

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

## Test Report

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Commercial-in-confidence

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

## Sponsored Investigation No. FSP 1759

### 1 Introduction

#### 1.1 Identification of specimen

The sponsor identified the specimen as Snap Retrofit Fire Collars protecting a plasterboard wall penetrated by nine (9) Px-Al-Px pipes.

#### 1.2 Sponsor

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

#### 1.3 Manufacturer

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

#### 1.4 Test standard

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

Section 10: Service Penetrations and control joints

#### 1.5 Reference standard

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

#### 1.6 Test number

CSIRO Reference test number: FS 4594/3981

## 1.7 Test date

The fire-resistance test was conducted on 20 July 2016.

# 2 Description of specimen

## 2.1 General

The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/120/120. Construction comprised 64-mm x 0.55-mm steel studs and noggins installed at nominally 600-mm centres, lined on each side with two (2) layers of 13-mm thick Boral Firestop sheets. The plasterboard sheeting was screw fixed to the steel studs using plasterboard screws at nominally 200-mm centres. The plasterboard wall thickness was 116-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 4176.1-2010 : Multilayer pipes for pressure applications - Multilayer piping systems for hot and cold water plumbing applications - General (ISO 21003-1:2008, MOD)

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

### Penetration # 1 – GAS32 retrofitted fire collar protecting a 15-mm Valsir Px-Al-Px Pipe

The GAS32 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 35-mm inner diameter and a 90-mm diameter base flange. The 63-mm high collar casing incorporated a layer of 140-mm x 55-mm x 4-mm thick Intumescent material and a layer of 120-mm x 55-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 120 x 54-mm as shown in drawing numbered GAS32-T dated 14 September 2016, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 15-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 2-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-16-B Penetration # 1, 15-mm Valsir Px-Al-Px Pipe – Gas32 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

### Penetration # 2 – 32R retrofitted fire collar protecting a 20-mm Valsir Px-Al-Px Pipe

The 32R Retrofit collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism 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 20-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 2.8-mm fitted through the collar's sleeve and penetrating the plasterboard wall through a 22-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-B Penetration # 2, 20-mm Valsir Px-Al-Px Pipe – 32R Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

#### Penetration # 3 – 32R retrofitted fire collar protecting a 15-mm Valsir Px-Al-Px Pipe

The 32R Retrofit collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism 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 15-mm Valsir Px-Al-Px stack 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-16-B Penetration # 3, 15-mm Valsir Px-Al-Px Pipe – 32R Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

#### Penetration # 4 – GAS32 retrofitted fire collar protecting a 20-mm Valsir Px-Al-Px Pipe

The GAS32 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 35-mm inner diameter and a 90-mm diameter base flange. The 63-mm high collar casing incorporated a layer of 140-mm x 55-mm x 4-mm thick Intumescent material and a layer of 120-mm x 55-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 120 x 54-mm as shown in drawing numbered GAS32-T dated 14 September 2016, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 20-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 2.9-mm fitted through the collar's sleeve and penetrating the plasterboard wall through a 22-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-B Penetration # 4, 20-mm Valsir Px-Al-Px Pipe – Gas32 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

#### Penetration # 5 – GAS32 retrofitted fire collar protecting a 26-mm Valsir Px-Al-Px Pipe

The GAS32 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 35-mm inner diameter and a 90-mm diameter base flange. The 63-mm high collar casing incorporated a layer of 140-mm x 55-mm x 4-mm thick Intumescent material and a layer of 120-mm x 55-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 120 x 54-mm as shown in drawing numbered GAS32-T dated 14 September 2016, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 26-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 3.4-mm fitted through the collar's sleeve and penetrating the plasterboard wall through a 29-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-B Penetration # 5, 26-mm Valsir Px-Al-Px Pipe – Gas32 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

#### Penetration # 6 – GAS50 retrofitted fire collar protecting a 32-mm Valsir Px-Al-Px Pipe

The GAS50 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 57-mm inner diameter and a 115-mm diameter base flange. The 92-mm high collar casing incorporated a layer of 215-mm x 85-mm x 4-mm thick Intumescent material and a layer of 190-mm x 85-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 190 x 84-mm as shown in drawing numbered GAS50-T dated 16 September 2016, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 32-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 3.6-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-16-B Penetration # 6, 32-mm Valsir Px-Al-Px Pipe – Gas50 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

#### Penetration # 7 – GAS50 retrofitted fire collar protecting a 40-mm Valsir Px-Al-Px Pipe

The GAS50 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 57-mm inner diameter and a 115-mm diameter base flange. The 92-mm high collar casing incorporated a layer of 215-mm x 85-mm x 4-mm thick Intumescent material and a layer of 190-mm x 85-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 190 x 84-mm as shown in drawing numbered GAS50-T dated 16 September 2016, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 40-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 4-mm fitted through the collar's sleeve and penetrating the plasterboard wall through a 44-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-B Penetration # 7, 40-mm Valsir Px-Al-Px Pipe – Gas50 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.



#### Penetration # 8 – GAS50 retrofitted fire collar protecting a 50-mm Valsir Px-Al-Px Pipe

The GAS50 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 57-mm inner diameter and a 115-mm diameter base flange. The 92-mm high collar casing incorporated a layer of 215-mm x 85-mm x 4-mm thick Intumescent material and a layer of 190-mm x 85-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 190 x 84-mm as shown in drawing numbered GAS50-T dated 16 September 2016, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 50-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 4.4-mm fitted through the collar's sleeve and penetrating the plasterboard wall through a 57-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-B Penetration # 8, 50-mm Valsir Px-Al-Px Pipe – Gas50 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

#### Penetration # 9 – GAS63 retrofitted fire collar protecting a 63-mm Valsir Px-Al-Px Pipe

The GAS63 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 67-mm inner diameter and a 121-mm diameter base flange. The 91-mm high collar casing incorporated a layer of 265-mm x 85-mm x 4-mm thick Intumescent material, a layer of 235-mm x 85-mm x 4-mm thick Intumescent material and a layer of 200-mm x 85-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link, one layer of 316 stainless steel mesh measuring 230 x 84-mm, and one layer of 316 stainless steel mesh measuring 200 x 84-mm as shown in drawing numbered GAS63-B-T dated 20 September 2016, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 63-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 5.4-mm fitted through the collar's sleeve and penetrating the plasterboard wall through a 67-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-B Penetration # 9, 63-mm Valsir Px-Al-Px Pipe – Gas63 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

## 2.2 Dimensions

The wall specimen was nominally 1150-mm wide x 1150-mm high x 116-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 numbered GAS32-T, dated 14 September 2016, by Snap Fire Systems Pty Ltd.

Drawing numbered GAS50-T, dated 16 September 2016, by Snap Fire Systems Pty Ltd.

Drawing numbered GAS63-B-T, dated 20 September 2016, by Snap Fire Systems Pty Ltd.

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

Drawing titled “Test Wall W-16-B Penetration #1, 15-mm Valsir Px-Al-Px Pipe – Gas32 Collar, dated 19 August 2016”.

Drawing titled “Test Wall W-16-B Penetration #2, 20-mm Valsir Px-Al-Px Pipe – 32R Collar, dated 19 August 2016”.

Drawing titled “Test Wall W-16-B Penetration #3, 15-mm Valsir Px-Al-Px Pipe – 32R Collar, dated 19 August 2016”.

Drawing titled “Test Wall W-16-B Penetration #4, 20-mm Valsir Px-Al-Px Pipe – Gas32 Collar, dated 19 August 2016”.

Drawing titled “Test Wall W-16-B Penetration #5, 26-mm Valsir Px-Al-Px Pipe – Gas32 Collar, dated 19 August 2016”.

Drawing titled “Test Wall W-16-B Penetration #6, 32-mm Valsir Px-Al-Px Pipe – Gas50 Collar, dated 19 August 2016”.

Drawing titled “Test Wall W-16-B Penetration #7, 40-mm Valsir Px-Al-Px Pipe – Gas50 Collar, dated 19 August 2016”.

Drawing titled “Test Wall W-16-B Penetration #8, 50-mm Valsir Px-Al-Px Pipe – Gas50 Collar, dated 19 August 2016”.

Drawing titled “Test Wall W-16-B Penetration #9, 63-mm Valsir Px-Al-Px Pipe – Gas63 Collar, dated 19 August 2016”.

## 4 Equipment

### 4.1 Furnace

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

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

## 4.2 Temperature

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

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

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

## 4.3 Measurement system

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

# 5 Ambient temperature

The temperature of the test area was 18°C at the commencement of the test.

# 6 Departure from standard

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

# 7 Termination of test

The test was terminated at 181 minutes by the agreement with the sponsor.

# 8 Test results

## 8.1 Critical observations

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

Time	Observation
5 minutes, 30 seconds -	Penetration # 2 and Penetration # 3 are fluing slightly.
6 minutes -	Penetration # 6 is fluing slightly.
6 minutes 30 seconds -	Penetration # 9 is fluing significantly.
7 minutes -	Penetration # 2, Penetration # 3 and Penetration # 6 have stopped fluing. Penetration # 8 is lightly fluing.

9 minutes -	Penetration # 8 is fluing significantly.
10 minutes -	Penetration # 7 is fluing significantly. Penetration # 9 has stopped fluing.
11 minutes -	Penetration # 7 and Penetration # 8 have almost stopped fluing. Penetration # 2 is slightly fluing.
12 minutes -	Penetration # 7 and Penetration # 8 have stopped fluing.
14 minutes -	Penetration # 6 has started fluing.
15 minutes -	Penetration # 6 has stopped fluing.
17 minutes -	Penetration # 9 has begun fluing again.
20 minutes -	All penetrations have stopped fluing.
50 minutes -	Slight fluing has begun again on Penetration # 5 and Penetration # 6.
83 minutes -	Slight fluing has begun again on Penetration # 9.
86 minutes -	<u>Insulation failure penetration 9</u> – 180K temperature exceeded on top of collar, 25-mm from wall
106 minutes -	Penetration # 2 has started fluing.
109 minutes -	<u>Insulation failure penetration 2</u> – 180K temperature exceeded on top of pipe, 25-mm from collar
114 minutes -	<u>Insulation failure penetration 8</u> – 180K temperature exceeded on top of collar, 25-mm from wall
125 minutes -	Smoke from Penetration # 9 is increasing, and melting at base of pipe.
132 minutes -	Penetration # 8 is softening at base of pipe.
138 minutes -	<u>Insulation failure penetration 5</u> – 180K temperature exceeded on top of collar, 25-mm from wall
140 minutes -	<u>Insulation failure penetration 6</u> – 180K temperature exceeded on top of collar, 25-mm from wall
160 minutes -	Fluing is evident from Penetration # 1, Penetration # 5 and Penetration # 8.
169 minutes -	<u>Insulation failure penetration 3</u> – 180K temperature exceeded on wall, 25-mm above collar
170 minutes -	<u>Insulation failure penetration 7</u> – 180K temperature exceeded on wall, 25-mm above collar
176 minutes -	<u>Insulation failure penetration 4</u> – 180K temperature exceeded on wall, 25-mm above collar
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.  
Figure 8 shows the curve of maximum temperature versus time associated with Penetration # 6.  
Figure 9 shows the curve of maximum temperature versus time associated with Penetration # 7.  
Figure 10 shows the curve of maximum temperature versus time associated with Penetration # 8.  
Figure 11 shows the curve of maximum temperature versus time associated with Penetration # 9.

## 8.5 Performance

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

### Penetration # 1 – GAS32 retrofitted fire collar protecting a 15-mm Valsir Px-Al-Px Pipe

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

### Penetration # 2 – 32R retrofitted fire collar protecting a 20-mm Valsir Px-Al-Px Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	109 minutes

Penetration # 3 – 32R retrofitted fire collar protecting a 15-mm Valsir Px-Al-Px Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	169 minutes

Penetration # 4 – GAS32 retrofitted fire collar protecting a 20-mm Valsir Px-Al-Px Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	176 minutes

Penetration # 5 – GAS32 retrofitted fire collar protecting a 26-mm Valsir Px-Al-Px Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	138 minutes

Penetration # 6 – GAS50 retrofitted fire collar protecting a 32-mm Valsir Px-Al-Px Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	140 minutes

Penetration # 7 – GAS50 retrofitted fire collar protecting a 40-mm Valsir Px-Al-Px Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	170 minutes

Penetration # 8 – GAS50 retrofitted fire collar protecting a 50-mm Valsir Px-Al-Px Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	114 minutes

Penetration # 9 – GAS63 retrofitted fire collar protecting a 63-mm Valsir Px-Al-Px Pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 181 minutes
Insulation	-	86 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	-	0/120/120
Penetration # 2	-	0/120/90
Penetration # 3	-	0/120/120
Penetration # 4	-	0/120/120
Penetration # 5	-	0/120/120
Penetration # 6	-	0/120/120
Penetration # 7	-	0/120/120
Penetration # 8	-	0/120/90
Penetration # 9	-	0/120/60

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

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

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

## 10 Field of direct application of test results

The results of the fire test contained in this test report are directly applicable, without reference to the testing authority, to similar constructions where one or more changes listed in Clause 10.12 of AS 1530.4-2014, have been made provided no individual component is removed or reduced.

## 11 Tested by



Russell Collins  
Testing Officer



# Appendices

## Appendix A – Measurement location

Measurement Location		
Group location	T/C Position	T/C designation
<b>Specimen</b>		
Specimen 1 – PE/Al/PE 16mm gas pipe protected with Snap GAS32	On wall – 25-mm above collar	S1
	On wall – 25-mm beside collar	S2
	On top of collar	S3
	On side of collar	S4
	On top of pipe 25-mm from collar	S5
	On side of pipe 25-mm from collar	S6
Specimen 2 – PE/Al/PE 20mm gas pipe protected with Snap 32R	On wall – 25-mm above collar	S7
	On wall – 25-mm beside collar	S8
	On top of collar	S9
	On side of collar	S10
	On top of pipe 25-mm from collar	S11
	On side of pipe 25-mm from collar	S12
Specimen 3 – PE/Al/PE 16mm gas pipe protected with Snap 32R	On wall – 25-mm above collar	S13
	On wall – 25-mm beside collar	S14
	On top of collar	S15
	On side of collar	S16
	On top of pipe 25-mm from collar	S17
	On side of pipe 25-mm from collar	S18
Specimen 4 – PE/Al/PE 20mm gas pipe protected with Snap GAS32	On wall – 25-mm above collar	S19
	On wall – 25-mm beside collar	S20
	On top of collar	S21
	On side of collar	S22
	On top of pipe 25-mm from collar	S23
	On side of pipe 25-mm from collar	S24
Specimen 5 – PE/Al/PE 26mm gas pipe protected with Snap GAS32	On wall – 25-mm above collar	S25
	On wall – 25-mm beside collar	S26
	On top of collar	S27
	On side of collar	S28
	On top of pipe 25-mm from collar	S29
	On side of pipe 25-mm from collar	S30

Specimen 6 – PE/Al/PE 32mm gas pipe protected with Snap GAS50	On wall – 25-mm above collar	S31
	On wall – 25-mm beside collar	S32
	On top of collar	S33
	On side of collar	S34
	On top of pipe 25-mm from collar	S35
	On side of pipe 25-mm from collar	S36
Specimen 7 PE/Al/PE 40mm gas pipe protected with Snap GAS50	On wall – 25-mm above collar	S37
	On wall – 25-mm beside collar	S38
	On top of collar	S39
	On side of collar	S40
	On top of pipe 25-mm from collar	S41
	On side of pipe 25-mm from collar	S42
Specimen 8 – PE/Al/PE 50mm gas pipe protected with Snap GAS50	On wall – 25-mm above collar	S43
	On wall – 25-mm beside collar	S44
	On top of collar	S45
	On side of collar	S46
	On top of pipe 25-mm from collar	S47
	On side of pipe 25-mm from collar	S48
Specimen 9 – PE/Al/PE 63mm gas pipe protected with Snap GAS63	On wall – 25-mm above collar	S49
	On wall – 25-mm beside collar	S50
	On top of collar	S51
	On side of collar	S52
	On top of pipe 25-mm from collar	S53
	On side of pipe 25-mm from collar	S54

Appendix B – Photographs



**PHOTOGRAPH 1 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING**

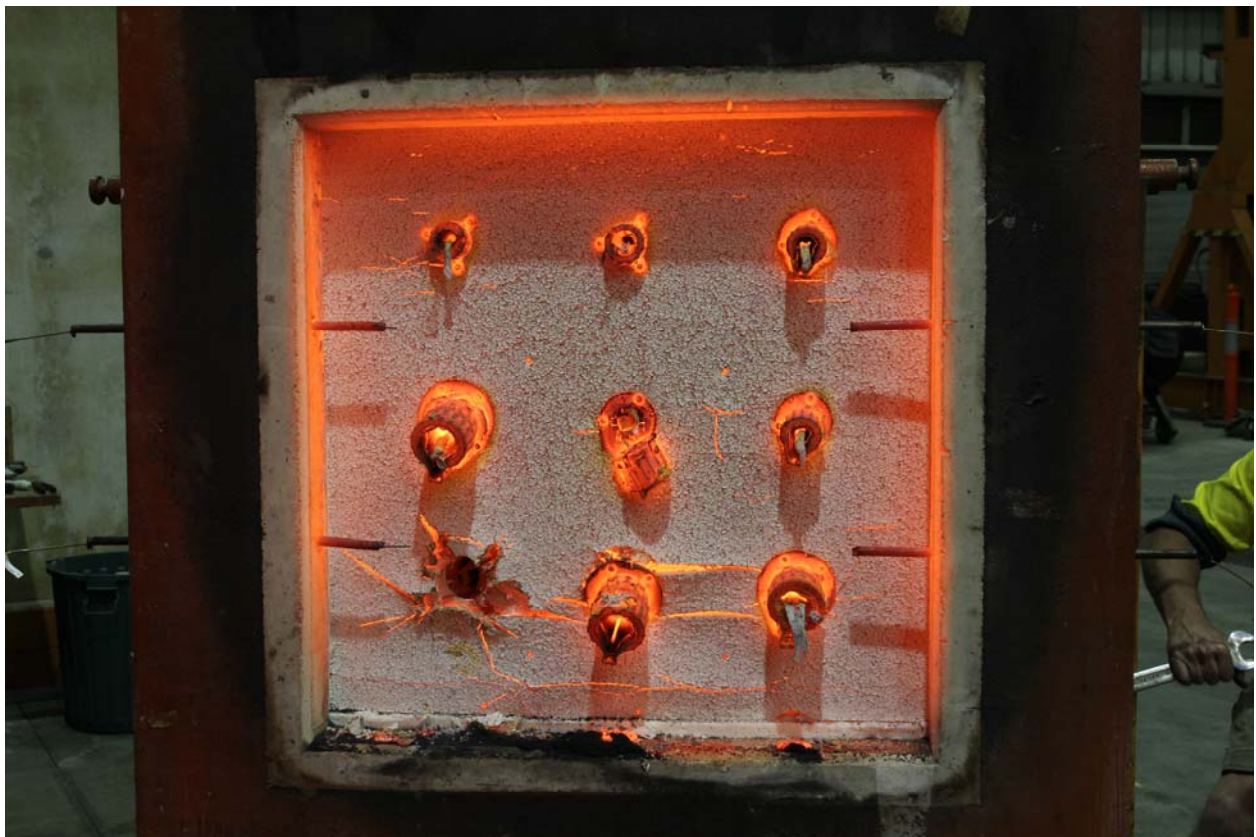


**PHOTOGRAPH 2 – SPECIMENS AFTER 60 MINUTES OF TESTING**





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



**PHOTOGRAPH 4 – EXPOSED FACE OF SPECIMENS AT CONCLUSION OF TESTING**

Appendix C – Furnace Temperature

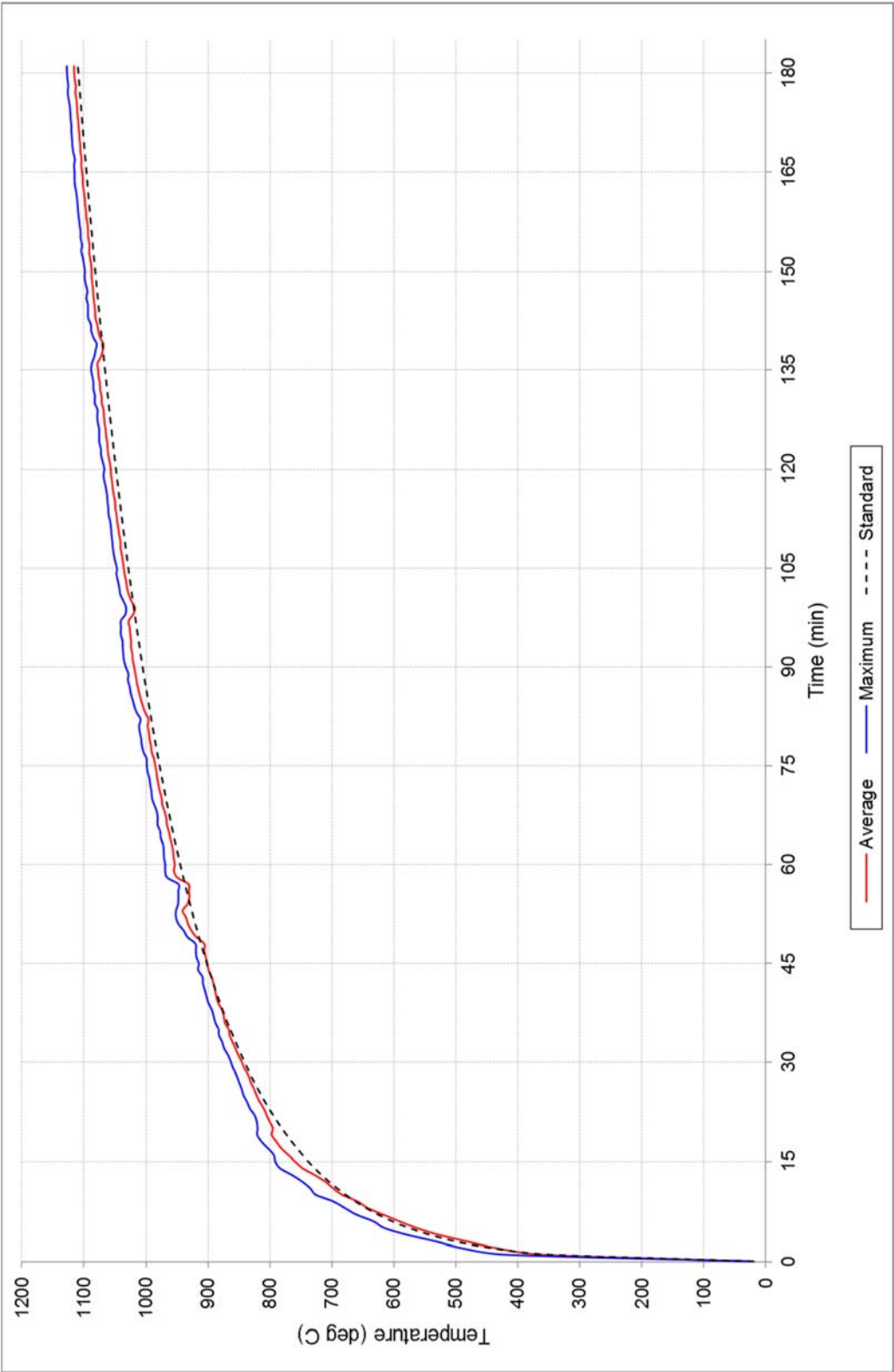


FIGURE 1 – FURNACE TEMPERATURE

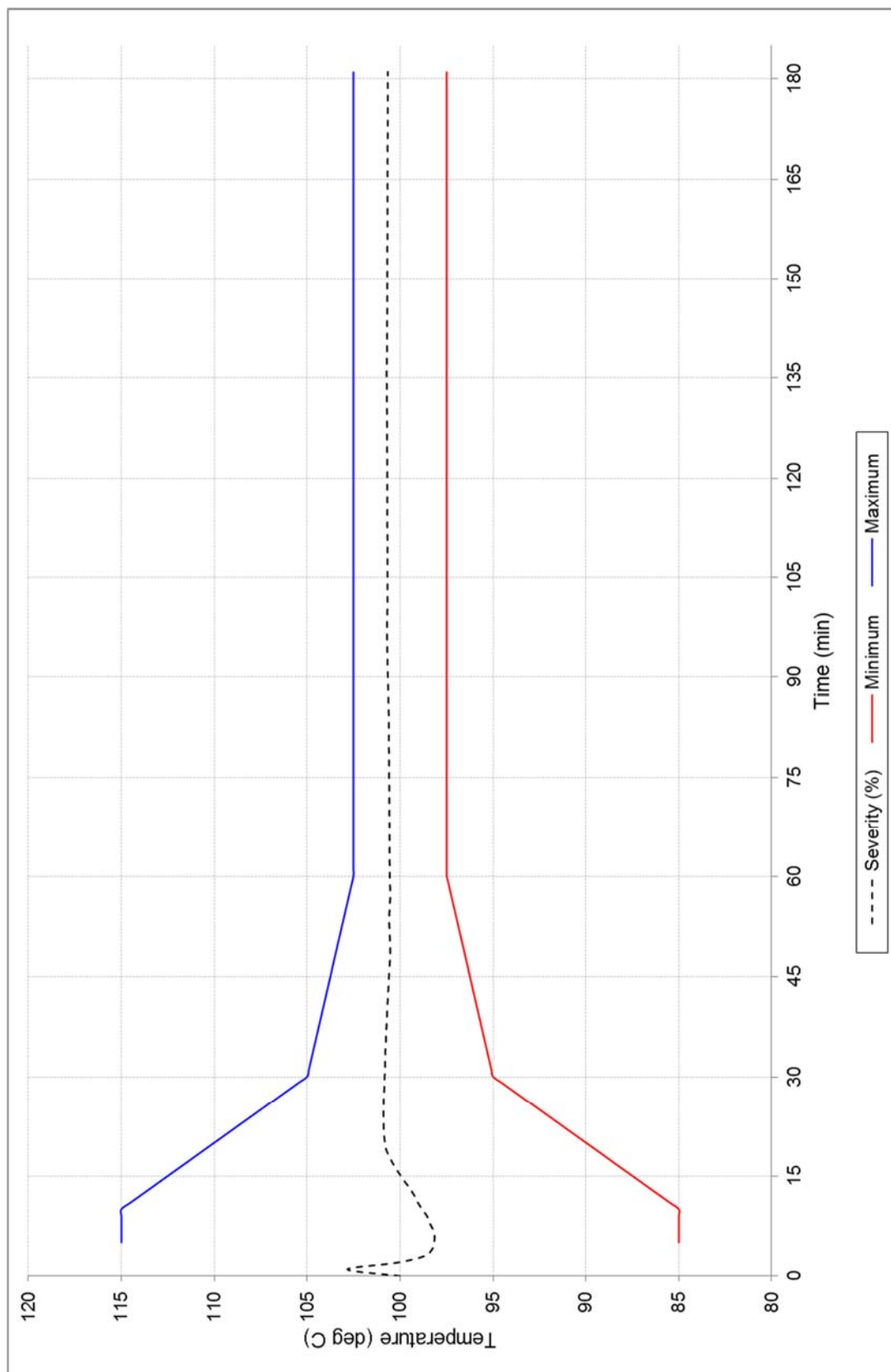


FIGURE 2 – FURNACE SEVERITY

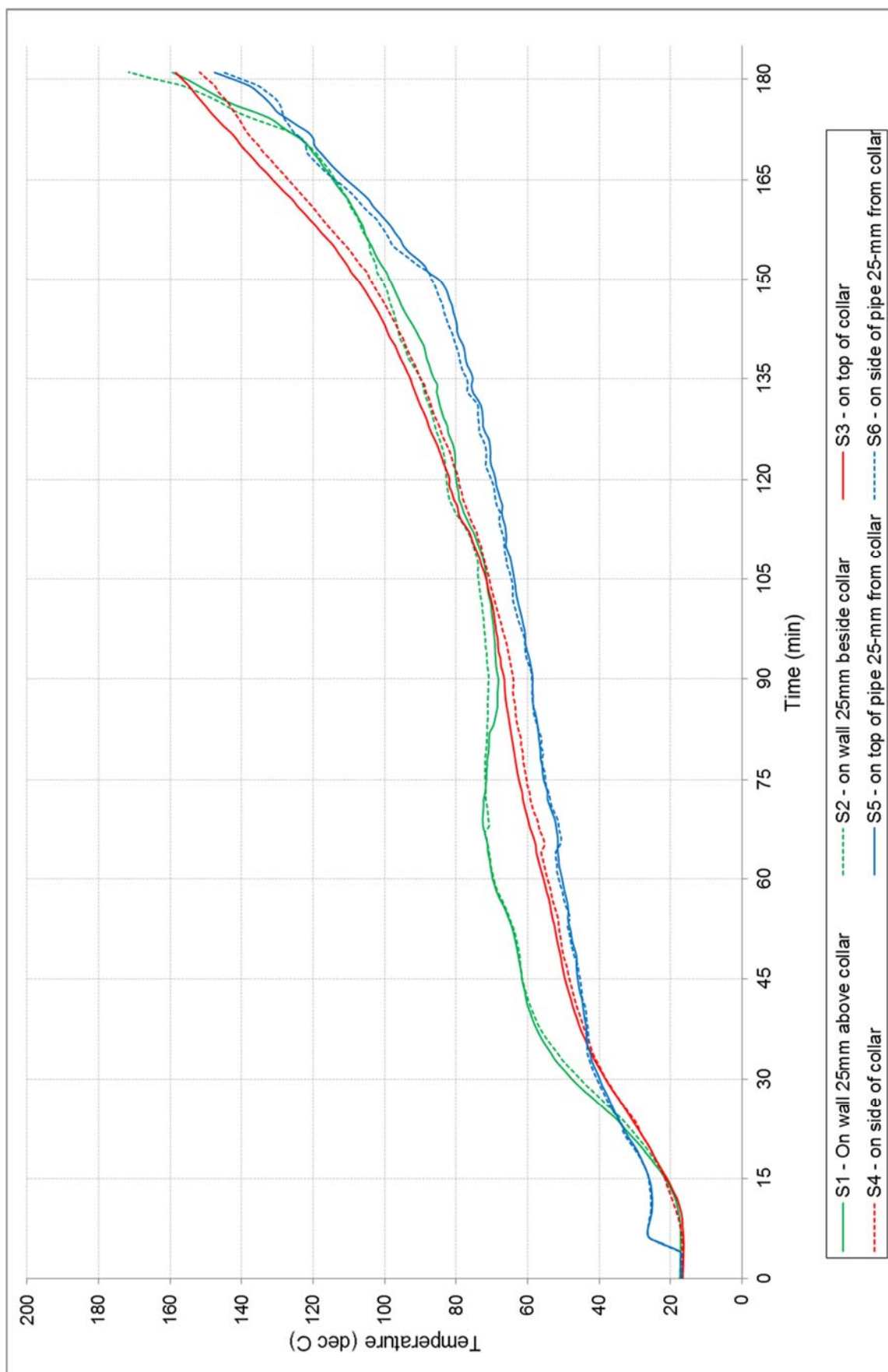


FIGURE 3 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 1



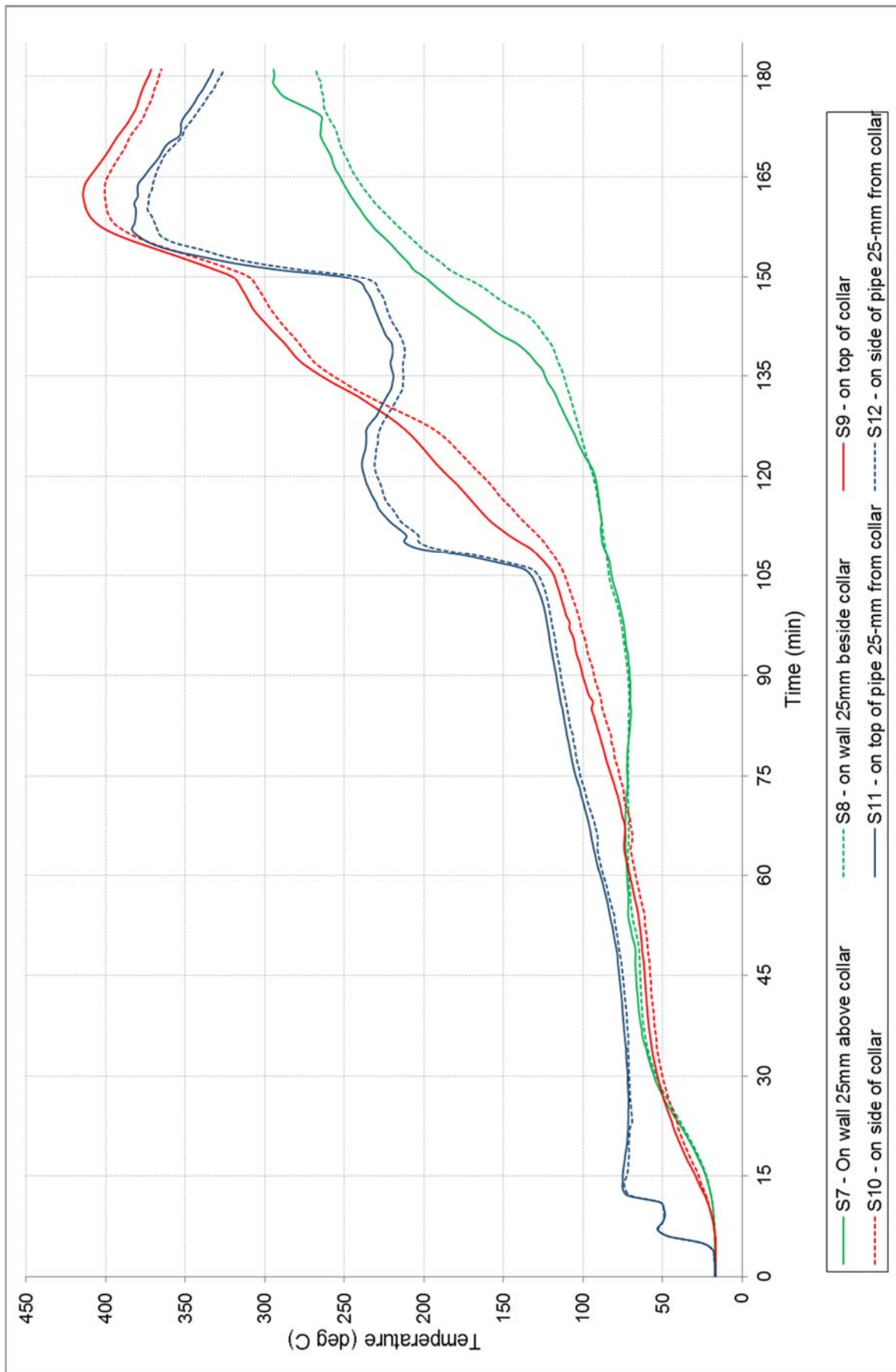


FIGURE 4 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 2



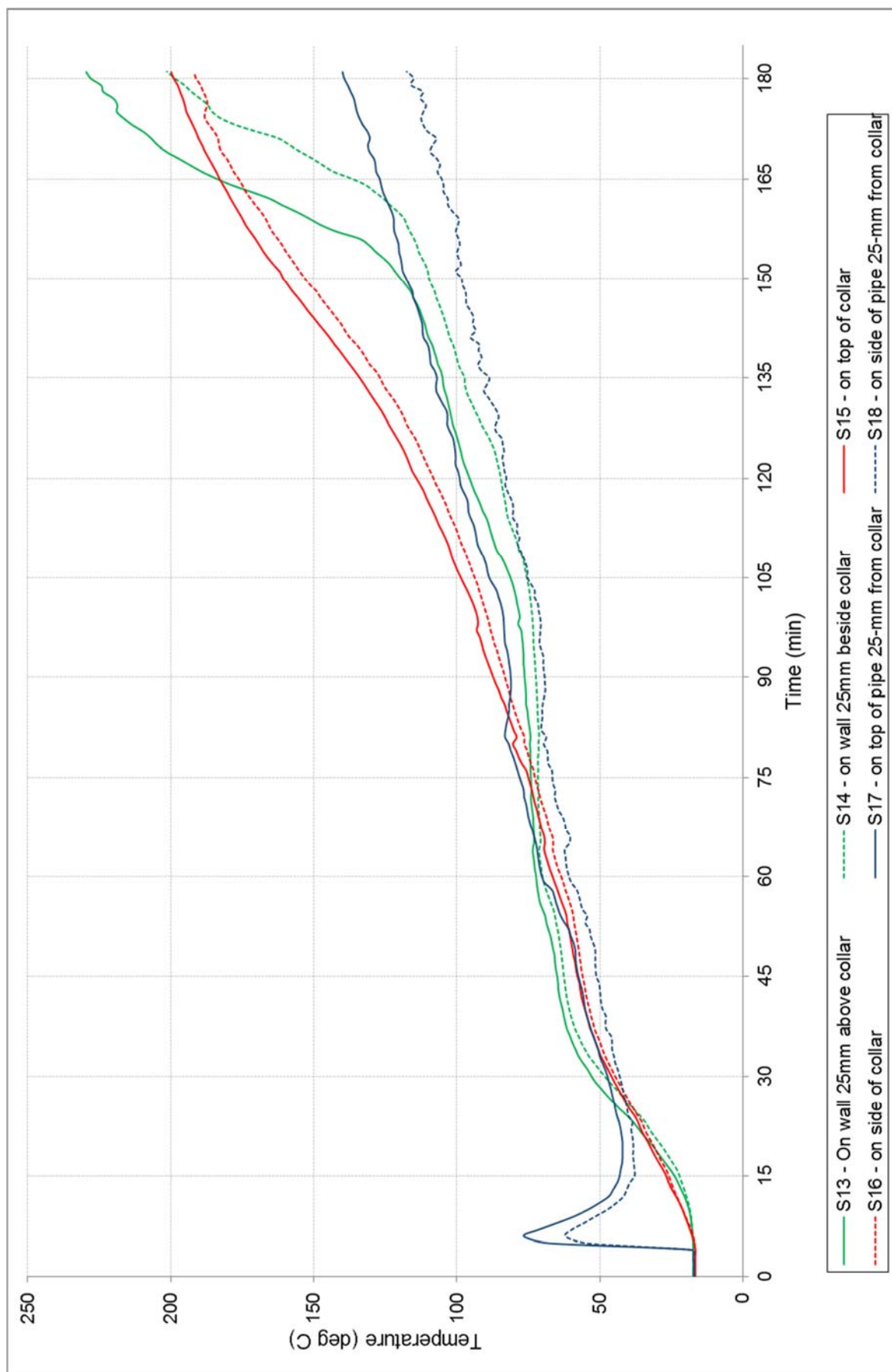


FIGURE 5 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 3

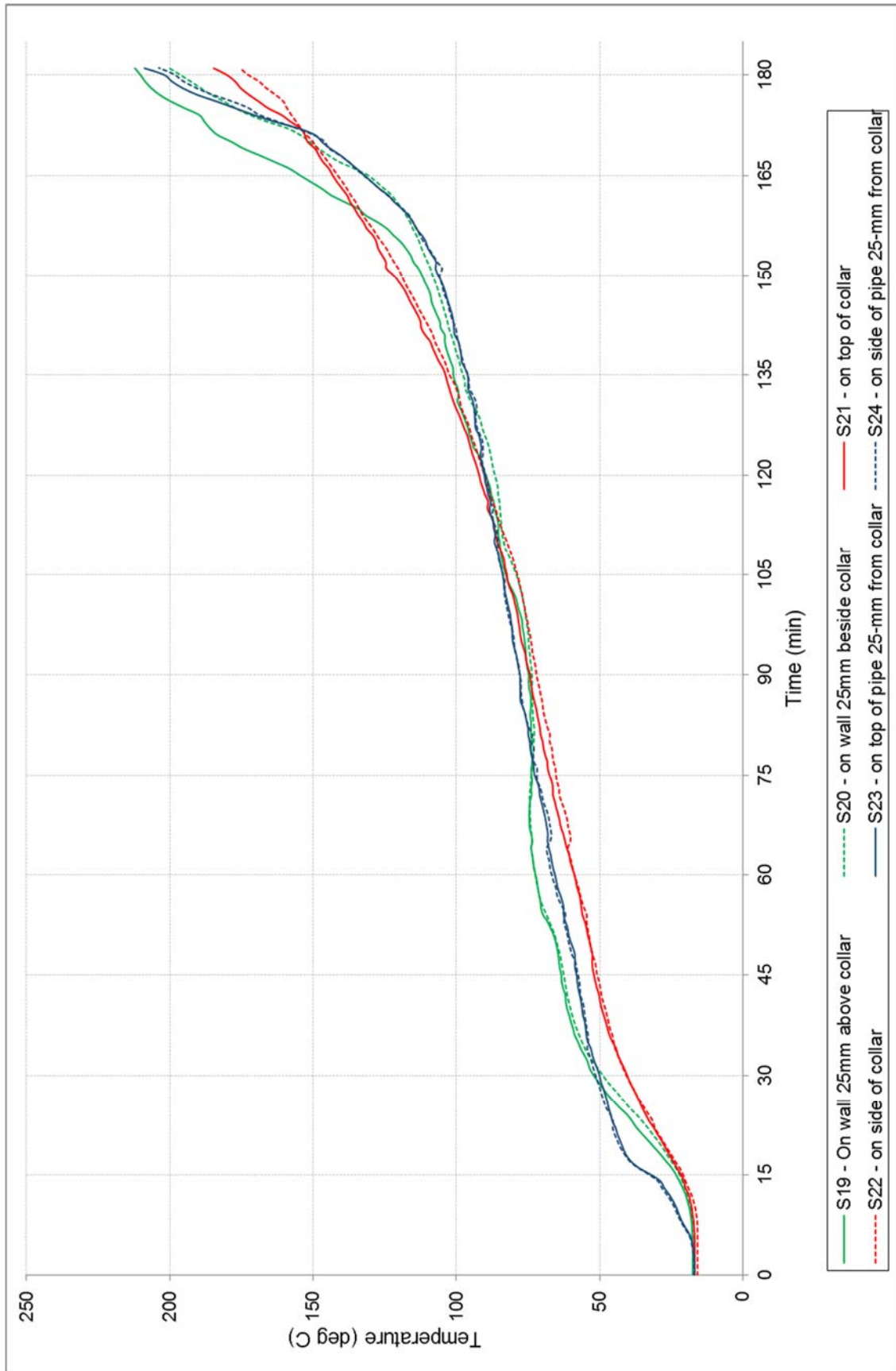


FIGURE 6 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 4

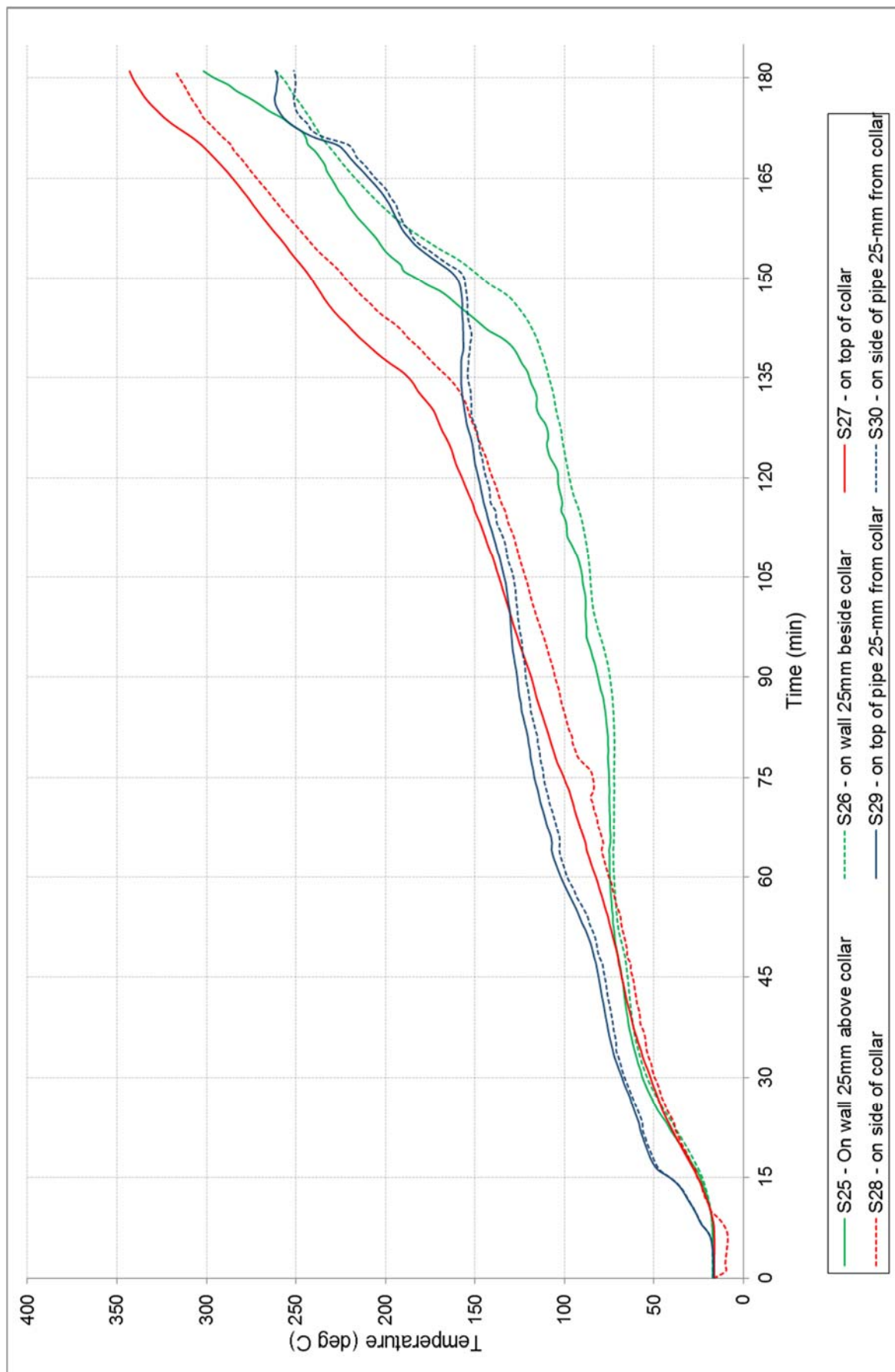


FIGURE 7 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 5

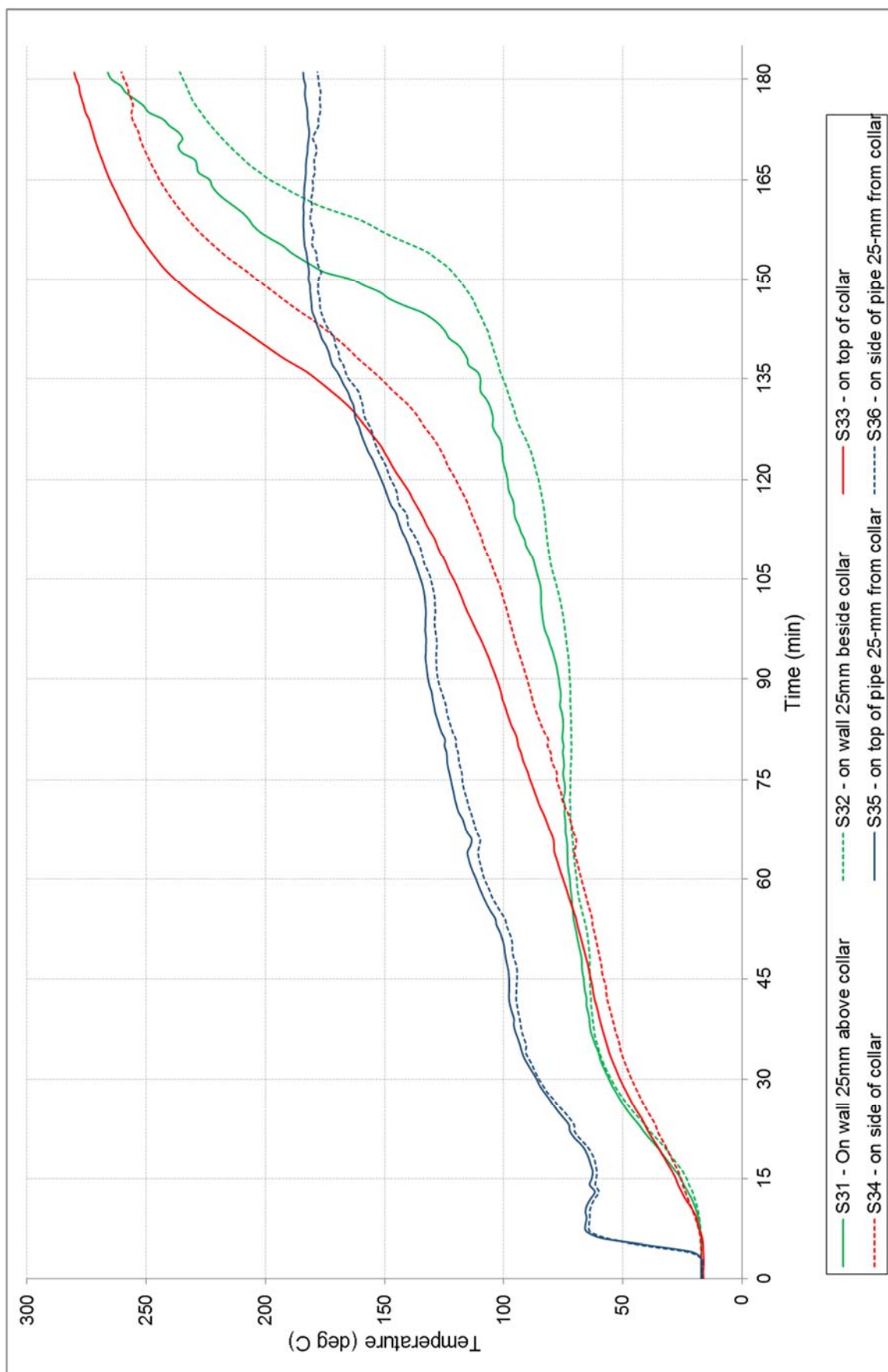


FIGURE 8 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 6

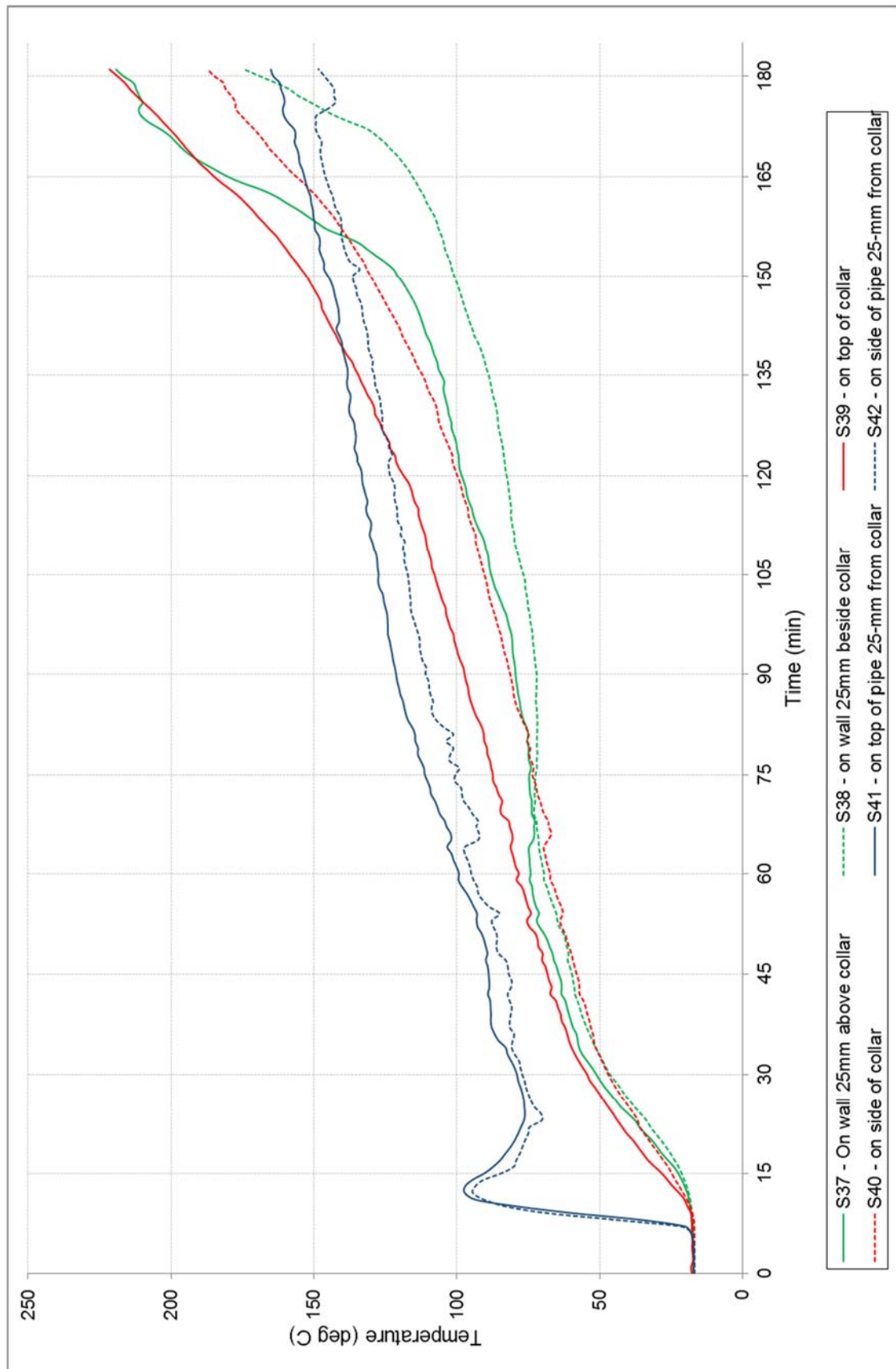


FIGURE 9 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 7

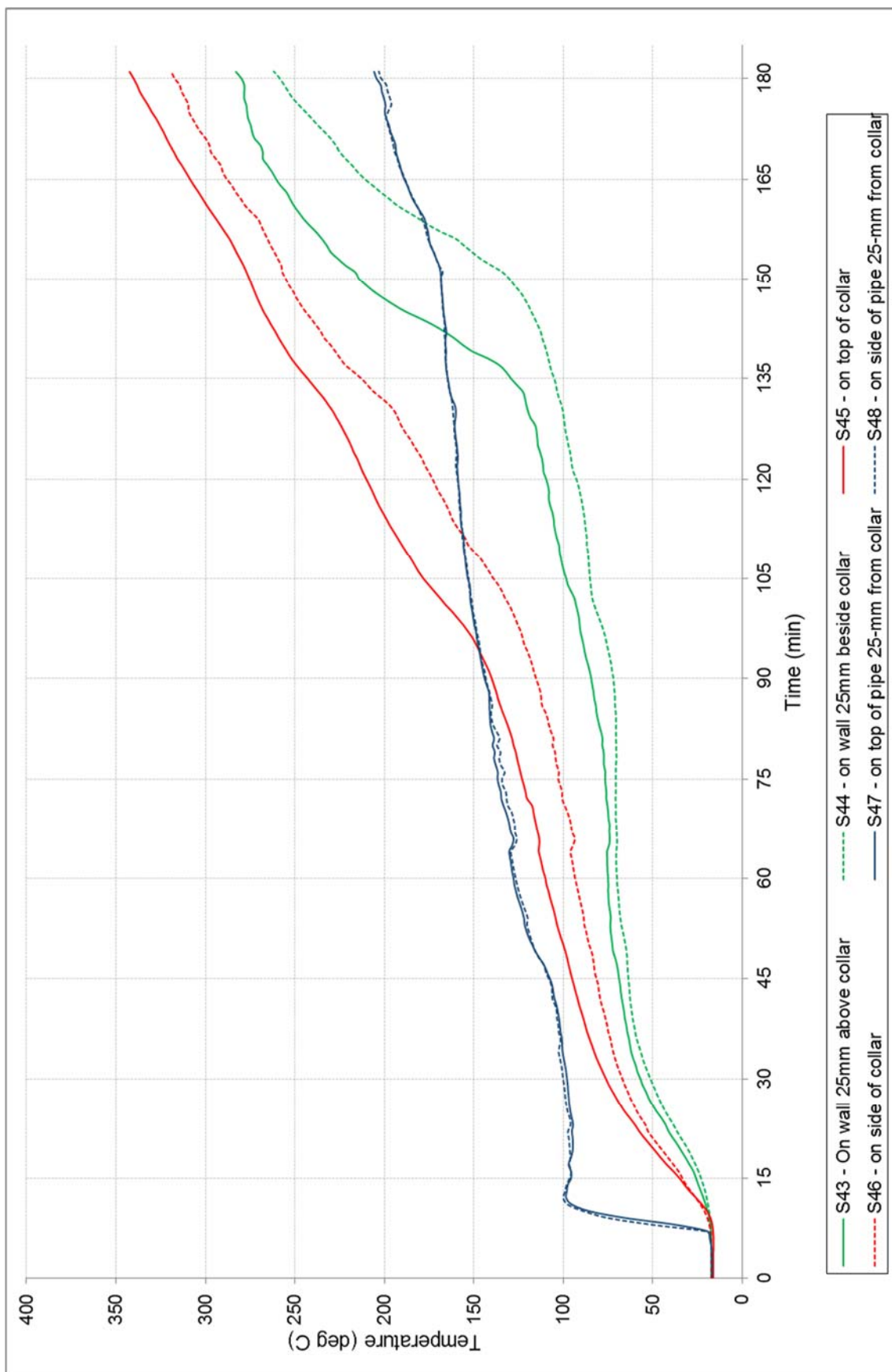


FIGURE 10 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 8



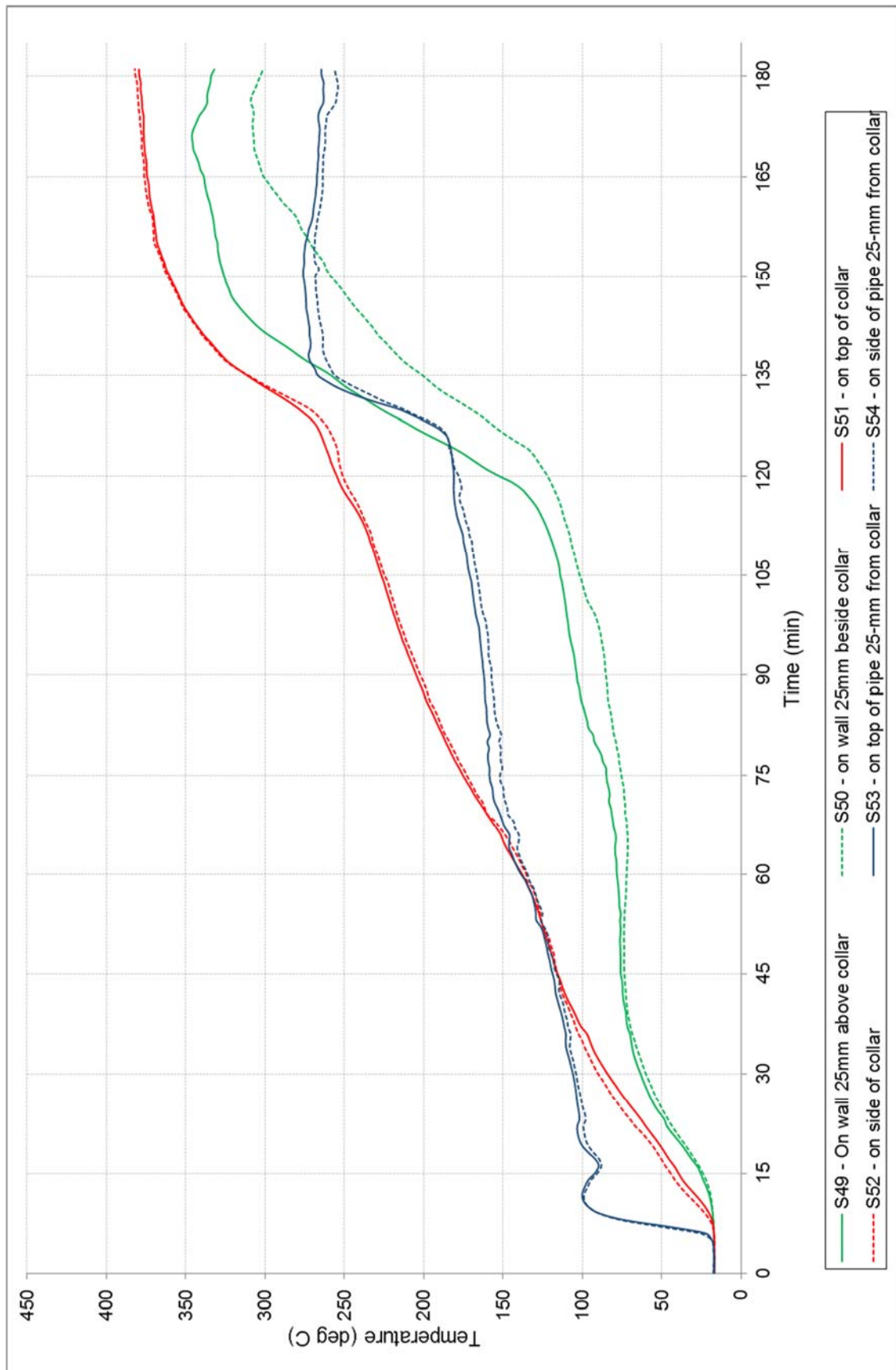
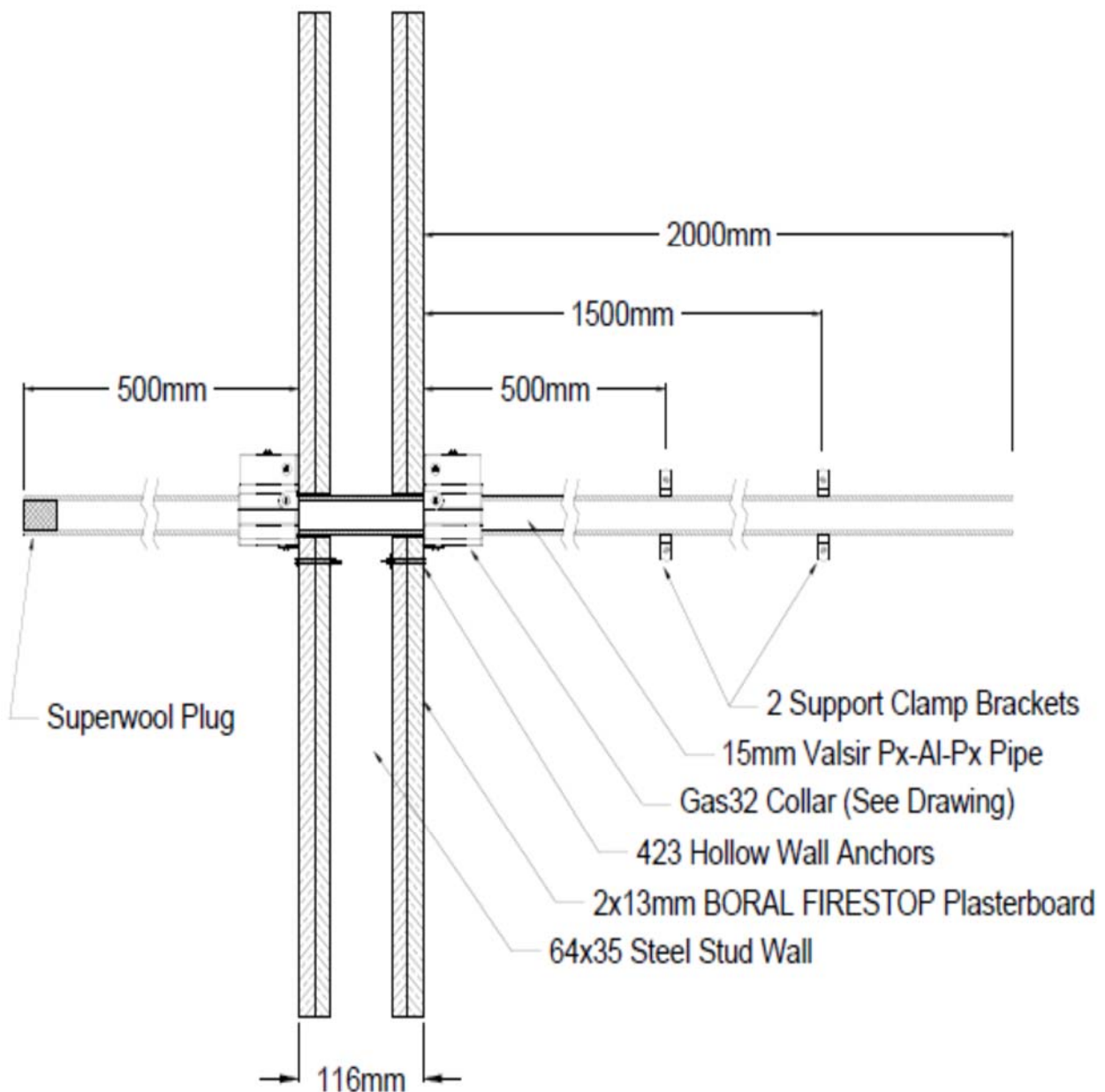


FIGURE 11 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 9

## Appendix D – Installation drawings

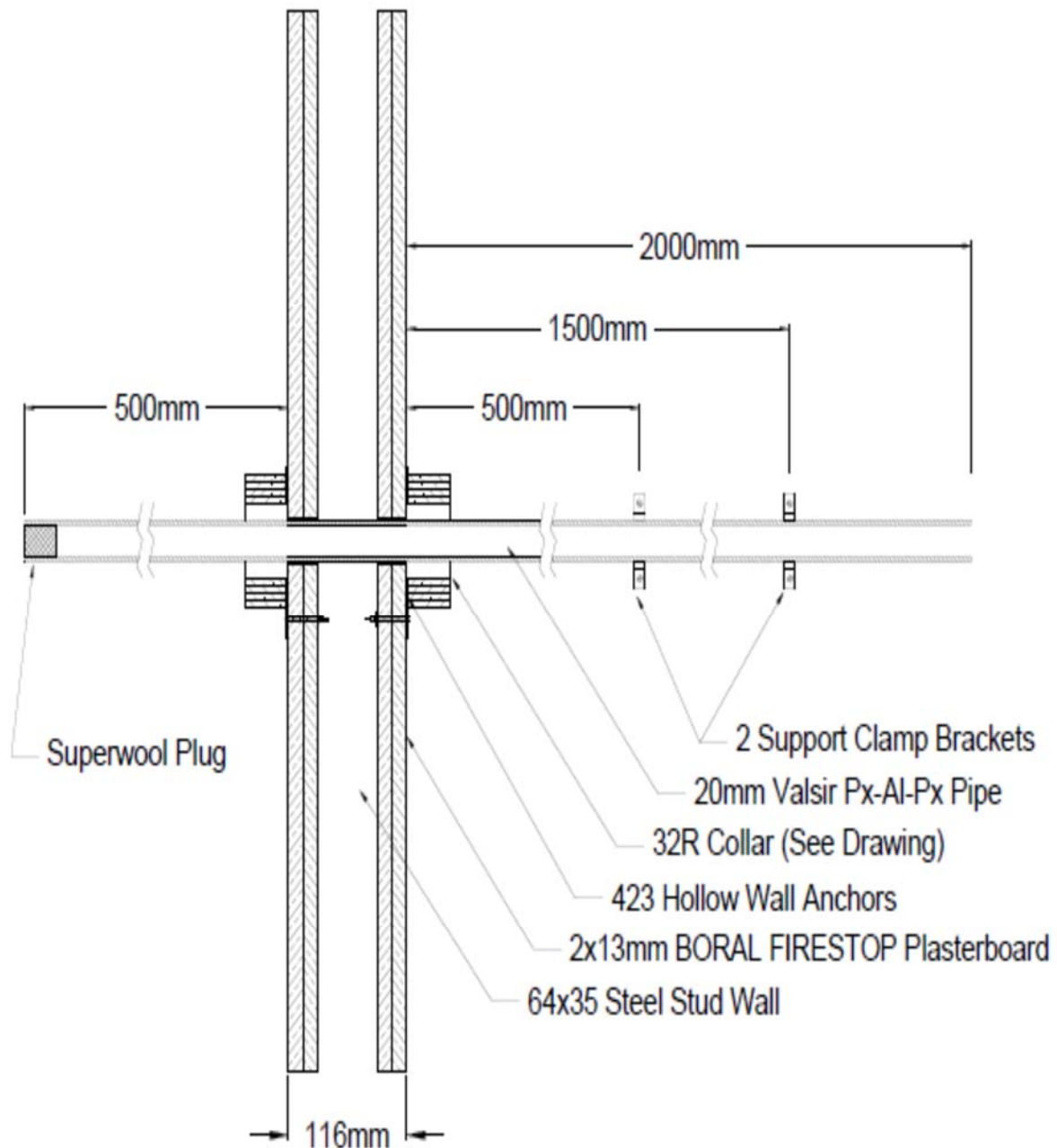
Test Wall W-16-B Penetration #1  
15mm Valsir Px-Al-Px Pipe – Gas32 Collar  
19 AUG 2016



DRAWING TITLED "TEST WALL W-16-B PENETRATION #1, 15-MM VALSIR PX-AL-PX PIPE – GAS32 COLLAR, DATED 19 AUGUST 2016".

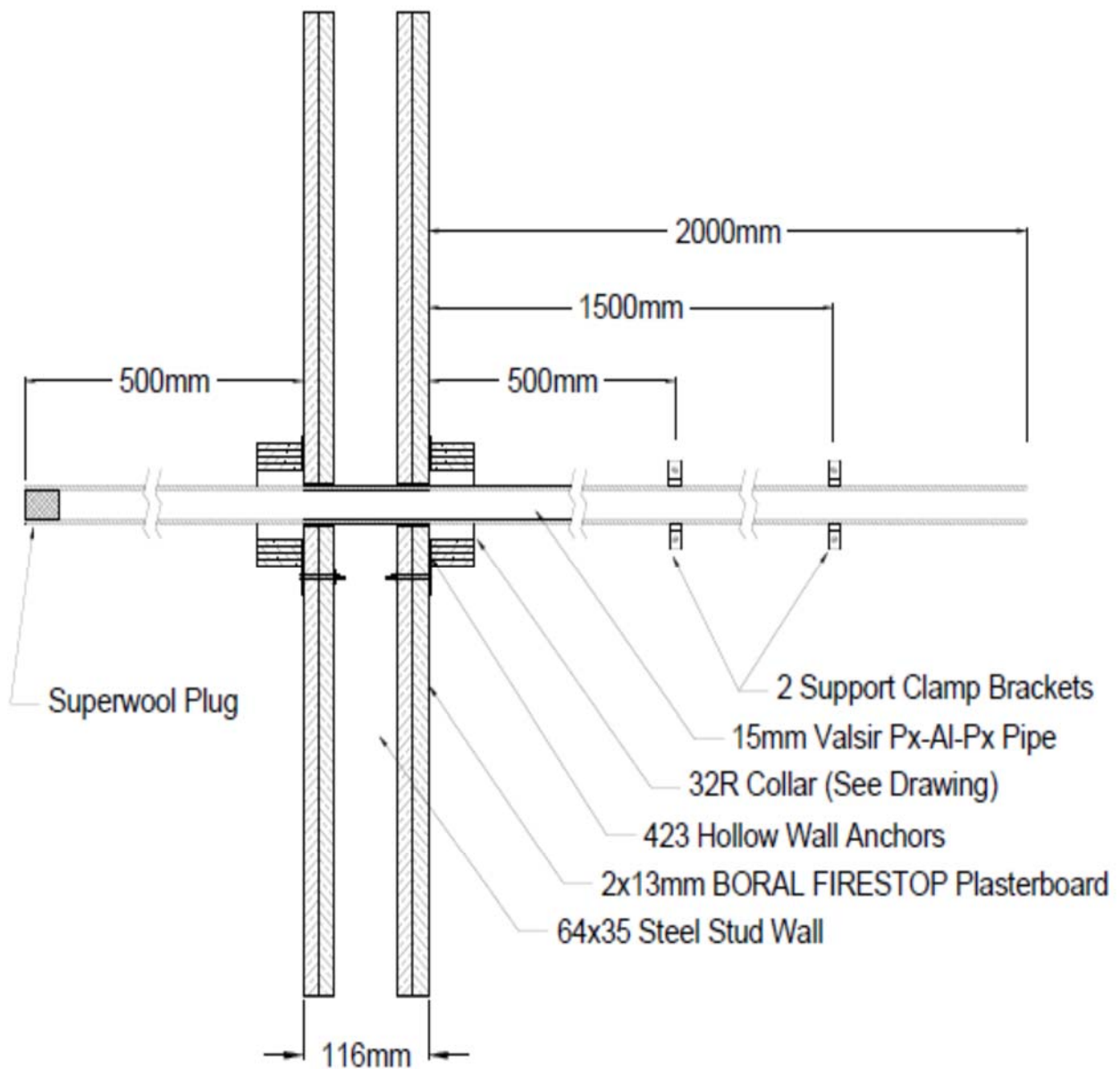


Test Wall W-16-B Penetration #2  
20mm Valsir Px-Al-Px Pipe – 32R Retrofit Collar  
19 AUG 2016



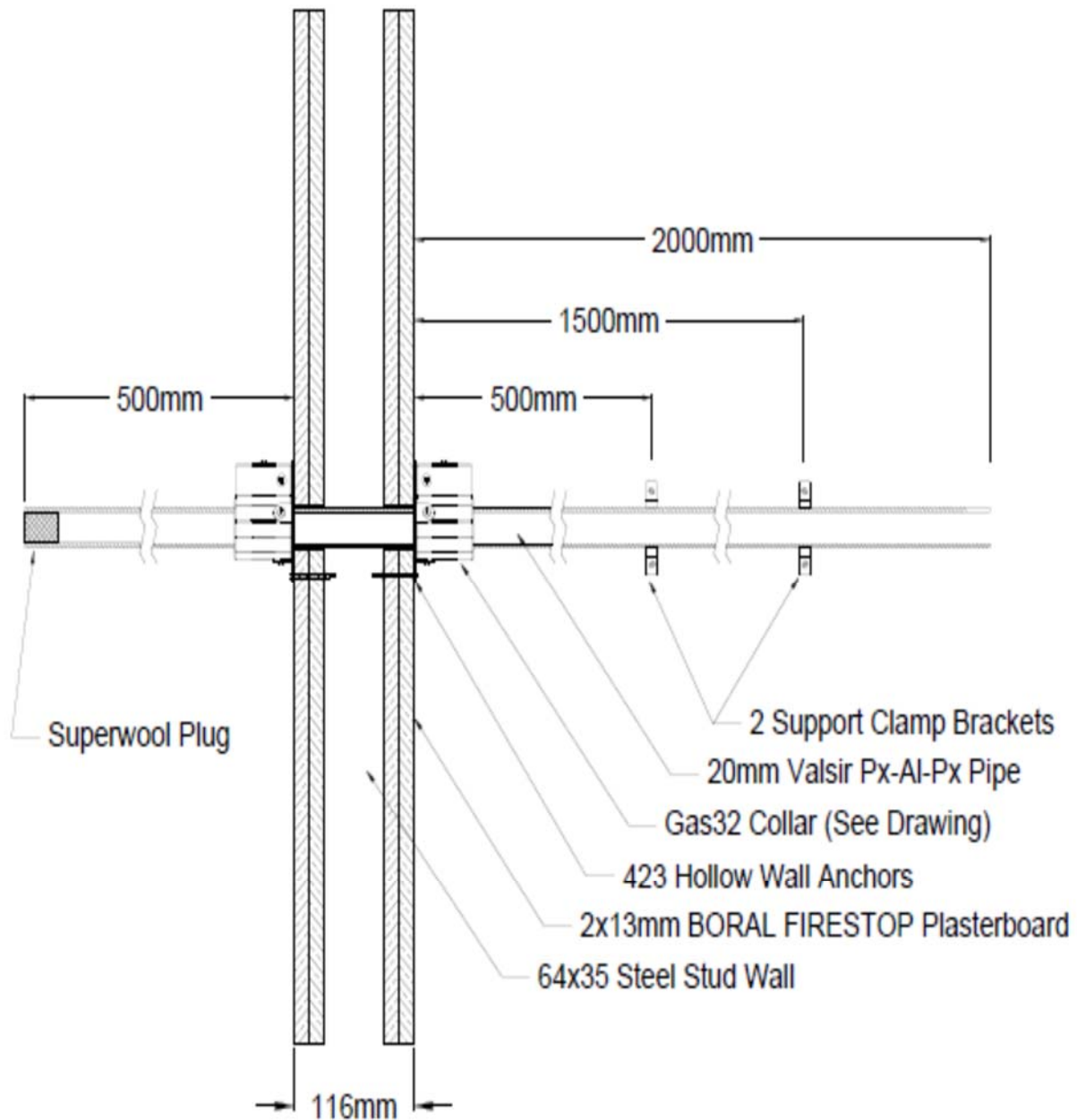
**DRAWING TITLED "TEST WALL W-16-B PENETRATION #2, 20-MM VALSIR PX-AL-PX PIPE – 32R COLLAR, DATED 19 AUGUST 2016".**

Test Wall W-16-B Penetration #3  
15mm Valsir Px-Al-Px Pipe – 32R Collar  
19 AUG 2016



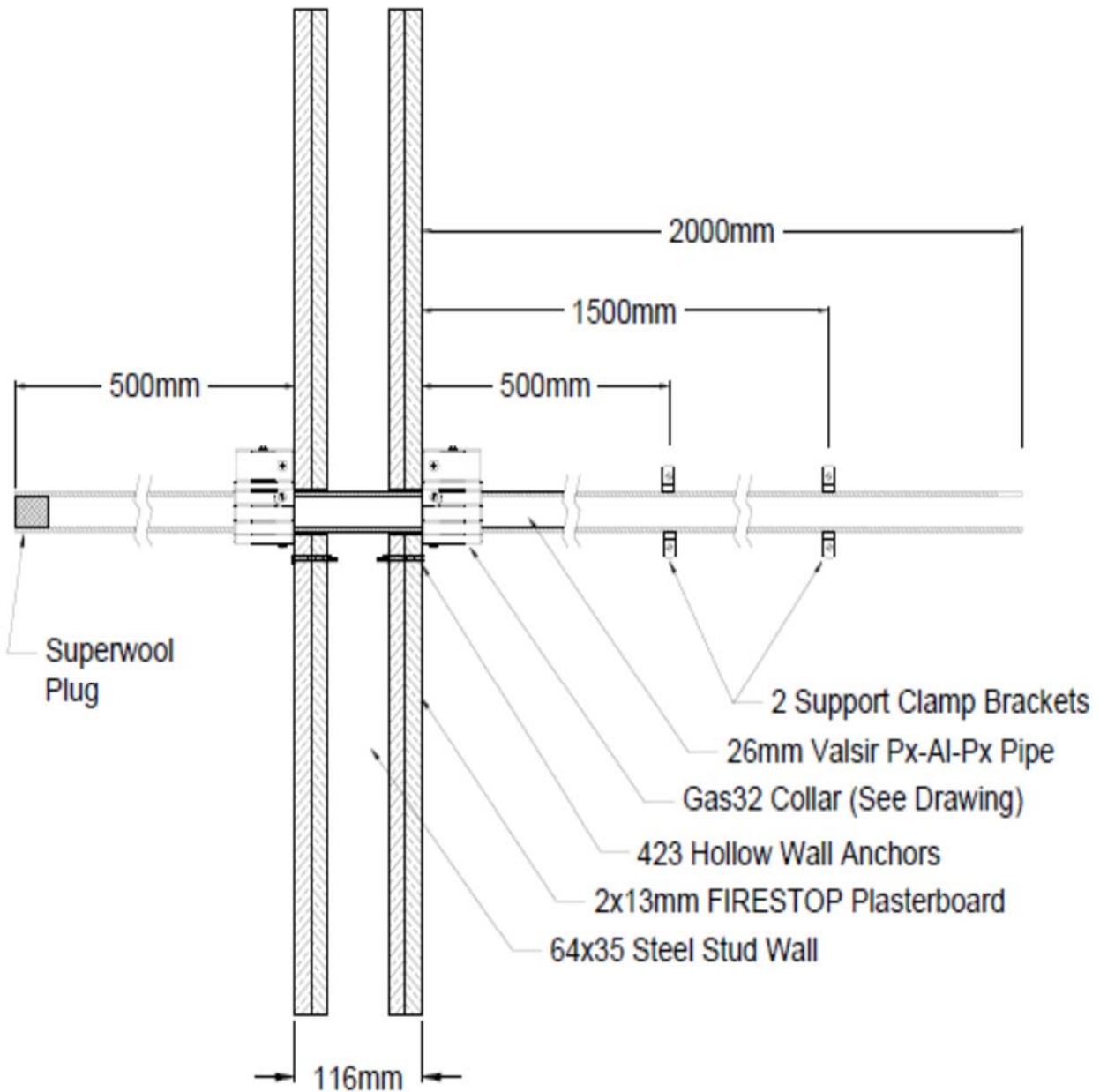
**DRAWING TITLED "TEST WALL W-16-B PENETRATION #3, 15-MM VALSIR PX-AL-PX PIPE – 32R COLLAR, DATED 19 AUGUST 2016".**

Test Wall W-16-B Penetration # 4  
20mm Valsir Px-Al-Px Pipe – Gas32 Collar  
19 AUG 2016



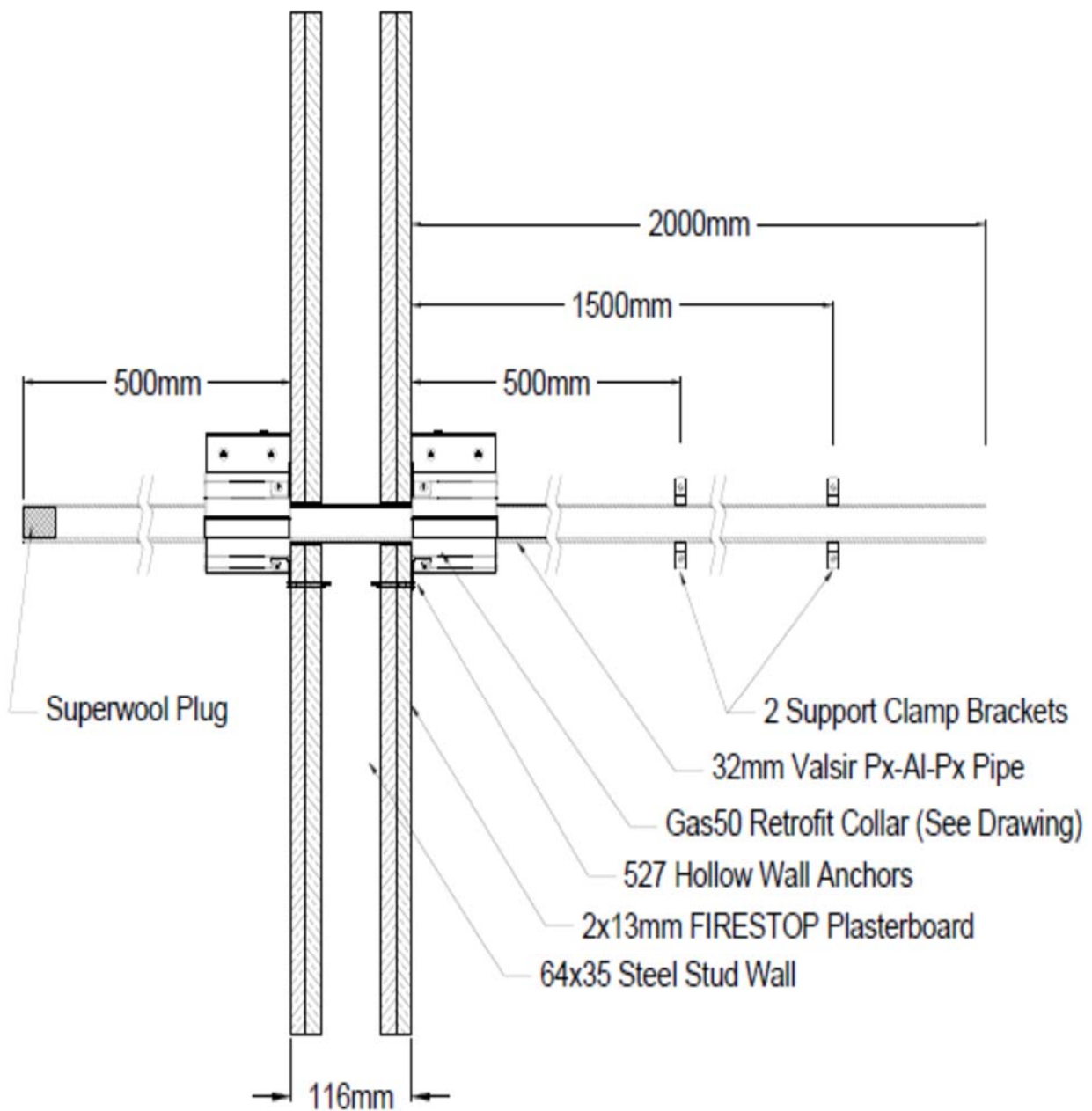
DRAWING TITLED "TEST WALL W-16-B PENETRATION #4, 20-MM VALSIR PX-AL-PX PIPE – GAS32 COLLAR, DATED 19 AUGUST 2016".

Test Wall W-16-B Penetration #5  
 26mm Valsir Px-Al-Px Pipe – Gas32 Collars  
 19 AUG 2016



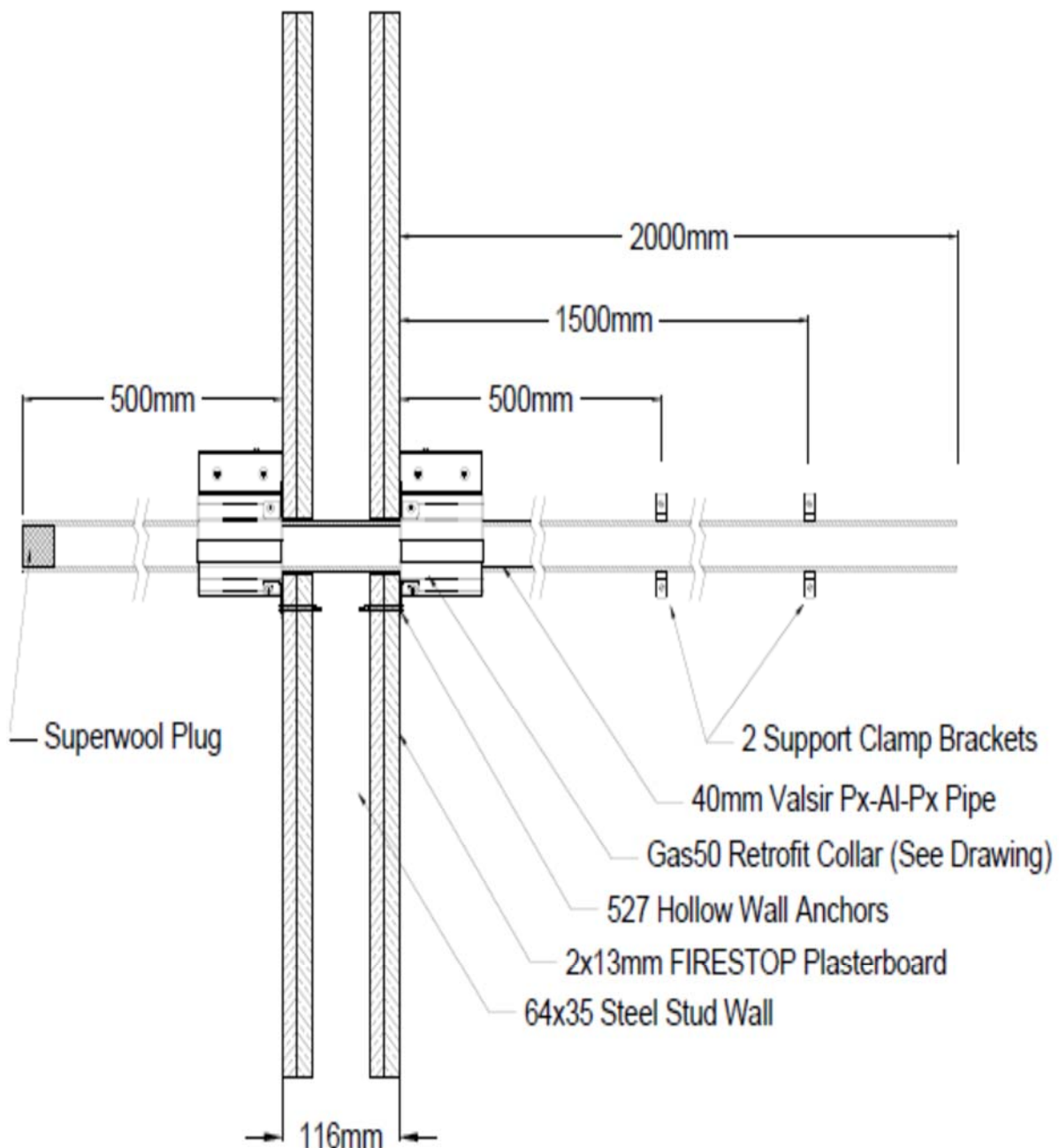
DRAWING TITLED "TEST WALL W-16-B PENETRATION #5, 26-MM VALSIR PX-AL-PX PIPE – GAS32 COLLAR, DATED 19 AUGUST 2016".

Test Wall W-16-B Penetration #6  
32mm Valsir Px-Al-Px Pipe – Gas50 Collar  
19 AUG 2016



**DRAWING TITLED "TEST WALL W-16-B PENETRATION #6, 32-MM VALSIR PX-AL-PX PIPE – GAS50 COLLAR, DATED 19 AUGUST 2016".**

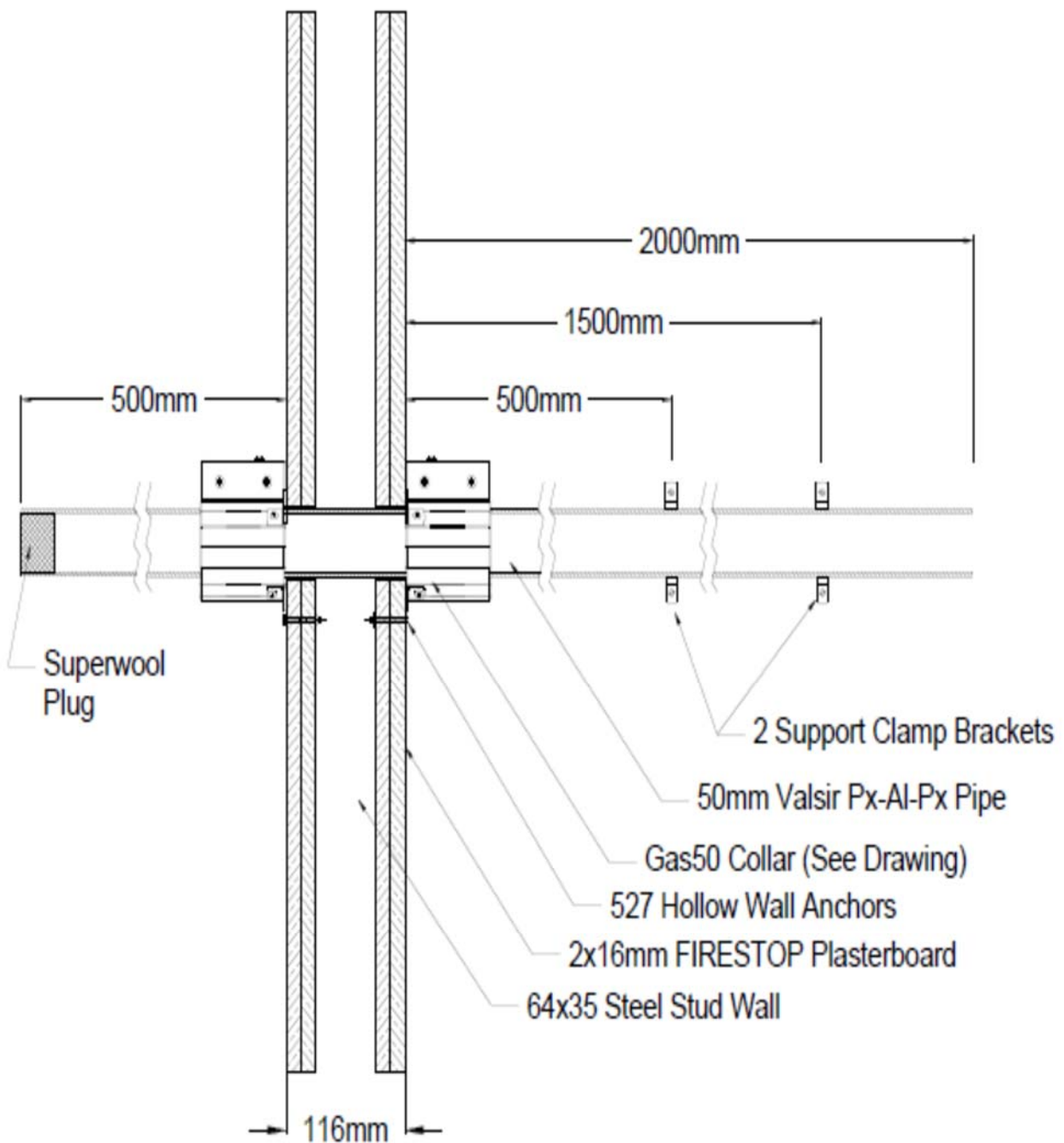
Test Wall W-16-B Penetration #7  
 40mm Valsir Px-Al-Px Pipe – Gas50 Collar  
 19 AUG 2016



**DRAWING TITLED “TEST WALL W-16-B PENETRATION #7, 40-MM VALSIR PX-AL-PX PIPE – GAS50 COLLAR, DATED 19 AUGUST 2016”.**

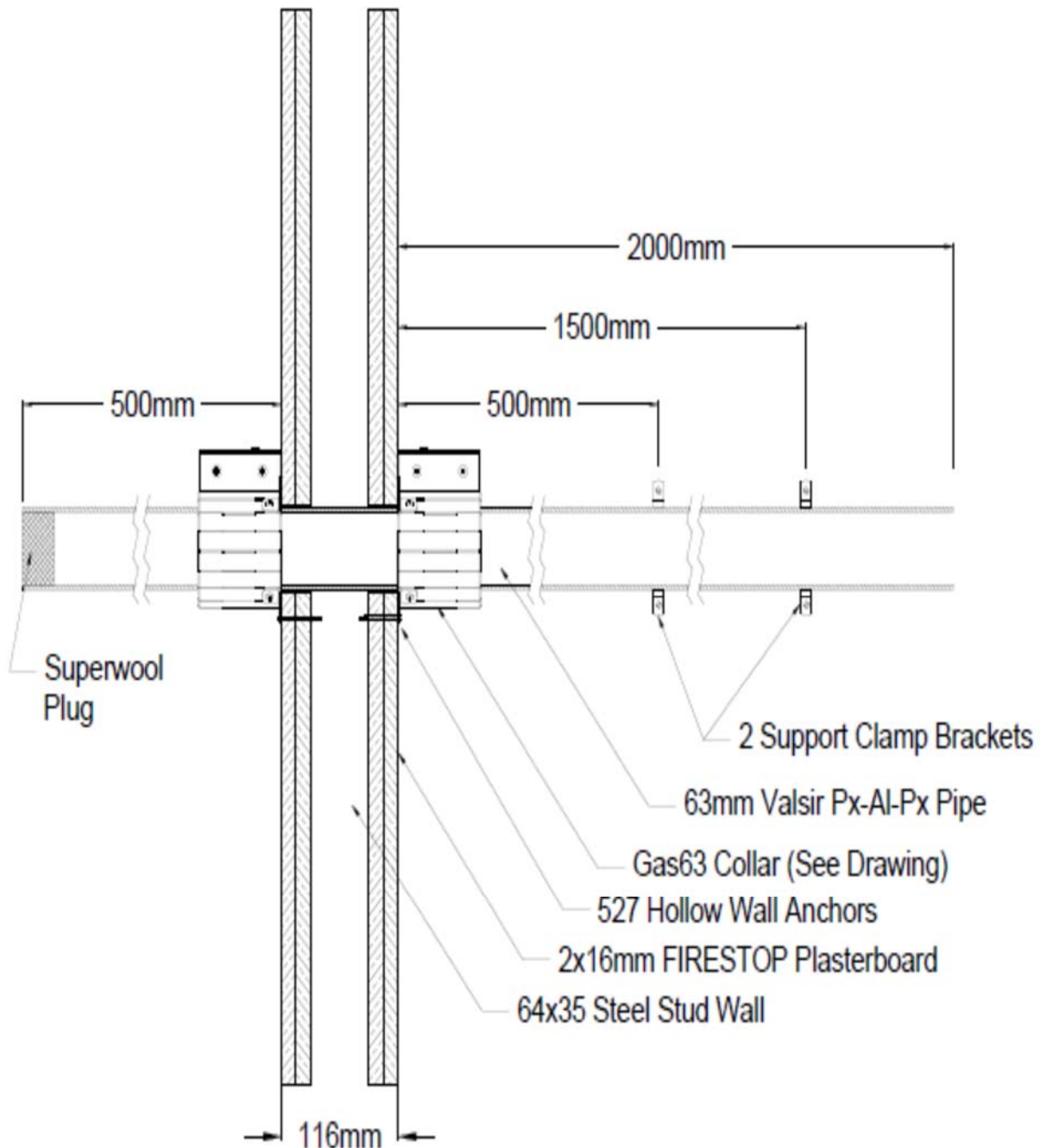


Test Wall W-16-B Penetration #8  
50mm Valsir Px-Al-Px Pipe – Gas50 Collar  
19 AUG 2016



DRAWING TITLED "TEST WALL W-16-B PENETRATION #8, 50-MM VALSIR PX-AL-PX PIPE – GAS50 COLLAR, DATED 19 AUGUST 2016".

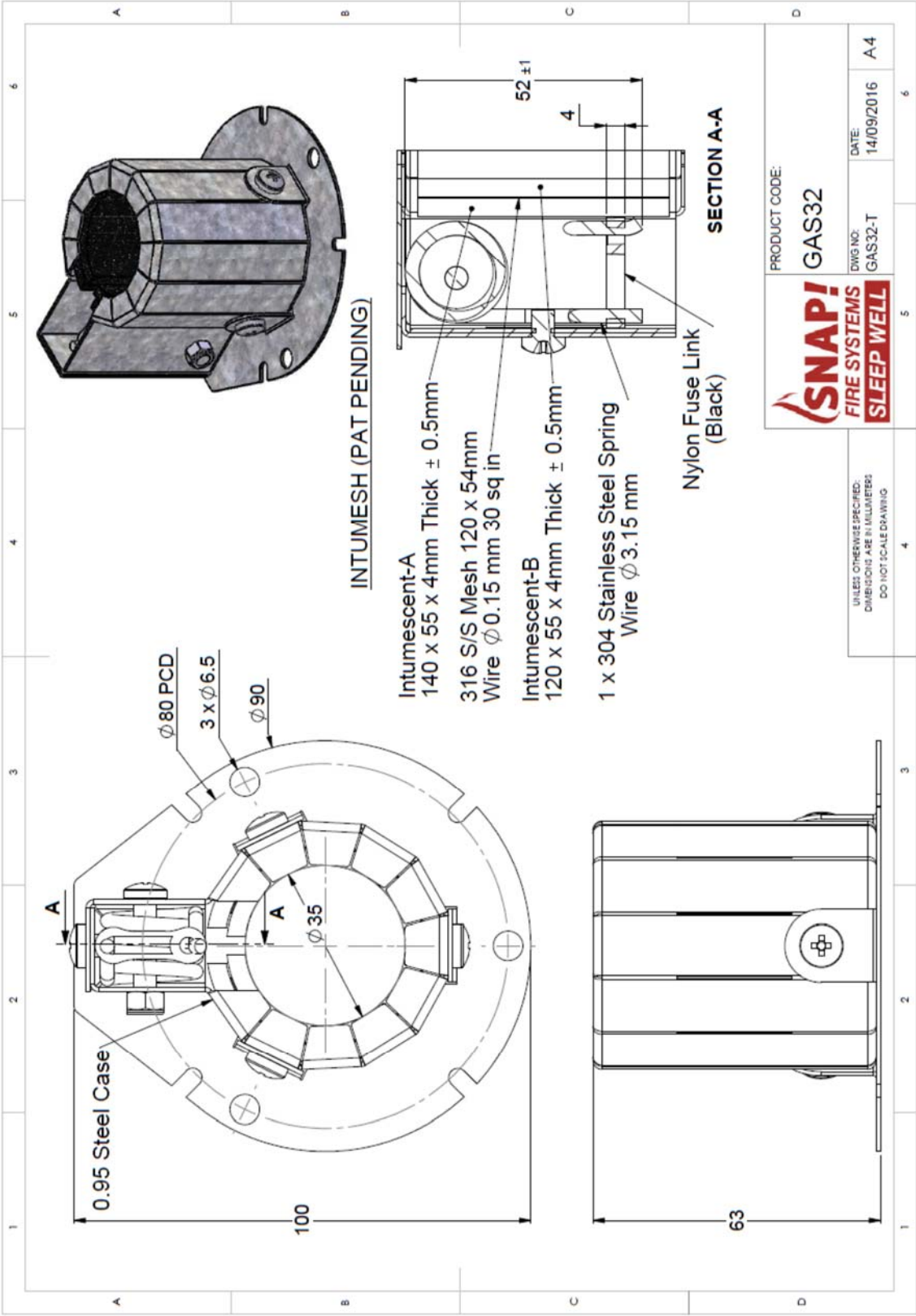
Test Wall W-16-B Penetration #9  
63mm Valsir Px-Al-Px Pipe – Gas63 Collar  
19 AUG 2016



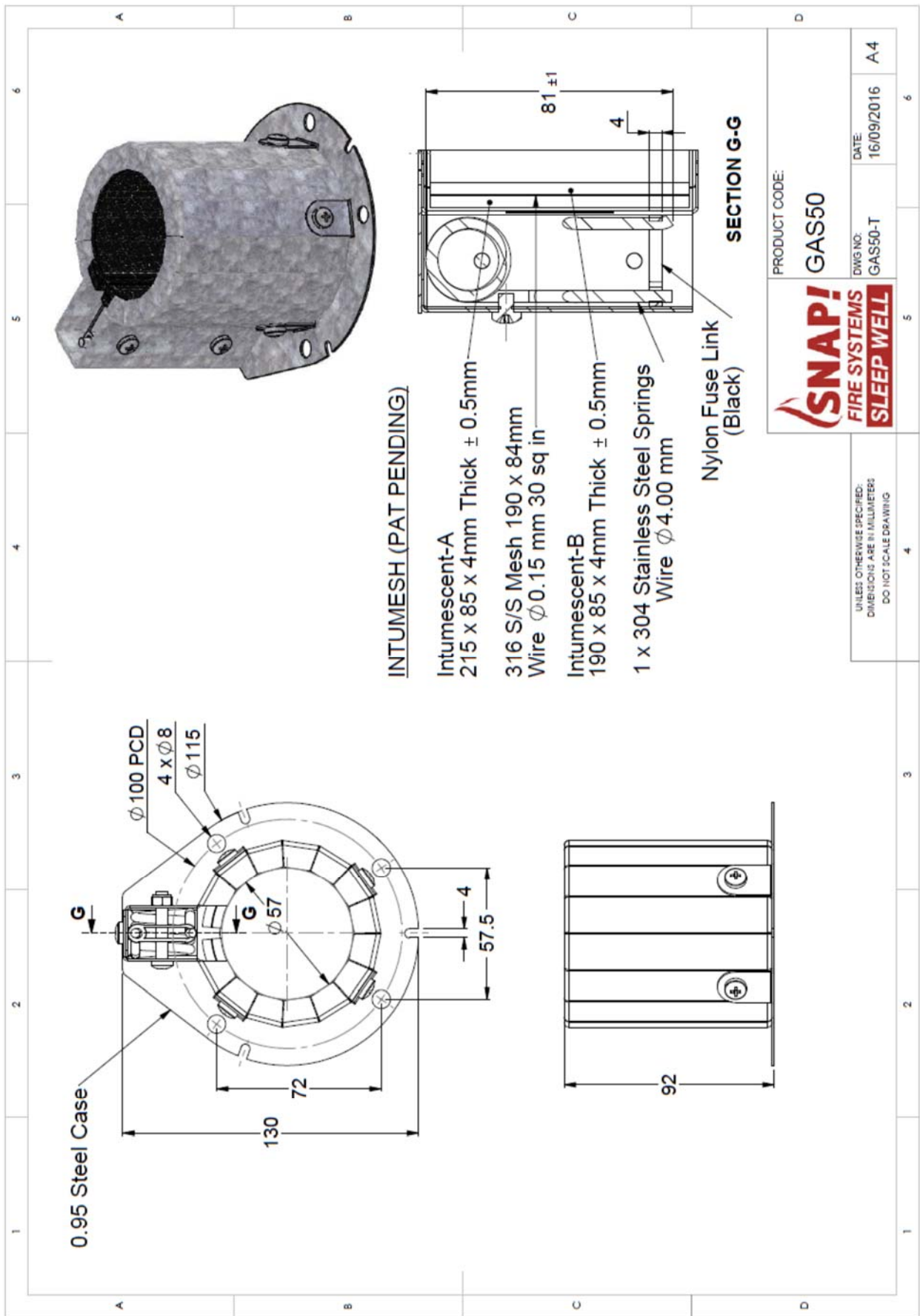
DRAWING TITLED "TEST WALL W-16-B PENETRATION #9, 63-MM VALSIR PX-AL-PX PIPE – GAS63 COLLAR, DATED 19 AUGUST 2016".



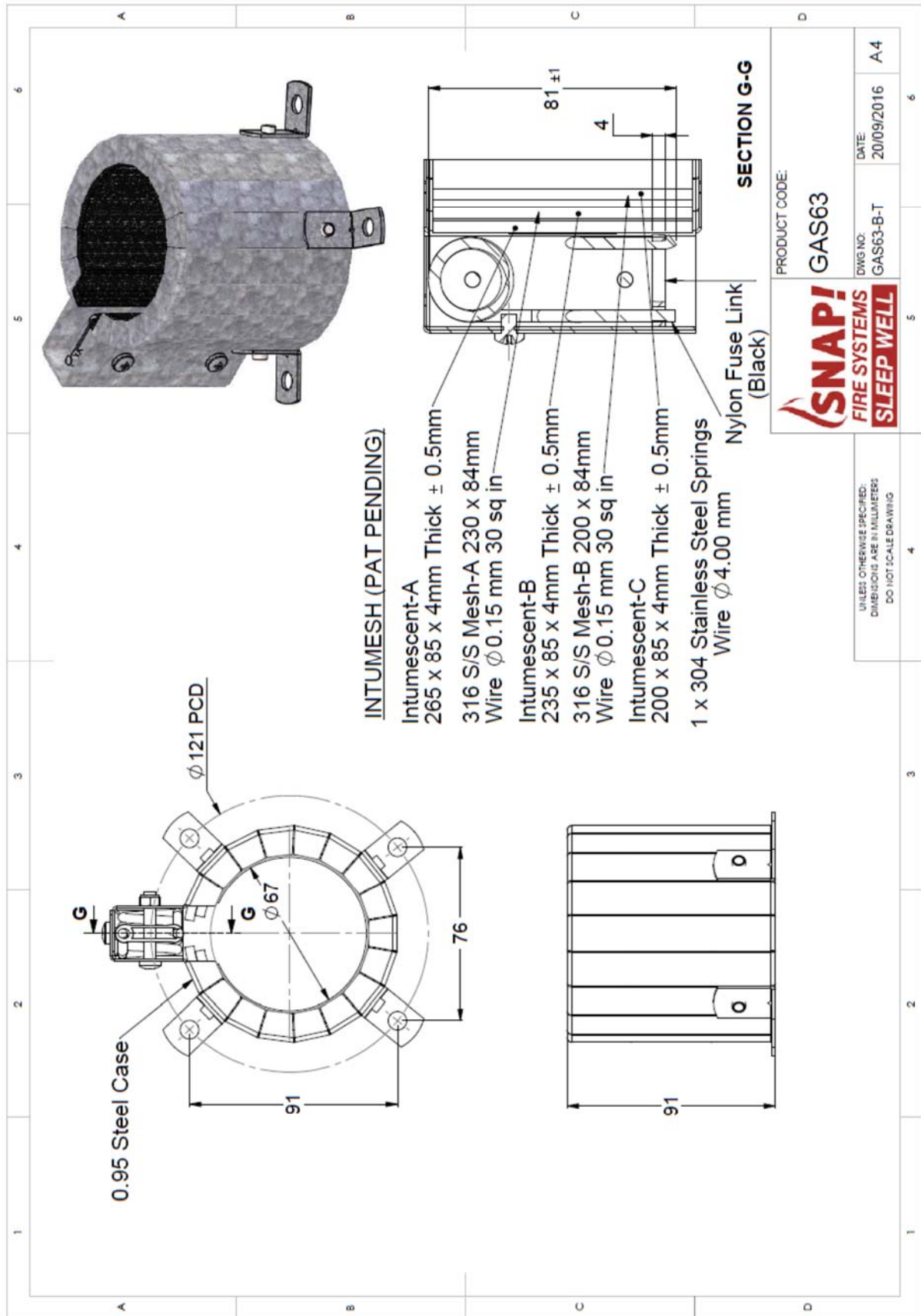
Appendix E – Specimen Drawings



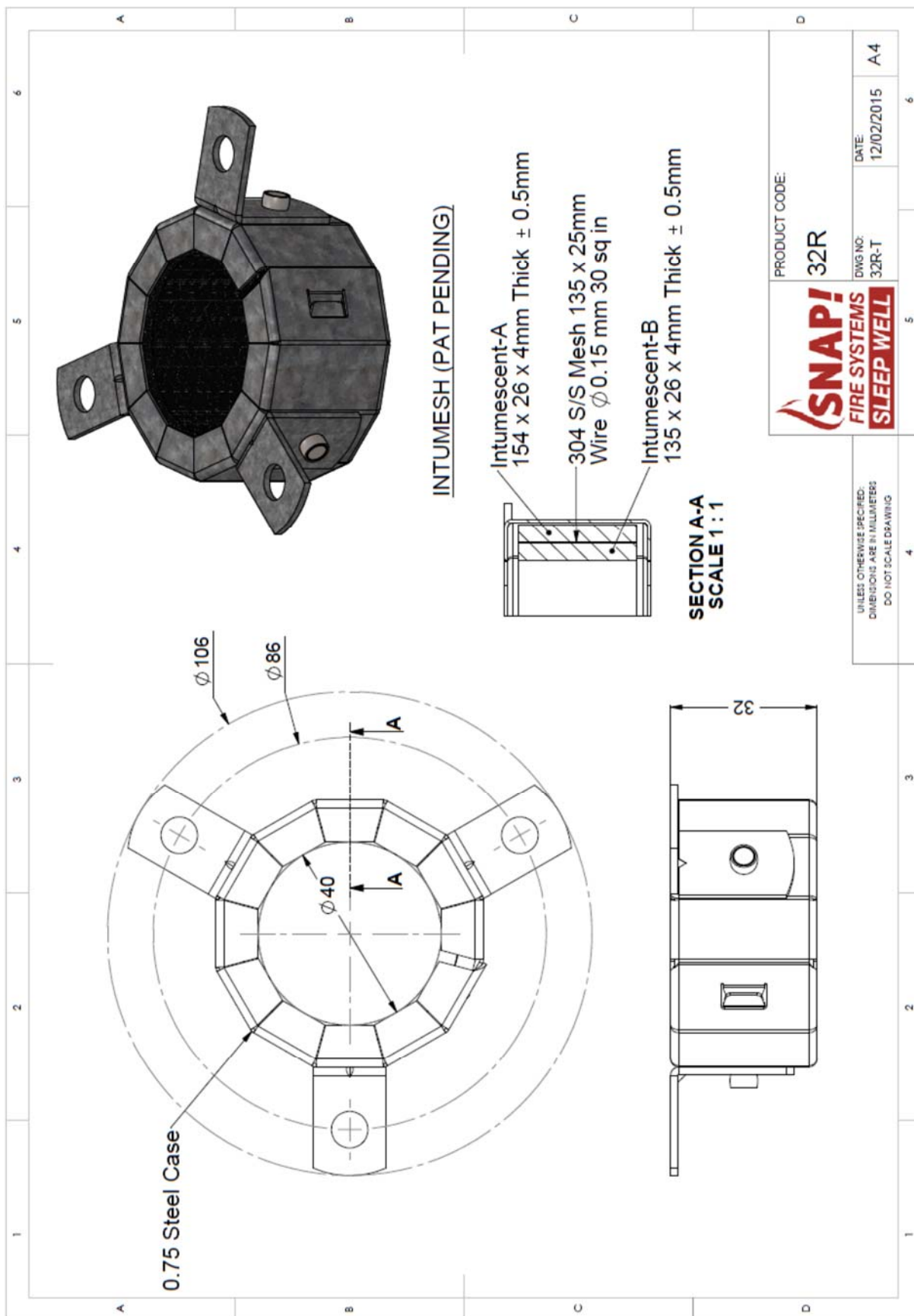
DRAWING NUMBERED GAS32-T, DATED 14 SEPTEMBER 2016, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING NUMBERED GAS50-T, DATED 16 SEPTEMBER 2016, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING NUMBERED GAS63-B-T, DATED 20 SEPTEMBER 2016, BY SNAP FIRE SYSTEMS PTY LTD.



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



## Appendix F – Certificates

INFRASTRUCTURE TECHNOLOGIES www.csiro.au		CSIRO
14 Julius Avenue, North Ryde NSW 2113 PO Box 52, North Ryde NSW 1670, Australia T (02) 9490 5444 • ABN 41 687 119 230		
<h1>Certificate of Test</h1>		No. 2872
"Copyright CSIRO 2016 ©" Copying or alteration of this report without written authorisation from CSIRO is forbidden.		
This is to certify that the element of construction described below was tested by CSIRO Infrastructure Technologies in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4 Fire-resistance tests of elements of construction, 2014 on behalf of:		
Snap Fire Systems Pty Ltd Building A, 1343 Wynnum Road Tingalpa QLD 4173		
A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1759.		
Product Name: Penetration # 1 – GAS32 retrofitted fire collar protecting a 15-mm Valsir Px-Al-Px Pipe		
Description:	The sponsor identified the specimen as a GAS32 retrofitted fire collar protecting a Boral Firestop wall system with an established fire resistance level (FRL) of -/120/120, penetrated by a 15-mm Valsir Px-Al-Px Pipe. The GAS32 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 35-mm inner diameter and a 90-mm diameter base flange. The 63-mm high collar casing incorporated a layer of 140-mm x 55-mm x 4-mm thick Intumescent material and a layer of 120-mm x 55-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 120 x 54-mm as shown in drawing numbered GAS32-T dated 14 September 2016, by Snap Fire Systems Pty Ltd. The penetrating service comprised a 15-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 2-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-16-B Penetration # 1, 15-mm Valsir Px-Al-Px Pipe – Gas32 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.	
Structural Adequacy	not applicable	
Integrity	no failure at 181 minutes	
Insulation	no failure at 181 minutes	
and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120. The fire-resistance level of the wall system is applicable when the system is exposed to fire from either direction. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.		
Testing Officer:	Russell Collins	Date of Test: 20 July 2016
Issued on the 15 <sup>th</sup> day of November 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 - Testing	

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No. 2873

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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1759.

Product Name: Penetration # 2 – 32R retrofitted fire collar protecting a 20-mm Valsir Px-Al-Px Pipe

Description: The sponsor identified the specimen as a 32R retrofitted fire collar protecting a Boral Firestop wall system with an established fire resistance level (FRL) of -/120/120, penetrated by a 20-mm Valsir Px-Al-Px Pipe. The 32R Retrofit collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 12 February 2015, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors. The penetrating service comprised a 20-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 2.8-mm fitted through the collar's sleeve and penetrating the plasterboard wall through a 22-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-B Penetration # 2, 20-mm Valsir Px-Al-Px Pipe – 32R Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 181 minutes
Insulation	109 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/90. The fire-resistance level of the wall system is applicable when the system is exposed to fire from either direction. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Russell Collins

Date of Test: 20 July 2016

Issued on the 15<sup>th</sup> day of November 2016 without alterations or additions.

Brett Roddy  
 Manager, Fire Testing and Assessments



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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1759.

Product Name: Penetration # 3 – 32R retrofitted fire collar protecting a 15-mm Valsir Px-Al-Px Pipe

Description: The sponsor identified the specimen as a 32R retrofitted fire collar protecting a Boral Firestop wall system with an established fire resistance level (FRL) of -/120/120, penetrated by a 15-mm Valsir Px-Al-Px Pipe. The 32R Retrofit collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism 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 15-mm Valsir Px-Al-Px stack 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-16-B Penetration # 3, 15-mm Valsir Px-Al-Px Pipe – 32R Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 181 minutes
Insulation	169 minutes

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

Testing Officer: Russell Collins

Date of Test: 20 July 2016

Issued on the 15<sup>th</sup> day of November 2016 without alterations or additions.

Brett Roddy  
 Manager, Fire Testing and Assessments



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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1759.

Product Name: Penetration # 4 – GAS32 retrofitted fire collar protecting a 20-mm Valsir Px-Al-Px Pipe

Description: The sponsor identified the specimen as a GAS32 retrofitted fire collar protecting a Boral Firestop wall system with an established fire resistance level (FRL) of -/120/120, penetrated by a 20-mm Valsir Px-Al-Px Pipe. The GAS32 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 35-mm inner diameter and a 90-mm diameter base flange. The 63-mm high collar casing incorporated a layer of 140-mm x 55-mm x 4-mm thick Intumescent material and a layer of 120-mm x 55-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 120 x 54-mm as shown in drawing numbered GAS32-T dated 14 September 2016, by Snap Fire Systems Pty Ltd. The penetrating service comprised a 20-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 2.9-mm fitted through the collar's sleeve and penetrating the plasterboard wall through a 22-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-B Penetration # 4, 20-mm Valsir Px-Al-Px Pipe – Gas32 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 181 minutes
Insulation	176 minutes

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

Testing Officer: Russell Collins

Date of Test: 20 July 2016

Issued on the 15<sup>th</sup> day of November 2016 without alterations or additions.

Brett Roddy  
 Manager, Fire Testing and Assessments



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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1759.

Product Name: Penetration # 5 – GAS32 retrofitted fire collar protecting a 26-mm Valsir Px-Al-Px Pipe

Description: The sponsor identified the specimen as a GAS32 retrofitted fire collar protecting a Boral Firestop wall system with an established fire resistance level (FRL) of -/120/120, penetrated by a 26-mm Valsir Px-Al-Px Pipe. The GAS32 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 35-mm inner diameter and a 90-mm diameter base flange. The 63-mm high collar casing incorporated a layer of 140-mm x 55-mm x 4-mm thick Intumescent material and a layer of 120-mm x 55-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 120 x 54-mm as shown in drawing numbered GAS32-T dated 14 September 2016, by Snap Fire Systems Pty Ltd. The penetrating service comprised a 26-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 3.4-mm fitted through the collar's sleeve and penetrating the plasterboard wall through a 29-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-B Penetration # 5, 26-mm Valsir Px-Al-Px Pipe – Gas32 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 181 minutes
Insulation	138 minutes

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

Testing Officer: Russell Collins

Date of Test: 20 July 2016

Issued on the 15<sup>th</sup> day of November 2016 without alterations or additions.

Brett Roddy  
 Manager, Fire Testing and Assessments



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## Certificate of Test

No. 2877

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This is to certify that the element of construction described below was tested by CSIRO Infrastructure Technologies in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4 Fire-resistance tests of elements of construction, 2014 on behalf of:

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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1759.

Product Name: Penetration # 6 – GAS50 retrofitted fire collar protecting a 32-mm Valsir Px-Al-Px Pipe

Description: The sponsor identified the specimen as a GAS50 retrofitted fire collar protecting a Boral Firestop wall system with an established fire resistance level (FRL) of -/120/120, penetrated by a 32-mm Valsir Px-Al-Px Pipe. The GAS50 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 57-mm inner diameter and a 115-mm diameter base flange. The 92-mm high collar casing incorporated a layer of 215-mm x 85-mm x 4-mm thick Intumescent material and a layer of 190-mm x 85-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 190 x 84-mm as shown in drawing numbered GAS50-T dated 16 September 2016, by Snap Fire Systems Pty Ltd. The penetrating service comprised a 32-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 3.6-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-16-B Penetration # 6, 32-mm Valsir Px-Al-Px Pipe – Gas50 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 181 minutes
Insulation	140 minutes

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

Testing Officer: Russell Collins

Date of Test: 20 July 2016

Issued on the 15<sup>th</sup> day of November 2016 without alterations or additions.

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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1759.

Product Name: Penetration # 7 – GAS50 retrofitted fire collar protecting a 40-mm Valsir Px-Al-Px Pipe

Description: The sponsor identified the specimen as a GAS50 retrofitted fire collar protecting a Boral Firestop wall system with an established fire resistance level (FRL) of -/120/120, penetrated by a 40-mm Valsir Px-Al-Px Pipe. The GAS50 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 57-mm inner diameter and a 115-mm diameter base flange. The 92-mm high collar casing incorporated a layer of 215-mm x 85-mm x 4-mm thick Intumescent material and a layer of 190-mm x 85-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 190 x 84-mm as shown in drawing numbered GAS50-T dated 16 September 2016, by Snap Fire Systems Pty Ltd. The penetrating service comprised a 40-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 4-mm fitted through the collar's sleeve and penetrating the plasterboard wall through a 44-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-B Penetration # 7, 40-mm Valsir Px-Al-Px Pipe – Gas50 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 181 minutes
Insulation	170 minutes

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

Testing Officer: Russell Collins

Date of Test: 20 July 2016

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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1759.

Product Name: Penetration # 8 – GAS50 retrofitted fire collar protecting a 50-mm Valsir Px-Al-Px Pipe

Description: The sponsor identified the specimen as a GAS50 retrofitted fire collar protecting a Boral Firestop wall system with an established fire resistance level (FRL) of -/120/120, penetrated by a 50-mm Valsir Px-Al-Px Pipe. The GAS50 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 57-mm inner diameter and a 115-mm diameter base flange. The 92-mm high collar casing incorporated a layer of 215-mm x 85-mm x 4-mm thick Intumescent material and a layer of 190-mm x 85-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 190 x 84-mm as shown in drawing numbered GAS50-T dated 16 September 2016, by Snap Fire Systems Pty Ltd. The penetrating service comprised a 50-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 4.4-mm fitted through the collar's sleeve and penetrating the plasterboard wall through a 57-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-B Penetration # 8, 50-mm Valsir Px-Al-Px Pipe – Gas50 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 181 minutes
Insulation	114 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/90. The fire-resistance level of the wall system is applicable when the system is exposed to fire from either direction. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Russell Collins

Date of Test: 20 July 2016

Issued on the 15<sup>th</sup> day of November 2016 without alterations or additions.

*B. Roddy*

Brett Roddy  
Manager, Fire Testing and Assessments



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

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1759.

Product Name: Penetration # 9 – GAS63 retrofitted fire collar protecting a 63-mm Valsir Px-Al-Px Pipe

Description: The sponsor identified the specimen as a GAS63 retrofitted fire collar protecting a Boral Firestop wall system with an established fire resistance level (FRL) of -/120/120, penetrated by a 63-mm Valsir Px-Al-Px Pipe. The GAS63 Retrofit collar comprised a 0.95-mm thick galvanised steel casing with a 67-mm inner diameter and a 121-mm diameter base flange. The 91-mm high collar casing incorporated a layer of 265-mm x 85-mm x 4-mm thick Intumescent material, a layer of 235-mm x 85-mm x 4-mm thick Intumescent material and a layer of 200-mm x 85-mm x 4-mm thick Intumescent material. The closing mechanism comprised 1 x 304 stainless steel spring bound with a black nylon fuse link, one layer of 316 stainless steel mesh measuring 230 x 84-mm, and one layer of 316 stainless steel mesh measuring 200 x 84-mm as shown in drawing numbered GAS63-B-T dated 20 September 2016, by Snap Fire Systems Pty Ltd. The penetrating service comprised a 63-mm Valsir Px-Al-Px stack pipe, with a wall thickness of 5.4-mm fitted through the collar's sleeve and penetrating the plasterboard wall through a 67-mm diameter cut-out hole as shown in drawing titled "Test Wall W-16-B Penetration # 9, 63-mm Valsir Px-Al-Px Pipe – Gas63 Collar, dated 19 August 2016". The pipe projected horizontally, 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 and 1500-mm from the unexposed face of the plasterboard wall by two support clamps spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Superwool) plug.

Structural Adequacy	not applicable
Integrity	no failure at 181 minutes
Insulation	86 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/60. The fire-resistance level of the wall system is applicable when the system is exposed to fire from either direction. The fire-resistance level (FRL) are limited to that of the separating element. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Russell Collins

Date of Test: 20 July 2016

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# References

The following informative documents are referred to in this Report:

AS 1530.4-2014	Methods for fire tests on building materials, components and structures part 4: fire-resistance tests of elements of building construction.
AS 4072.1-2005	Components for the protection of openings in fire-resistant separating elements. Part 1: service penetrations and control joints.
AS 4176.1-2010	Multilayer pipes for pressure applications - Multilayer piping systems for hot and cold water plumbing applications - General (ISO 21003-1:2008, MOD)

----end of report----

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#### FOR FURTHER INFORMATION

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