

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

## Test Report

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**Date:** 4 December 2015  
**Client:** Snap Fire Systems Pty Ltd

Commercial-in-confidence




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

## Sponsored Investigation No. FSP 1716

### 1 Introduction

#### 1.1 Identification of specimen

The sponsor identified the specimen as Snap Cast-in Fire Collars protecting a plasterboard wall penetrated by one (1) HDPE pipe, one (1) PVC pipe, two (2) Raupiano Pipes and one (1) Pex-a 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 4517/3888

## 1.7 Test date

The fire-resistance test was conducted on 7 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 -/120/120. Construction comprised 64-mm x 0.35-mm steel studs and noggins installed at nominally 600-mm centres, lined on each side with two layers of 16-mm thick 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 128-mm from exposed face to unexposed face. The wall was penetrated by five (5) stack pipes protected by retro-fitted Snap Fire Systems fire collars.

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

- One (1) HDPE pipe manufactured in accordance with AS/NZS 5065:2005 'Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications'
- One (1) Pex-a pipe manufactured in accordance with AS/NZS 2492:2007 'Cross-linked polyethylene (PE-X) pipes for pressure applications'
- One (1) Raupiano pipe manufactured in accordance with AS/NZS 7671:2010 'Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings - Polypropylene (PP)(ISO 7671:2003), MOD' ;
- One (1) Raupiano pipe manufactured in accordance with EN 1451-1:2000 'Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Polypropylene (PP). Specifications for pipes, fittings and the system'
- One (1) PVC pipe manufactured in accordance with/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 and 5.

### Penetration # 1 – HP150 R retrofitted fire collar protecting a 160-mm High Density Polyethylene (HDPE) pipe

The SNAP retrofitted HP150 R collar comprised a 0.95-mm steel casing with a 175-mm inner diameter and a 326-mm diameter base flange. The 117-mm high collar casing incorporated a strip of 570-mm x 112-mm x 8-mm thick Intumesh intumescent material. The closing mechanism comprised four 304 stainless steel springs, with nylon fuse links, and a 596-mm x 112-mm stainless steel mesh as shown in drawing numbered HP 150 R -T dated 3 November 2014, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 160-mm nominal diameter HDPE pipe, with a wall thickness of 6.7-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 165-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-E Penetration # 1 – 160-mm HDPE Pipe – HP150R Retrofit Collar", dated 2 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 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 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 32-mm nominal diameter Pex-a Pipe, with a wall thickness of 4.9-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-E Penetration # 2 – 32-mm Pex-A Pipe – 32R Retrofit Collar", dated 2 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 – 110R retrofitted fire collar protecting a 110-mm diameter Raupiano pipe

The SNAP 110R retrofitted fire collar comprised a 0.75-mm steel casing with a 127-mm inner diameter and a 214-mm diameter base flange. The 62-mm high collar casing incorporated three layers of 403-mm x 58-mm wide x 2.5-mm thick Intumesh intumescent material. Between the intumescent layers, 58-mm wide stainless steel mesh was installed as shown in drawing numbered 110R-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 two hollow wall anchors.

The penetrating service comprised a 110-mm nominal diameter Raupiano Pipe, with a wall thickness of 3.2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 113-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-E Penetration # 3 – 110-mm Raupiano Pipe – 110R Retrofit Collar", dated 2 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 – 50R retrofitted fire collar protecting a 40-mm diameter Raupiano 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 strips 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 2013, 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 40-mm nominal diameter Raupiano Pipe, with a wall thickness of 2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 43-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-E Penetration # 4 – 40-mm Raupiano Pipe – 50R Retrofit Collar", dated 2 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 – HP150 R retrofitted fire collar protecting a 160-mm Polyvinyl Chloride (PVC) pipe

The SNAP retrofitted HP150 R collar comprised a 0.95-mm steel casing with a 175-mm inner diameter and a 326-mm diameter base flange. The 117-mm high collar casing incorporated a strip of 570-mm x 112-mm x 8-mm thick Intumesh intumescent material. The closing mechanism comprised four stainless steel springs, with nylon fuse links, and a 596-mm x 112-mm 304 stainless steel mesh as shown in drawing numbered HP 150 R -T dated 3 November 2014, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 160-mm nominal diameter PVC-SC Pipe, with a wall thickness of 4.05-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 165-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-E Penetration # 5 – 160-mm PVC-SC Pipe – HP150R Retrofit Collar", dated 2 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 constructed five (5) days prior to testing.



## 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-E Penetration # 1 – 160-mm HDPE Pipe – HP150R Retrofit Collar”, dated 2 October 2015, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Wall W-15-E Penetration # 2 – 32-mm Pex-A Pipe – 32R Retrofit Collar”, dated 2 October 2015, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Wall W-15-E Penetration # 3 – 110-mm Raupiano Pipe – 110R Retrofit Collar”, dated 2 October 2015, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Wall W-15-E Penetration # 4 – 40-mm Raupiano Pipe – 50R Retrofit Collar”, dated 2 October 2015, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Wall W-15-E Penetration # 5 – 160-mm PVC-SC Pipe – HP150R Retrofit Collar”, dated 2 October 2015, by Snap Fire Systems Pty Ltd.

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

Drawing numbered 50 R-T, dated 4 November 2013, by Snap Fire Systems Pty Ltd.

Drawing numbered 110 R-T, dated 4 November 2014, by Snap Fire Systems Pty Ltd.

Drawing numbered HP150R-T, dated 3 November 2014, 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 181 minutes by the agreement with the sponsor.

## 8 Test results

### 8.1 Critical observations

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

<b>Time</b>	<b>Observation</b>
1 minutes -	Smoke is being emitted from Penetration # 5.
2 minutes -	Smoke is fluing from Penetrations # 2, 3 and.
5 minutes -	Smoke is fluing from Penetration # 1.
6 minutes -	The base of Penetration # 3 has softened.
10 minutes -	Smoke has ceased fluing from Penetration # 2 and 3.
20 minutes -	Smoke has ceased fluing from all Penetrations.
83 minutes -	Smoke is fluing from Penetration # 5. Condensation is dripping from Penetration # 3.
87 minutes -	Smoke is being emitted from the pipe collar on Penetration # 5.
114 minutes -	Charring is visible on Penetration # 5 at the base near the collar.
138 minutes -	Glowing is visible on Penetration # 5 near the collar. Cotton Wool Pad test applied. Ignition noted – <u>Integrity failure of Penetration # 5.</u>
142 minutes -	Smoke is being emitted from Penetration # 1 near the collar.
166 minutes -	Flaming is visible on the unexposed face of Penetration # 1.
168 minutes -	Cotton Wool Pad test applied on Penetration # 3. No ignition.
181 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.

## 8.5 Performance

Performance observed in respect of the following AS 1530.4-2005 criteria:

### Penetration # 1 – HP150 R retrofitted fire collar protecting a 160-mm High Density Polyethylene (HDPE) pipe

Structural adequacy - not applicable

Integrity - no failure at 166 minutes

Insulation - no failure at 163 minutes

### Penetration # 2 – 32R retrofitted fire collar protecting a Pex-a pipe protecting a 32-mm Pex-A Pipe

Structural adequacy - not applicable

Integrity - no failure at 181 minutes

Insulation - no failure at 181 minutes

Penetration # 3 – 110R retrofitted fire collar protecting a 110-mm diameter Raupiano pipe

Structural adequacy - not applicable

Integrity - no failure at 181 minutes

Insulation - no failure at 181 minutes

Penetration # 4 – 50R retrofitted fire collar protecting a 40-mm diameter Raupiano pipe

Structural adequacy - not applicable

Integrity - no failure at 181 minutes

Insulation - no failure at 181 minutes

Penetration # 5 – HP150 R retrofitted fire collar protecting a 160-mm Polyvinyl Chloride (PVC) pipe

Structural adequacy - not applicable

Integrity - no failure at 138 minutes

Insulation - no failure at 123 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; and
Penetration # 5	-	-/120/120;

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

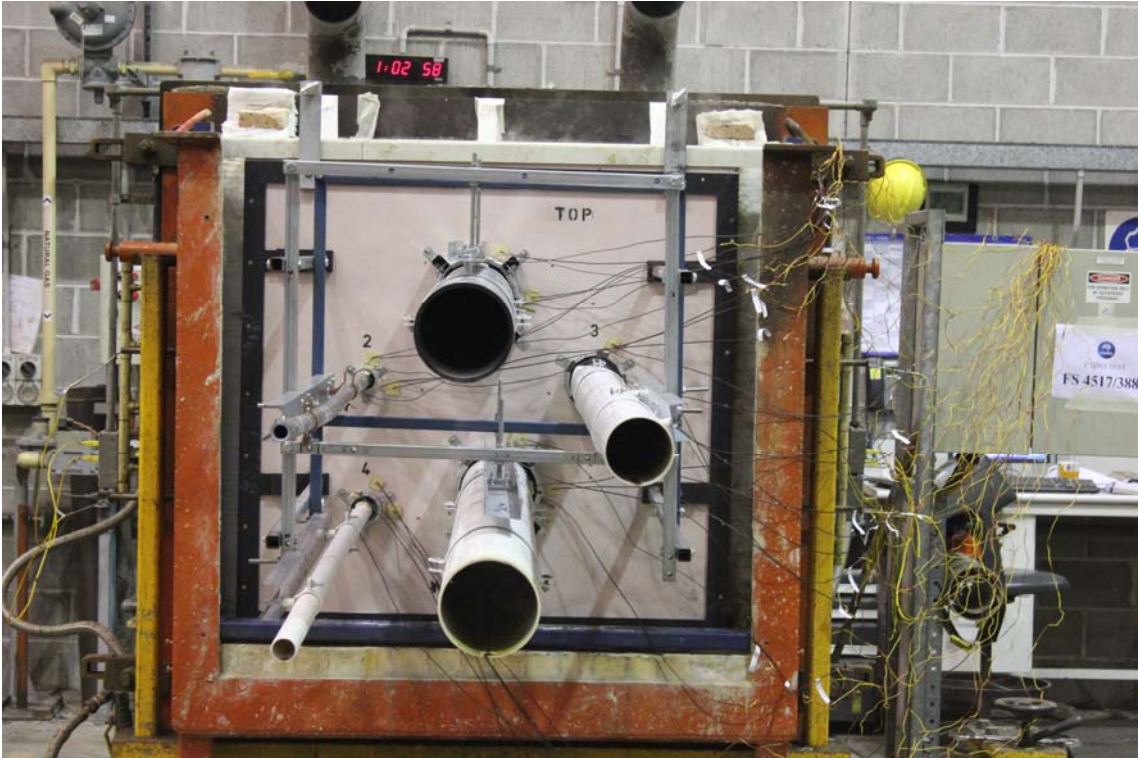
## Appendix A – Measurement location

Measurement Location		
Group location	T/C Position	T/C designation
<b>Specimen</b>		
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

Appendix B – Photographs



PHOTOGRAPH 1 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING



PHOTOGRAPH 2 – SPECIMENS AFTER 60 MINUTES OF TESTING

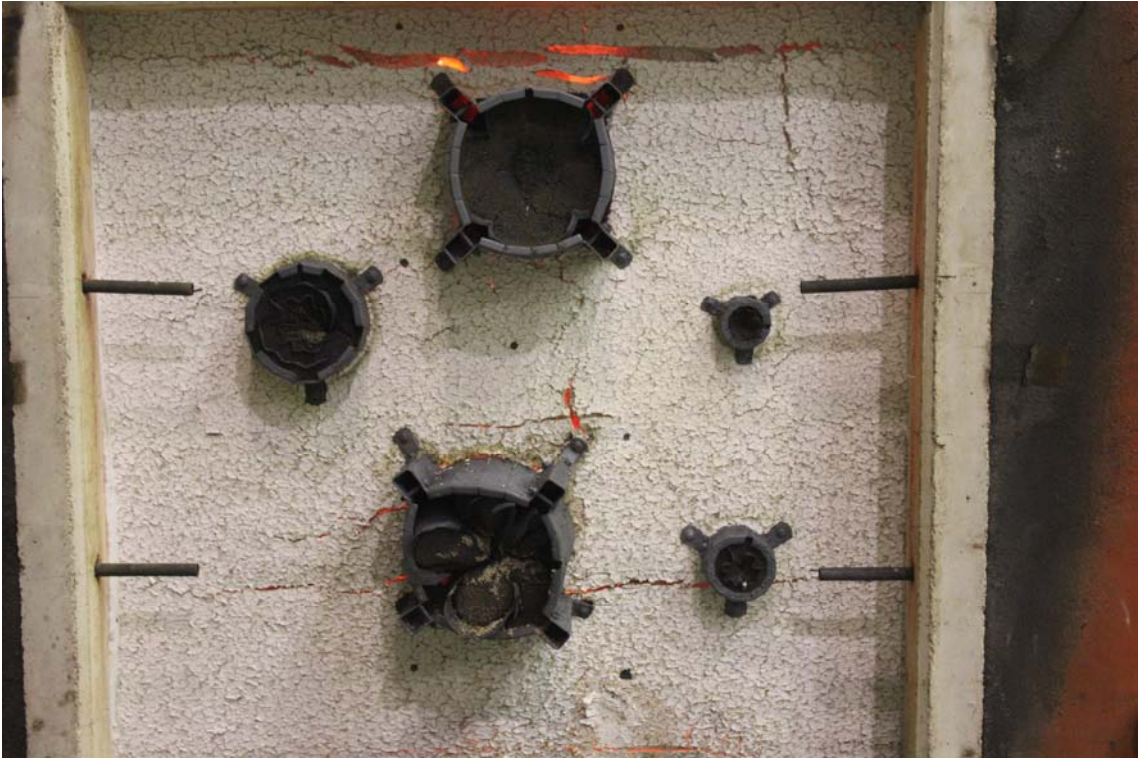


**PHOTOGRAPH 3 – SPECIMENS AFTER 120 MINUTES OF TESTING**



**PHOTOGRAPH 4 – SPECIMENS AFTER 180 MINUTES OF TESTING**





**PHOTOGRAPH 5 – EXPOSED FACE OF SPECIMENS AT CONCLUSION OF TESTING**

## Appendix C – Furnace Temperature

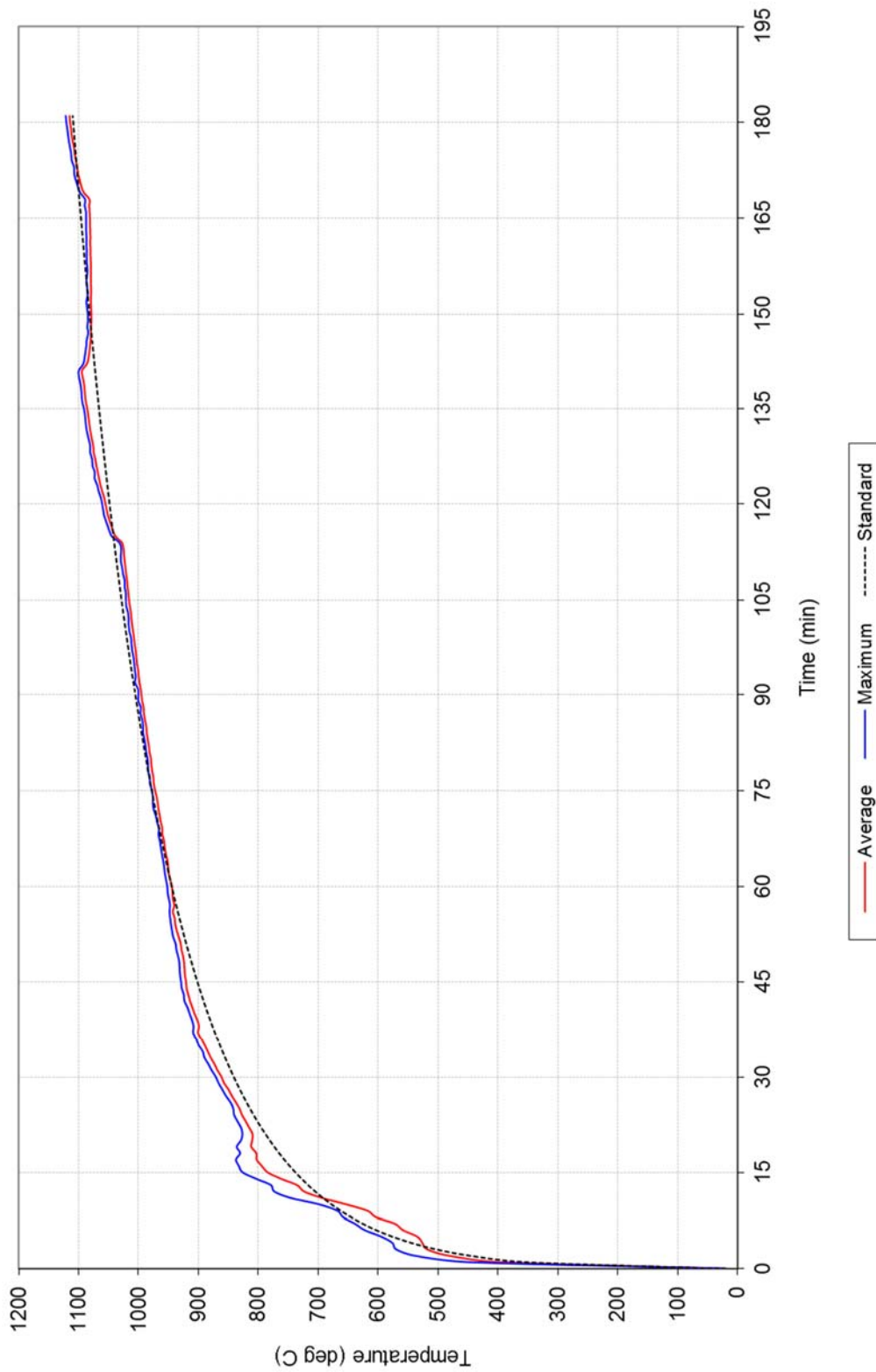


FIGURE 1 – FURNACE TEMPERATURE

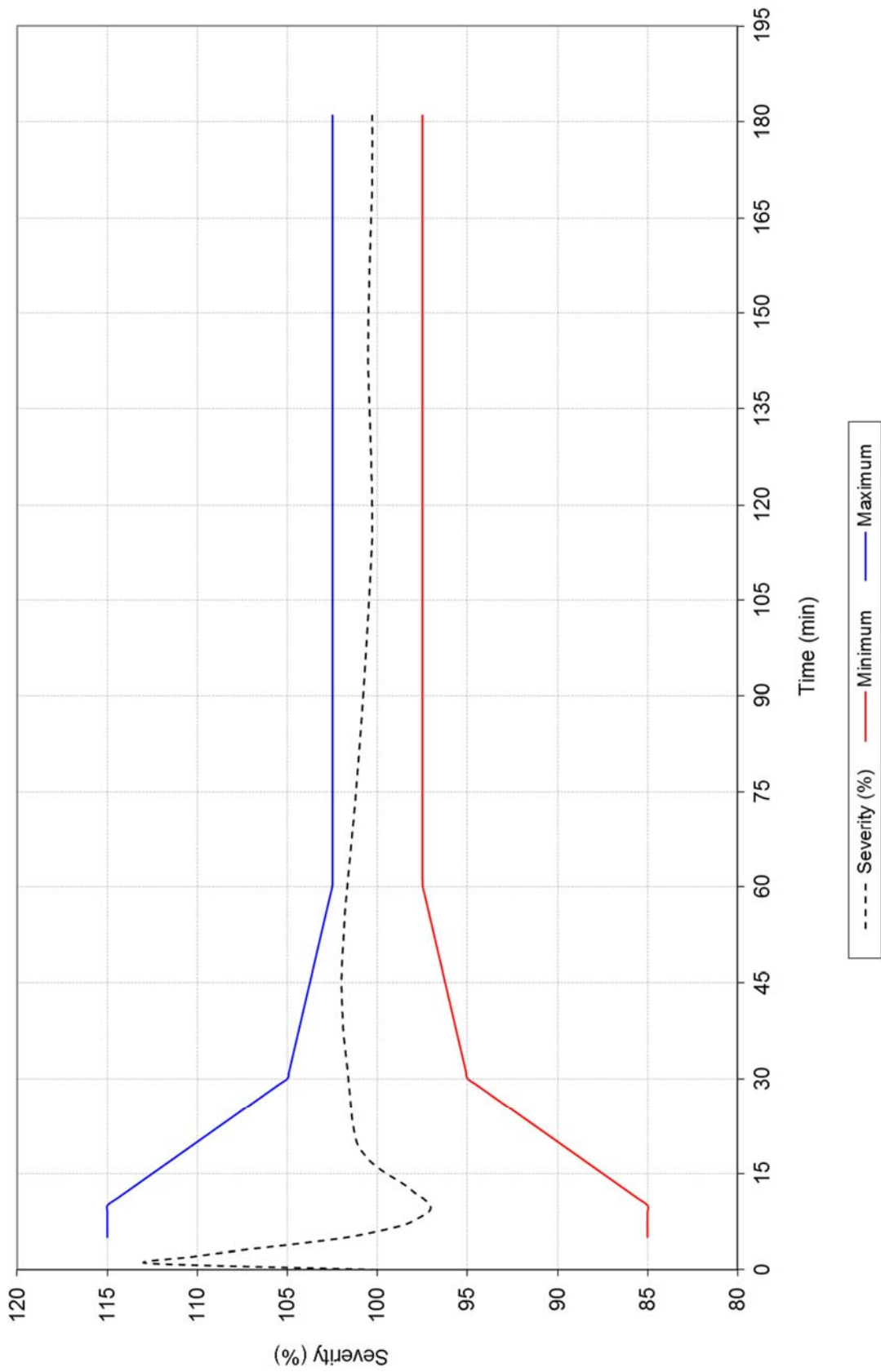


FIGURE 2 – FURNACE SEVERITY

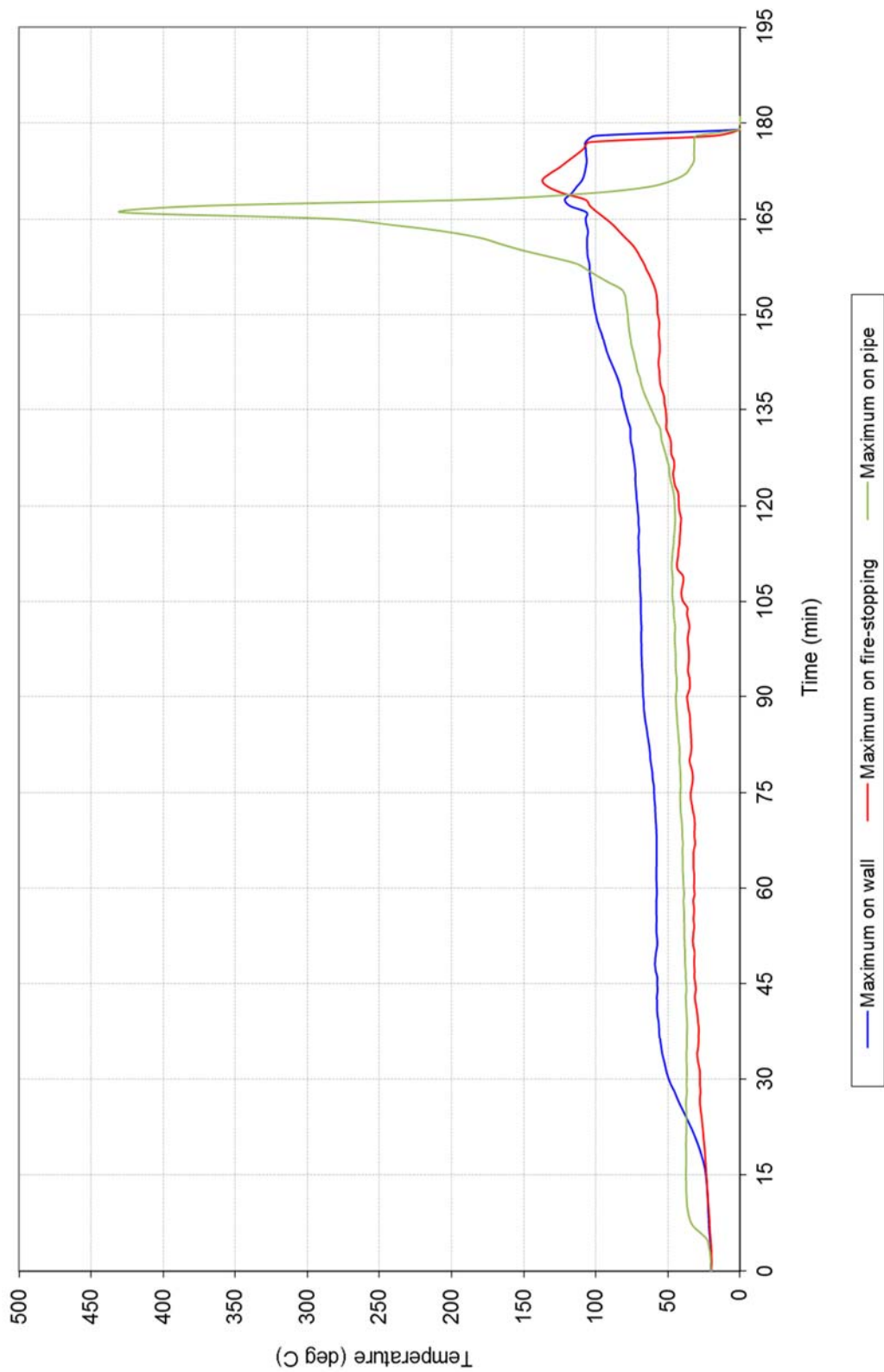


FIGURE 3 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 1

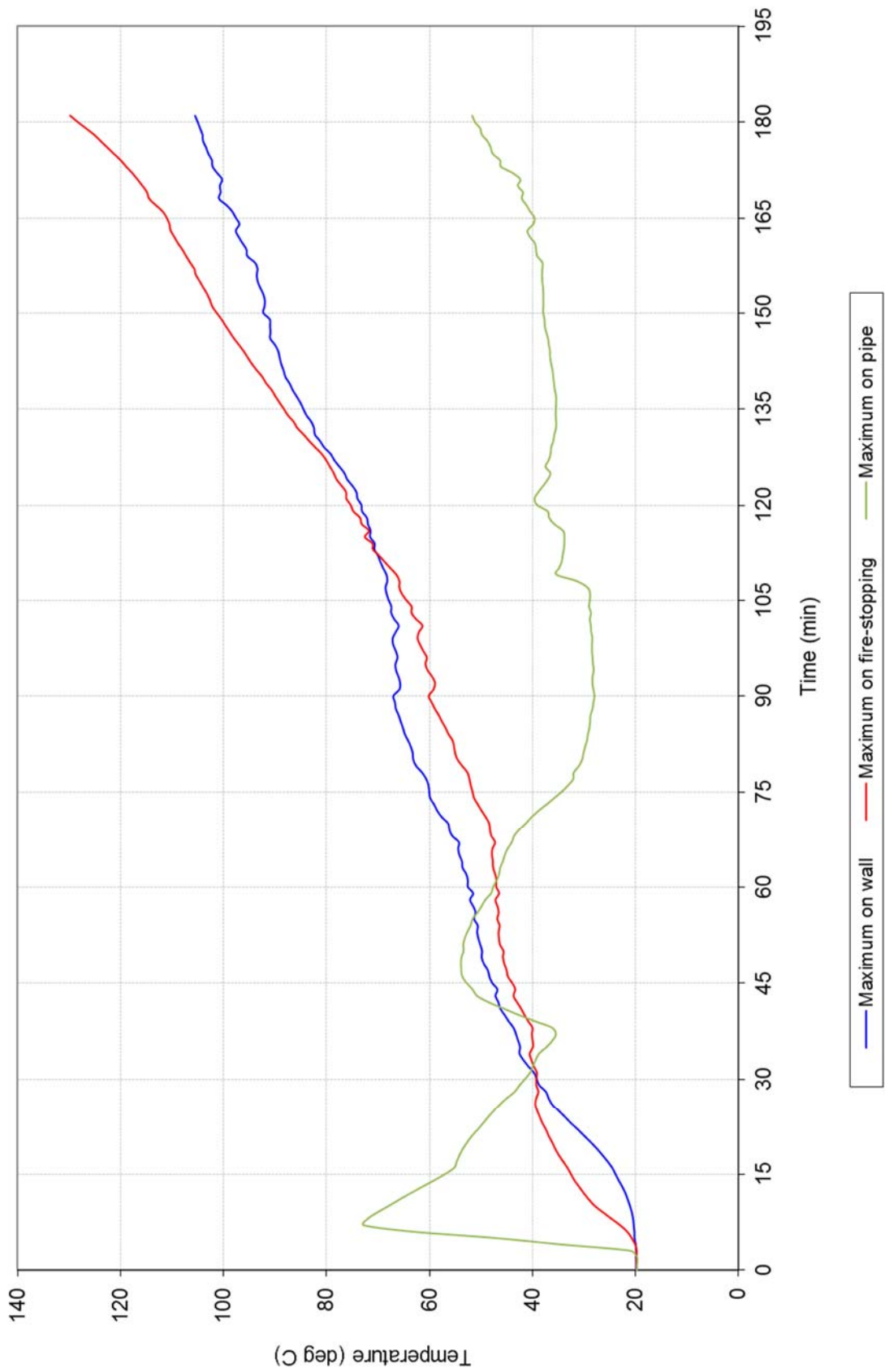


FIGURE 4 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 2

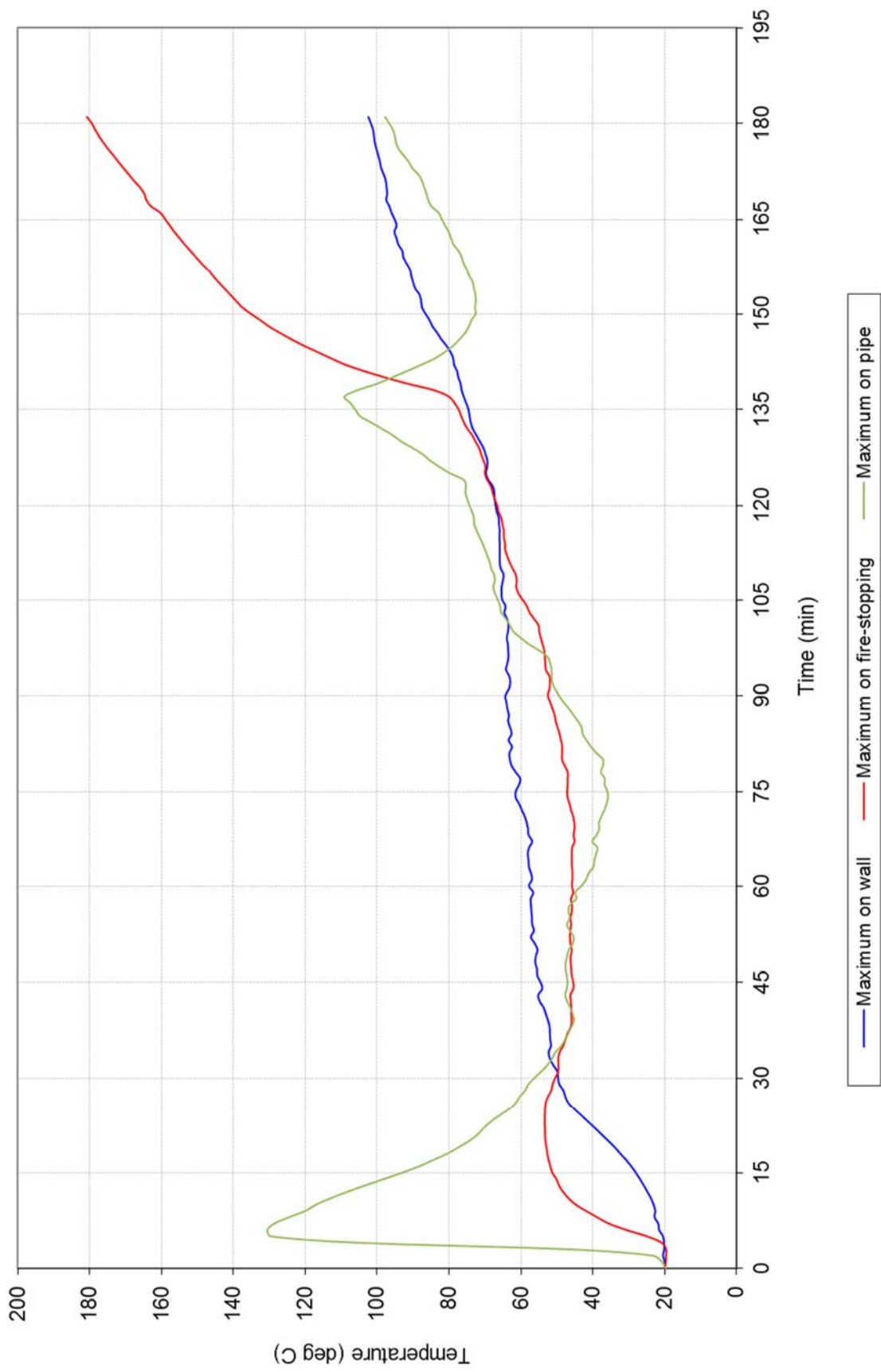


FIGURE 5 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 3

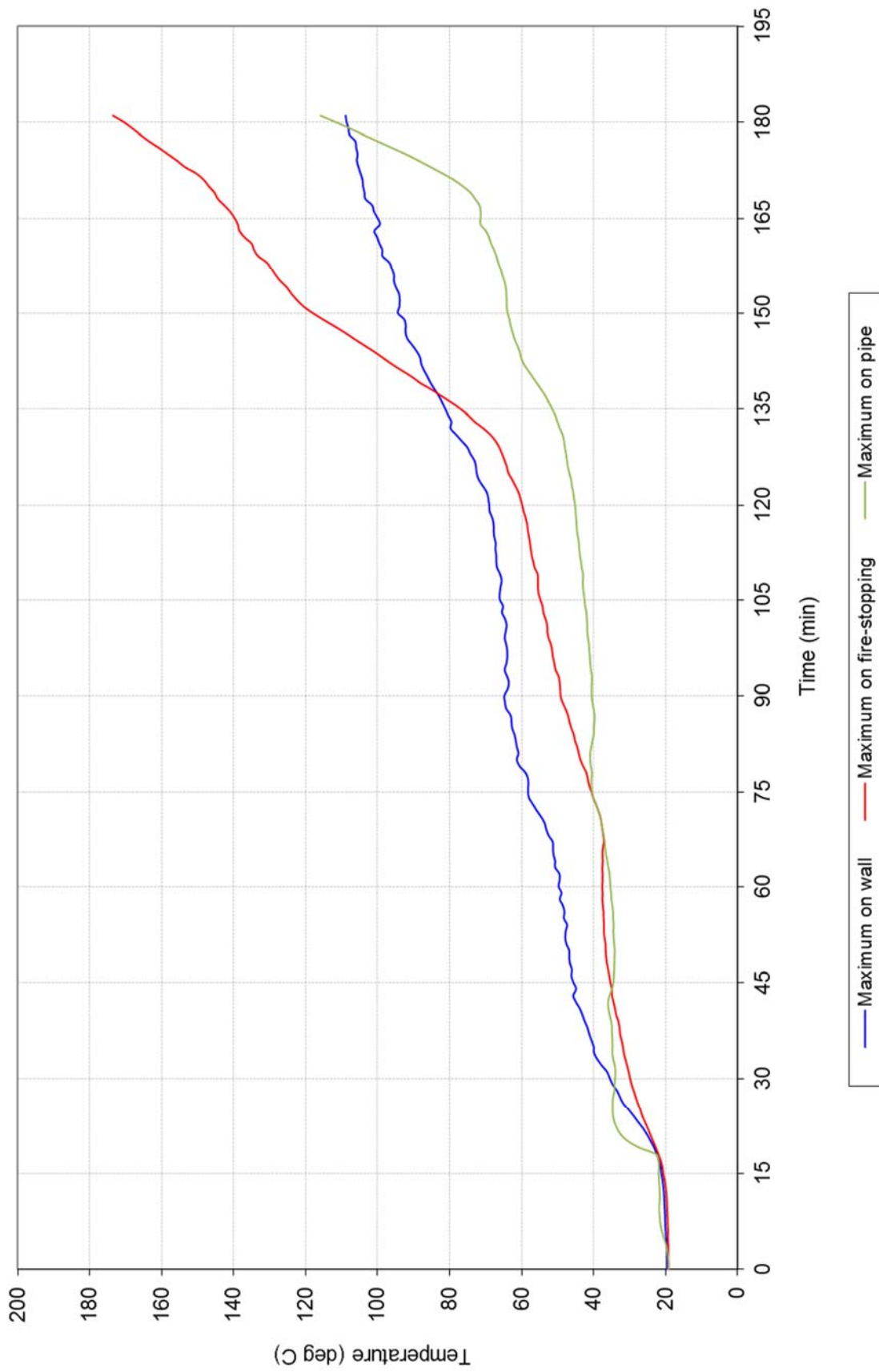


FIGURE 6 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 4

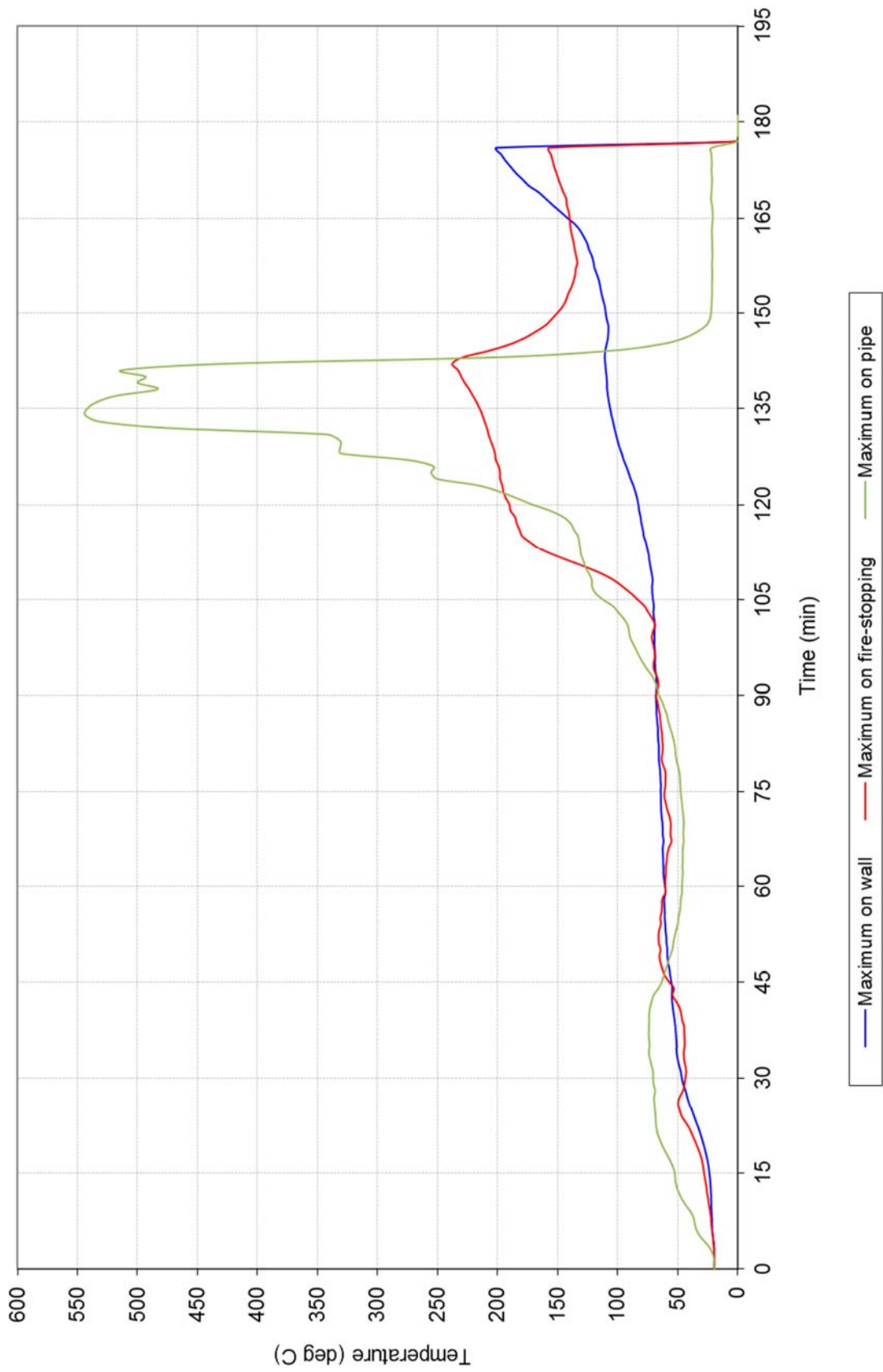
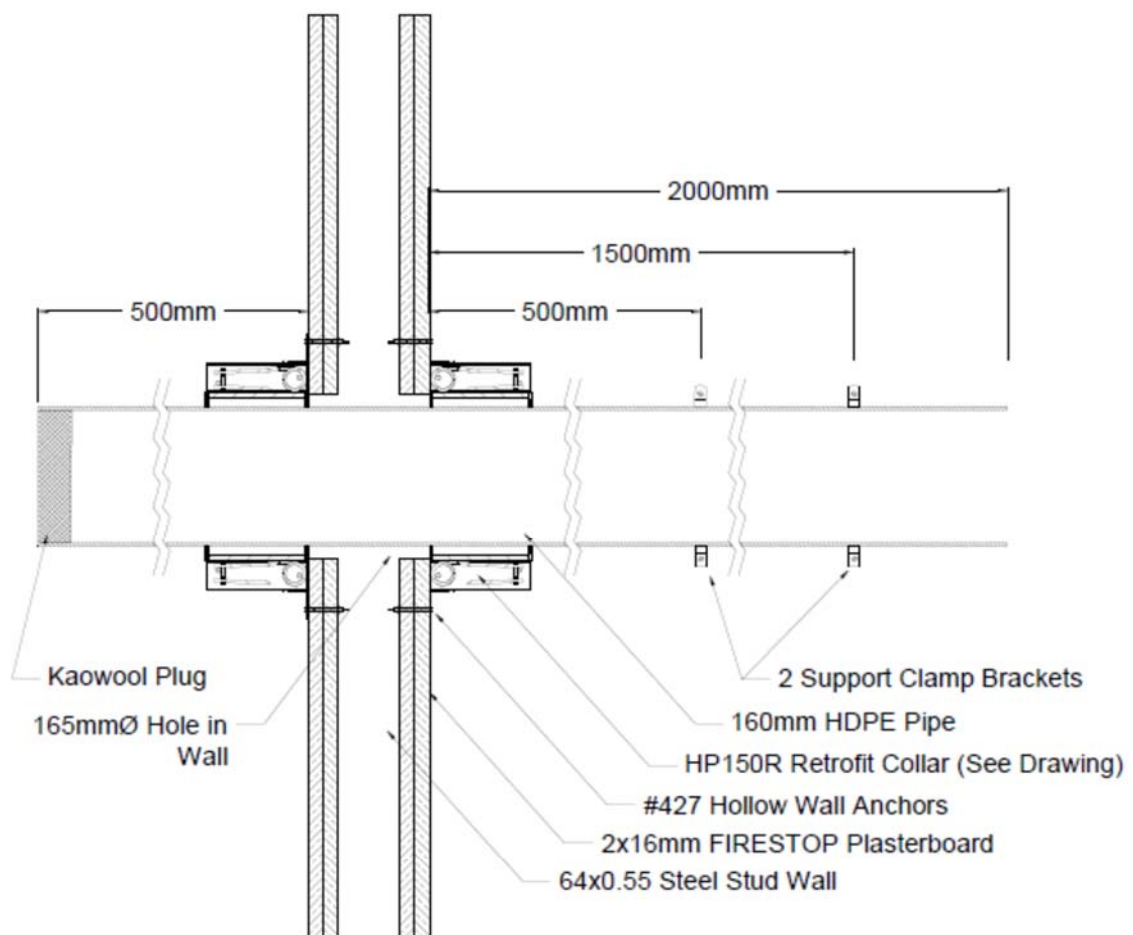


FIGURE 7 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 5



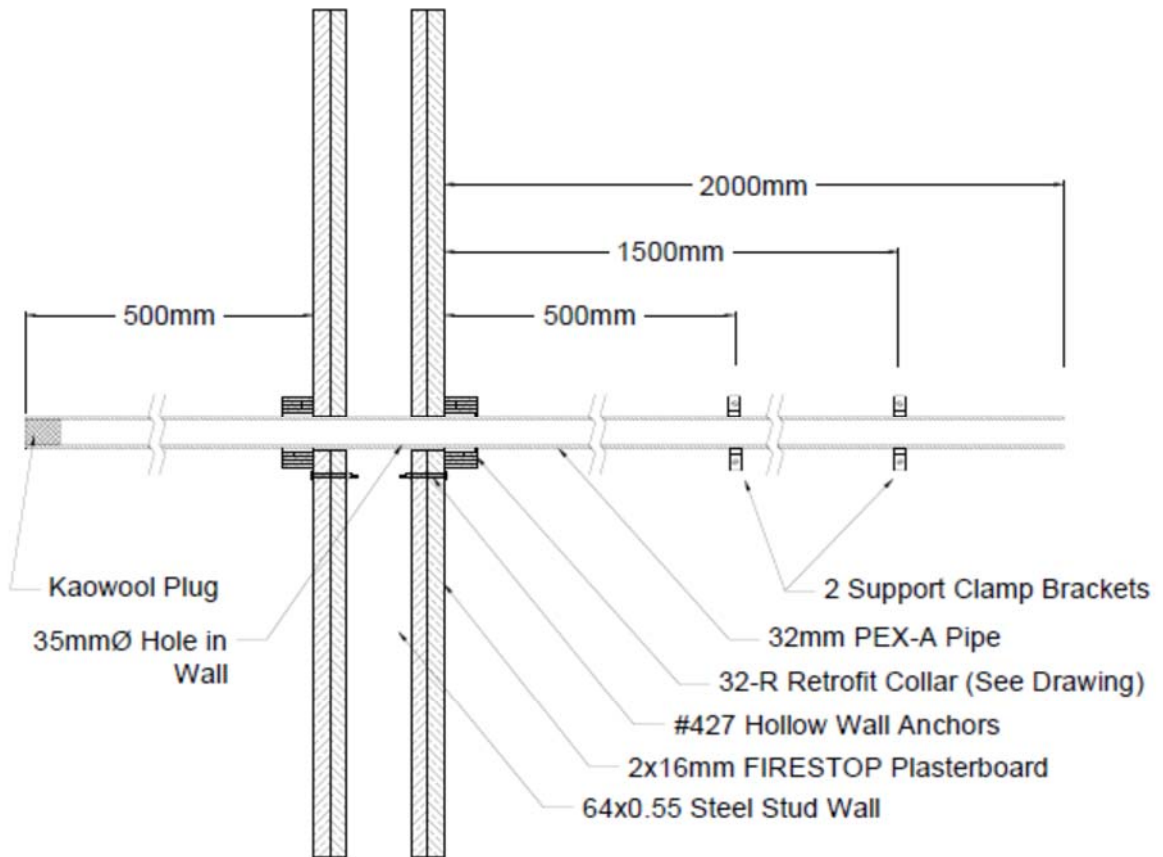
## Appendix D – Installation drawings

Test Wall W-15-E Penetration # 1  
160mm HDPE Pipe – HP150R Retrofit Collar  
02 OCT 2015



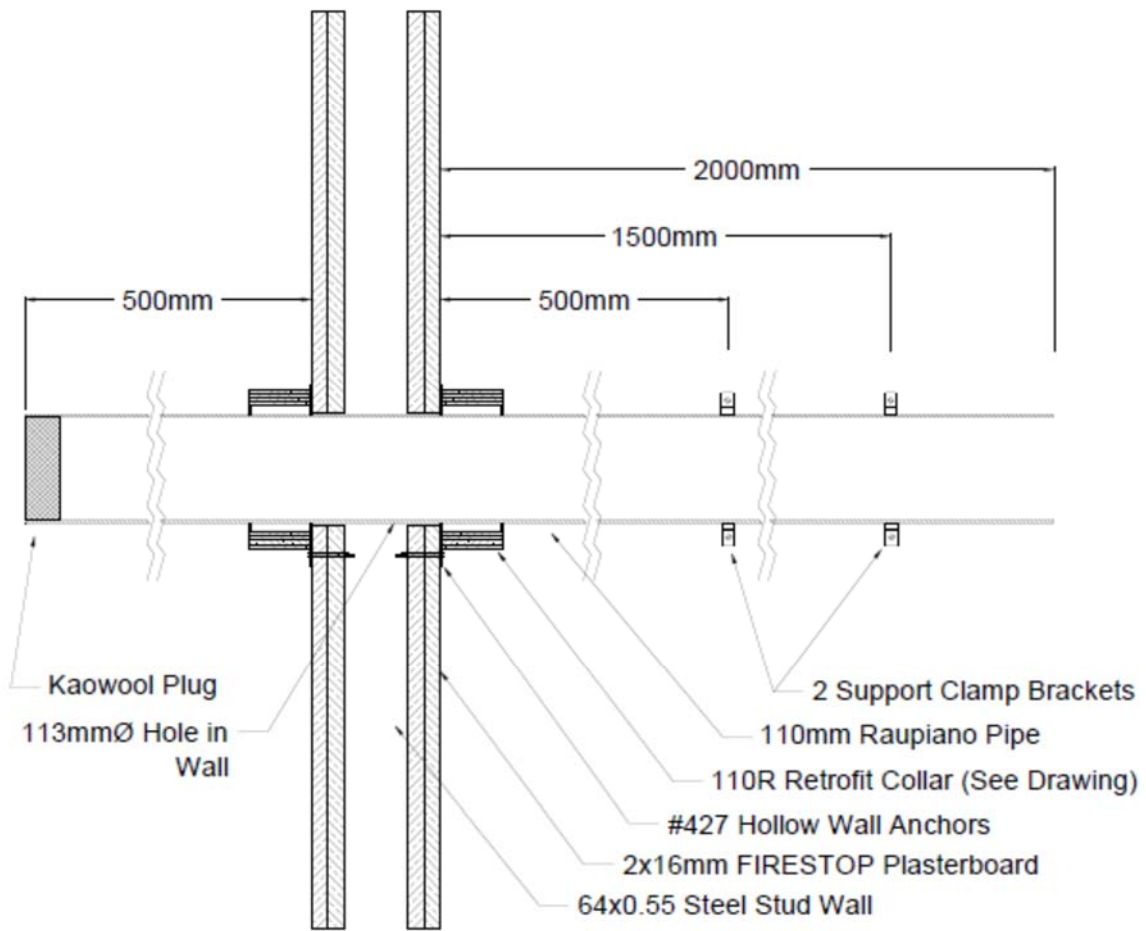
**DRAWING TITLED "TEST WALL W-15-E PENETRATION # 1 – 160-MM HDPE PIPE – HP150R RETROFIT COLLAR", DATED 2 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD.**

Test Wall W-15-E Penetration # 2  
32mm Pex-A Pipe – 32R Retrofit Collar  
02 OCT 2015



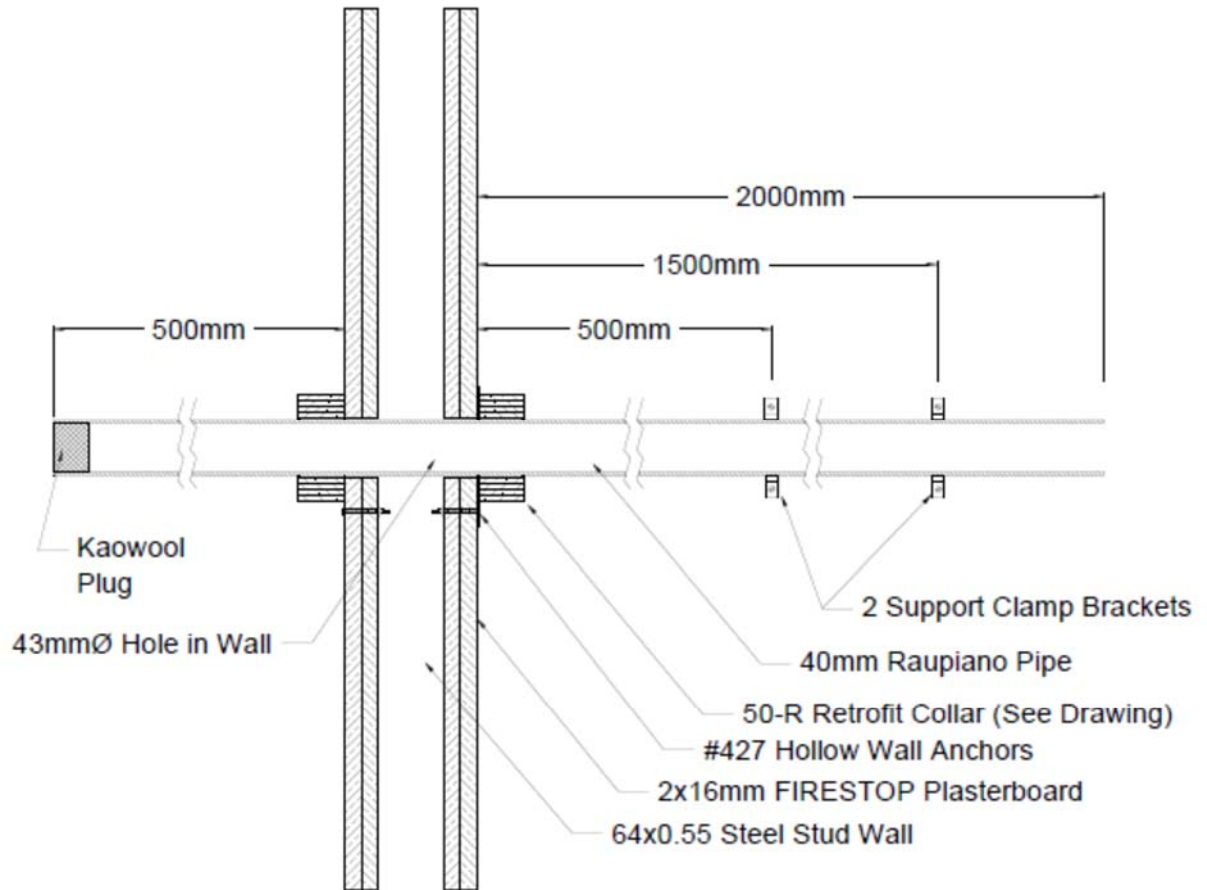
**DRAWING TITLED “TEST WALL W-15-E PENETRATION # 2 – 32-MM PEX-A PIPE – 32R RETROFIT COLLAR”,  
DATED 2 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD.**

Test Wall W-15-E Penetration # 3  
 110mm Raupiano Pipe – 110R Retrofit Collar  
 02 OCT 2015



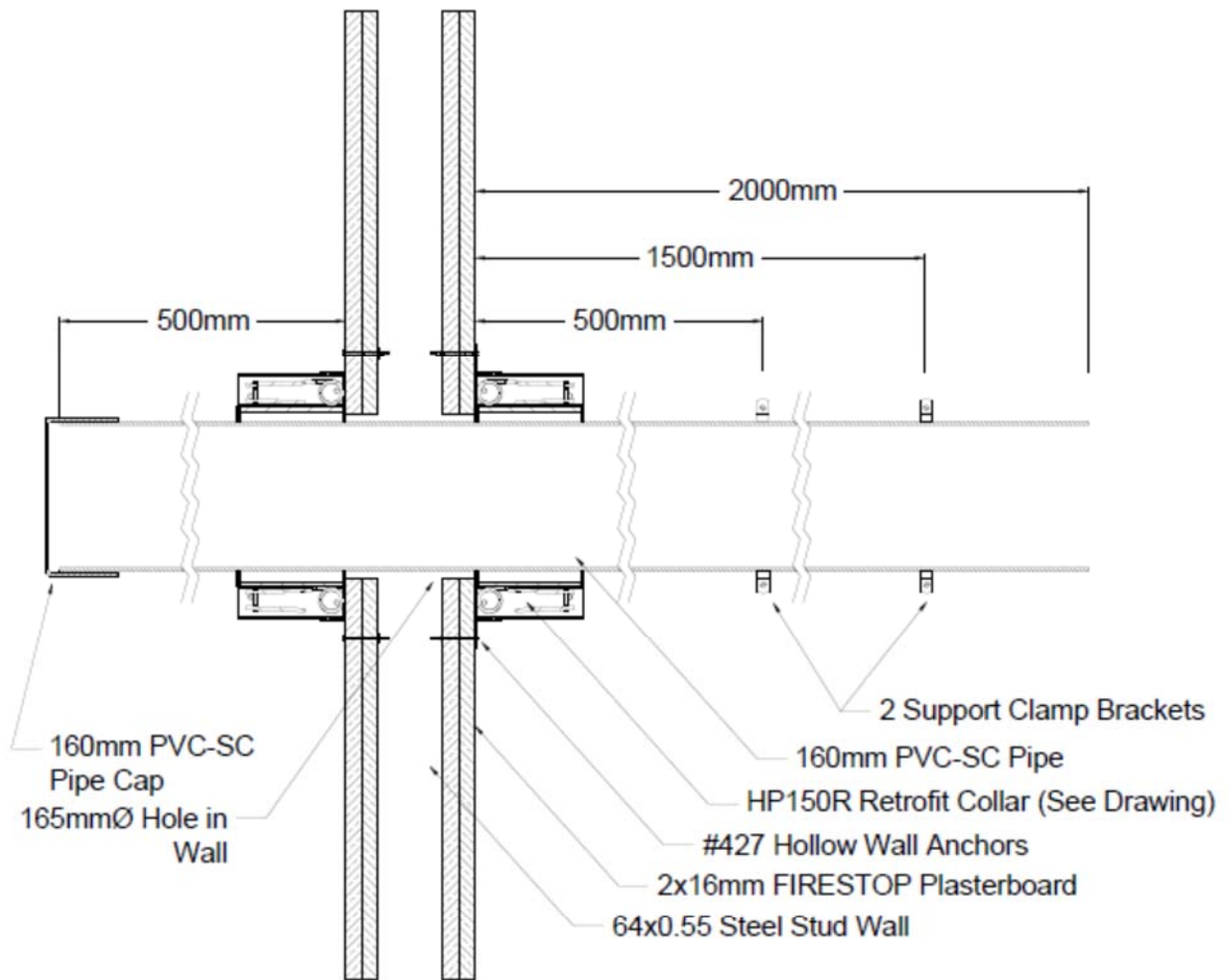
**DRAWING TITLED "TEST WALL W-15-E PENETRATION # 3 – 110-MM RAUPIANO PIPE – 110R RETROFIT COLLAR", DATED 2 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD.**

Test Wall W-15-E Penetration # 4  
40mm Raupiano Pipe – 50R Retrofit Collar  
02 OCT 2015



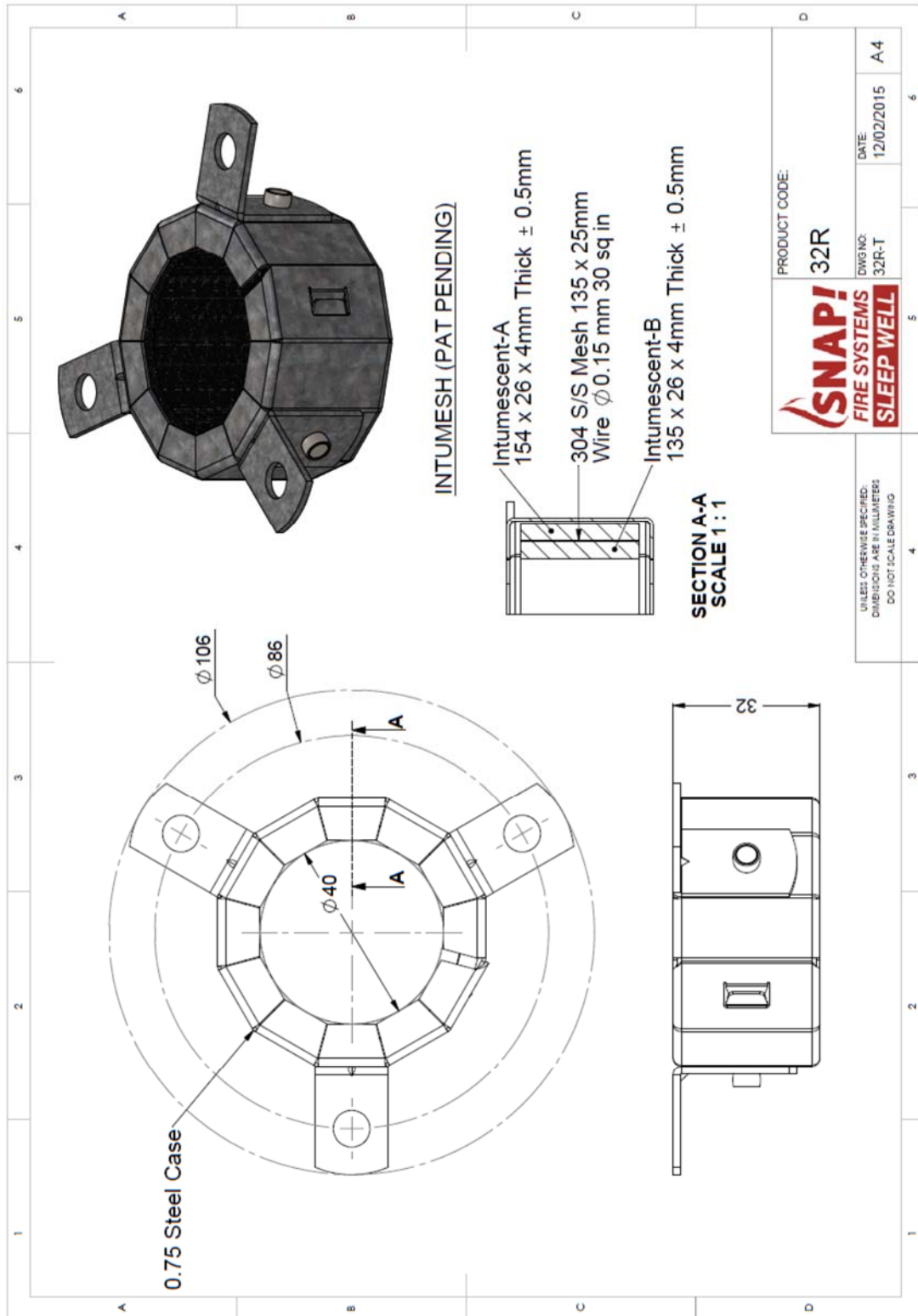
**DRAWING TITLED “TEST WALL W-15-E PENETRATION # 4 – 40-MM RAUPIANO PIPE – 50R RETROFIT COLLAR”, DATED 2 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD.**

Test Wall W-15-E Penetration # 5  
 160mm PVC-SC Pipe – HP150R Retrofit Collar  
 02 OCT 2015

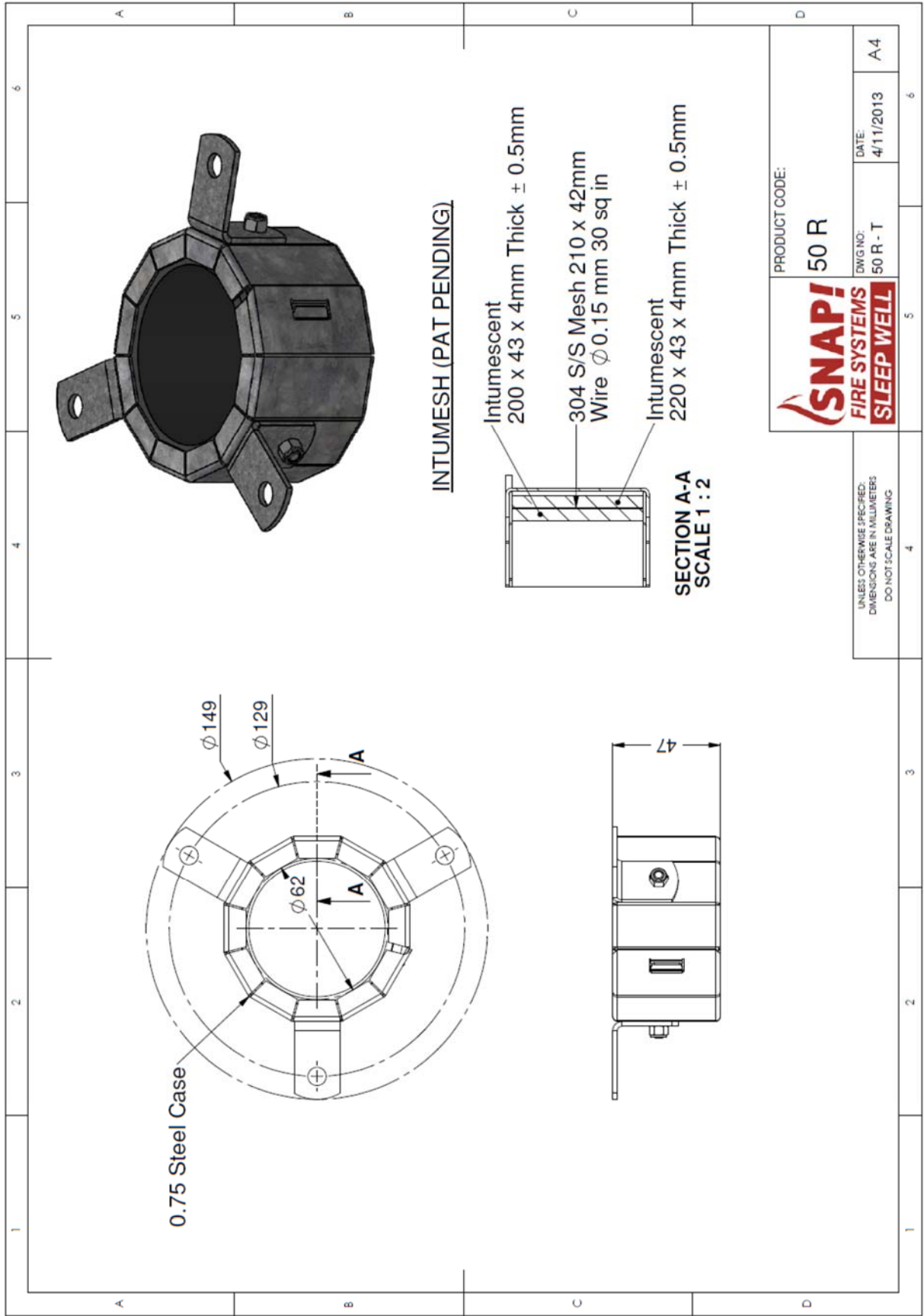


**DRAWING TITLED “TEST WALL W-15-E PENETRATION # 5 – 160-MM PVC-SC PIPE – HP150R RETROFIT COLLAR”, DATED 2 OCTOBER 2015, BY SNAP FIRE SYSTEMS PTY LTD.**

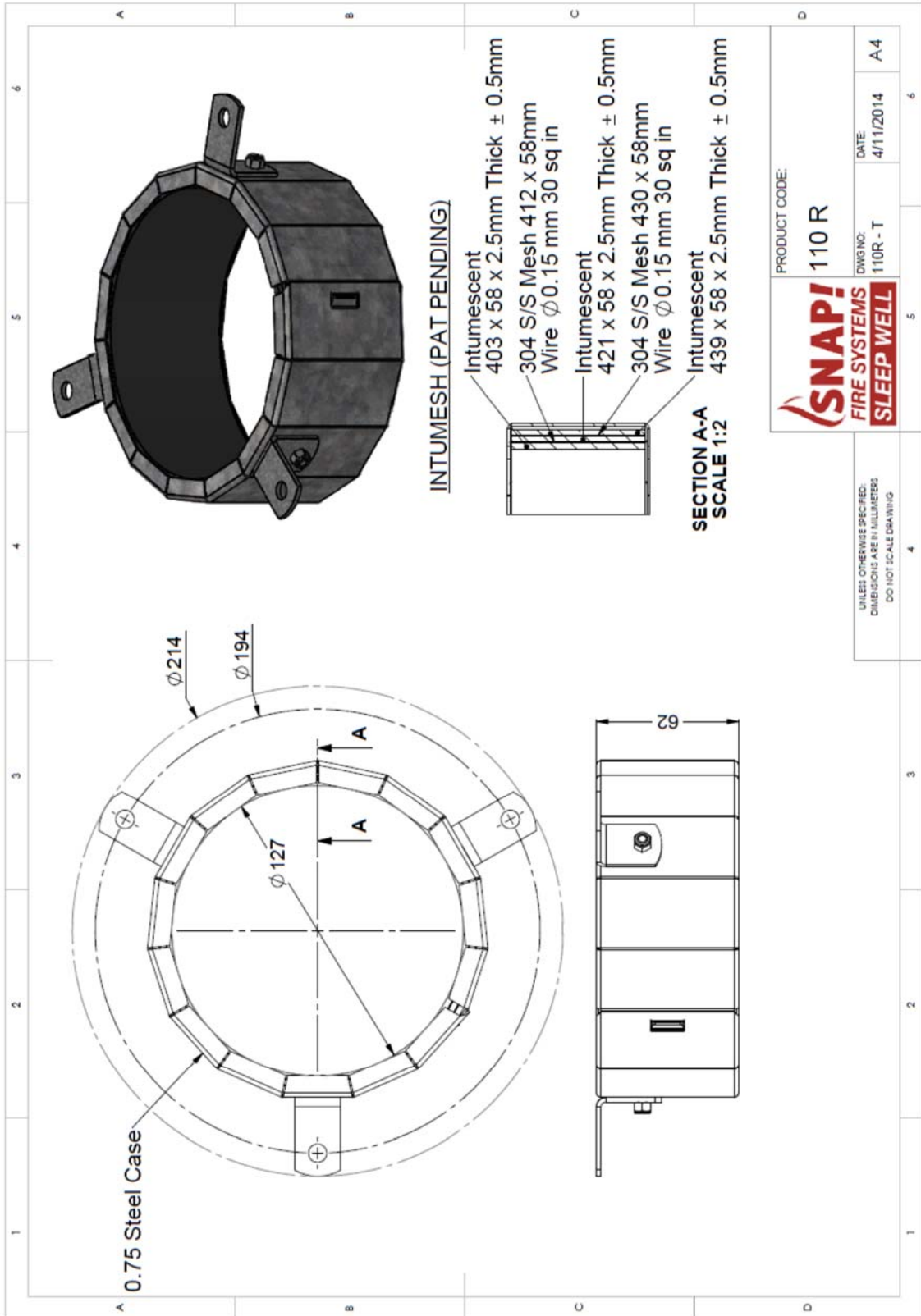
# Appendix E – Specimen Drawings



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

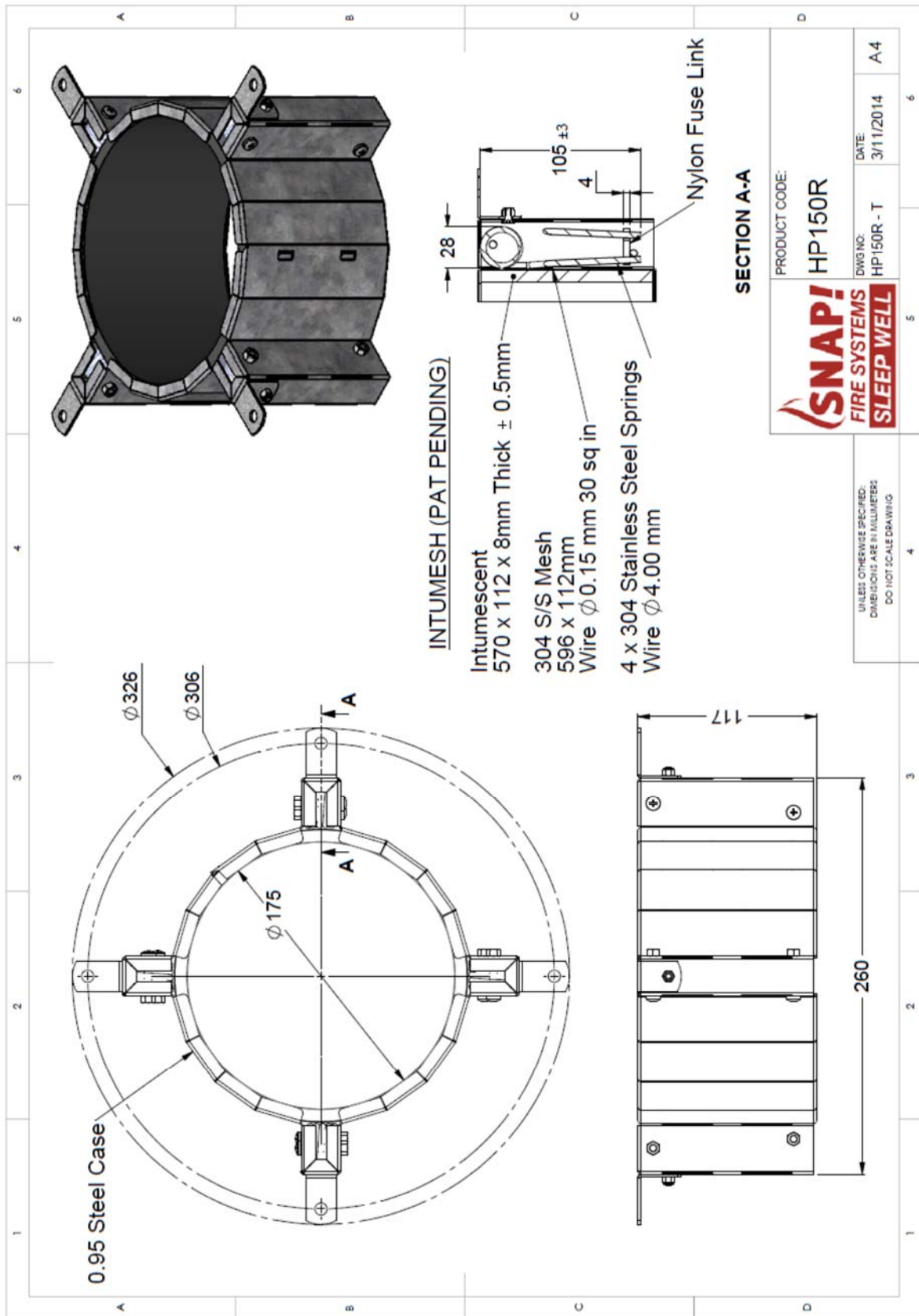


DRAWING NUMBERED 50 R-T, DATED 4 NOVEMBER 2013, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING NUMBERED 110R-T, DATED 4 NOVEMBER 2014, BY SNAP FIRE SYSTEMS PTY LTD.





DRAWING NUMBERED HP150R-T, DATED 3 NOVEMBER 2014, BY SNAP FIRE SYSTEMS PTY LTD.

# Appendix F – Certificates

<b>INFRASTRUCTURE TECHNOLOGIES</b> 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. 2760
<small>“Copyright CSIRO 2015 ©” 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 the CSIRO Division of Materials Science and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-2005 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 1716.		
Product Name: Penetration # 1 – HP150 R retrofitted fire collar protecting a 160-mm High Density Polyethylene (HDPE) pipe		
Description:	The SNAP retrofitted HP150 R collar comprised a 0.95-mm steel casing with a 175 mm inner diameter and a 326-mm diameter base flange. The 117-mm high collar casing incorporated a strip of 570 mm x 112 mm x 8-mm thick Intumesh intumescent material. The closing mechanism comprised four 304 stainless steel springs, with nylon fuse links, and a 596 mm x 112-mm stainless steel mesh as shown in drawing numbered HP 150 R -T dated 3 November 2014, by Snap Fire Systems Pty Ltd. The penetrating service comprised a 160-mm nominal diameter HDPE pipe, with a wall thickness of 6.7-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 165 mm diameter cut-out hole as shown in drawing titled “Test Wall W-15-E Penetration # 1 – 160-mm HDPE Pipe – HP150R Retrofit Collar”, dated 2 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 166 minutes
Insulation		no failure at 163 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.		
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:	7 September 2015
Issued on the 4 <sup>th</sup> day of December 2015 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. 2760**



## Certificate of Test

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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 1716.

Product Name: Penetration # 2 – 32R retrofitted fire collar protecting a 32-mm Pex-A Pipe

Description: 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 32-mm nominal diameter PEX-A Pipe, with a wall thickness of 4.9-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-E Penetration # 2 – 32-mm Pex-A Pipe – 32R Retrofit Collar", dated 2 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 181 minutes
Insulation	no failure at 181 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120. The 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: 7 September 2015

Issued on the 4<sup>th</sup> day of December 2015 without alterations or additions.

Brett Roddy  
Manager, Fire Testing and Assessments



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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 1716.

Product Name: Penetration # 3 – 110R retrofitted fire collar protecting a 110 mm diameter Raupiano pipe

Description: The SNAP 110R retrofitted fire collar comprised a 0.75-mm steel casing with a 127-mm inner diameter and a 214-mm diameter base flange. The 62-mm high collar casing incorporated three layers of 403-mm x 58-mm wide x 2.5-mm thick Intumesh intumescent material. Between the intumescent layers, 58-mm wide stainless steel mesh was installed as shown in drawing numbered 110R-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 two hollow wall anchors. The penetrating service comprised a 110-mm nominal diameter Raupiano Pipe, with a wall thickness of 3.2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 113 mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-E Penetration # 3 – 110-mm Raupiano Pipe – 110R Retrofit Collar", dated 2 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 181 minutes
Insulation	no failure at 181 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120. The 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: 7 September 2015

Issued on the 4<sup>th</sup> day of December 2015 without alterations or additions.

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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 1716.

Product Name: Penetration # 4 – 50R retrofitted fire collar protecting a 40-mm diameter Raupiano pipe

Description: 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 strips 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 2013, 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 40-mm nominal diameter Raupiano Pipe, with a wall thickness of 2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 43 mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-E Penetration # 4 – 40-mm Raupiano Pipe – 50R Retrofit Collar", dated 2 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 181 minutes
Insulation	no failure at 181 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120. The 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: 7 September 2015

Issued on the 4<sup>th</sup> day of December 2015 without alterations or additions.

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## Certificate of Test

No. 2764

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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 1716.

Product Name: Penetration # 5 – HP150 R retrofitted fire collar protecting a 160-mm Polyvinyl Chloride (PVC) pipe

Description: The SNAP retrofitted HP150 R collar comprised a 0.95-mm steel casing with a 175 mm inner diameter and a 326-mm diameter base flange. The 117-mm high collar casing incorporated a strip of 570 mm x 112 mm x 8-mm thick Intumescent material. The closing mechanism comprised four stainless steel springs, with nylon fuse links, and a 596 mm x 112-mm 304 stainless steel mesh as shown in drawing numbered HP 150 R -T dated 3 November 2014, by Snap Fire Systems Pty Ltd. The penetrating service comprised a 160-mm nominal diameter PVC-SC Pipe, with a wall thickness of 4.05-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 165 mm diameter cut-out hole as shown in drawing titled “Test Wall W-15-E Penetration # 5 – 160-mm PVC-SC Pipe – HP150R Retrofit Collar”, dated 2 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 138 minutes
Insulation	no failure at 123 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.

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: 7 September 2015

Issued on the 4<sup>th</sup> day of December 2015 without alterations or additions.

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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 5065:2005 | Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications'   |
| AS/NZS 2492:2007 | Cross-linked polyethylene (pe-x) pipes for pressure applications'   |
| AS/NZS 7671:2010 | Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings - polypropylene (pp)(iso 7671:2003), mod' ;  |
| EN 1451-1:2000   | Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure. Polypropylene (pp). Specifications for pipes, fittings and the system' |
| 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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