

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

**Report number FSP 1340
CSIRO job number SP3195
Date of issue 27 FEBRUARY 2009**

**Client
SNAP FIRE SYSTEMS PTY LTD**

Commercial-in-confidence



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Table of Contents

SUMMARY	5
<i>IDENTIFICATION OF SPECIMEN:</i>	5
<i>SPONSOR:</i>	5
<i>MANUFACTURER:</i>	5
<i>TEST STANDARD:</i>	5
<i>TEST NUMBER:</i>	5
<i>TEST DATE:</i>	5
<i>DESCRIPTION OF SPECIMEN:</i>	5
GENERAL.....	5
Penetration 1 – Cast-in SNAPH50GAS fire collar protecting a nominal 40-mm REHAU PEX-AL-PE gas pipe.....	6
Penetration 2 – Retrofit SNAP50GAS fire collar protecting a nominal 40-mm REHAU PEX-AL-PE gas pipe.....	6
Penetration 3 – Cast-in SNAPH50GAS fire collar protecting a nominal 50-mm IPLEX PE-AL-PE gas pipe.....	6
Penetration 4 – Cast-in SNAPH50GAS fire collar protecting a nominal 32-mm IPLEX PE-AL-PE gas pipe.....	7
Penetration 5 – Retrofit SNAP63GAS fire collar protecting a nominal 63-mm GASPEX PEX-AL-PEX gas pipe.....	7
Penetration 6 – Cast-in SNAPH50GAS fire collar protecting a nominal 32-mm GASPEX PEX-AL-PEX gas pipe.....	8
Penetration 7 – Cast-in SNAPH50GAS fire collar protecting a nominal 50-mm GASPEX PEX-AL-PEX gas pipe.....	8
<i>DOCUMENTATION:</i>	9
<i>EQUIPMENT:</i>	9
<i>AMBIENT TEMPERATURE:</i>	10
<i>DEPARTURE FROM STANDARD:</i>	10
<i>TERMINATION OF TEST:</i>	10
<i>TEST RESULTS:</i>	10
CRITICAL OBSERVATIONS.....	10
FURNACE TEMPERATURE.....	11
SPECIMEN TEMPERATURE.....	11
PERFORMANCE.....	12
<i>FIRE-RESISTANCE LEVEL (FRL):</i>	13
APPENDICES	15
<i>APPENDIX 1</i>	15
Photograph 1 – Exposed face of the specimen prior to testing.....	15
Photograph 2 – Unexposed face of the specimen prior to testing.....	15
Photograph 3 – End of pipes after 8 minutes of testing.....	16
Photograph 4 – Specimen after 31 minutes of testing.....	16
Photograph 5 – Specimen after 60 minutes of testing.....	17
Photograph 6 – Specimen after 120 minutes of testing.....	17
Photograph 7 – Specimen after 180 minutes of testing.....	18
Photograph 8 – Specimen at the conclusion of testing.....	18
Photograph 9 – Pipe 1 at the conclusion of testing.....	19
Photograph 10 – Pipe 2 at the conclusion of testing.....	19
Photograph 11 – Pipe 3 at the conclusion of testing.....	20
Photograph 12 – Pipe 4 at the conclusion of testing.....	20
Photograph 13 – Pipe 7 at the conclusion of testing.....	21



Photograph 14 – Exposed face after the conclusion of testing.....	21
<i>APPENDIX 2</i>	22
Figure 1 - Furnace temperature.....	22
Figure 2 - Specimen temperature – Penetration 1.....	23
Figure 3 - Specimen temperature – Penetration 2.....	24
Figure 4 - Specimen temperature – Penetration 3.....	25
Figure 5 - Specimen temperature – Penetration 4.....	26
Figure 6 - Specimen temperature – Penetration 5.....	27
Figure 7 - Specimen temperature – Penetration 6.....	28
Figure 8 - Specimen temperature – Penetration 7.....	29
<i>APPENDIX 3</i>	30
Specification numbered TESTLAB-1, dated November 2008 by Snap Fire Systems.....	30
Specification numbered SNAP63GAS, dated 06 November 2008 by Snap Fire Systems.....	31
Specification numbered SNAP50GAS, dated 07 November 2008 by Snap Fire Systems.....	32
Specification numbered SNAPH50GAS, dated 06 November 2008 by Snap Fire Systems.....	33
Specification numbered SNAPGASRANGE, dated 07 November 2008 by Snap Fire Systems.....	34
<i>APPENDIX 4</i>	35
Copy of Certificate of Test - No.2115.....	35
Copy of Certificate of Test - No.2116.....	36
Copy of Certificate of Test - No.2117.....	37
Copy of Certificate of Test - No.2118.....	38
Copy of Certificate of Test - No.2119.....	39
Copy of Certificate of Test - No.2120.....	40
Copy of Certificate of Test - No.2121.....	41

SPONSORED INVESTIGATION No. FSP 1340**FIRE-RESISTANCE TEST ON FIRE COLLARS PROTECTING A
CONCRETE SLAB PENETRATED BY SERVICES.****SUMMARY****IDENTIFICATION OF SPECIMEN:**

The sponsor identified the specimen as Snap Fire Collars protecting a concrete slab penetrated by seven gas pipes of various constructions.

SPONSOR: Snap Fire Systems Pty Ltd
Unit 3, 26 Navigator Place
Hendra QLD

MANUFACTURER: Snap Fire Systems Pty Ltd
Unit 3, 26 Navigator Place
Hendra 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.

TEST NUMBER: FS 4036/3195

TEST DATE: The fire-resistance test was conducted on 11 November 2008.

DESCRIPTION OF SPECIMEN:**GENERAL**

The specimen comprised a 1150-mm x 1150-mm x 150-mm thick reinforced concrete slab penetrated by seven gas pipes of various constructions protected by retro-fitted and cast-in Snap Fire System fire collars. The fire collars were fixed to the underside of the existing reinforced concrete slab by mechanical anchors.

For the purpose of the test, the specimens were referenced as Penetrations 1, 2, 3, 4, 5, 6, and 7.



Penetration 1 – Cast-in SNAPH50GAS fire collar protecting a nominal 40-mm REHAU PEX-AL-PE gas pipe

The SNAPH50GAS, fire collar consisted of a galvanised steel case 82-mm diameter x 90-mm high, with a single spring pocket and a 115-mm diameter base plate screwed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide and 200-mm long. Between the wraps was a layer 0.15-mm thick x 85-mm wide of stainless steel mesh. The cast-in collar had a plastic hightop making the overall height of the collar 205-mm high. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 40-mm REHAU PEX-AL-PE gas pipe penetrating the concrete slab through the cast in collar. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 2 – Retrofit SNAP50GAS fire collar protecting a nominal 40-mm REHAU PEX-AL-PE gas pipe

The SNAP50GAS, fire collar consisted of a galvanised steel case 82-mm diameter x 90-mm high, with a single spring. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide and 200-mm long. Between the wraps was a layer 0.15-mm thick x 85-mm wide of stainless steel mesh. The collar was fixed to the underside of the concrete slab with 6-mm diameter mechanical anchors fitted through 8-mm diameter holes in four brackets screw fixed to the case of the collar.

The penetrating service comprised a nominally 40-mm REHAU PEX-AL-PE gas pipe penetrating an oversized hole cored through the concrete slab. Once the pipe was fitted through the hole and restrained, the resulting gap around the pipe was backfilled flush with both sides of the concrete slab using a quick drying cement. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 3 – Cast-in SNAPH50GAS fire collar protecting a nominal 50-mm IPLEX PE-AL-PE gas pipe

The SNAPH50GAS, fire collar consisted of a galvanised steel case 82-mm diameter x 90-mm high, with a single spring pocket and a 115-mm diameter base plate screwed to the case. The single spring is

pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide and 200-mm long. Between the wraps was a layer 0.15-mm thick x 85-mm wide of stainless steel mesh. The cast-in collar had a plastic hightop making the overall height of the collar 205-mm high. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 50-mm IPLEX PE-AL-PE gas pipe penetrating the concrete slab through the cast in collar. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 4 – Cast-in SNAPH50GAS fire collar protecting a nominal 32-mm IPLEX PE-AL-PE gas pipe

The SNAPH50GAS, fire collar consisted of a galvanised steel case 82-mm diameter x 90-mm high, with a single spring pocket and a 115-mm diameter base plate screwed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide and 200-mm long. Between the wraps was a layer 0.15-mm thick x 85-mm wide of stainless steel mesh. The cast-in collar had a plastic hightop making the overall height of the collar 205-mm high. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 32-mm IPLEX PE-AL-PE gas pipe penetrating the concrete slab through the cast in collar. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 5 – Retrofit SNAP63GAS fire collar protecting a nominal 63-mm GASPEX PEX-AL-PEX gas pipe

The SNAP63GAS, fire collar consisted of a galvanised steel case 95-mm diameter 95-mm high, with a single spring pocket and a 125-mm diameter base plate screwed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Three soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide. Between the wraps were two layers of 0.15-mm thick x 85-mm wide Stainless steel mesh. The collar was fixed to the underside of the concrete slab with 6-mm diameter mechanical

anchors fitted through 8-mm diameter holes in four brackets screw fixed to the case of the collar.

The penetrating service comprised a nominally 63-mm GASPEX PEX-AL-PEX gas pipe penetrating an oversized hole cored through the concrete slab. Once the pipe was fitted through the hole and restrained, the resulting gap around the pipe was backfilled flush with both sides of the concrete slab using a quick drying cement. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 6 – Cast-in SNAP50GAS fire collar protecting a nominal 32-mm GASPEX PEX-AL-PEX gas pipe

The SNAP50GAS, fire collar consisted of a galvanised steel case 82-mm diameter x 90-mm high, with a single spring pocket and a 115-mm diameter base plate screwed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide and 200-mm long. Between the wraps was a layer 0.15-mm thick x 85-mm wide of stainless steel mesh. The cast-in collar had a plastic hightop making the overall height of the collar 205-mm high. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 32-mm GASPEX PEX-AL-PEX gas pipe penetrating the concrete slab through the cast in collar. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 7 – Cast-in SNAP50GAS fire collar protecting a nominal 50-mm GASPEX PEX-AL-PEX gas pipe

The SNAP50GAS, fire collar consisted of a galvanised steel case 82-mm diameter x 90-mm high, with a single spring pocket and a 115-mm diameter base plate screwed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide and 200-mm long. Between the wraps was a layer 0.15-mm thick x 85-mm wide of stainless steel mesh. The cast-in collar had a plastic hightop making the overall height of the collar 205-mm high. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 50-mm GASPEX PEX-AL-PEX gas pipe penetrating the concrete slab through the cast in collar. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

DIMENSIONS

The overall dimensions of the concrete slab was 1150-mm square, 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.

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 numbered TESTLAB-1, dated November 2008, by Snap Fire Systems.

Drawings numbered SNAP63GAS and SNAPH50GAS, both dated 6 november 2008, by Snap Fire Systems.

Drawing numbered SNAP50GAS and SNAPGASRANGE, both dated 7 november 2008, 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.

PRESSURE

The furnace pressure was measured by a differential low-pressure transducer with a range of ± 50 Pa.

MEASUREMENT SYSTEM

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

AMBIENT TEMPERATURE:

The temperature of the test area was 19°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:

- 4 minutes - Smoke from furnace flues
- 6 minutes - Large amount of smoke from furnace flues no visible fluing from pipes.
- 8 minutes - Pipe 1, 2 and 6 fluing from unexposed end, pipe 1 has a small amount of smoke only.
- 9 minutes - Pipe 7 is now fluing a small amount of smoke. Smoke reducing from pipe 2.
- 10 minutes - Small amount of smoke from pipes 3 and 6.
- 11 minutes - Large amount of smoke from pipe 1 and 3, small amount from 6.
- 12 minutes - Smoke reduced from pipe 1, smoke increased from 1 again and from pipe 7.



- 13 minutes - Pipes 1 and 3 fluing a large amount of smoke, small amount from 7.
- 15 minutes - Large amount of smoke from pipes 1, 3 and 7.
- 19 minutes - Pipe 3 has deformed at base near slab.
- 21 minutes - Pipes 1, 3 and 7 are still fluing smoke.
- 25 minutes - Smoke quantity reduced from pipes 3 and 7.
- 26 minutes - Moisture visible at base of pipes 2 and 5.
- 31 minutes - Pipe 4 is starting to flue smoke. Moisture is forming around the base of pipes 2 and 5.
- 60 minutes - Light smoke is emitted from pipes 1 and 2.
- 90 minutes - Light smoke is emitted from pipes 1 and 2.
- 120 minutes - Light smoke is emitted from pipe 2 only.
- 180 minutes - Light smoke is emitted from pipes 2 and 5.
- 210 minutes - Pipes 1, 6 and 7 have visible deformation at base of pipe.
- 230 minutes - Pipes 2 and 5 are still emitting smoke from the unexposed end.
- 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 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.

Figure 7 shows the curve of maximum temperature versus time associated with Penetration 6.

Figure 8 shows the curve of maximum temperature versus time associated with Penetration 7.

PERFORMANCE

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

Penetration 1 – Cast-in SNAP50GAS fire collar protecting a nominal 40-mm REHAU PEX-AL-PE gas pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	212 minutes

Penetration 2 – Retrofit SNAP50GAS fire collar protecting a nominal 40-mm REHAU PEX-AL-PE gas pipe

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

Penetration 3 – Cast-in SNAP50GAS fire collar protecting a nominal 50-mm IPLEX PE-AL-PE gas pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	17 minutes

Penetration 4 – Cast-in SNAP50GAS fire collar protecting a nominal 32-mm IPLEX PE-AL-PE gas pipe

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

Penetration 5 – Retrofit SNAP63GAS fire collar protecting a nominal 63-mm GASPEX PEX-AL-PEX gas pipe

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

Penetration 6 – Cast-in SNAP50GAS fire collar protecting a nominal 32-mm IPLEX PEX-AL-PEX gas pipe

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

Penetration 7 – Cast-in SNAP50GAS fire collar protecting a nominal 50-mm IPLEX PEX-AL-PEX gas pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	230 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	-	-/240/180;
Penetration 2	-	-/240/240;
Penetration 3	-	-/240/0;
Penetration 4	-	-/240/240;
Penetration 5	-	-/240/240;
Penetration 6	-	-/240/240 and
Penetration 7	-	-/240/180;

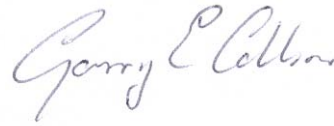
For the purposes of AS 1530.4-2005 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions.



TESTED BY:



Chris Wojcik
Testing Officer



Garry E Collins
Manager, Fire Testing and Assessments

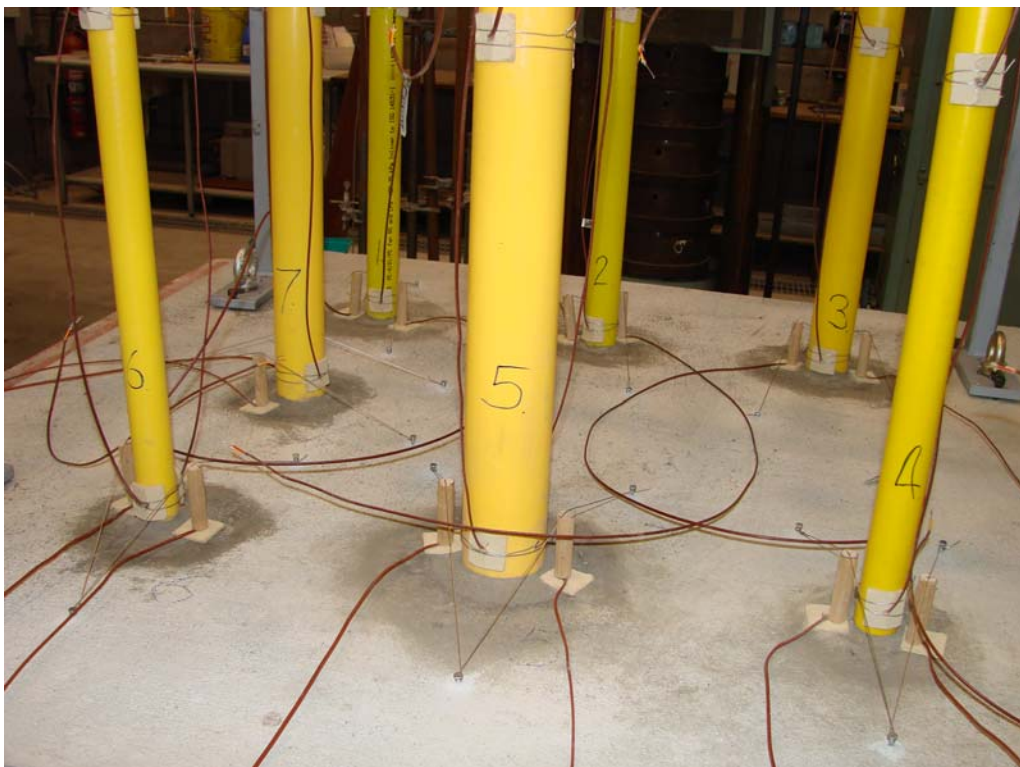
27 February 2009

APPENDICES

APPENDIX 1



Photograph 1 – Exposed face of the specimen prior to testing



Photograph 2 – Unexposed face of the specimen prior to testing



Photograph 3 – End of pipes after 8 minutes of testing



Photograph 4 – Specimen after 31 minutes of testing



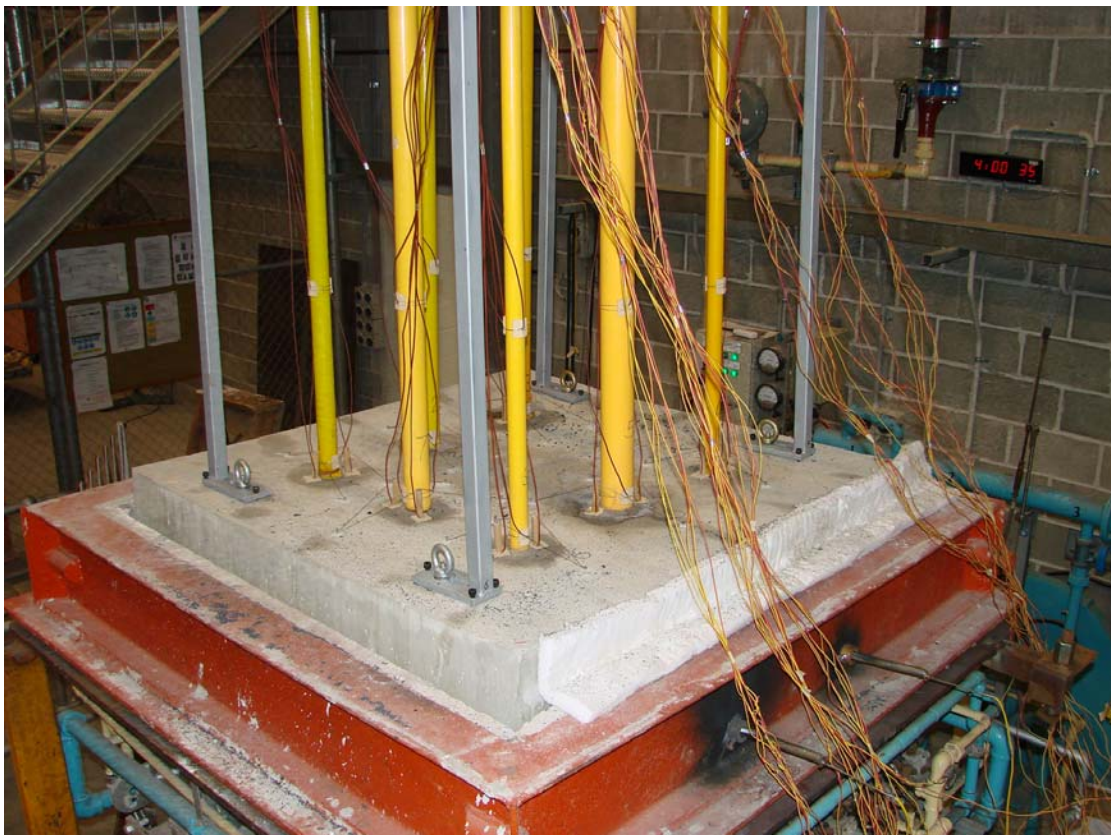
Photograph 5 – Specimen after 60 minutes of testing



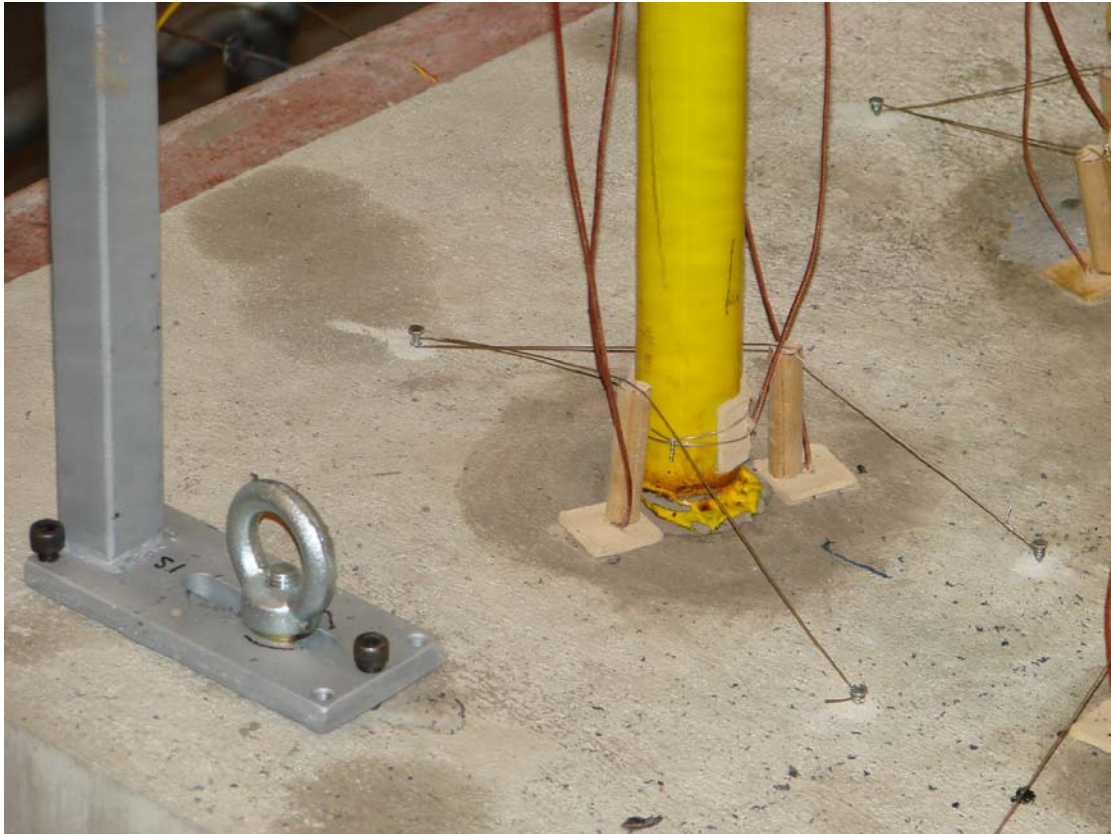
Photograph 6 – Specimen after 120 minutes of testing



Photograph 7 – Specimen after 180 minutes of testing



Photograph 8 – Specimen at the conclusion of testing



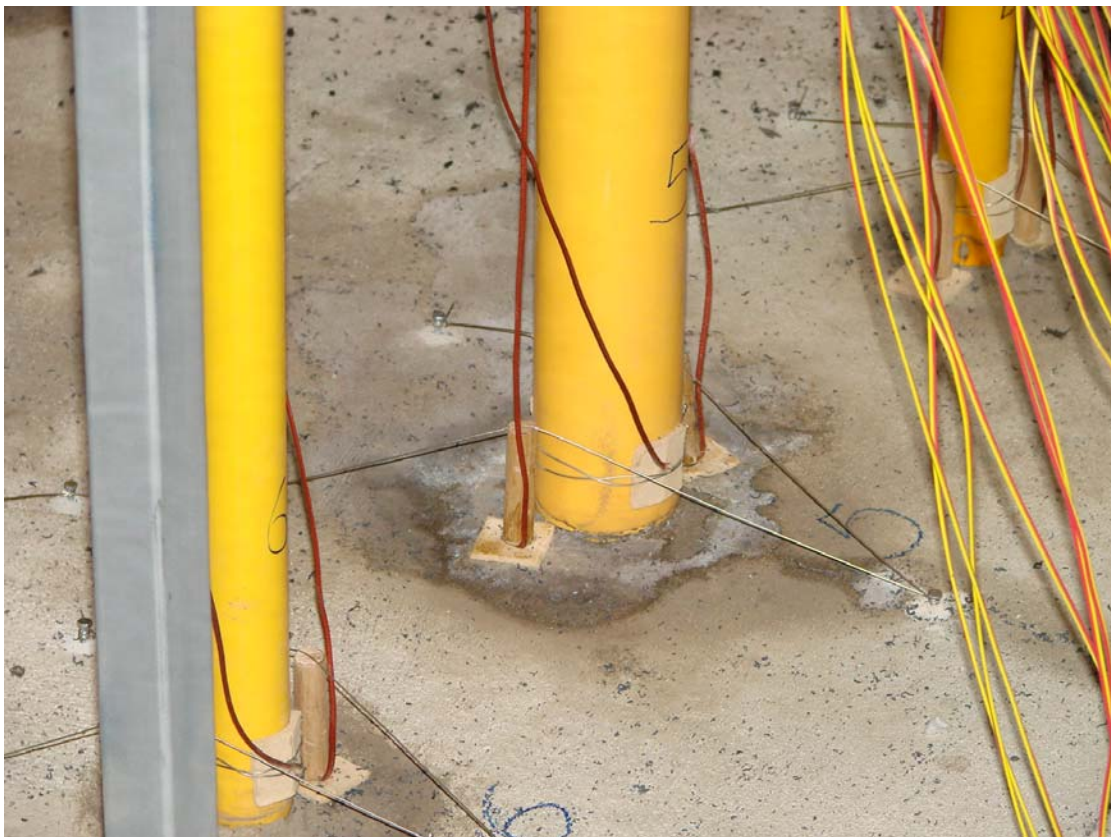
Photograph 9 – Pipe 1 at the conclusion of testing



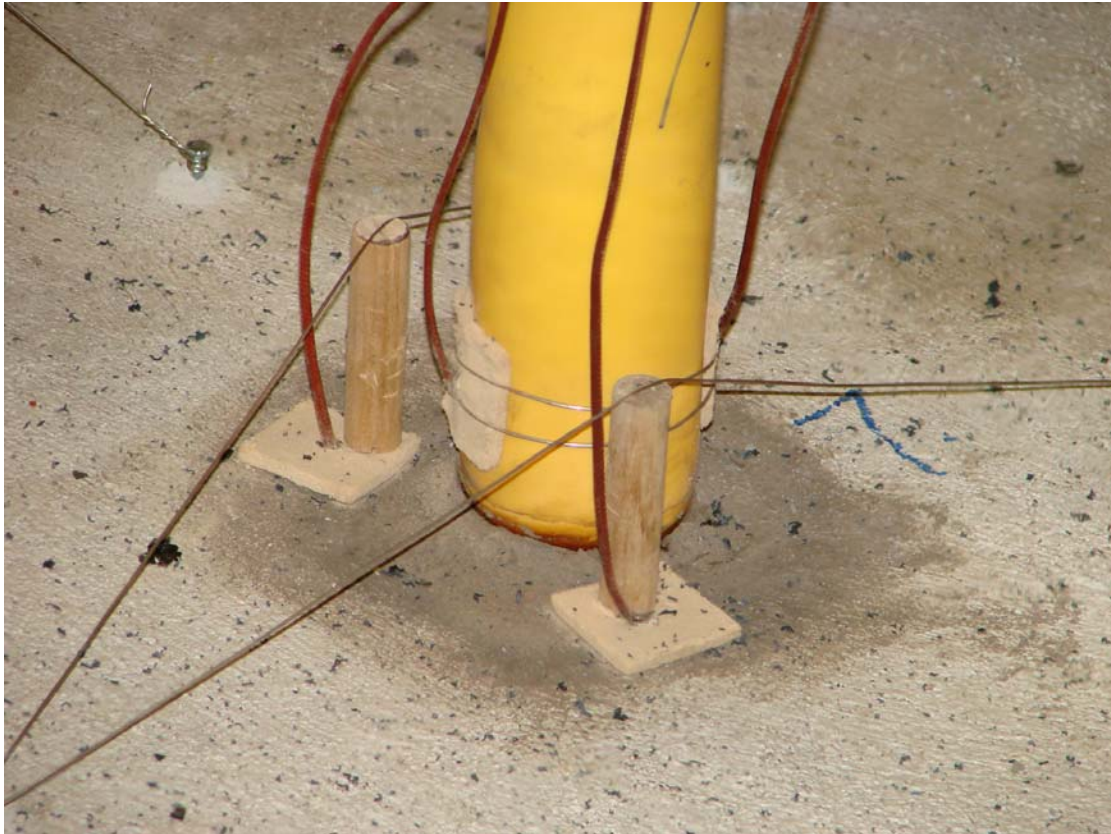
Photograph 10 – Pipe 2 at the conclusion of testing



Photograph 11 – Pipe 3 at the conclusion of testing



Photograph 12 – Pipe 4 at the conclusion of testing



Photograph 13 – Pipe 7 at the conclusion of testing



Photograph 14 – Exposed face after the conclusion of testing

APPENDIX 2

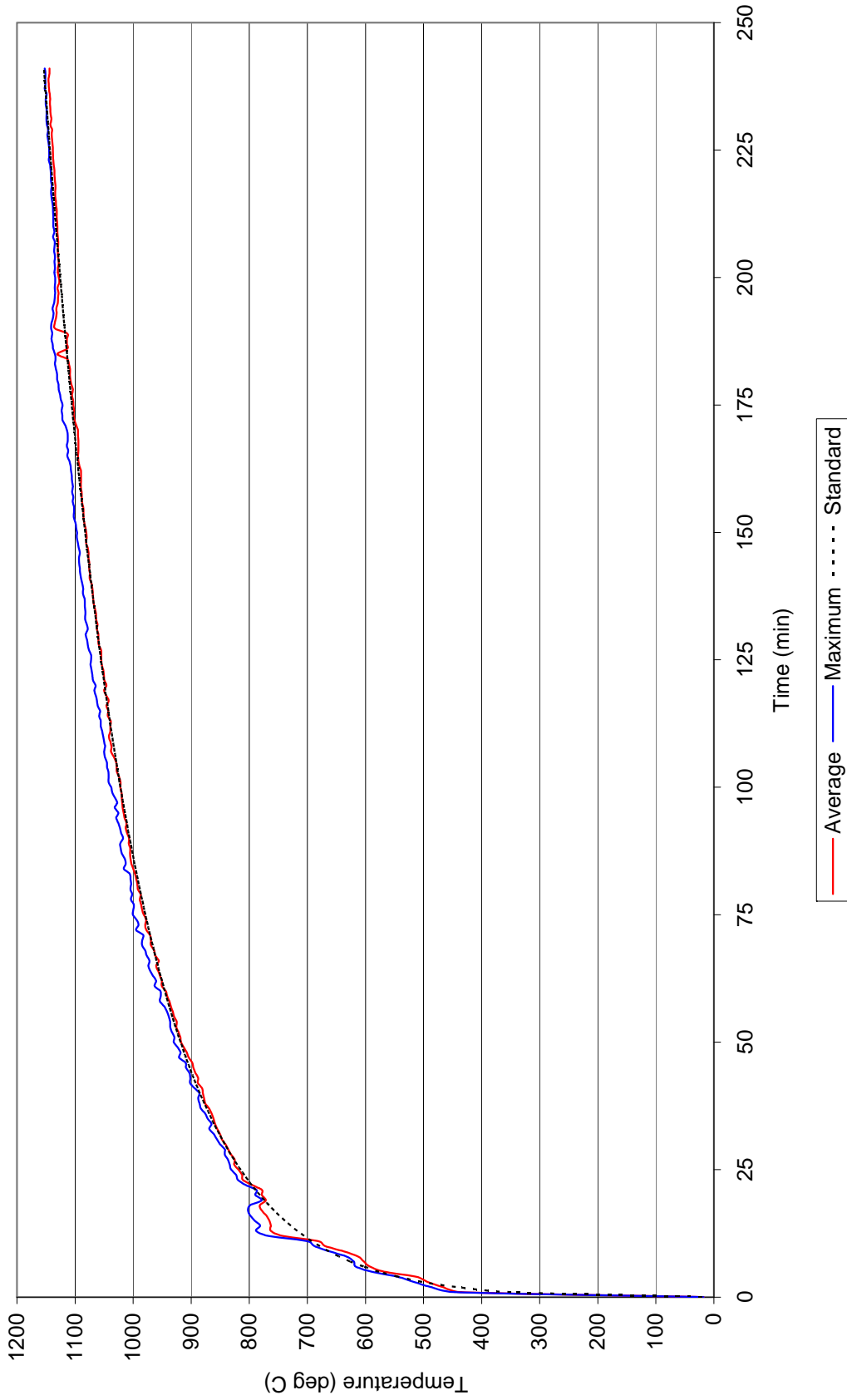


Figure 1 - Furnace temperature





Figure 2 - Specimen temperature – Penetration 1

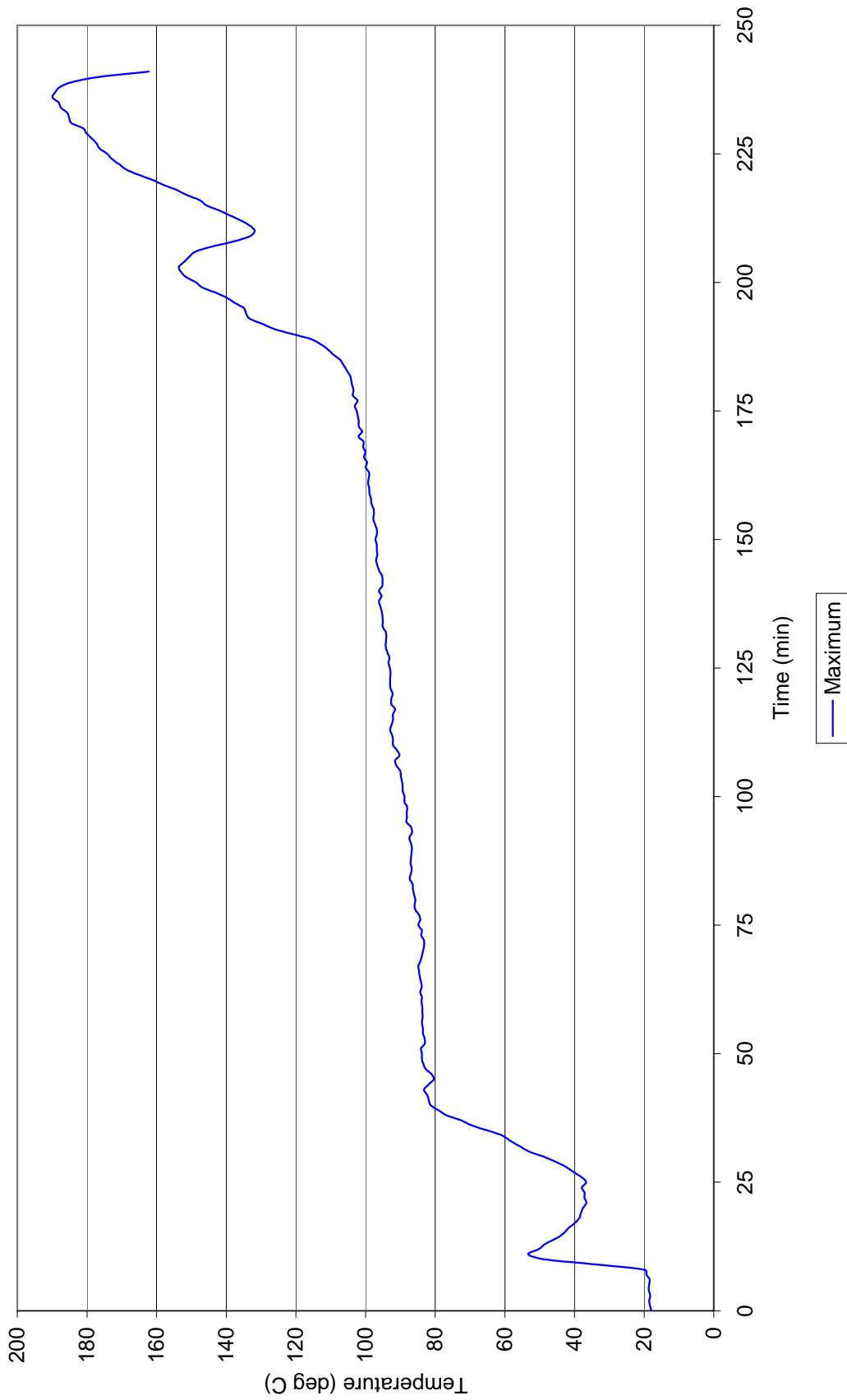


Figure 3 - Specimen temperature – Penetration 2

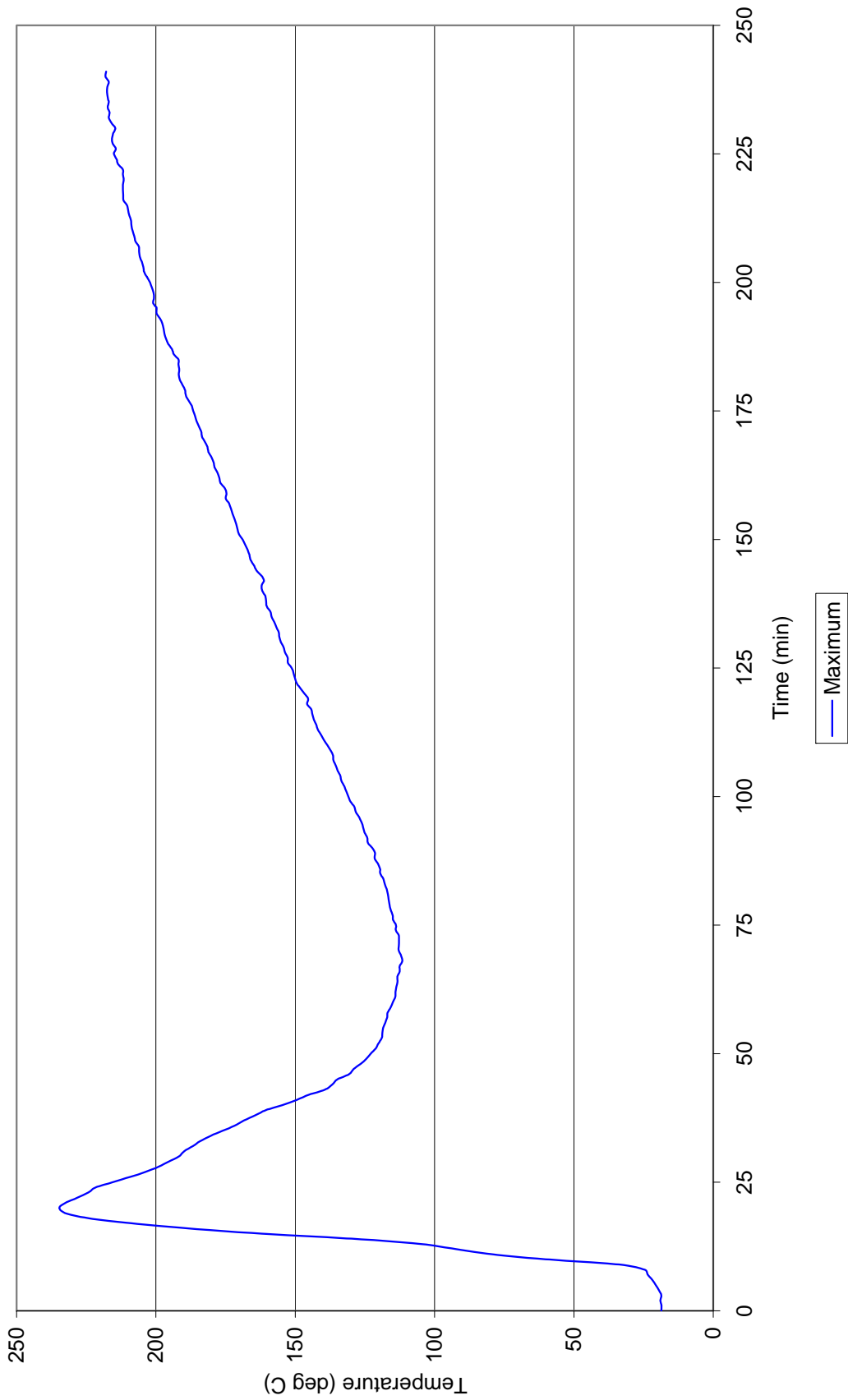


Figure 4 - Specimen temperature – Penetration 3

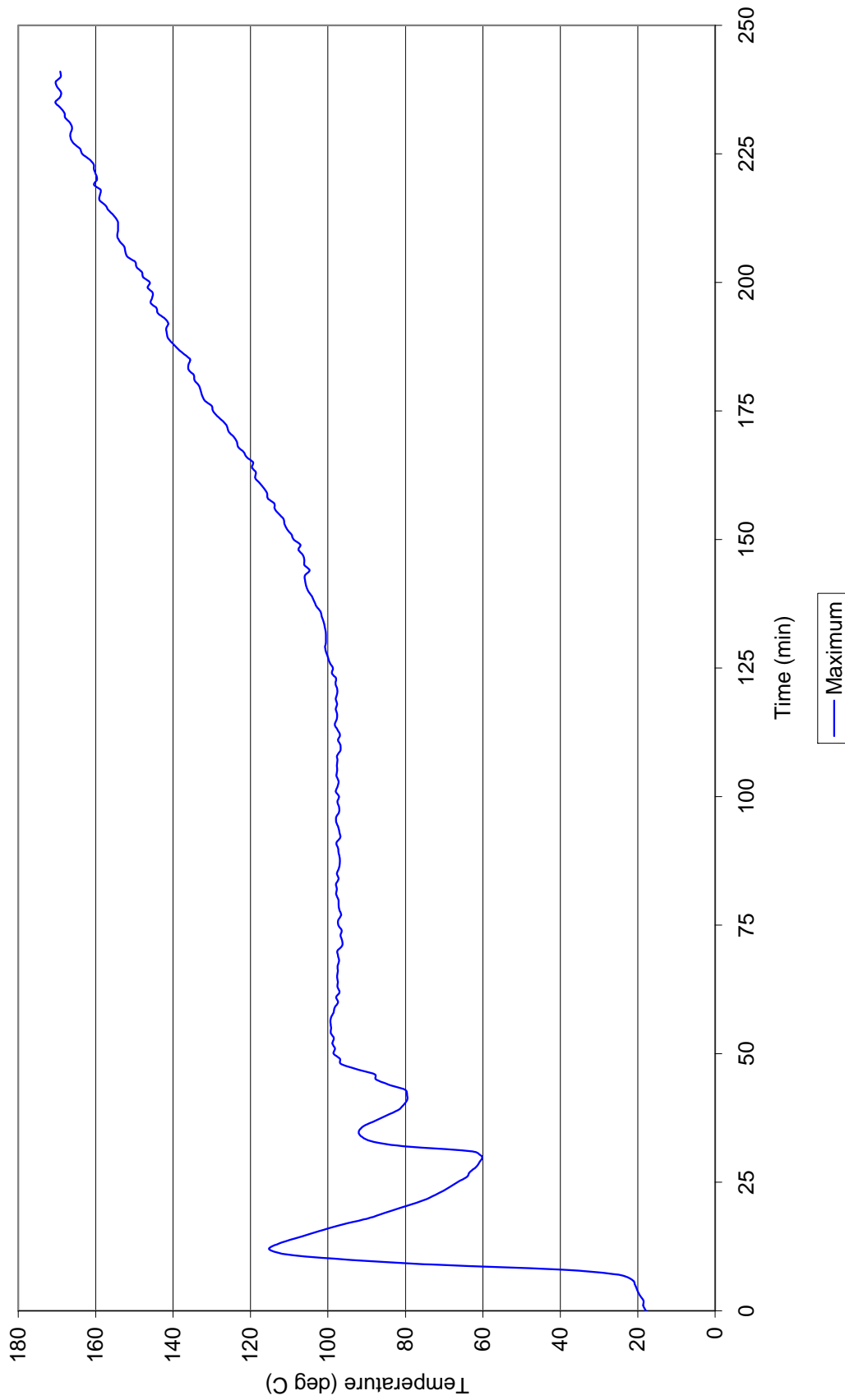


Figure 5 - Specimen temperature – Penetration 4

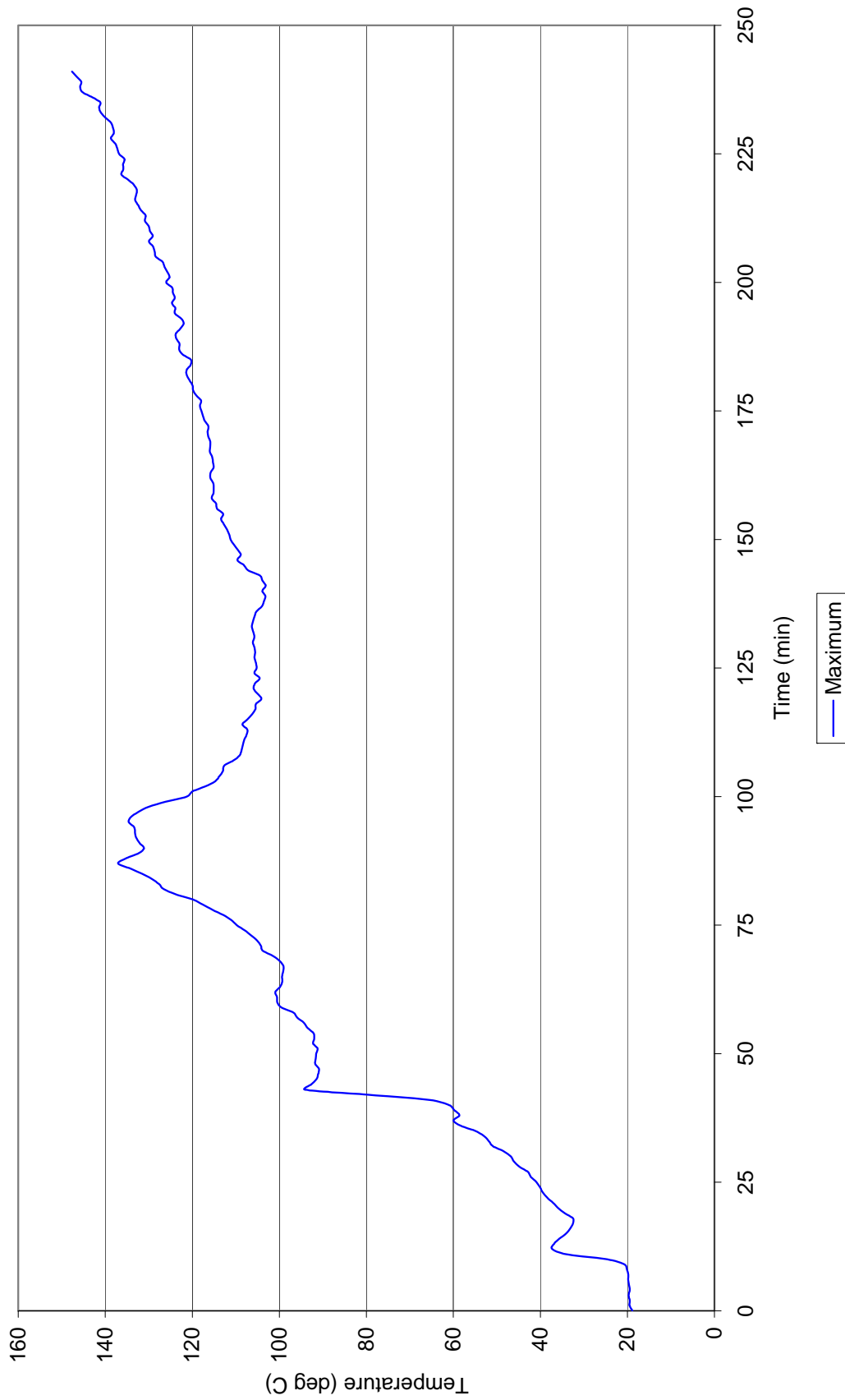


Figure 6 - Specimen temperature – Penetration 5

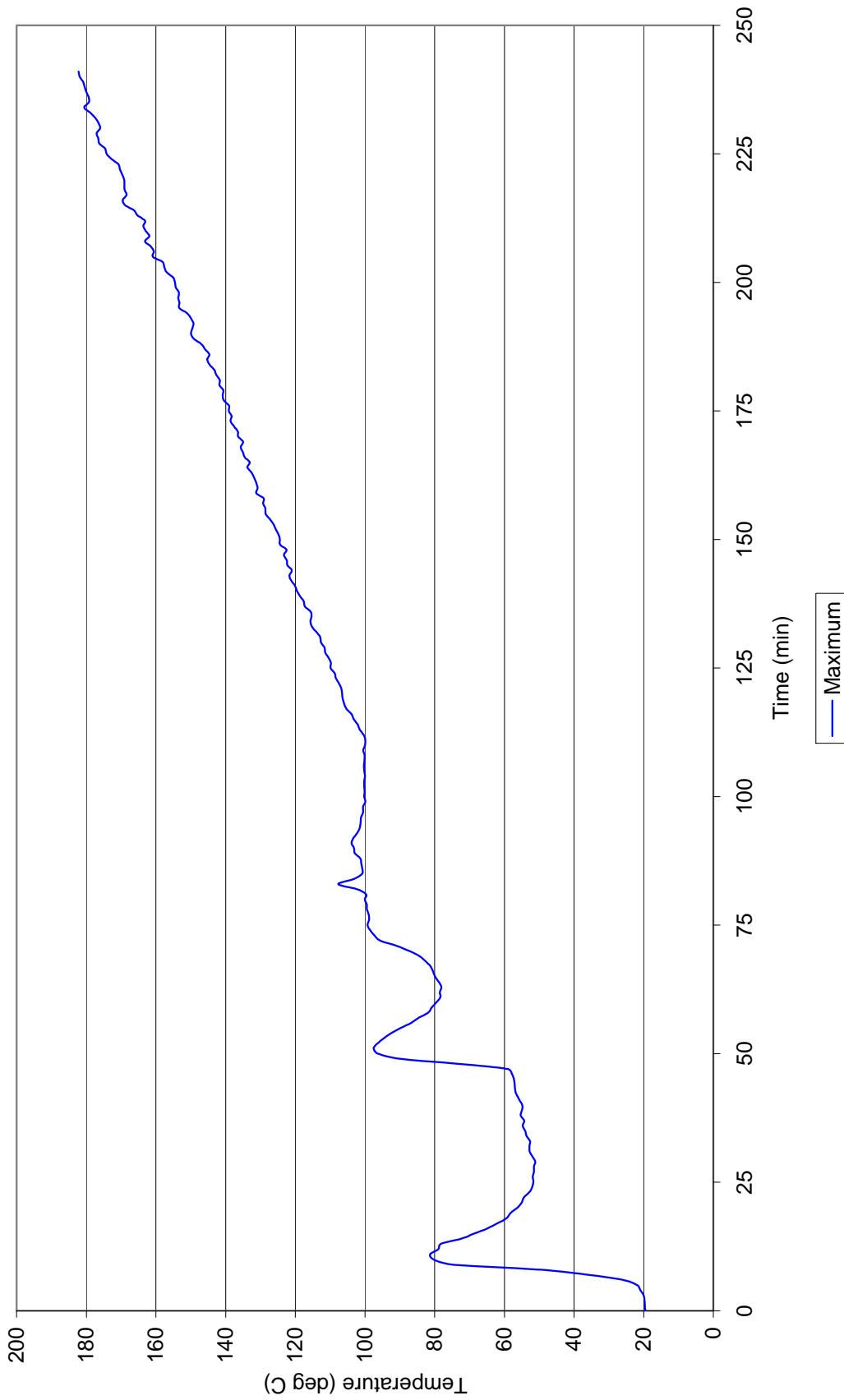


Figure 7 - Specimen temperature – Penetration 6

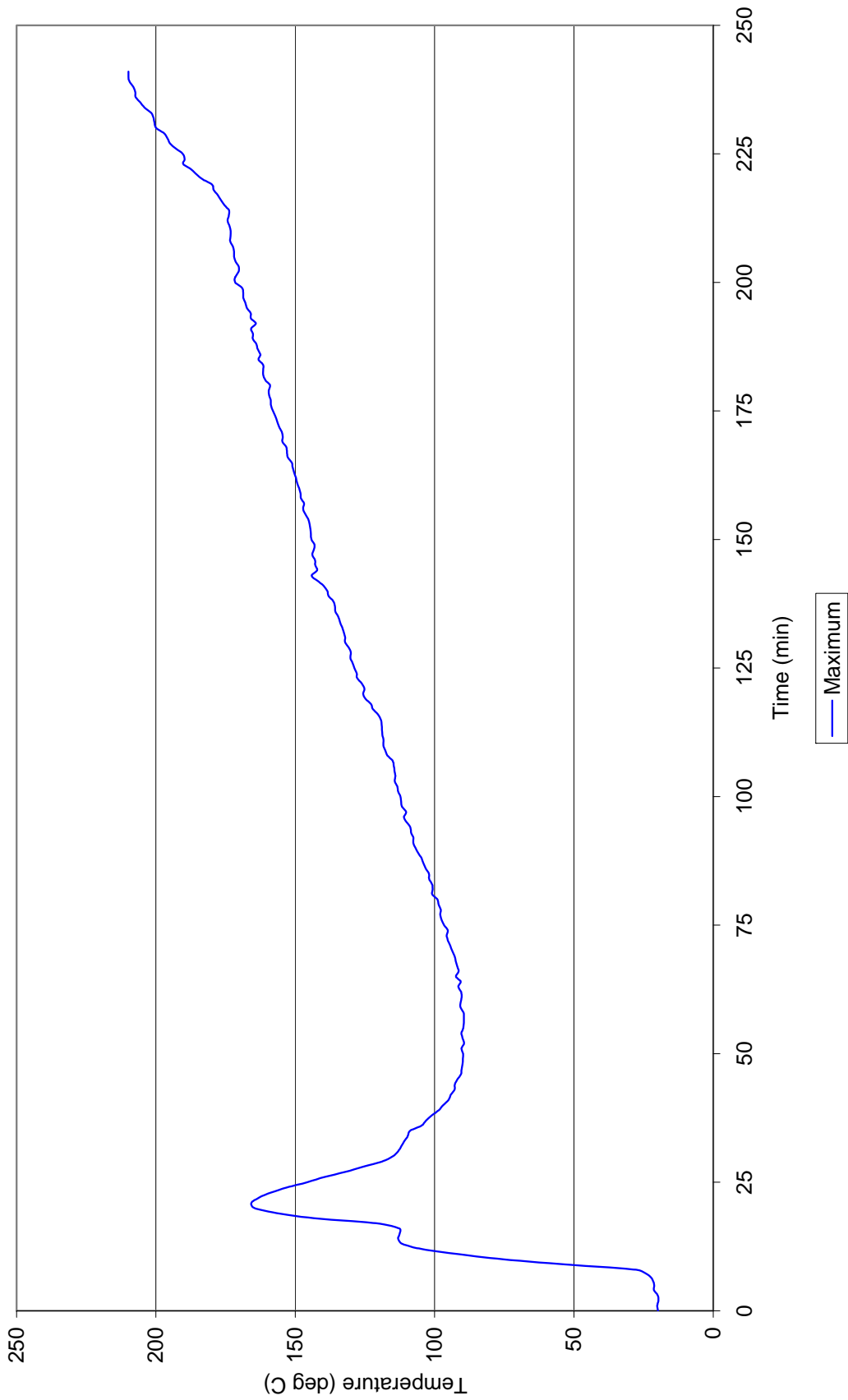
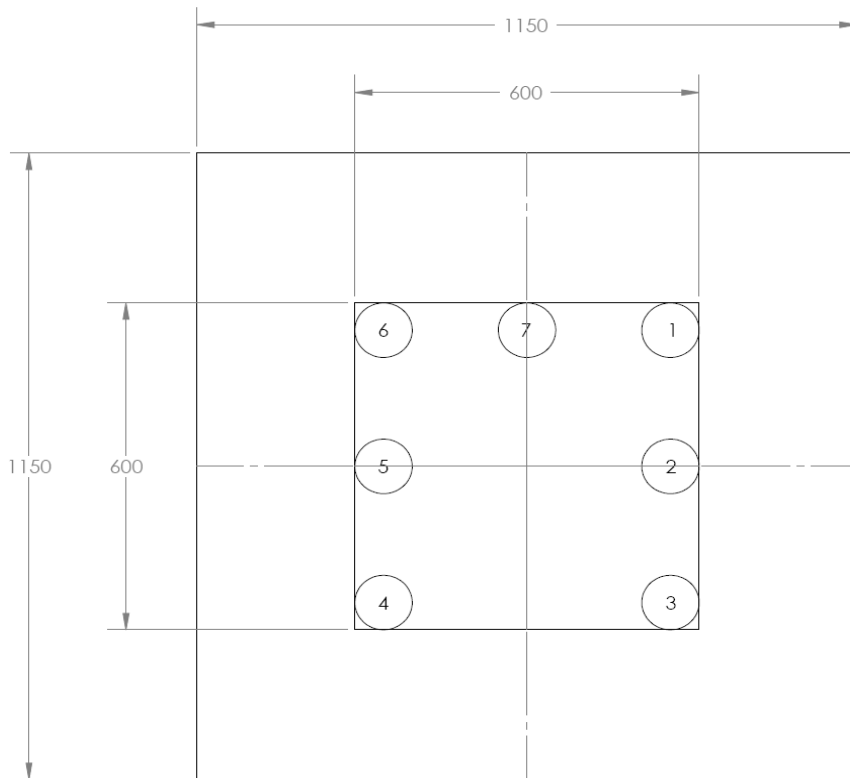
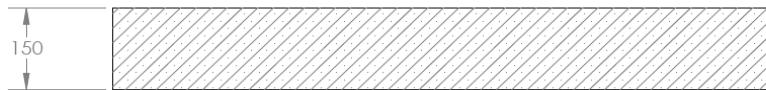


Figure 8 - Specimen temperature – Penetration 7

APPENDIX 3



TOP VIEW



FRONT VIEW

BRAND	DESCRIPTION	DIAMETER	SLAB POSITION	COLLAR	TYPE
REHAU	PE(X)-AL-PE	40	1	SNAPH50GAS	CAST-IN
REHAU	PE(X)-AL-PE	40	2	SNAP50GAS	RETRO
IPILEX	PE-AL-PE	50	3	SNAPH50GAS	CAST-IN
IPILEX	PE-AL-PE	32	4	SNAPH50GAS	CAST-IN
GASPEX	PE(X)-AL-PE(X)	63	5	SNAP63GAS	RETRO
GASPEX	PE(X)-AL-PE(X)	32	6	SNAPH50GAS	CAST-IN
GASPEX	PE(X)-AL-PE(X)	50	7	SNAPH50GAS	CAST-IN

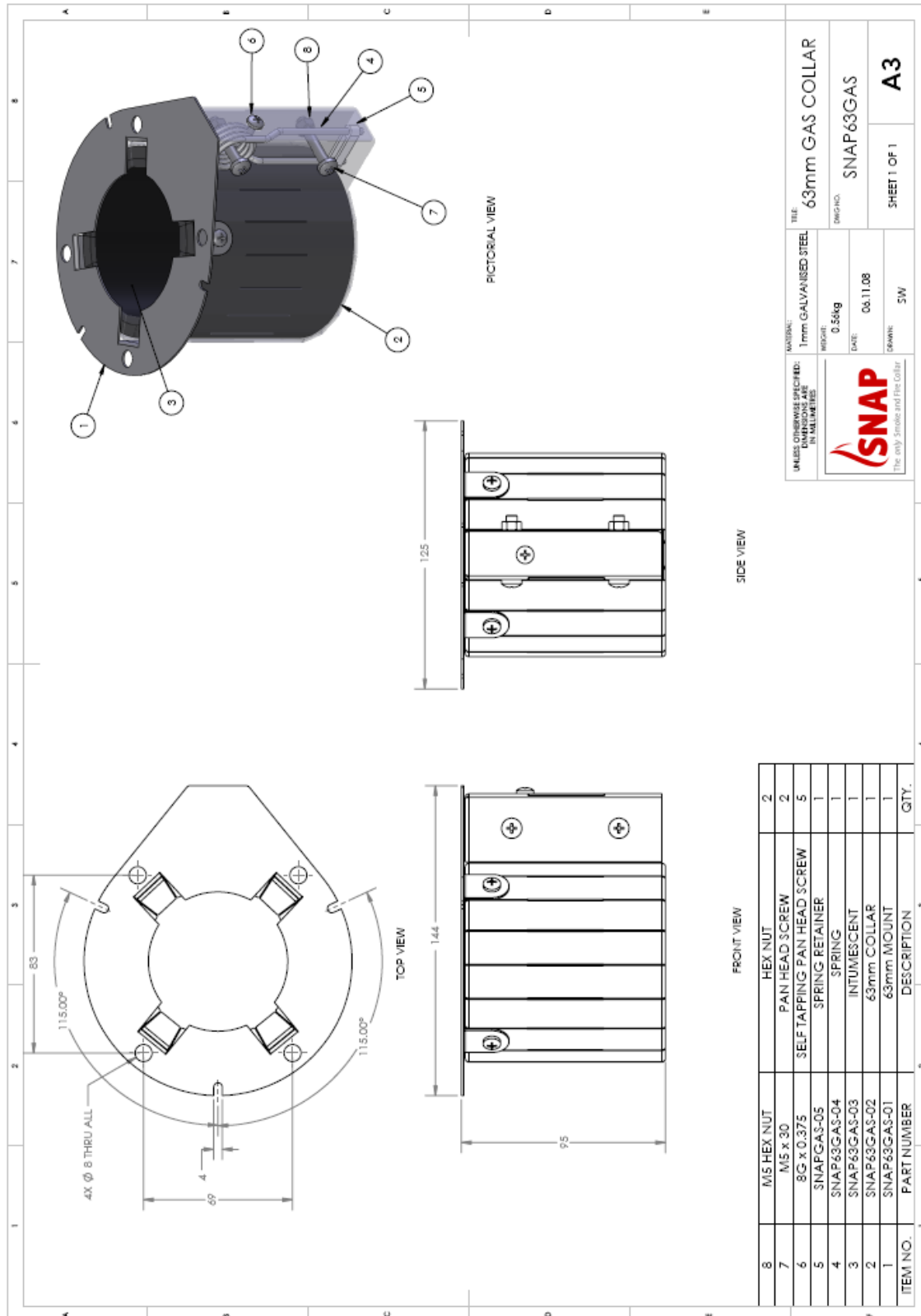
SNAP FIRE SYSTEMS



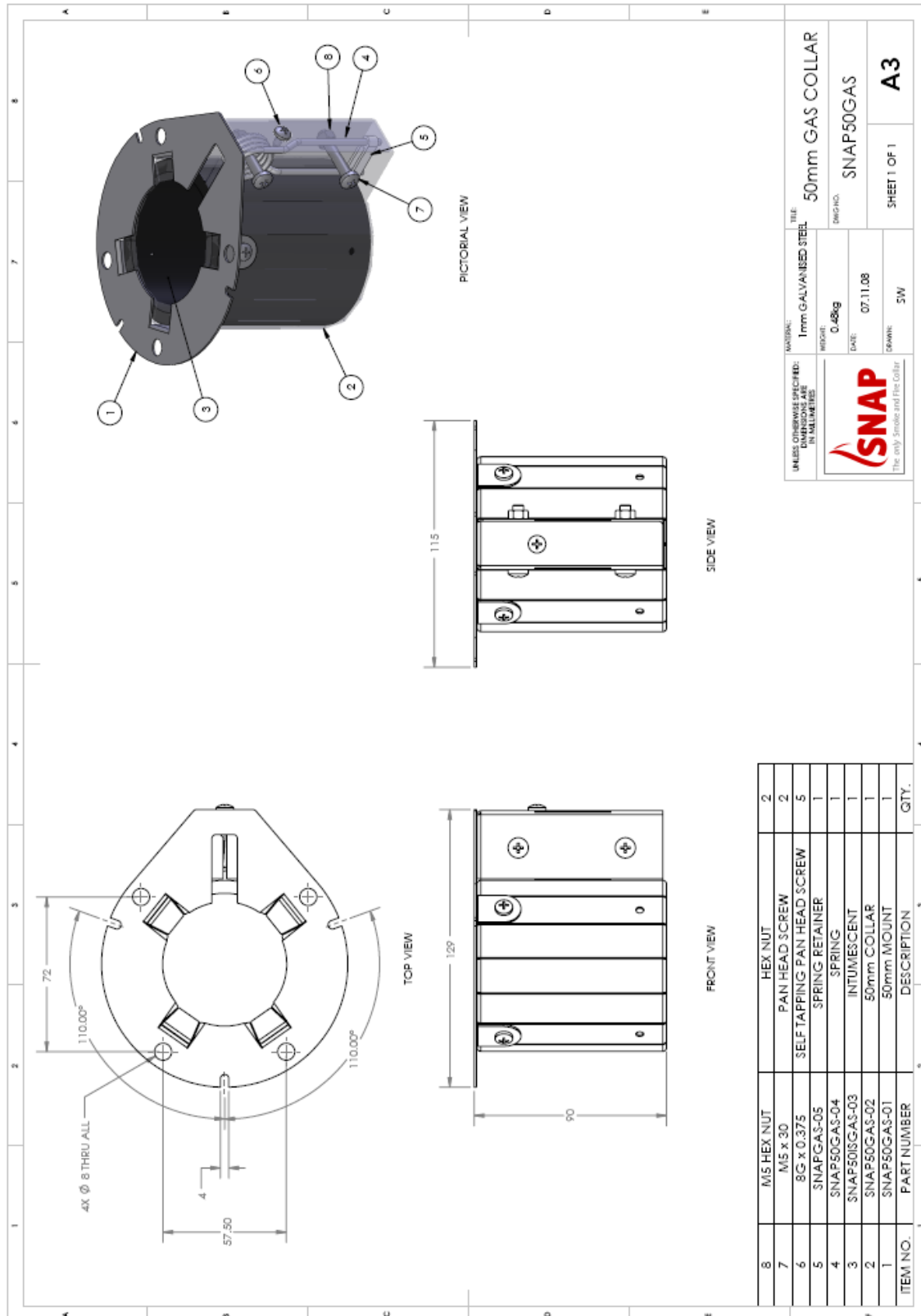
DWG No.	TESTSLAB-1
COLLAR TEST LOCATIONS	
NOV 2008	SCALE 1:10

Specification numbered TESTLAB-1, dated November 2008 by Snap Fire Systems

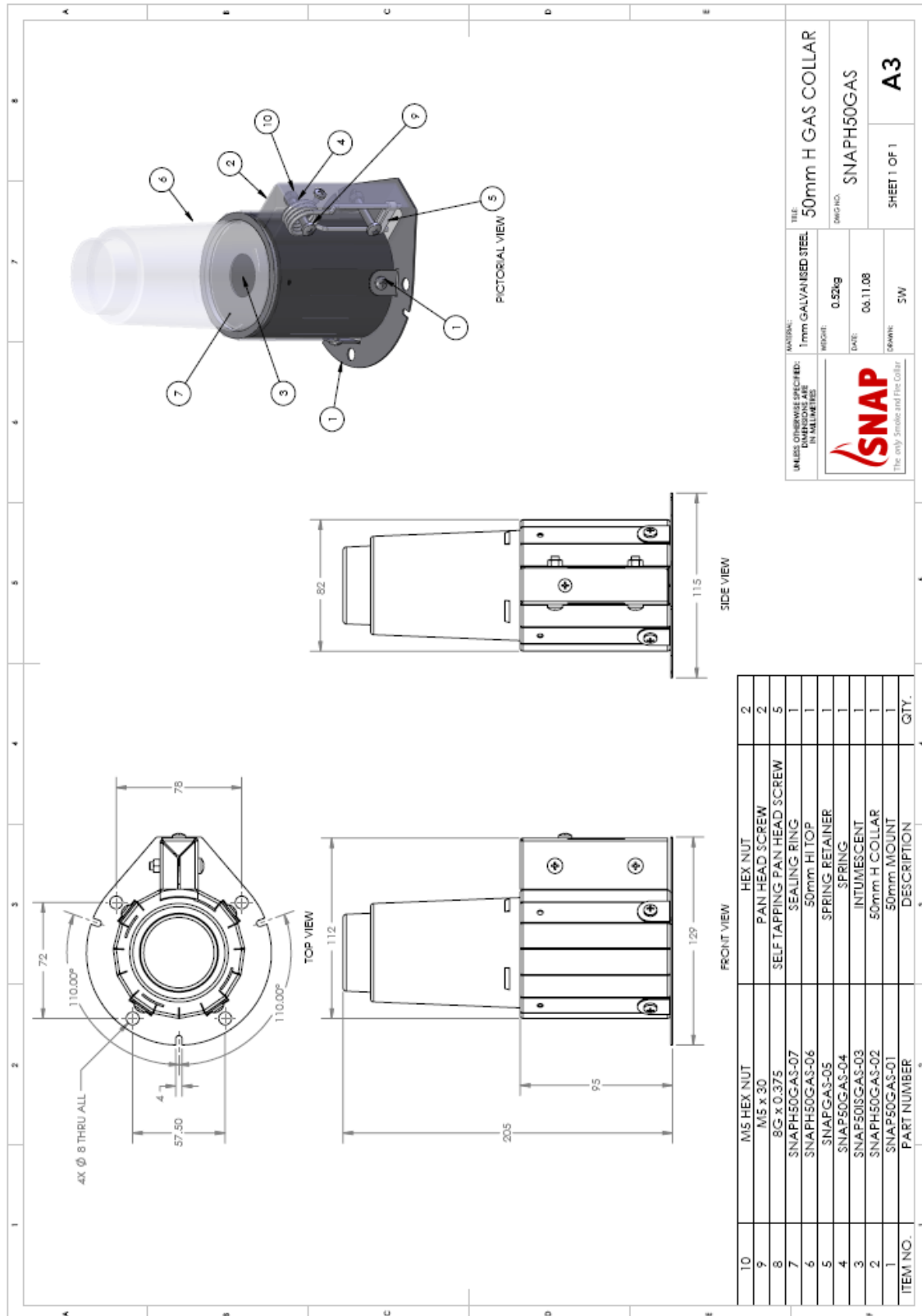




Specification numbered SNAP63GAS, dated 06 November 2008 by Snap Fire Systems

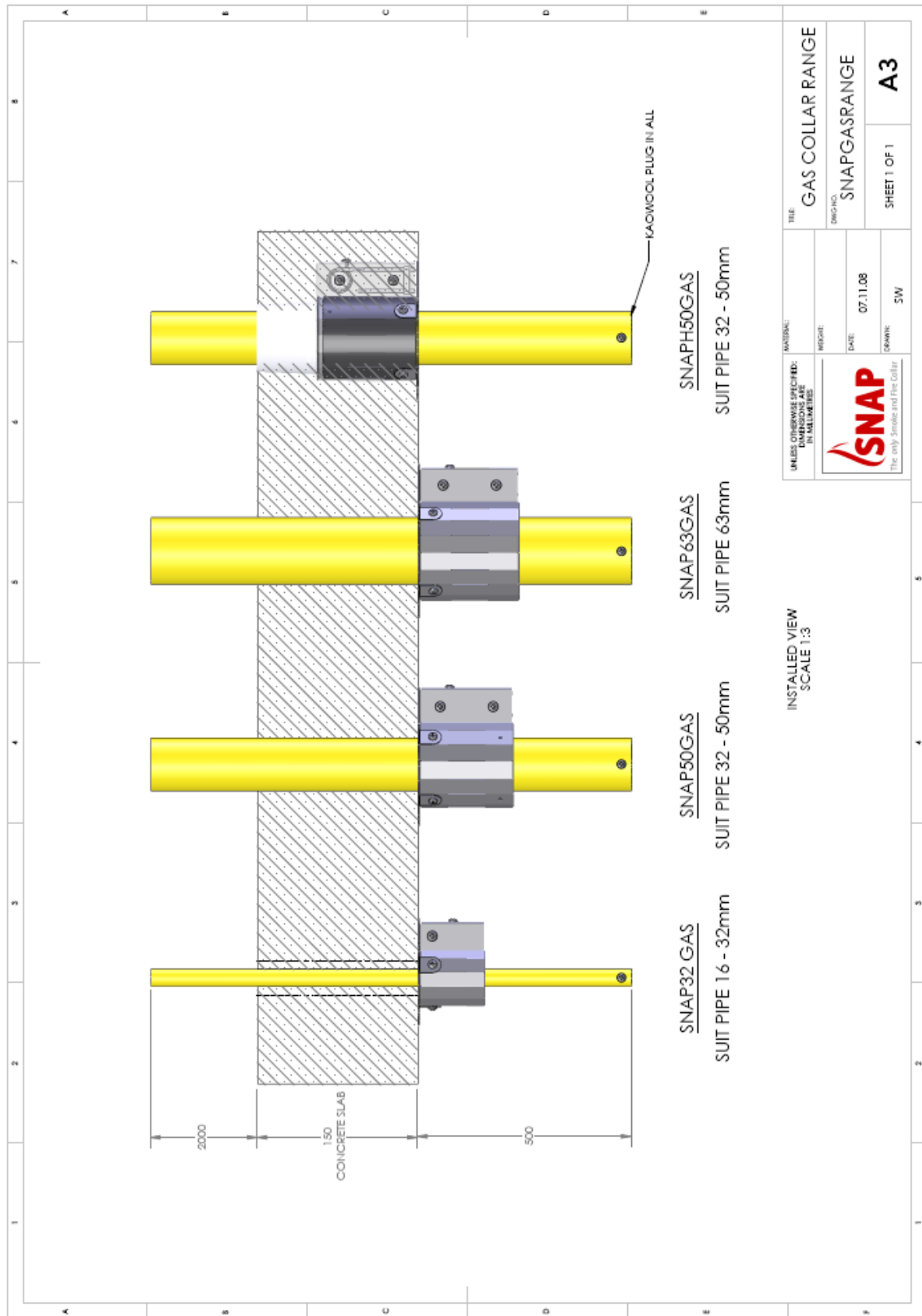


Specification numbered SNAP50GAS, dated 07 November 2008 by Snap Fire Systems



Specification numbered SNAP50GAS, dated 06 November 2008 by Snap Fire Systems





Specification numbered SNAPGASRANGE, dated 07 November 2008 by Snap Fire Systems



APPENDIX 4

Certificate of Test

No. 2115

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This is to certify that the element of construction described below was tested by the CSIRO Division of Material 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 3, 26 Navigator Place
Hendra QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1340.

Product Name: Penetration 1 –Cast-in SNAPH50GAS fire collar protecting a nominal 40-mm REHAU PEX-AL-PE gas pipe.

Description: The SNAPH50GAS, fire collar consisted of a galvanised steel case 82-mm diameter x 90-mm high, with a single spring pocket and a 115-mm diameter base plate screwed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide and 200-mm long. Between the wraps was a layer 0.15-mm thick x 85-mm wide of stainless steel mesh. The cast-in collar had a plastic hightop making the overall height of the collar 205-mm high. The collar was cast into the concrete slab with its base flush with the underside.

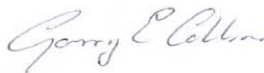
The penetrating service comprised a nominally 40-mm REHAU PEX-AL-PE gas pipe penetrating the concrete slab through the cast in collar. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Structural Adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	212 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/180. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 11 November 2008.

Issued on the 27th day of February 2009 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
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Certificate of Test

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This is to certify that the element of construction described below was tested by the CSIRO Division of Material 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 3, 26 Navigator Place
 Hendra QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1340.

Product Name: Penetration 2 – Retrofit SNAP50GAS fire collar protecting a nominal 40-mm REHAU PEX-AL-PE gas pipe.

Description: The SNAP50GAS, fire collar consisted of a galvanised steel case 82-mm diameter x 90-mm high, with a single spring. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide and 200-mm long. Between the wraps was a layer 0.15-mm thick x 85-mm wide of stainless steel mesh. The collar was fixed to the underside of the concrete slab with 6-mm diameter mechanical anchors fitted through 8-mm diameter holes in four brackets screw fixed to the case of the collar.

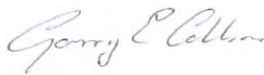
The penetrating service comprised a nominally 40-mm REHAU PEX-AL-PE gas pipe penetrating an oversized hole cored through the concrete slab. Once the pipe was fitted through the hole and restrained, the resulting gap around the pipe was backfilled flush with both sides of the concrete slab using a quick drying cement. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

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

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 11 November 2008.

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Snap Fire Systems Pty Ltd
Unit 3, 26 Navigator Place
Hendra QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1340.

Product Name: Penetration 3 – Cast-in SNAPH50GAS fire collar protecting a nominal 50-mm IPLEX PE-AL-PE gas pipe.

Description: The SNAPH50GAS, fire collar consisted of a galvanised steel case 82-mm diameter x 90-mm high, with a single spring pocket and a 115-mm diameter base plate screwed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide and 200-mm long. Between the wraps was a layer 0.15-mm thick x 85-mm wide of stainless steel mesh. The cast-in collar had a plastic hightop making the overall height of the collar 205-mm high. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 50-mm IPLEX PE-AL-PE gas pipe gas pipe penetrating the concrete slab through the cast in collar. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Structural Adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	17 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/0. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik **Date of Test:** 11 November 2008.

Issued on the 27th day of February 2009 without alterations or additions.



Garry E Collins
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Snap Fire Systems Pty Ltd
Unit 3, 26 Navigator Place
Hendra QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1340.

Product Name: Penetration 4 – Cast-in SNAPH50GAS fire collar protecting a nominal 32-mm IPLEX PE-AL-PE gas pipe.

Description: The SNAPH50GAS, fire collar consisted of a galvanised steel case 82-mm diameter x 90-mm high, with a single spring pocket and a 115-mm diameter base plate screwed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide and 200-mm long. Between the wraps was a layer 0.15-mm thick x 85-mm wide of stainless steel mesh. The cast-in collar had a plastic hightop making the overall height of the collar 205-mm high. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 32-mm IPLEX PE-AL-PE gas pipe gas pipe penetrating the concrete slab through the cast in collar. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

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

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 11 November 2008.

Issued on the 27th day of February 2009 without alterations or additions.



Garry E Collins
Manager, Fire Testing and Assessments



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Snap Fire Systems Pty Ltd
 Unit 3, 26 Navigator Place
 Hendra QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1340.

Product Name: Penetration 5 – Retrofit SNAP63GAS fire collar protecting a nominal 63-mm GASPEX PEX-AL-PEX gas pipe.

Description: The SNAP63GAS, fire collar consisted of a galvanised steel case 95-mm diameter 95-mm high, with a single spring pocket and a 125-mm diameter base plate screwed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Three soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide. Between the wraps were two layers of 0.15-mm thick x 85-mm wide Stainless steel mesh. The collar was fixed to the underside of the concrete slab with 6-mm diameter mechanical anchors fitted through 8-mm diameter holes in four brackets screw fixed to the case of the collar.

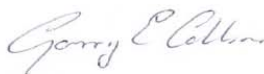
The penetrating service comprised a nominally 63-mm GASPEX PEX-AL-PEX gas pipe penetrating an oversized hole cored through the concrete slab. Once the pipe was fitted through the hole and restrained, the resulting gap around the pipe was backfilled flush with both sides of the concrete slab using a quick drying cement. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

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

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 11 November 2008.

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Snap Fire Systems Pty Ltd
Unit 3, 26 Navigator Place
Hendra QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1340.

Product Name: Penetration 6 – Cast-in SNAPH50GAS fire collar protecting a nominal 32-mm GASPEX PEX-AL-PEX gas pipe.

Description: The SNAPH50GAS, fire collar consisted of a galvanised steel case 82-mm diameter x 90-mm high, with a single spring pocket and a 115-mm diameter base plate screwed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide and 200-mm long. Between the wraps was a layer 0.15-mm thick x 85-mm wide of stainless steel mesh. The cast-in collar had a plastic hightop making the overall height of the collar 205-mm high. The collar was cast into the concrete slab with its base flush with the underside.

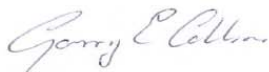
The penetrating service comprised a nominally 32-mm GASPEX PEX-AL-PEX gas pipe penetrating the concrete slab through the cast in collar. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

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

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 11 November 2008.

Issued on the 27th day of February 2009 without alterations or additions.



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Snap Fire Systems Pty Ltd
Unit 3, 26 Navigator Place
Hendra QLD

A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1340.

Product Name: Penetration 7 – Cast-in SNAPH50GAS fire collar protecting a nominal 50-mm GASPEX PEX-AL-PEX gas pipe.

Description: The SNAPH50GAS, fire collar consisted of a galvanised steel case 82-mm diameter x 90-mm high, with a single spring pocket and a 115-mm diameter base plate screwed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 85-mm wide and 200-mm long. Between the wraps was a layer 0.15-mm thick x 85-mm wide of stainless steel mesh. The cast-in collar had a plastic hightop making the overall height of the collar 205-mm high. The collar was cast into the concrete slab with its base flush with the underside.

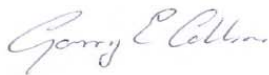
The penetrating service comprised a nominally 50-mm GASPEX PEX-AL-PEX gas pipe penetrating the concrete slab through the cast in collar. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Structural Adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	230 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/180. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 11 November 2008.

Issued on the 27th day of February 2009 without alterations or additions.



Garry E Collins
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