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

Report number FSP 1576
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Client
SNAP FIRE SYSTEMS PTY LTD.

Commercial-in-confidence

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SPONSORED INVESTIGATION No. FSP 1576

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 4339/3628

TEST DATE: The fire-resistance test was conducted on 20 February 2013.

DESCRIPTION OF SPECIMEN:

GENERAL

The specimen comprised an 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: the penetration comprised a 100-mm PVC pipe uncapped on both ends for experimental purpose only.

Penetration 2 – H 50 FWS cast-in fire collar protecting a nominal 50-mm diameter Polyvinyl Chloride (PVC) pipe incorporating a floor waste

The SNAP Cast-in H 50 FWS 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 FWS-T, dated 20 May 2013, by SNAP Fire Systems.

The penetrating service comprised a 56-mm OD PVC pipe, with a wall thickness of 2.2-mm fitted through the H 50 FWS cast-in Snap fire collar. The floor waste system was fitted with a 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 56-mm OD PVC gully trap was connected to the penetrating pipe, supported by M10 HKD clamp fixed to the concrete slab, as shown in photograph #1. On the exposed face, the gully trap was sealed using a PVC end cap.

The floor waste gully was charged with water to the level shown in drawing titled “Penetration #2 50 PVC FW”, dated 2 February 2013, by Snap Fire Systems Pty Ltd.

Penetration 3 – H 100 FWS cast-in fire collar protecting a nominal 80-mm diameter Polyvinyl Chloride (PVC) pipe incorporating a floor waste

The SNAP H 100 FWS 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 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 - T, dated 20 May 2013, by SNAP Fire Systems.

The penetrating service comprised a 82.6-mm OD PVC pipe, with a wall thickness of 2.9-mm fitted through the H 100 FWS cast-in Snap fire collar. The floor waste system was fitted with a 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 82.6-mm OD PVC gully trap was connected to the penetrating pipe, supported by a M10 HKD clamp 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 80 PVC FW”, dated 2 February 2013, by Snap Fire Systems Pty Ltd.

Penetration 4 – H 100 FWS cast-in fire collar protecting a nominal 100-mm diameter Polyvinyl Chloride (PVC) Sandwich Construction (SC) pipe incorporating a floor waste

The SNAP H 100 FWS 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 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 - T, dated 20 May 2013, by SNAP Fire Systems.

The penetrating service comprised a 110-mm OD Sandwich Construction PVC pipe, with a wall thickness of 3.5-mm fitted through the H 100 FWS cast-in Snap fire collar. The floor waste system was fitted 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 110-mm OD PVC gully trap was connected to the penetrating pipe, supported by a M10 HKD clamp 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 #4 100 PVC FW”, dated 2 February 2013, by Snap Fire Systems Pty Ltd.

Penetration 5 – H 50 FWS cast-in fire collar protecting a nominal 40-mm diameter Polyvinyl Chloride (PVC) pipe incorporating a floor waste

The SNAP Cast-in H 50 FWS 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 FWS-T, dated 20 May 2013, by SNAP Fire Systems.

The penetrating service comprised a 42.9-mm OD PVC pipe, with a wall thickness of 2.7-mm fitted through the H 50 FWS 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 42.9-mm OD PVC gully trap was connected to the penetrating pipe, supported by a M10 HKD clamp 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 #4 40 PVC FW”, dated 2 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 #2 50 PVC FW”, dated 2 February 2013, by Snap Fire Systems Pty Ltd

Drawing titled “Penetration #3 80 PVC FW”, dated 2 February 2013, by Snap Fire Systems Pty Ltd

Drawing titled “Penetration #4 100 PVC FW”, dated 2 February 2013, by Snap Fire Systems Pty Ltd

Drawing titled “Penetration #5 40 PVC FW”, dated 2 February 2013, by Snap Fire Systems Pty Ltd

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

Drawing numbered H 100 FWS - T, dated 11 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℃ at the co mmencement 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:

4 minutes -	Smoke is being emitted from all penetrations.
11 minutes -	Smoke is no longer emitted from #2, #3, & #4.
24 minutes -	Smoke is fluing from #3 & #4.
60 minutes -	Water is visible on the unexposed face of the slab.
120 minutes -	Smoke is being emitted from all the penetrations.
180 minutes -	No apparent change to the specimens.
241 minutes -	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 #2.

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

Figure 4 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 2 – H 50 FWS cast-in fire collar protecting a 50-mm Polyvinyl Chloride (PVC) pipe incorporating a floor waste

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 80-mm diameter Polyvinyl Chloride (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 PVC FW cast-in fire collar protecting a 100-mm diameter Polyvinyl Chloride (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 FWS cast-in fire collar protecting a 40-mm Polyvinyl Chloride (PVC) pipe incorporating a floor waste

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:

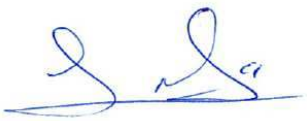
Penetration 2	-	-/240/240;
Penetration 3	-	-/240/240;
Penetration 4	-	-/240/240; and
Penetration 5	-	-/240/240.

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

26 April 2013

APPENDICES

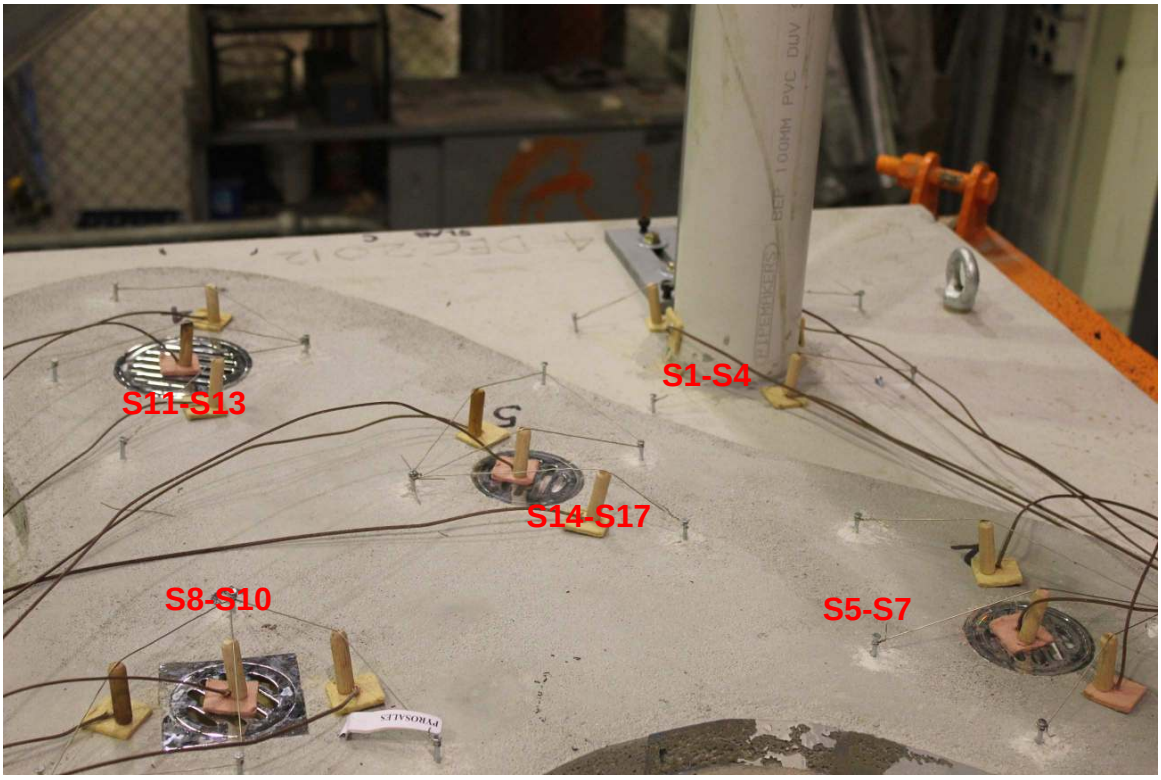
APPENDIX 1

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 floor grate	S5
	On floor grate	S6
	On slab - 25-mm from floor grate	S7
Penetration 3	On slab - 25-mm from floor grate	S8
	On slab - 25-mm from floor grate	S9
	On floor grate	S10
Penetration 4	On slab - 25-mm from floor grate	S11
	On slab - 25-mm from floor grate	S12
	On floor grate	S13
Penetration 5	On slab - 25-mm from floor grate	S14
	On slab - 25-mm from floor grate	S15
	On floor grate	S16

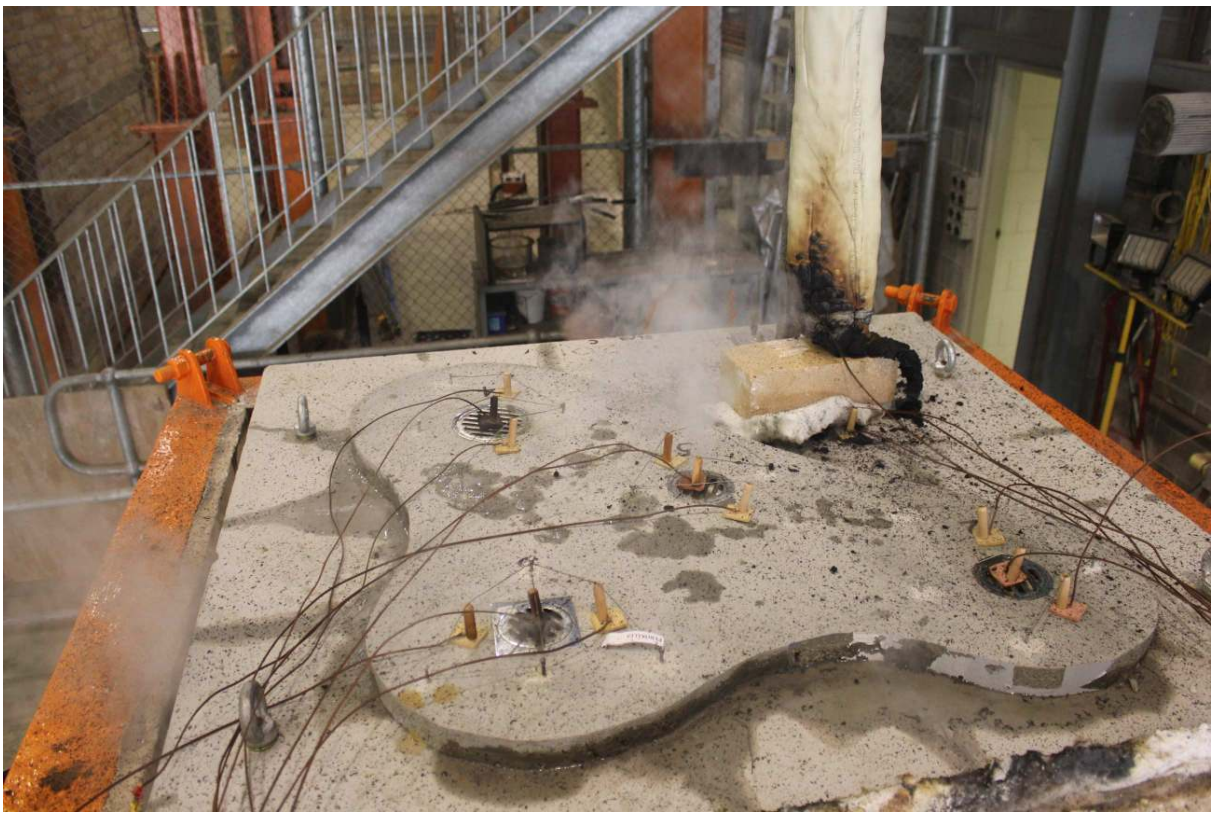
Table 1 – Specimen thermocouple positioning

APPENDIX 2

Photograph 1 – Exposed face of the specimen prior to testing

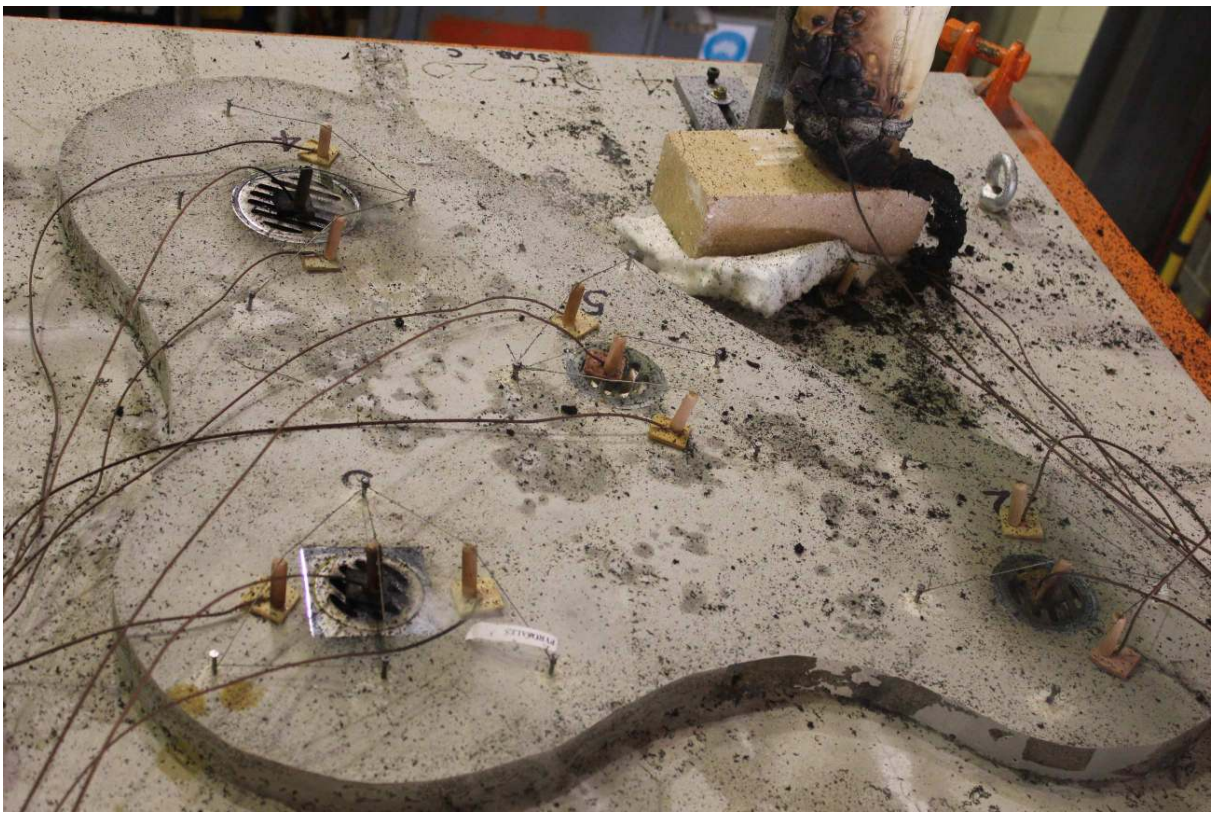


Photograph 2 – Unexposed face of the specimen prior to testing

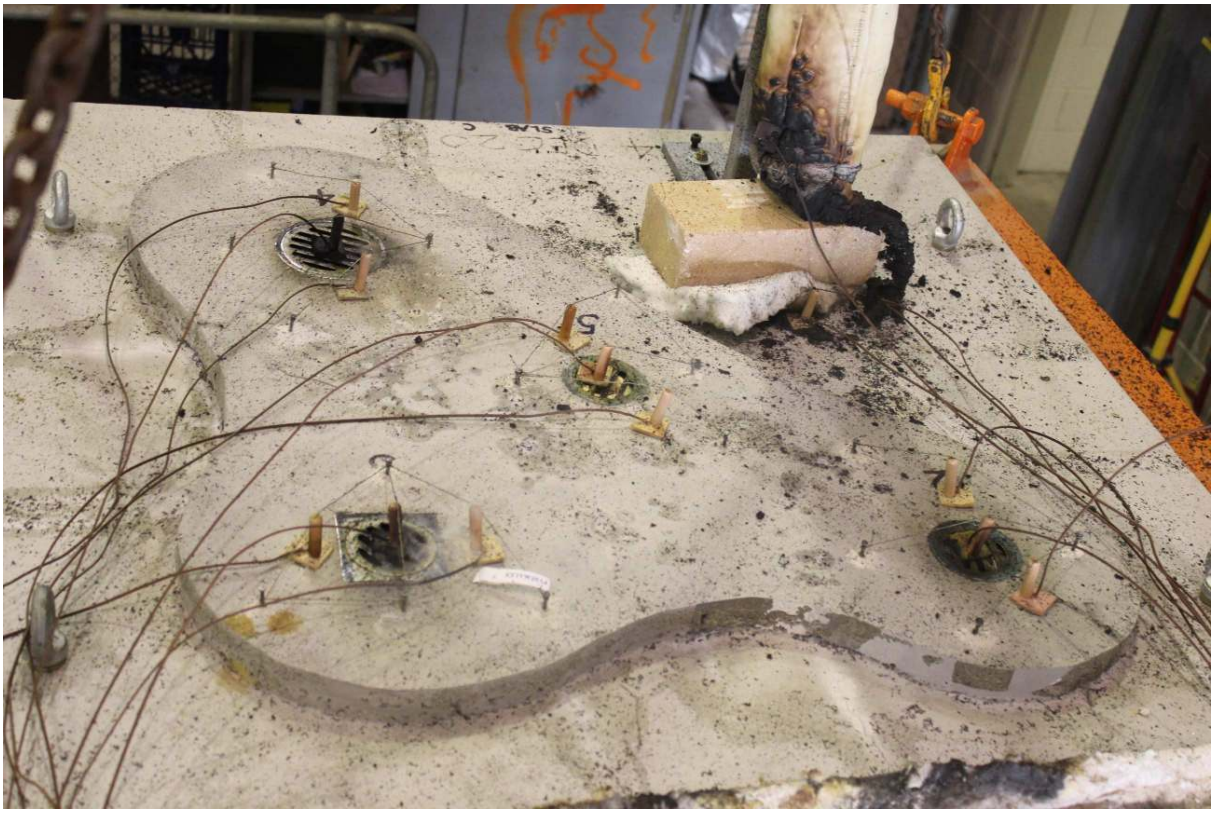


Photograph 3 – Specimens after 60 minutes of testing

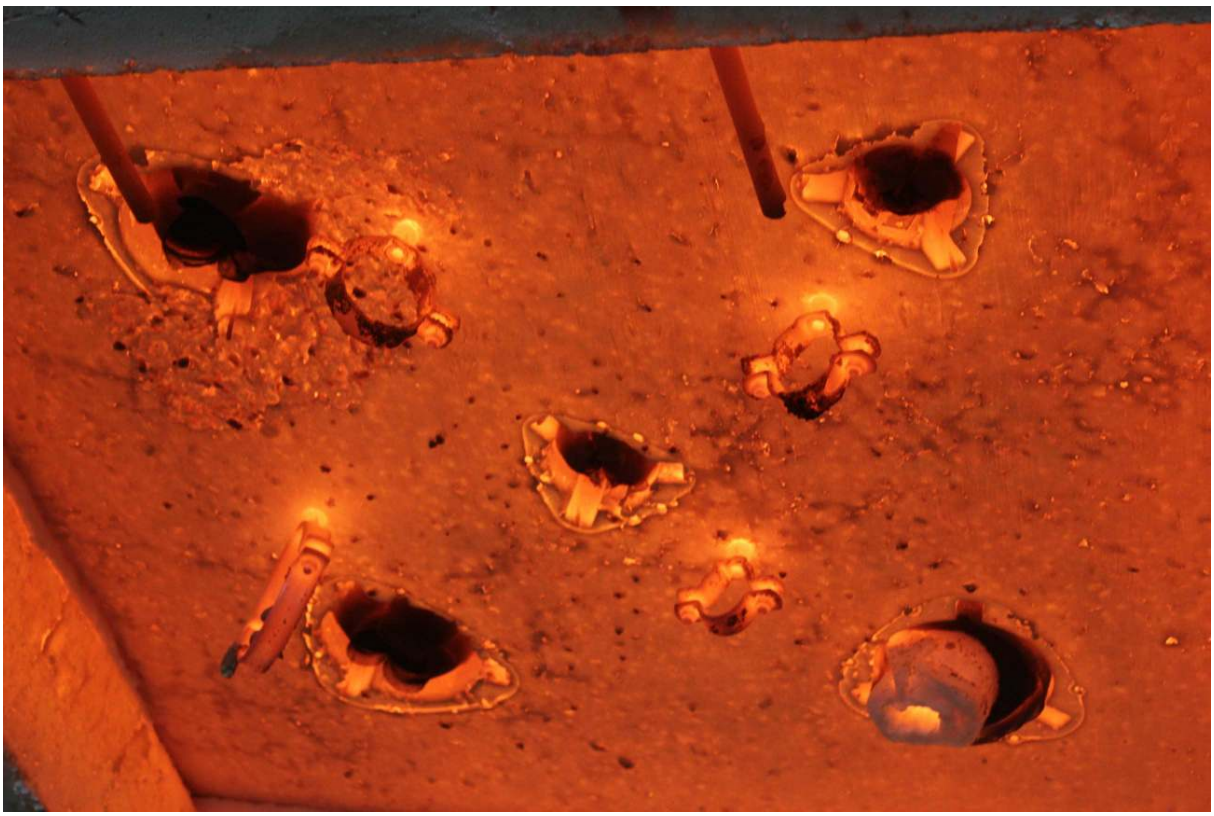
Photograph 4 – Specimens after 120 minutes of testing



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

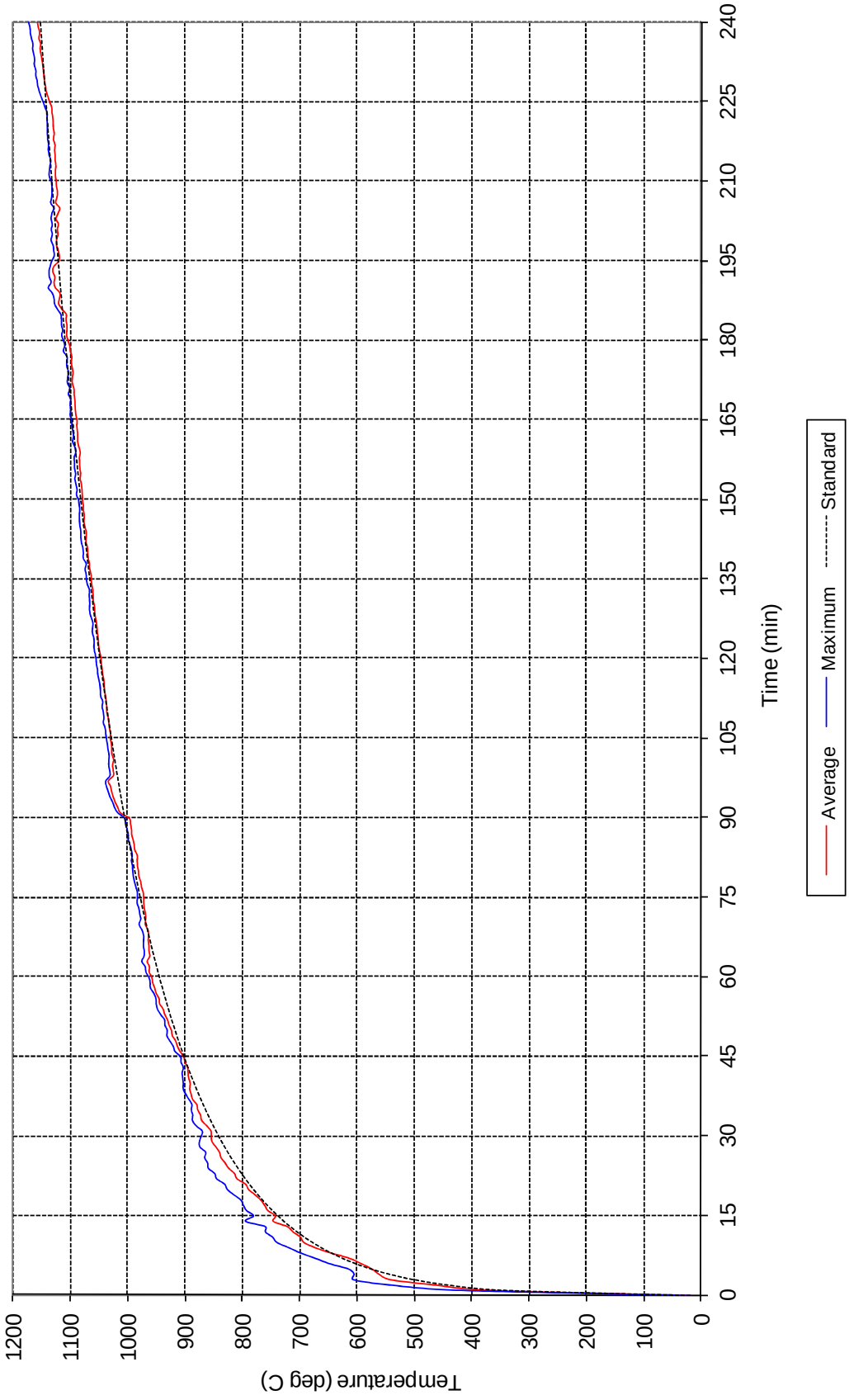


Figure 1 - Furnace temperature

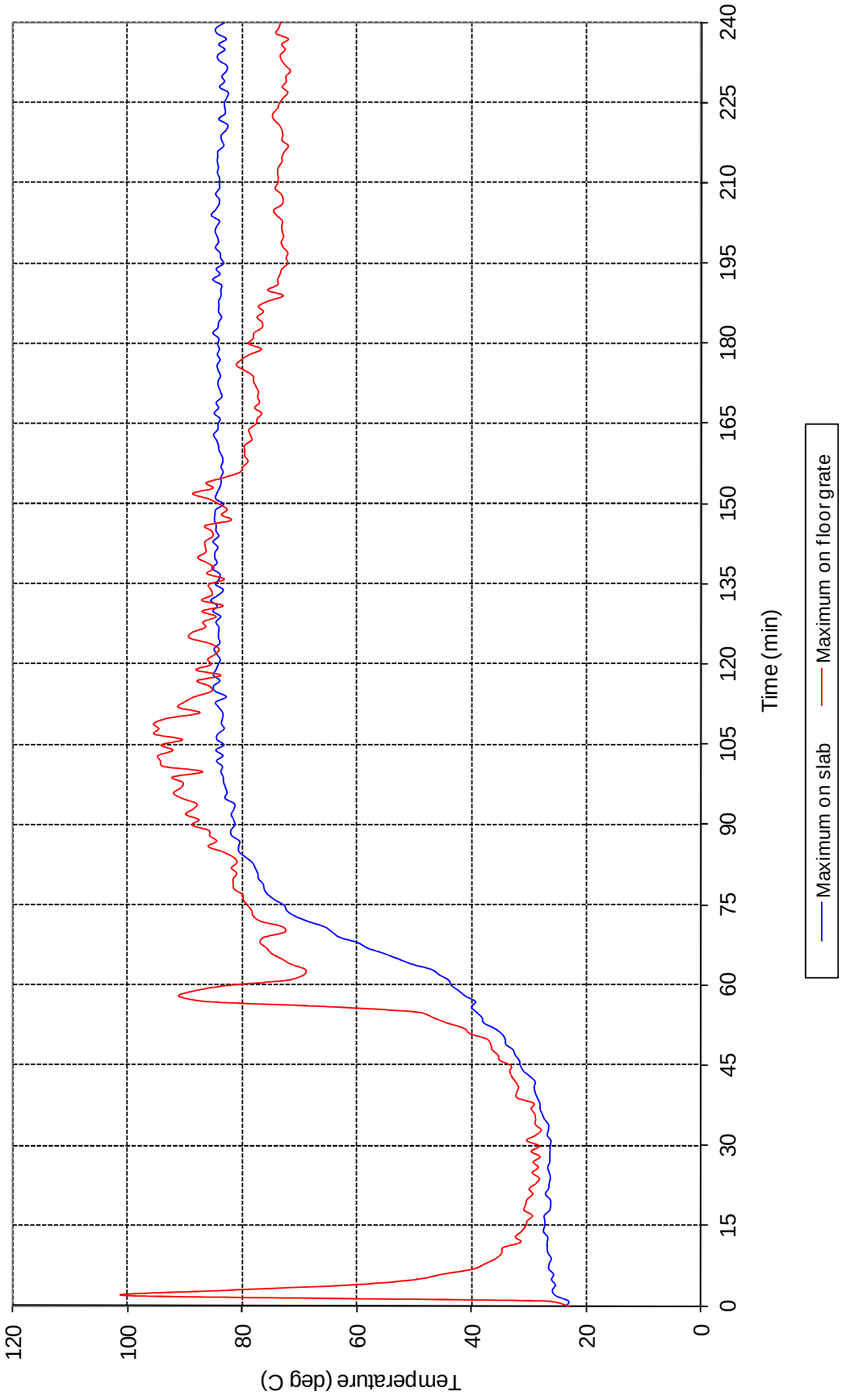


Figure 2 - Specimen temperature – Associated with Penetration 2

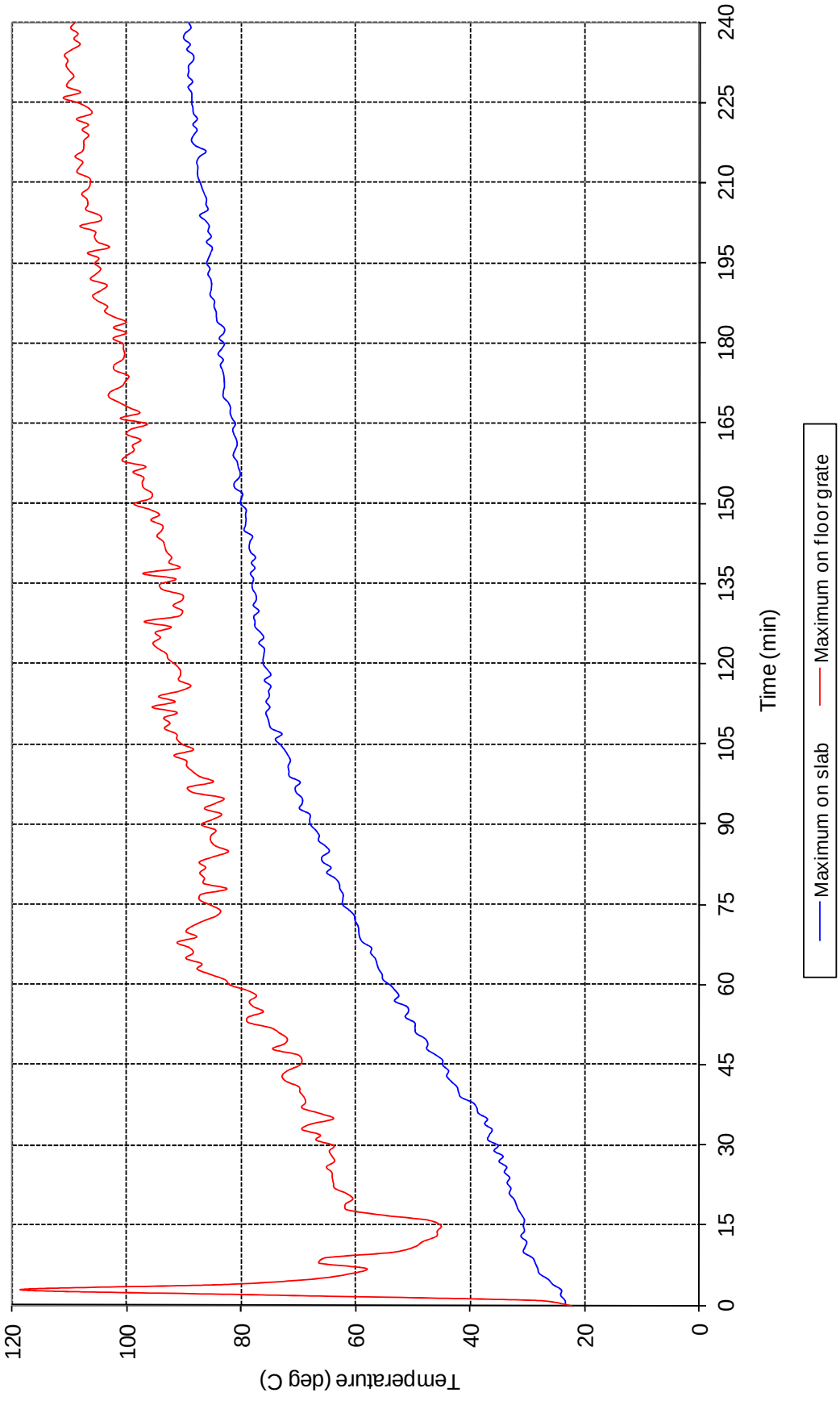


Figure 3 - Specimen temperature – Associated with Penetration 3

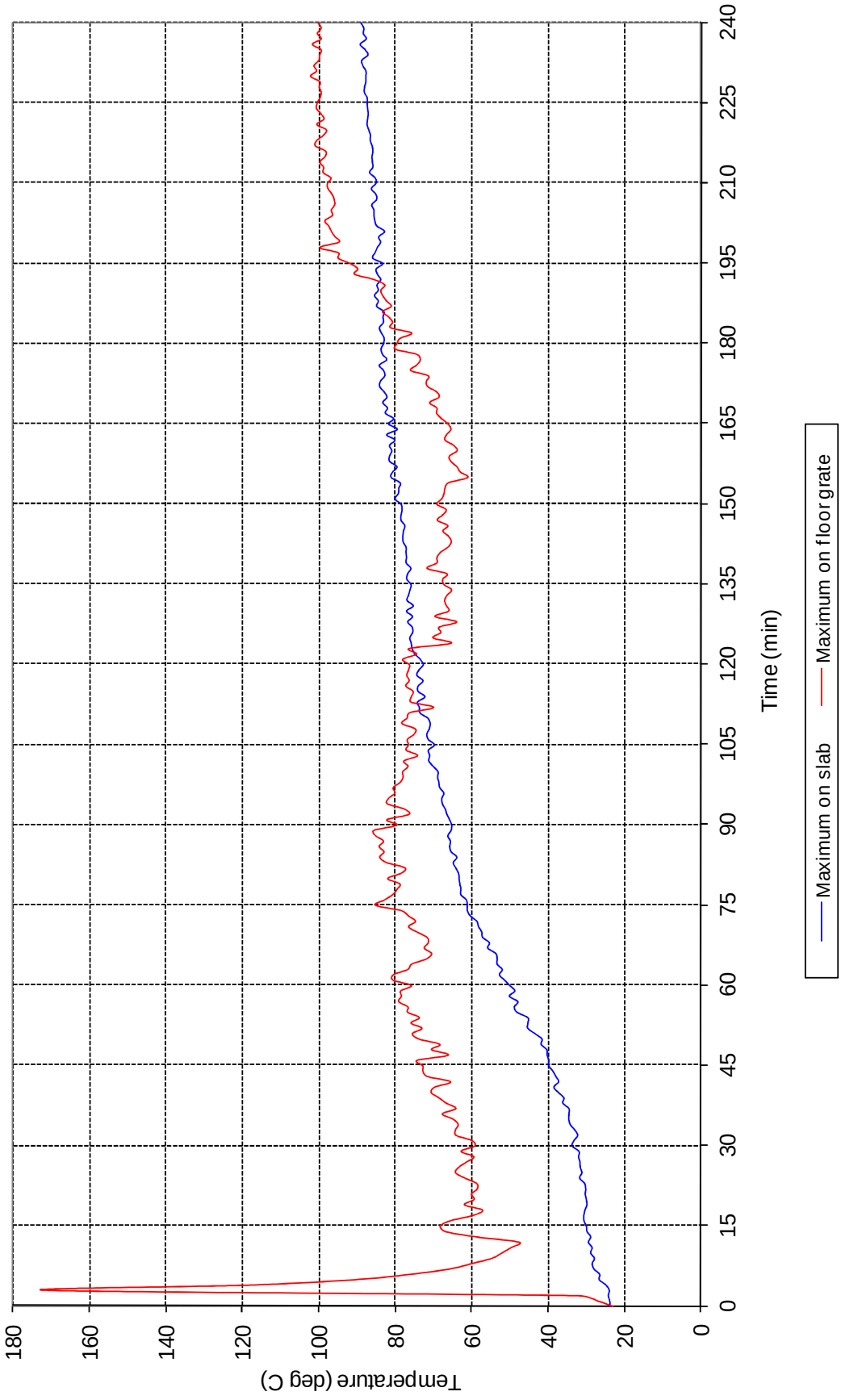


Figure 4 - Specimen temperature – Associated with Penetration 4

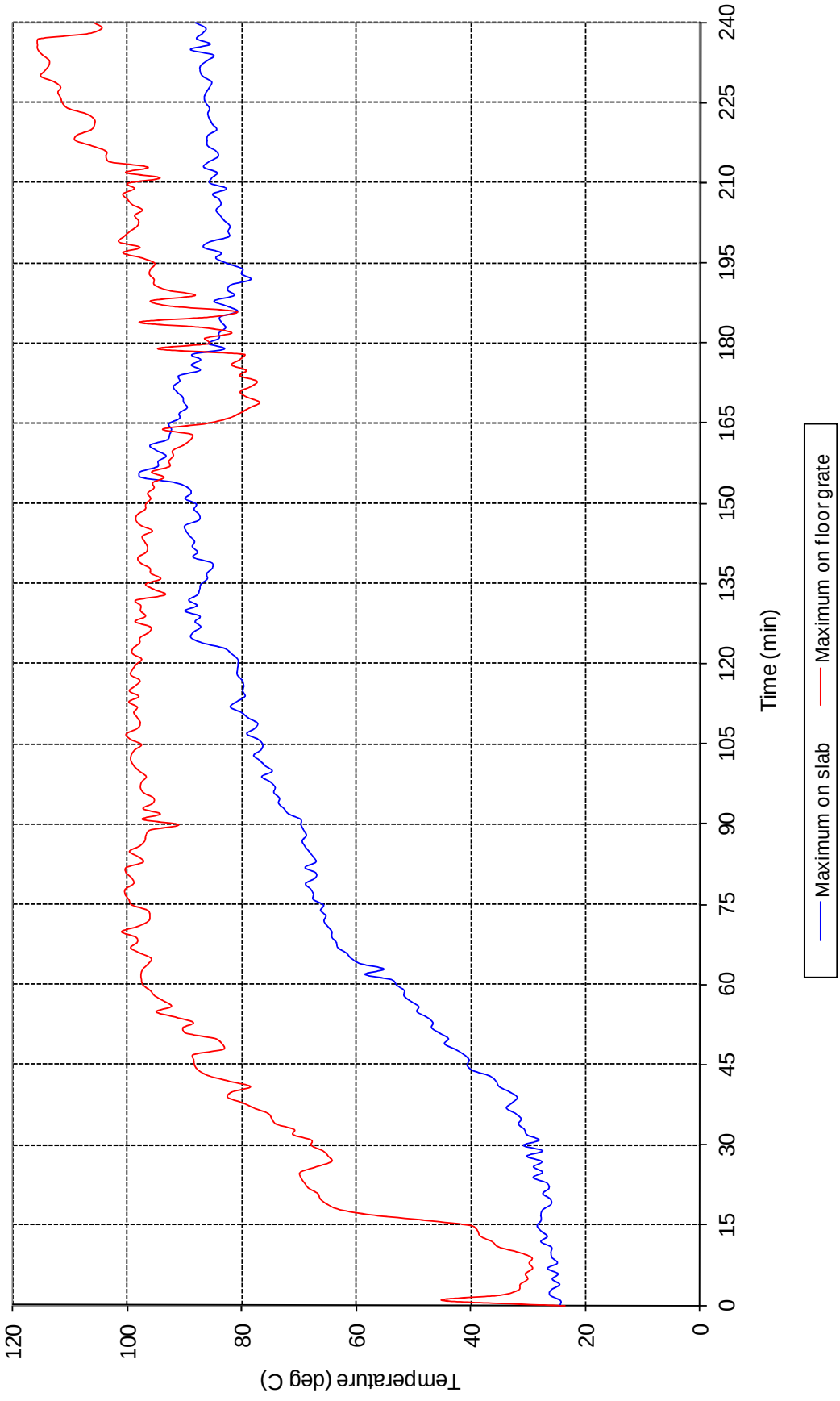
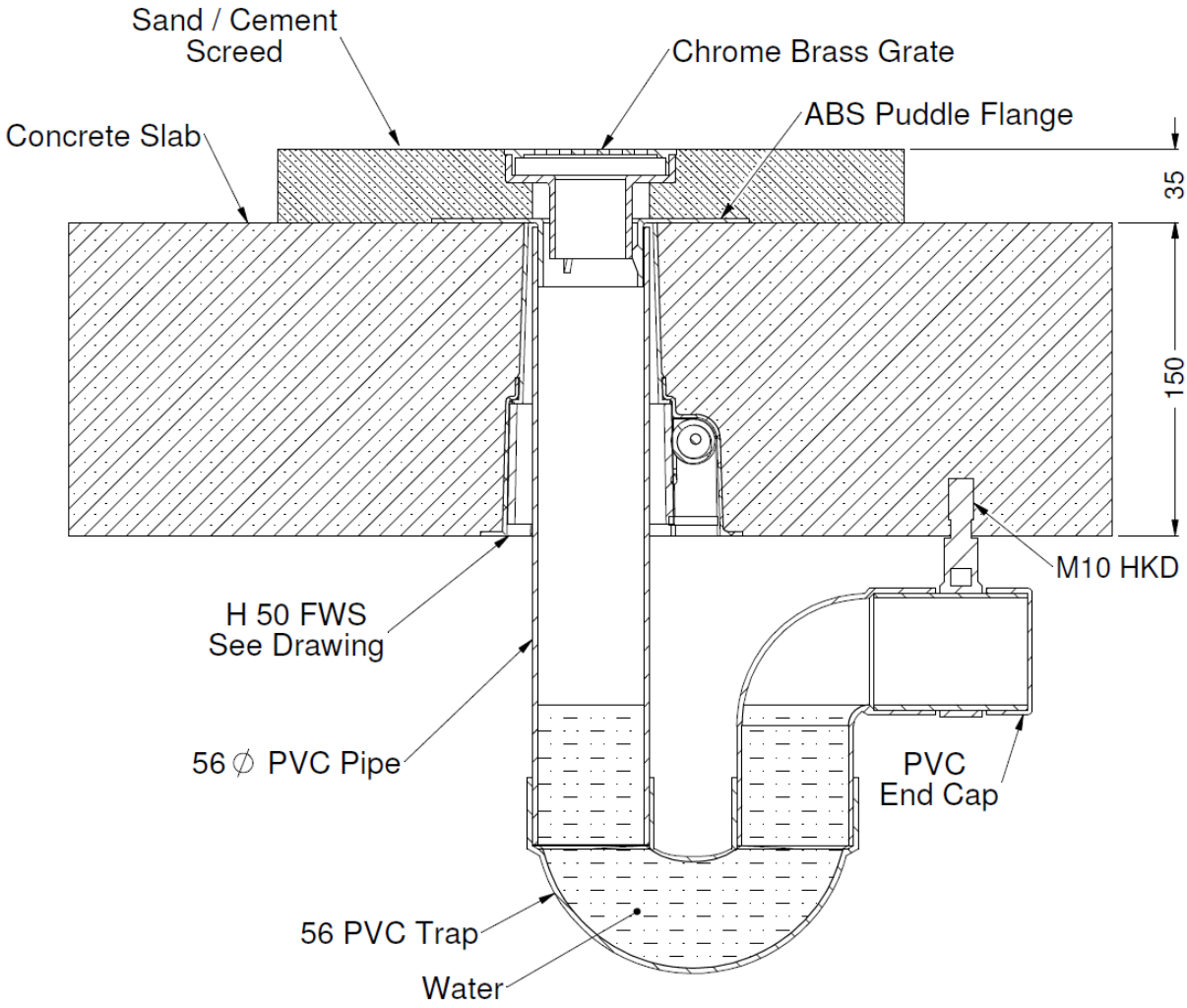


Figure 5 - Specimen temperature – Associated with Penetration 5

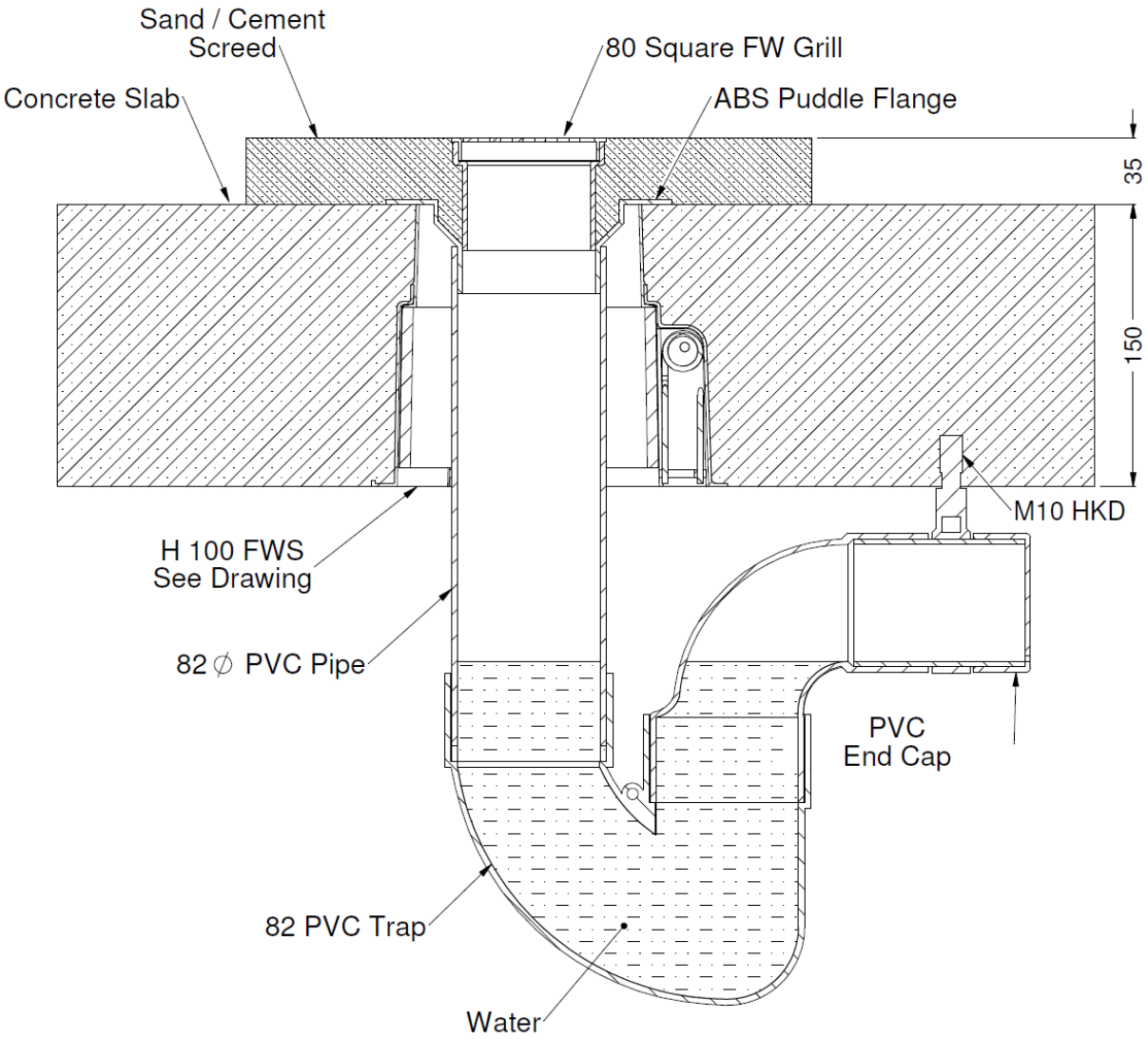
APPENDIX 4

Penetration #2
50 PVC FW - Date 02-02-2013



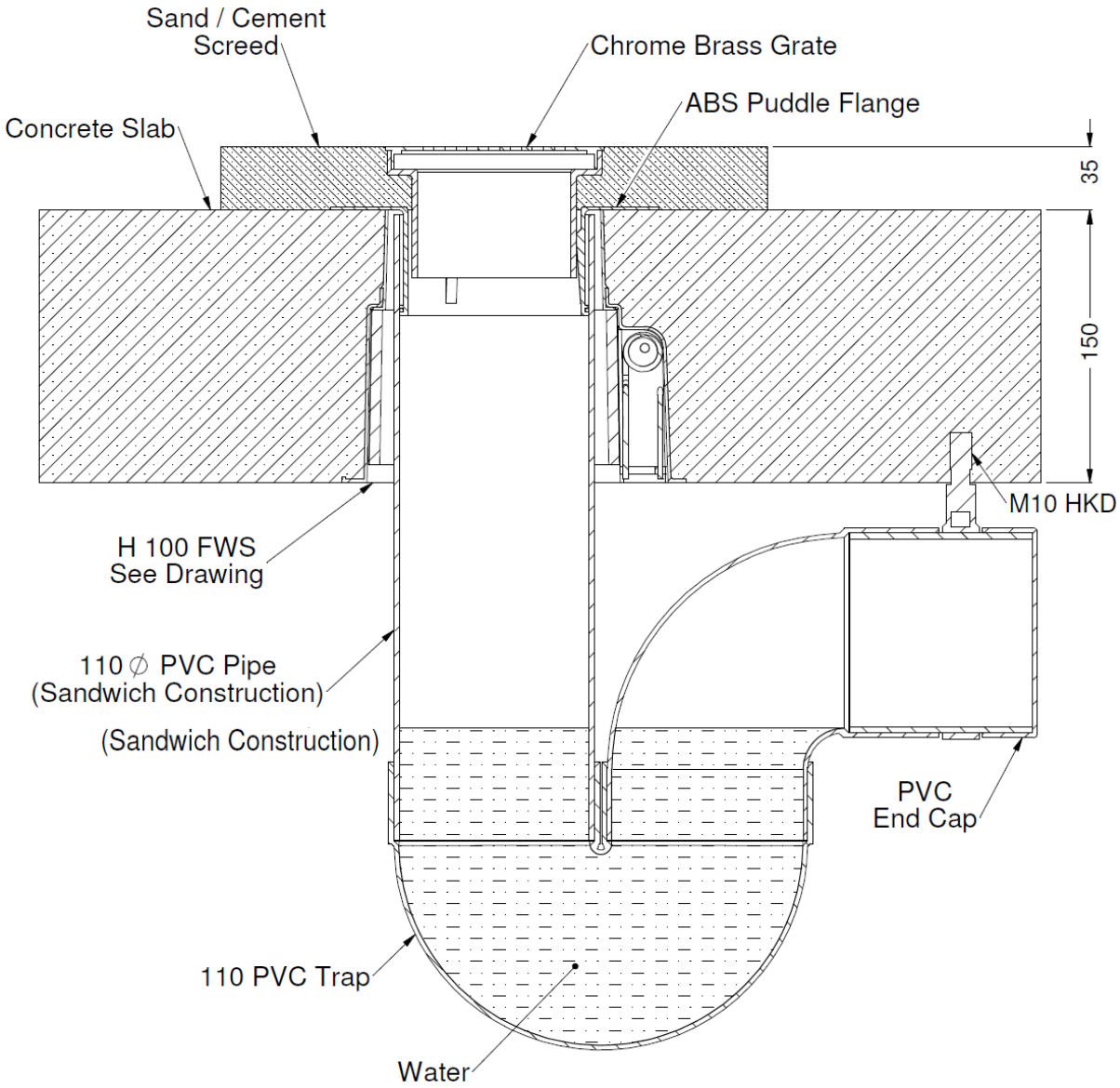
Drawing titled “Penetration #2 50 PVC FW”, dated 2 February 2013

Penetration #3
80 PVC FW - Date 02-02-2013



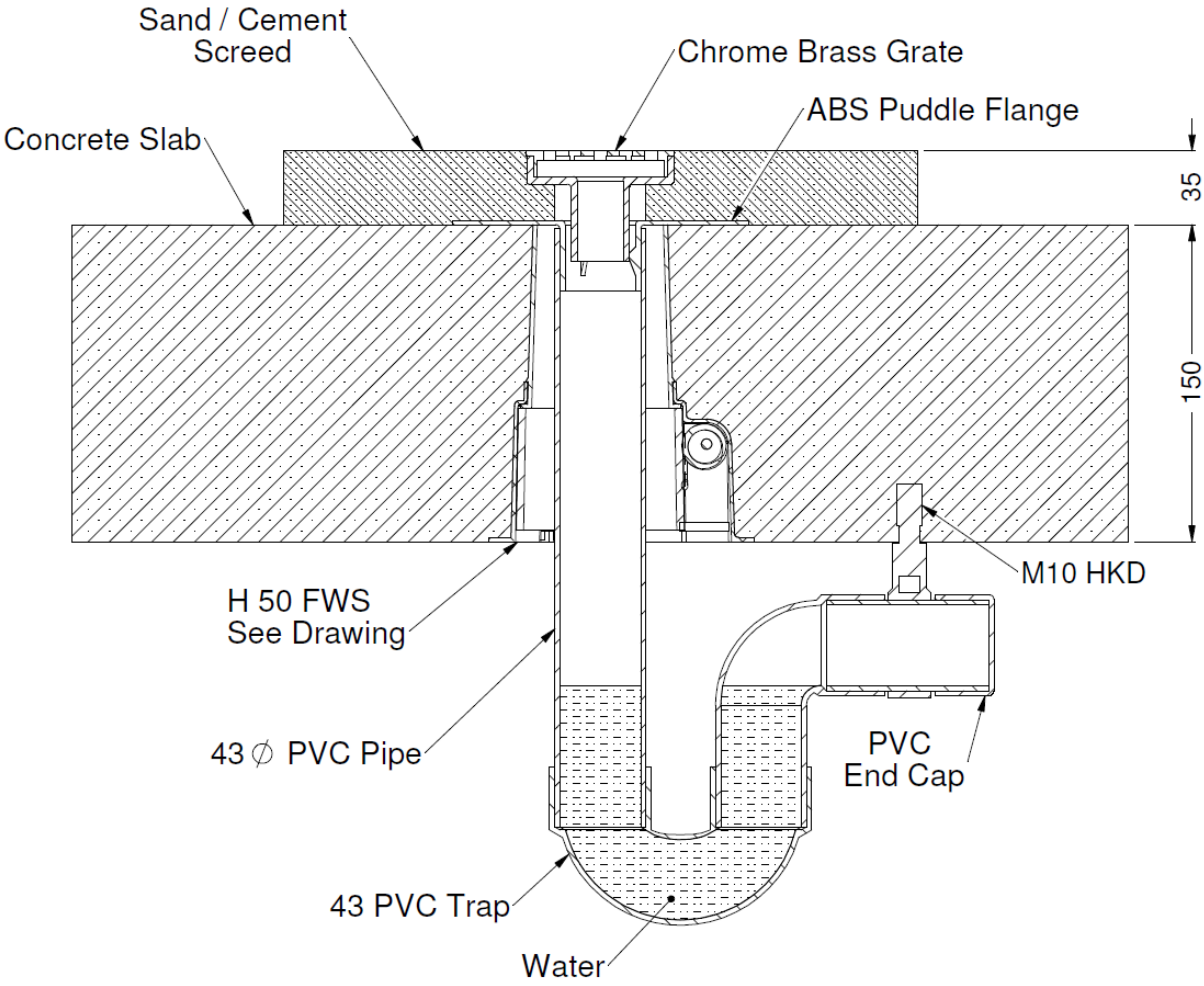
Drawing titled “Penetration #3 80 PVC FW”, dated 2 February 2013

Penetration #4
100 PVCsc FW - Date 02-02-2013

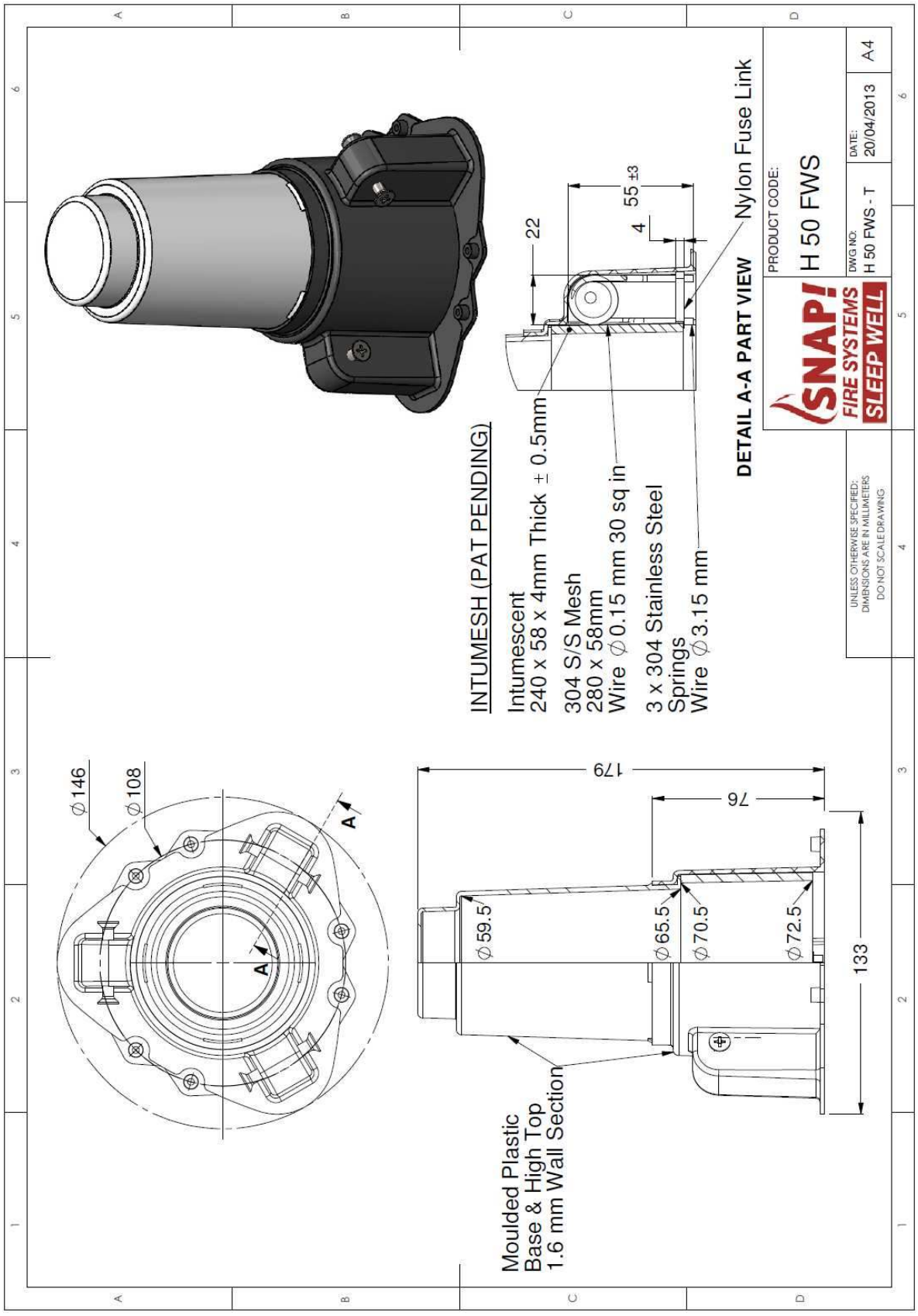


Drawing titled “Penetration #4 100 PVC FW”, dated 2 February 2013

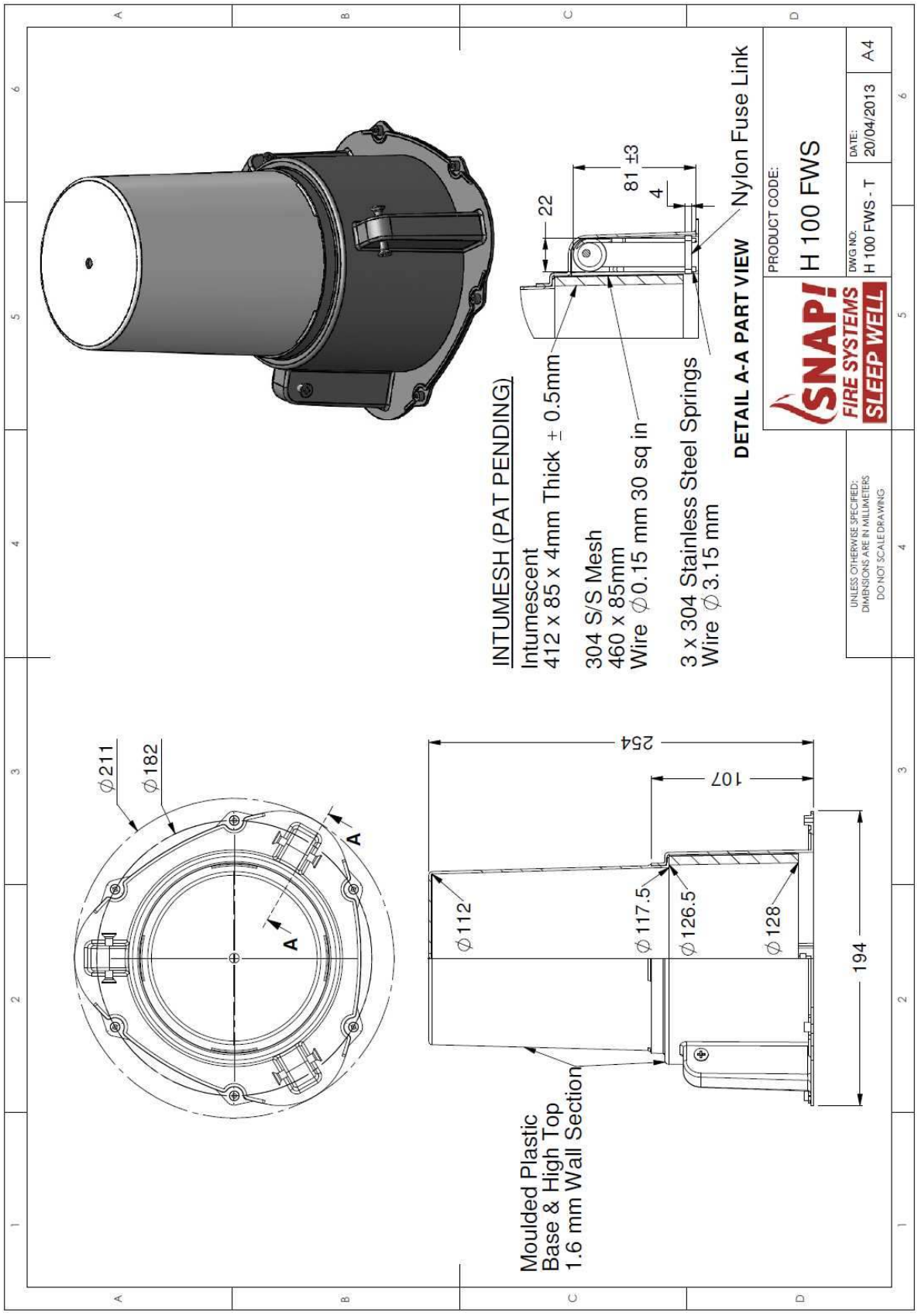
Penetration #5
40 PVC FW - Date 02-02-2013



Drawing titled “Penetration #5 40 PVC FW”, dated 2 February 2013



Drawing numbered H 50 FWS - T, dated 20/04/2013, by Snap Fire Systems



Drawing numbered H 100 FWS - T, dated 20/04/2013, by Snap Fire Systems

APPENDIX 5

Certificate of Test

No. 2469

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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 1576.

Product Name: Penetration 2 – H 50 FWS cast-in fire collar protecting a nominal 50-mm diameter Polyvinyl Chloride (PVC) pipe incorporating a floor waste

Description: The SNAP Cast-in H 50 FWS 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 FWS-T, dated 20 May 2013, by SNAP Fire Systems.

The penetrating service comprised a 56-mm OD PVC pipe, with a wall thickness of 2.2-mm fitted through the H 50 FWS cast-in Snap fire collar. The floor waste system was fitted with a 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 56-mm OD PVC gully trap was connected to the penetrating pipe, supported by M10 HKD clamp fixed to the concrete slab as shown in photograph #1. On the exposed face, the gully trap was sealed using a PVC end cap.

The floor waste gully was charged with water to the level shown in drawing titled "Penetration #2 50 PVC FW", dated 2 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: 20 February 2013.
Issued on the 12th day of April 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

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Certificate of Test

No. 2470

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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 1576.

Product Name: Penetration 3 – H 100 FWS cast-in fire collar protecting a nominal 80-mm diameter Polyvinyl Chloride (PVC) pipe incorporating a floor waste

Description: The SNAP H 100 FWS 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 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 - T, dated 20 May 2013, by SNAP Fire Systems.

The penetrating service comprised a 82.6-mm OD PVC pipe, with a wall thickness of 2.9-mm fitted through the H 100 FWS cast-in Snap fire collar. The floor waste system was fitted with a 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 an 82.6-mm OD PVC gully trap was connected to the penetrating pipe, supported by a M10 HKD clamp 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 80 PVC FW", dated 2 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: 20 February 2013.
Issued on the 12th day of April 2013 without alterations or additions.

Garry E Collins
Manager, Fire Testing and Assessments

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Certificate of Test

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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 1576.

Product Name: Penetration 4 – H 100 FWS cast-in fire collar protecting a nominal 100-mm diameter Polyvinyl Chloride (PVC) Sandwich Construction (SC) pipe incorporating a floor waste

Description: The SNAP H 100 FWS 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 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 - T, dated 20 May 2013, by SNAP Fire Systems.

The penetrating service comprised a 110-mm OD Sandwich Construction PVC pipe, with a wall thickness of 3.5-mm fitted through the H 100 FWS cast-in Snap fire collar. The floor waste system was fitted 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 110-mm OD PVC gully trap was connected to the penetrating pipe, supported by a M10 HKD clamp 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 #4 100 PVC FW", dated 2 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: 20 February 2013.
Issued on the 12th day of April 2013 without alterations or additions.

Garry E Collins
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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 1576.

Product Name: Penetration 5 – H 50 FWS cast-in fire collar protecting a 40-mm Polyvinyl Chloride (PVC) pipe incorporating a floor waste

Description: The SNAP Cast-in H 50 FWS 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 FWS-T, dated 20 May 2013, by SNAP Fire Systems.

The penetrating service comprised a 42.9-mm OD PVC pipe, with a wall thickness of 2.7-mm fitted through the H 50 FWS 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 42.9-mm OD PVC gully trap was connected to the penetrating pipe, supported by a M10 HKD clamp 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 #4 40 PVC FW", dated 2 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: 20 February 2013.
Issued on the 12th day of April 2013 without alterations or additions.

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