Fire-resistance test on fire collars protecting a CSR Hebel AAC block wall penetrated by services

Test Report

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Client: Snap Fire Systems Pty Ltd

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Revision C	Final for issue	19/12/2014	CSIRO/SNAP	FSP 1659a
Revision D	Final for issue	9/1/2015	CSIRO/SNAP	FSP 1659a

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9 January 2015	9 January 2015	9 January 2015

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Contents

Fire-resistance test on fire collars protecting a CSR Hebel AAC block wall penetrated by services

Sponsored Investigation No. FSP 1659a

1 Introduction

1.1 Identification of specimen

The sponsor identified the specimen as Snap Retrofitted Fire Collars protecting a CSR Hebel block wall penetrated by three (3) Polyvinyl Chloride (PVC) stack pipes and two (2) High Density Polyethylene (HDPE) stack pipes.

1.2 Sponsor

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

1.3 Manufacturer

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

1.4 Test standard

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

1.5 Reference standard

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

1.6 Test number

CSIRO Reference test number: FS 4437/3774

1.7 Test date

The fire-resistance test was conducted on 4 August 2014.

2 Description of specimen

2.1 General

The specimen comprised a 150-mm thick CSR Hebel block wall, with a stated FRL of -/240/240, penetrated by three (3) Polyvinyl Chloride (PVC) stack pipes and two (2) High Density Polyethylene (HDPE) stack pipes.

For the purpose of the test, the specimens were referenced as Penetrations A, B, C, D and E. Only four (4) specimens are included in this report.

The plastic pipes are stated to be manufactured in accordance with:

- Polyvinyl Chloride (PVC) pipes manufactured in accordance with AS/NSZ 1260.
- High Density Polyethylene (HDPE) pipes manufactured in accordance with ISO 770/8772.

Penetration # A – HP150 R retrofitted fire collar protecting a 160-mm diameter Polyvinyl Chloride Sandwich Construction (PVC-SC) stack pipe

The SNAP retrofitted HP150 R fire collar comprised a 0.95-mm steel casing with a 175-mm inner diameter and a 325-mm diameter base flange. The 117-mm high collar casing incorporated a strip of 588-mm x 110-mm x 6-mm thick Intumesh intumescent material. The closing mechanism comprised four stainless steel springs, with nylon fuse links, and a 640-mm x 109-mm stainless steel mesh as shown in drawing numbered HP 150 R-T dated 12 September 2014, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 160-mm diameter Polyvinyl Chloride Sandwich Construction (PVC-SC) stack pipe, with a wall thickness of 3.3-mm fitted through a 175-mm diameter hole in the block wall. The pipe projected horizontally 2000-mm away from the unexposed face of the CSR Hebel block wall and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000-mm from the unexposed face of the CSR Hebel block wall as shown in drawing titled "Penetration #A – PVC-SC (160-mm OD) Stack" dated 4 August 2014, by Snap Fire Systems Pty Ltd. On the exposed end, the pipe was capped with a PVC End cap.

The annular gap between the pipe and the wall was sealed with a 20-mm deep bead of Fullers Firesound fire sealant.

Penetration # C – LP50 R retrofitted fire collar protecting a 56-mm diameter Polyvinyl Chloride (PVC) stack pipe

The SNAP retrofitted LP50 R fire collar comprised a 0.75-mm steel casing with a 69-mm inner diameter and a 203-mm diameter base flange. The 62-mm high collar casing incorporated a strip of 240-mm x 58-mm x 4-mm thick Intumesh intumescent material. The closing mechanism comprised three stainless steel springs, with nylon fuse links and a 280-mm x 58-mm stainless steel mesh as shown in drawing numbered LP 50 R-T dated 22 September 2014, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 56-mm diameter Polyvinyl Chloride (PVC) stack pipe, with a wall thickness of 2.3-mm fitted through a 65-mm diameter hole in the block wall. The pipe projected horizontally 2000-mm away from the unexposed face of the CSR Hebel block wall and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000-mm from the unexposed face of the CSR Hebel block wall as shown in drawing titled "Penetration #C – PVC (56-mm OD) Stack" dated 4 August 2014, by Snap Fire Systems Pty Ltd. On the exposed end, the pipe was capped with a Kaowool Plug.

On the exposed face, the annular gap between the pipe and the wall was sealed with a 10-mm deep bead of Fullers Firesound fire sealant.

Penetration # D – HP100 R retrofitted fire collar protecting a 110-mm diameter Polyvinyl Chloride Sandwich Construction (PVC-SC) stack pipe

The SNAP retrofitted HP100 R fire collar comprised a 0.95-mm steel casing with a 120-mm inner diameter and a 257-mm diameter base flange. The 92-mm high collar casing incorporated a strip of 412-mm x 85-mm x 4-mm thick Intumesh intumescent material. The closing mechanism comprised three stainless steel springs, with nylon fuse links, and a 460-mm x 85-mm stainless steel mesh as shown in drawing numbered HP 100 R-T dated 22 September 2014, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 110-mm diameter Polyvinyl Chloride Sandwich Construction (PVC-SC) stack pipe, with a wall thickness of 3.4-mm fitted through a 115-mm diameter hole in the block wall. The pipe projected horizontally 2000-mm away from the unexposed face of the CSR Hebel block wall and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000-mm from the unexposed face of the CSR Hebel block wall as shown in drawing titled "Penetration #D – PVC-SC (110-mm OD) Stack" dated 4 August 2014, by Snap Fire Systems Pty Ltd. On the exposed end, the pipe was capped with a Kaowool Plug.

On the exposed face, the annular gap between the pipe and the wall was sealed with a 15-mm deep bead of Fullers Firesound fire sealant.

Penetration # E – HP100 R retrofitted fire collar protecting a 110-mm diameter High Density Polyethylene (HDPE) stack pipe

The SNAP retrofitted HP100 R fire collar comprised a 0.95-mm steel casing with a 120-mm inner diameter and a 257-mm diameter base flange. The 92-mm high collar casing incorporated a strip of 412-mm x 85-mm x 4-mm thick Intumesh intumescent material. The closing mechanism comprised three stainless steel springs, with nylon fuse links, and a 460-mm x 85-mm stainless steel mesh as shown in drawing numbered HP 100 R-T dated 22 September 2014, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 110-mm diameter High Density Polyethylene (HDPE) stack pipe, with a wall thickness of 4.9-mm fitted through a 115-mm diameter hole in the block wall. The pipe projected horizontally 2000-mm away from the unexposed face of the CSR Hebel block wall and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000-mm from the unexposed face of the CSR Hebel block wall as shown in drawing titled "Penetration #E – HDPE (110-mm OD) Stack" dated 4 August 2014, by Snap Fire Systems Pty Ltd. On the exposed end, the pipe was capped with a Kaowool Plug.

2.2 Dimensions

The overall dimension of the CSR Hebel block wall was 1150-mm wide x 1150-mm long, to suit the opening in the specimen containing frame.

2.3 Orientation

The reinforced CSR Hebel block wall was placed vertically against the furnace chamber.

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 #A – PVC-SC (160-mm OD) Stack” dated 4 August 2014, by Snap Fire Systems Pty Ltd.

Drawing titled “Penetration #B – HDPE (160-mm OD) Stack” dated 4 August 2014, by Snap Fire Systems Pty Ltd.

Drawing titled “Penetration #C – PVC (56-mm OD) Stack” dated 4 August 2014, by Snap Fire Systems Pty Ltd.

Drawing titled “Penetration #D – PVC-SC (110-mm OD) Stack” dated 4 August 2014, by Snap Fire Systems Pty Ltd.

Drawing titled “Penetration #E – HDPE (110-mm OD) Stack” dated 4 August 2014, by Snap Fire Systems Pty Ltd

Drawing numbered HP 150 R-T dated 12 September 2014, by Snap Fire Systems Pty Ltd.

Drawing numbered LP 50 R-T dated 22 September 2014, by Snap Fire Systems Pty Ltd.

Drawing numbered HP 100 R-T dated 22 September 2014, by Snap Fire Systems Pty Ltd.

4 Equipment

4.1 Furnace

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

The furnace was lined with refractory bricks and materials with the thermal properties as specified in AS 1530.4-2005 and was heated by combustion of a mixture of natural gas and air.

4.2 Temperature

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

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

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

4.3 Measurement system

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

5 Ambient temperature

The temperature of the test area was 21°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:

Time	Observation
2 minutes -	Fluing is visible from Penetrations A, B and C.
4 minutes -	Fluing is visible from Penetrations A, B and E.
6 minutes -	Fluing is visible from Penetrations A, B, D and E.
8 minutes -	Fluing is visible from Penetrations A and B.
16 minutes -	Fluing has decreased.
25 minutes -	No fluing is visible from the Penetrations.
28 minutes -	Smoke is fluing from Penetration B.
33 minutes -	Penetration B is deforming at its base.

36 minutes -	Integrity failure on Penetration B. Cotton pad test applied on the base of the pipe – Ignition noted. Insulation failure of penetration B – maximum temperature rise of 180 deg C is exceeded on the pipe.
145 minutes -	Smoke is fluing from Penetration A and D.
207 minutes -	Intumescent material is visible on the base of Penetrations A and D. Smoke is being emitted.
227 minutes -	Insulation failure of penetration A – maximum temperature rise of 180 deg C is exceeded on 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 the curve of maximum temperature versus time associated with Penetration A.

Figure 4 shows the curve of maximum temperature versus time associated with Penetration B.

Figure 5 shows the curve of maximum temperature versus time associated with Penetration C.

Figure 6 shows the curve of maximum temperature versus time associated with Penetration D.

Figure 7 shows the curve of maximum temperature versus time associated with Penetration E.

8.5 Performance

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

Penetration # A – HP150 R retrofitted fire collar protecting a 160-mm diameter Polyvinyl Chloride (PVC-SC) stack pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	227 minutes

Penetration # C – LP50 R retrofitted fire collar protecting a 56-mm diameter Polyvinyl Chloride (PVC) stack pipe

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

Penetration # D – HP100 R retrofitted fire collar protecting a 110-mm diameter Polyvinyl Chloride (PVC-SC) stack pipe

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

Penetration # E – HP100 R retrofitted fire collar protecting a 110-mm diameter High Density Polyethylene (HDPE) stack 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 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 A	-	-/240/180;
Penetration C	-	-/240/240;
Penetration D	-	-/240/240; and
Penetration E	-	-/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-Ledermann
Testing Officer

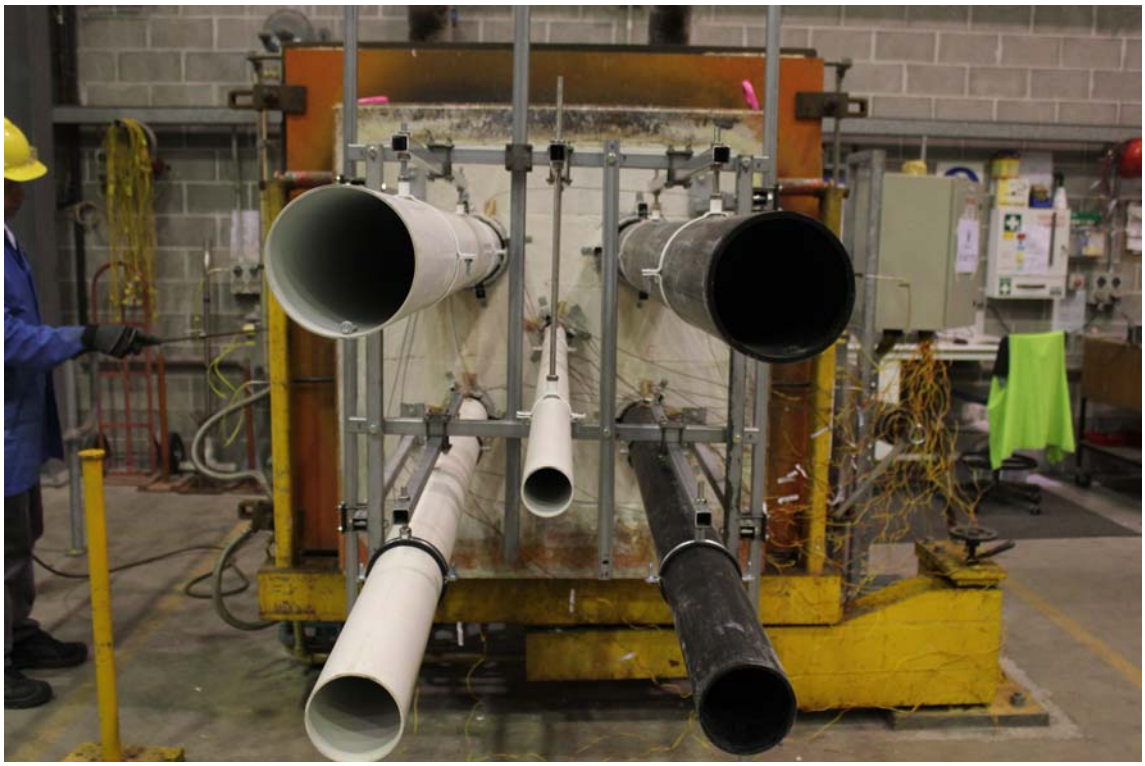
Appendices

Appendix A – Measurement location

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

Appendix B - Photographs

PHOTOGRAPH 1 – EXPOSED FACE OF SPECIMENS PRIOR TO TESTING

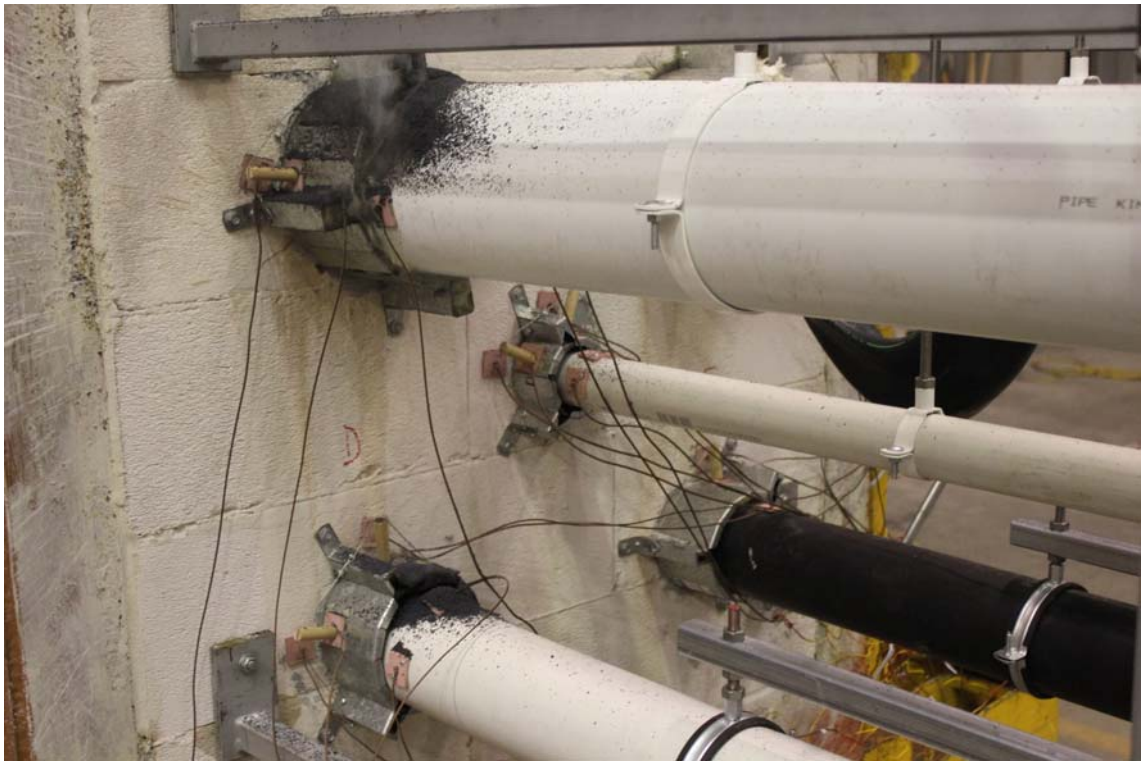


PHOTOGRAPH 2 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING

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 5 – SPECIMENS AFTER 241 MINUTES OF TESTING

Appendix C – Furnace Temperature

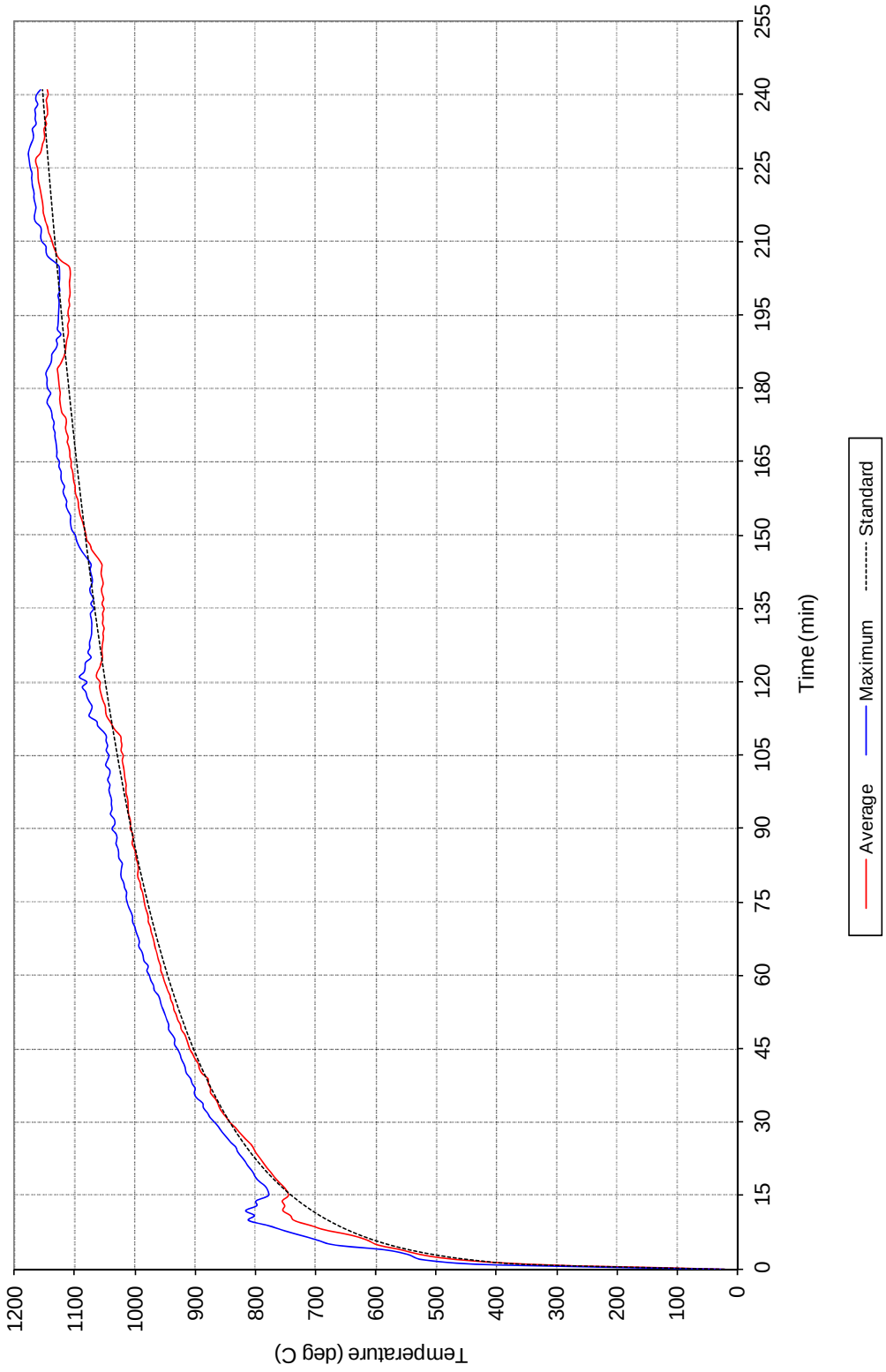


FIGURE 1 – FURNACE TEMPERATURE

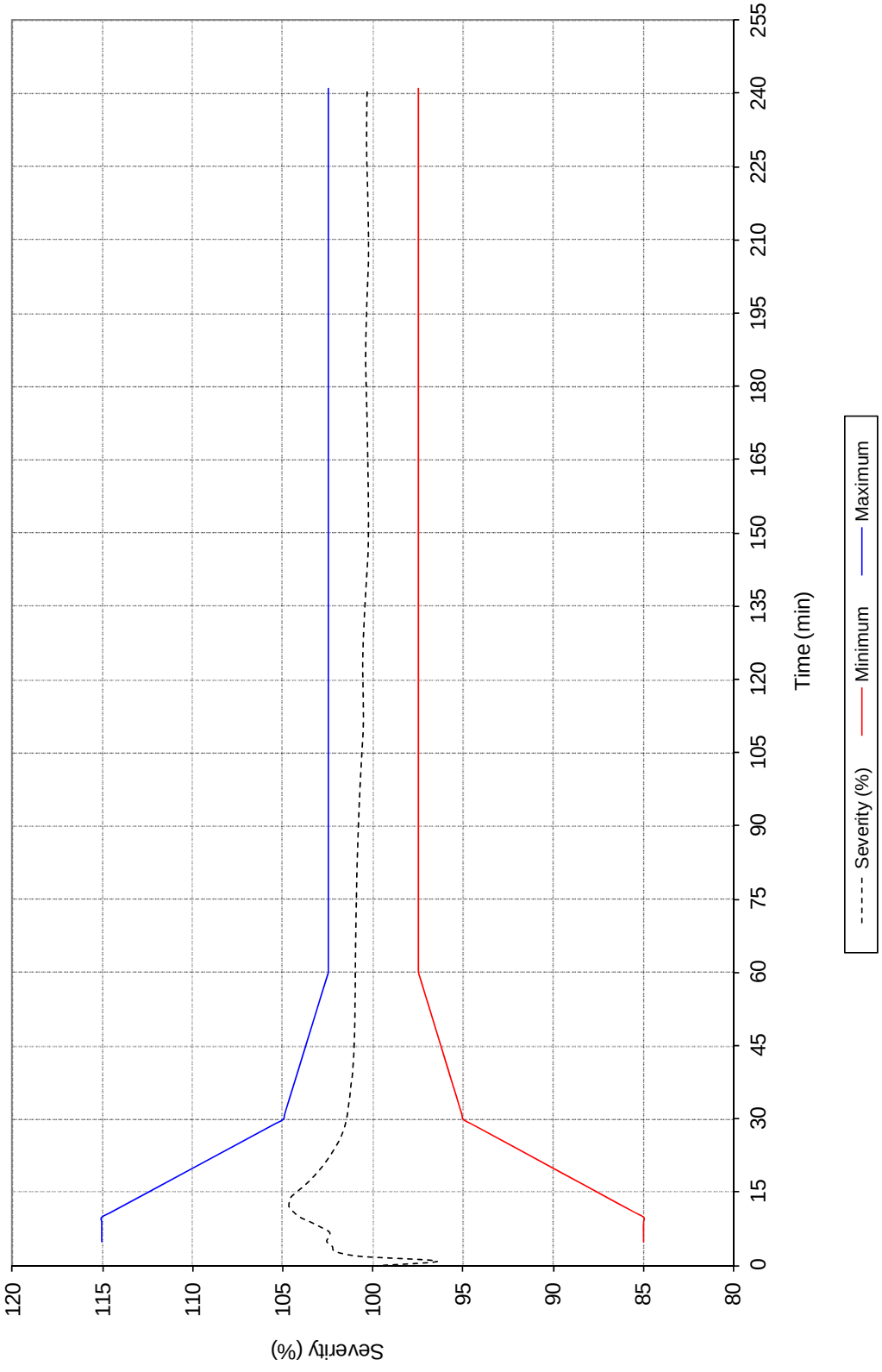


FIGURE 2 – FURNACE SEVERITY

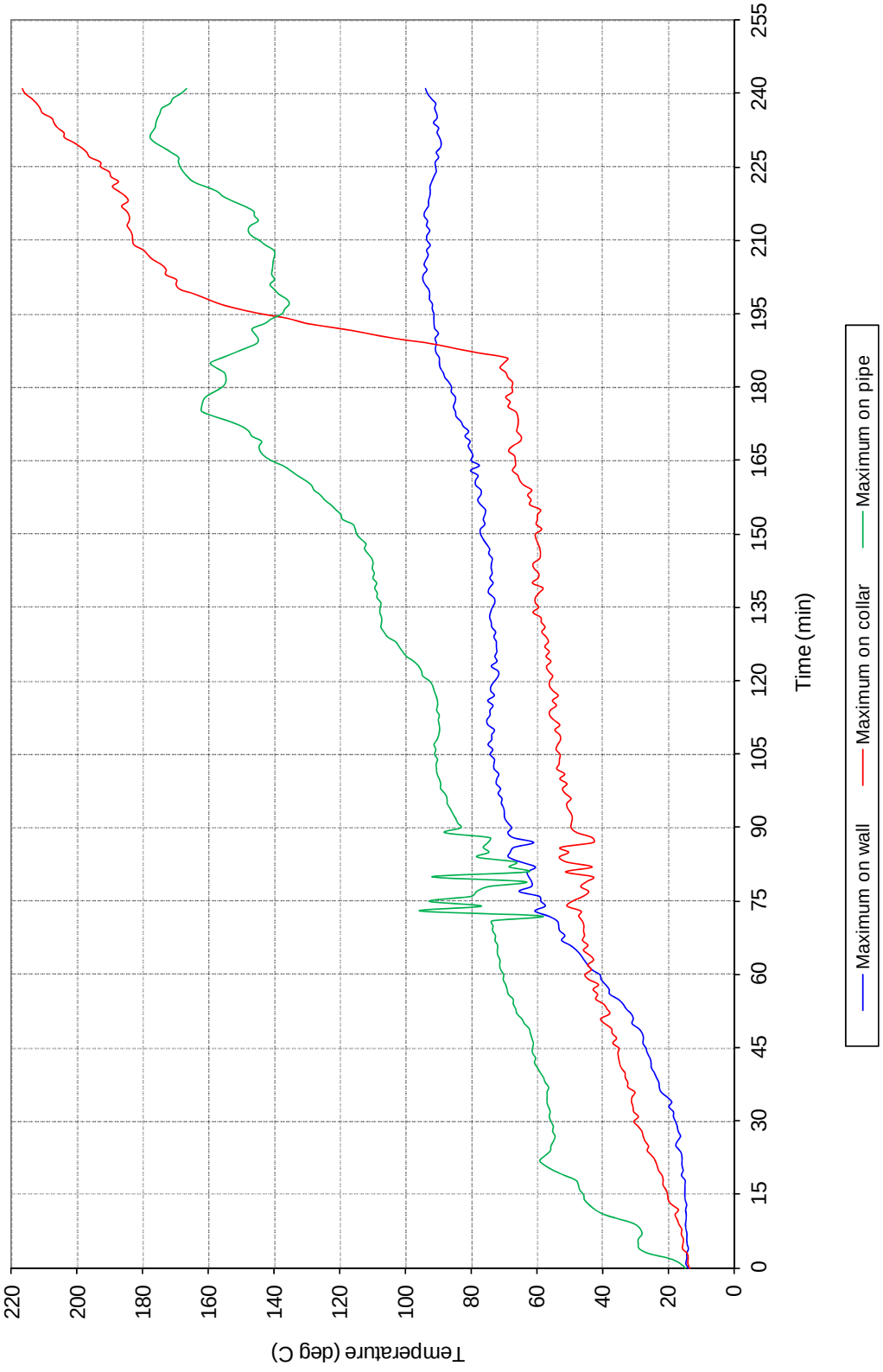


FIGURE 3 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION A

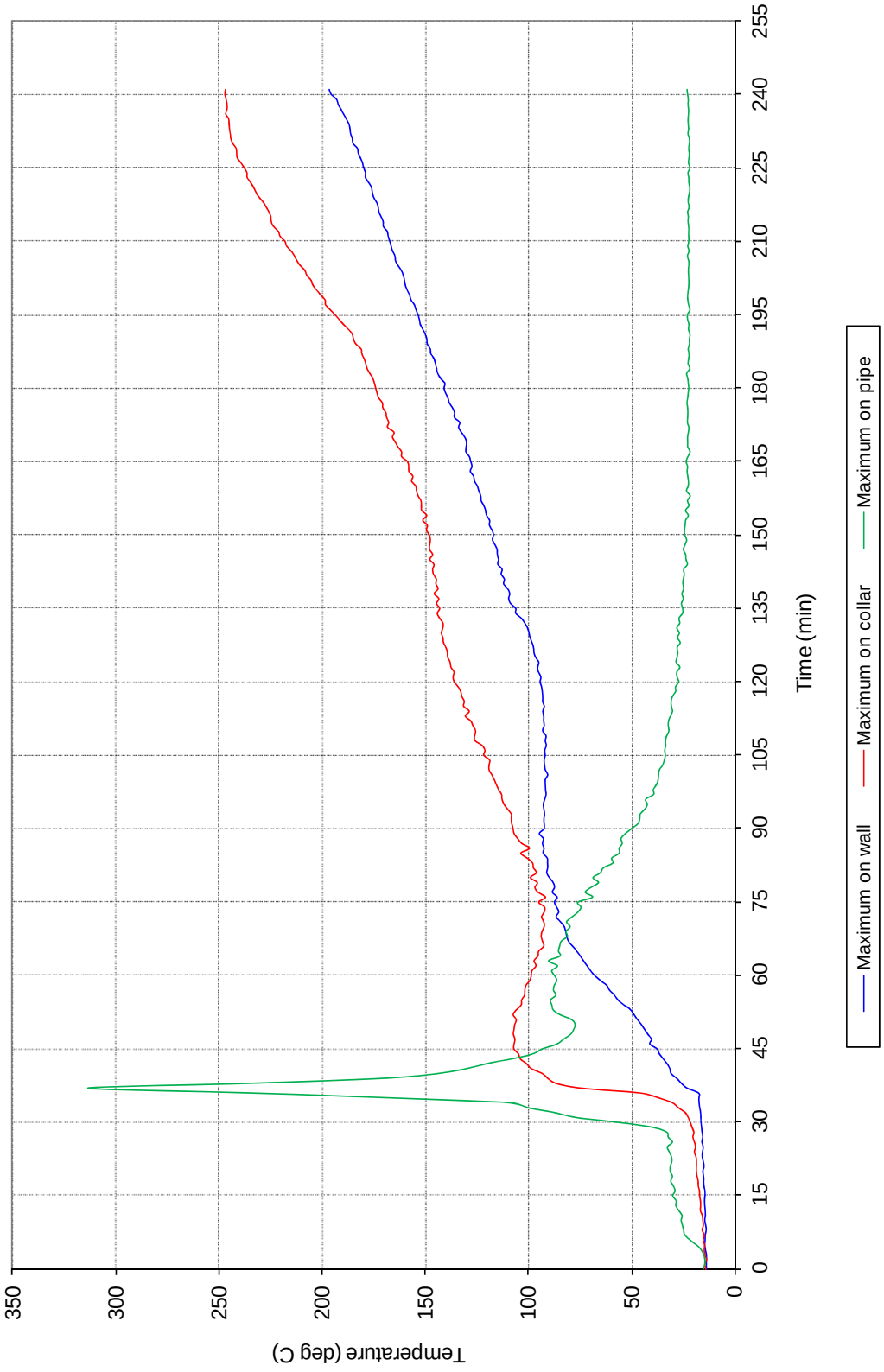


FIGURE 4 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION B

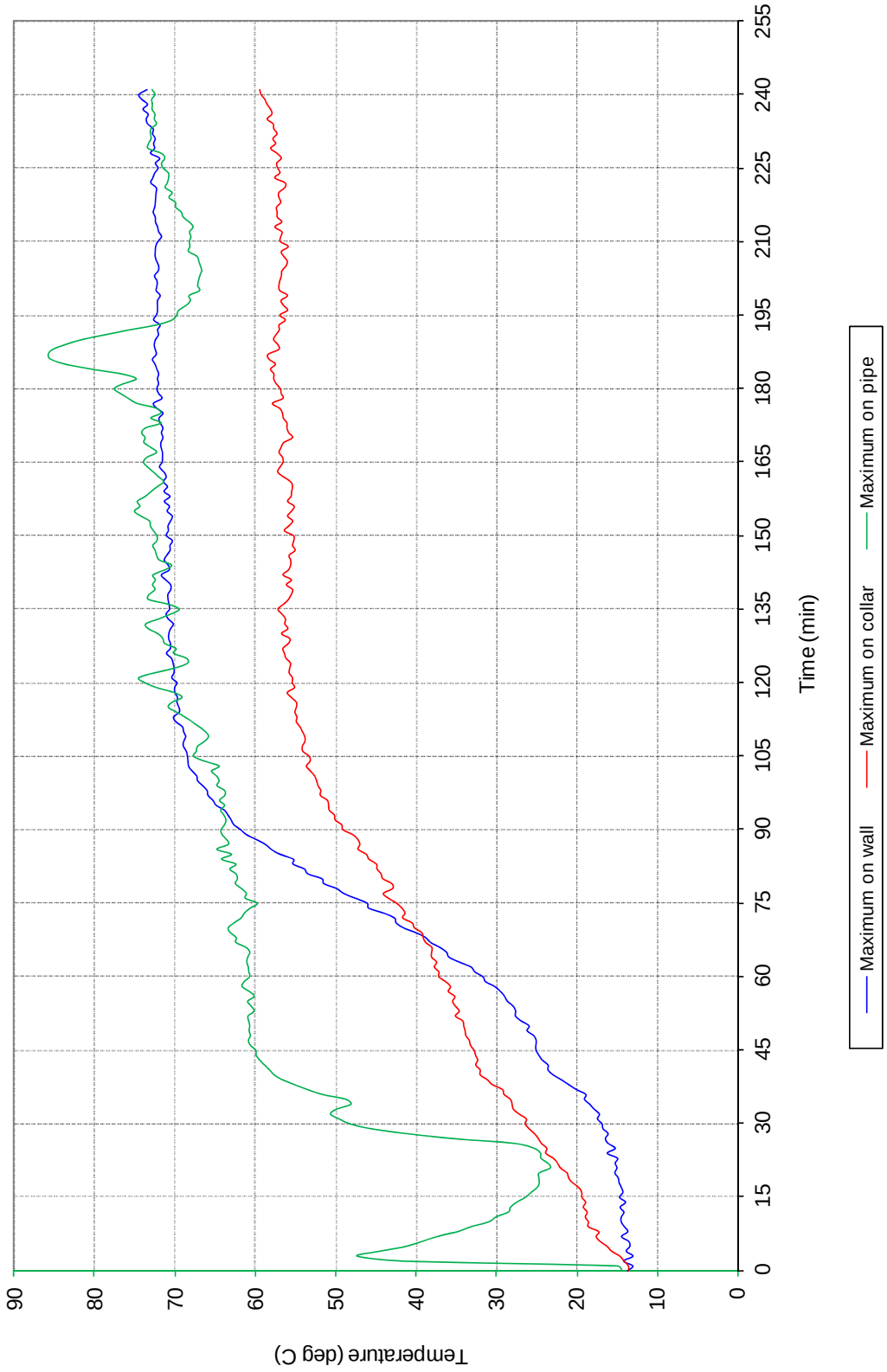


FIGURE 5 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION C

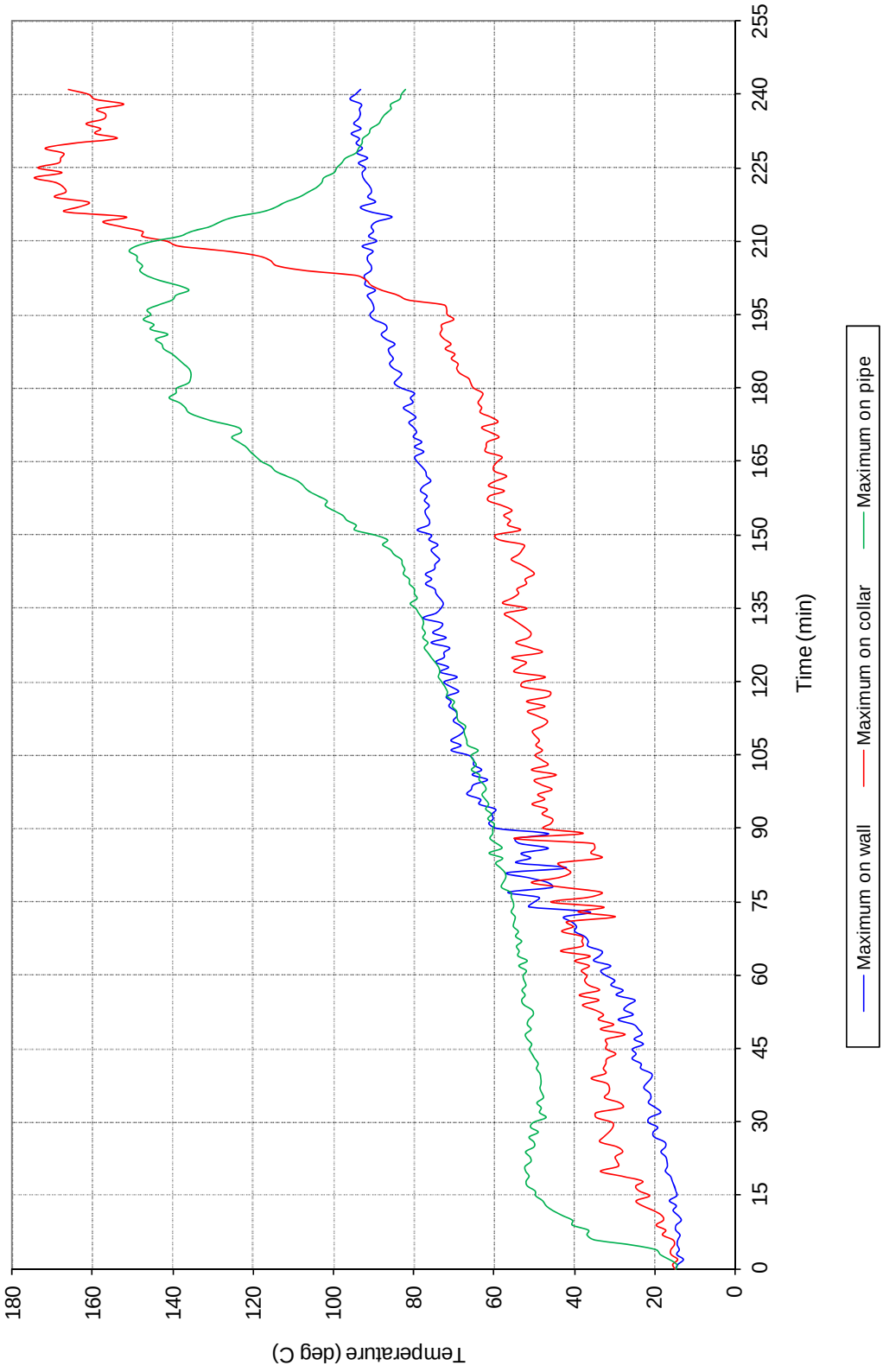


FIGURE 6 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION D

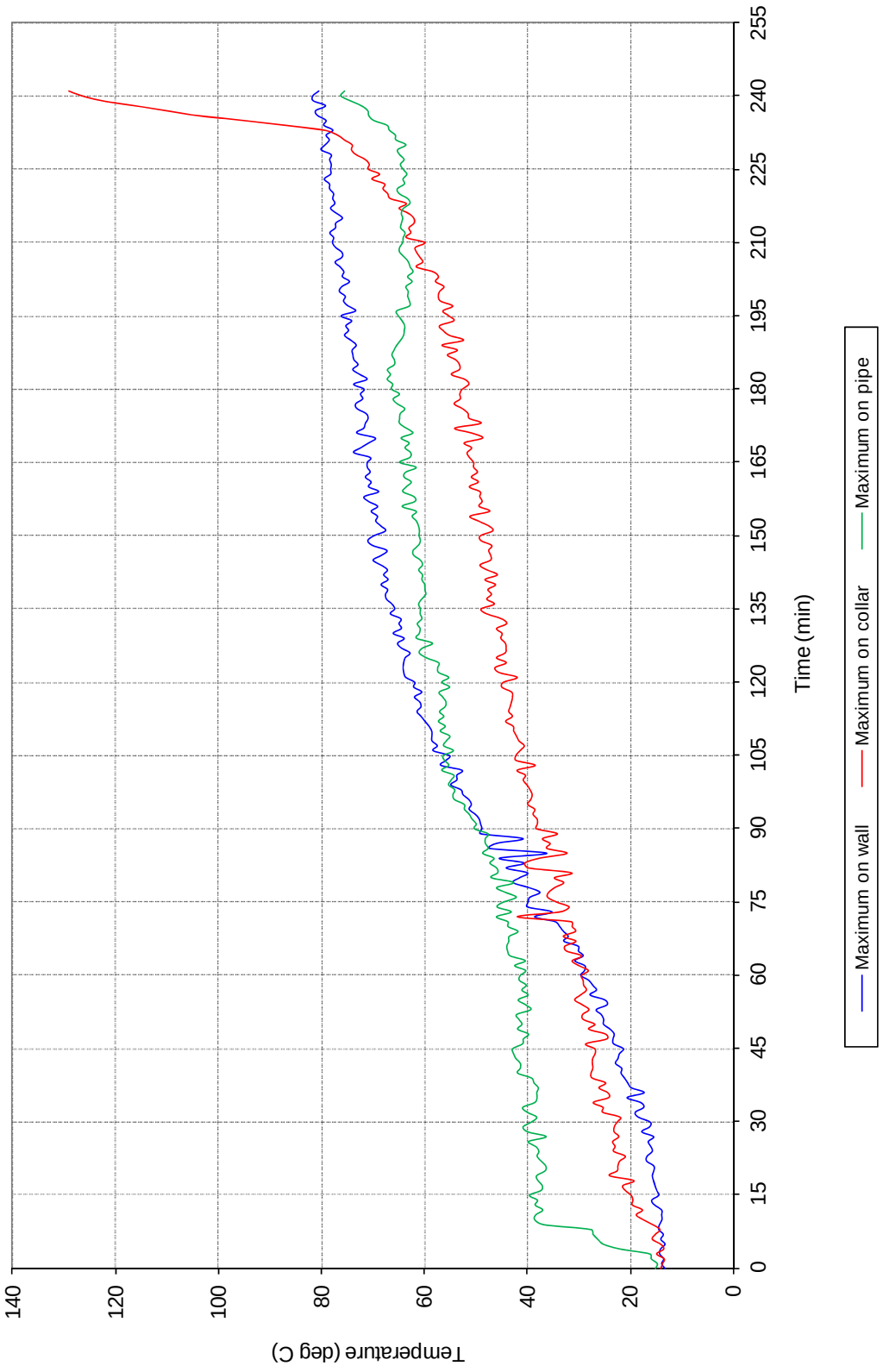
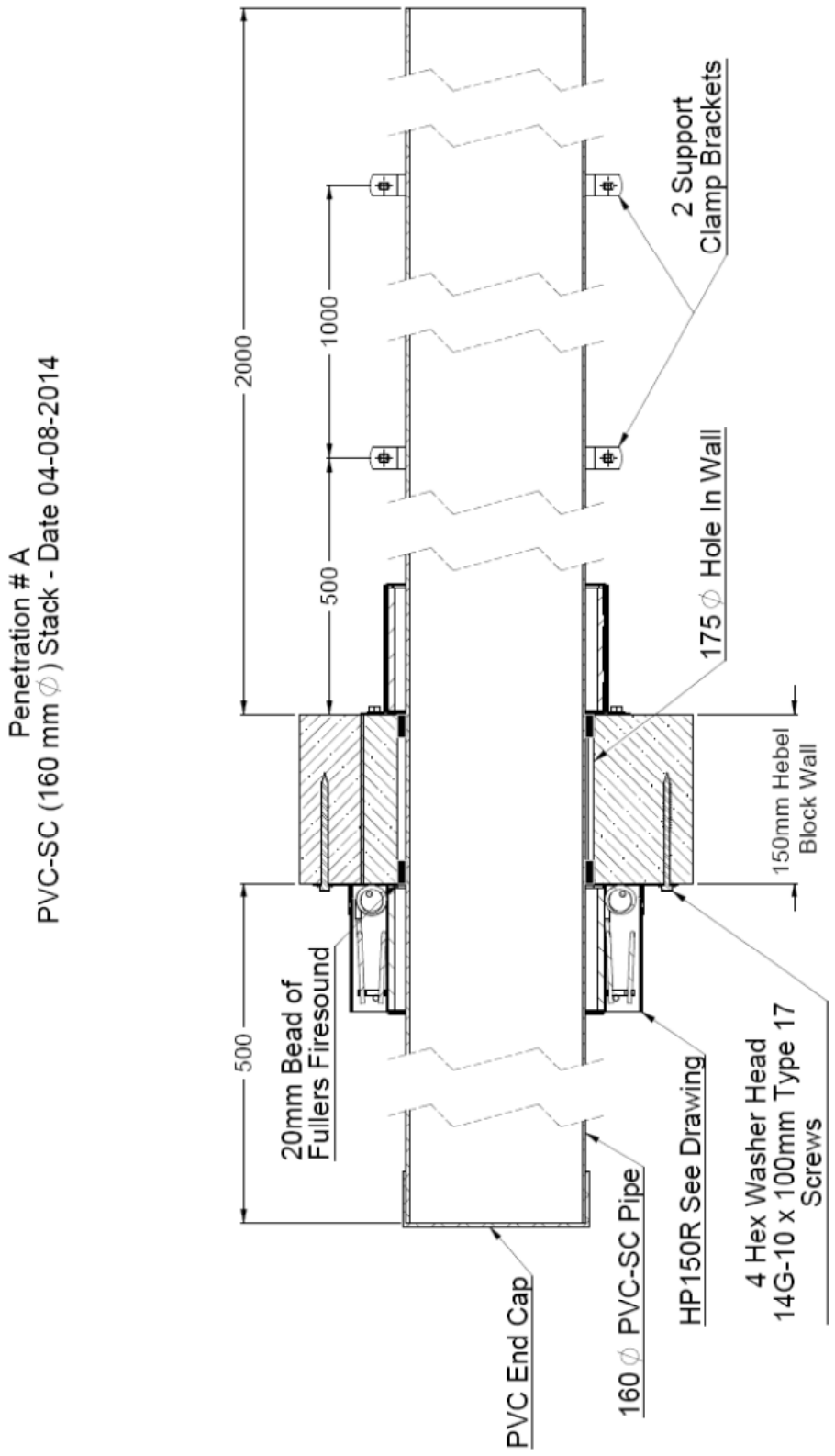
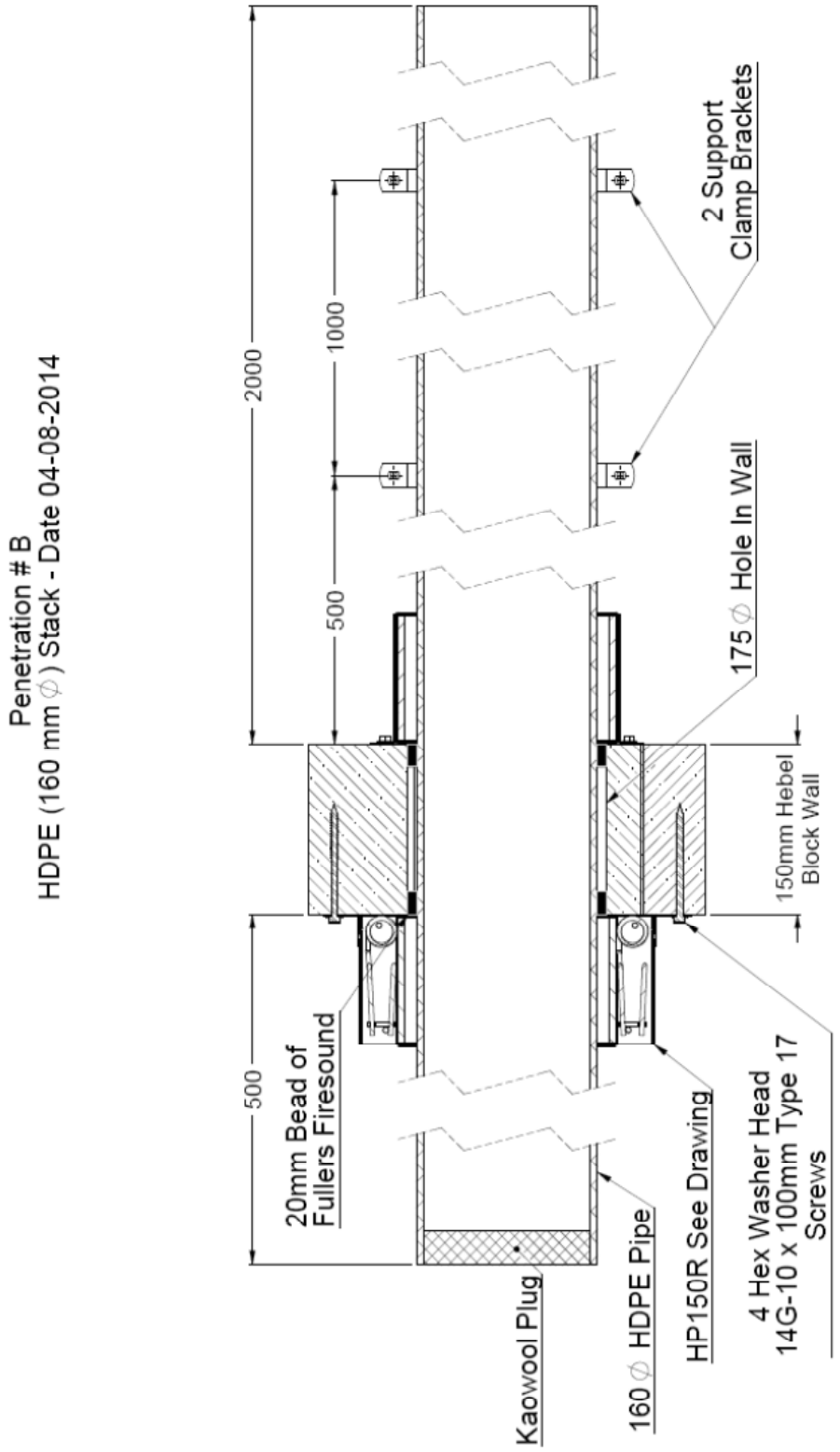


FIGURE 7 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION E

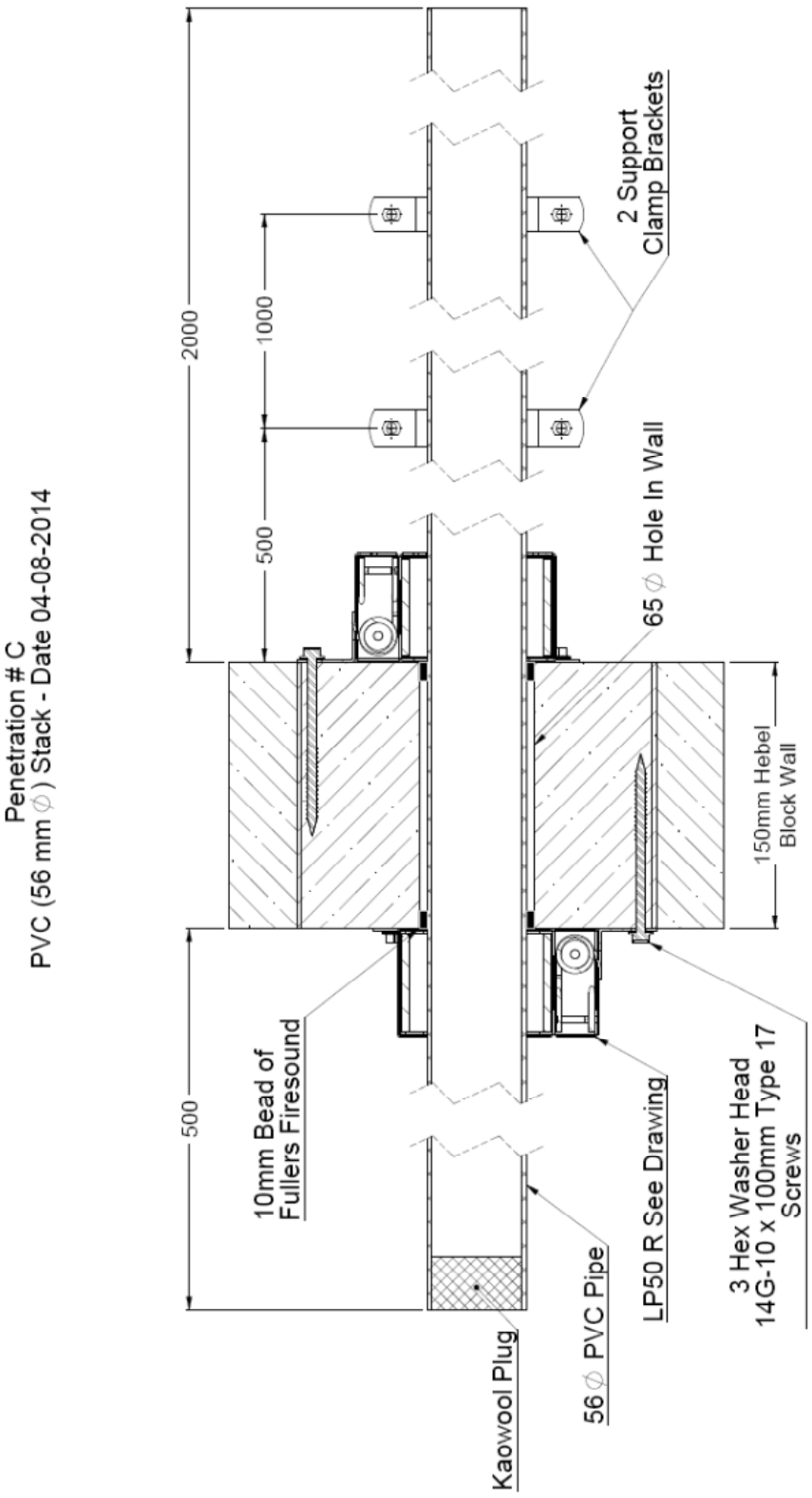
Appendix D – Installation drawings



DRAWING TITLED "PENETRATION #A – PVC-SC (160-MM OD) STACK" DATED 4 AUGUST 2014, BY SNAP FIRE SYSTEMS PTY LTD



DRAWING TITLED "PENETRATION #B – HDPE (160-MM OD) STACK" DATED 4 AUGUST 2014, BY SNAP FIRE SYSTEMS PTY LTD



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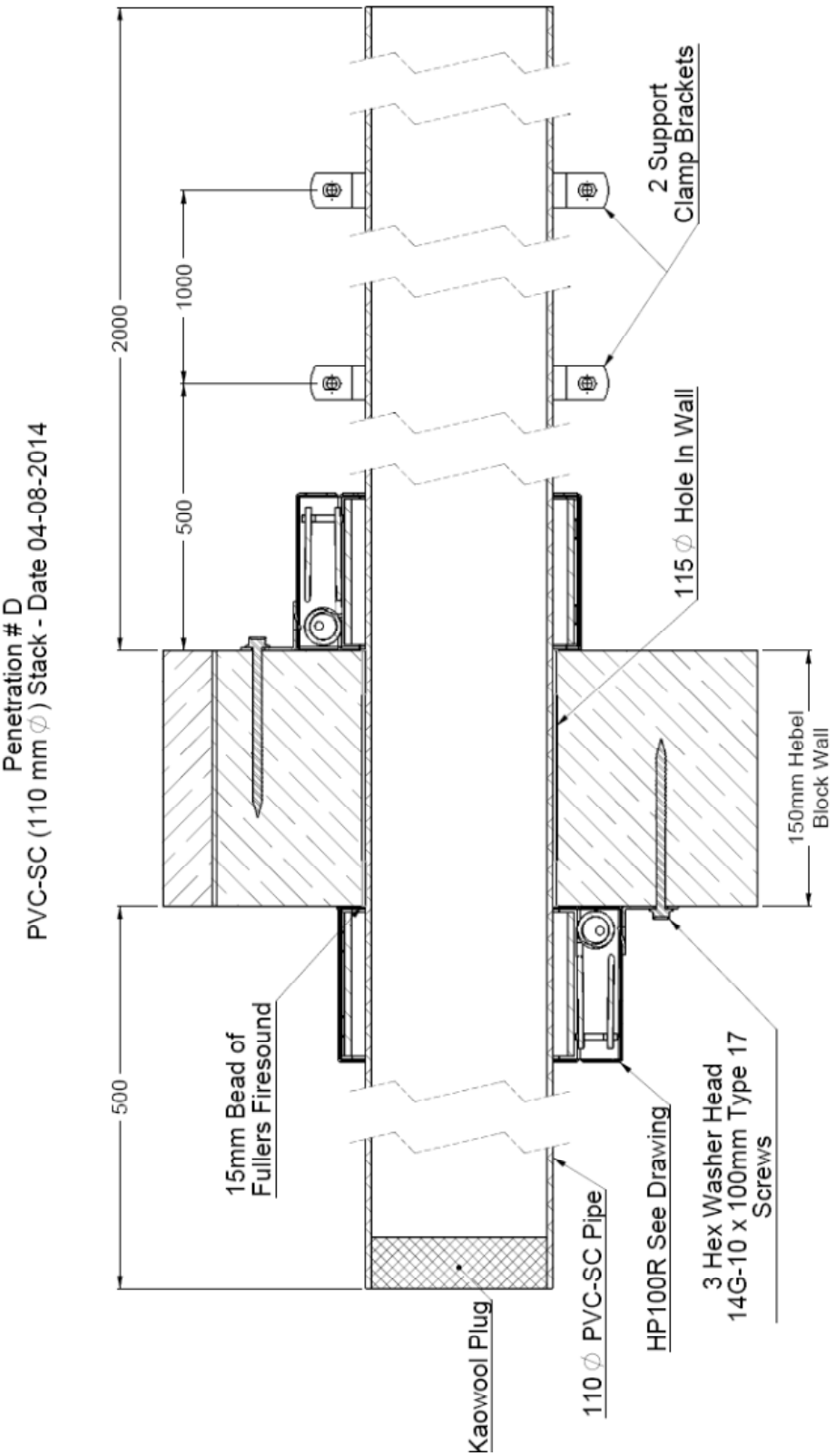
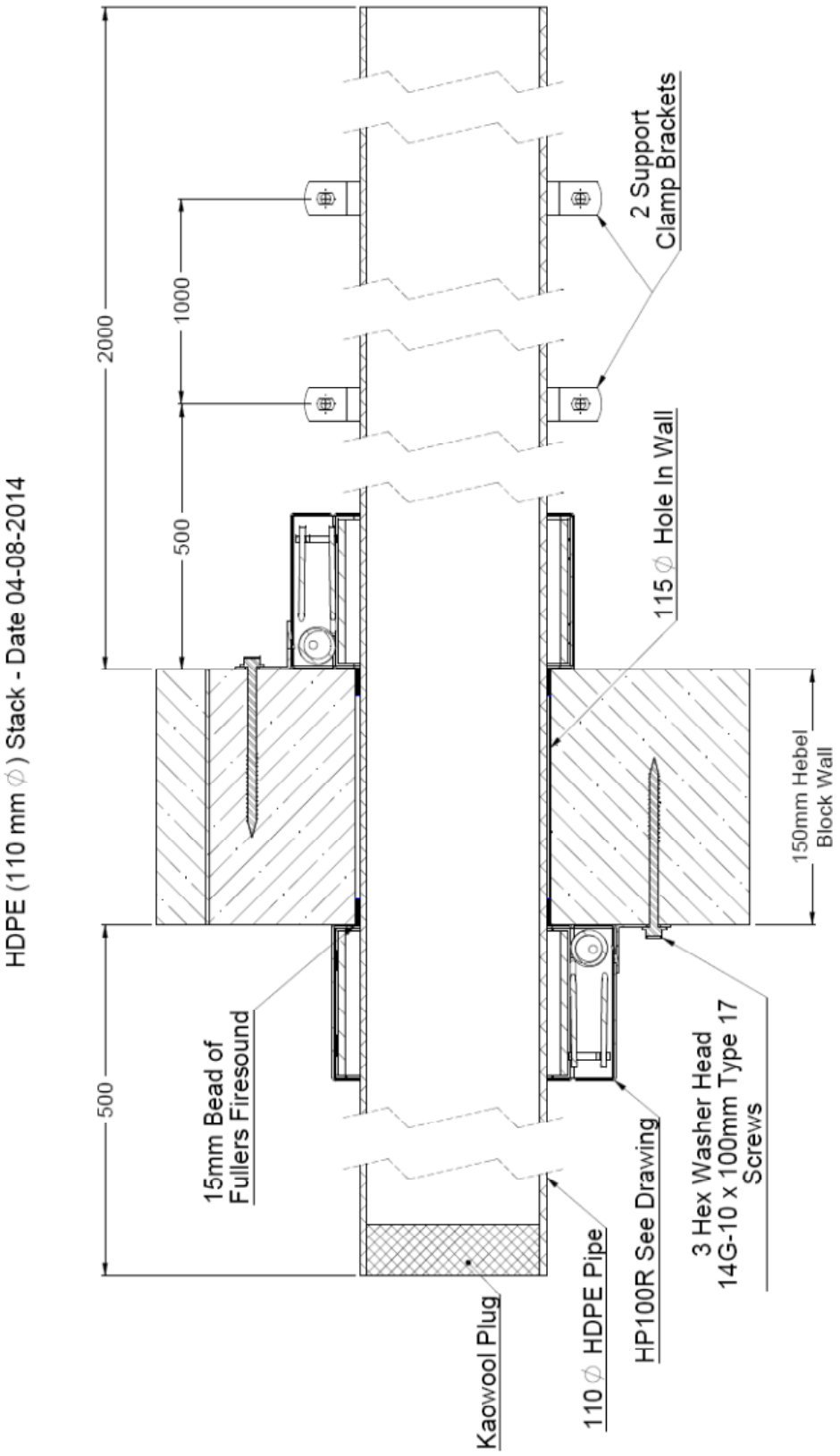
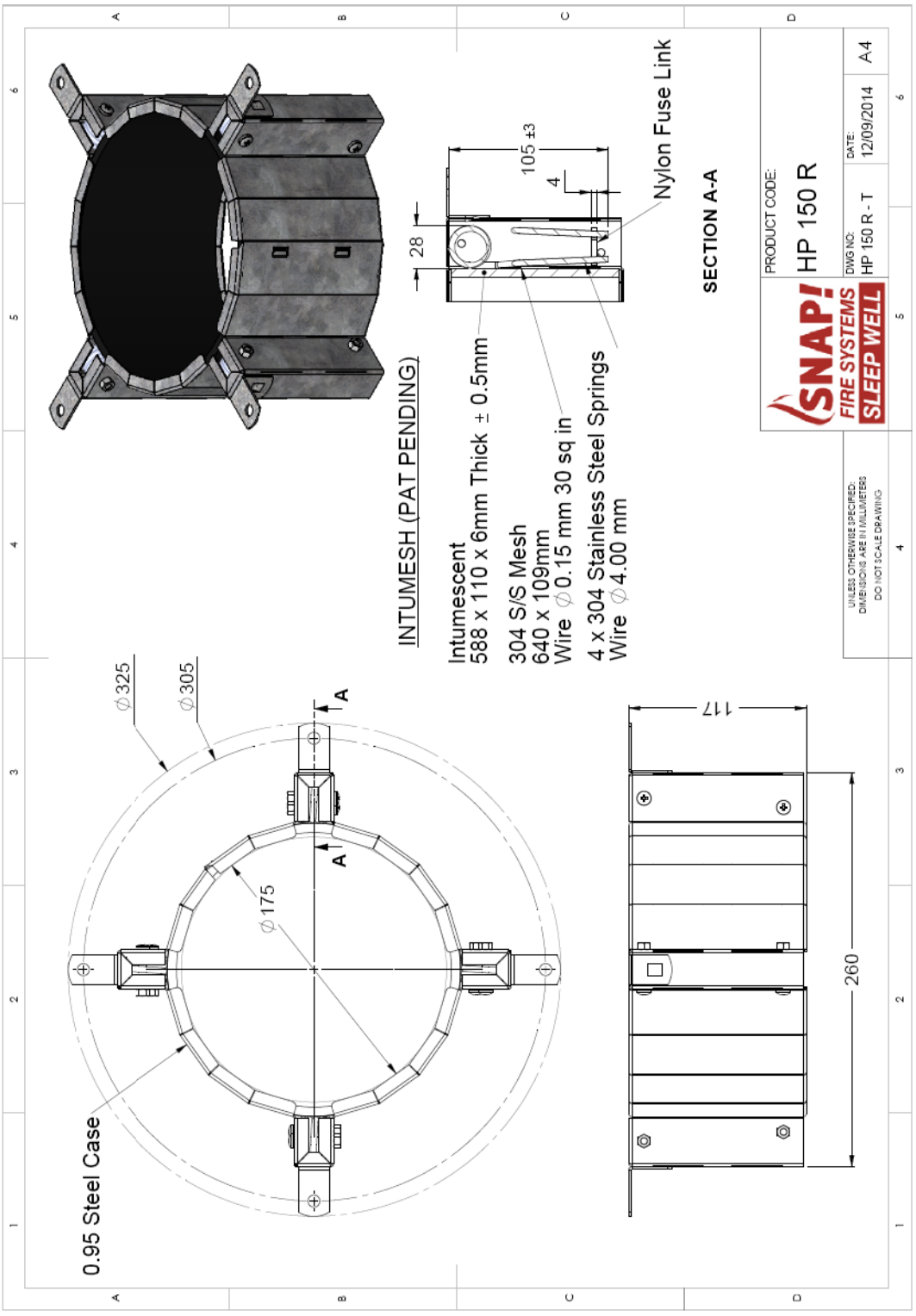


DRAWING TITLED "PENETRATION #D – PVC-SC (110-MM OD) STACK" DATED 4 AUGUST 2014, BY SNAP FIRE SYSTEMS PTY LTD

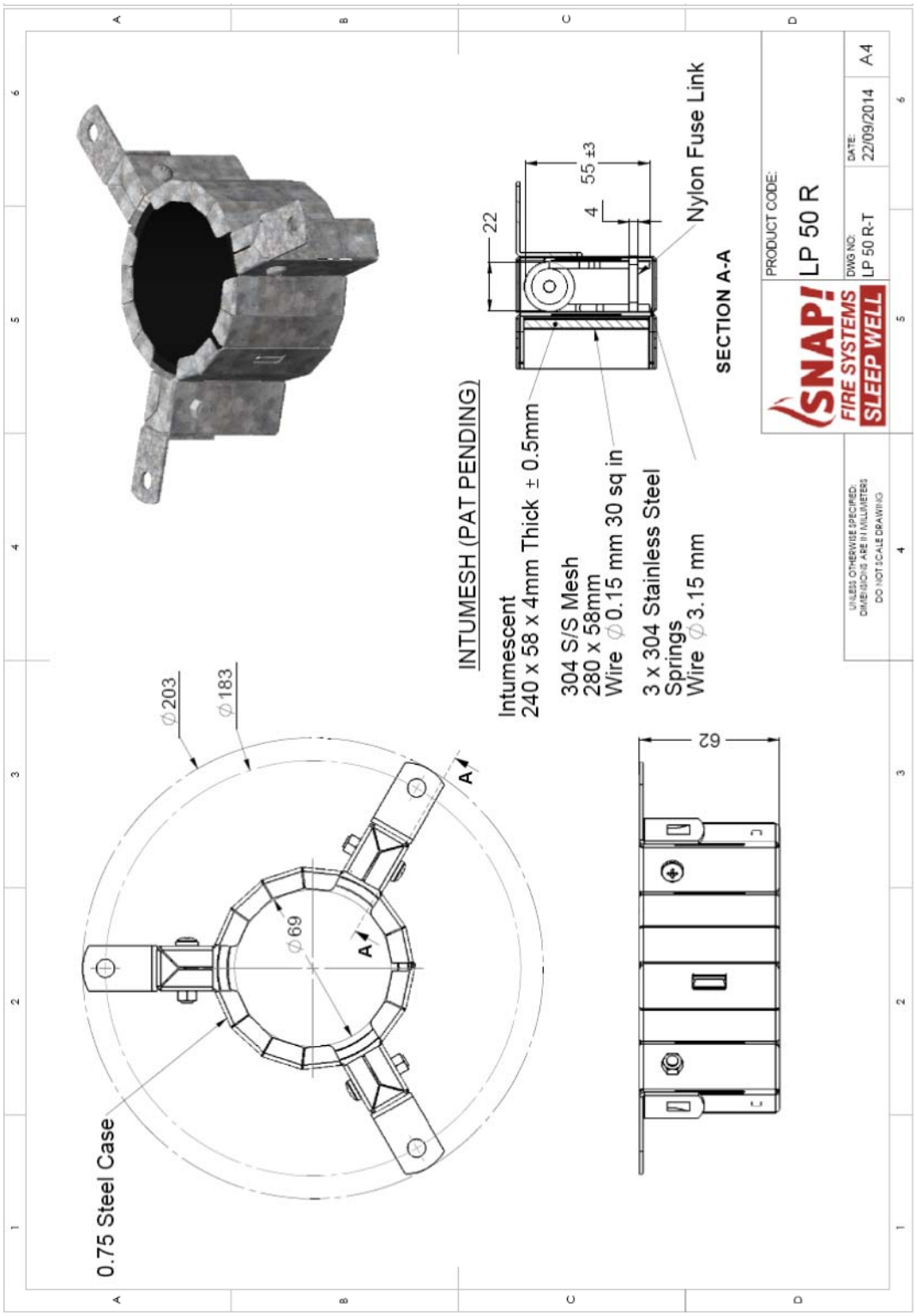


DRAWING TITLED "PENETRATION #E – HDPE (110-MM OD) STACK" DATED 4 AUGUST 2014, BY SNAP FIRE SYSTEMS PTY LTD

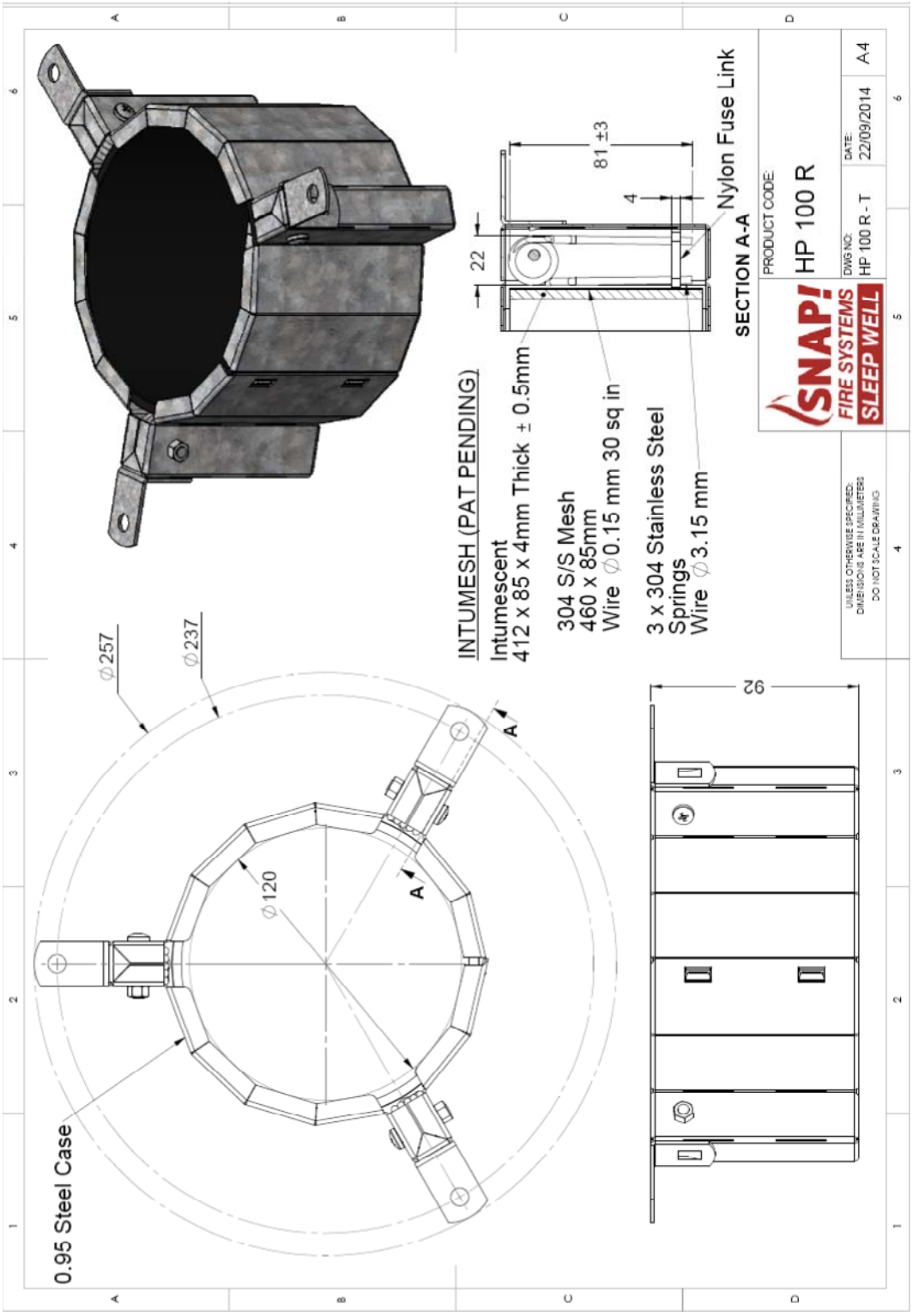
Appendix E – Specimen Drawings



DRAWING NUMBERED HP 150 R-T DATED 12 SEPTEMBER 2014, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING NUMBERED LP 50 R-T DATED 22 SEPTEMBER 2014, BY SNAP FIRE SYSTEMS PTY LTD.



DRAWING NUMBERED HP 100 R-T DATED 22 SEPTEMBER 2014, BY SNAP FIRE SYSTEMS PTY LTD.

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.

Appendix F – Certificates

- COPY OF CERTIFICATE OF TEST – NO. 2605a
- COPY OF CERTIFICATE OF TEST – NO. 2607a
- COPY OF CERTIFICATE OF TEST – NO. 2608a
- COPY OF CERTIFICATE OF TEST – NO. 2630

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Certificate of Test

No. 2605a

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 1659a.

Product Name: Penetration # A – HP150 R retrofitted fire collar protecting a 160-mm diameter Polyvinyl Chloride (PVC-SC) stack pipe.

Description: The SNAP retrofitted HP150 R fire collar comprised a 0.95-mm steel casing with a 175 mm inner diameter and a 325-mm diameter base flange. The 117-mm high collar casing incorporated a strip of 588 mm x 110 mm x 6-mm thick Intumesh intumescent material. The closing mechanism comprised four stainless steel springs, with nylon fuse links, and a 640 mm x 109-mm stainless steel mesh as shown in drawing numbered HP 150 R-T dated 12 September 2014, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 160-mm diameter Polyvinyl Chloride Sandwich Construction (PVC-SC) stack pipe, with a wall thickness of 3.3-mm fitted through a 175-mm diameter hole in the block wall. The pipe projected horizontally 2000-mm away from the unexposed face of the CSR Hebel block wall and 500 mm into the furnace chamber. The pipe was supported at 500-mm and 1000 mm from the unexposed face of the CSR Hebel block wall as shown in drawing titled "Penetration #A – PVC-SC (160-mm OD) Stack" dated 4 August 2014, by Snap Fire Systems Pty Ltd. On the exposed end, the pipe was capped with a PVC End cap.

The annular gap between the pipe and the wall was sealed with a 20-mm deep bead of Fullers Firesound fire sealant.

Structural Adequacy	not applicable
Integrity	no failure at 241 minutes
Insulation	227 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-Ledermann Date of Test: 4 August 2014

Issued on the 19th day of December 2014 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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

Certificate of Test

No. 2607a

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 1659a.

Product Name: Penetration # C – LP50 R retrofitted fire collar protecting a 56-mm diameter Polyvinyl Chloride (PVC) stack pipe.

Description: The SNAP retrofitted LP50 R fire collar comprised a 0.75-mm steel casing with a 69 mm inner diameter and a 203-mm diameter base flange. The 62-mm high collar casing incorporated a strip of 240 mm x 58 mm x 4-mm thick Intumesh intumescent material. The closing mechanism comprised three stainless steel springs, with nylon fuse links and a 280 mm x 58-mm stainless steel mesh as shown in drawing numbered LP 50 R-T dated 22 September 2014, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 56-mm diameter Polyvinyl Chloride (PVC) stack pipe, with a wall thickness of 2.3-mm fitted through a 65-mm diameter hole in the block wall. The pipe projected horizontally 2000-mm away from the unexposed face of the CSR Hebel block wall and 500 mm into the furnace chamber. The pipe was supported at 500-mm and 1000 mm from the unexposed face of the CSR Hebel block wall as shown in drawing titled "Penetration #C – PVC (56-mm OD) Stack" dated 4 August 2014, by Snap Fire Systems Pty Ltd. On the exposed end, the pipe was capped with a Kaowool Plug.

On the exposed face, the annular gap between the pipe and the wall was sealed with a 10-mm deep bead of Fullers Firesound fire sealant.

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-Ledermann Date of Test: 4 August 2014

Issued on the 19th day of December 2014 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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Certificate of Test

No. 2608a

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 1659a.

Product Name: Penetration # D – HP100 R retrofitted fire collar protecting a 110-mm diameter Polyvinyl Chloride Sandwich Construction (PVC-SC) stack pipe.

Description: The SNAP retrofitted HP100 R fire collar comprised a 0.95-mm steel casing with a 120 mm inner diameter and a 257-mm diameter base flange. The 92-mm high collar casing incorporated a strip of 412 mm x 85 mm x 4-mm thick Intumesh intumescent material. The closing mechanism comprised three stainless steel springs, with nylon fuse links, and a 460 mm x 85-mm stainless steel mesh as shown in drawing numbered HP 100 R-T dated 22 September 2014, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 110-mm diameter Polyvinyl Chloride Sandwich Construction (PVC-SC) stack pipe, with a wall thickness of 3.4-mm fitted through a 115-mm diameter hole in the block wall. The pipe projected horizontally 2000-mm away from the unexposed face of the CSR Hebel block wall and 500 mm into the furnace chamber. The pipe was supported at 500-mm and 1000 mm from the unexposed face of the CSR Hebel block wall as shown in drawing titled "Penetration #D – PVC-SC (110-mm OD) Stack" dated 4 August 2014, by Snap Fire Systems Pty Ltd. On the exposed end, the pipe was capped with a Kaowool Plug.

On the exposed face, the annular gap between the pipe and the wall was sealed with a 15-mm deep bead of Fullers Firesound fire sealant.

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-Ledermann Date of Test: 4 August 2014

Issued on the 19th day of December 2014 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

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Certificate of Test

No. 2630

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 1659a.

Product Name: Penetration # E – HP100 R retrofitted fire collar protecting a 110-mm diameter High Density Polyethylene (HDPE) stack pipe.

Description: The SNAP retrofitted HP100 R fire collar comprised a 0.95-mm steel casing with a 120 mm inner diameter and a 257-mm diameter base flange. The 92-mm high collar casing incorporated a strip of 412 mm x 85 mm x 4-mm thick Intumesh intumescent material. The closing mechanism comprised three stainless steel springs, with nylon fuse links, and a 460 mm x 85-mm stainless steel mesh as shown in drawing numbered HP 100 R-T dated 22 September 2014, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 110-mm diameter High Density Polyethylene (HDPE) stack pipe, with a wall thickness of 4.9-mm fitted through a 115-mm diameter hole in the block wall. The pipe projected horizontally 2000-mm away from the unexposed face of the CSR Hebel block wall and 500 mm into the furnace chamber. The pipe was supported at 500-mm and 1000 mm from the unexposed face of the CSR Hebel block wall as shown in drawing titled "Penetration #E – HDPE (110-mm OD) Stack" dated 4 August 2014, by Snap Fire Systems Pty Ltd. On the exposed end, the pipe was capped with a Kaowool Plug.

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-Ledermann Date of Test: 4 August 2014

Issued on the 9th day of January 2015 without alterations or additions. This version supersedes Certificate # 2620a issued on 19 December 2014.

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FOR FURTHER INFORMATION

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