FIRE-RESISTANCE TEST ON FIRE COLLARS PROTECTING A CONCRETE SLAB PENETRATED BY SERVICES

Report number FSP 1575
CSIRO job number SP3629
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Client
SNAP FIRE SYSTEMS PTY LTD.

Commercial-in-confidence

CSIRO – MATERIALS SCIENCE AND ENGINEERING
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SPONSORED INVESTIGATION No. FSP 1575

FIRE-RESISTANCE TEST ON FIRE COLLARS PROTECTING A CONCRETE SLAB PENETRATED BY SERVICES

SUMMARY

IDENTIFICATION OF SPECIMEN:

The sponsor identified the specimen as Snap Cast-in Fire Collars protecting a concrete slab penetrated by five PVC pipes.

SPONSOR: Snap Fire Systems Pty Ltd
Unit 2-160 Redland Bay Road
CAPALABA QLD

MANUFACTURER: Snap Fire Systems Pty Ltd
Unit 2-160 Redland Bay Road
CAPALABA QLD

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.

REFERENCE STANDARD:

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

TEST NUMBER: FS 4340/3629

TEST DATE: The fire-resistance test was conducted on 25 February 2013.

DESCRIPTION OF SPECIMEN:

GENERAL

The specimen comprised a 1150-mm x 1150-mm x 150-mm thick reinforced concrete slab penetrated by five plastic pipes 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 – H 100 S-RR cast-in fire collar protecting a 100-mm Drain Waste Vent (DWV) Polyvinyl Chloride (PVC) pipe

The SNAP Cast-in H 100 S-RR fire collar comprised a 1.6-mm thick High Density Polyethylene (HDPE) casing with a 127-mm inner diameter and a 182-mm diameter base flange. The 107-mm high collar casing incorporated a 412-mm x 85-mm x 4-mm thick intumescent material. The closing mechanism comprised three galvanised steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh as shown in drawing numbered H 100 S-RR - T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 110-mm OD DWV PVC 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 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end using a Kaowool plug.

On the unexposed face, the narrow gap between the pipe and the slab was filled with Fuller Firesound sealant to a 10-mm depth.

Detail of construction is shown in drawing titled "Penetration #1 100 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd.

Penetration 2 – H 100 S-RR cast-in fire collar protecting a 80-mm Drain Waste Vent (DWV) Polyvinyl Chloride (PVC) pipe

The SNAP Cast-in H 100 S-RR fire collar comprised a 1.6-mm thick High Density Polyethylene (HDPE) casing with a 127-mm inner diameter and a 182-mm diameter base flange. The 107-mm high collar casing incorporated a 412-mm x 85-mm x 4-mm thick intumescent material. The closing mechanism comprised three galvanised steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh as shown in drawing numbered H 100 S-RR - T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised an 83-mm OD DWV PVC 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 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end using a Kaowool plug.

On the unexposed face, the narrow gap between the pipe and the slab was filled with sand and standard cement backfill to a 43-mm depth.

Detail of construction is shown in drawing titled "Penetration #2 100 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd.

Penetration 3 – L 65 S cast-in fire collar protecting a 65-mm diameter Drain Waste Vent (DWV) Polyvinyl Chloride (PVC) pipe

The L 65 S cast-in Snap fire collar comprised a 1.6-mm thick High Density Polyethylene (HDPE) casing with a 127-mm inner diameter and a 182-mm diameter base flange. The 115-mm high collar casing incorporated a 240-mm x 58-mm x 4-mm thick intumescent material. The closing mechanism comprised three galvanized 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 12 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 69-mm OD DWC PVC 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 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end using a Kaowool plug.

Detail of construction is shown in drawing titled "Penetration #3 65 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd.

Penetration 4 – H 50 S-RR cast-in fire collar protecting a 50-mm diameter Drain Waste Vent (DWV) Polyvinyl Chloride (PVC) pipe

The H 50 S-RR cast-in Snap fire collar comprised a 1.6-mm thick High Density Polyethylene (HDPE) casing with a 71-mm inner diameter and a 108-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 stainless 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 11 March 2012, by SNAP Fire Systems.

The penetrating service comprised a 56-mm OD DWV PVC pipe, with a wall thickness of 2-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 on the exposed end using a Kaowool plug.

On the unexposed face, the narrow gap between the pipe and the slab was filled with Fuller Firesound sealant to a 10-mm depth.

Detail of construction is shown in drawing titled "Penetration #4 50 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd.

Penetration 5 – L 40 S cast-in fire collar protecting a 40-mm diameter Drain Waste Vent (DWV) Polyvinyl Chloride (PVC) pipe

The L 40 S cast-in Snap fire collar comprised a 1.6-mm thick High Density Polyethylene (HDPE) casing with a 71-mm inner diameter and a 108-mm diameter base flange. The 86-mm high collar casing incorporated a 240-mm x 58-mm x 4-mm thick intumescent material. The closing mechanism comprised three galvanized steel springs, a nylon fuse link and a 280-mm x 58-mm stainless steel mesh as shown in drawing numbered L 40 S-T, dated 12 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 42-mm OD DWV PVC pipe, with a wall thickness of 2-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 on the exposed end using a Kaowool plug.

Detail of construction is shown in drawing titled "Penetration #5 40 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd.

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.

ORIENTATION

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

CONDITIONING

The concrete slab was left to cure for a period of seventy days.

DOCUMENTATION:

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

Drawing titled "Penetration #1 100 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd

Drawing titled "Penetration #2 80 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd

Drawing titled "Penetration #3 65 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd

Drawing titled "Penetration #4 50 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd

Drawing titled “Penetration #5 40 PVC Stack”, dated 29 January 2013, by Snap Fire Systems Pty Ltd

Drawing numbered H 50 S - RR - T, dated 11 March 2013, by Snap Fire Systems

Drawing numbered H 100 S - RR - T, dated 11 March 2013, by Snap Fire Systems

Drawing numbered L 40 S - T, dated 12 March 2013, by Snap Fire Systems

Drawing numbered L 65 S - T, dated 12 March 2013, by Snap Fire Systems

Confidential information about the test specimen has been submitted and is retained at CSIRO Materials Science and Engineering.

EQUIPMENT:

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.

TEMPERATURE

The temperature in the furnace chamber was measured by four type K, 3-mm diameter, 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.

MEASUREMENT SYSTEM

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

AMBIENT TEMPERATURE:

The temperature of the test area was 21°C at the commencement of the test.

DEPARTURE FROM STANDARD:

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

TERMINATION OF TEST:

The test was terminated at 241 minutes by agreement with the sponsor.

TEST RESULTS:

CRITICAL OBSERVATIONS

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

2 minutes -	Smoke is fluing from pipe #4.
3 minutes -	Smoke is fluing from pipe #1, #2 & #3.
	Smoke is no longer fluing from pipe #4.
4 minutes -	Amount of smoke fluing from pipe #1 & #3 has decreased.
6 minutes -	Amount of smoke fluing from #1 has decreased.
10 minutes -	Smoke is no longer fluing from pipes.
	Pipe #1 has risen approx 10-mm from the base of the slab.
130 minutes -	Smoke is being emitted from the base of pipe #1.
170 minutes -	Smoke is being emitted from the base of pipe #5.
241 minutes -	No apparent change to the specimen.
	Test terminated.

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.

SPECIMEN TEMPERATURE

Figure 2 shows the curve of maximum temperature versus time associated with Penetration #1.

Figure 3 shows the curve of maximum temperature versus time associated with Penetration #2.

Figure 4 shows the curve of maximum temperature versus time associated with Penetration #3.

Figure 5 shows the curve of maximum temperature versus time associated with Penetration #4.

Figure 6 shows the curve of maximum temperature versus time associated with Penetration #5.

PERFORMANCE

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

Penetration 1 – H 100 S-RR cast-in fire collar protecting a 100-mm DWV PVC pipe

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

Penetration 2 – H 100 S-RR cast-in fire collar protecting a 80-mm DWV PVC pipe

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

Penetration 3 – L 65 S cast-in fire collar protecting a 65-mm diameter DWV PVC

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

Penetration 4 – H 50 S-RR cast-in fire collar protecting a 50-mm diameter PVC DWV pipe

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

Penetration 5 – L 40 S cast-in fire collar protecting a 40-mm diameter DWV PVC

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.

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 - -/240/240; 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.

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 AS1530.4-2005, have been made provided no individual component is removed or reduced.

TESTED BY:

Mario Lara
Testing Officer

Garry E Collins
Manager, Fire Testing and Assessments

22 March 2013

APPENDICES

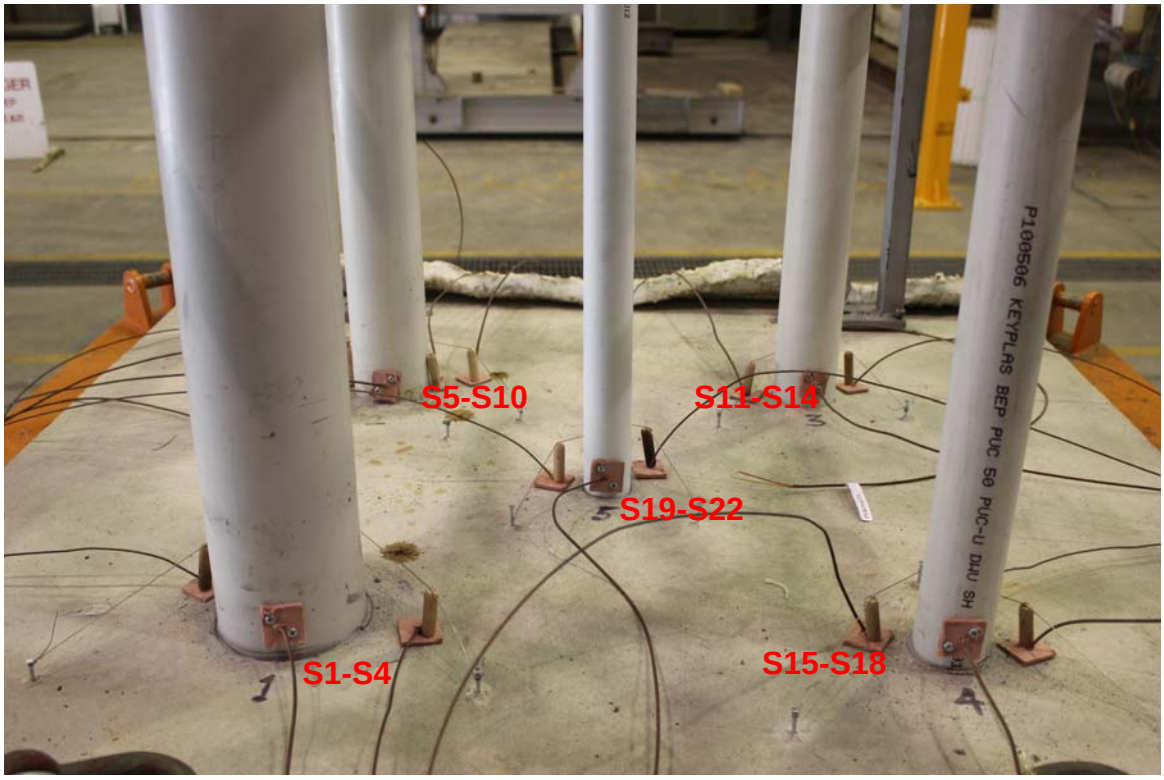
APPENDIX 1

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 concrete mix - 25-mm from pipe	S7
	On concrete mix - 25-mm from pipe	S8
	On pipe - 25-mm from slab	S9
	On pipe - 25-mm from slab	S10
Penetration 3	On slab - 25-mm from pipe	S11
	On slab - 25-mm from pipe	S12
	On pipe - 25-mm from slab	S13
	On pipe - 25-mm from slab	S14
Penetration 4	On slab - 25-mm from pipe	S15
	On slab - 25-mm from pipe	S16
	On pipe - 25-mm from slab	S17
	On pipe - 25-mm from slab	S18
Penetration 5	On slab - 25-mm from pipe	S19
	On slab - 25-mm from pipe	S20
	On pipe - 25-mm from slab	S21
	On pipe - 25-mm from slab	S22

Table 1 – Specimen thermocouple positioning

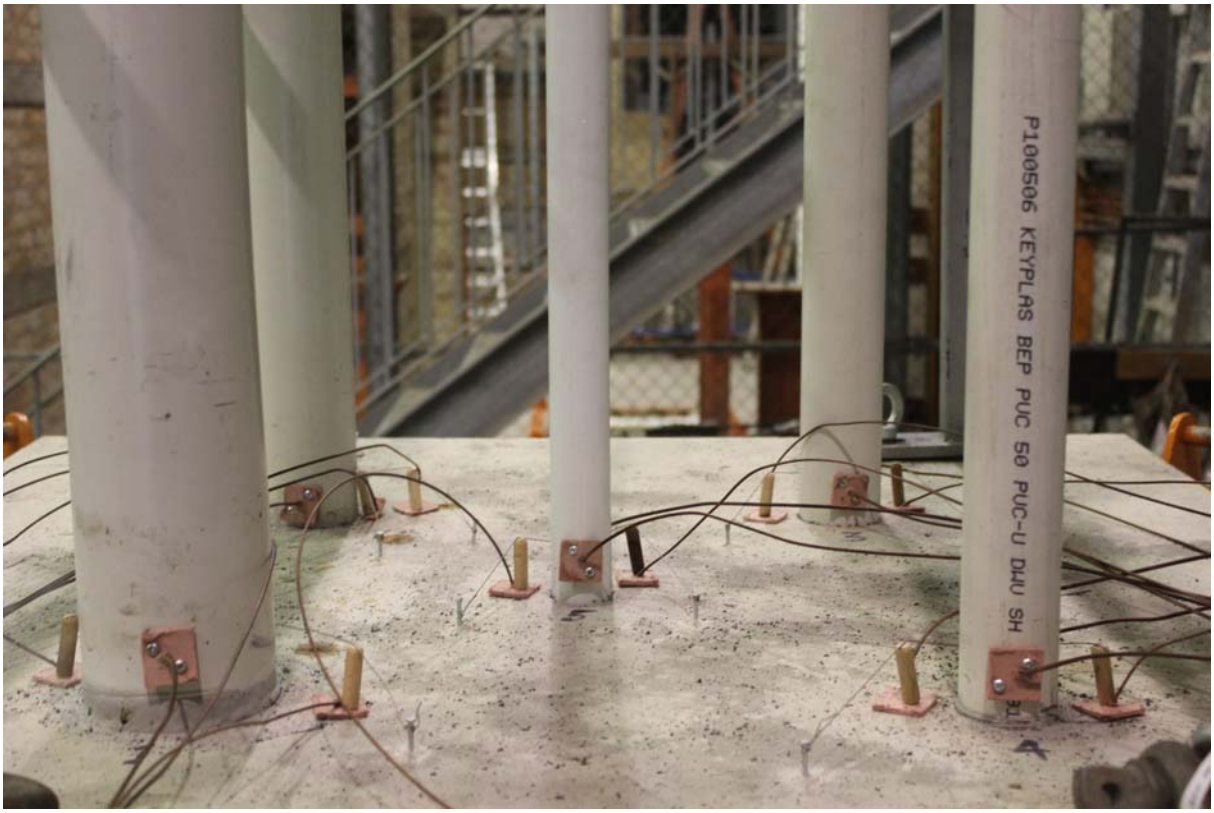
APPENDIX 2

Photograph 1 – Exposed face of the specimen prior to testing



Photograph 2 – Unexposed face of the specimen 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 at the conclusion of testing

Photograph 7 – Exposed face of the specimens at the conclusion of testing

APPENDIX 3

Figure 1 - Furnace temperature

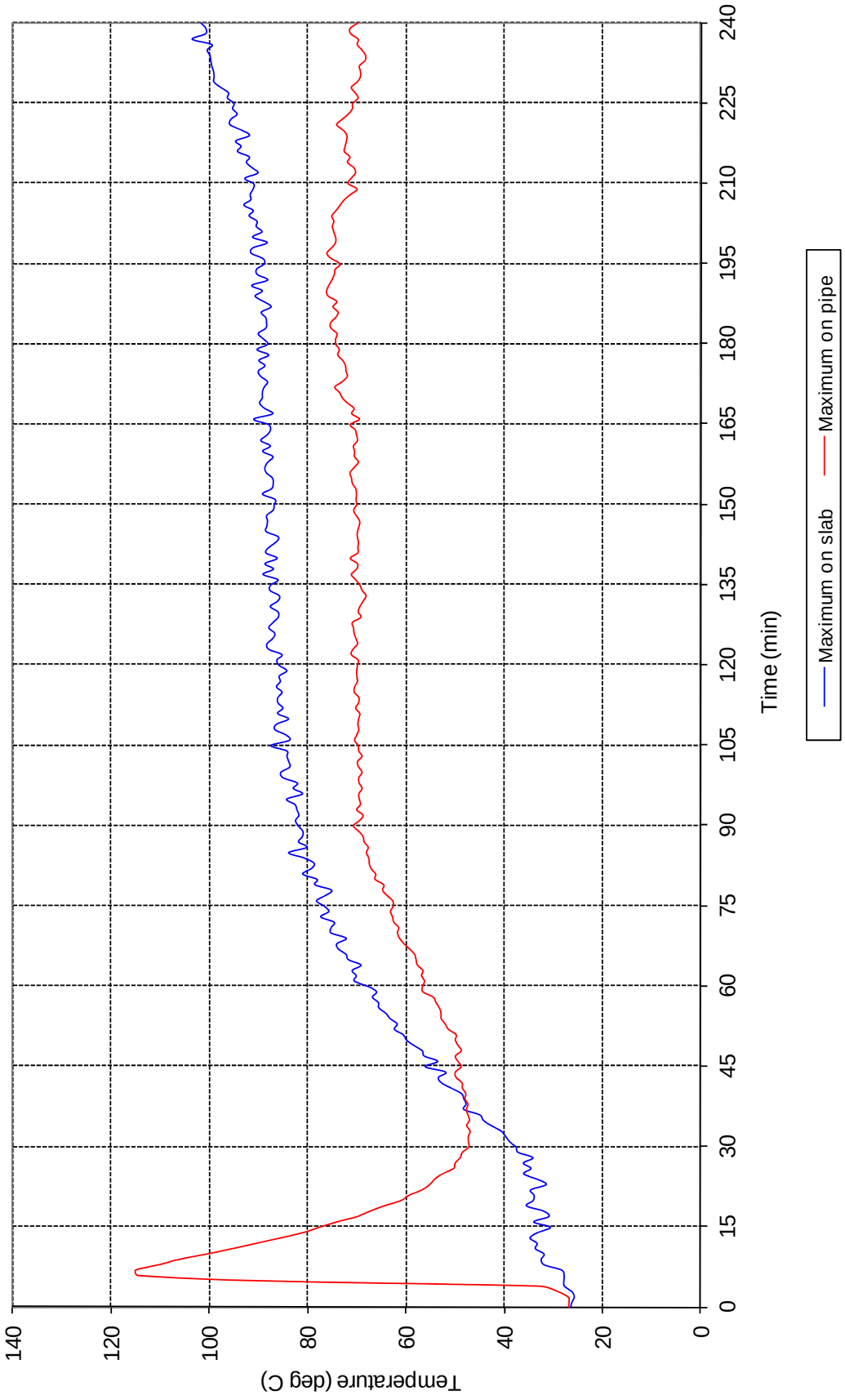


Figure 2 - Specimen temperature – Associated with Penetration 1

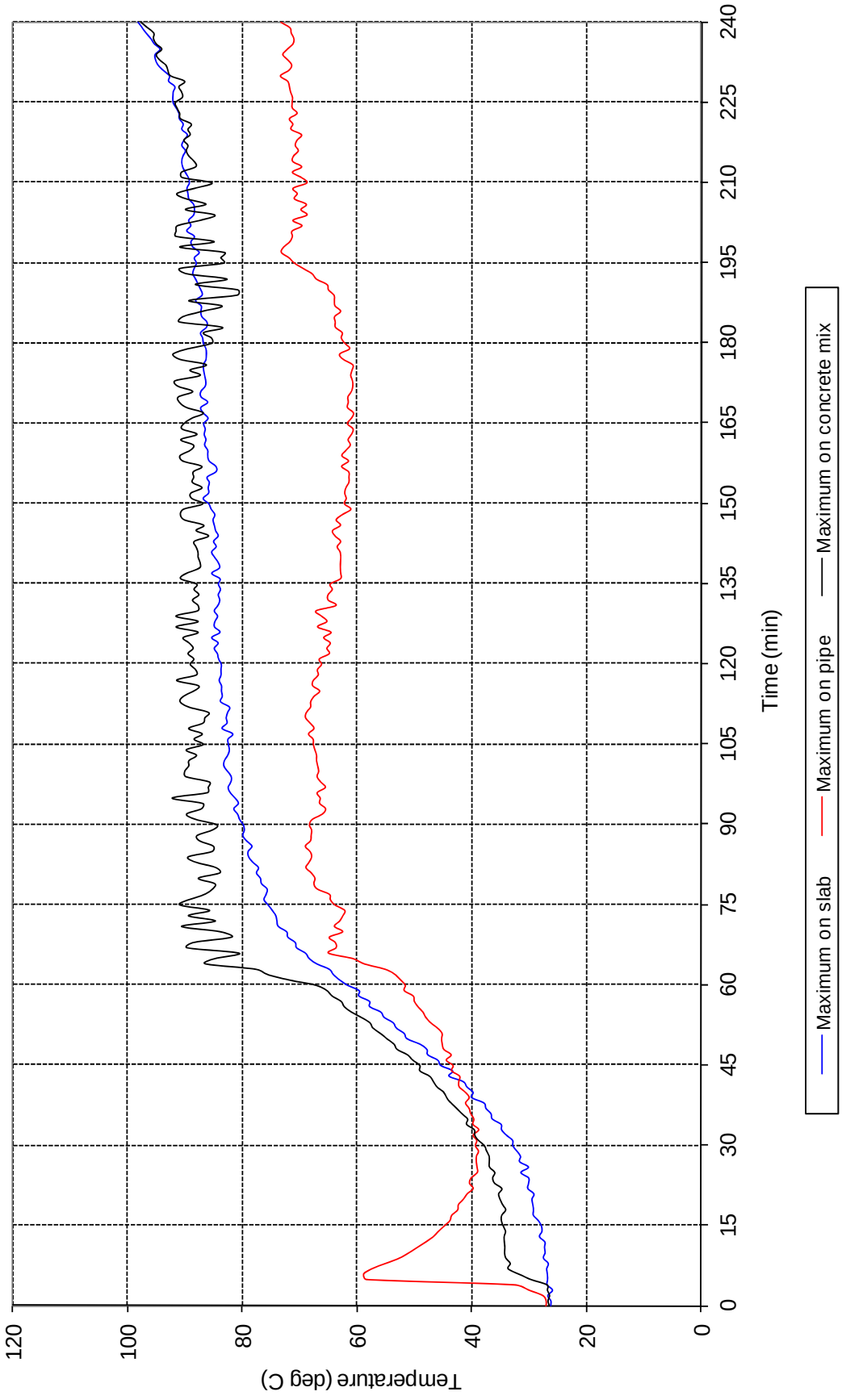


Figure 3 - Specimen temperature – Associated with Penetration 2

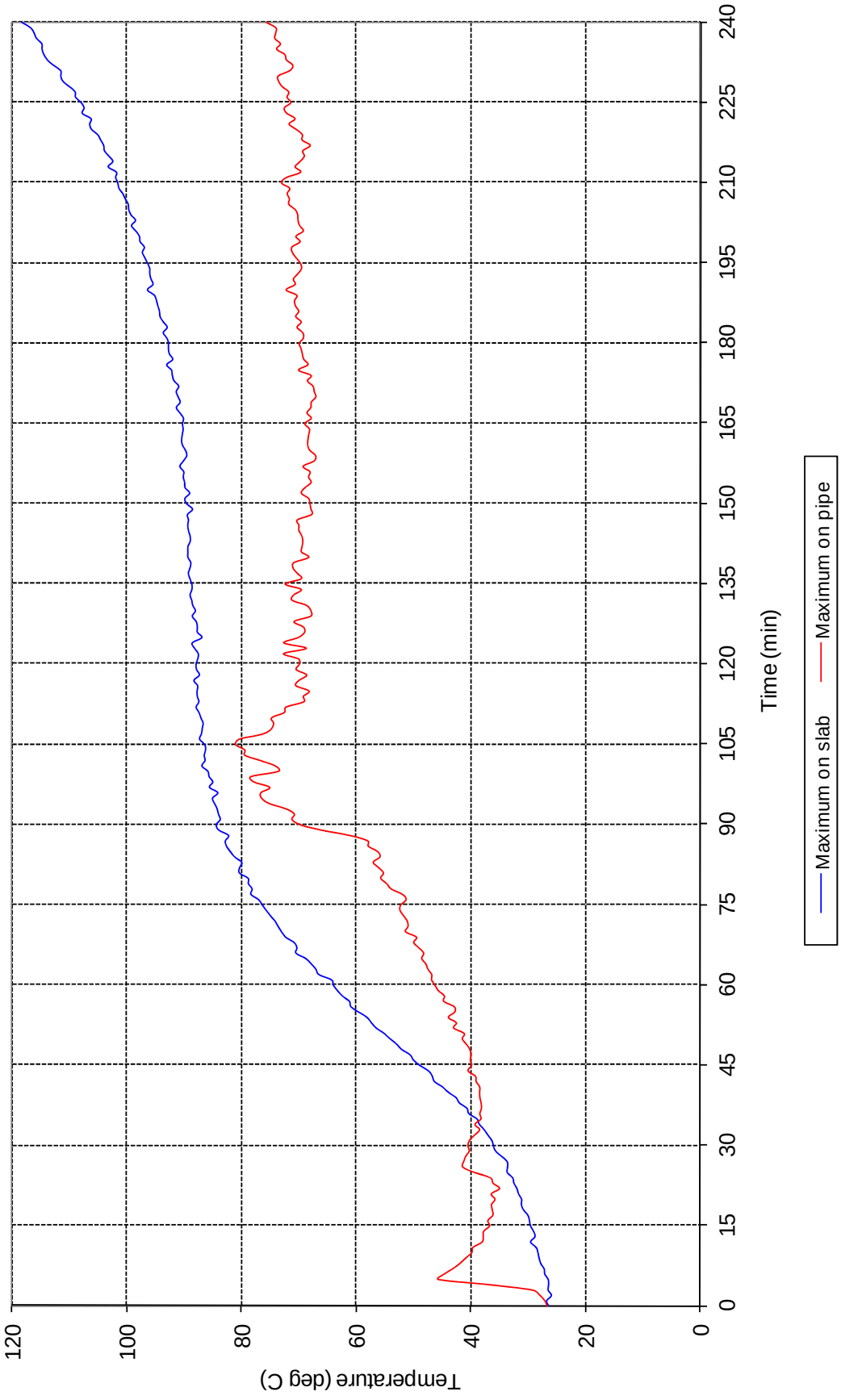


Figure 4 - Specimen temperature – Associated with Penetration 3

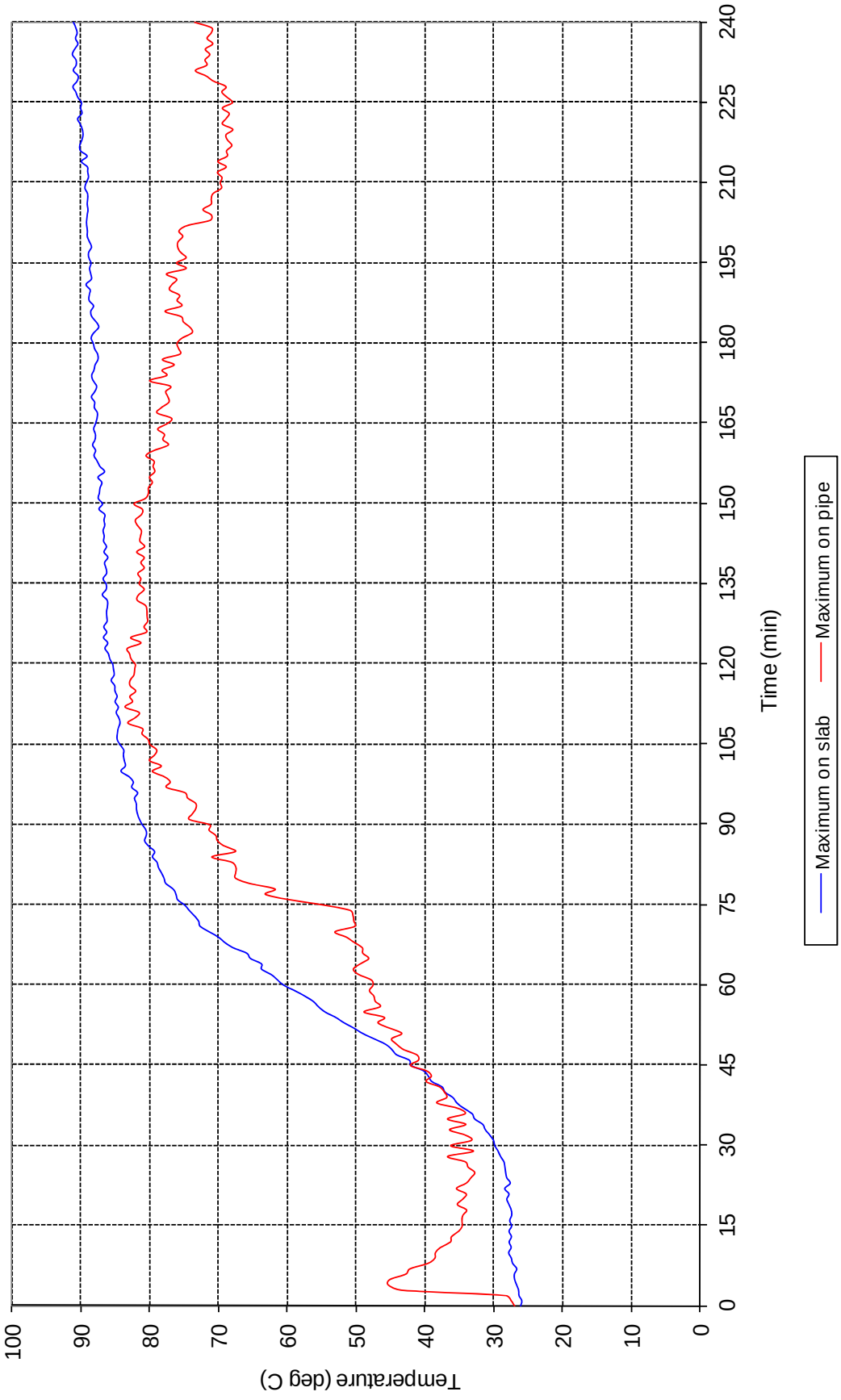


Figure 5 - Specimen temperature – Associated with Penetration 4

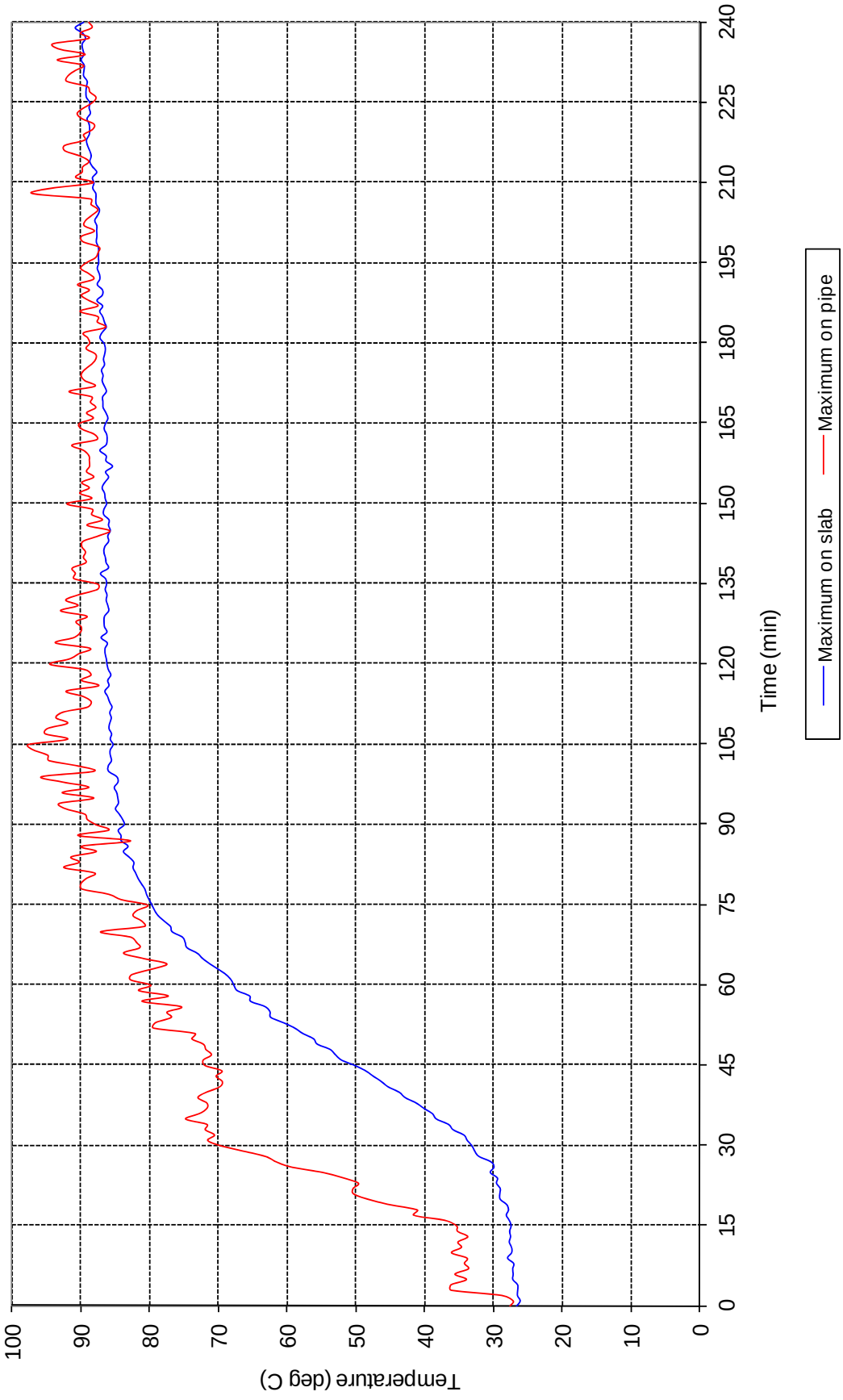
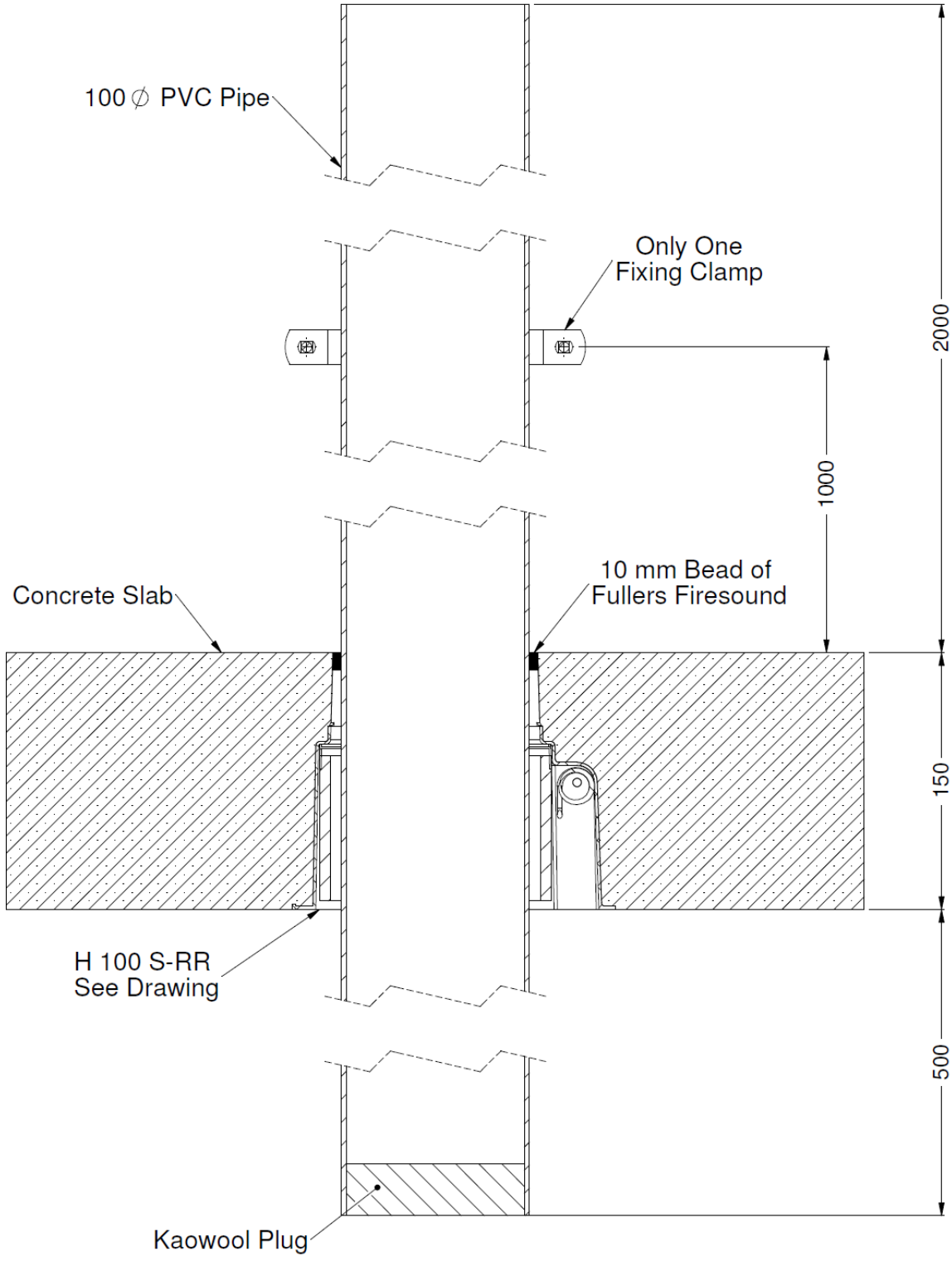


Figure 6 - Specimen temperature – Associated with Penetration 5

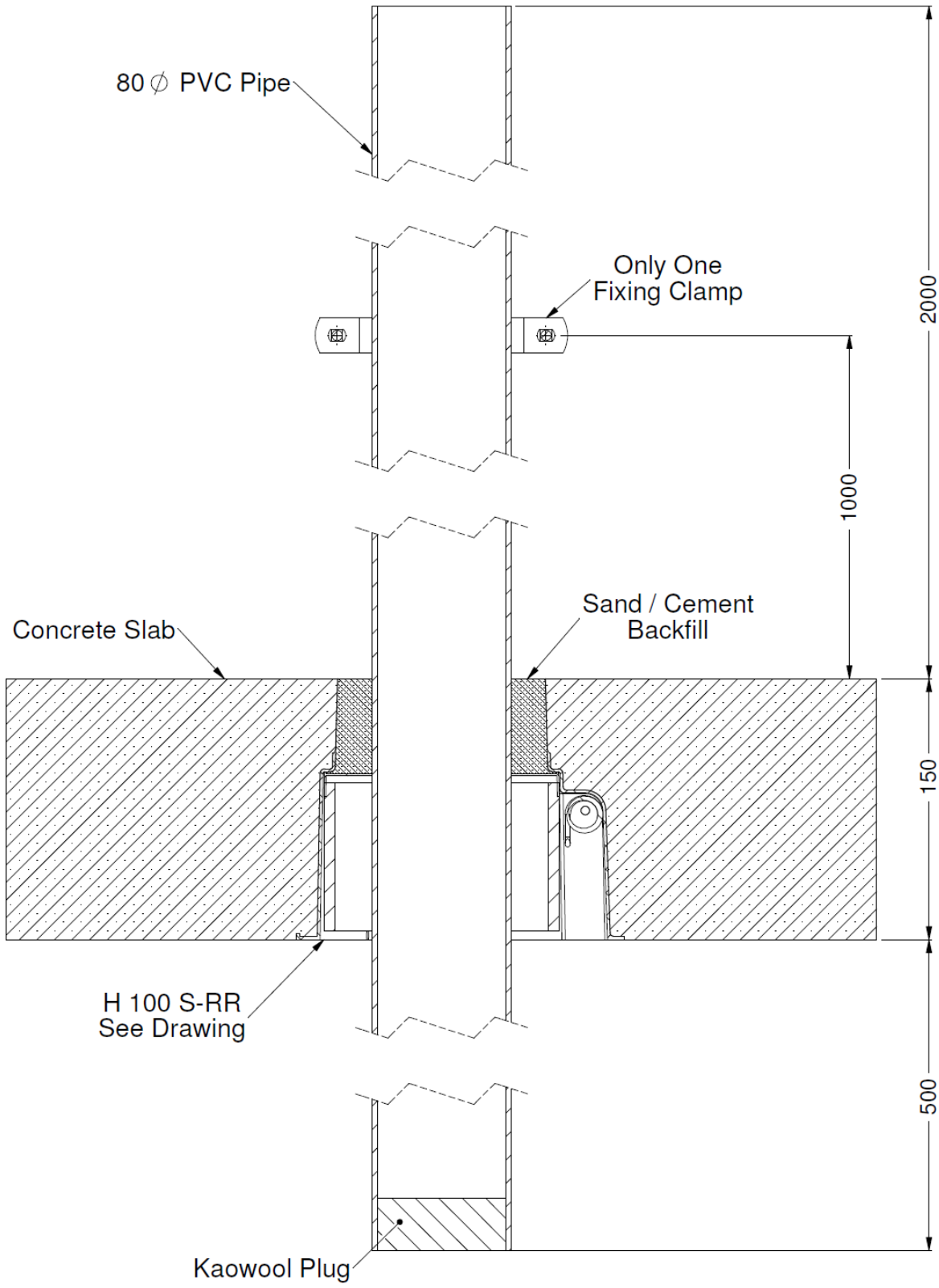
APPENDIX 4

SLAB A - Penetration #1
100 PVC Stack - Date 29-01-2013



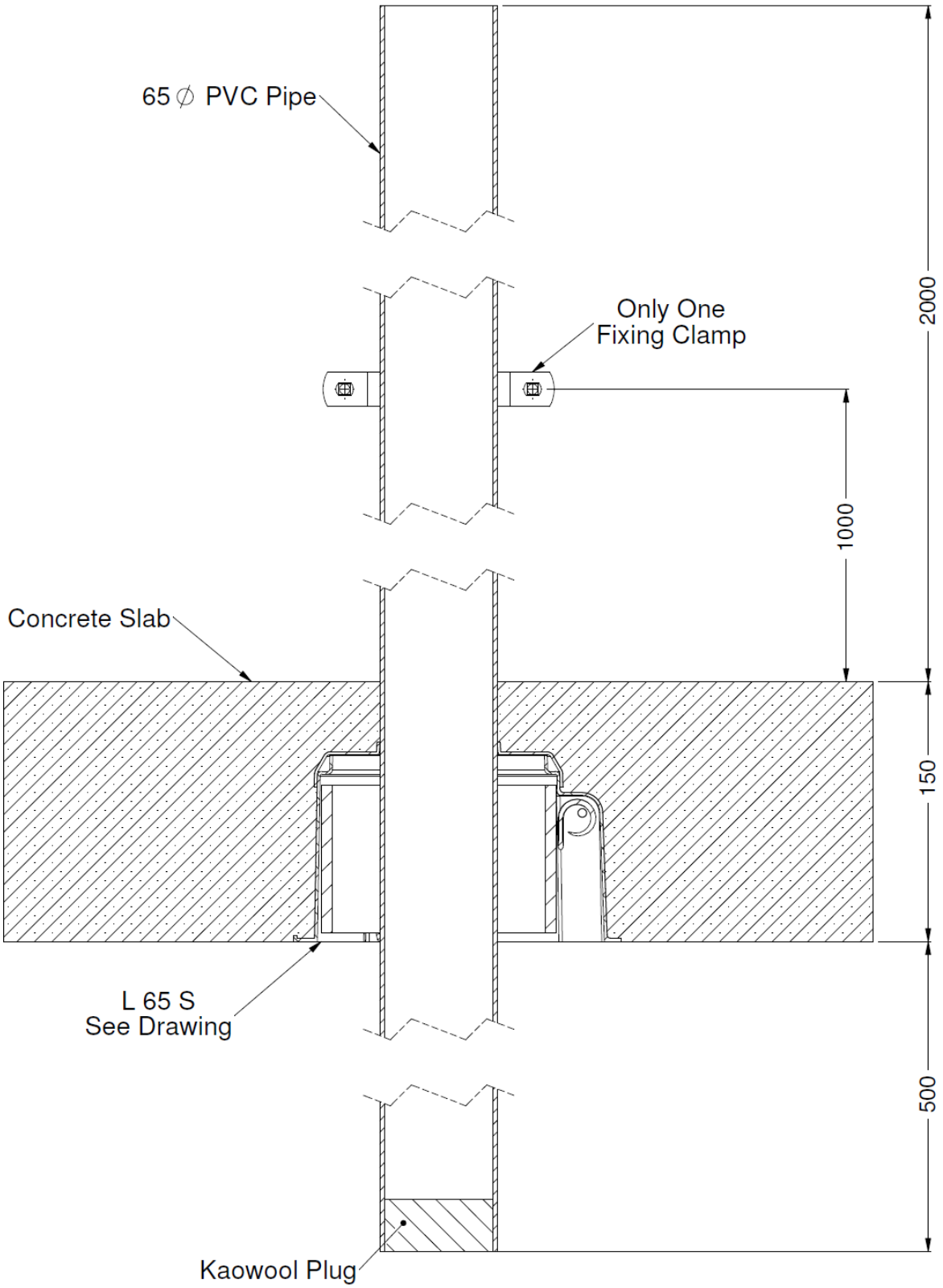
Drawing titled “Penetration #1 100 PVC Stack”, dated 29 January 2013

SLAB A - Penetration #2
80 PVC Stack - Date 29-01-2013



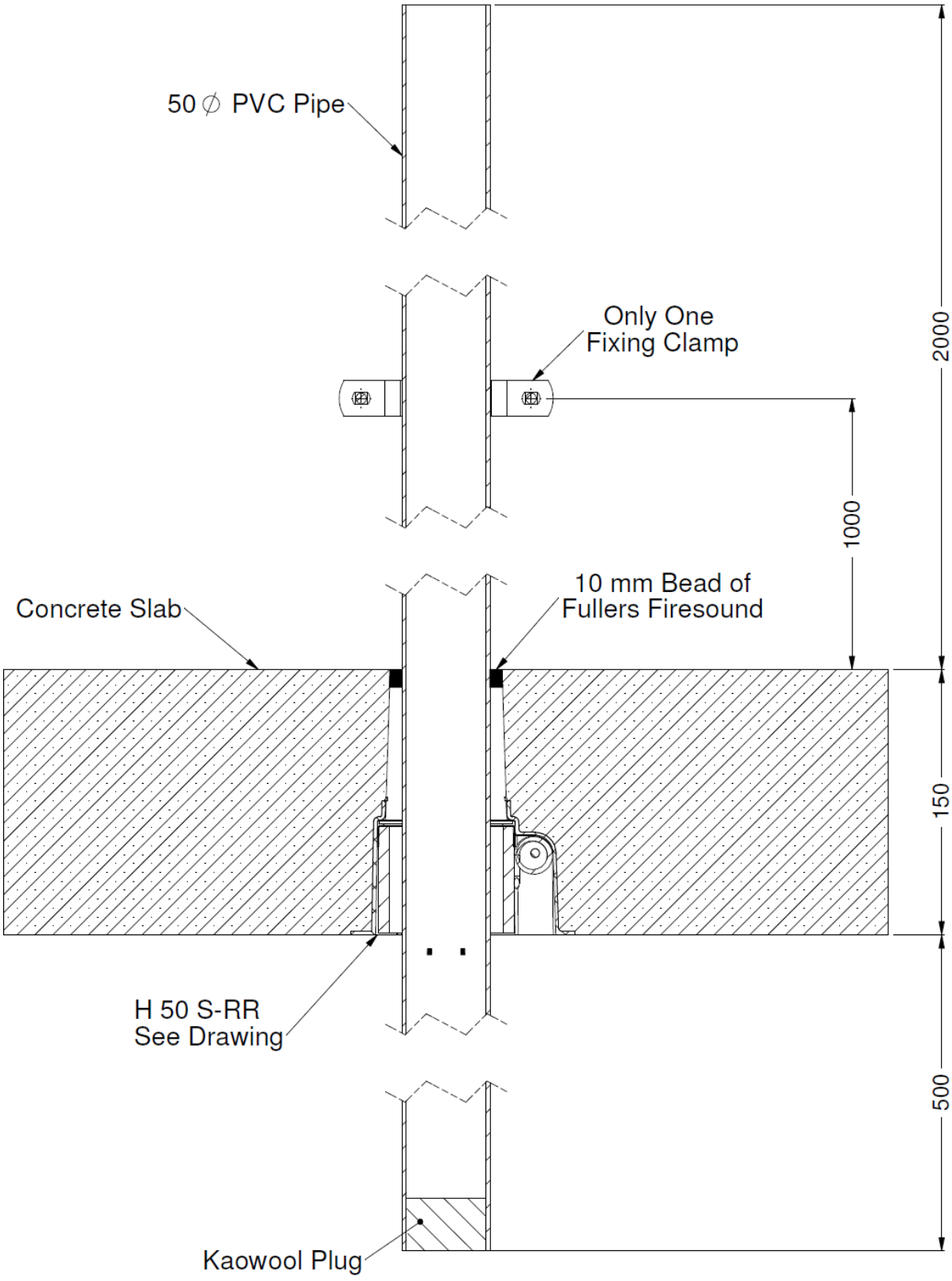
Drawing titled “Penetration #2 80 PVC Stack”, dated 29 January 2013

SLAB A - Penetration #3
65 PVC Stack - Date 29-01-2013



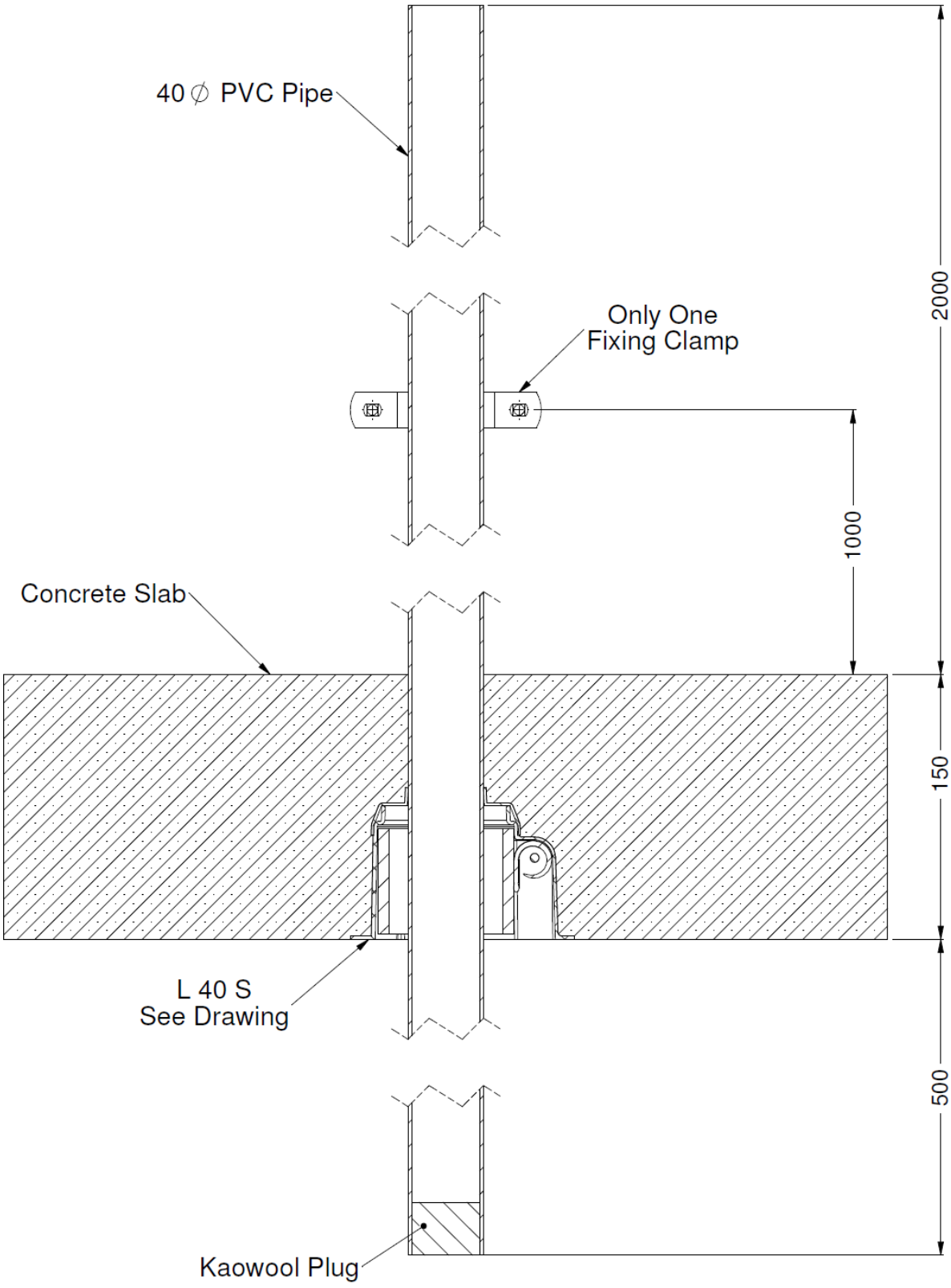
Drawing titled “Penetration #3 65 PVC Stack”, dated 29 January 2013

SLAB A - Penetration #4
50 PVC Stack - Date 29-01-2013

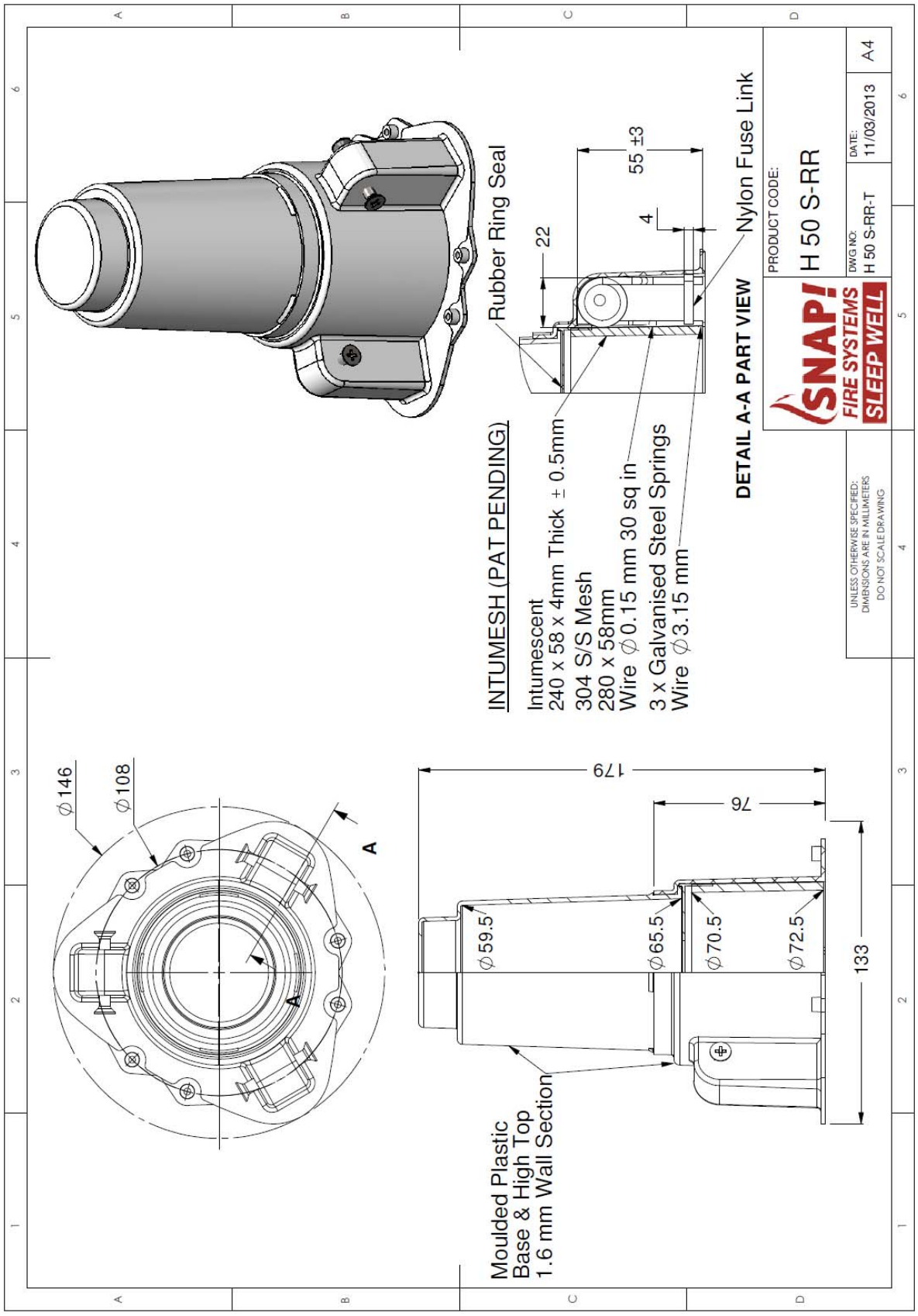


Drawing titled “Penetration #4 50 PVC Stack”, dated 29 January 2013

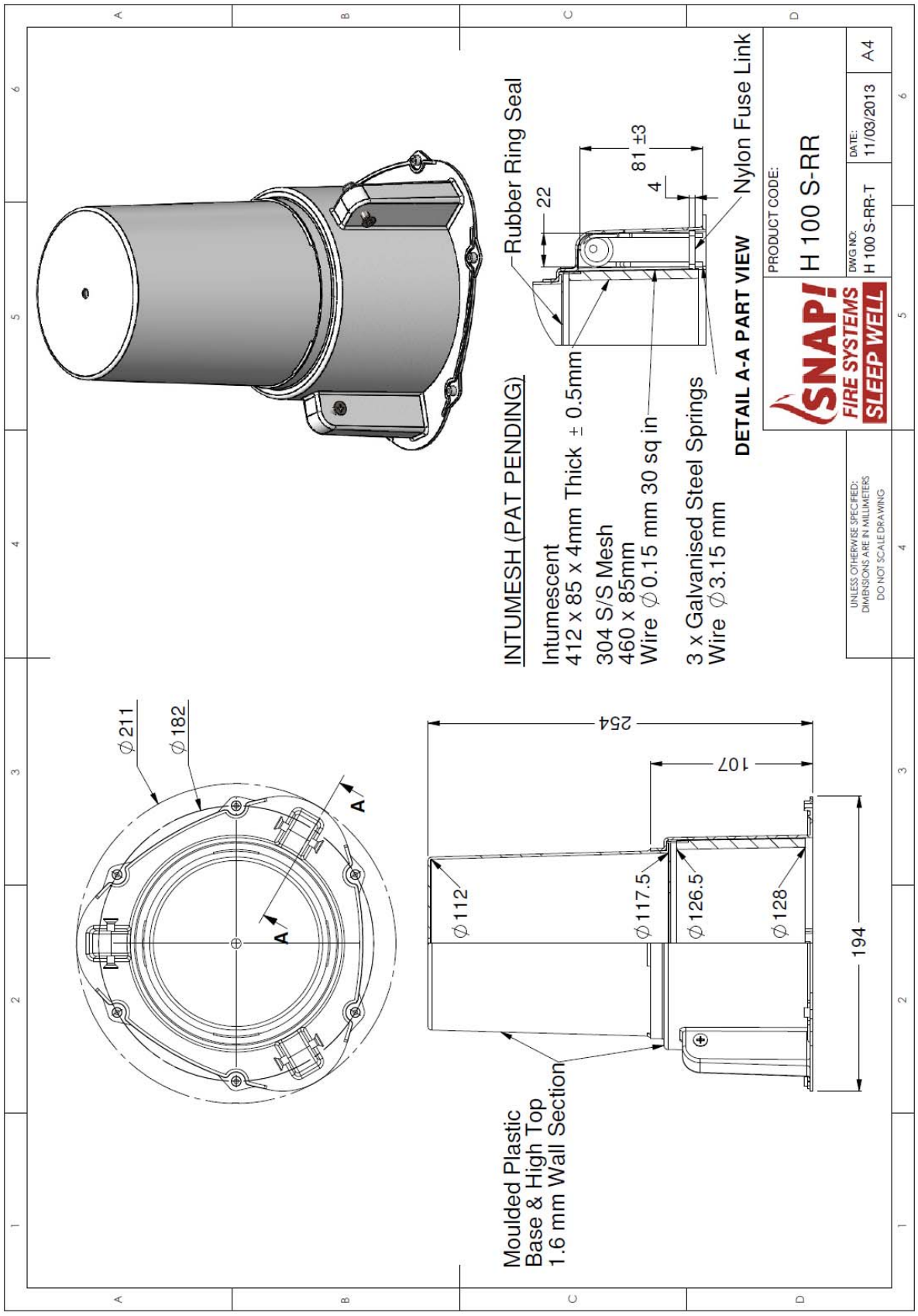
SLAB A - Penetration #5
40 PVC Stack - Date 29-01-2013



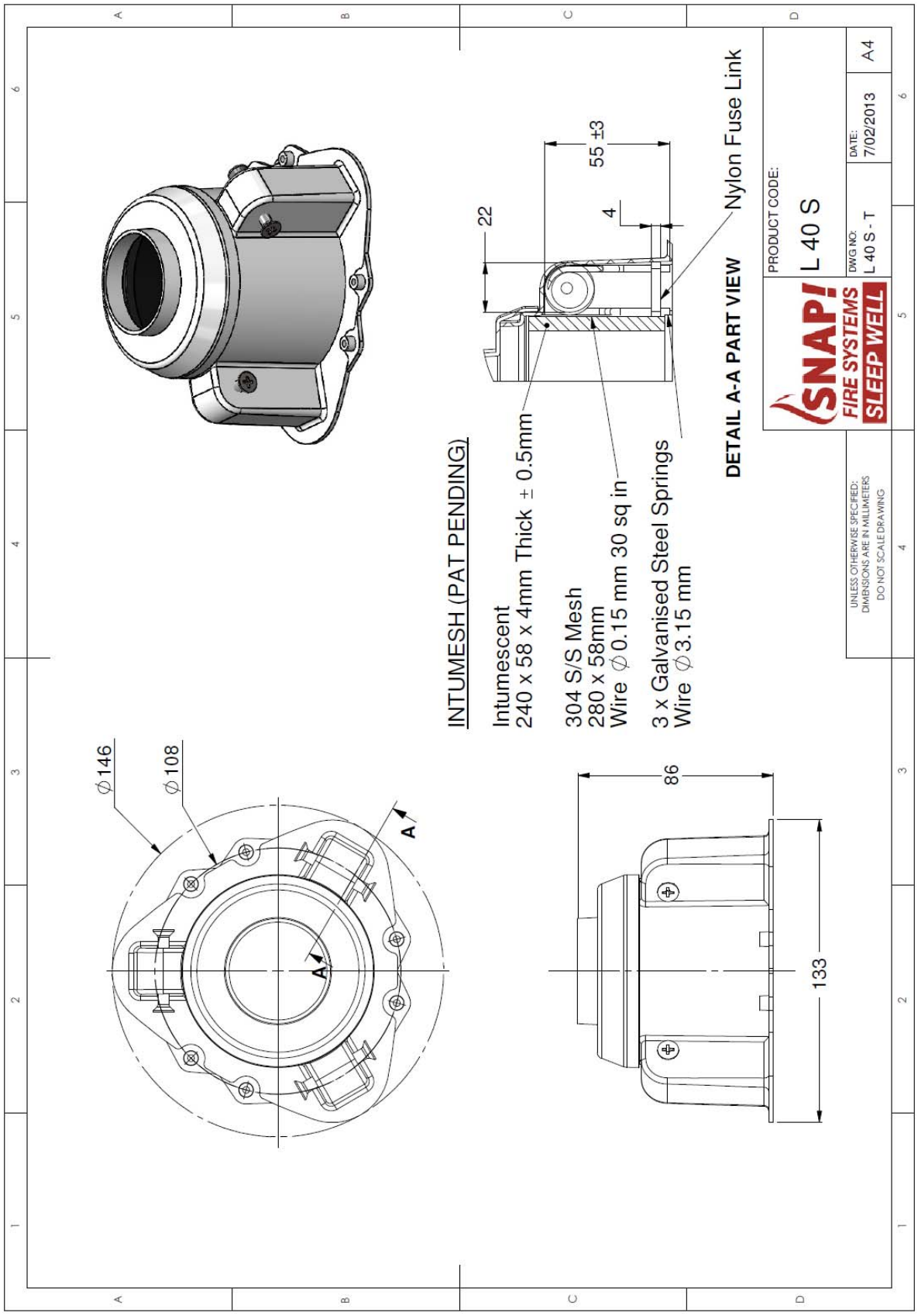
Drawing titled “Penetration #5 40 PVC Stack”, dated 29 January 2013



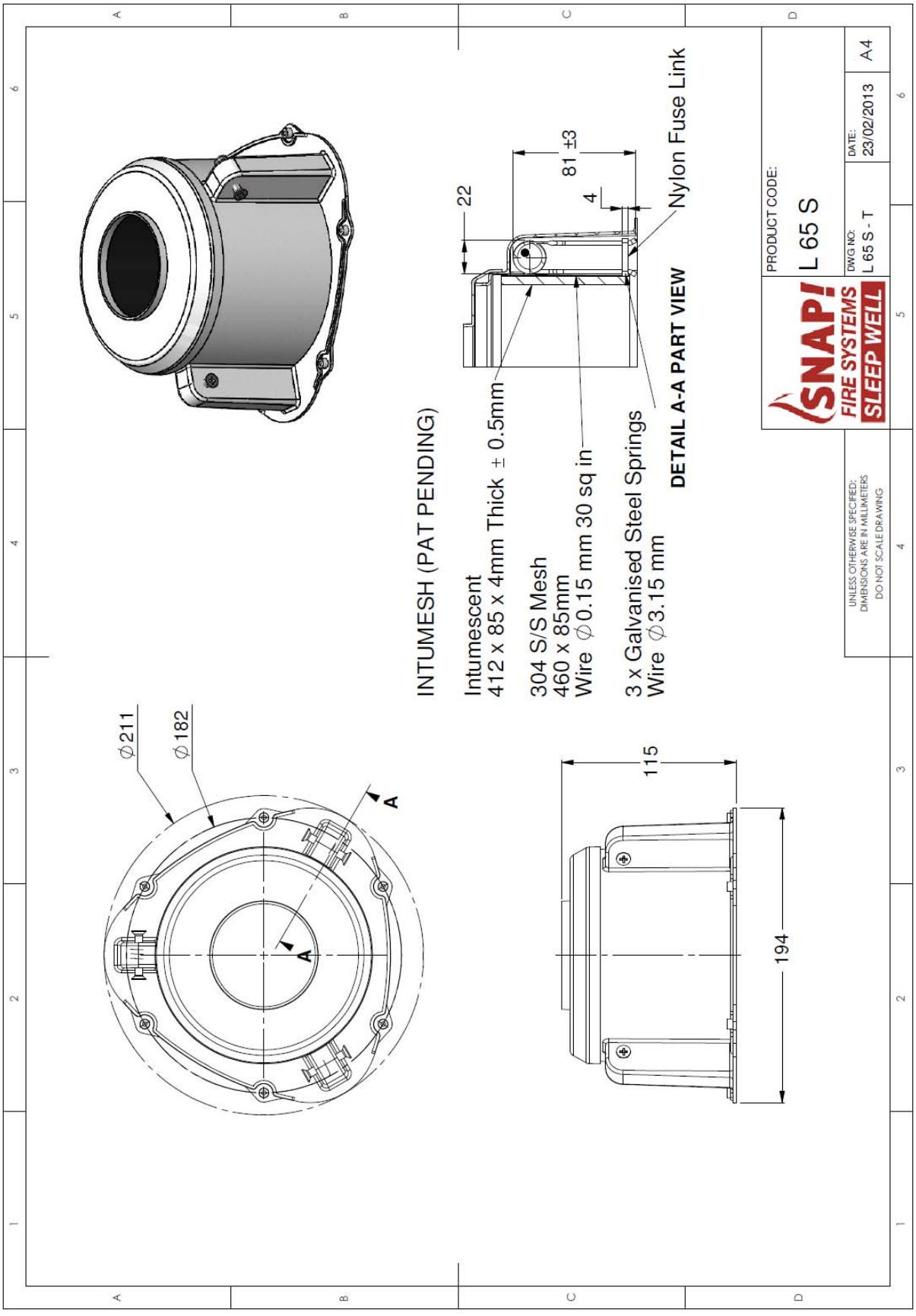
Drawing numbered H 50 S - RR - T, dated 11/03/2013, by Snap Fire Systems



Drawing numbered H 100 S - RR - T, dated 11/03/2013, by Snap Fire Systems



Drawing numbered L 40 S - T, dated 12/03/2013, by Snap Fire Systems



Drawing numbered L 65 S - T, dated 12/03/2013, by Snap Fire Systems

APPENDIX 5

Certificate of Test

No. 2458

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 1575.

Product Name: Penetration 1 – H 100 S-RR cast-in fire collar protecting a 100-mm Drain Waste Vent (DWV) Polyvinyl Chloride (PVC) pipe

Description: The SNAP Cast-in H 100 S-RR fire collar comprised a 1.6-mm thick High Density Polyethylene (HDPE) casing with a 127-mm inner diameter and a 182-mm diameter base flange. The 107-mm high collar casing incorporated a 412-mm x 85-mm x 4-mm thick intumescent material. The closing mechanism comprised three galvanised steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh as shown in drawing numbered H 100 S-RR - T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 110-mm OD DWV PVC 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 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end using a Kaowool plug.

On the unexposed face, the narrow gap between the pipe and the slab was filled with Fuller Firesound sealant to a 10-mm depth.

Detail of construction is shown in drawing titled "Penetration #1 100 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd.

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 the regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara Date of Test: 25 February 2013.
Issued on the 22nd day of March 2013 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments

CSIRO Materials Science and Engineering
14 Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA
Telephone: 61 2 9490 5444 Facsimile:61 2 9490 5555

Copy of Certificate of Test - No.2458

Certificate of Test

No. 2459

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 1575.

Product Name: Penetration 2 – H 100 S-RR cast-in fire collar protecting a 80-mm Drain Waste Vent (DWV) Polyvinyl Chloride (PVC) pipe

Description: The SNAP Cast-in H 100 S-RR fire collar comprised a 1.6-mm thick High Density Polyethylene (HDPE) casing with a 127-mm inner diameter and a 182-mm diameter base flange. The 107-mm high collar casing incorporated a 412-mm x 85-mm x 4-mm thick intumescent material. The closing mechanism comprised three galvanised steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh as shown in drawing numbered H 100 S-RR - T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised an 83-mm OD DWV PVC 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 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end using a Kaowool plug.

On the unexposed face, the narrow gap between the pipe and the slab was filled with sand and standard cement backfill to a 43-mm depth.

Detail of construction is shown in drawing titled "Penetration #2 100 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd.

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 the regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara Date of Test: 25 February 2013.
Issued on the 22nd day of March 2013 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments

CSIRO Materials Science and Engineering
14 Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA
Telephone: 61 2 9490 5444 Facsimile:61 2 9490 5555

Copy of Certificate of Test - No.2459

Certificate of Test

No. 2460

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 1575.

Product Name: Penetration 3 – L 65 S cast-in fire collar protecting a 65-mm diameter Drain Waste Vent (DWV) Polyvinyl Chloride (PVC) pipe

Description: The L 65 S cast-in Snap fire collar comprised a 1.6-mm thick High Density Polyethylene (HDPE) casing with a 127-mm inner diameter and a 182-mm diameter base flange. The 115-mm high collar casing incorporated a 240-mm x 58-mm x 4-mm thick intumescent material. The closing mechanism comprised three galvanized 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 12 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 69-mm OD DWC PVC 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 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end using a Kaowool plug.

Detail of construction is shown in drawing titled "Penetration #3 65 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd.

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 the regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara Date of Test: 25 February 2013.
Issued on the 22nd day of March 2013 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments

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Copy of Certificate of Test - No.2460

Certificate of Test

No. 2461

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 1575.

Product Name: Penetration 4 – H 50 S-RR cast-in fire collar protecting a 50-mm diameter Drain Waste Vent (DWV) Polyvinyl Chloride (PVC) pipe

Description: The H 50 S-RR cast-in Snap fire collar comprised a 1.6-mm thick High Density Polyethylene (HDPE) casing with a 71-mm inner diameter and a 108-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 stainless 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 11 March 2012, by SNAP Fire Systems.

The penetrating service comprised a 56-mm OD DWV PVC pipe, with a wall thickness of 2-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 on the exposed end using a Kaowool plug.

On the unexposed face, the narrow gap between the pipe and the slab was filled with Fuller Firesound sealant to a 10-mm depth.

Detail of construction is shown in drawing titled "Penetration #4 50 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd.

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 the regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara Date of Test: 25 February 2013.
Issued on the 22nd day of March 2013 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments

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Copy of Certificate of Test - No.2461

Certificate of Test

No. 2462

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 1575.

Product Name: Penetration 5 – L 40 S cast-in fire collar protecting a 40-mm diameter Drain Waste Vent (DWV) Polyvinyl Chloride (PVC) pipe

Description: The L 40 S cast-in Snap fire collar comprised a 1.6-mm thick High Density Polyethylene (HDPE) casing with a 71-mm inner diameter and a 108-mm diameter base flange. The 86-mm high collar casing incorporated a 240-mm x 58-mm x 4-mm thick intumescent material. The closing mechanism comprised three galvanized steel springs, a nylon fuse link and a 280-mm x 58-mm stainless steel mesh as shown in drawing numbered L 40 S-T, dated 12 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 42-mm OD DWV PVC pipe, with a wall thickness of 2-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 on the exposed end using a Kaowool plug.

Detail of construction is shown in drawing titled "Penetration #5 40 PVC Stack", dated 29 January 2013, by Snap Fire Systems Pty Ltd.

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 the regulatory requirements for evidence of compliance.

Testing Officer: Mario Lara Date of Test: 25 February 2013.
Issued on the 22nd day of March 2013 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments

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