Fire-resistance test on fire collars protecting a concrete slab penetrated by services

Test Report

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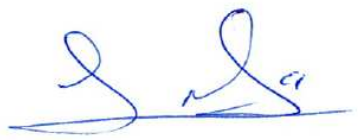	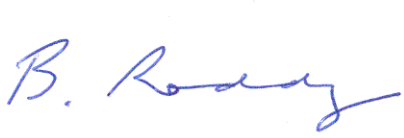	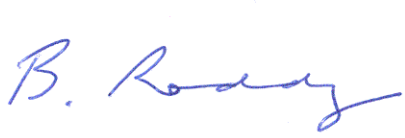
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Contents

Fire-resistance test on fire collars protecting a concrete slab penetrated by services

Sponsored Investigation No. FSP 1615

1 Introduction

1.1 Identification of specimen

The sponsor identified the specimen as Snap Cast-in Fire Collars protecting a concrete slab penetrated by four high-density polyethylene (HDPE) pipes and one Polyvinyl Chloride (PVC) pipe.

1.2 Sponsor

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

1.3 Manufacturer

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

1.4 Test standard

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

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 4395/3722

1.7 Test date

The fire-resistance test was conducted on 2 December 2013.

2 Description of specimen

2.1 General

The specimen comprised a 1150-mm x 1150-mm x 150-mm thick reinforced concrete slab penetrated by four High-density polyethylene (HDPE) pipes and one Polyvinyl Chloride (PVC) pipe protected by cast-in Snap Fire System fire collars.

For the purpose of the test, the specimens were referenced as Penetrations 1, 2, 3, 4 and 5.

Penetration 1 – HP 150 R retrofitted fire collar protecting a 160-mm high-density polyethylene (HDPE) pipe

The SNAP retrofitted HP 150 R fire collar comprised a 0.95-mm steel case with a 175-mm inner diameter and a 308-mm diameter base flange. The 117-mm high collar casing incorporated a 588-mm x 110-mm x 6-mm thick intumescent material. The closing mechanism comprised four stainless steel springs, a nylon fuse link and a 640-mm x 109-mm stainless steel mesh as shown in drawing numbered H 150 R-T, dated 23 January 2014, by SNAP Fire Systems. The fire collar was fixed to the slab by four brackets with PBZ0635 fasteners.

The penetrating service comprised a 160-mm high-density polyethylene (HDPE) pipe, with a measured wall thickness of 6-mm fitted through the collar's sleeve. The pipe projected vertically 2000-mm above the concrete slab and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped with kaowool plug on the exposed end.

On the unexposed face, the 5-mm gap between the pipe and the slab was filled with a bead of Sika Firerate Sealant.

Penetration 2 – HP 150 R retrofitted fire collar protecting a 160-mm Polyvinil Chloride (PVC) Sandwich Construction (SC) pipe with fitting inside the collar

The SNAP retrofitted HP 150 R fire collar comprised a 0.95-mm steel case with a 175-mm inner diameter and a 308-mm diameter base flange. The 117-mm high collar casing incorporated a 588-mm x 110-mm x 6-mm thick intumescent material. The closing mechanism comprised four stainless steel springs, a nylon fuse link and a 640-mm x 109-mm stainless steel mesh as shown in drawing numbered H 150 R-T, dated 23 January 2014, by SNAP Fire Systems. The fire collar was fixed to the slab by four brackets with PBZ0635 fasteners.

The penetrating service comprised a 160-mm PVC Sandwich Construction (SC) stack pipe, with a wall thickness of 3-mm fitted through the collar's sleeve. The pipe projected vertically 2000-mm above the concrete slab and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end.

On the exposed side of the slab a PVC 90° elbow was connected to the penetrating pipe, supported by M10 HKD and nut clip, fixed to the concrete slab as shown in drawing titled "Penetration #2 – PVC SC (160-mm) Stack with Fitting", dated 11 November 2013, by Snap Fire Systems Pty Ltd. The pipe was open at the unexposed end and capped on the exposed end.

On the unexposed face, the narrow gap between the pipe and the slab was filled with Sika Firerate Sealant.

Penetration 3 – HP 150 R retrofitted fire collar protecting a 125-mm high-density polyethylene (HDPE) pipe

The SNAP retrofitted HP 150 R fire collar comprised a 0.95-mm steel case with a 175-mm inner diameter and a 308-mm diameter base flange. The 117-mm high collar casing incorporated a 588-mm x 110-mm x 6-mm thick intumescent material. The closing mechanism comprised four stainless steel springs, a nylon fuse link and a 640-mm x 109-mm stainless steel mesh as shown in drawing numbered H 150 R-T, dated 23 January 2014, by SNAP Fire Systems. The fire collar was fixed to the slab by four brackets with PBZ0635 fasteners.

The penetrating service comprised a 125-mm high-density polyethylene (HDPE) pipe, with a wall thickness of 5-mm fitted through the collar's sleeve. The pipe projected vertically 2000-mm above the concrete slab and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped with Kaowool plug on the exposed end.
On the unexposed face, the 5-mm gap between the pipe and the slab was filled with a bead of Sika Firerate Sealant.

Penetration 4 – H 150 S-RR cast-in fire collar protecting a 125-mm high-density polyethylene (HDPE) pipe

The SNAP Cast-in H 150 S-RR fire collar comprised a 2-mm thick polypropylene casing with a 179-mm inner diameter and a 267-mm diameter base flange. The 110-mm high collar casing incorporated a 588-mm x 110-mm x 6-mm thick intumescent material. The closing mechanism comprised four stainless steel springs, a nylon fuse link and a 640-mm x 109-mm stainless steel mesh as shown in drawing numbered H 150 S-RR-T, dated 24 January 2014, by SNAP Fire Systems.

The penetrating service comprised a 125-mm high-density polyethylene (HDPE) pipe, with a measured wall thickness of 5-mm fitted through the collar's sleeve. The pipe projected vertically 2000-mm above the concrete slab and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped with Kaowool plug on the exposed end.

On the unexposed face, the 20-mm gap between the pipe and the collar sleeve was filled with sand/cement backfill.

Penetration 5 – H 50 S-RR cast-in fire collar protecting a 50-mm high-density polyethylene (HDPE) pipe

The SNAP Cast-in H 50 S-RR fire collar comprised a 1.6 mm thick HDPE casing with a 70.5-mm inner diameter and a 146-mm diameter base flange. The 76-mm high collar casing incorporated a 240-mm x 58-mm x 4-mm thick intumescent material. The closing mechanism comprised three galvanised steel springs, a nylon fuse link and a 280-mm x 58-mm stainless steel mesh as shown in drawing numbered H 50 S-RR-T, dated 7 November 2014, by SNAP Fire Systems.

The penetrating service comprised a 50-mm high-density polyethylene (HDPE) pipe, with a measured wall thickness of 4-mm fitted through the collar's sleeve. The pipe projected vertically, 2000-mm above the concrete slab and 500-mm into the furnace chamber. The pipe was supported at 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped with kaowool plug on the exposed end.

On the unexposed face, the 10-mm gap between the pipe and the slab was filled with Sika Firerate Sealant to a 10-mm depth.

2.2 Dimensions

The overall dimension of the concrete slab was 1150-mm wide x 1150-mm long, to suit the opening in the specimen containing frame.

2.3 Orientation

The reinforced concrete slab was placed horizontally on top of the furnace chamber, and subjected to fire exposure from the underside.

2.4 Conditioning

The concrete slab was left to cure for a period longer than 30 days.

2.5 Selection, construction and installation of the specimen and the supporting construction

Service penetration construction and installation was organised by the sponsor.

CSIRO was not involved in the selection of the materials.

3 Documentation

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

Drawing titled "Penetration #1 – HDPE 160-mm Stack", dated 11 November 2013, by Snap Fire Systems Pty Ltd.

Drawing titled "Penetration #2 – PVC SC 160-mm Stack with fitting", dated 11 November 2013, by Snap Fire Systems Pty Ltd.

Drawing titled “Penetration #3 – HDPE 125-mm Stack”, dated 11 November 2013, by Snap Fire Systems Pty Ltd.

Drawing titled “Penetration #4 – HDPE 125-mm Stack”, dated 11 November 2013, by Snap Fire Systems Pty Ltd.

Drawing titled “Penetration #5 – HDPE 50-mm Stack”, dated 11 November 2013, by Snap Fire Systems Pty Ltd.

Drawing numbered HP 150 R-T, dated 23 January 2014, by Snap Fire Systems Pty Ltd.

Drawing numbered HP 150 S-RR-T, dated 24 January 2014, by Snap Fire Systems Pty Ltd.

Drawing numbered H 50 S-RR-T, dated 7 November 2013, 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 is shown in photograph 2.

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 23°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 241 minutes by the agreement with the sponsor.

8 Test results

8.1 Critical observations

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

2 minutes -	Smoke is fluing from Penetration 2.
2 minutes -	Smoke is fluing from Penetration 4 and 5.
3 minutes -	Smoke fluing from Penetration 2 is decreasing.
3 minutes -	Smoke is fluing from Penetration 3.
4 minutes -	A small amount of smoke is fluing from Penetration # 1. Smoke fluing from Penetration 2, 3, and 4 is decreasing.
6 minutes -	A small amount of smoke is fluing from Penetration 2, 3 and 4.
8 minutes -	All penetrations have ceased fluing smoke.
10 minutes -	A large amount of smoke is being emitted from furnace flue.
15 minutes -	Little visible change to unexposed face of specimen.
35 minutes -	Steam is being emitted from slab near Penetration 5.
60 minutes -	Little visible change to unexposed face of the specimen.
70 minutes -	A small amount of smoke is visible from unexposed end of Penetration 1.
85 minutes -	A small amount of smoke/steam is being emitted from end of Penetration 2.
120 minutes -	Little visible change to unexposed face of specimen.
170 minutes -	Light smoke is being emitted from around the base of Penetration 4.
183 minutes -	Insulation failure of Penetration 4 – maximum temperature rise of 180 K is reached on the unexposed face of the slab, 25-mm from the base of the pipe.
241 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 curves of temperature versus time associated with Penetration #1.

Figure 4 shows curves of temperature versus time associated with Penetration #2.

Figure 5 shows curves of temperature versus time associated with Penetration #3.

Figure 6 shows curves of temperature versus time associated with Penetration #4.

Figure 7 shows curves of temperature versus time associated with Penetration #5.

8.5 Performance

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

Penetration 1 – HP 150 R retrofit fire collar protecting a 160-mm High-density polyethylene (HDPE) pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes

Penetration 2 – HP 150 R retrofit fire collar protecting a 160-mm PVC Sandwich Construction (SC) stack pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes

Penetration 3 – HP 150 R retrofit fire collar protecting a 125-mm high-density polyethylene (HDPE) pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes

Penetration 4 – H 150 S-RR cast-in fire collar protecting a 125-mm high-density polyethylene (HDPE) pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	183 minutes

Penetration 5 – H 50 S-RR cast-in fire collar protecting a 50-mm high-density polyethylene (HDPE) pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes

This report details methods of construction, the test conditions and the results obtained when 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	-	-/240/240;
Penetration 2	-	-/240/240;
Penetration 3	-	-/240/240;
Penetration 4	-	-/240/180; and
Penetration 5	-	-/240/240

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
Testing Officer

Appendices

Appendix A – Temperature measurement locations

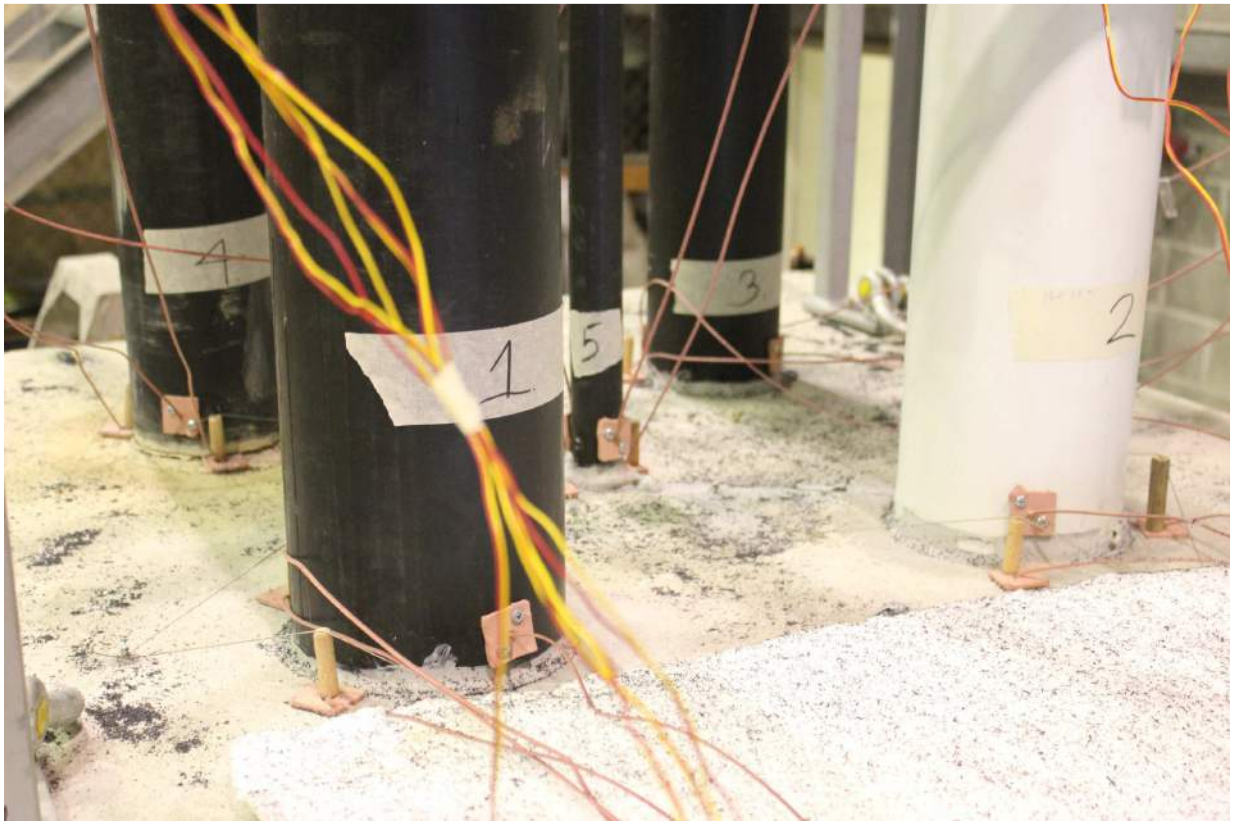
Measurement Location		
Group location	**T/C Position**	**T/C designation**
Specimen		
Penetration 1	On slab - 25-mm from pipe	S1
	On slab - 25-mm from pipe	S2
	On pipe - 25-mm from slab	S3
	On pipe - 25-mm from slab	S4
Penetration 2	On slab - 25-mm from pipe	S5
	On slab - 25-mm from pipe	S6
	On pipe - 25-mm from slab	S7
	On pipe - 25-mm from slab	S8
Penetration 3	On slab - 25-mm from pipe	S9
	On slab - 25-mm from pipe	S10
	On pipe - 25-mm from slab	S11
	On pipe - 25-mm from slab	S12
Penetration 4	On slab - 25-mm from pipe	S13
	On slab - 25-mm from pipe	S14
	On pipe - 25-mm from slab	S15
	On pipe - 25-mm from slab	S16
Penetration 5	On slab - 25-mm from pipe	S17
	On sealant - 25-mm from pipe	S18
	On pipe - 25-mm from slab	S19
	On pipe - 25-mm from slab	S20

Appendix B – Photographs

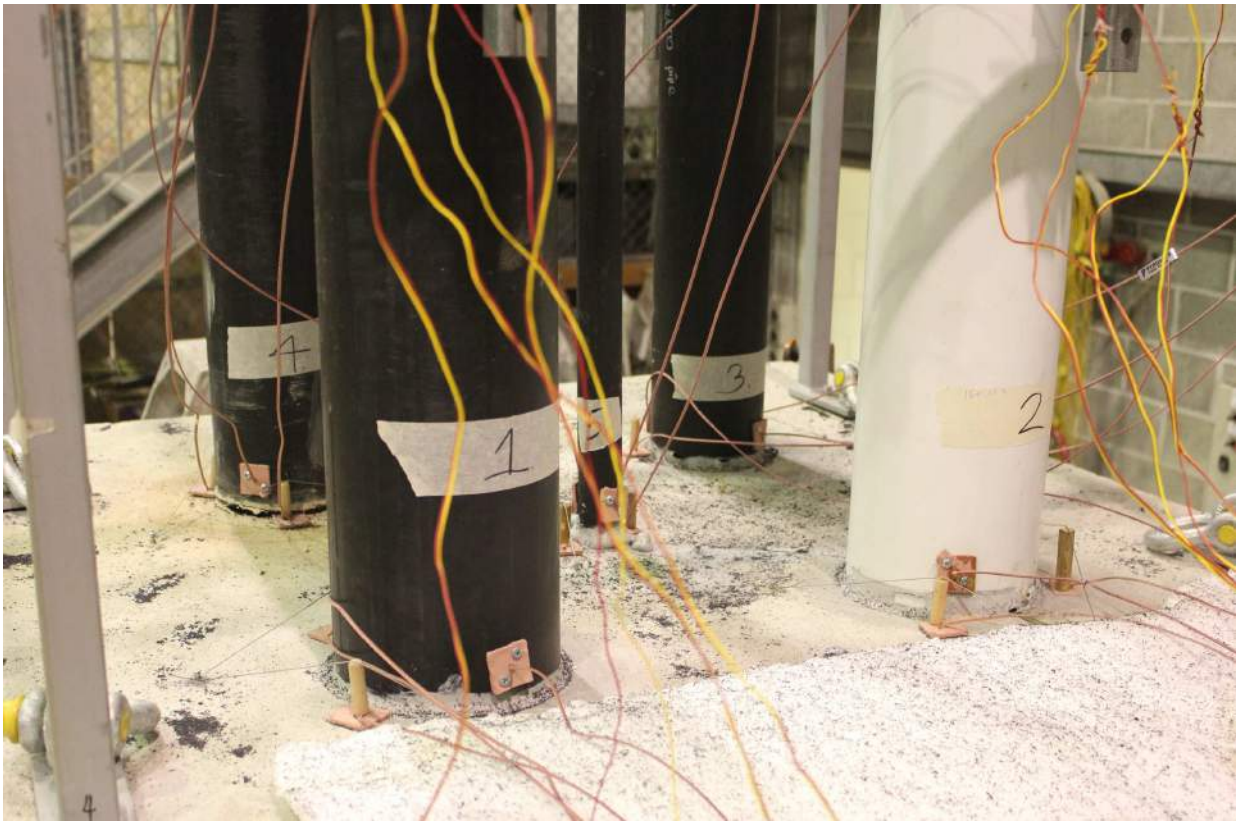
PHOTOGRAPH 1 – EXPOSED FACE OF SPECIMENS PRIOT TO TESTING

PHOTOGRAPH 2 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING

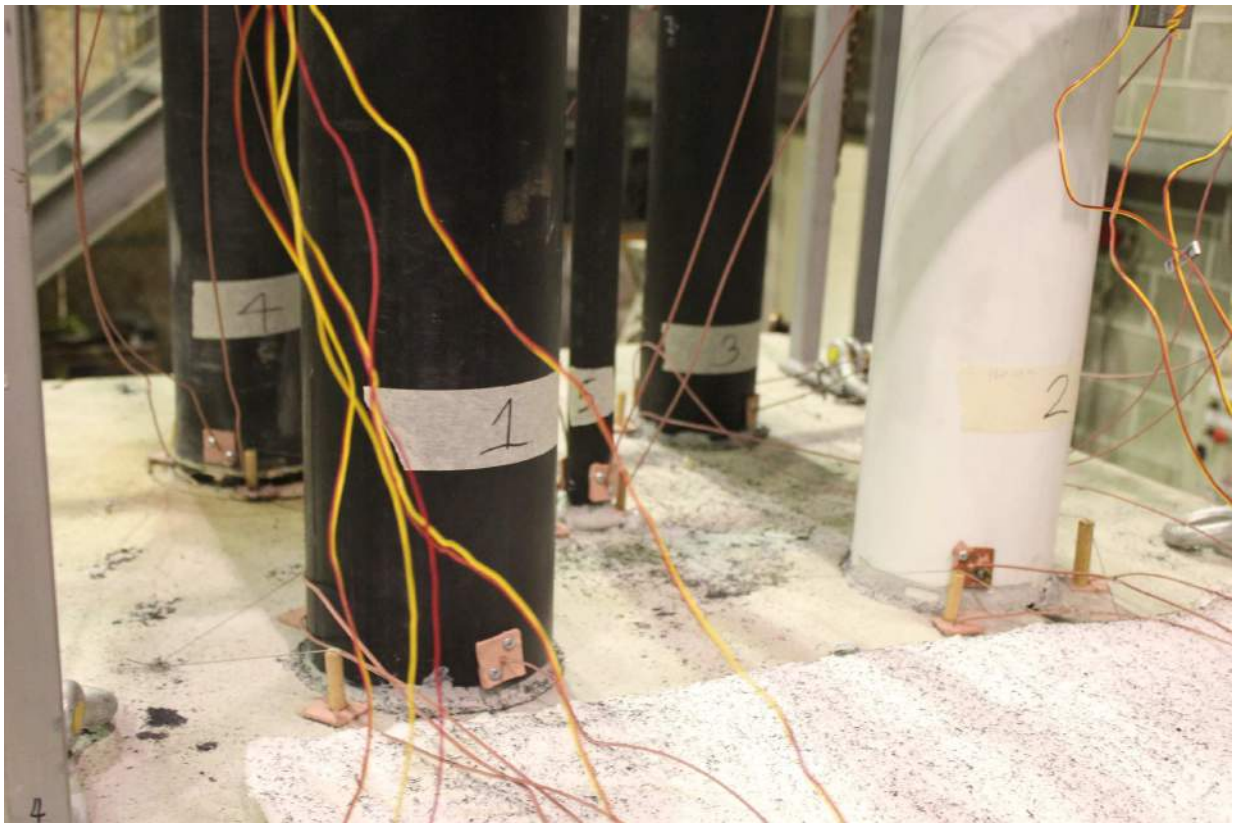
PHOTOGRAPH 3 – SPECIMENS AFTER 60 MINUTES OF TESTING



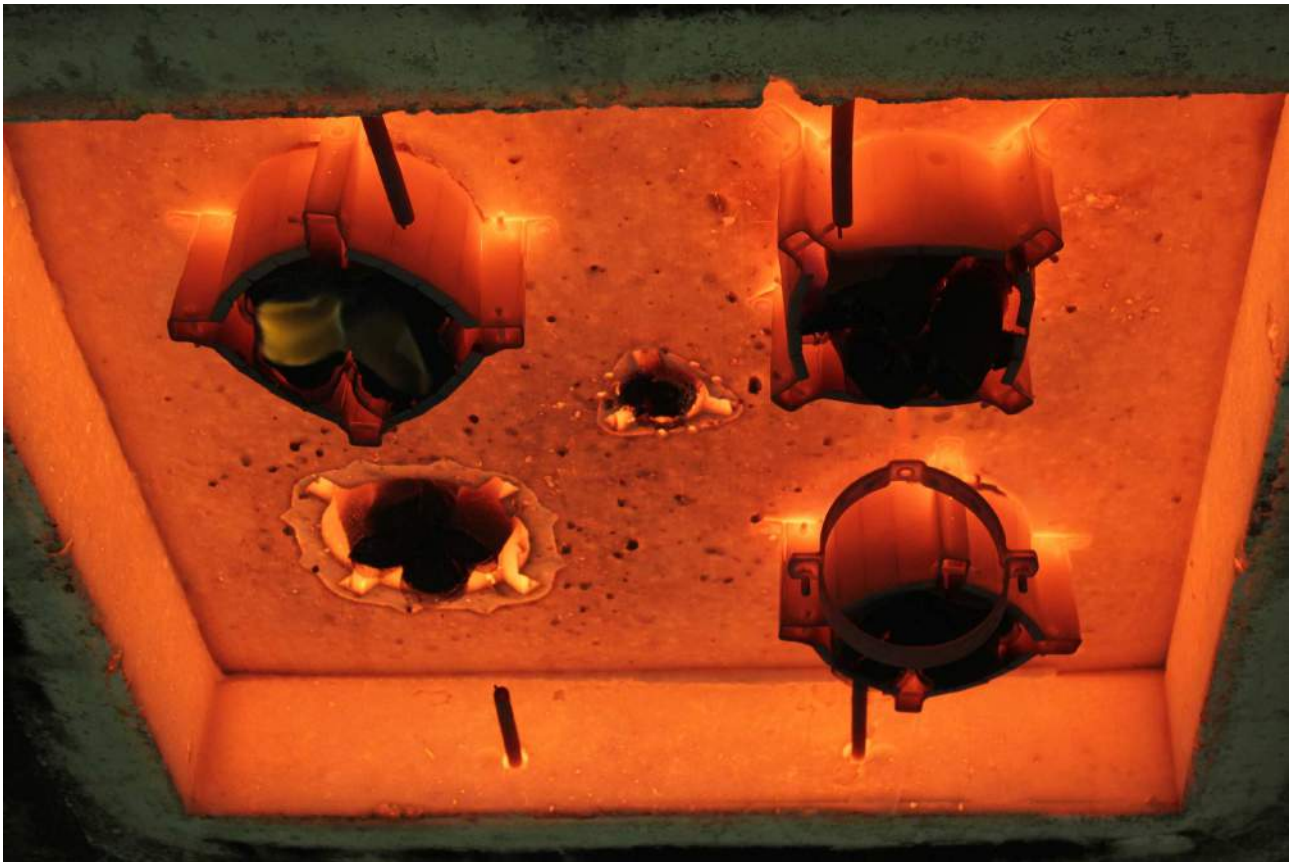
PHOTOGRAPH 4 – SPECIMENS AFTER 120 MINUTES OF TESTING



PHOTOGRAPH 5 – SPECIMENS AFTER 180 MINUTES OF TESTING



PHOTOGRAPH 6 – SPECIMENS AFTER 240 MINUTES OF TESTING



PHOTOGRAPH 7 – EXPOSED FACE OF SPECIMENS AT CONCLUSION OF TESTING

Appendix C – Furnace Temperature

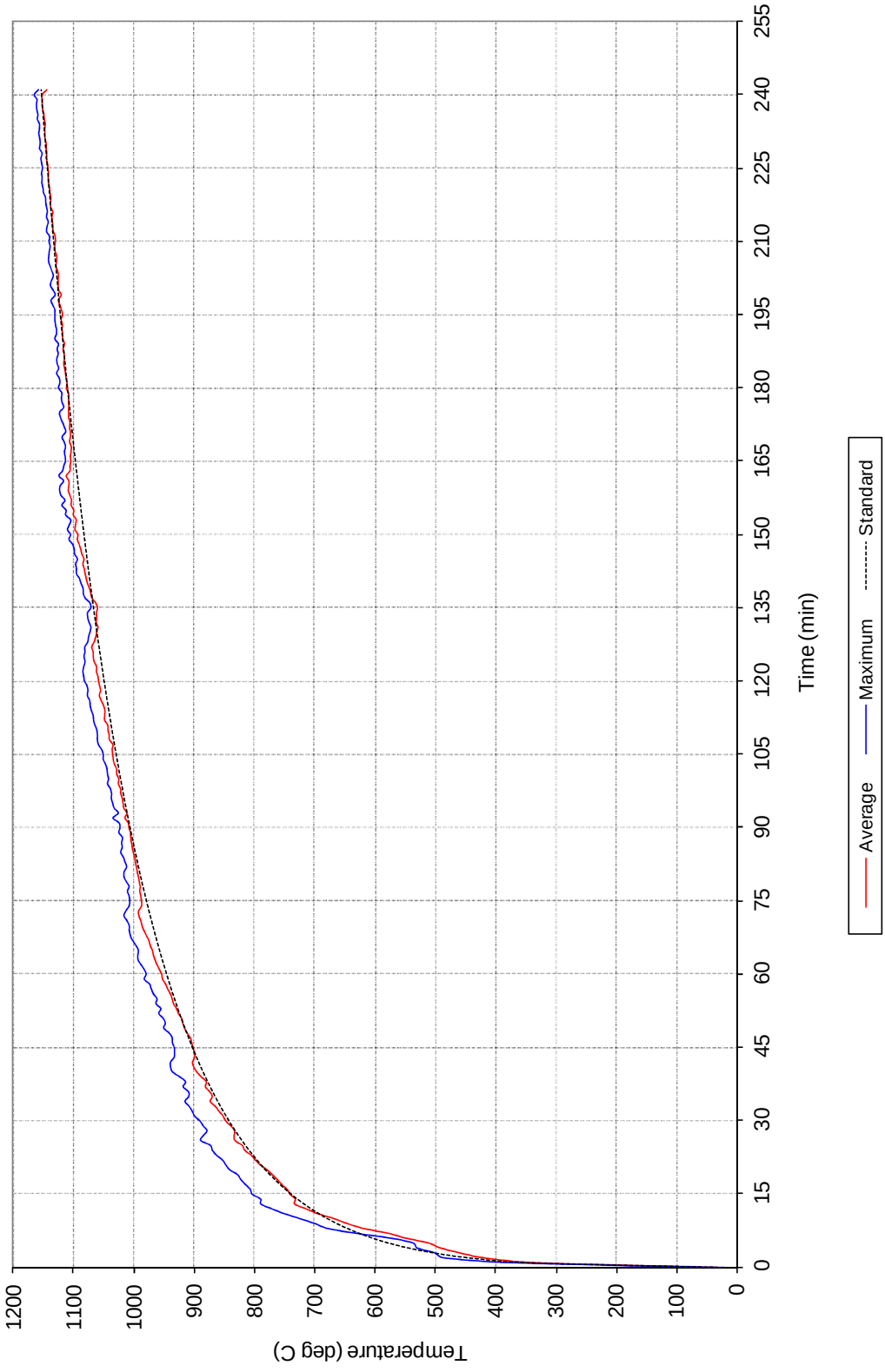


FIGURE 1 – FURNACE TEMPERATURE

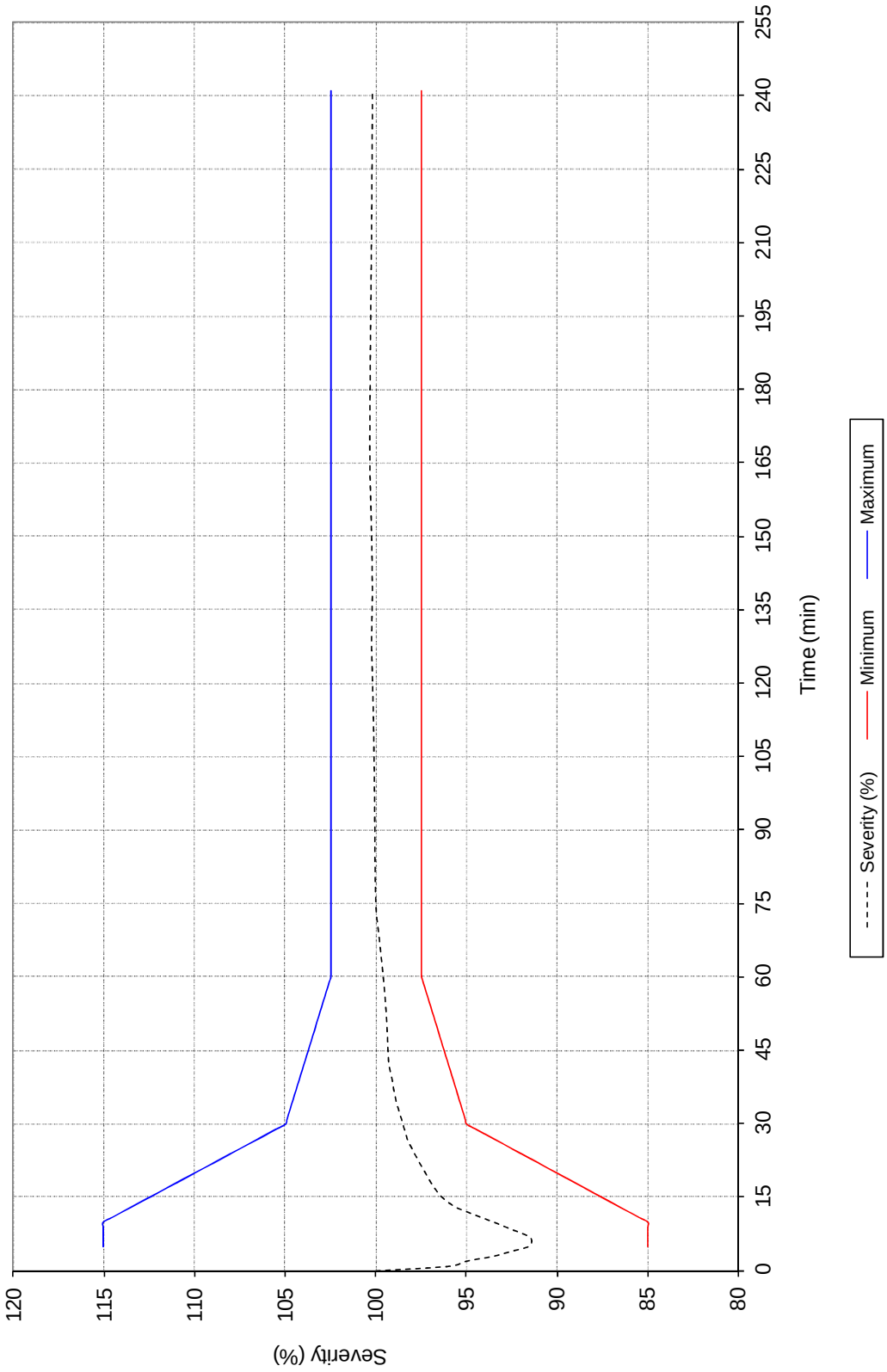


FIGURE 2 – FURNACE SEVERITY

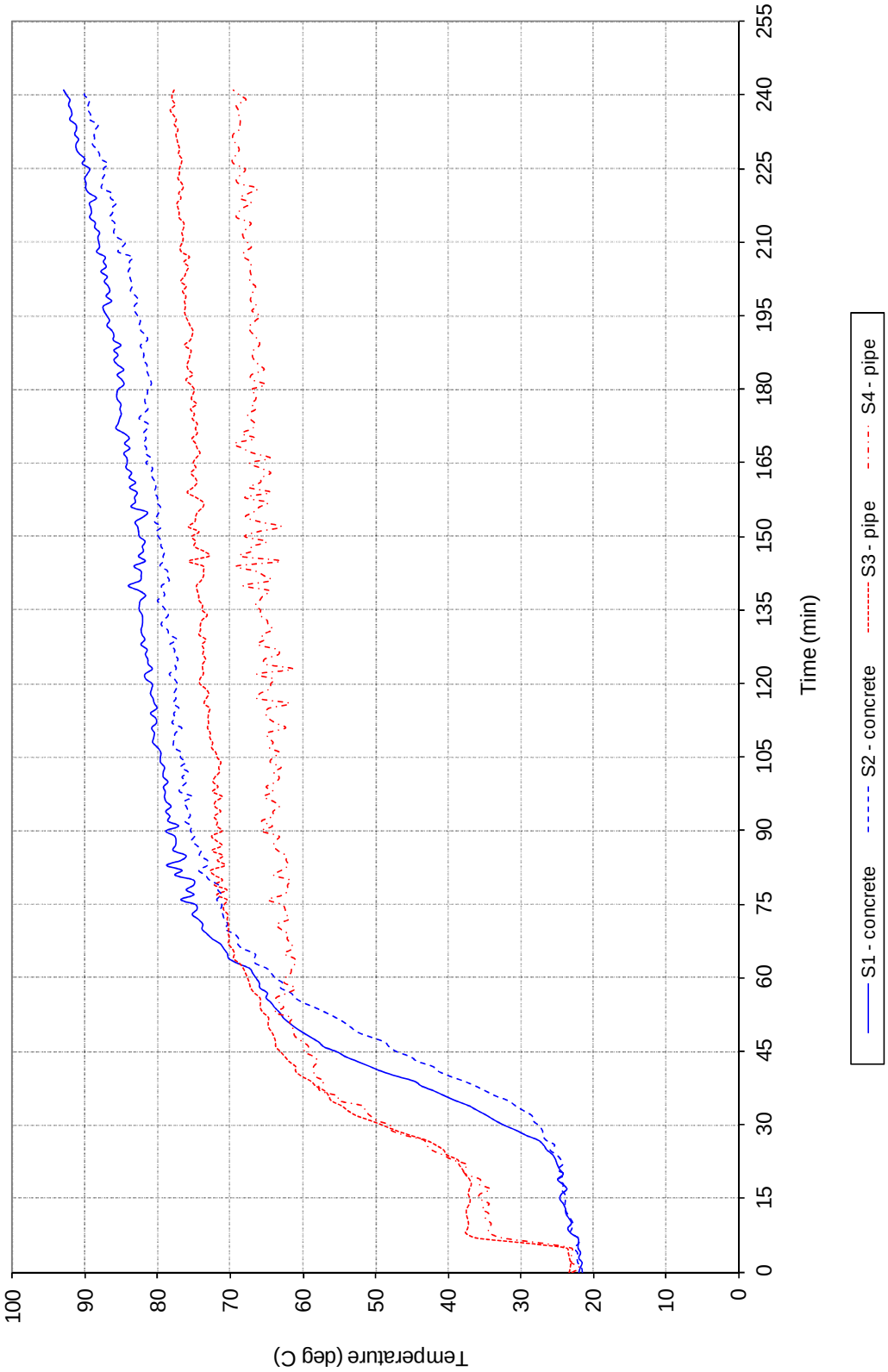


FIGURE 3 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION 1

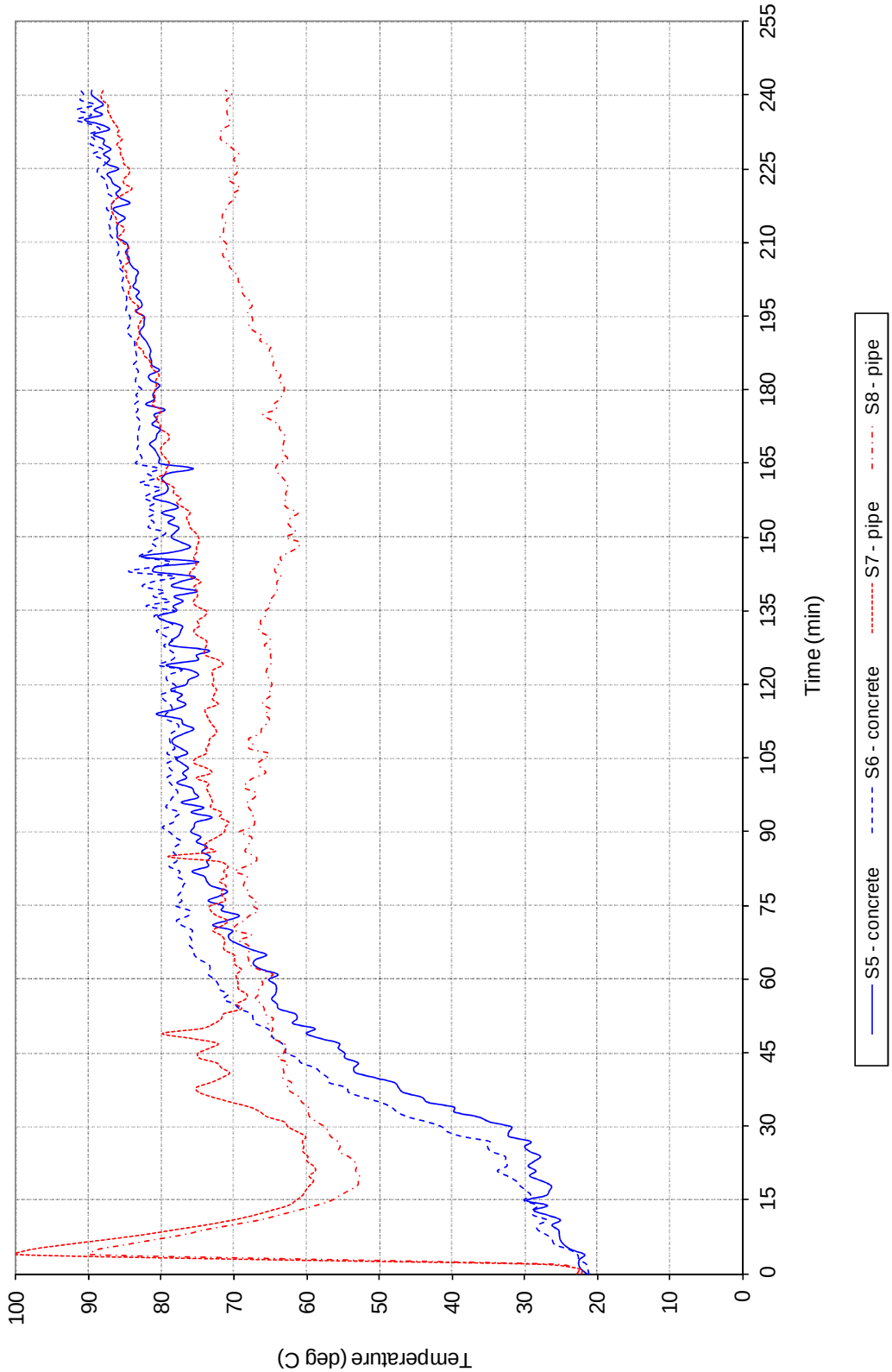


FIGURE 4 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION 2

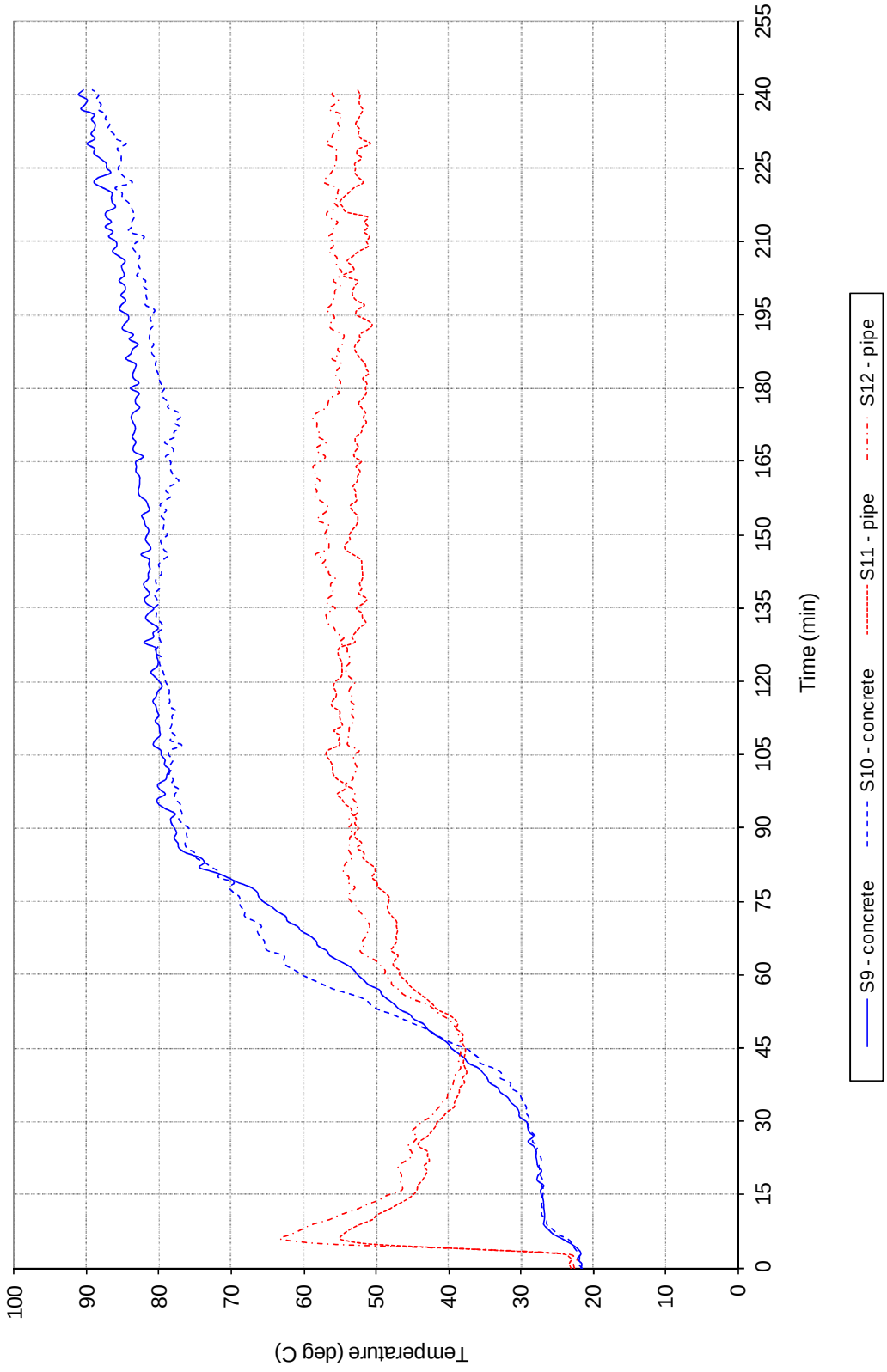


FIGURE 5 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION 3

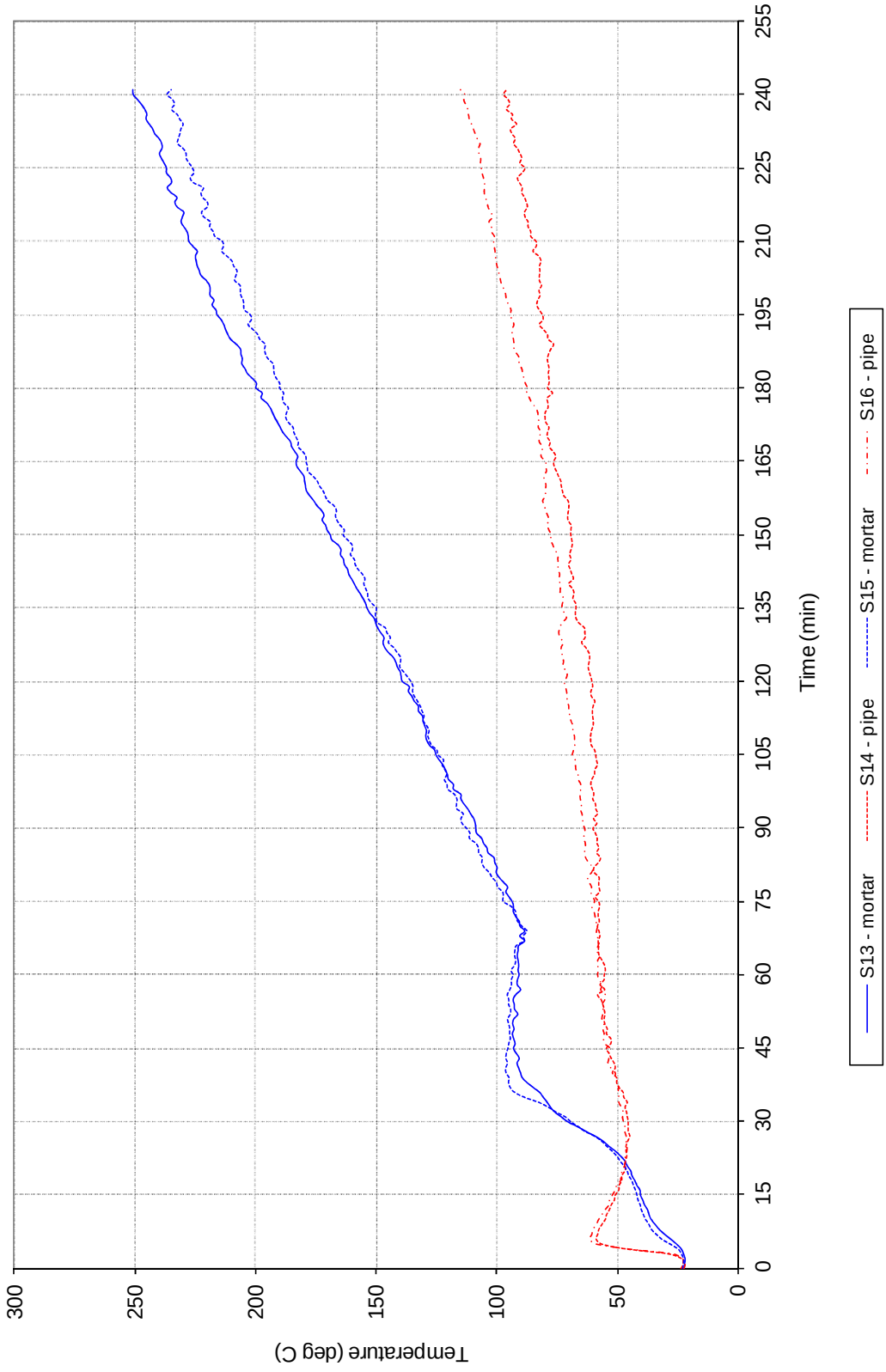


FIGURE 6 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION 4

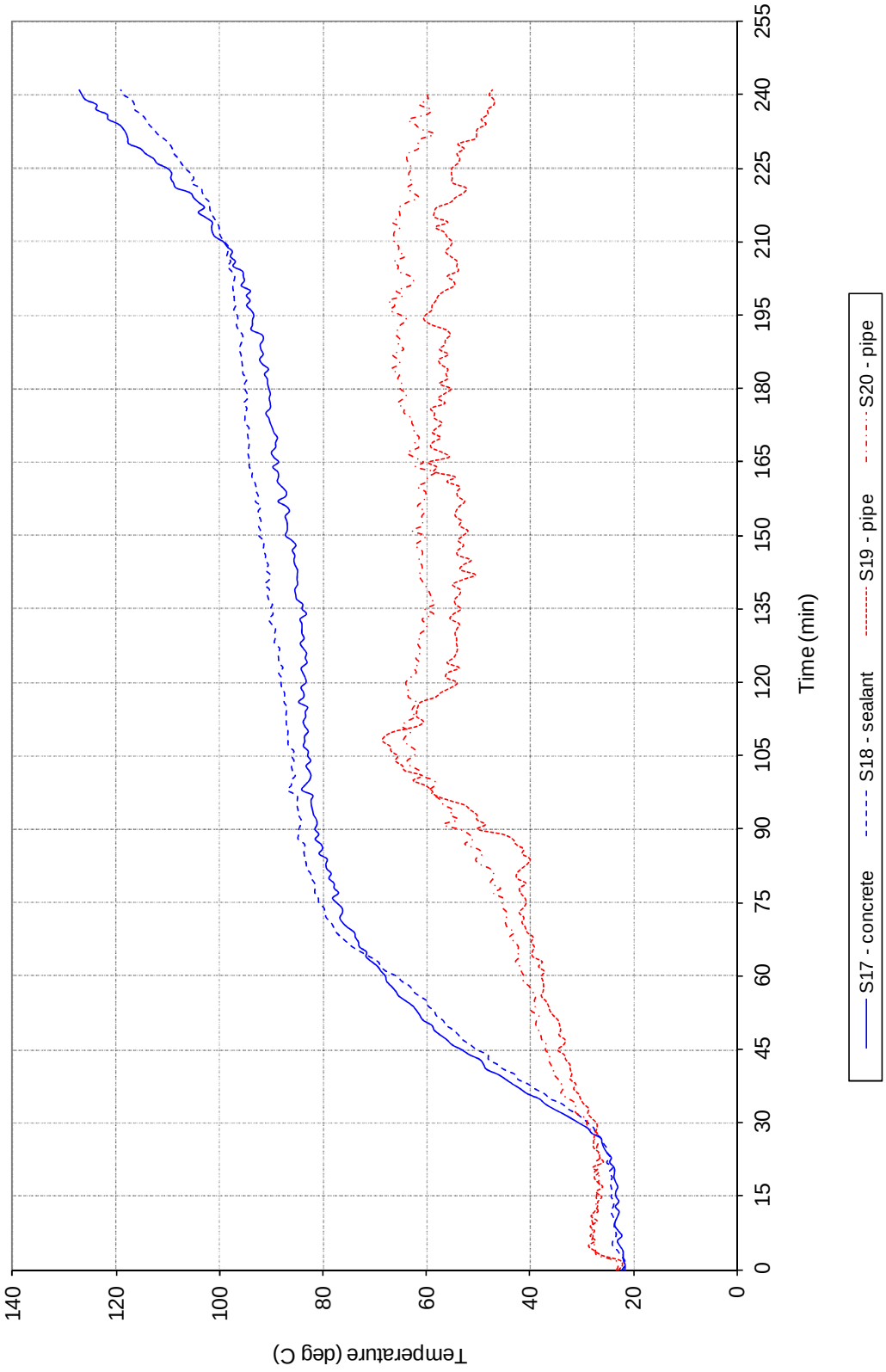
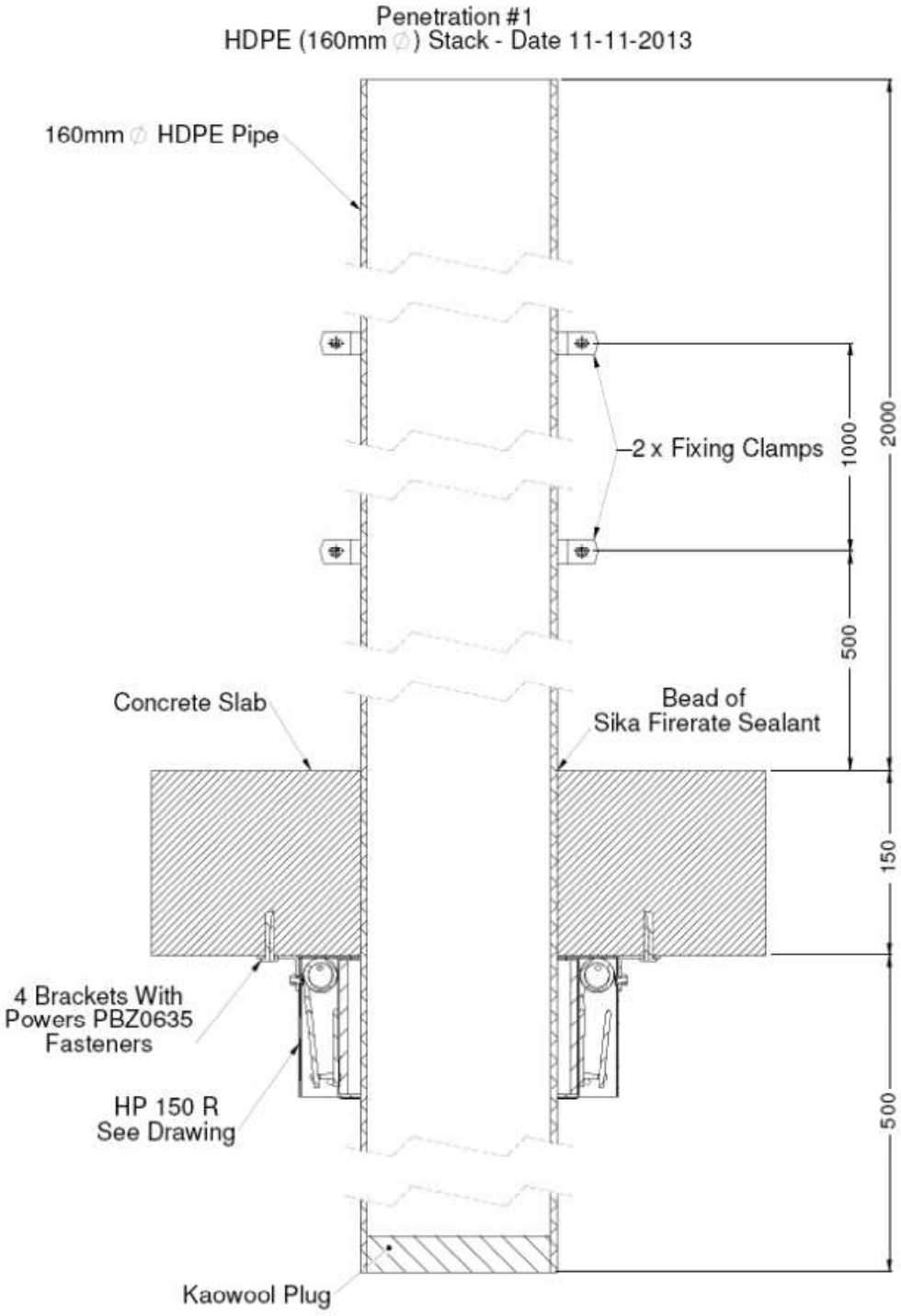
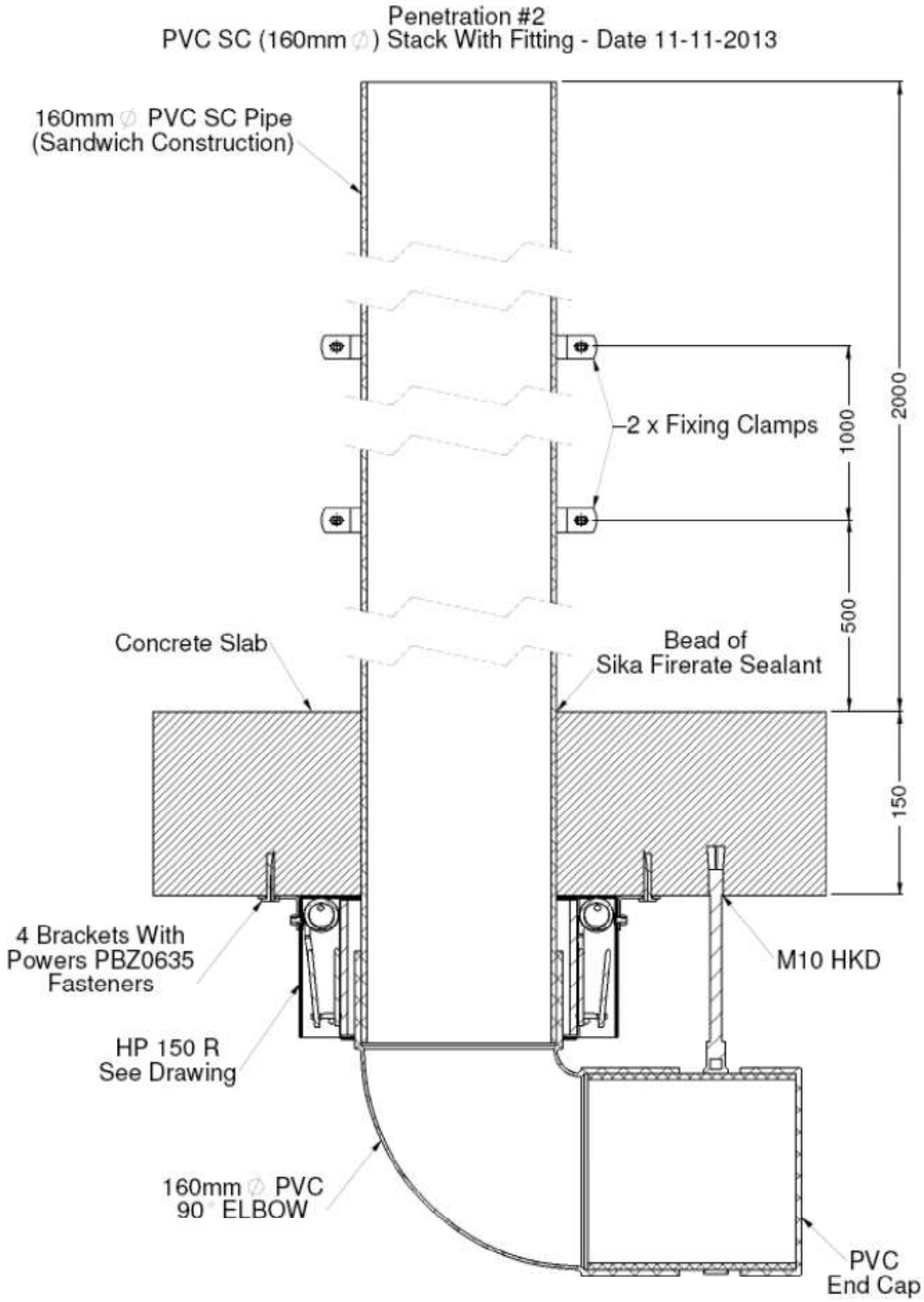


FIGURE 7 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION 5

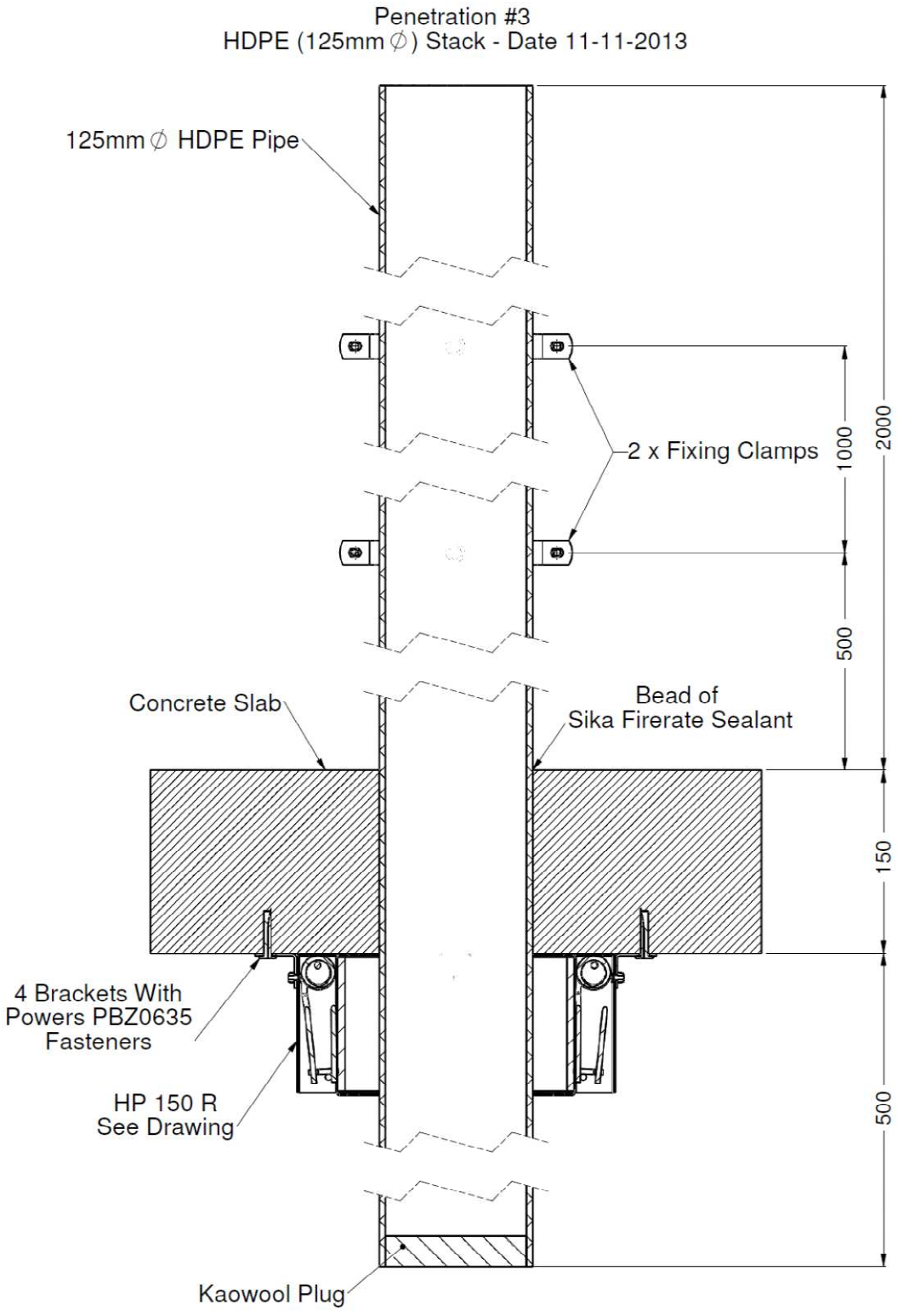
Appendix D – Installation drawings



DRAWING TITLED "PENETRATION #1 – HDPE 160-MM STACK" DATED 11 NOVEMBER 2013, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING TITLED "PENETRATION #2 – PVC SC 160-MM STACK WITH FITTING" DATED 11 NOVEMBER 2013, BY SNAP FIRE SYSTEMS PTY LTD.



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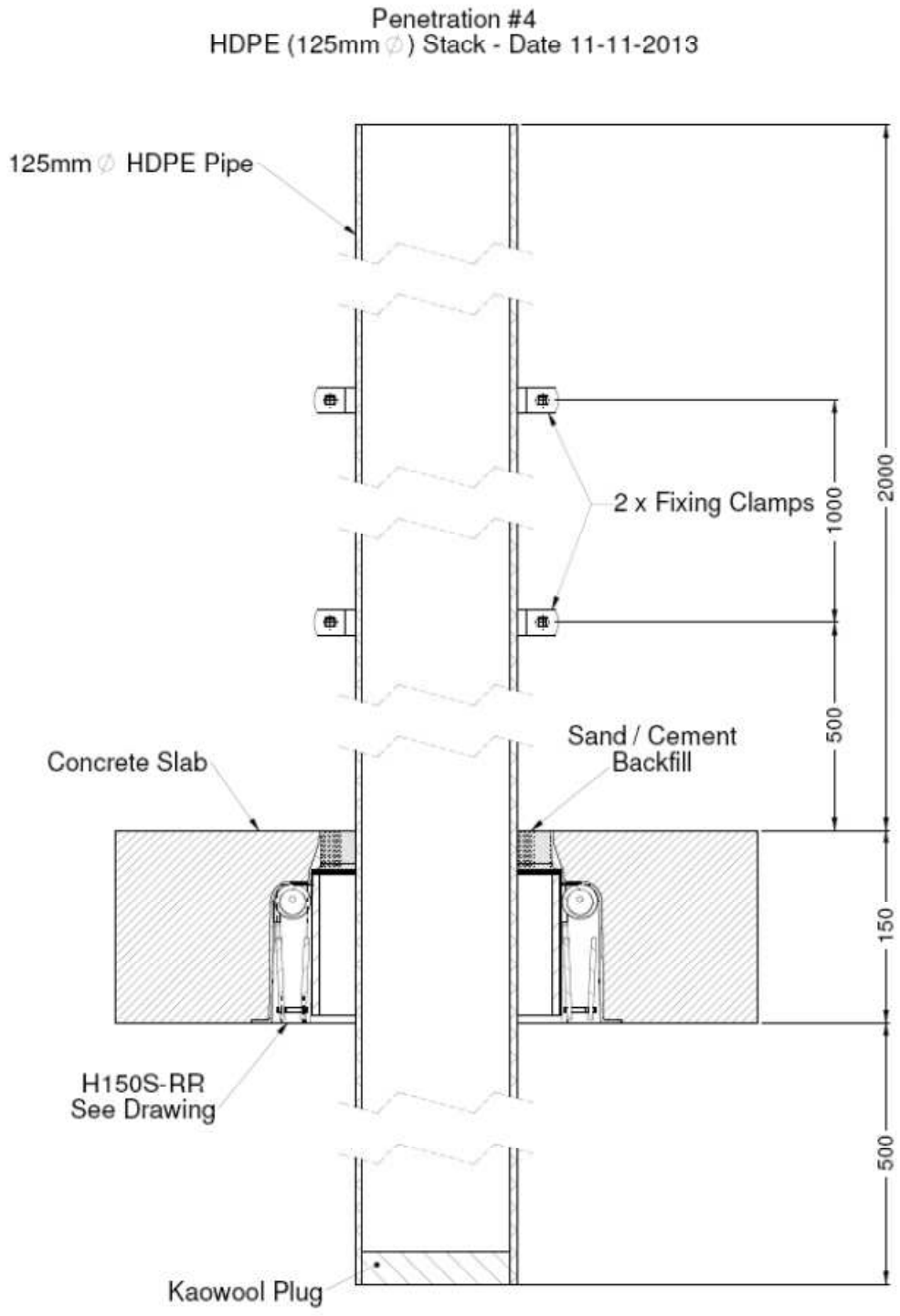

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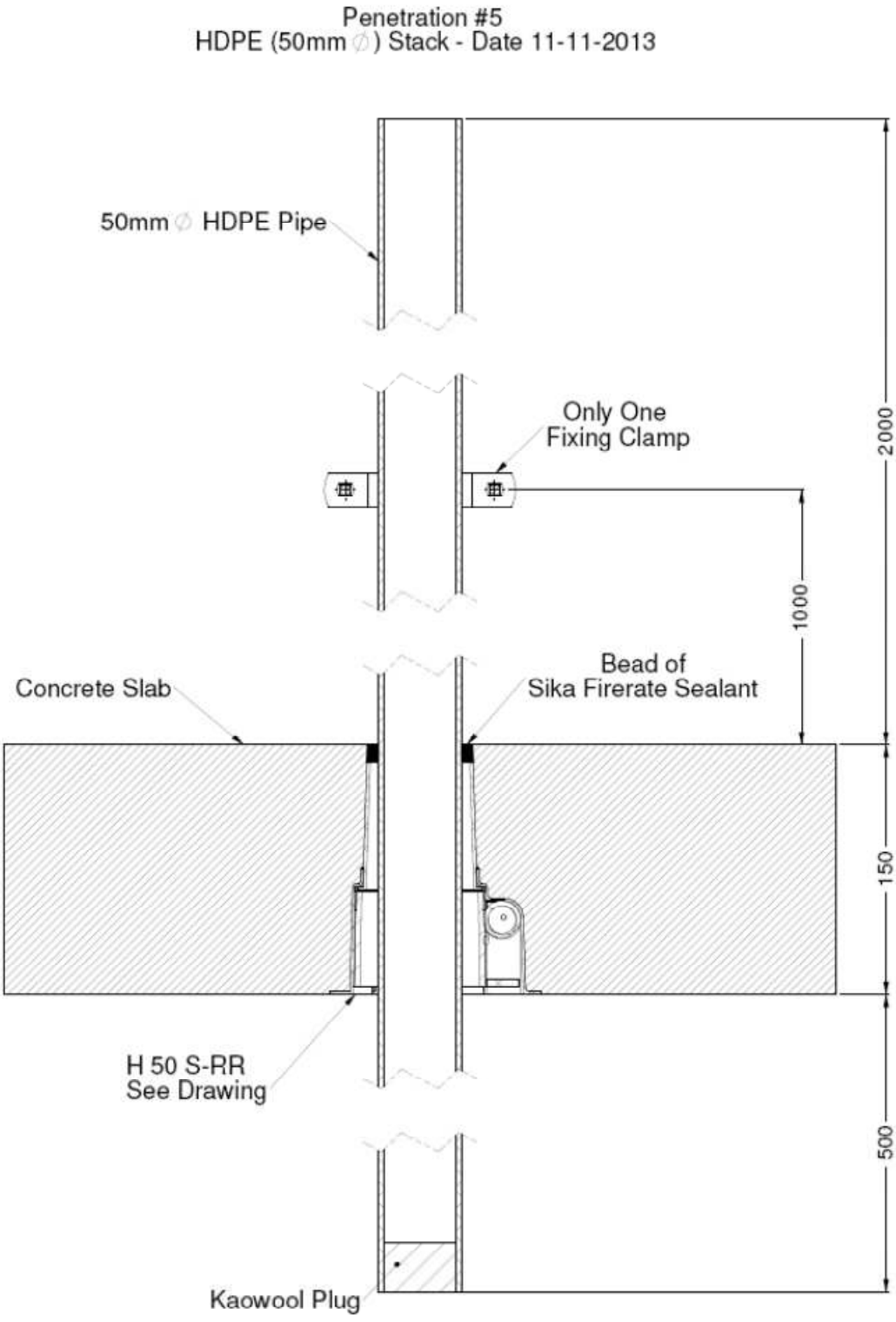
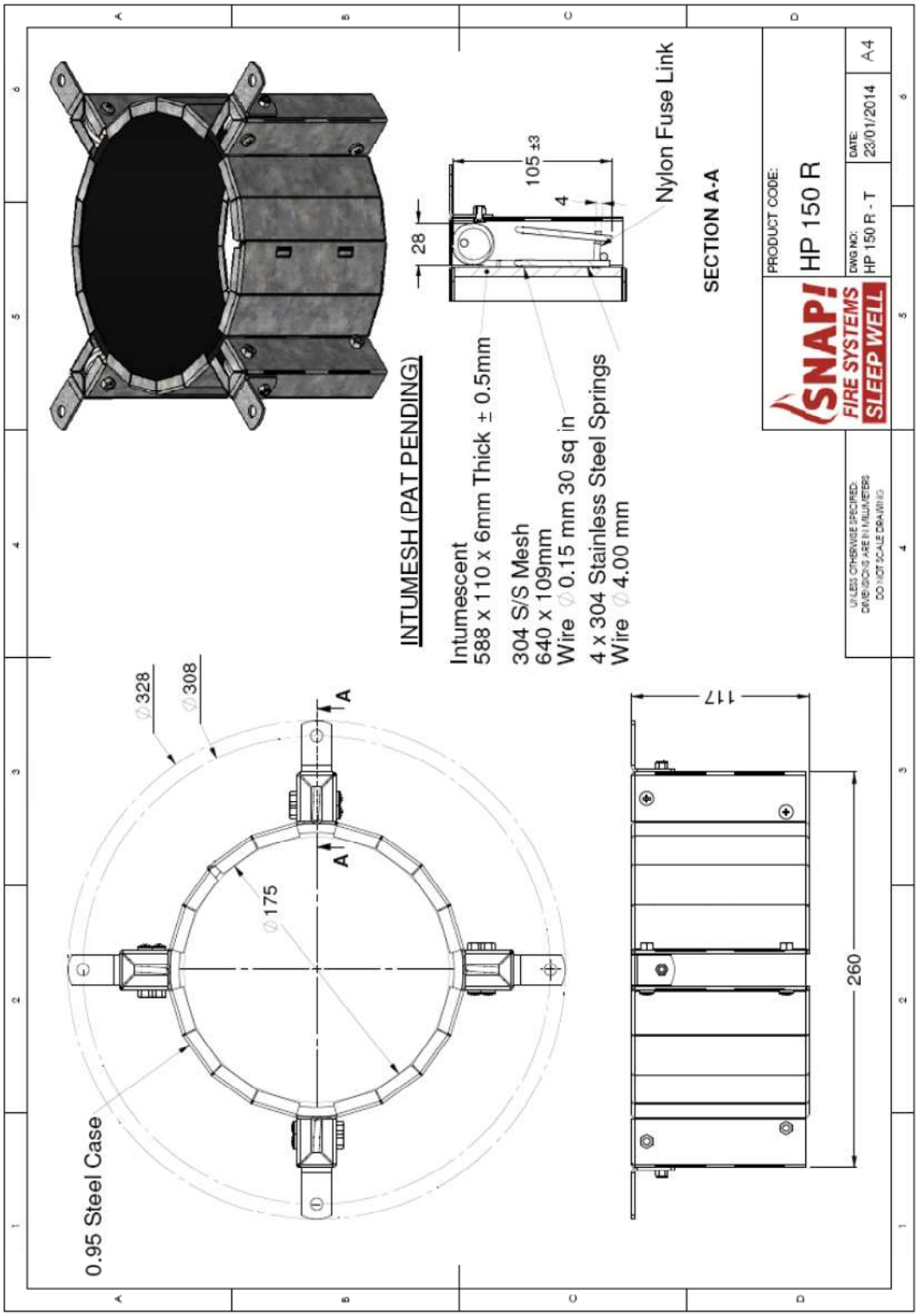
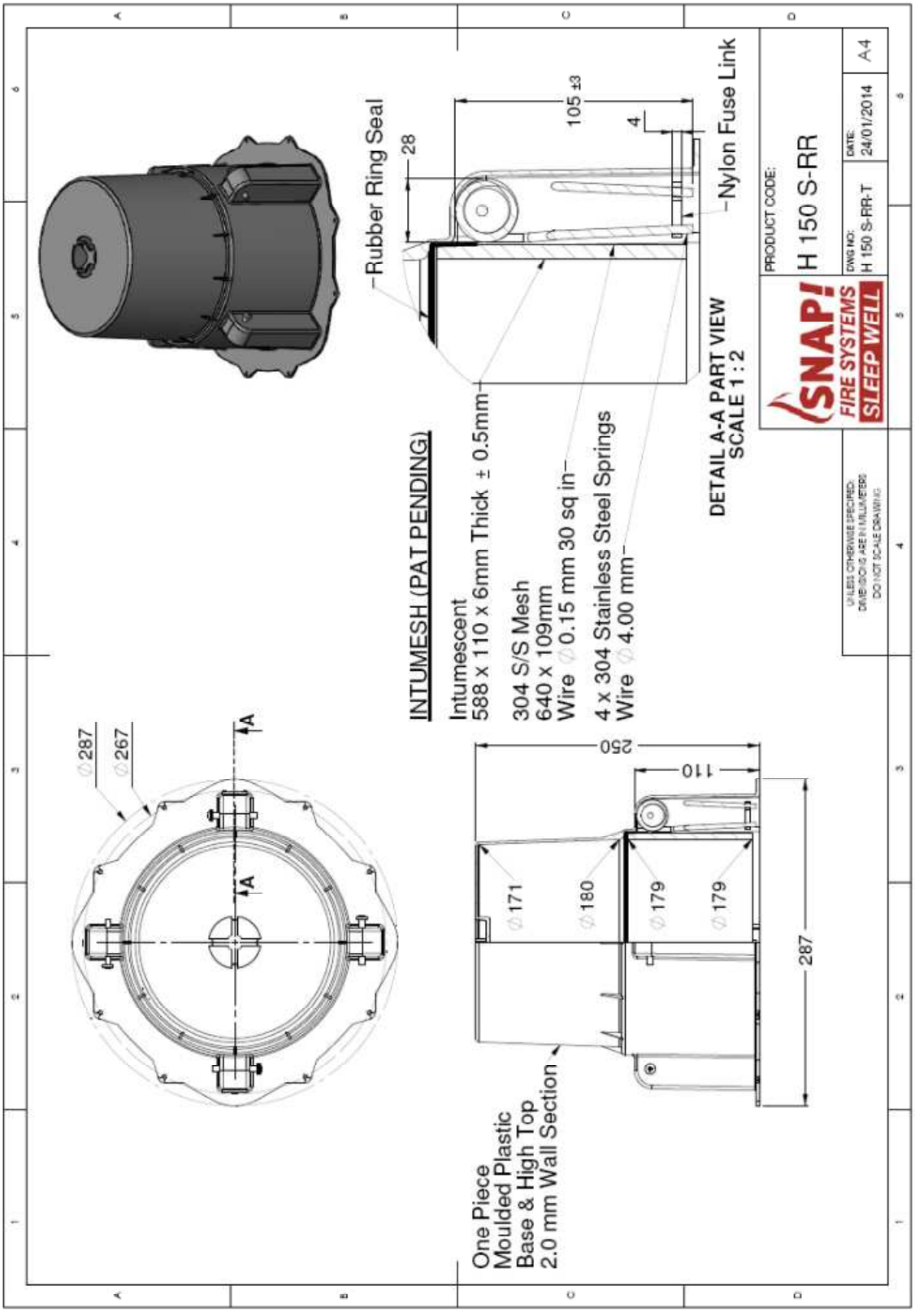


DRAWING TITLED "PENETRATION #5 – HDPE 50-MM STACK" DATED 11 NOVEMBER 2013, BY SNAP FIRE SYSTEMS PTY LTD.

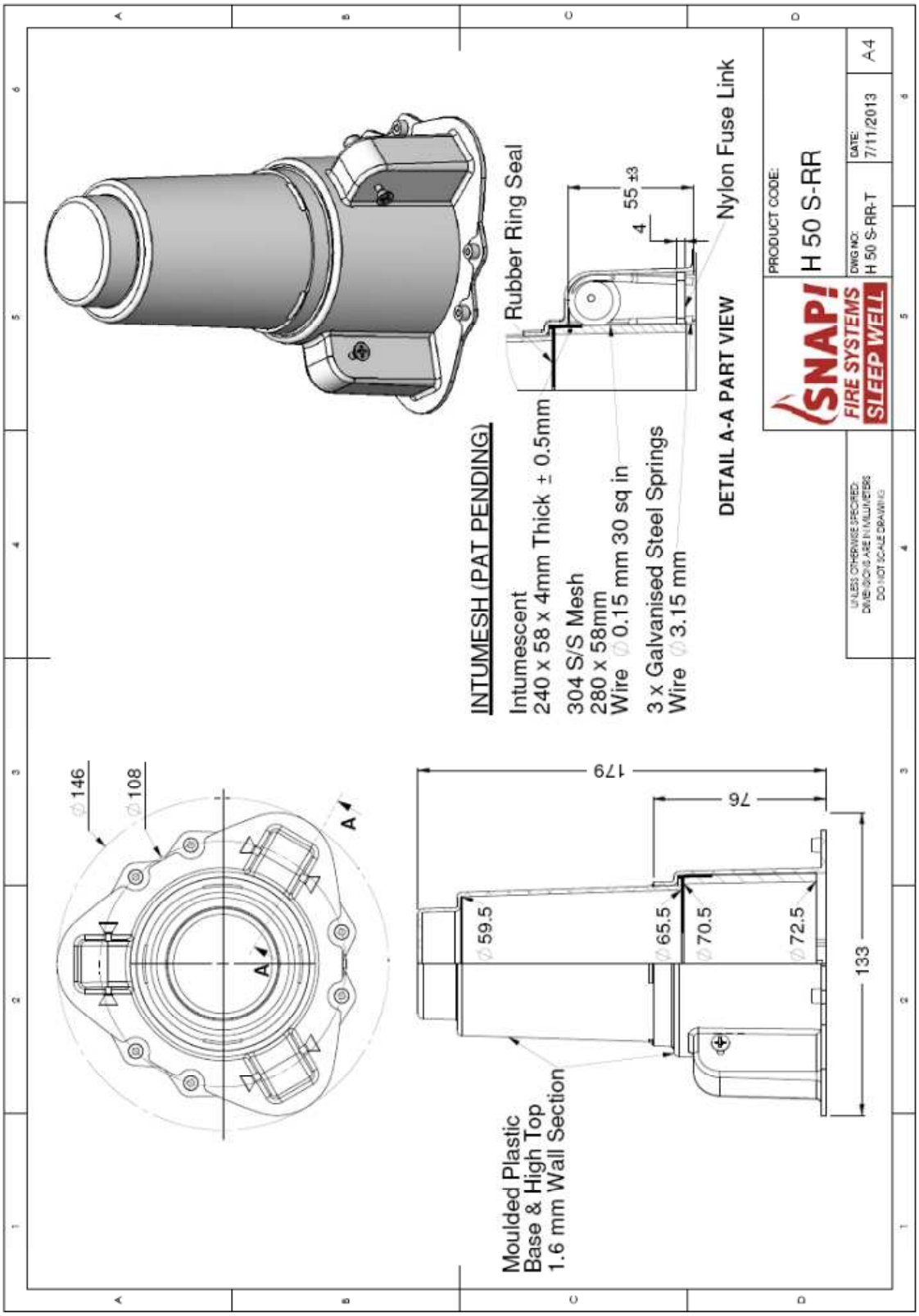
Appendix E – Specimen Drawings



DRAWING NUMBERED HP 150 R-T, DATED 23 JANUARY 2014, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING NUMBERED HP 150 S-RR-T, DATED 24 JANUARY 2014, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING NUMBERED H 50 S-RR-T, DATED 7 NOVEMBER 2013, BY SNAP FIRE SYSTEMS PTY LTD.

Appendix F – Certificates

INFRASTRUCTURE TECHNOLOGIES
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14 Julius Avenue, North Ryde NSW 2113
PO Box 310, North Ryde NSW 1670, Australia
T (02) 9490 5444 • ABN 41 687 119 230

Certificate of Test

No. 2540

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 1615.

Product Name: Penetration 1 – HP 150 R retrofitted fire collar protecting a 160-mm high-density polyethylene (HDPE) pipe

Description: The SNAP retrofitted HP 150 R fire collar comprised a 0.95-mm steel case with a 175 mm inner diameter and a 308-mm diameter base flange. The 117-mm high collar casing incorporated a 588 mm x 110 mm x 6-mm thick intumescent material. The closing mechanism comprised four stainless steel springs, a nylon fuse link and a 640 mm x 109-mm stainless steel mesh as shown in drawing numbered H 150 R-T, dated 23 January 2014, by SNAP Fire Systems. The fire collar was fixed to the slab by four brackets with PBZ0635 fasteners. The penetrating service comprised a 160-mm high-density polyethylene (HDPE) pipe, with a measured wall thickness of 6-mm fitted through the collar's sleeve. The pipe projected vertically 2000-mm above the concrete slab and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000 mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped with kaowool plug on the exposed end. On the unexposed face, the 5-mm gap between the pipe and the slab was filled with a bead of Sika Firerate Sealant.

The element of construction described above satisfied the following criteria for fire-resistance for the period stated.

Structural Adequacy	not applicable
Integrity	no failure at 241 minutes
Insulation	no failure at 241 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. 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 Date of Test: 2 December 2013

Issued on the 12th day of March 2014 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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

COPY OF CERTIFICATE OF TEST – NO. 2540

INFRASTRUCTURE TECHNOLOGIES
www.csiro.au

14 Julius Avenue, North Ryde NSW 2113
PO Box 310, North Ryde NSW 1670, Australia
T (02) 9490 5444 • ABN 41 687 119 230

Certificate of Test

No. 2541

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 1615.

Product Name: Penetration 2 – HP 150 R retrofitted fire collar protecting a 160-mm Polyvinil Chloride (PVC) Sandwich Construction (SC) pipe with fitting inside the collar

Description: The SNAP retrofitted HP 150 R fire collar comprised a 0.95-mm steel case with a 175 mm inner diameter and a 308-mm diameter base flange. The 117-mm high collar casing incorporated a 588-mm x 110 mm x 6-mm thick intumescent material. The closing mechanism comprised four stainless steel springs, a nylon fuse link and a 640 mm x 109-mm stainless steel mesh as shown in drawing numbered H 150 R-T, dated 23 January 2014, by SNAP Fire Systems. The fire collar was fixed to the slab by four brackets with PBZ0635 fasteners. The penetrating service comprised a 160-mm PVC Sandwich Construction (SC) stack pipe, with a wall thickness of 3-mm fitted through the collar's sleeve. The pipe projected vertically 2000-mm above the concrete slab and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000 mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end. On the exposed side of the slab a PVC 90° elbow was connected to the penetrating pipe, supported by M10 HKD and nut clip, fixed to the concrete slab as shown in drawing titled "Penetration #2 – PVC SC (160-mm) Stack with Fitting", dated 11 November 2013, by Snap Fire Systems Pty Ltd. The pipe was open at the unexposed end and capped on the exposed end. On the unexposed face, the narrow gap between the pipe and the slab was filled with Sika Firerate Sealant.

The element of construction described above satisfied the following criteria for fire-resistance for the period stated.

Structural Adequacy	not applicable
Integrity	no failure at 241 minutes
Insulation	no failure at 241 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. 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 Date of Test: 2 December 2013

Issued on the 12th day of March 2014 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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Certificate of Test

No. 2542

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 1615.

Product Name: Penetration 3 – HP 150 R retrofitted fire collar protecting a 125-mm high-density polyethylene (HDPE) pipe

Description: The SNAP retrofitted HP 150 R fire collar comprised a 0.95-mm steel case with a 175 mm inner diameter and a 308-mm diameter base flange. The 117-mm high collar casing incorporated a 588 mm x 110 mm x 6-mm thick intumescent material. The closing mechanism comprised four stainless steel springs, a nylon fuse link and a 640 mm x 109-mm stainless steel mesh as shown in drawing numbered H 150 R-T, dated 23 January 2014, by SNAP Fire Systems. The fire collar was fixed to the slab by four brackets with PBZ0635 fasteners. The penetrating service comprised a 125-mm high-density polyethylene (HDPE) pipe, with a wall thickness of 5-mm fitted through the collar's sleeve. The pipe projected vertically 2000-mm above the concrete slab and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000 mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped with Kaowool plug on the exposed end. On the unexposed face, the 5-mm gap between the pipe and the slab was filled with a bead of Sika Firerate Sealant.

The element of construction described above satisfied the following criteria for fire-resistance for the period stated.

Structural Adequacy	not applicable
Integrity	no failure at 241 minutes
Insulation	no failure at 241 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. 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 Date of Test: 2 December 2013

Issued on the 12th day of March 2014 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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Certificate of Test

No. 2543

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 1615.

Product Name: Penetration 4 – H 150 S-RR cast-in fire collar protecting a 125-mm high-density polyethylene (HDPE) pipe

Description: The SNAP Cast-in H 150 S-RR fire collar comprised a 2-mm thick polypropylene casing with a 179 mm inner diameter and a 267-mm diameter base flange. The 110-mm high collar casing incorporated a 588-mm x 110 mm x 6-mm thick intumescent material. The closing mechanism comprised four stainless steel springs, a nylon fuse link and a 640 mm x 109-mm stainless steel mesh as shown in drawing numbered H 150 S-RR-T, dated 24 January 2014, by SNAP Fire Systems. The penetrating service comprised a 125-mm high-density polyethylene (HDPE) pipe, with a measured wall thickness of 5-mm fitted through the collar's sleeve. The pipe projected vertically 2000-mm above the concrete slab and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000 mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped with Kaowool plug on the exposed end. On the unexposed face, the 20-mm gap between the pipe and the collar sleeve was filled with sand/cement backfill.

The element of construction described above satisfied the following criteria for fire-resistance for the period stated.

Structural Adequacy	not applicable
Integrity	no failure at 241 minutes
Insulation	183 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/180. 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 Date of Test: 2 December 2013

Issued on the 12th day of March 2014 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

This document is issued in accordance with NATA's accreditation requirements.
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Certificate of Test

No. 2544

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 1615.

Product Name: Penetration 5 – H 50 S-RR cast-in fire collar protecting a 50-mm high-density polyethylene (HDPE) pipe

Description: The SNAP Cast-in H 50 S-RR fire collar comprised a 1.6 mm thick HDPE casing with a 70.5 mm inner diameter and a 146-mm diameter base flange. The 76-mm high collar casing incorporated a 240-mm x 58 mm x 4-mm thick intumescent material. The closing mechanism comprised three galvanised steel springs, a nylon fuse link and a 280 mm x 58-mm stainless steel mesh as shown in drawing numbered H 50 S-RR-T, dated 7 November 2014, by SNAP Fire Systems. The penetrating service comprised a 50-mm high-density polyethylene (HDPE) pipe, with a measured wall thickness of 4-mm fitted through the collar's sleeve. The pipe projected vertically, 2000-mm above the concrete slab and 500-mm into the furnace chamber. The pipe was supported at 1000 mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped with kaowool plug on the exposed end. On the unexposed face, the 10-mm gap between the pipe and the slab was filled with Sika Firerate Sealant to a 10-mm depth.

The element of construction described above satisfied the following criteria for fire-resistance for the period stated.

Structural Adequacy	not applicable
Integrity	no failure at 241 minutes
Insulation	no failure at 241 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. 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 Date of Test: 2 December 2013

Issued on the 12th day of March 2014 without alterations or additions.

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COPY OF CERTIFICATE OF TEST – NO. 2544

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.

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FOR FURTHER INFORMATION

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