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

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Client
SNAP FIRE SYSTEMS PTY LTD.

Commercial-in-confidence

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Table of Contents

SUMMARY **5**

IDENTIFICATION OF SPECIMEN: *5*

SPONSOR: *5*

MANUFACTURER: *5*

TEST STANDARD: *5*

REFERENCE STANDARD: *5*

TEST NUMBER: *5*

TEST DATE: *5*

DESCRIPTION OF SPECIMEN: *5*

GENERAL 5

Penetration 1 – H 100 S cast-in fire collar protecting a 110-mm High Density Polyethylene (HDPE) pipe 6

Penetration 2 – H 100 S cast-in fire collar protecting a 110-mm Polyvinyl Chloride (PVC) pipe incorporating a fitting inside the collar 6

Penetration 3 – H 100 FWS-RR cast-in fire collar protecting a 65-mm 7

diameter Polyvinyl Chloride (PVC) pipe incorporating a floor waste 7

Penetration 4 – H 100 FWS-RR cast-in fire collar protecting a 110-mm diameter Polyvinyl Chloride (PVC) pipe incorporating a floor waste and fitting inside the collar 7

Penetration 5 – H 50 S-RR cast-in fire collar protecting a 42-mm Polyvinyl Chloride (PVC) pipe incorporating a fitting inside the collar 8

DIMENSIONS 8

ORIENTATION 8

CONDITIONING 8

DOCUMENTATION: *8*

EQUIPMENT: *9*

AMBIENT TEMPERATURE: *9*

DEPARTURE FROM STANDARD: *10*

TERMINATION OF TEST: *10*

TEST RESULTS: *10*

CRITICAL OBSERVATIONS 10

FURNACE TEMPERATURE 10

SPECIMEN TEMPERATURE 10

PERFORMANCE 11

FIRE-RESISTANCE LEVEL (FRL): *12*

FIELD OF DIRECT APPLICATION OF TEST RESULTS: *12*

APPENDICES **13**

APPENDIX 1 ..... *13*

Table 1 – Specimen thermocouple positioning 13

APPENDIX 2 ..... *14*

Photograph 1 – Exposed face of the specimen prior to testing 14

Photograph 2 – Unexposed face of the specimen prior to testing 14

Photograph 3 – Specimens after 60 minutes of testing 15

Photograph 4 – Specimens after 120 minutes of testing 15

Photograph 5 – Specimens after 180 minutes of testing 16

Photograph 6 – Specimens after 240 minutes of testing 16

Photograph 7 – Exposed face of the specimens at the conclusion of testing 17

APPENDIX 3 ..... *18*

Figure 1 - Furnace temperature 18

Figure 2 - Specimen temperature – Associated with Penetration 1 19
Figure 3 - Specimen temperature – Associated with Penetration 2 20
Figure 4 - Specimen temperature – Associated with Penetration 3 21
Figure 5 - Specimen temperature – Associated with Penetration 4 22
Figure 5 - Specimen temperature – Associated with Penetration 5 23

APPENDIX 4 ..... *24*
Drawing titled “Penetration #1 100 HDPE Stack”, dated 1 February 2013 24
Drawing titled “Penetration #2 80 PVCs Stack With Fitting”, dated 1 February 2013 25
Drawing titled “Penetration #3 65 PVC FW”, dated 1 February 2013 26
Drawing titled “Penetration #4 100 PVCs FW With Fitting”, dated 1 February 2013 27
Drawing titled “Penetration #5 40 PVC Stack With Fitting”, dated 1 February 2013 28
Drawing numbered H 50 S - RR - T, dated 11/03/2013, by Snap Fire Systems 29
Drawing numbered H 100 FWS - RR - T, dated 11/03/2013, by Snap Fire Systems 30
Drawing numbered H 100 S - T, dated 11/03/2013, by Snap Fire Systems 31

APPENDIX 5 ..... *32*
Copy of Certificate of Test - No.2463 32
Copy of Certificate of Test - No.2464 33
Copy of Certificate of Test - No.2465 34
Copy of Certificate of Test - No.2466 35
Copy of Certificate of Test - No.2467 36

SPONSORED INVESTIGATION No. FSP 1577

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 four floor wastes and one stack pipe.

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 4338/3627

TEST DATE: The fire-resistance test was conducted on 18 February 2013.

DESCRIPTION OF SPECIMEN:

GENERAL

The specimen comprised a 1150-mm x 1150-mm x 150-mm thick reinforced concrete slab penetrated by four floor waste systems and one stack 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 – H 100 S cast-in fire collar protecting a 110-mm High Density Polyethylene (HDPE) pipe

The SNAP Cast-in H 100 S fire collar comprised a 1.6-mm thick 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 galvanized steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh, as shown in drawing numbered H 110 S-T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 110-mm OD 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 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 HDPE Stack", dated 1 February 2013, by Snap Fire Systems Pty Ltd.

Penetration 2 – H 100 S cast-in fire collar protecting a 110-mm Polyvinyl Chloride (PVC) pipe incorporating a fitting inside the collar

The SNAP Cast-in H 100 S fire collar comprised a 1.6-mm thick 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 galvanized steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh, as shown in drawing numbered H 110 S-T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 110-mm OD PVC pipe (Sandwich Construction), with a wall thickness of 3.5-mm fitted through the collar's sleeve. The pipe projected vertically, 2000-mm above the concrete slab. The pipe was supported at 1000-mm from the unexposed face of the concrete slab. On the exposed side of the slab a PVC 90º elbow was connected to the penetrating pipe within the fire collar and supported by a steel support M10 HKD clamp, as shown in photograph #1. The pipe was open at the unexposed end and capped on the exposed end using a PVC cap.

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

Detail of construction is shown in drawing titled "Penetration #2 100 PVC Stack With Fitting", dated 1 February 2013, by Snap Fire Systems Pty Ltd.

Penetration 3 – H 100 FWS-RR cast-in fire collar protecting a 65-mm diameter Polyvinyl Chloride (PVC) pipe incorporating a floor waste

The SNAP H 100 FWS-RR Snap fire collar comprised a 1.6-mm thick plastic 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 stainless steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh, as shown in drawing numbered H 100 FWS - RR - T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 65-mm OD PVC pipe, with a wall thickness of 2.7-mm fitted through the H 100 FWS-RR cast-in Snap fire collar. The floor waste system was capped on the unexposed face with chromed brass floor waste grate, a 35-mm thick cement screed was laid on top of the concrete slab and finished flush with the floor grate. On the exposed side of the slab a 80-mm OD PVC gully trap was connected to the penetrating pipe, supported by M10 HKD clamps fixed to the concrete slab as shown in photograph #1. On the exposed face, the floor waste gully was sealed using a PVC end cap.

The floor waste gully was charged with water to the level shown in drawing titled “Penetration #3 65 PVC FW”, dated 1 February 2013, by Snap Fire Systems Pty Ltd.

Penetration 4 – H 100 FWS-RR cast-in fire collar protecting a 110-mm diameter Polyvinyl Chloride (PVC) pipe incorporating a floor waste and fitting inside the collar

The SNAP H 100 FWS-RR cast-in Snap fire collar comprised a 1.6-mm thick plastic 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 stainless steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh, as shown in drawing numbered H 100 FWS - RR - T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 110-mm OD PVC pipe (Sandwich Construction), with a wall thickness of 3.5-mm fitted through the H 100 FWS-RR cast-in Snap fire collar. The floor waste system was capped on the unexposed face with chromed brass floor waste grate, a 35-mm thick cement screed was laid on top of the concrete slab and finished flush with the floor grate. On the exposed side of the slab a PVC 90º elbow was connected to the penetrating pipe within the fire collar and supported by a steel support M10 HKD clamp as shown in photograph #1. The pipe was capped on the exposed end using a PVC cap.

Detail of construction is shown in drawing titled “Penetration #4 110 PVC FW With Fitting”, dated 1 February 2013, by Snap Fire Systems Pty Ltd.

Penetration 5 – H 50 S-RR cast-in fire collar protecting a 42-mm Polyvinyl Chloride (PVC) pipe incorporating a fitting inside the collar

The SNAP Cast-in H 50 S-RR fire collar comprised a 1.6-mm thick 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 galvanized steel springs, a nylon fuse link and a 280-mm x 58-mm stainless steel mesh, as shown in drawing numbered H 110 S-RR-T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 42-mm OD 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. The pipe was supported at 1000-mm from the unexposed face of the concrete slab. On the exposed side of the slab a PVC 90º elbow was connected to the penetrating pipe within the fire collar and supported by a steel support M10 HKD clamp as shown in photograph #1. The pipe was open at the unexposed end and capped on the exposed end using a PVC cap.

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

Detail of construction is shown in drawing titled "Penetration #5 40 PVC Stack With Fitting", dated 1 February 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 sixty three 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 HDPE Stack", dated 1 February 2013, by Snap Fire Systems Pty Ltd.

Drawing titled "Penetration #2 100 PVC Stack With Fitting", dated 1 February 2013, by Snap Fire Systems Pty Ltd.

Drawing titled "Penetration #3 65 PVC FW", dated 1 February 2013, by Snap Fire Systems Pty Ltd.

Drawing titled “Penetration #4 100 PVC FW With Fitting”, dated 1 February 2013, by Snap Fire Systems Pty Ltd.

Drawing titled “Penetration #5 40 PVC Stack With Fitting”, dated 1 February 2013, by Snap Fire Systems Pty Ltd.

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

Drawing numbered H 100 FWS - RR - T, dated 11 March 2013, by Snap Fire Systems Pty Ltd.

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

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 24°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 penetration #4.
3 minutes -	Intumescent material is visible on penetration #4
	Smoke is fluing from penetrations #1 and #2.
4 minutes -	Smoke is no longer fluing from penetration #4.
	Amount of smoke fluing from penetrations #1 & #2 decreased.
7 minutes -	Smoke is fluing from penetration #1.
9 minutes -	Smoke is no longer fluing from penetration #1.
13 minutes -	Smoke is being emitted from penetration #4.
45 minutes -	Moisture is forming around the base of penetration #5 on the unexposed face.
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 5 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 cast-in fire collar protecting a 110-mm HDPE pipe

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

Penetration 2 – H 100 S cast-in fire collar protecting a 110-mm DWV PVC pipe

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

Penetration 3 – H 100 FWS cast-in fire collar protecting a 65-mm diameter PVC pipe incorporating a floor waste

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

Penetration 4 – H 100 FWS-RR cast-in fire collar protecting a 110-mm diameter PVC pipe incorporating a floor waste

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

Penetration 5 – H 50 S-RR cast-in fire collar protecting a 42-mm PVC 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.

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

29 March 2013

APPENDICES

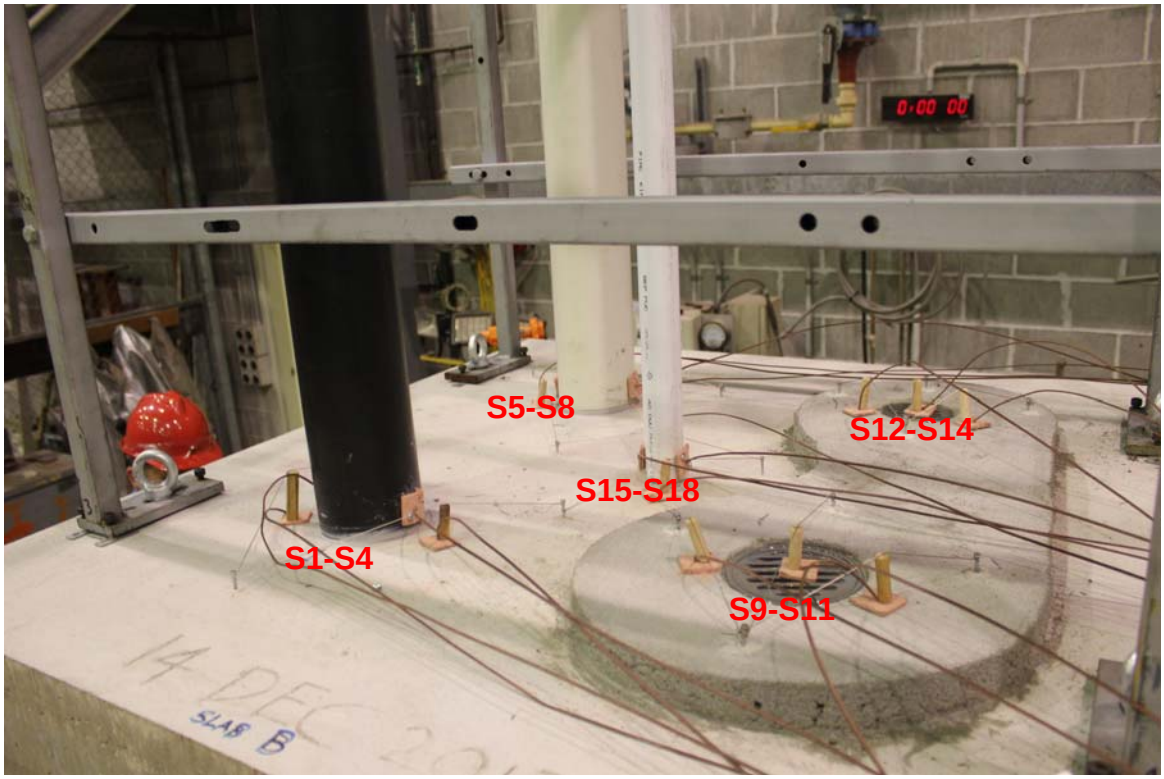
APPENDIX 1

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 pipe - 25-mm from slab	S7
	On pipe - 25-mm from slab	S8
Penetration 3	On slab - 25-mm from floor grate	S9
	On slab - 25-mm from floor grate	S10
	On floor grate	S11
Penetration 4	On slab - 25-mm from floor grate	S12
	On slab - 25-mm from floor grate	S13
	On floor grate	S14
Penetration 5	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

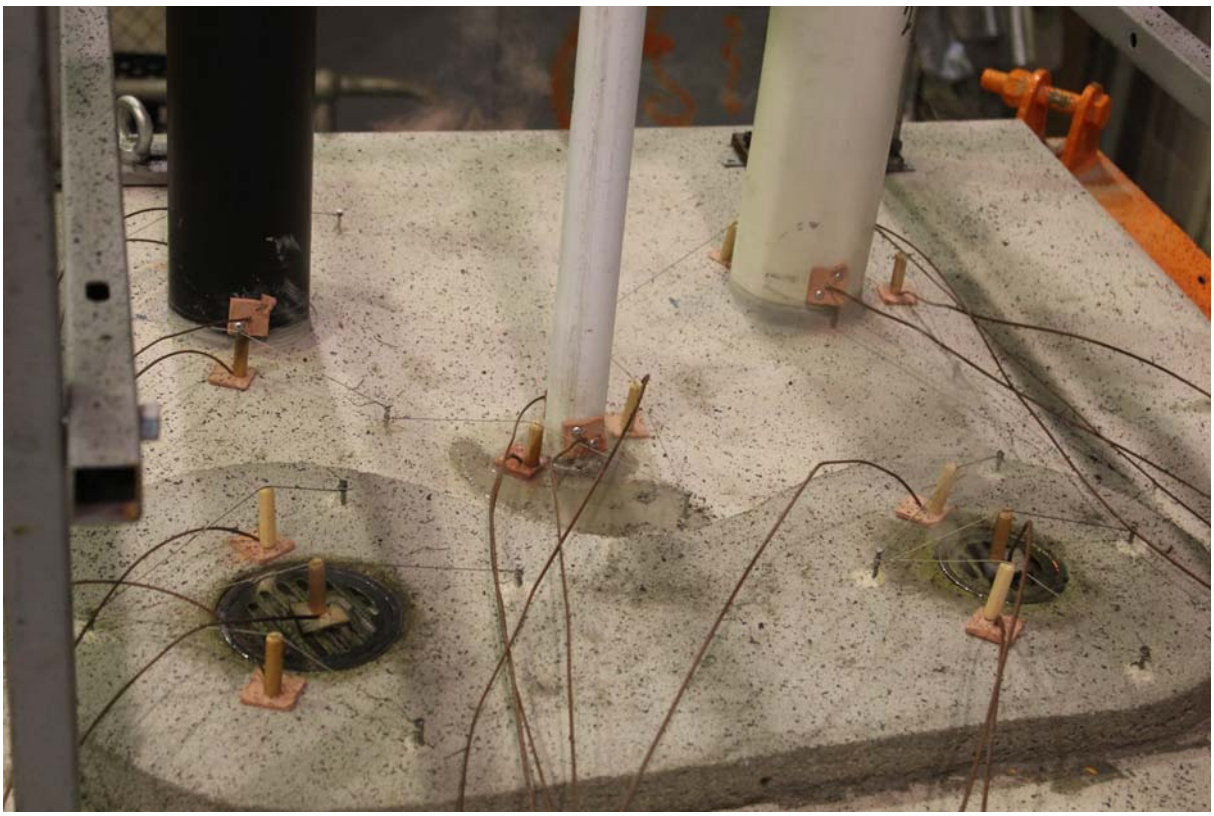
Table 1 – Specimen thermocouple positioning

APPENDIX 2

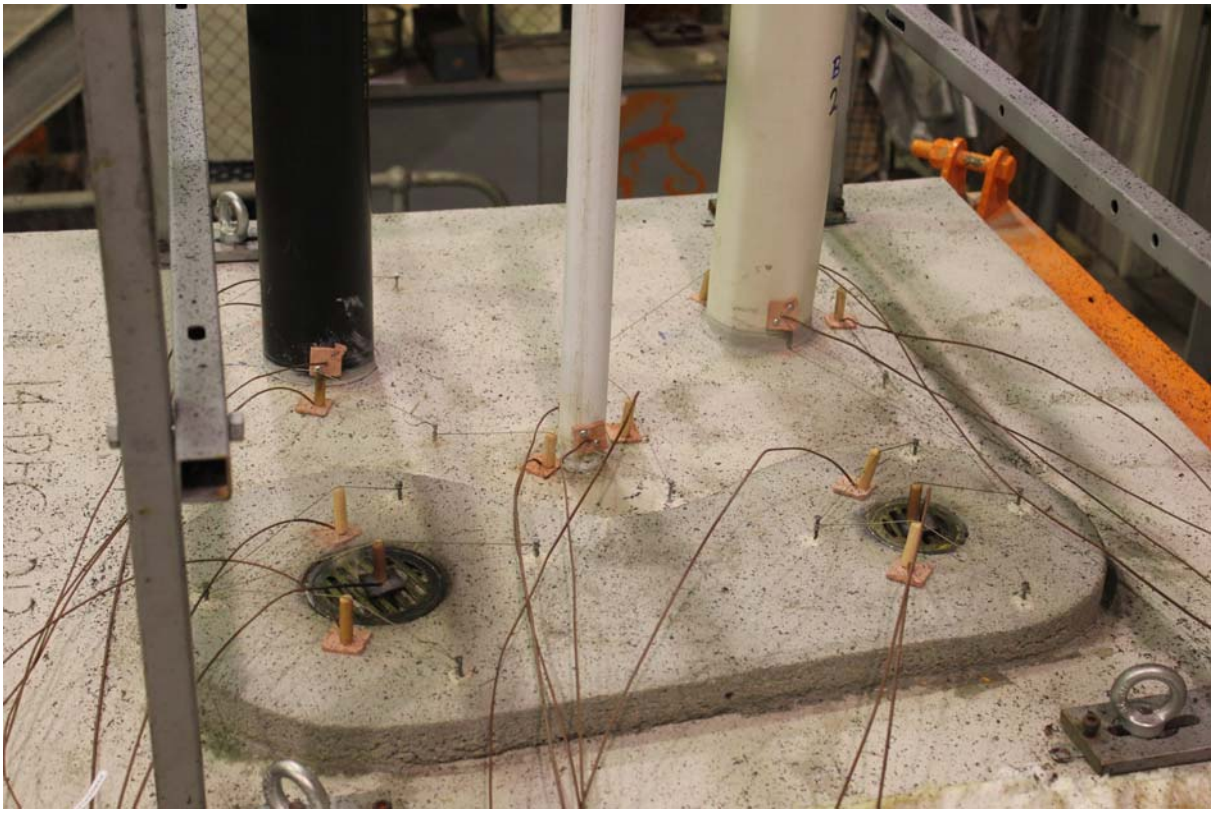
Photograph 1 – Exposed face of the specimen prior to testing



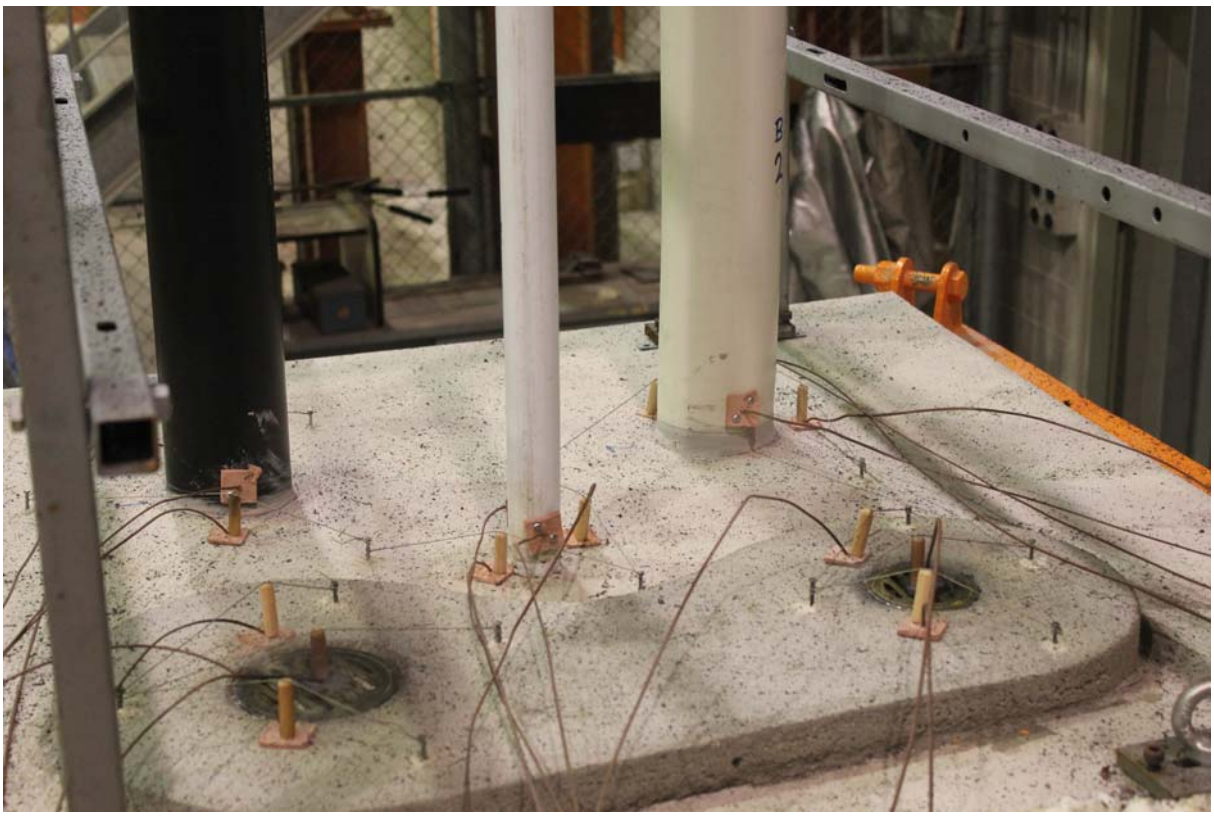
Photograph 2 – Unexposed face of the specimen prior to testing



Photograph 3 – Specimens after 60 minutes of testing

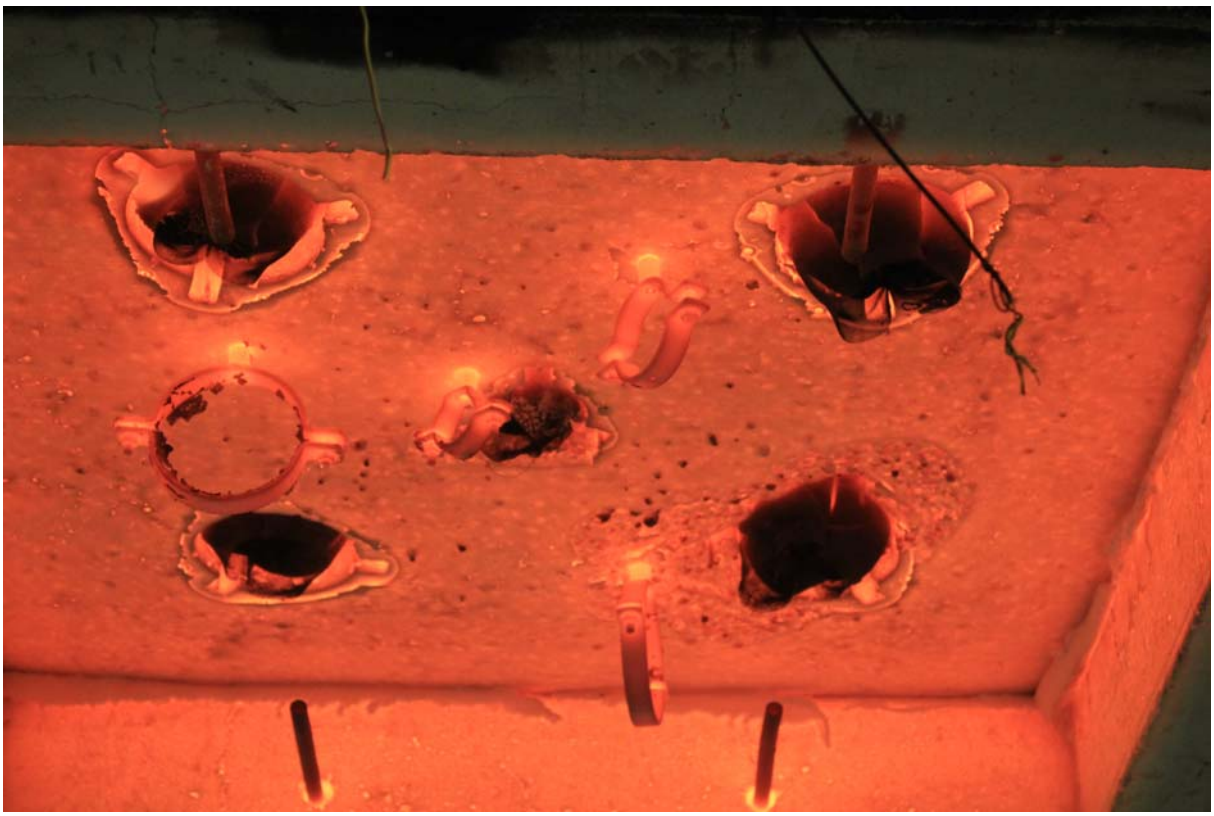


Photograph 4 – Specimens after 120 minutes of testing



Photograph 5 – Specimens after 180 minutes of testing

Photograph 6 – Specimens after 240 minutes of testing



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

APPENDIX 3

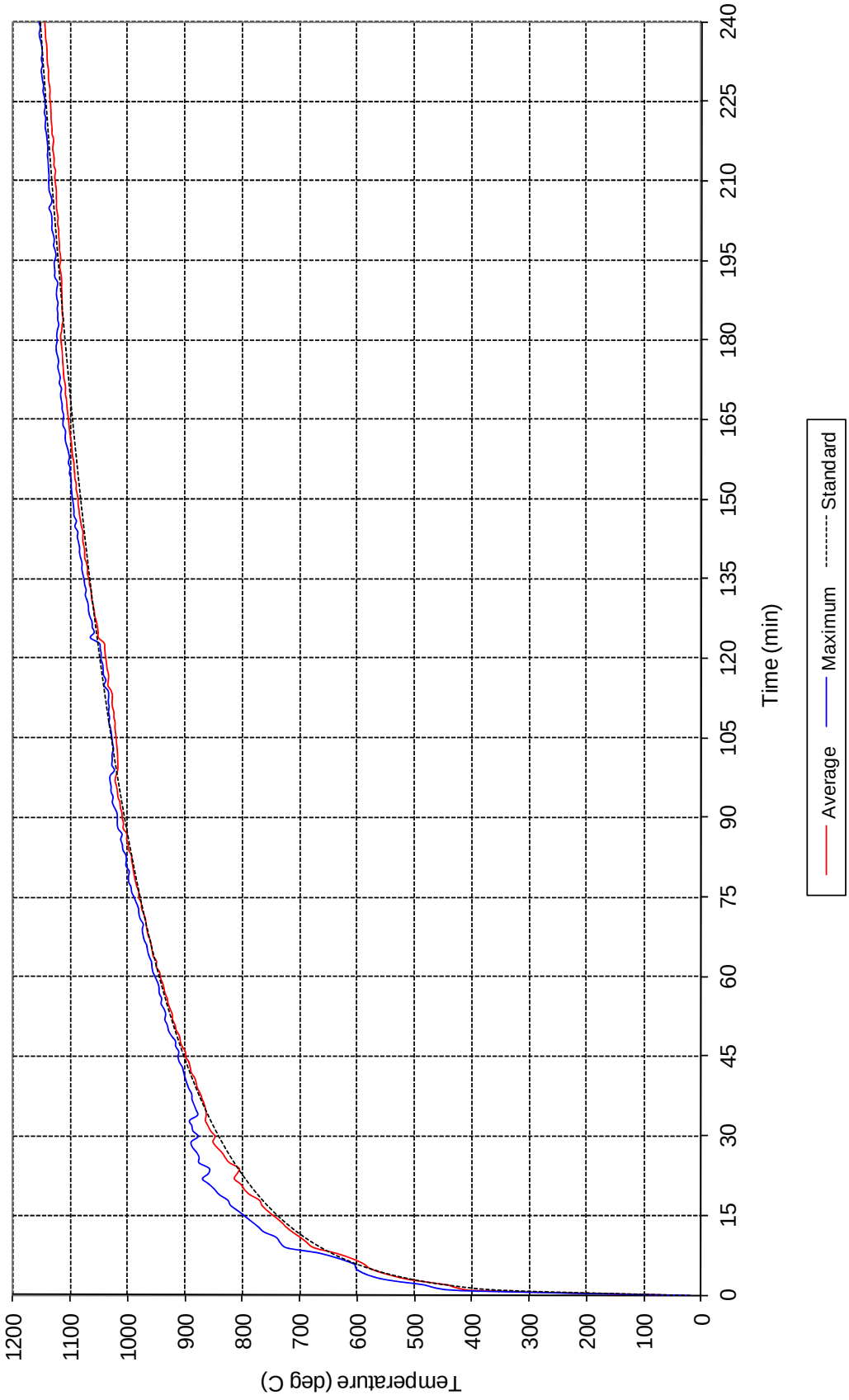


Figure 1 - Furnace temperature

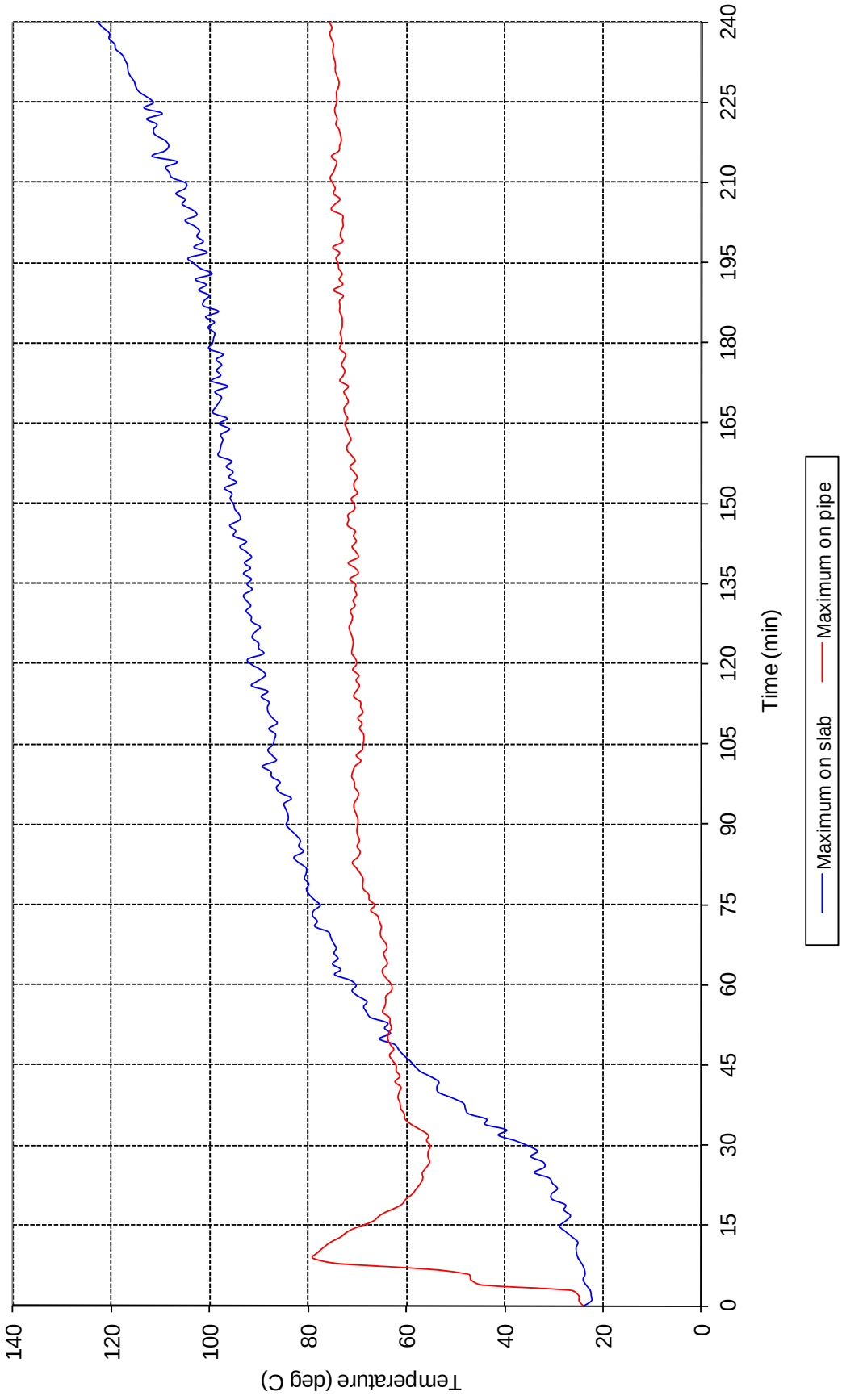


Figure 2 - Specimen temperature – Associated with Penetration 1

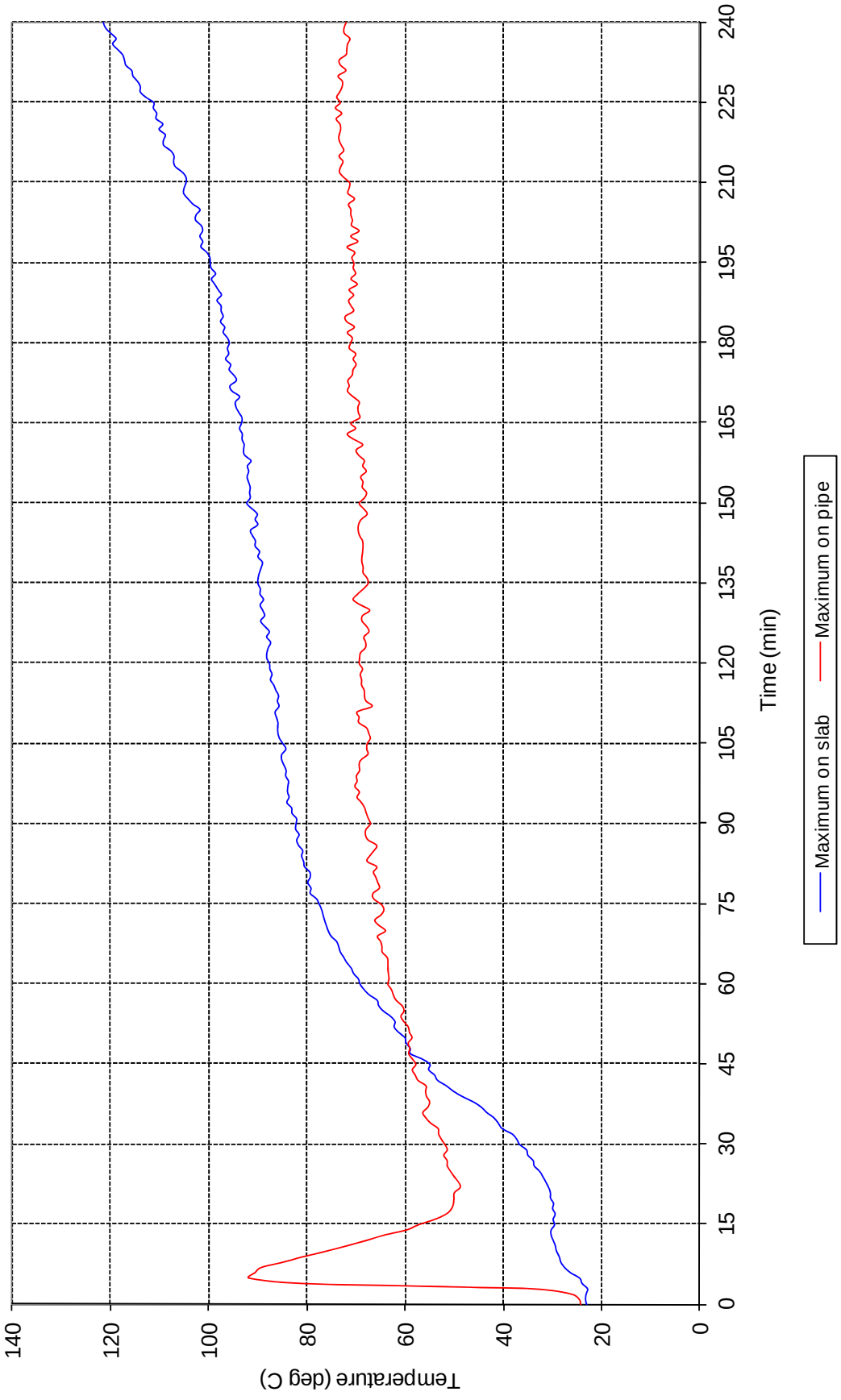


Figure 3 - Specimen temperature – Associated with Penetration 2

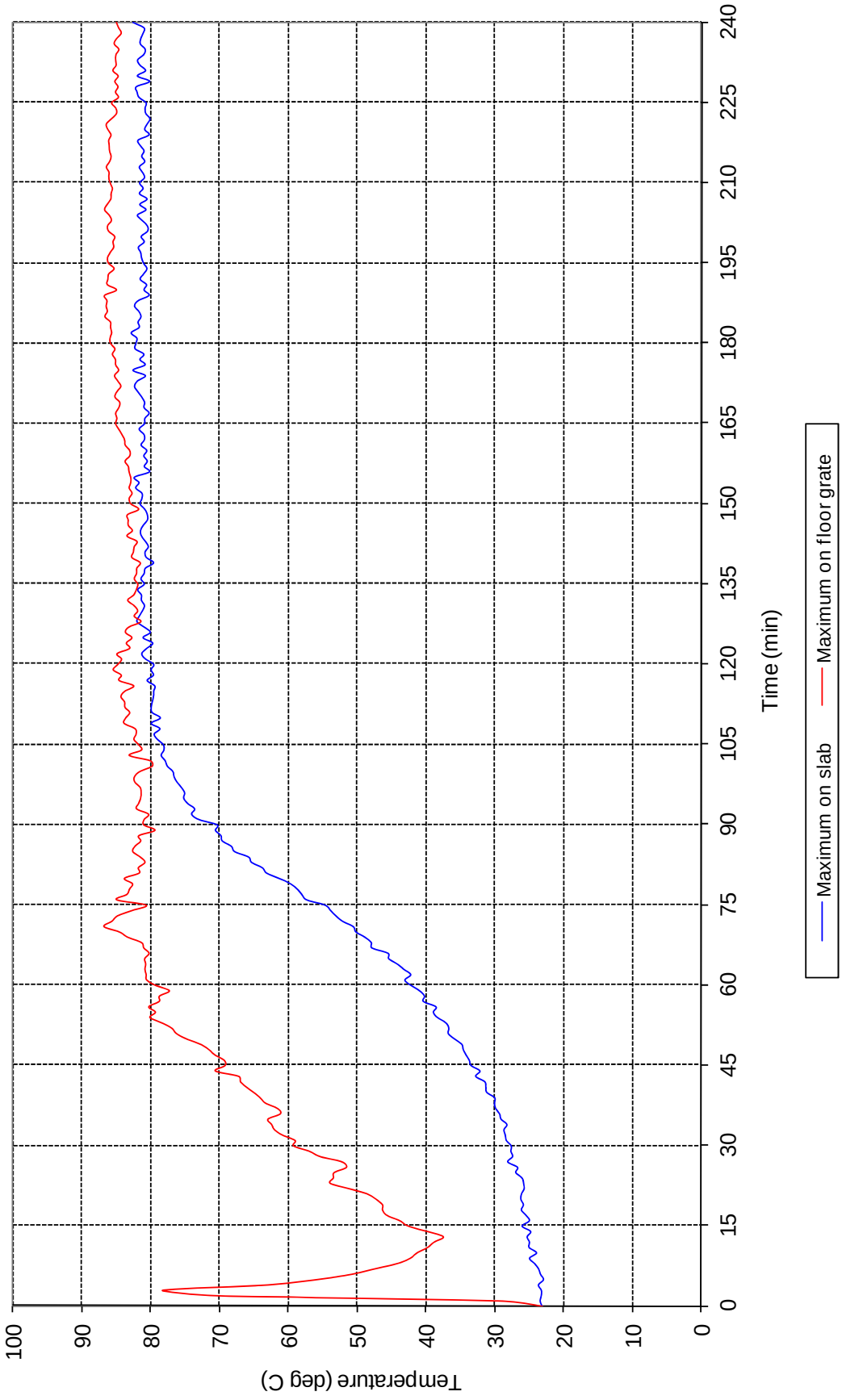


Figure 4 - Specimen temperature – Associated with Penetration 3

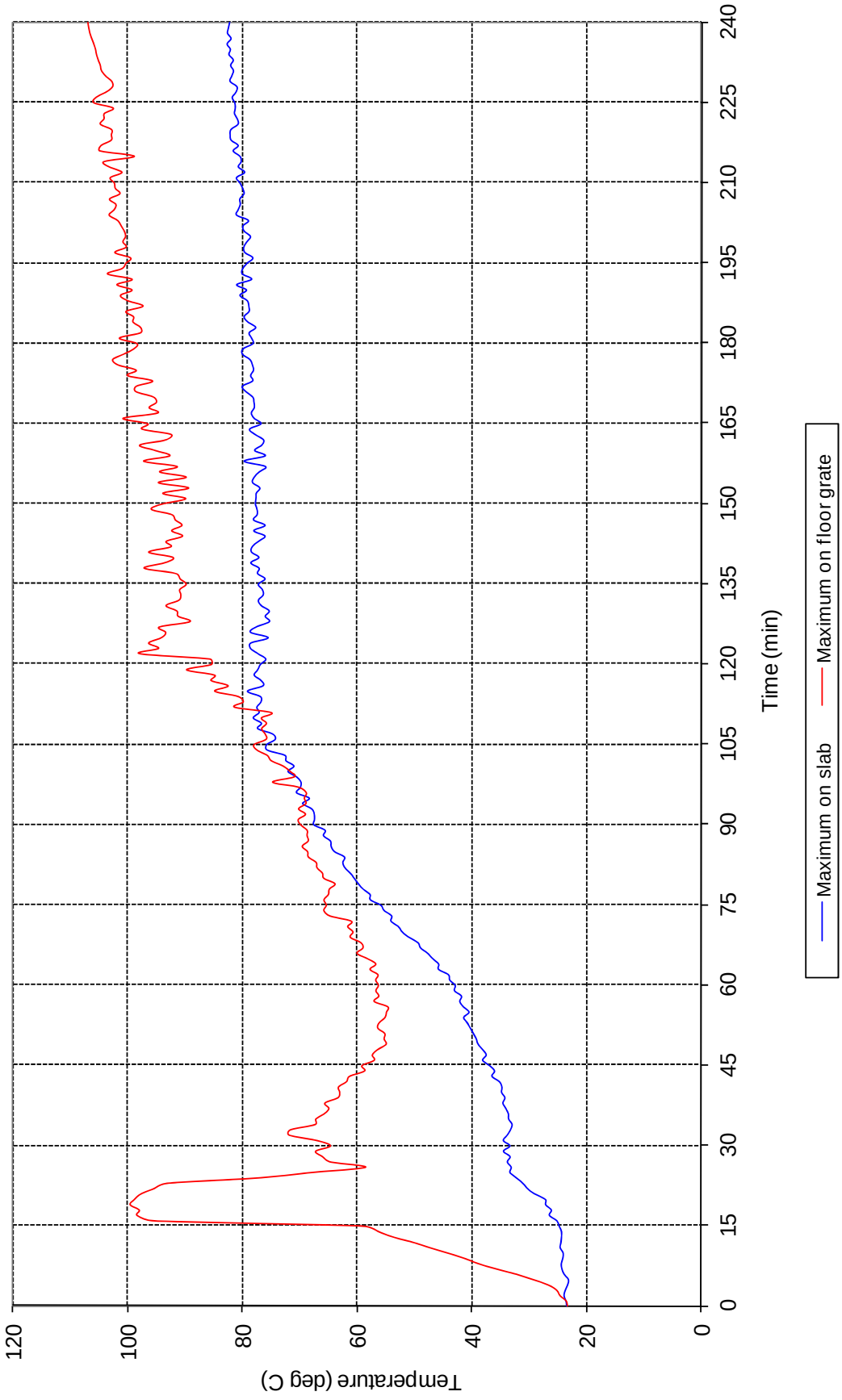


Figure 5 - Specimen temperature – Associated with Penetration 4

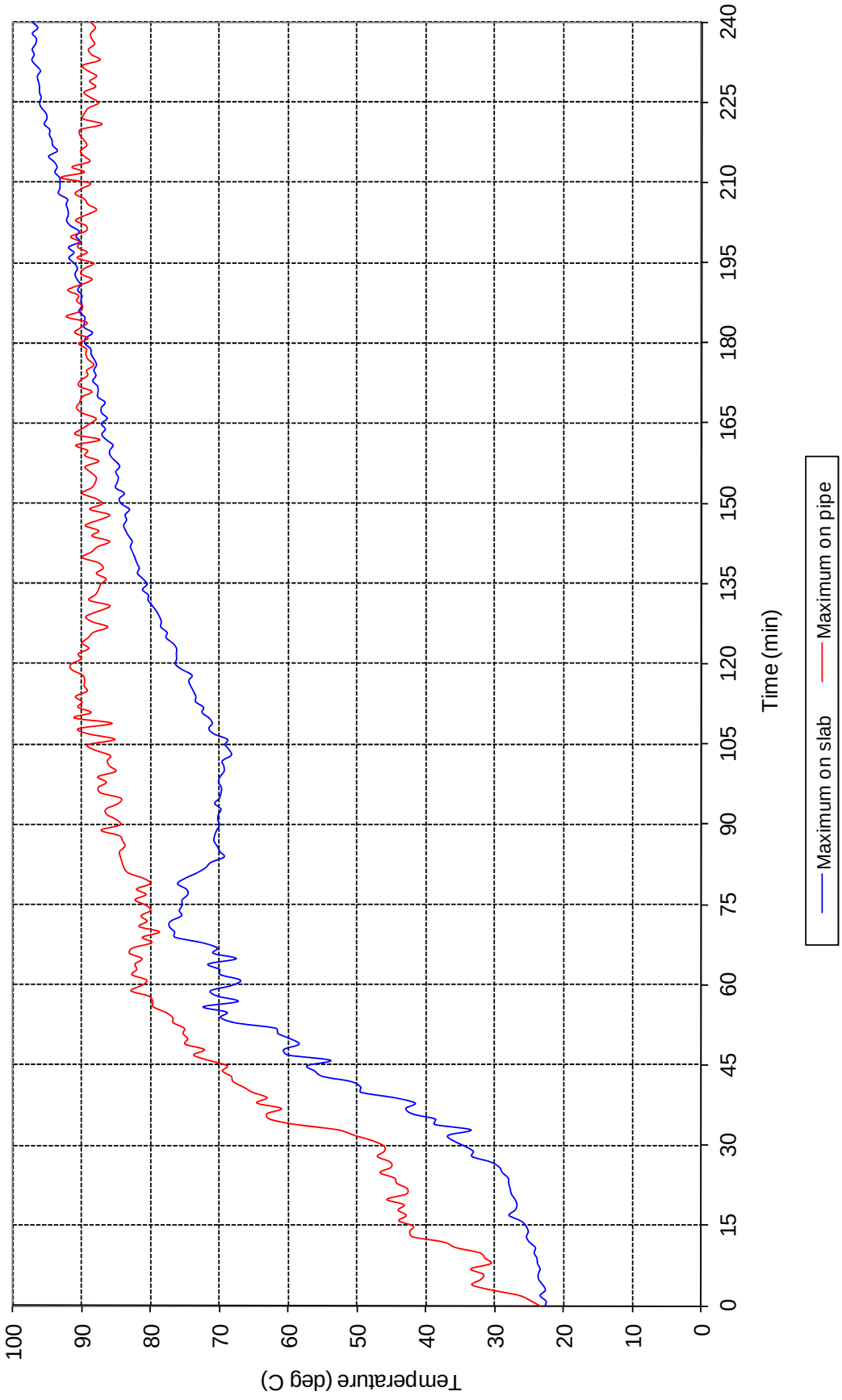
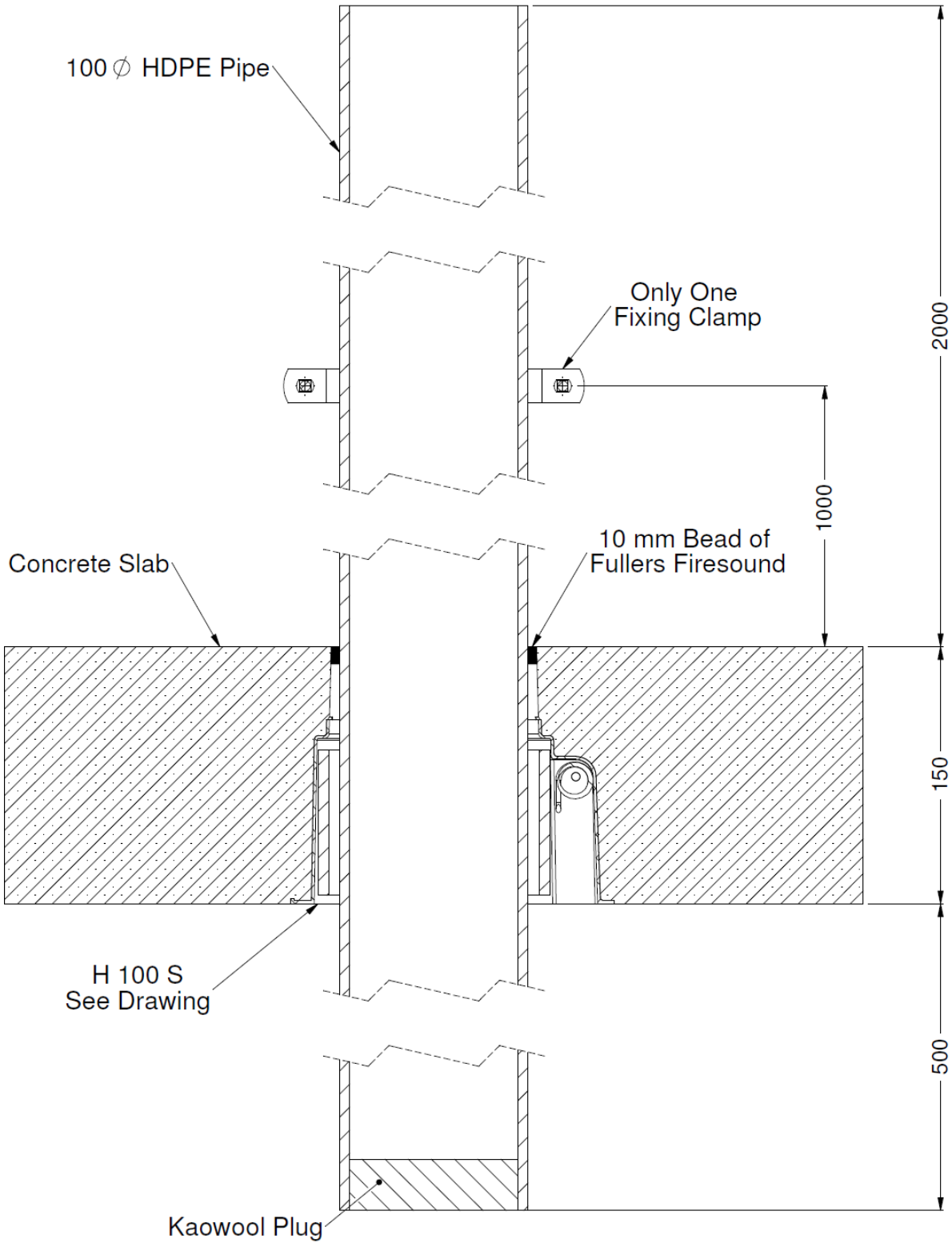


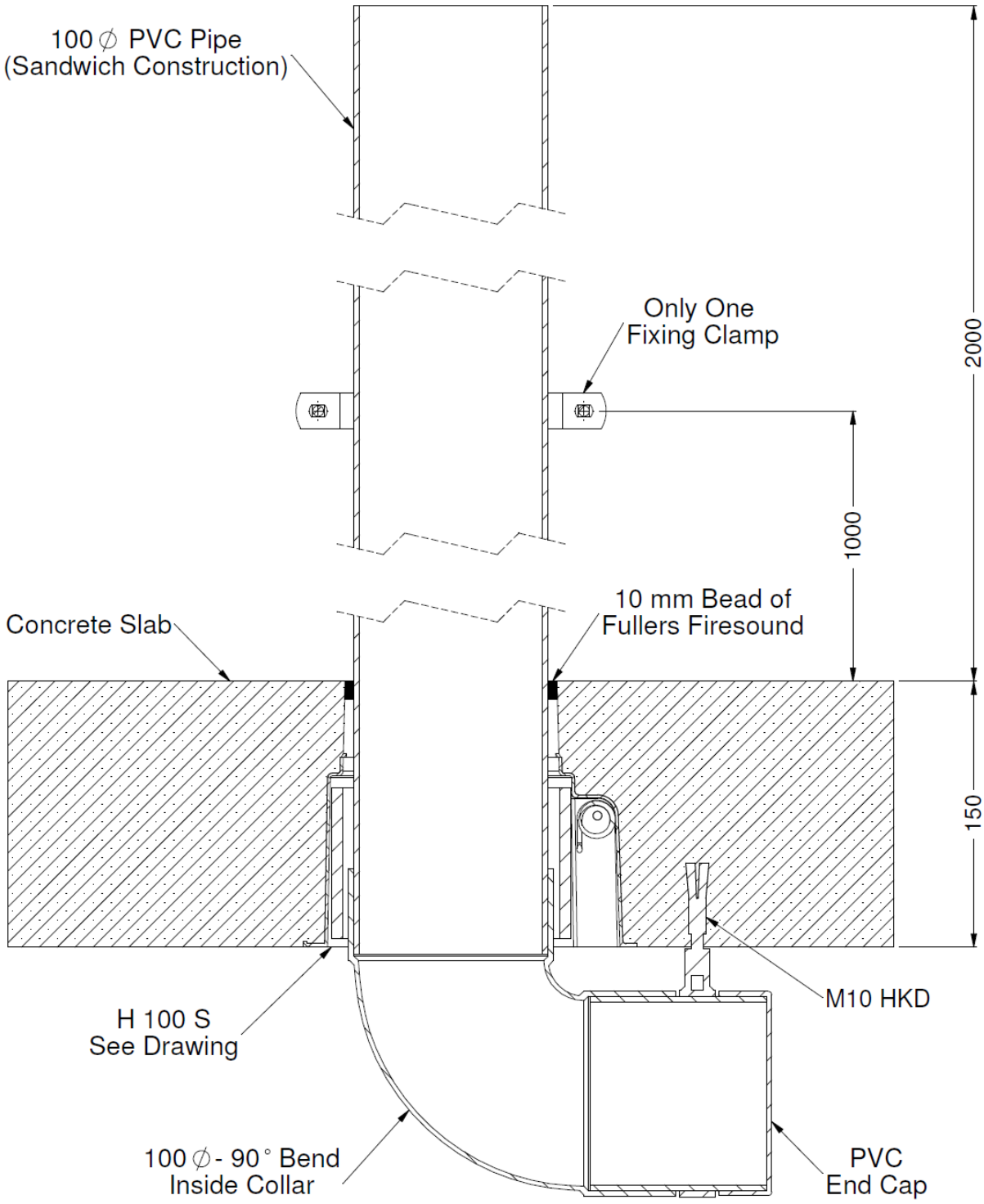
Figure 5 - Specimen temperature – Associated with Penetration 5

APPENDIX 4
SLAB B - Penetration #1
100 HDPE Stack - Date 01-02-2013



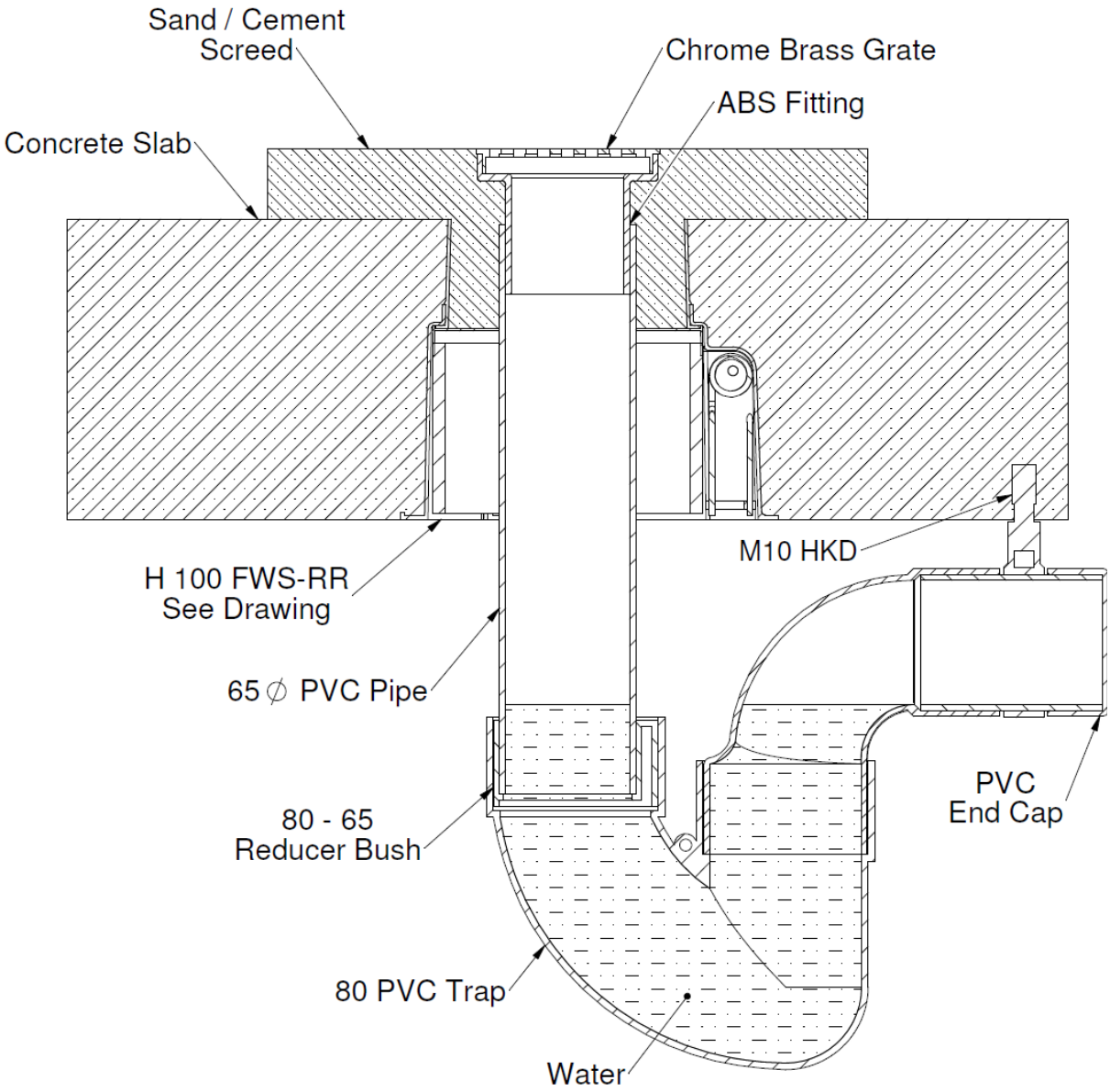
Drawing titled “Penetration #1 100 HDPE Stack”, dated 1 February 2013

SLAB B - Penetration #2
100 PVCs Stack With Fitting - Date 01-02-2013



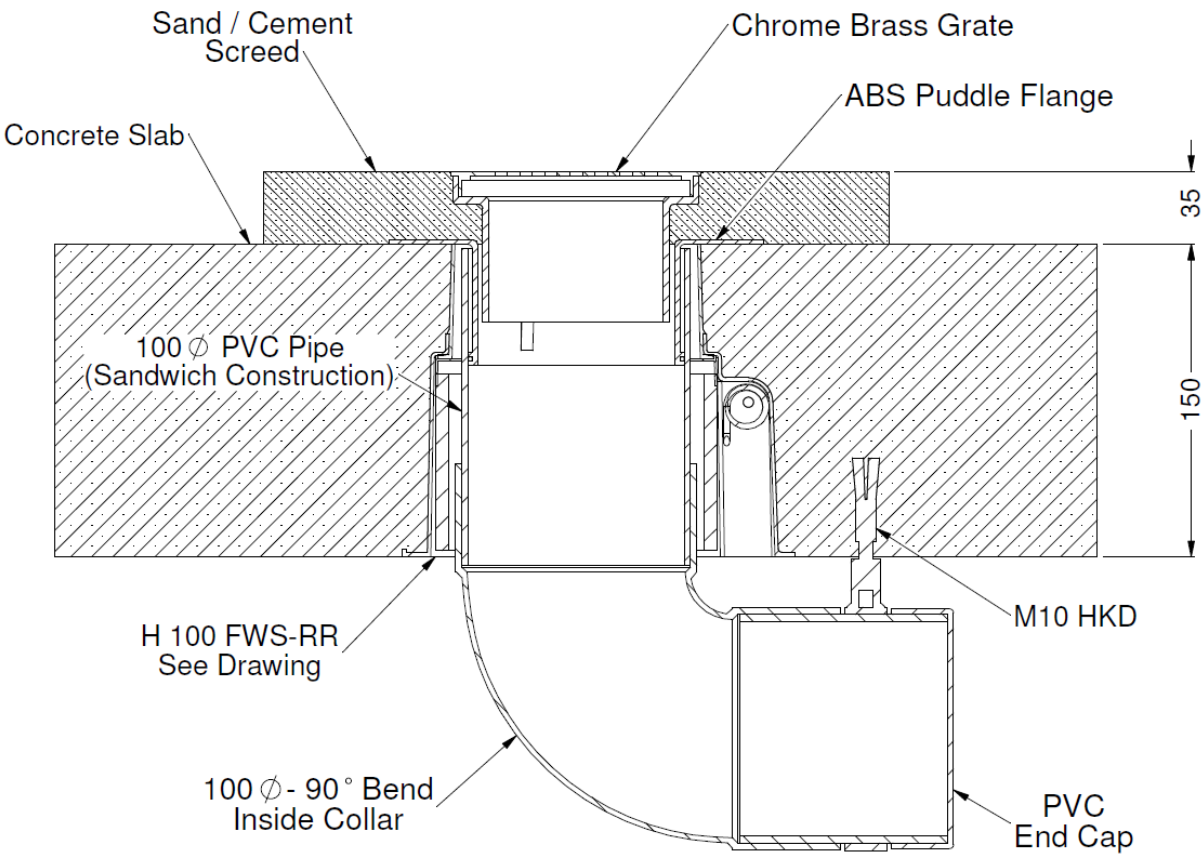
Drawing titled “Penetration #2 80 PVCs Stack With Fitting”, dated 1 February 2013

SLAB B - Penetration #3
65 PVC FW - Date 01-02-2013



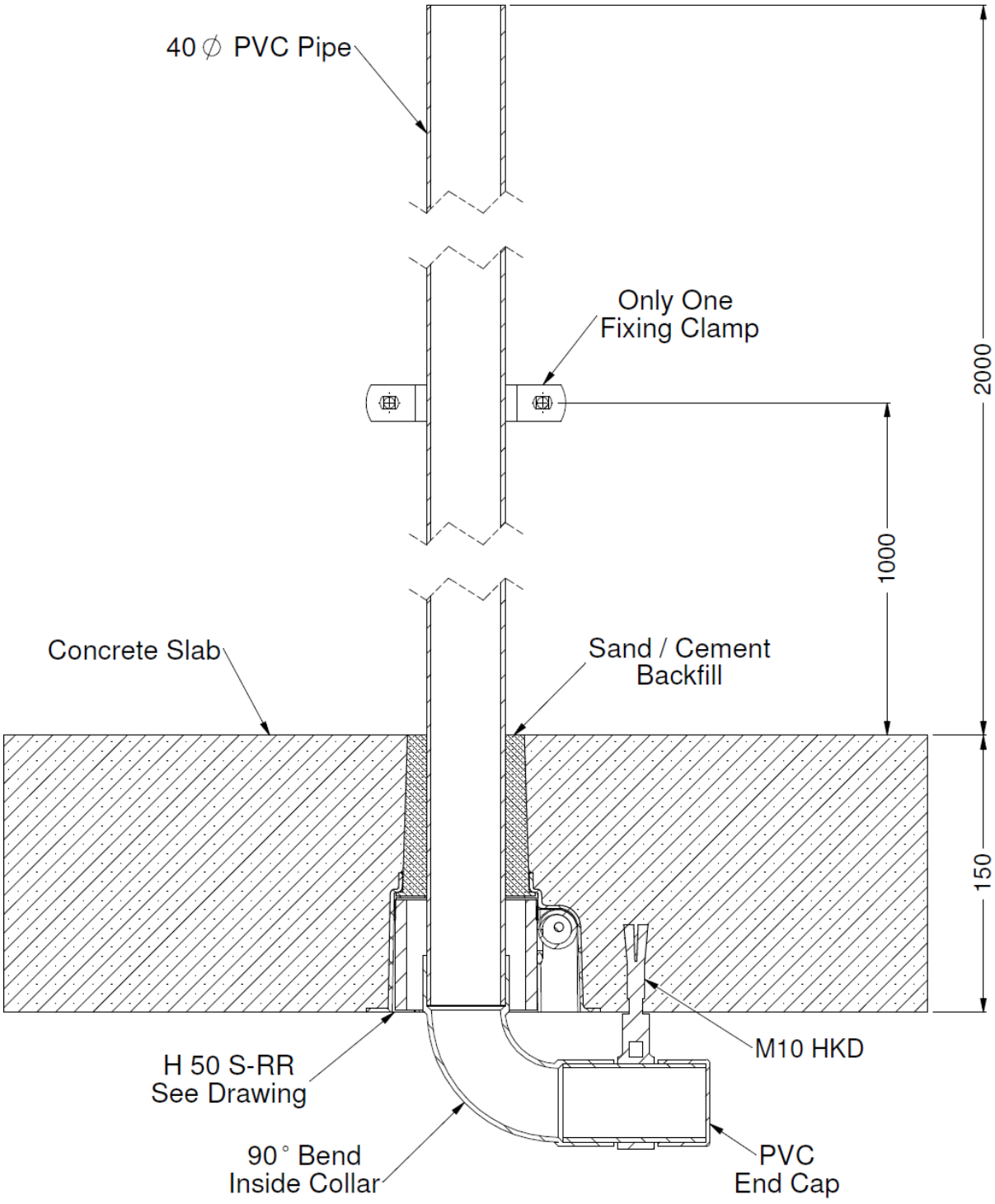
Drawing titled “Penetration #3 65 PVC FW”, dated 1 February 2013

SLAB B - Penetration #4
100 PVCs FW With Fitting - Date 01-02-2013

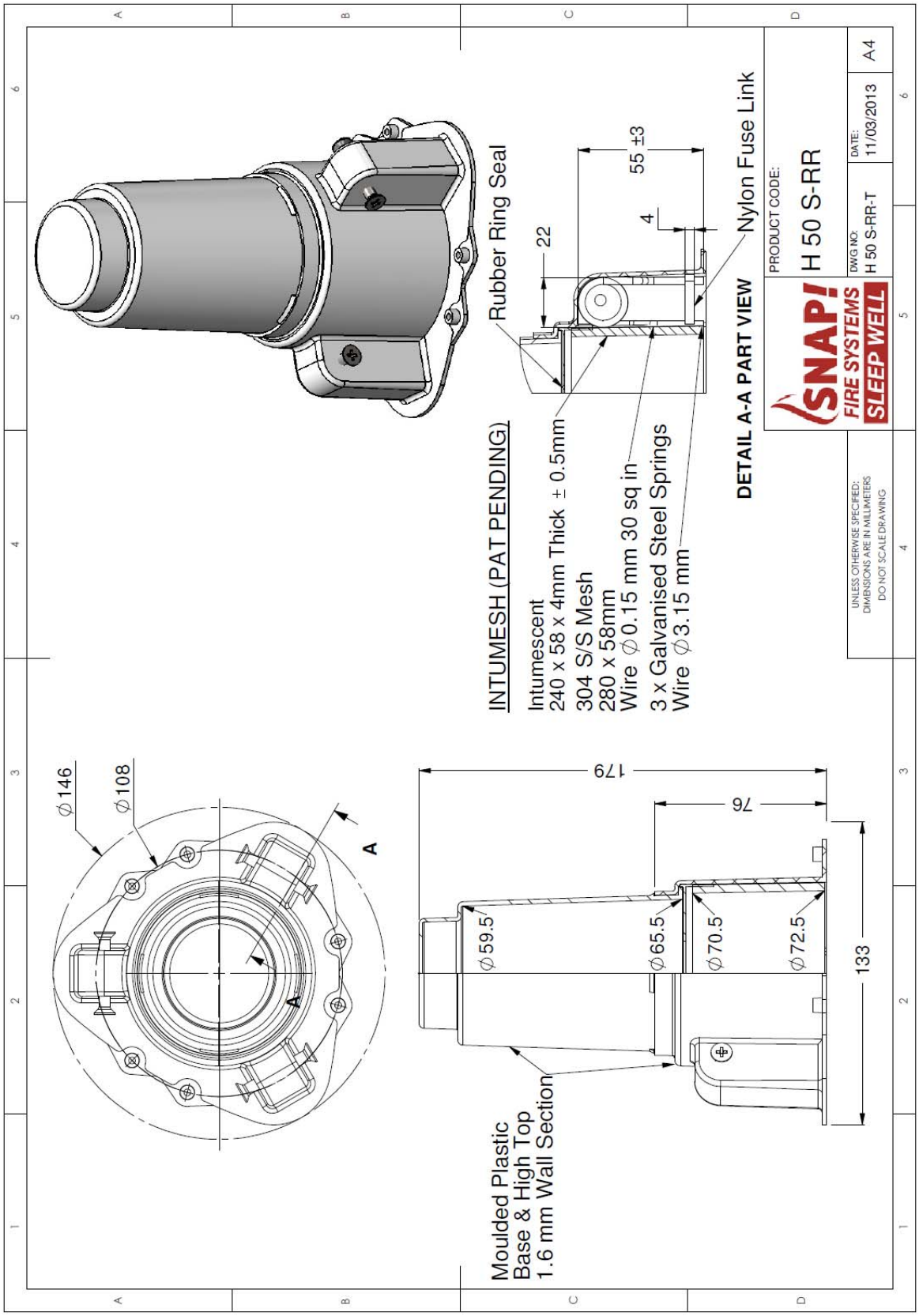


Drawing titled “Penetration #4 100 PVCs FW With Fitting”, dated 1 February 2013

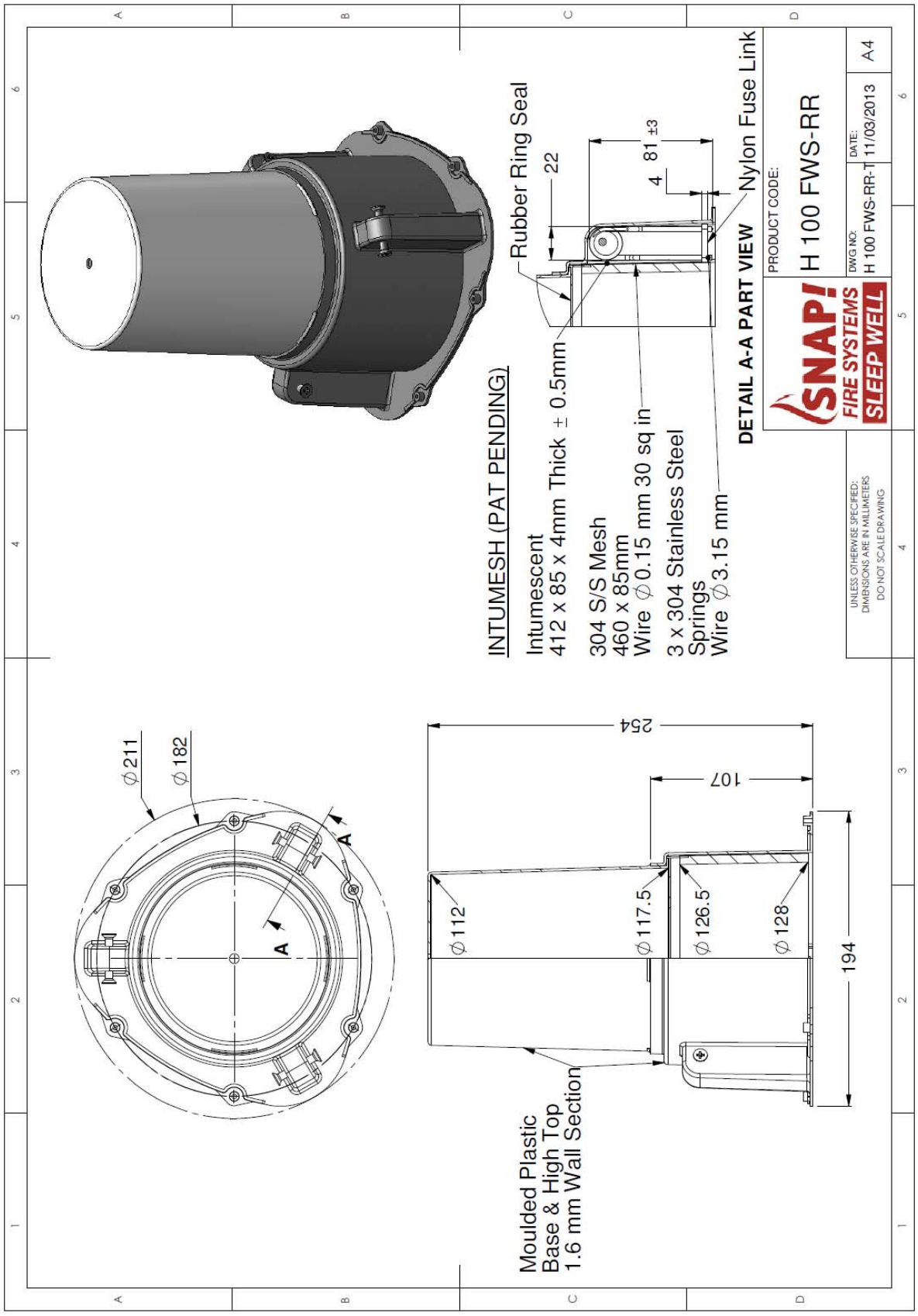
SLAB B - Penetration #5
40 PVC Stack With Fitting - Date 01-02-2013



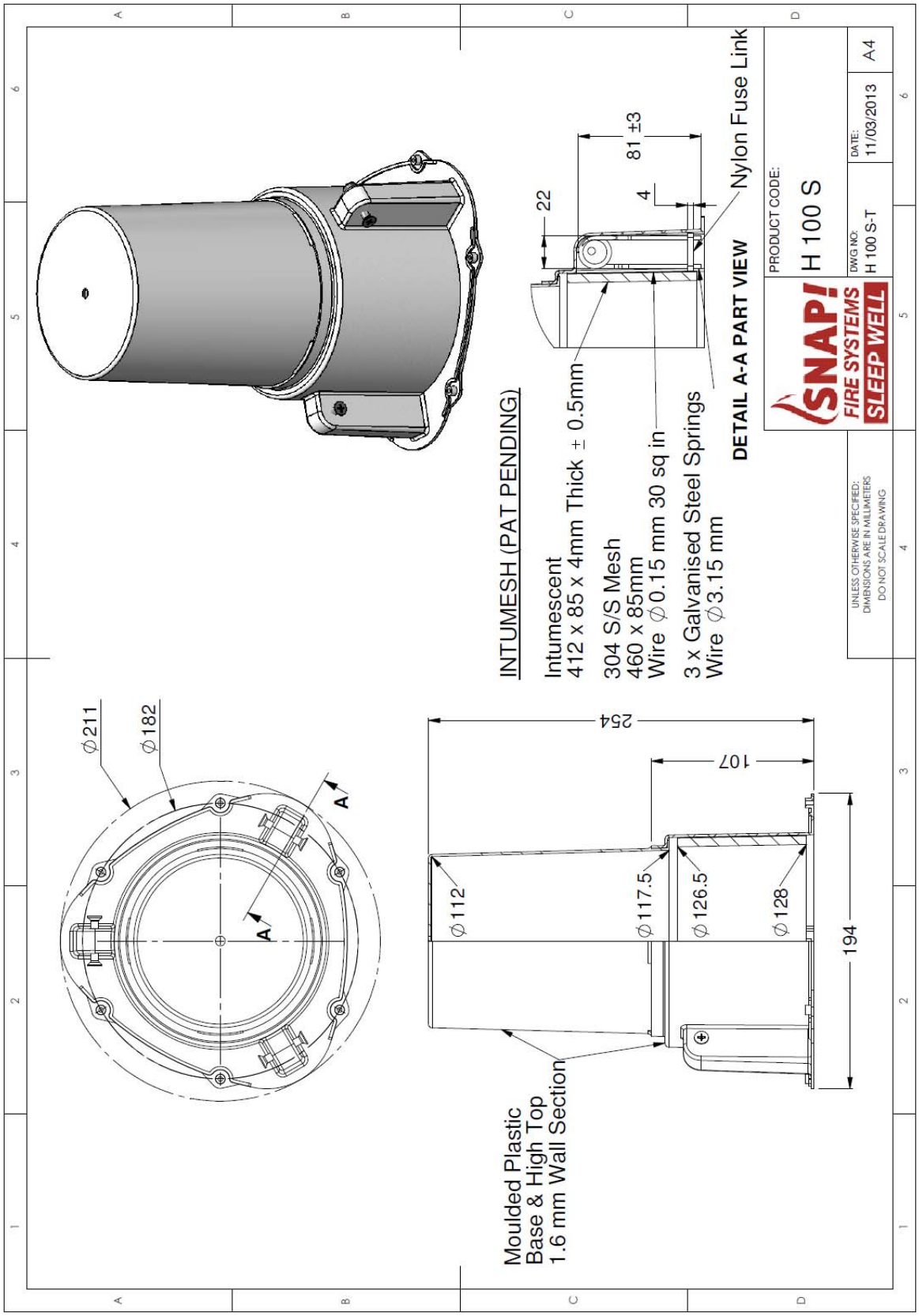
Drawing titled “Penetration #5 40 PVC Stack With Fitting”, dated 1 February 2013



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



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



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

APPENDIX 5

Certificate of Test

No. 2463

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 1577.

Product Name: Penetration 1 – H 100 S cast-in fire collar protecting a 110-mm High Density Polyethylene (HDPE) pipe

Description: The SNAP Cast-in H 100 S fire collar comprised a 1.6-mm thick 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 galvanized steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh, as shown in drawing numbered H 110 S-T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 110-mm OD 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 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 HDPE Stack", dated 1 February 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: 18 February 2013.
Issued on the 26th 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.2463

Certificate of Test

No. 2464

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 1577.

Product Name: Penetration 2 – H 100 S cast-in fire collar protecting a 110-mm Polyvinyl Chloride (PVC) pipe incorporating a fitting inside the collar

Description: The SNAP Cast-in H 100 S fire collar comprised a 1.6-mm thick 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 galvanized steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh, as shown in drawing numbered H 110 S-T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 110-mm OD PVC pipe (Sandwich Construction), with a wall thickness of 3.5-mm fitted through the collar's sleeve. The pipe projected vertically, 2000-mm above the concrete slab. The pipe was supported at 1000-mm from the unexposed face of the concrete slab. On the exposed side of the slab a PVC 90º elbow was connected to the penetrating pipe within the fire collar and supported by a steel support M10 HKD clamp, as shown in photograph #1. The pipe was open at the unexposed end and capped on the exposed end using a PVC cap.

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

Detail of construction is shown in drawing titled "Penetration #2 100 PVC Stack With Fitting", dated 1 February 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: 18 February 2013.
Issued on the 26th 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.2464

Certificate of Test

No. 2465

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 1577.

Product Name: Penetration 3 – H 100 FWS-RR cast-in fire collar protecting a 65-mm diameter Polyvinyl Chloride (PVC) pipe incorporating a floor waste

Description: The SNAP H 100 FWS-RR Snap fire collar comprised a 1.6-mm thick plastic 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 stainless steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh, as shown in drawing numbered H 100 FWS - RR - T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 65-mm OD PVC pipe, with a wall thickness of 2.7-mm fitted through the H 100 FWS-RR cast-in Snap fire collar. The floor waste system was capped on the unexposed face with chromed brass floor waste grate, a 35-mm thick cement screed was laid on top of the concrete slab and finished flush with the floor grate. On the exposed side of the slab a 80-mm OD PVC gully trap was connected to the penetrating pipe, supported by M10 HKD clamps fixed to the concrete slab as shown in photograph #1. On the exposed face, the floor waste gully was sealed using a PVC end cap.

The floor waste gully was charged with water to the level shown in drawing titled "Penetration #3 65 PVC FW", dated 1 February 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: 18 February 2013.
Issued on the 26th 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.2465

Certificate of Test

No. 2466

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 1577.

Product Name: Penetration 4 – H 100 FWS-RR cast-in fire collar protecting a 110-mm diameter Polyvinyl Chloride (PVC) pipe incorporating a floor waste and fitting inside the collar

Description: The SNAP H 100 FWS-RR cast-in Snap fire collar comprised a 1.6-mm thick plastic 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 stainless steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh, as shown in drawing numbered H 100 FWS - RR - T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 110-mm OD PVC pipe (Sandwich Construction), with a wall thickness of 3.5-mm fitted through the H 100 FWS-RR cast-in Snap fire collar. The floor waste system was capped on the unexposed face with chromed brass floor waste grate, a 35-mm thick cement screed was laid on top of the concrete slab and finished flush with the floor grate. On the exposed side of the slab a PVC 90º elbow was connected to the penetrating pipe within the fire collar and supported by a steel support M10 HKD clamp as shown in photograph #1. The pipe was capped on the exposed end using a PVC cap.

Detail of construction is shown in drawing titled "Penetration #4 110 PVC FW With Fitting", dated 1 February 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: 18 February 2013.
Issued on the 26th day of March 2013 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments

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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.2466

Certificate of Test

No. 2467

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 1577.

Product Name: Penetration 5 – H 50 S-RR cast-in fire collar protecting a 42-mm Polyvinyl Chloride (PVC) pipe incorporating a fitting inside the collar

Description: The SNAP Cast-in H 50 S-RR fire collar comprised a 1.6-mm thick 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 galvanized steel springs, a nylon fuse link and a 280-mm x 58-mm stainless steel mesh, as shown in drawing numbered H 110 S-RR-T, dated 11 March 2013, by SNAP Fire Systems.

The penetrating service comprised a 42-mm OD 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. The pipe was supported at 1000-mm from the unexposed face of the concrete slab. On the exposed side of the slab a PVC 90° elbow was connected to the penetrating pipe within the fire collar and supported by a steel support M10 HKD clamp as shown in photograph #1. The pipe was open at the unexposed end and capped on the exposed end using a PVC cap.

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

Detail of construction is shown in drawing titled "Penetration #5 40 PVC Stack With Fitting", dated 1 February 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: 18 February 2013.
Issued on the 26th day of March 2013 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments

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