP 1723

1 Introduction

1.1 Identification of specimen

The sponsor identified the specimen as Snap Retrofit Fire Collars protecting a plasterboard wall penetrated by four (4) PEX-a, four (4) PEX-b and one (1) PVC pipe.

1.2 Sponsor

Snap Fire Systems Pty Ltd
Unit 2/160 Redland Bay Road
CAPALABA QLD

1.3 Manufacturer

Snap Fire Systems Pty Ltd
Unit 2/160 Redland Bay Road
CAPALABA QLD

1.4 Test standard

Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-2005, Fire-resistance tests of elements of construction.

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 4516/3889

1.7 Test date

The fire-resistance test was conducted on 2 September 2015.

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 -/60/60. Construction comprised 64-mm x 0.55-mm steel studs and noggins installed at nominally 600-mm centres, lined on each side with one layer of 16-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 96-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 2492:2007 'Cross-linked polyethylene (PE-X) pipes for pressure applications' and
- AS/NZS 1260:2009 'PVC-U pipes and fittings for drain, waste and vent application'.

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

<u>Penetration # 1 – 32R retrofitted fire collar protecting a 16-mm PEX-a Pipe</u>

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 wraps 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 2 July 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 16-mm nominal diameter PEX-a Pipe, with a wall thickness of 2.7-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 19-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 1 – 16-mm PEX-A Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Penetration # 2 – 32R retrofitted fire collar protecting a 16-mm PEX-b 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 2 July 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 16-mm nominal diameter PEX-b Pipe, with a wall thickness of 2.3-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 19-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 2 – 16-mm PEX-b Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Penetration # 3 – 32R retrofitted fire collar protecting a 20-mm PEX-a 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 2 July 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 20-mm nominal diameter PEX-a Pipe, with a wall thickness of 3.5-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 23-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 3 – 20-mm PEX-a Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Penetration # 4 – 32R retrofitted fire collar protecting a 20-mm PEX-b 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 2 July 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 20-mm nominal diameter PEX-b Pipe, with a wall thickness of 2.35-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 23-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 4 – 20-mm PEX-b Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Penetration # 5 – 32R retrofitted fire collar protecting a 25-mm PEX-a 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 2 July 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 25-mm nominal diameter PEX-a Pipe, with a wall thickness of 4.3-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 28-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 5 – 25-mm PEX-a Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Penetration # 6 – 32R retrofitted fire collar protecting a 25-mm PEX-b 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 2 July 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 25-mm nominal diameter PEX-b Pipe, with a wall thickness of 2.8-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 28-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 6 – 25-mm PEX-b Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Penetration # 7 – 32R retrofitted fire collar protecting a 32-mm PEX-a 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 2 July 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 PEX-a Pipe, with a wall thickness of 5.2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 35-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 7 – 32-mm PEX-a Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Penetration # 8 – 32R retrofitted fire collar protecting a 32-mm PEX-b 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 2 July 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 PEX-b Pipe, with a wall thickness of 3.3-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 35-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 8 – 32-mm PEX-b Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Penetration # 9 – 32R retrofitted fire collar protecting a 21.6-mm Polyvinyl Chloride (P-PVC) Pipe + Lagging

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 2 July 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 15-mm nominal diameter P-PVC Pipe, with a wall thickness of 2.1-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 24-mm diameter cut-out hole. The pipe was wrapped with Thermotec 25-mm thick 4-Zero lagging as shown in drawing titled "Test Wall W-15-H Penetration # 9 – 15-mm P-PVC Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

2.2 Dimensions

The wall specimen was nominally 1150-mm wide x 1150-mm high x 128-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-15-H Penetration # 1 16-mm PEX-a Pipe – 32R Retrofit Collar, dated 21 October 2015, by Snap Fire Systems Pty Ltd”.

Drawing titled “Test Wall W-15-H Penetration # 2 16-mm PEX-b Pipe – 32R Retrofit Collar, dated 21 October 2015, by Snap Fire Systems Pty Ltd”.

Drawing titled “Test Wall W-15-H Penetration # 3 20-mm PEX-a Pipe – 32R Retrofit Collar, dated 21 October 2015, by Snap Fire Systems Pty Ltd”.

Drawing titled “Test Wall W-15-H Penetration # 4 20-mm PEX-b Pipe – 32R Retrofit Collar, dated 21 October 2015, by Snap Fire Systems Pty Ltd”.

Drawing titled “Test Wall W-15-H Penetration # 5 25-mm PEX-a Pipe – 32R Retrofit Collar, dated 21 October 2015, by Snap Fire Systems Pty Ltd”.

Drawing titled “Test Wall W-15-H Penetration # 6 25-mm PEX-b Pipe – 32R Retrofit Collar, dated 21 October 2015, by Snap Fire Systems Pty Ltd”.

Drawing titled “Test Wall W-15-H Penetration # 7 32-mm PEX-a Pipe – 32R Retrofit Collar, dated 21 October 2015, by Snap Fire Systems Pty Ltd”.

Drawing titled “Test Wall W-15-H Penetration # 8 32-mm PEX-b Pipe – 32R Retrofit Collar, dated 21 October 2015, by Snap Fire Systems Pty Ltd”.

Drawing titled “Test Wall W-15-H Penetration # 9 21.6-mm P-PVC Pipe – 32R Retrofit Collar, dated 21 October 2015, by Snap Fire Systems Pty Ltd”.

Drawing numbered 32 R-T, dated 12 February 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 1530.4-2005 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 13°C at the commencement of the test.

6 Departure from standard

There were no departures from the requirements of AS 1530.4-2005.

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 minutes -	Smoke is beginning to flue from Penetration # 2.
2 minutes -	Smoke is beginning to flue from Penetration # 4, 5 and 7.
3 minutes -	Smoke is beginning to flue from Penetration # 1 and 3.
4 minutes -	Smoke has ceased to flue from Penetration # 1 and 2. Smoke is fluing from Penetration # 8.
6 minutes -	Smoke has ceased to flue from Penetration # 8.
7 minutes -	Fluing has ceased on Penetrations # 1, 2, 3, 4, 5, 6, 7 and 8.
10 minutes -	Smoke is visible from the intumescent material under Penetration # 9 on exposed face.
13 minutes -	Smoke is fluing from Penetration # 9 at collar.
16 minutes -	Smoke is fluing from Penetration # 9.
26 minutes -	Smoke continues to flu from Penetration # 9.
30 minutes -	A small amount of smoke is fluing from Penetration # 6. Some smoke is visible and condensation at end of Penetration # 9 is noted.

34 minutes -	Fluing is visible from Penetrations # 5 and 6.
35 minutes -	Fluing is visible from # 3 and 7.
45 minutes -	Fluing is visible from Penetrations # 2 and 4.
49 minutes -	Condensation is visible on Penetration # 7. Fluing is visible from Penetrations # 2, 3, 4, 6, 7, 8 and 9.
53 minutes -	The lagging on Penetration # 9 is melting.
65 minutes -	Fluing is visible on Penetrations # 2, 3, 5, 7 and 8.
69 minutes -	Insulation failure of Penetration # 8 – Maximum temperature rise limit of 180K achieved on the unexposed face of the wall.
70 minutes -	Visible PVC pipe at collar on Penetration # 9 has melted.
73 minutes -	Insulation failure of Penetration # 9 – Maximum temperature rise limit of 180K achieved on the unexposed face of the pipe lagging.
75 minutes -	Fluing is visible from Penetrations # 2, 4, 5, 6 and 7. Swelling of the unexposed intumescent is noted on Penetration # 8.
76 minutes -	Insulation failure of Penetration # 5 – Maximum temperature rise limit of 180K achieved on the unexposed face of the wall. Insulation failure of Penetration # 6 – Maximum temperature rise limit of 180K achieved on the unexposed face of the pipe.
78 minutes -	Insulation failure of Penetration # 7 – Maximum temperature rise limit of 180K achieved on the unexposed face of the pipe.
81 minutes -	Discolouration is noted at the plasterboard screw heads.
83 minutes -	Swelling of the intumescent is evident on Penetration # 6 and some distortion is noted.
84 minutes -	Insulation failure of Penetration # 3 – Maximum temperature rise limit of 180K achieved on the unexposed face of the wall.
87 minutes -	Insulation failure of Penetration # 2 – Maximum temperature rise limit of 180K achieved on the unexposed face of the wall.
90 minutes -	Fluing is visible from Penetrations # 1, 2, 3, 4 and 5.
92 minutes -	Smoke is visible from collar on Penetration # 2. The collars on Penetrations # 4, 5, 6, 7, 8 and 9 appear sealed on the unexposed face.
93 minutes -	Insulation failure of Penetration # 3 – Maximum temperature rise limit of 180K achieved on the unexposed face of the wall.
105 minutes -	Swelling is evident on the unexposed intumescent on Penetrations # 1, 2 and 3.
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 1530.4-2005 criteria:

Penetration # 1 – 32R retrofitted fire collar protecting a 16-mm PEX-a Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 121 minutes.
Insulation	-	no failure at 93 minutes.

Penetration # 2 – 32R retrofitted fire collar protecting a 16-mm PEX-b Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 121 minutes.
Insulation	-	no failure at 87 minutes.

Penetration # 3 – 32R retrofitted fire collar protecting a 20-mm PEX-a Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 121 minutes.
Insulation	-	no failure at 92 minutes.

Penetration # 4 – 32R retrofitted fire collar protecting a 20-mm PEX-b Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 121 minutes.
Insulation	-	no failure at 84 minutes.

Penetration # 5 – 32R retrofitted fire collar protecting a 25-mm PEX-a Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 121 minutes.
Insulation	-	no failure at 76 minutes.

Penetration # 6 – 32R retrofitted fire collar protecting a 25-mm PEX-b Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 121 minutes.
Insulation	-	no failure at 76 minutes.

Penetration # 7 – 32R retrofitted fire collar protecting a 32-mm PEX-a Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 121 minutes.
Insulation	-	no failure at 78 minutes.

Penetration # 8 – 32R retrofitted fire collar protecting a 32-mm PEX-b Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 121 minutes.
Insulation	-	no failure at 69 minutes.

Penetration # 9 – 32R retrofitted fire collar protecting a 21.6-mm Polyvinyl Chloride (P-PVC) Pipe + Lagging

Structural adequacy	-	not applicable
Integrity	-	no failure at 121 minutes.
Insulation	-	no failure at 73 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	-	-/60/60;
Penetration # 2	-	-/60/60;
Penetration # 3	-	-/60/60;
Penetration # 4	-	-/60/60;
Penetration # 5	-	-/60/60;
Penetration # 6	-	-/60/60;
Penetration # 7	-	-/60/60;
Penetration # 8	-	-/60/60; and
Penetration # 9	-	-/60/60;

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

For the purposes of AS 1530.4-2005 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 1530.4-2005, have been made provided no individual component is removed or reduced.

11 Tested by

Mario Lara-Ledermann
Testing Officer

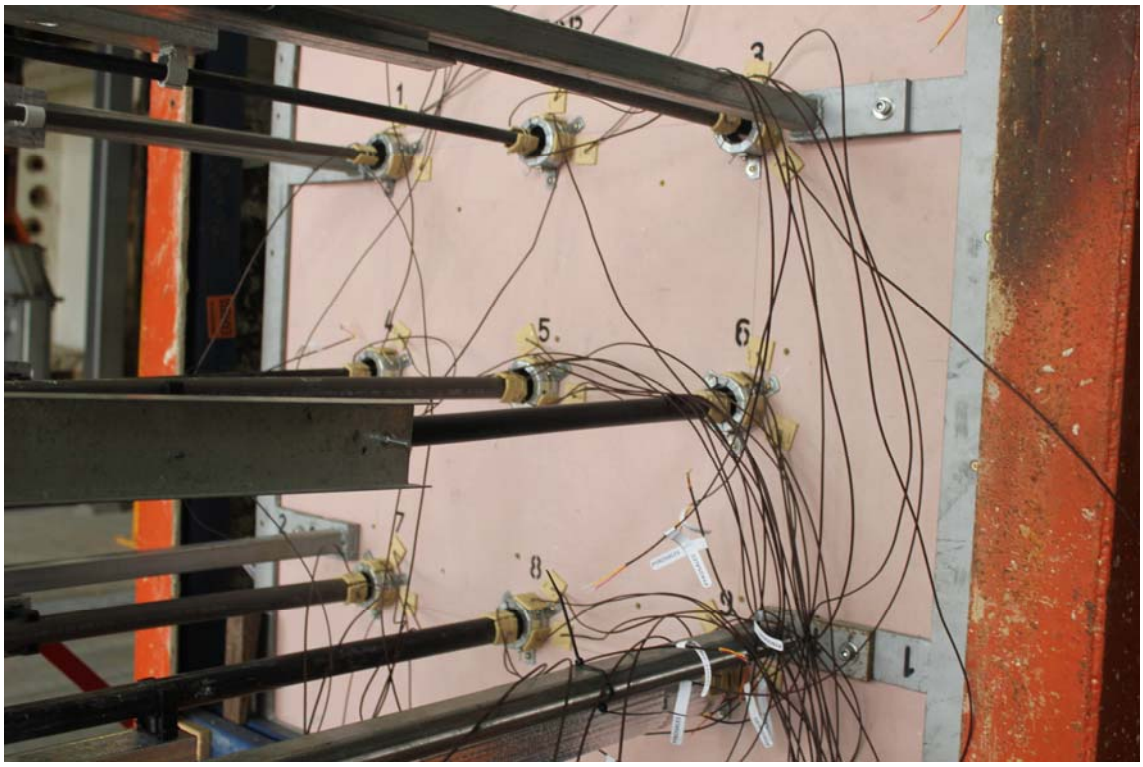
Appendices

Appendix A – Measurement location

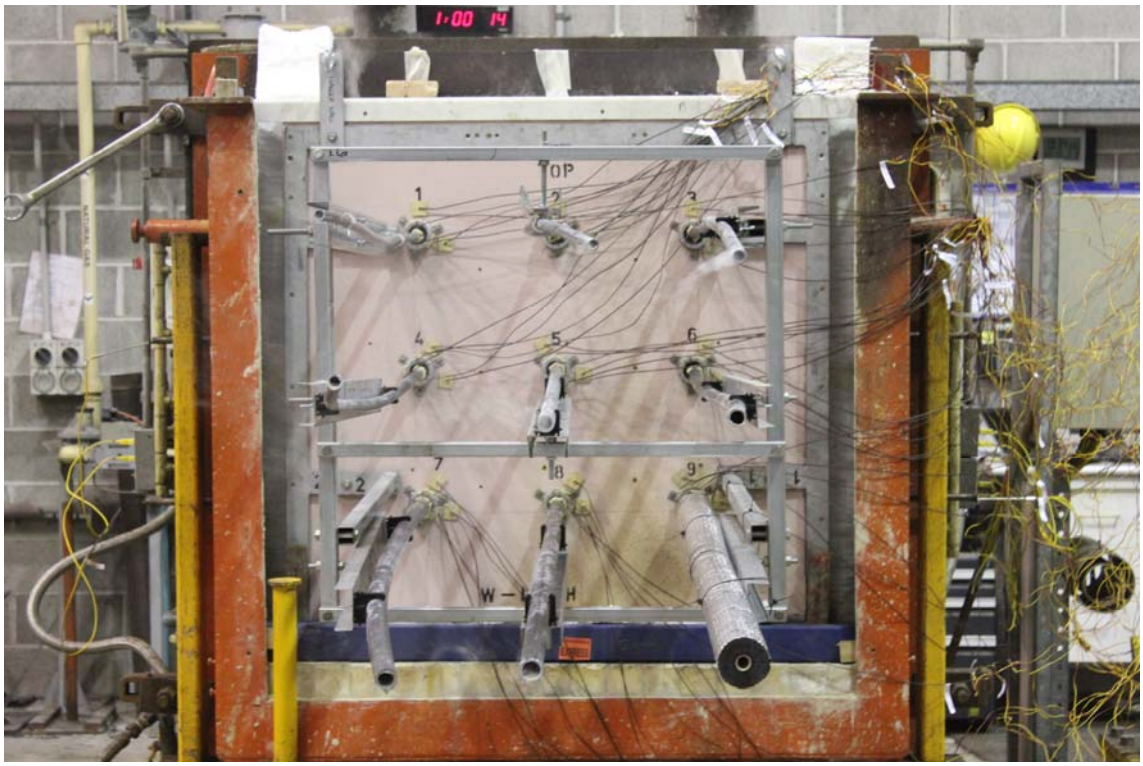
Measurement Location		
Group location	**T/C Position**	**T/C designation**
Specimen		
Penetration # 1	On wall – 25-mm from collar.	S1
	On wall – 25-mm from collar.	S2
	On collar.	S3
	On collar.	S4
	On pipe – 25-mm from collar.	S5
	On pipe – 25-mm from collar.	S6
Penetration # 2	On wall – 25-mm from collar.	S7
	On wall – 25-mm from collar.	S8
	On collar.	S9
	On collar.	S10
	On pipe – 25-mm from collar.	S11
	On pipe – 25-mm from collar.	S12
Penetration # 3	On wall – 25-mm from collar.	S13
	On wall – 25-mm from collar.	S14
	On collar.	S15
	On collar.	S16
	On pipe – 25-mm from collar.	S17
	On pipe – 25-mm from collar.	S18
Penetration # 4	On wall – 25-mm from collar.	S19
	On wall – 25-mm from collar.	S20
	On collar.	S21
	On collar.	S22
	On pipe – 25-mm from collar.	S23
	On pipe – 25-mm from collar.	S24
Penetration # 5	On wall – 25-mm from collar.	S25
	On wall – 25-mm from collar.	S26
	On collar.	S27
	On collar.	S28
	On pipe – 25-mm from collar.	S29
	On pipe – 25-mm from collar.	S30

Penetration # 6	On wall – 25-mm from collar.	S31
	On wall – 25-mm from collar.	S32
	On collar.	S33
	On collar.	S34
	On pipe – 25-mm from collar.	S35
	On pipe – 25-mm from collar.	S36
Penetration # 7	On wall – 25-mm from collar.	S37
	On wall – 25-mm from collar.	S38
	On collar.	S39
	On collar.	S40
	On pipe – 25-mm from collar.	S41
	On pipe – 25-mm from collar.	S42
Penetration # 8	On wall – 25-mm from collar.	S43
	On wall – 25-mm from collar.	S44
	On collar.	S45
	On collar.	S46
	On pipe – 25-mm from collar.	S47
	On pipe – 25-mm from collar.	S48
Penetration # 9	On wall – 25-mm from collar.	S49
	On wall – 25-mm from collar.	S50
	On collar.	S51
	On collar.	S52
	On pipe – 25-mm from collar.	S53
	On pipe – 25-mm from collar.	S54

Appendix B – Photographs

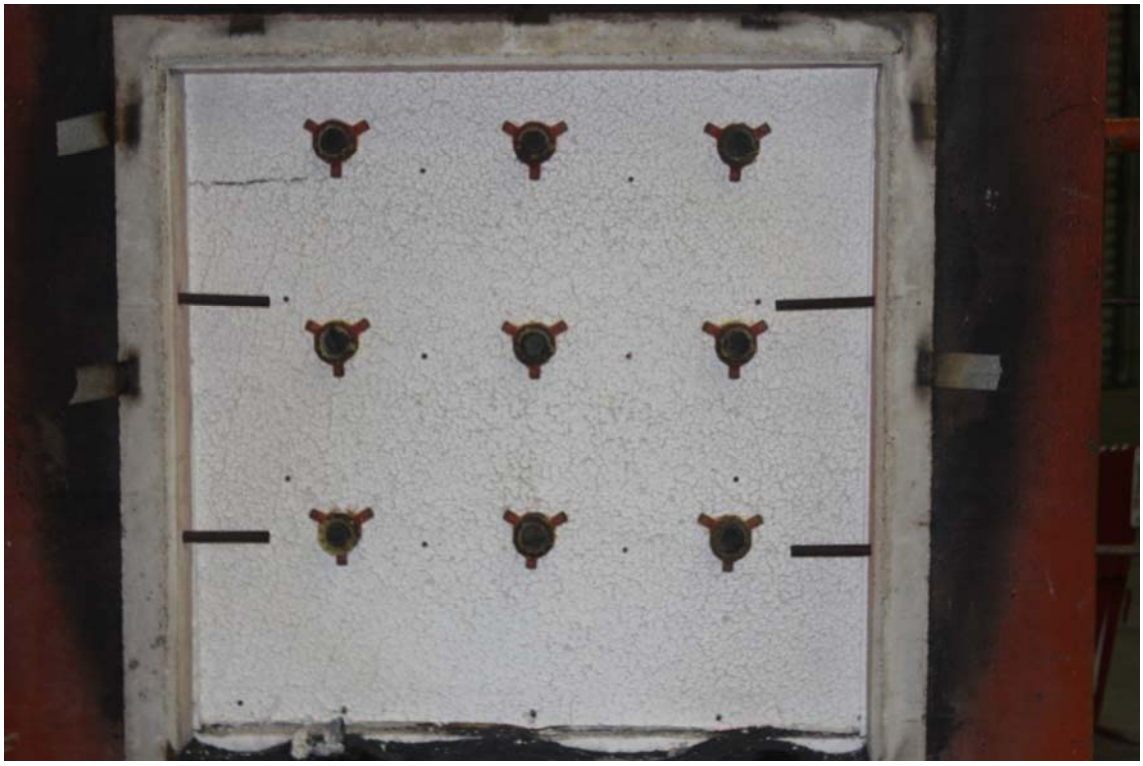


PHOTOGRAPH 1 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING



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

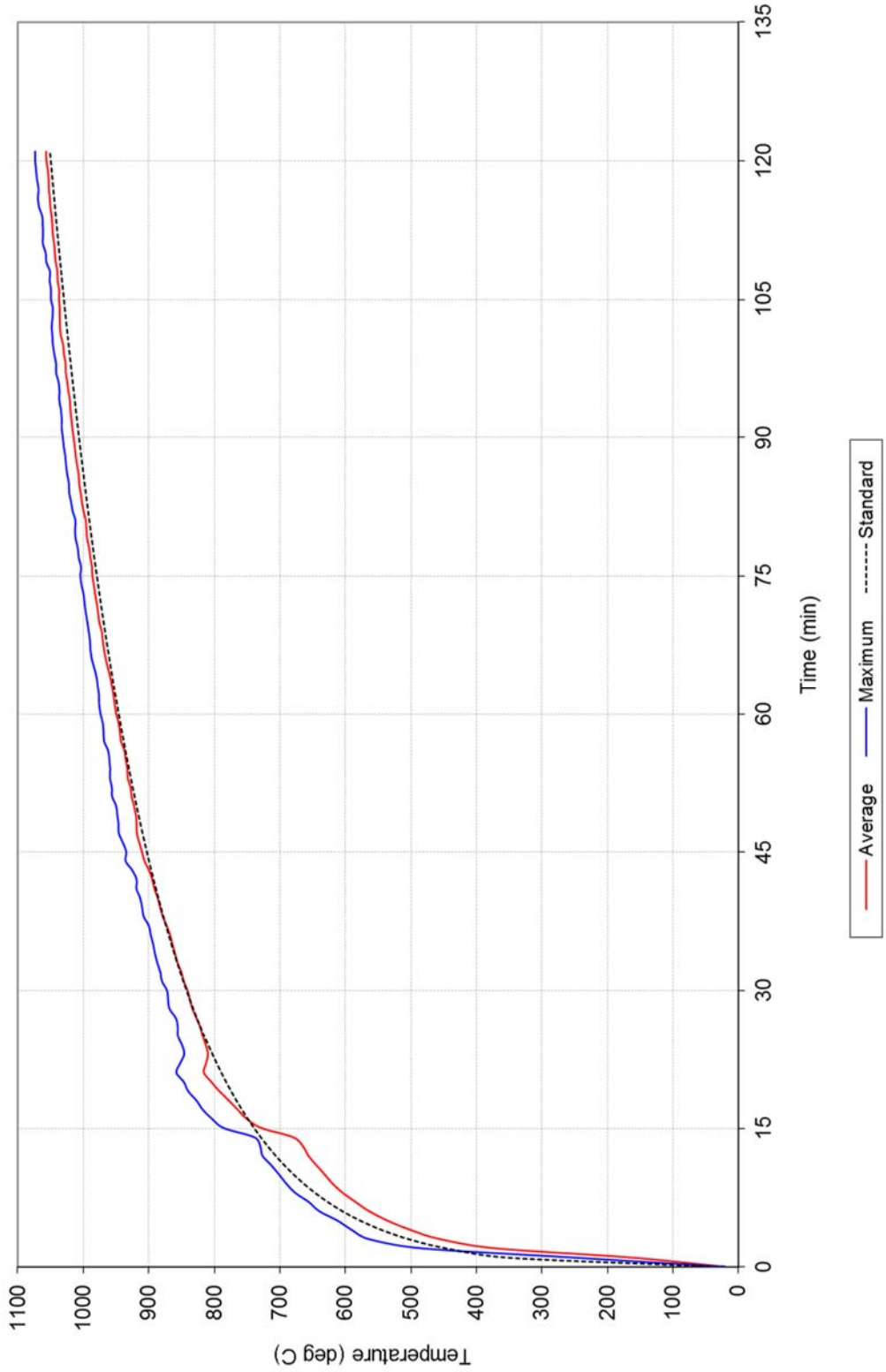


FIGURE 1 – FURNACE TEMPERATURE

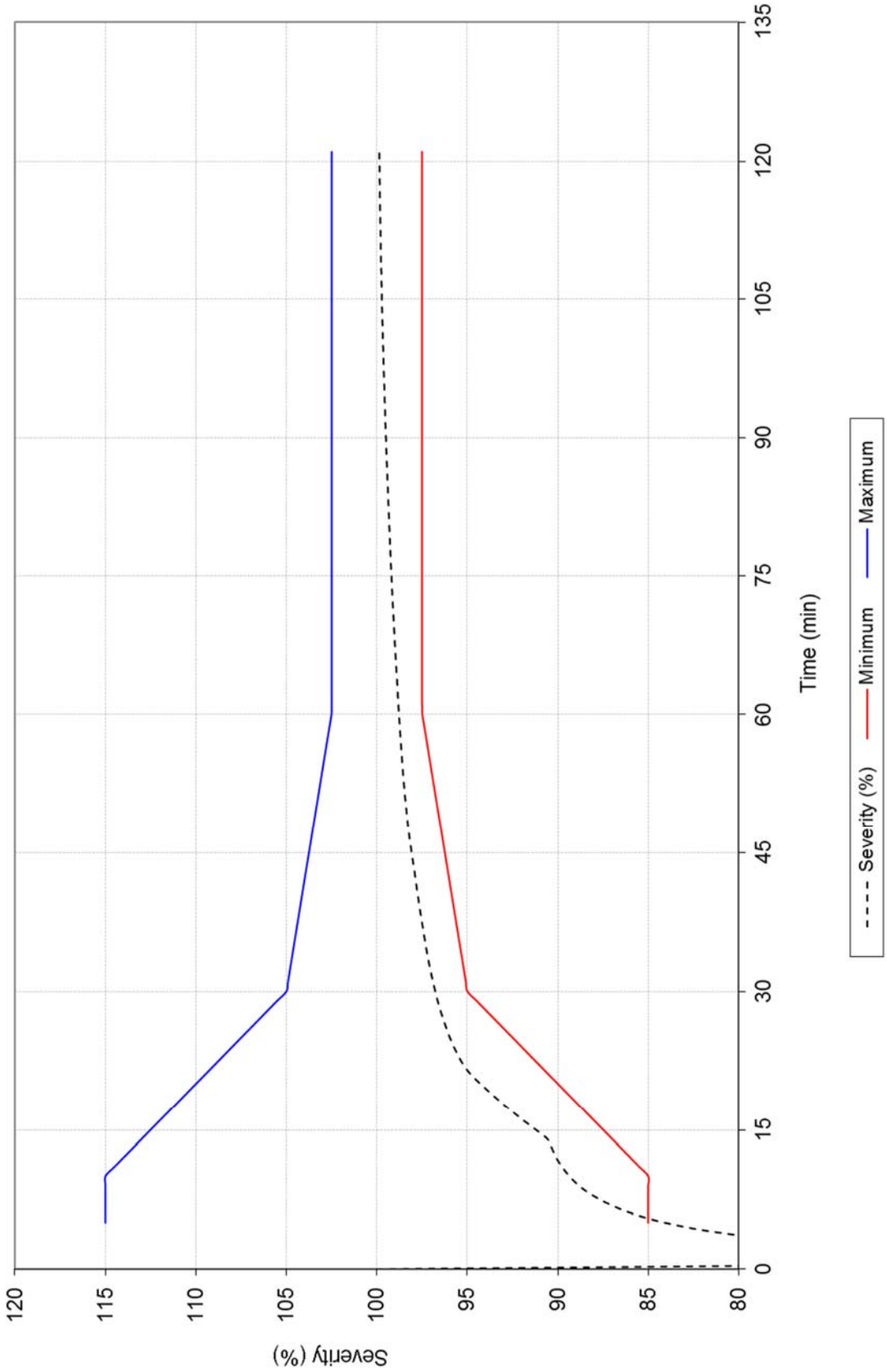


FIGURE 2 – FURNACE SEVERITY

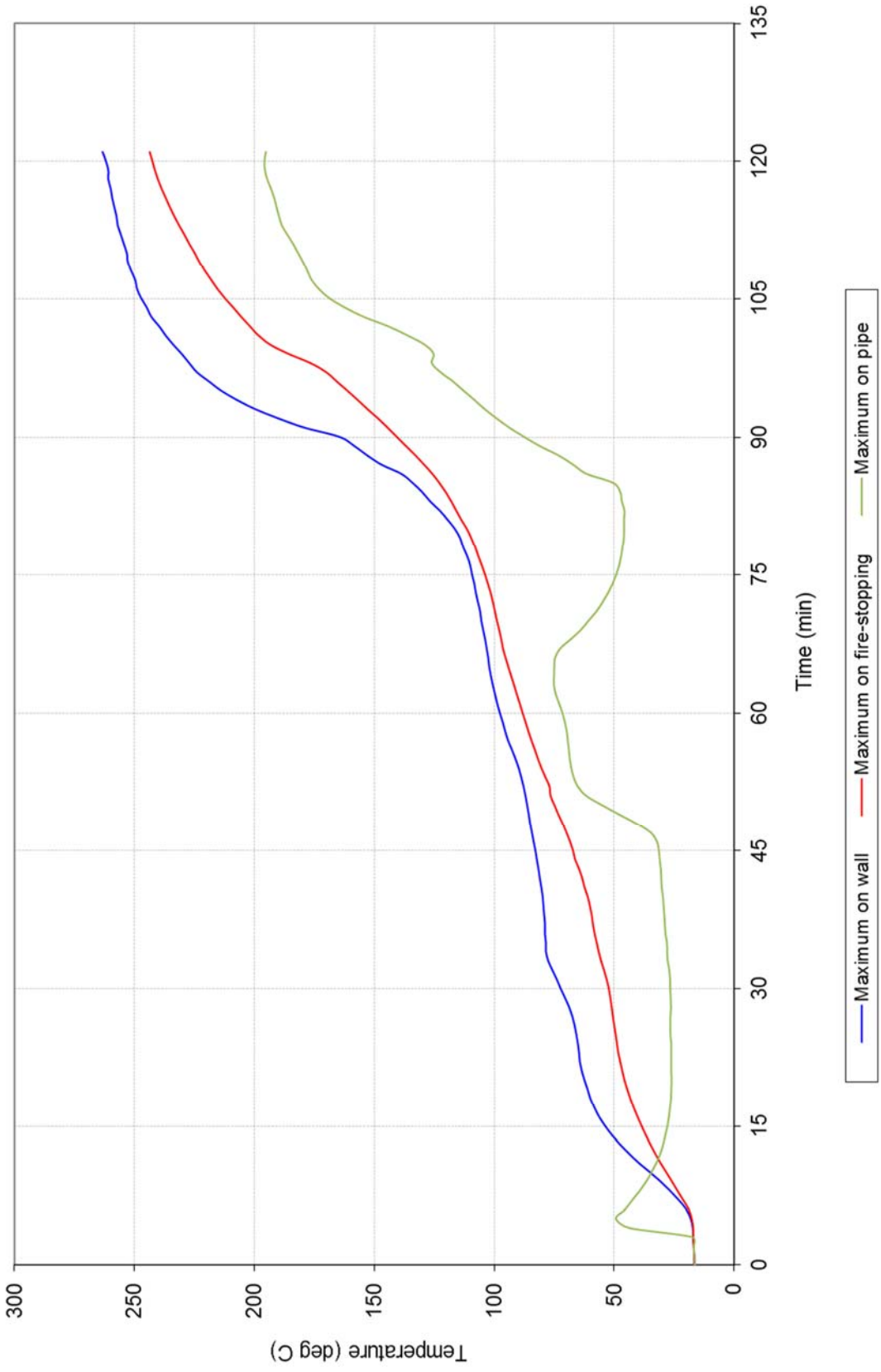


FIGURE 3 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 1

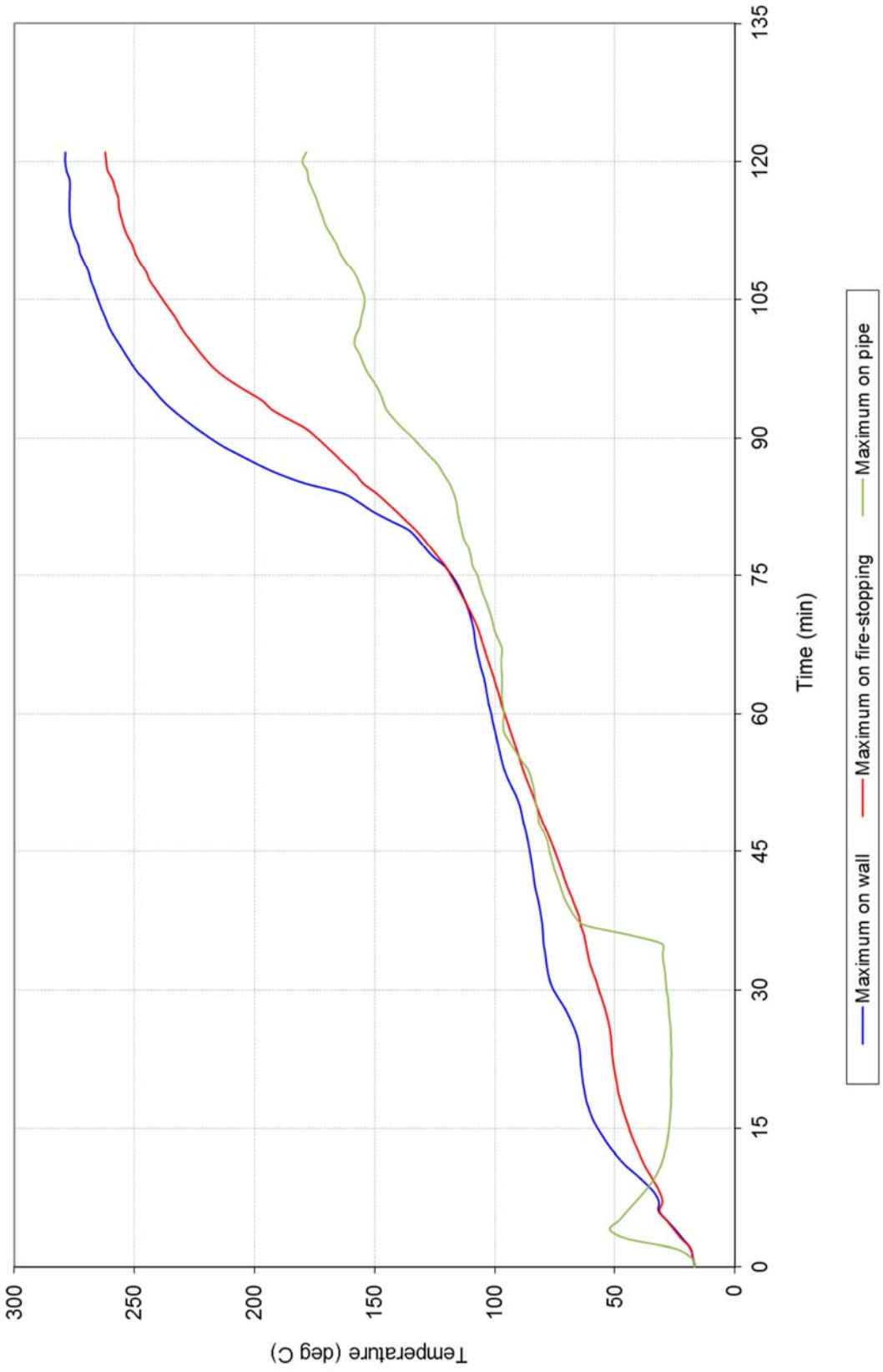


FIGURE 4 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 2

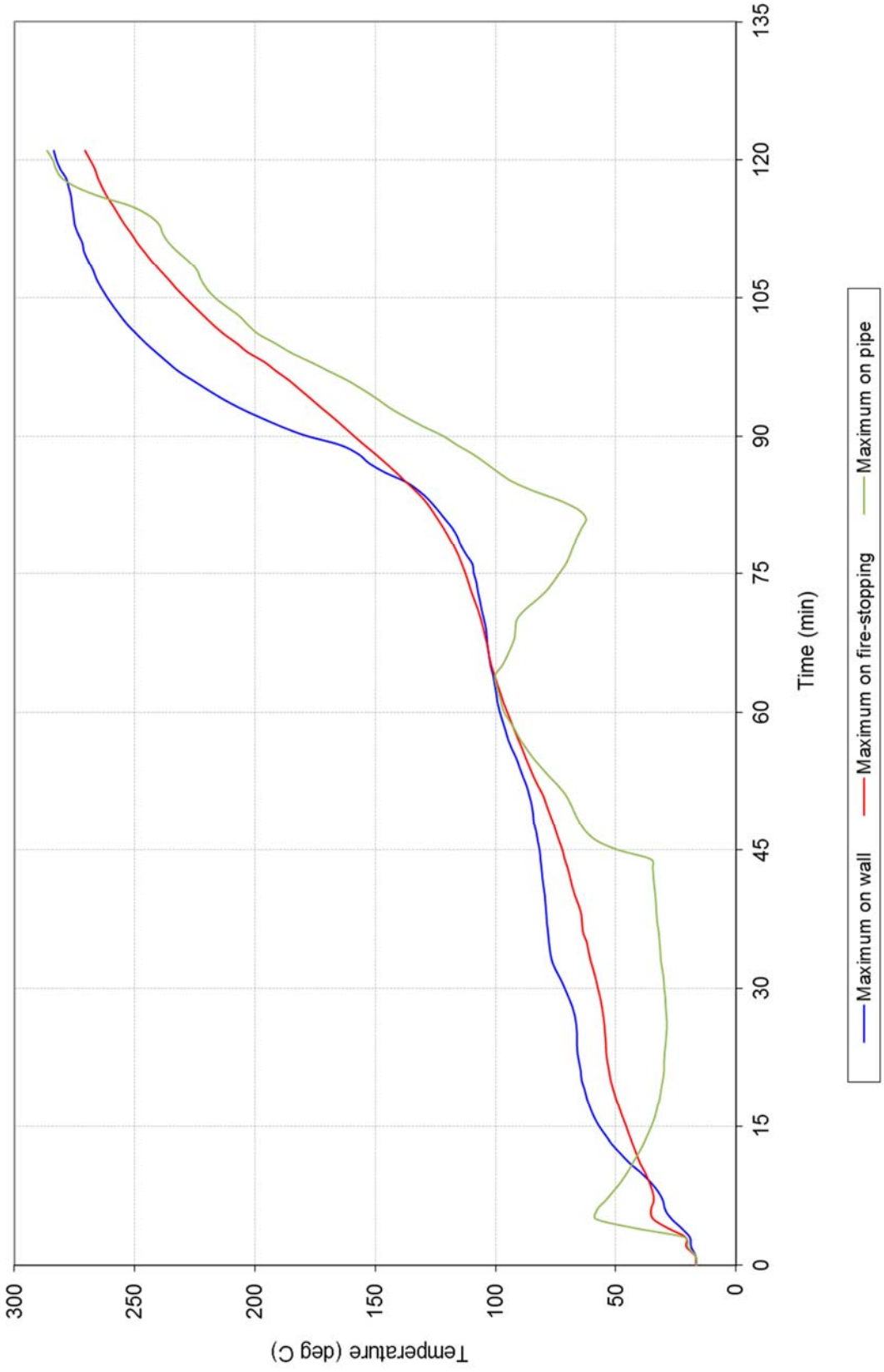


FIGURE 5 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 3

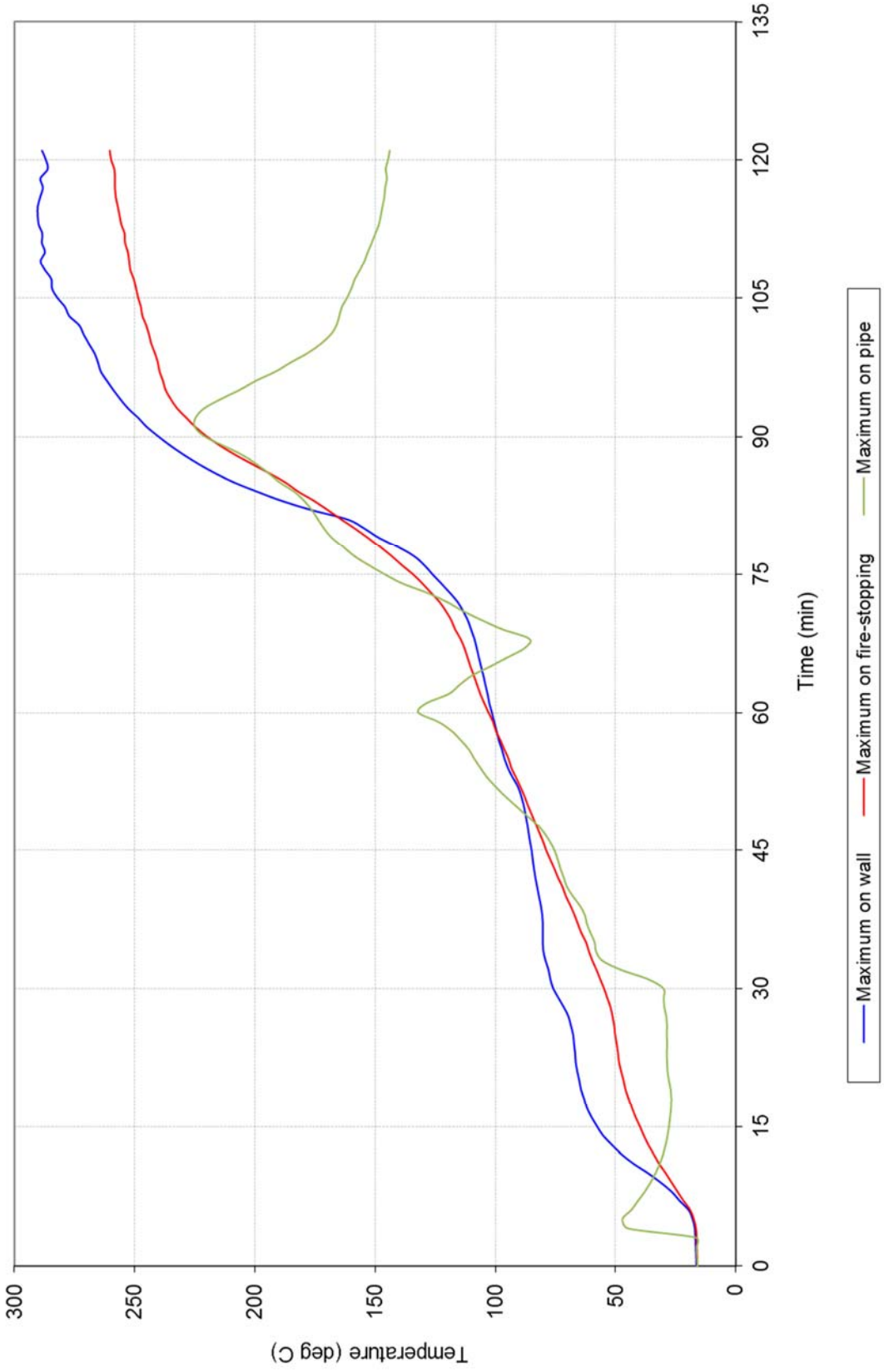


FIGURE 6 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 4

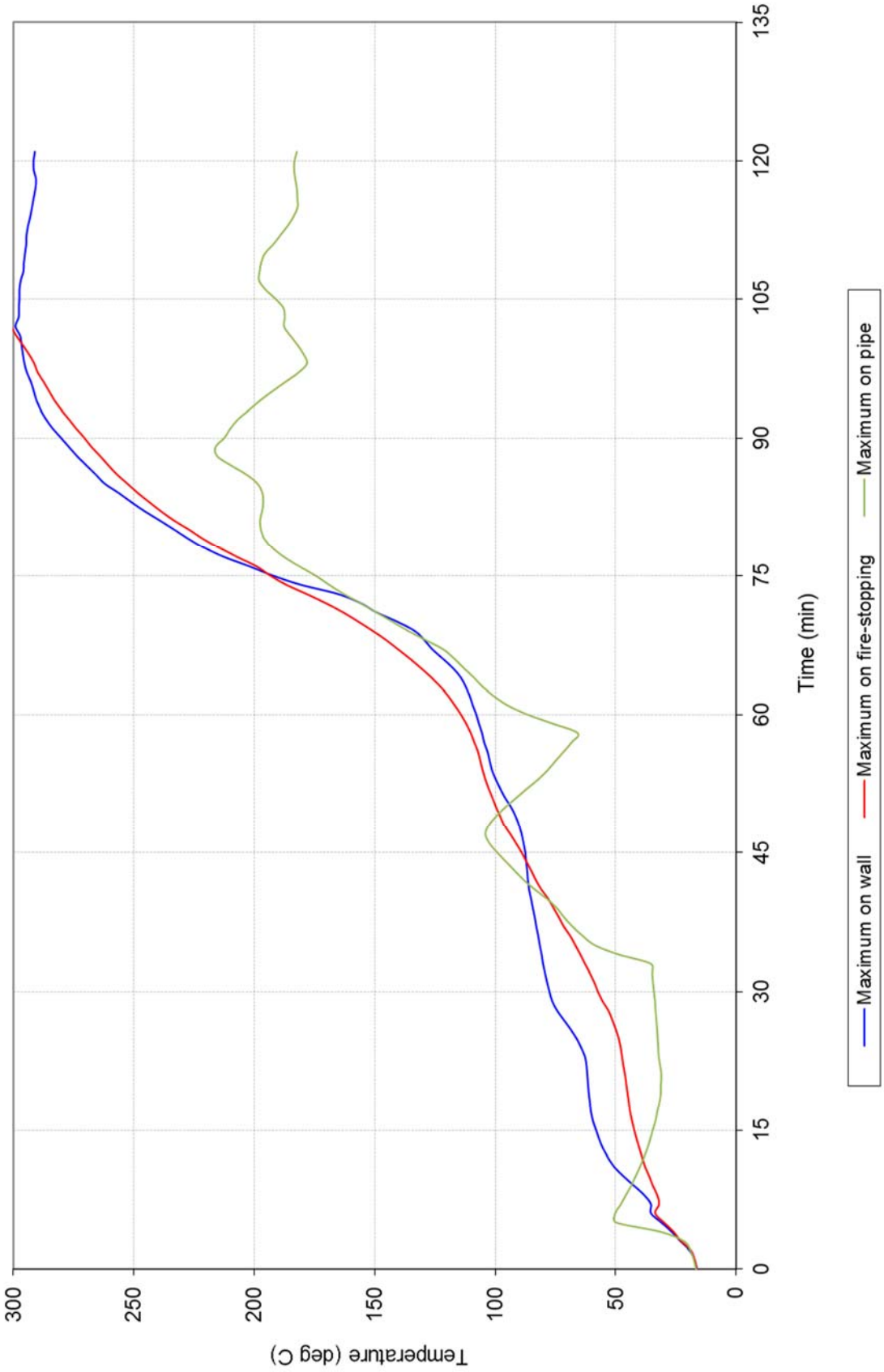


FIGURE 7 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 5

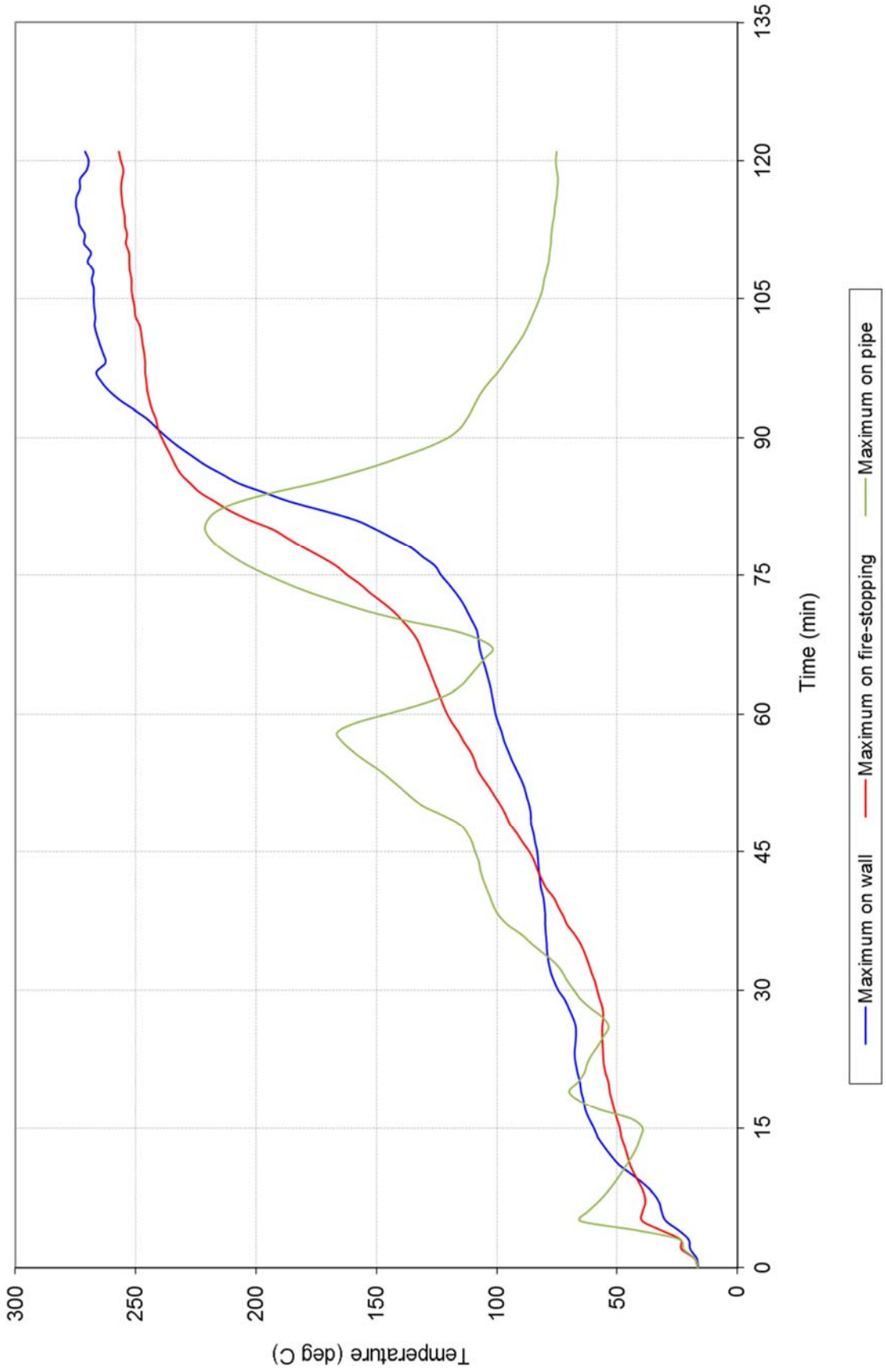


FIGURE 8 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 6

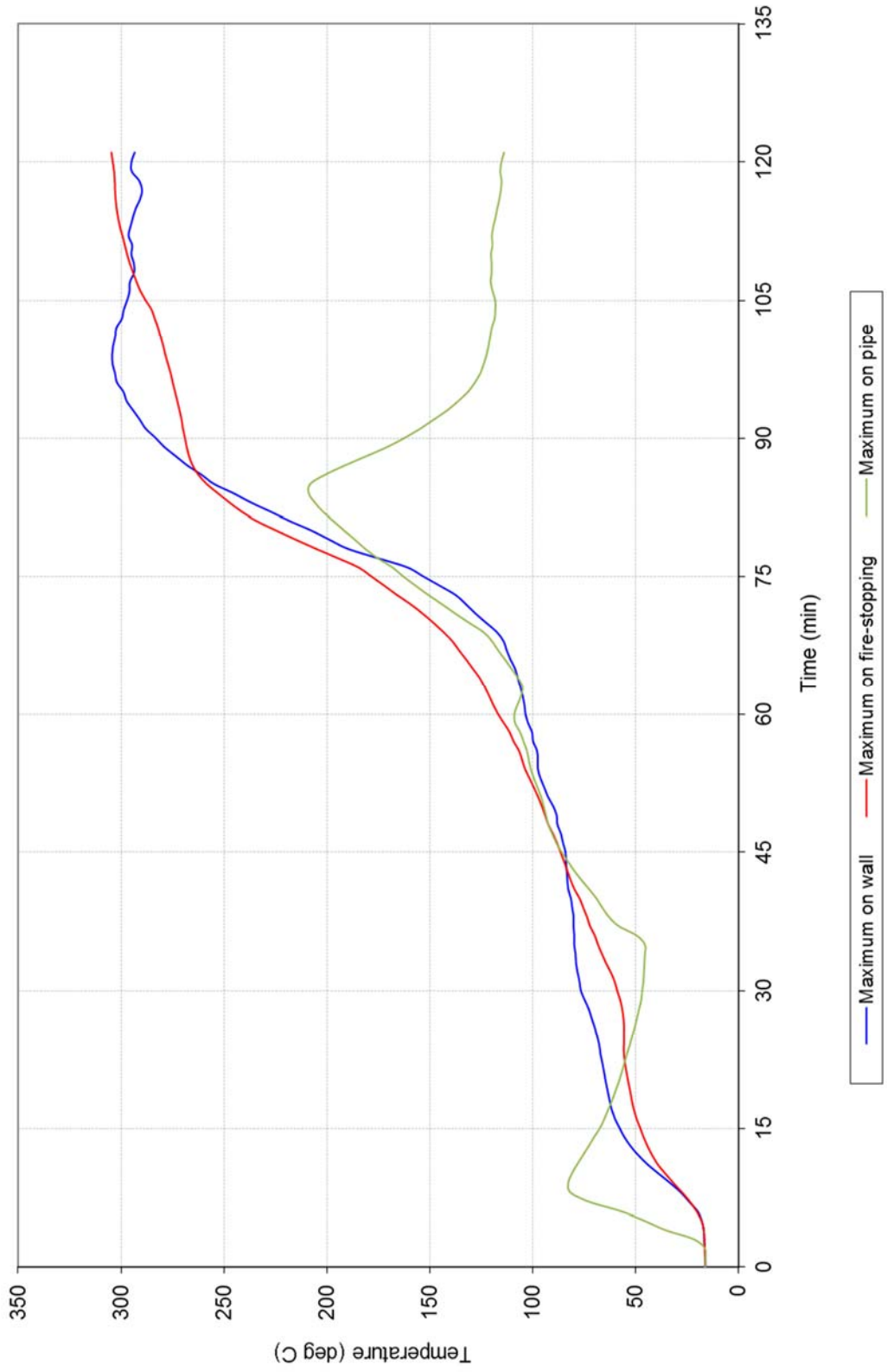


FIGURE 9 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 7

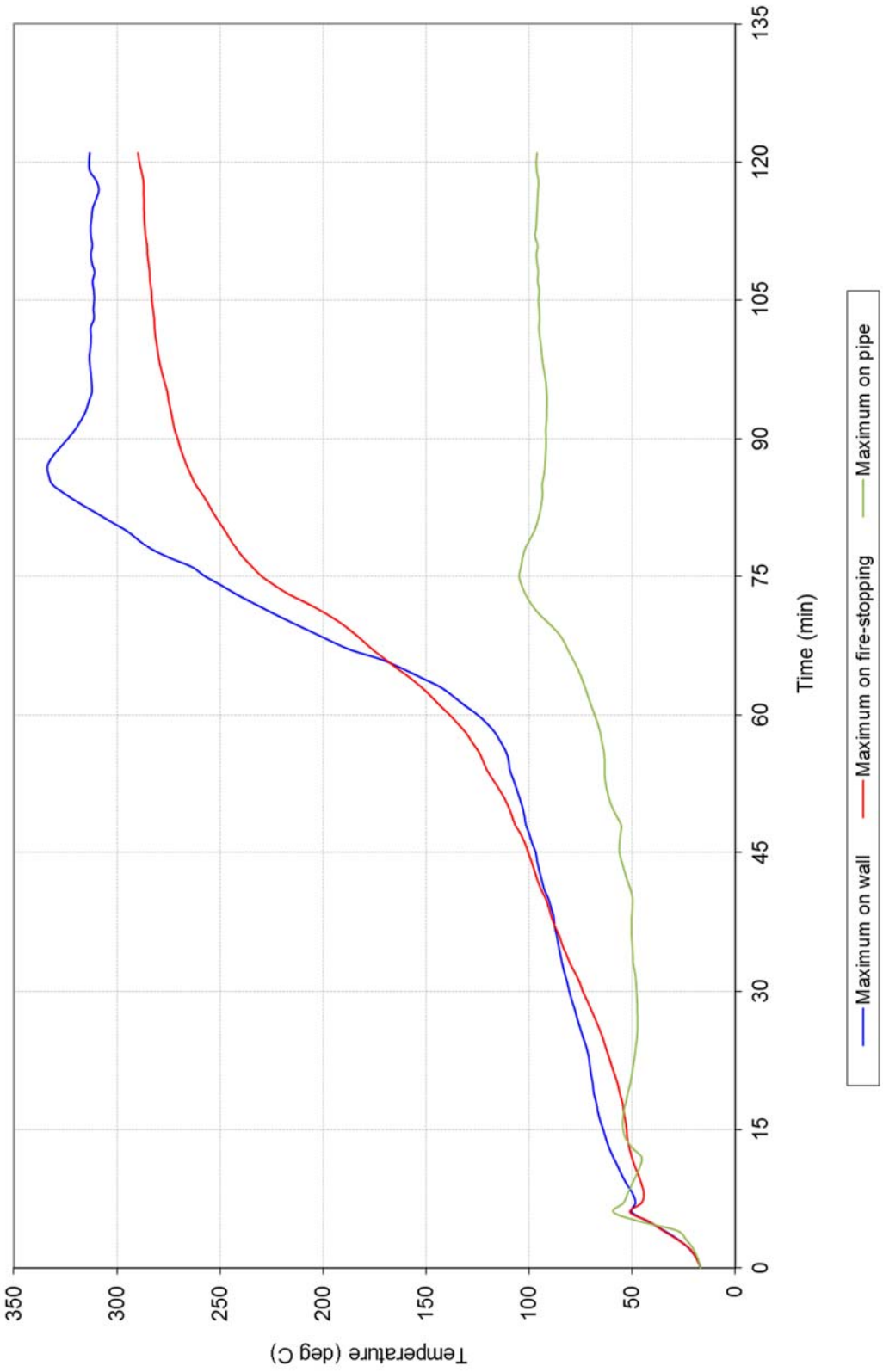


FIGURE 10 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 8

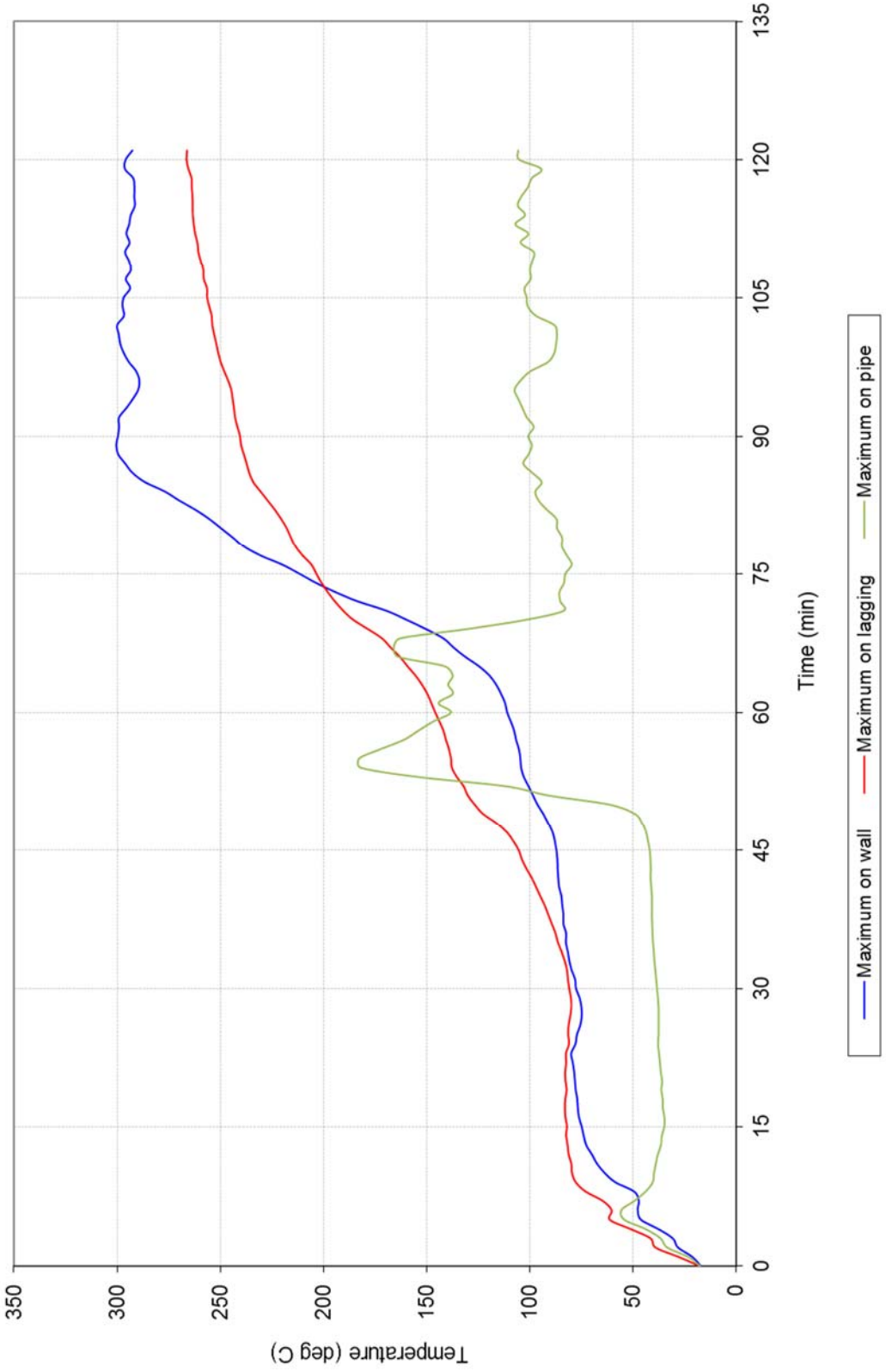
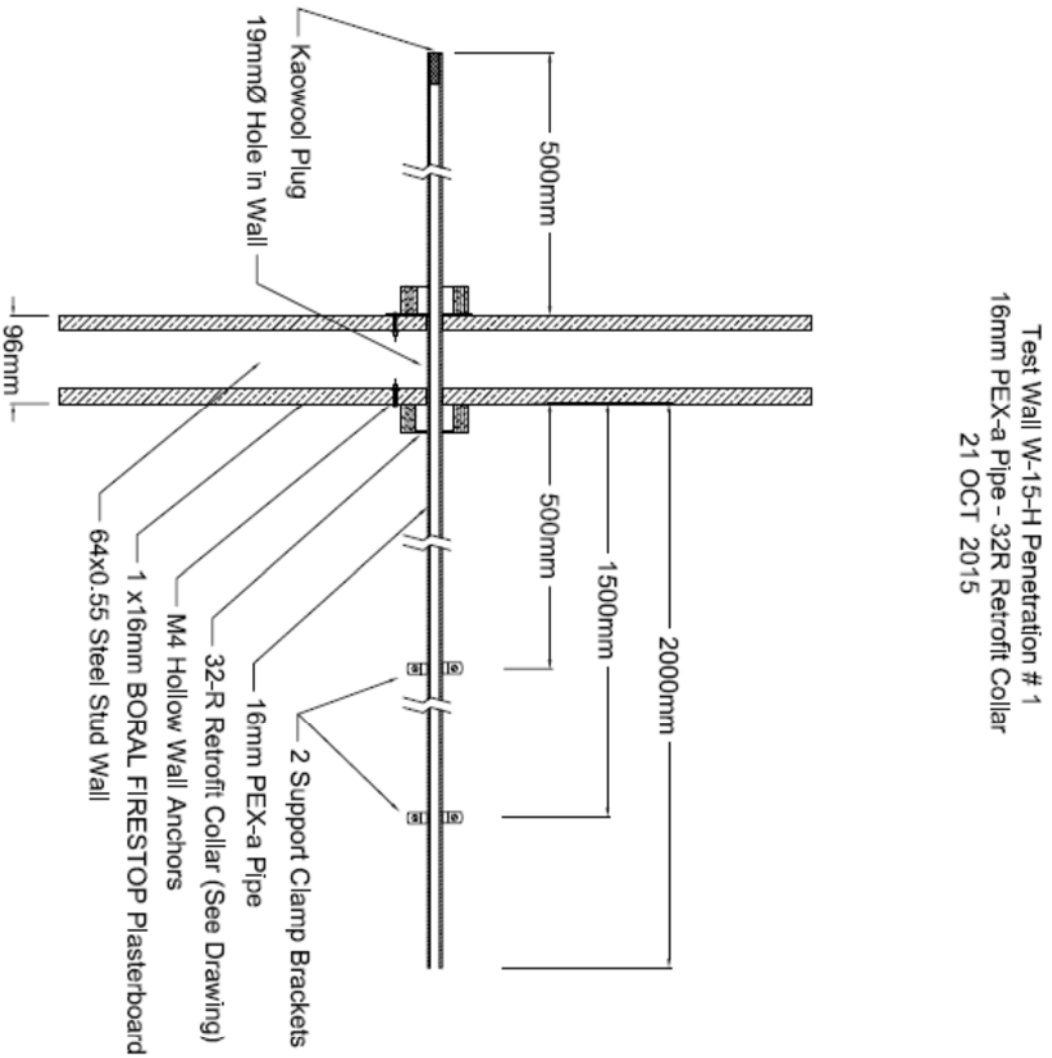
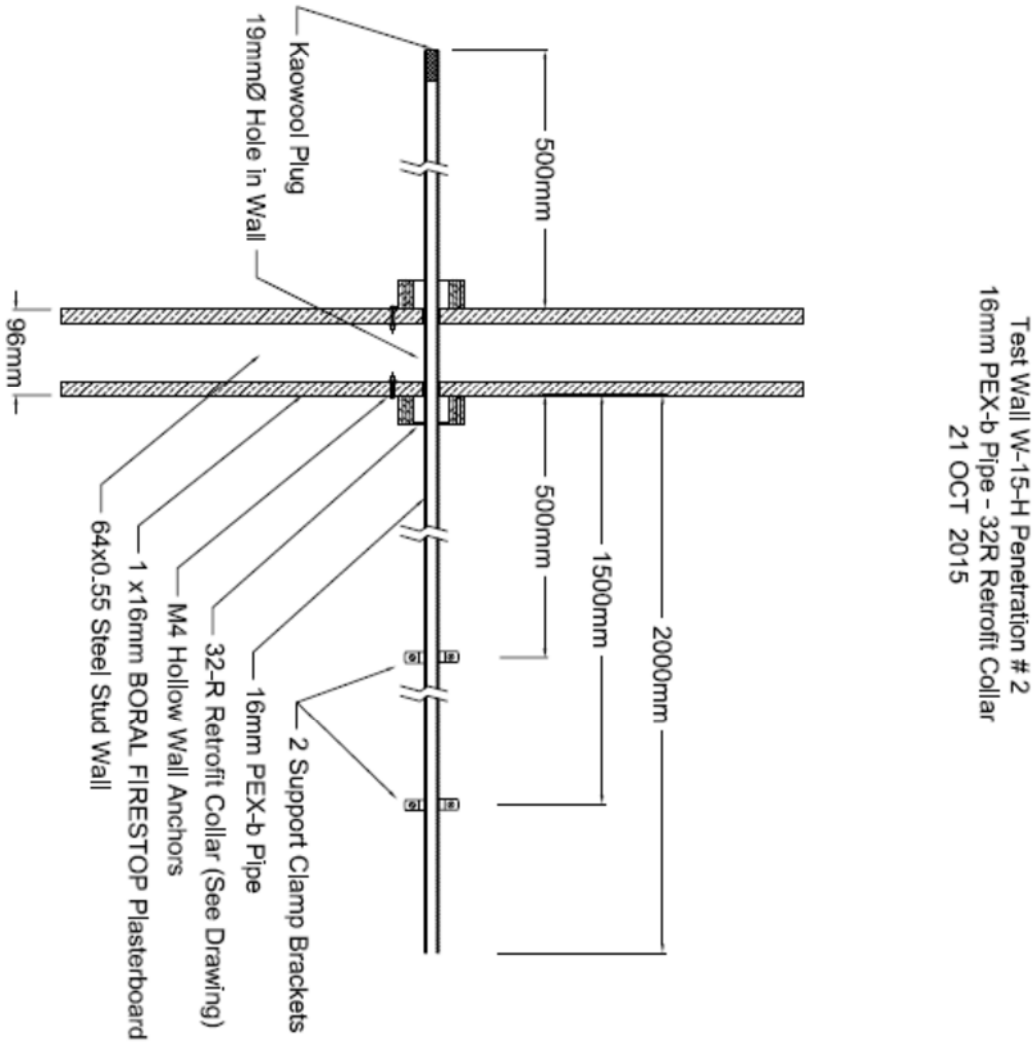


FIGURE 11 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 9

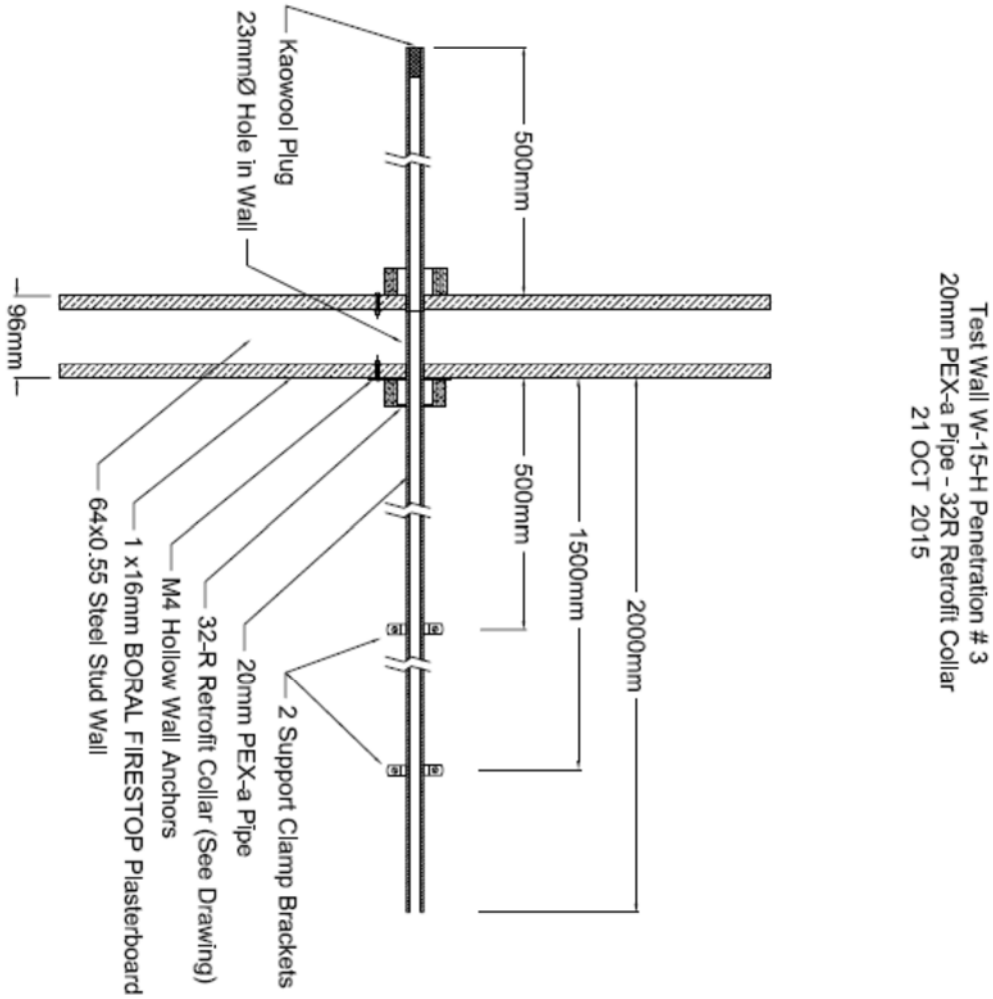
Appendix D – Installation drawings



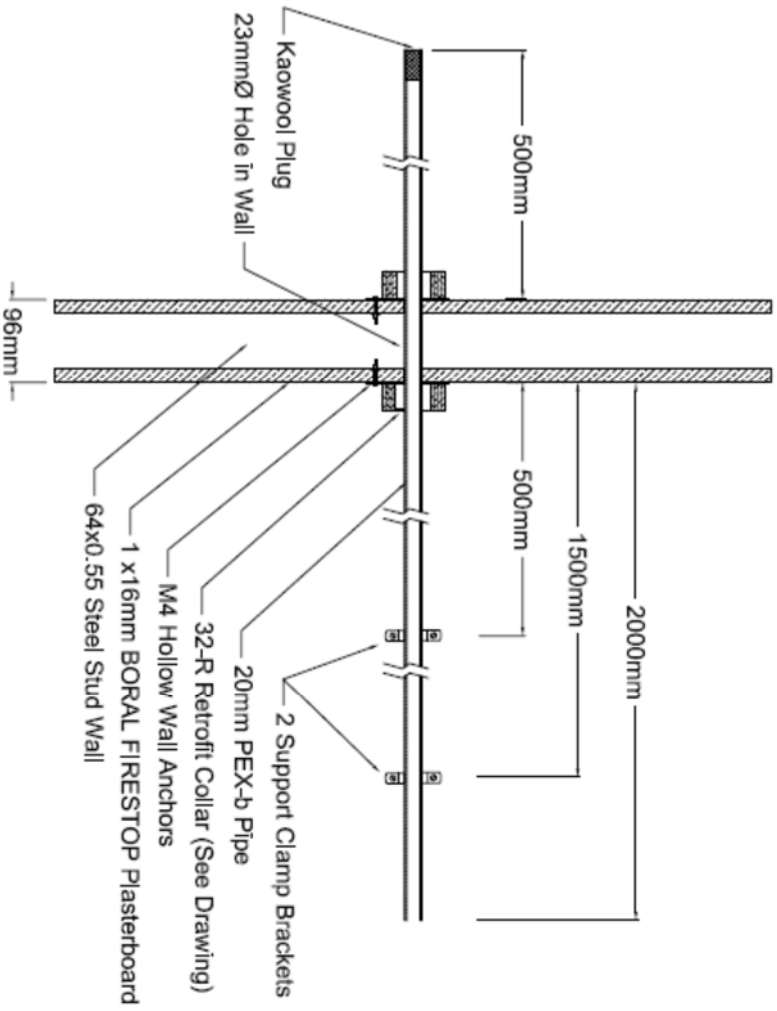
DRAWING TITLED "TEST WALL W-15-H PENETRATION # 1 16-MM PEX-A PIPE – 32R RETROFIT COLLAR, DATED 21 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD".



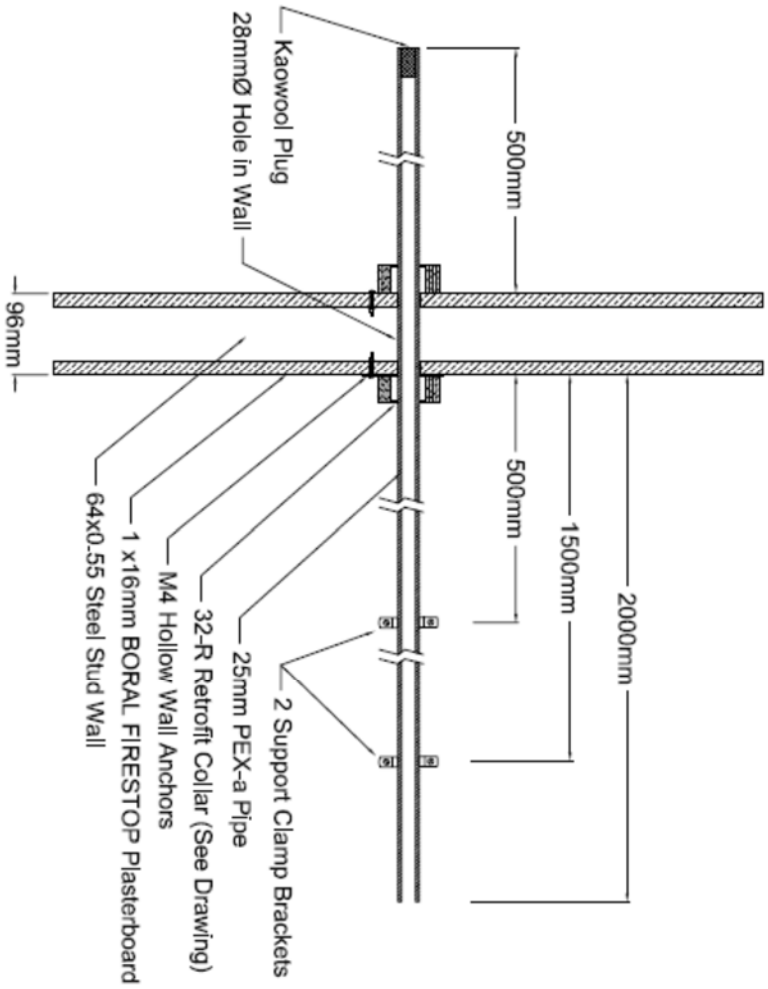
DRAWING TITLED "TEST WALL W-15-H PENETRATION # 2 16-MM PEX-B PIPE – 32R RETROFIT COLLAR, DATED 21 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD".



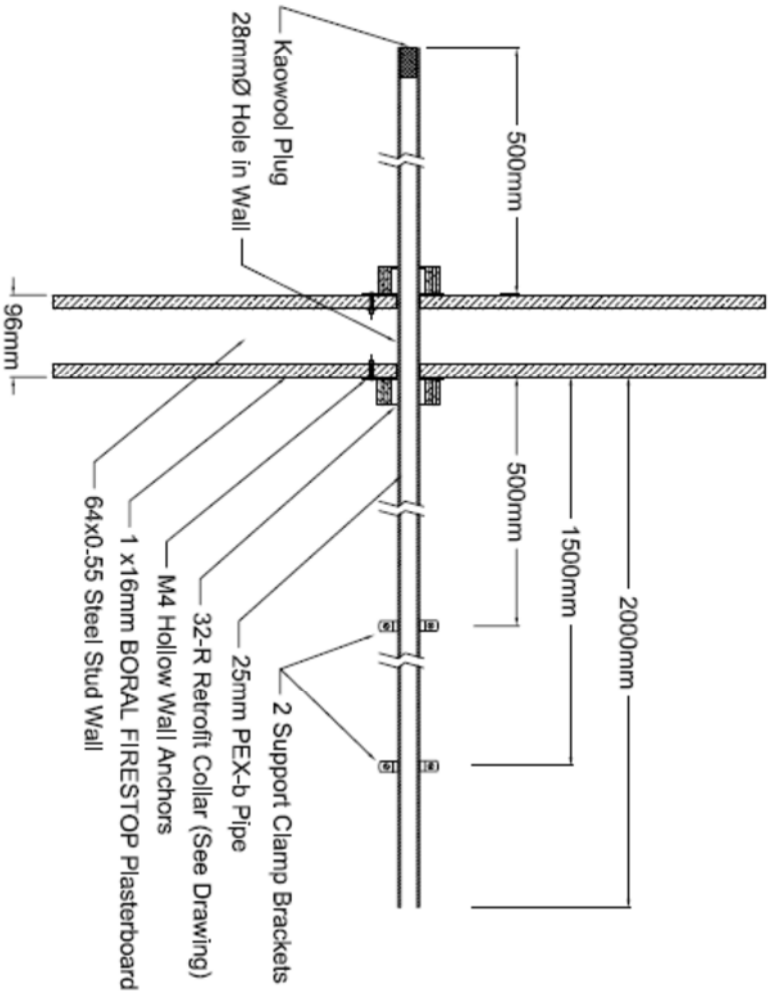
DRAWING TITLED "TEST WALL W-15-H PENETRATION # 3 20-MM PEX-A PIPE – 32R RETROFIT COLLAR, DATED 21 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD".



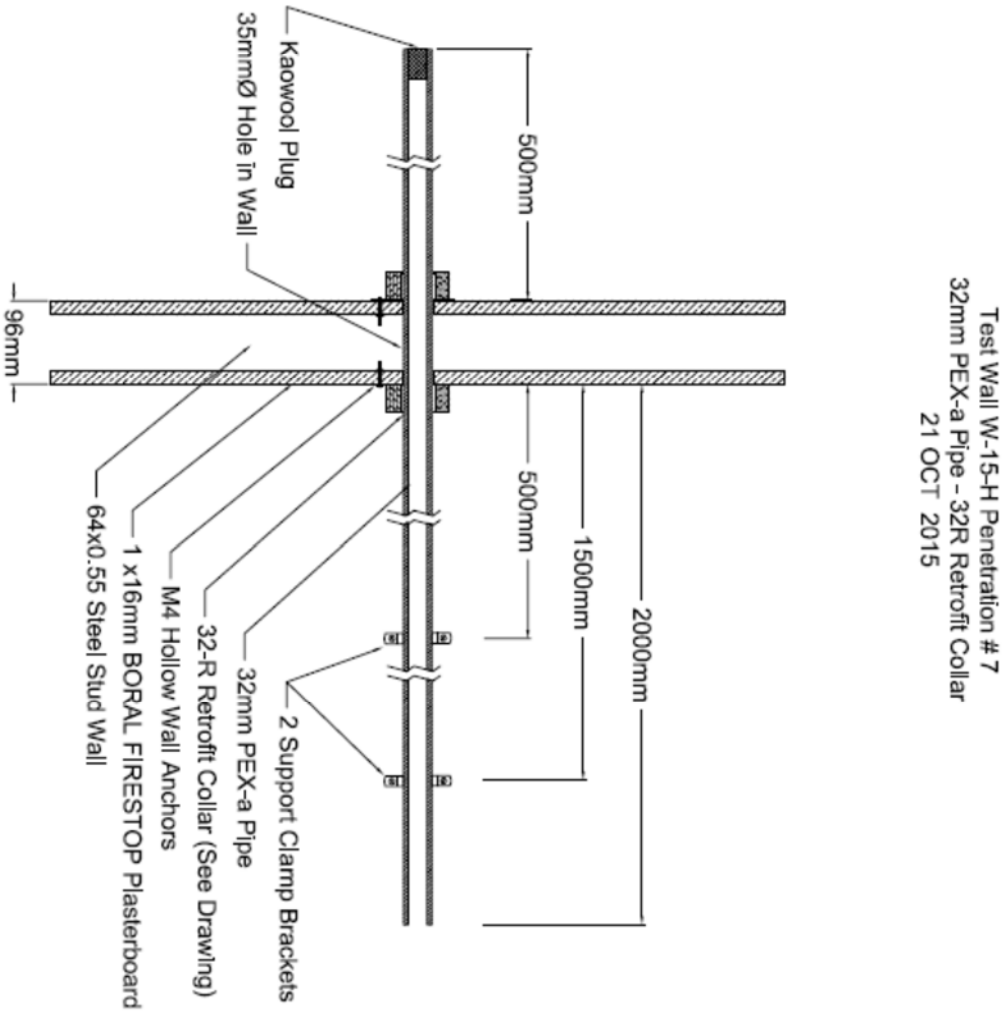
DRAWING TITLED "TEST WALL W-15-H PENETRATION # 4 20-MM PEX-B PIPE – 32R RETROFIT COLLAR, DATED 21 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD".



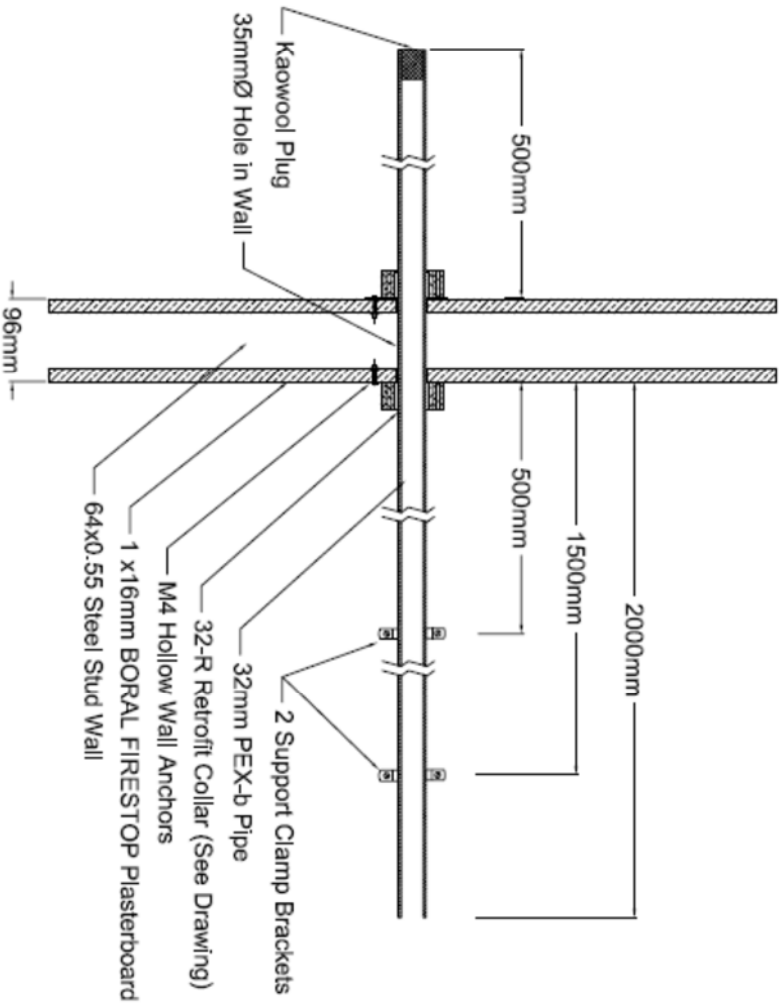
DRAWING TITLED "TEST WALL W-15-H PENETRATION # 5 25-MM PEX-A PIPE – 32R RETROFIT COLLAR, DATED 21 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD".



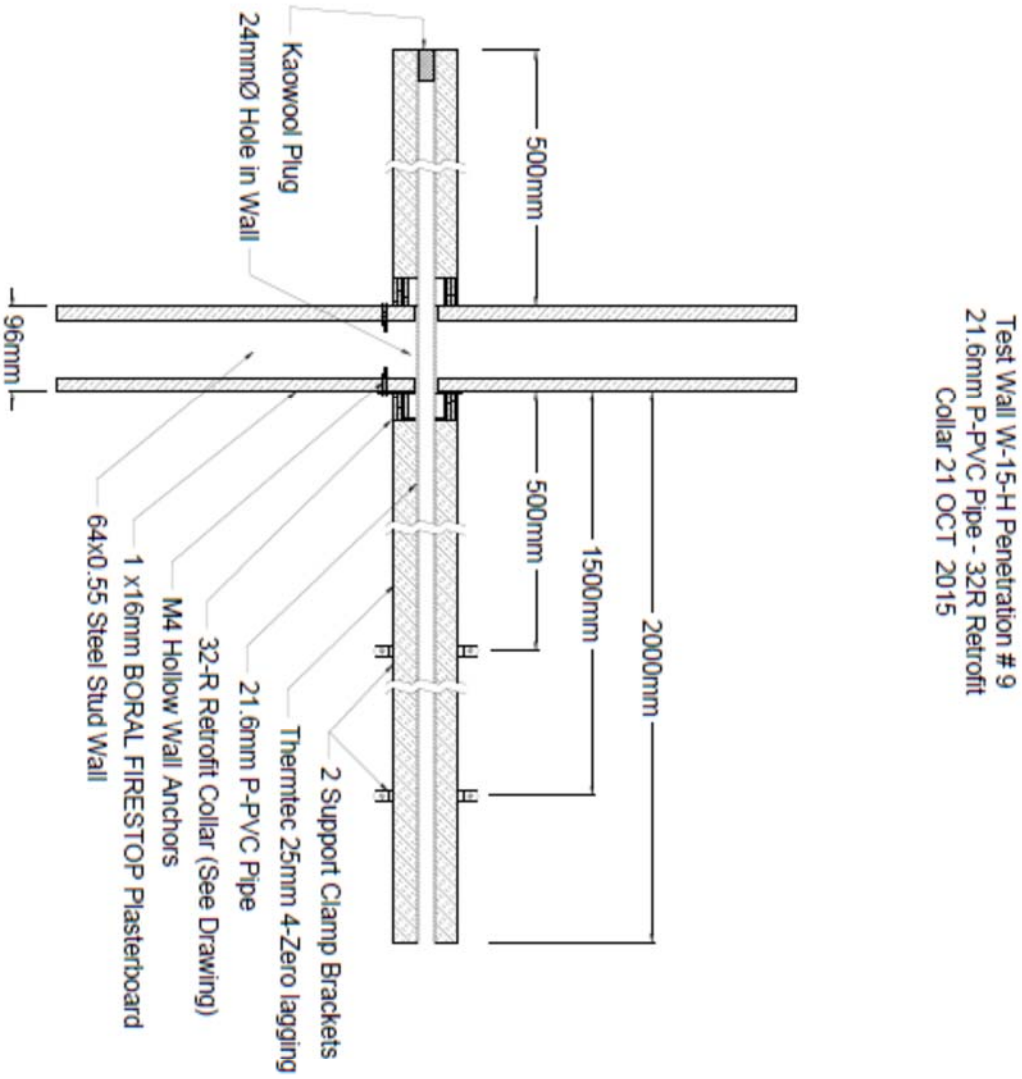
DRAWING TITLED "TEST WALL W-15-H PENETRATION # 6 25-MM PEX-B PIPE – 32R RETROFIT COLLAR, DATED 21 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD".



DRAWING TITLED "TEST WALL W-15-H PENETRATION # 7 32-MM PEX-A PIPE – 32R RETROFIT COLLAR, DATED 21 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD".

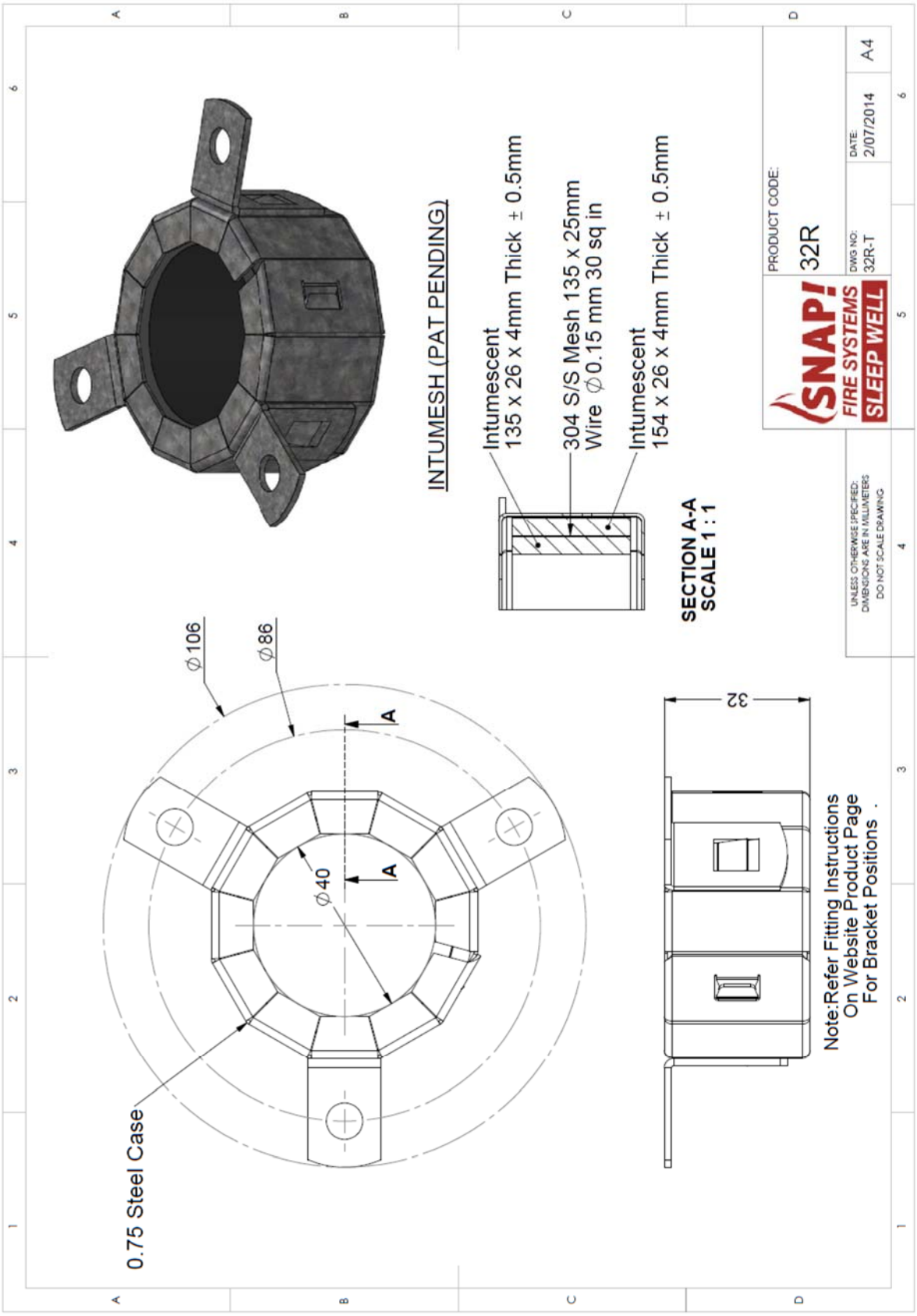


DRAWING TITLED "TEST WALL W-15-H PENETRATION # 8 32-MM PEX-B PIPE – 32R RETROFIT COLLAR, DATED 21 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD".



DRAWING TITLED "TEST WALL W-15-H PENETRATION # 9 21.6-MM P-PVC PIPE – 32R RETROFIT COLLAR, DATED 21 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD".

Appendix E – Specimen Drawings



DRAWING NUMBERED 32 R-T, DATED 2 JULY 2014, 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

Certificate of Test

No. 2751

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, 2005 on behalf of:

Snap Fire Systems Pty Ltd
Unit 2/160 Redland Bay Road
CAPALABA QLD

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1723.

Product Name: Penetration # 1 – 32R retrofitted fire collar protecting a 16-mm PEX-a Pipe

Description: The sponsor identified the specimen as a SNAP Retrofit 32R fire collar protecting a plasterboard wall penetrated by a 16-mm nominal diameter PEX-a Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/60/60. 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 wraps 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 2 July 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 16-mm nominal diameter PEX-a Pipe, with a wall thickness of 2.7-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 19-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 1 – 16-mm PEX-A Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 93 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60. The FRL is applicable for exposure to the fire from the same direction as tested. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara-Ledermann Date of Test: 21 September 2015
Issued on the 8th day of March 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. 2751

INFRASTRUCTURE TECHNOLOGIES
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14 Julius Avenue, North Ryde NSW 2113
PO Box 52, North Ryde NSW 1670, Australia
T (02) 9490 5444 • ABN 41 687 119 230

Certificate of Test

No. 2752

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, 2005 on behalf of:

Snap Fire Systems Pty Ltd
Unit 2/160 Redland Bay Road
CAPALABA QLD

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1723.

Product Name: Penetration # 2 – 32R retrofitted fire collar protecting a 16-mm PEX-b Pipe

Description: The sponsor identified the specimen as a SNAP Retrofit 32R fire collar protecting a plasterboard wall penetrated by a 16-mm nominal diameter PEX-b Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/60/60. 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 2 July 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 16-mm nominal diameter PEX-b Pipe, with a wall thickness of 2.3-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 19-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 2 – 16-mm PEX-b Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 87 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60. The FRL is applicable for exposure to the fire from the same direction as tested. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara-Ledermann Date of Test: 21 September 2015
Issued on the 8th day of March 2016 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

This document is issued in accordance with NATA's accreditation requirements.
Accreditation No. 165 – Corporate Site No. 3625
Accredited for compliance with ISO/IEC 17025

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Certificate of Test

No. 2753

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, 2005 on behalf of:

Snap Fire Systems Pty Ltd
Unit 2/160 Redland Bay Road
CAPALABA QLD

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1723.

Product Name: Penetration # 3 – 32R retrofitted fire collar protecting a 20-mm PEX-a Pipe

Description: The sponsor identified the specimen as a SNAP Retrofit 32R fire collar protecting a plasterboard wall penetrated by a 20-mm PEX-a Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/60/60. 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 2 July 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 20-mm nominal diameter PEX-a Pipe, with a wall thickness of 3.5-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 23-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 3 – 20-mm PEX-a Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 92 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60. The FRL is applicable for exposure to the fire from the same direction as tested. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara-Ledermann Date of Test: 21 September 2015
Issued on the 8th day of March 2016 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

NATA	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. 2753

INFRASTRUCTURE TECHNOLOGIES
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14 Julius Avenue, North Ryde NSW 2113
PO Box 52, North Ryde NSW 1670, Australia
T (02) 9490 5444 • **ABN** 41 687 119 230

Certificate of Test

No. 2754

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, 2005 on behalf of:

Snap Fire Systems Pty Ltd
Unit 2/160 Redland Bay Road
CAPALABA QLD

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1723.

Product Name: Penetration # 4 – 32R retrofitted fire collar protecting a 20-mm PEX-b Pipe

Description: The sponsor identified the specimen as a SNAP Retrofit 32R fire collar protecting a plasterboard wall penetrated by a 20-mm PEX-b Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/60/60. 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 2 July 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 20-mm nominal diameter PEX-b Pipe, with a wall thickness of 2.35-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 23-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 4 – 20-mm PEX-b Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 84 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60. The FRL is applicable for exposure to the fire from the same direction as tested. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara-Ledermann Date of Test: 21 September 2015
Issued on the 8th day of March 2016 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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Certificate of Test

No. 2755

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, 2005 on behalf of:

Snap Fire Systems Pty Ltd
Unit 2/160 Redland Bay Road
CAPALABA QLD

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1723.

Product Name: Penetration # 5 – 32R retrofitted fire collar protecting a 25-mm PEX-a Pipe

Description: The sponsor identified the specimen as a SNAP Retrofit 32R fire collar protecting a plasterboard wall penetrated by a 25-mm PEX-a Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/60/60. 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 2 July 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 25-mm nominal diameter PEX-a Pipe, with a wall thickness of 4.3-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 28-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 5 – 25-mm PEX-a Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 76 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60. The FRL is applicable for exposure to the fire from the same direction as tested. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara-Ledermann Date of Test: 21 September 2015
Issued on the 8th day of March 2016 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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Certificate of Test

No. 2756

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, 2005 on behalf of:

Snap Fire Systems Pty Ltd
Unit 2/160 Redland Bay Road
CAPALABA QLD

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1723.

Product Name: Penetration # 6 – 32R retrofitted fire collar protecting a 25-mm PEX-b Pipe

Description: The sponsor identified the specimen as a SNAP Retrofit 32R fire collar protecting a plasterboard wall penetrated by a 25-mm PEX-b Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/60/60. 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 2 July 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 25-mm nominal diameter PEX-b Pipe, with a wall thickness of 2.8-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 28-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 6 – 25-mm PEX-b Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 76 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60. The FRL is applicable for exposure to the fire from the same direction as tested. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara-Ledermann Date of Test: 21 September 2015
Issued on the 8th day of March 2016 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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Certificate of Test

No. 2757

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, 2005 on behalf of:

Snap Fire Systems Pty Ltd
Unit 2/160 Redland Bay Road
CAPALABA QLD

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1723.

Product Name: Penetration # 7 – 32R retrofitted fire collar protecting a 32-mm PEX-a Pipe

Description: The sponsor identified the specimen as a SNAP Retrofit 32R fire collar protecting a plasterboard wall penetrated by a 32-mm PEX-a Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/60/60. 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 2 July 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 PEX-a Pipe, with a wall thickness of 5.2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 35-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 7 – 32-mm PEX-a Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 78 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60. The FRL is applicable for exposure to the fire from the same direction as tested. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara-Ledermann Date of Test: 21 September 2015
Issued on the 8th day of March 2016 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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Certificate of Test

No. 2758

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, 2005 on behalf of:

Snap Fire Systems Pty Ltd
Unit 2/160 Redland Bay Road
CAPALABA QLD

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1723.

Product Name: Penetration # 8 – 32R retrofitted fire collar protecting a 32-mm PEX-b Pipe

Description: The sponsor identified the specimen as a SNAP Retrofit 32R fire collar protecting a plasterboard wall penetrated by a 25-mm PEX-b Pipe. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/60/60. 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 2 July 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 PEX-b Pipe, with a wall thickness of 3.3-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 35-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 8 – 32-mm PEX-b Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 69 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60. The FRL is applicable for exposure to the fire from the same direction as tested. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara-Ledermann Date of Test: 21 September 2015
Issued on the 8th day of March 2016 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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Certificate of Test

No. 2759

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, 2005 on behalf of:

Snap Fire Systems Pty Ltd
Unit 2/160 Redland Bay Road
CAPALABA QLD

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1723.

Product Name: Penetration # 9 – 32R retrofitted fire collar protecting a 21.6-mm Polyvinyl Chloride (P-PVC) Pipe + Lagging

Description: The sponsor identified the specimen as a SNAP Retrofit 32R fire collar protecting a plasterboard wall penetrated by a 21.6-mm Polyvinyl Chloride (P-PVC) Pipe + Lagging. The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/60/60. 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 2 July 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 15-mm nominal diameter P-PVC Pipe, with a wall thickness of 2.1-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 24-mm diameter cut-out hole. The pipe was wrapped with Thermotec 25-mm thick 4-Zero lagging as shown in drawing titled "Test Wall W-15-H Penetration # 9 – 21.6-mm P-PVC Pipe – 32R Retrofit Collar", dated 21 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 ceramic fibre (Kaowool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 121 minutes
Insulation	no failure at 73 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/60/60. The FRL is applicable for exposure to the fire from the same direction as tested. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara-Ledermann Date of Test: 21 September 2015
Issued on the 8th day of March 2016 without alterations or additions.

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Manager, Fire Testing and Assessments

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References

The following informative documents are referred to in this Report:

AS 1530.4-2005	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 2492:2007	Cross-linked polyethylene (pe-x) pipes for pressure applications'
AS/NZS 1260:2009	Pvc-u pipes and fittings for drain, waste and vent application

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FOR FURTHER INFORMATION

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