

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

**Report number FSP 1339
CSIRO job number SP3196
Date of issue 27 FEBRUARY 2009**

**Client
SNAP FIRE SYSTEMS PTY LTD**

Commercial-in-confidence



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SPONSORED INVESTIGATION No. FSP 1339**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 4037/3196

TEST DATE: The fire-resistance test was conducted on 13 November 2008.

DESCRIPTION OF SPECIMEN:**GENERAL**

The specimen comprised an 1150-mm x 1150-mm x 150-mm thick reinforced concrete slab penetrated by seven gas pipe of various constructions protected by retro-fitted 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 – Retrofit SNAP32GAS fire collar protecting a nominal 16-mm IPLEX PE-AL-PE gas pipe

The SNAP32GAS, fire collar consisted of a galvanised steel case 54-mm diameter x 63-mm high, with a single spring pocket and a 90-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 57-mm wide x 130-mm long. Between the wraps was a layer 0.15-mm thick x 57-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 6.5-mm diameter holes in three brackets screw fixed to the case of the collar.

The penetrating service comprised a nominally 16-mm IPLEX PE-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 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 2 – Retrofit SNAP32GAS fire collar protecting a nominal 32-mm REHAU PEX-AL-PE gas pipe

The SNAP32GAS, fire collar consisted of a galvanised steel case 54-mm diameter x 63-mm high, with a single spring pocket and a 90-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 57-mm wide x 130-mm long. Between the wraps was a layer 0.15-mm thick x 57-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 6.5-mm diameter holes in three brackets screw fixed to the case of the collar.

The penetrating service comprised a nominally 32-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 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 – Retrofit 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 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 32-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 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 4 – Retrofit SNAP32GAS fire collar protecting a nominal 32-mm GASPEX PEX-AL-PEX gas pipe

The SNAP32GAS, fire collar consisted of a galvanised steel case 54-mm diameter x 63-mm high, with a single spring pocket and a 90-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 57-mm wide x 130-mm long. Between the wraps was a layer 0.15-mm thick x 57-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 6.5-mm diameter holes in three brackets screw fixed to the case of the collar.

The penetrating service comprised a nominally 32-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 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 5 – Retrofit SNAP32GAS fire collar protecting a nominal 16-mm GASPEX PEX-AL-PEX gas pipe

The SNAP32GAS, fire collar consisted of a galvanised steel case 54-mm diameter x 63-mm high, with a single spring pocket and a 90-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 57-mm wide x 130-mm long. Between the wraps was a layer 0.15-mm thick x 57-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 6.5-mm diameter holes in three brackets screw fixed to the case of the collar.

The penetrating service comprised a nominally 16-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 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 – Retrofit SNAP32GAS fire collar protecting a nominal 32-mm IPLEX PE-AL-PE gas pipe

The SNAP32GAS, fire collar consisted of a galvanised steel case 54-mm diameter x 63-mm high, with a single spring pocket and a 90-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 57-mm wide x 130-mm long. Between the wraps was a layer 0.15-mm thick x 57-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 6.5-mm diameter holes in three brackets screw fixed to the case of the collar.

The penetrating service comprised a nominally 32-mm IPLEX PE-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 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 7 – Retrofit SNAP50GAS fire collar protecting a nominal 50-mm IPLEX PE-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 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 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 50-mm IPLEX 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 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.

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 TESTSLAB-2, dated November 2008, by Snap Fire Systems.

Drawings numbered SNAP32GAS and SNAP50GAS, 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 20°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 - Light smoke flues from the furnace.
- 5 minutes - Smoke quantity increased from furnace flues.
- 10 minutes - No pipes are fluing from unexposed ends.
- 18 minutes - Smoke ceased fluing from furnace flues.

- 30 minutes - No pipes are fluing from unexposed ends.
- 44 minutes - Moisture is forming around the bases of pipes 5, 6 and 7.
- 60 minutes - - Moisture is forming around the base of pipe 1.
- None of the pipes are fluing smoke.
- 79 minutes - Light smoke is starting to flue from pipe 3.
- 101 minutes - Light smoke is starting to flue from pipe 2.
- 120 minutes - No more moisture is visible on the unexposed face of the slab. Pipes 2 and 3 are still fluing light smoke.
- 217 minutes - Light smoke is also being emitted from ends of pipes 6 and 7.
- 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 – Retrofit SNAP32GAS fire collar protecting a nominal 16-mm IPLEX PE-AL-PE gas pipe

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

Insulation - no failure at 241 minutes

Penetration 2 – Retrofit SNAP32GAS fire collar protecting a nominal 32-mm REHAU PE(X)-AL-PE gas pipe

Structural adequacy - not applicable

Integrity - no failure at 241 minutes

Insulation - no failure at 241 minutes

Penetration 3 – Retrofit SNAP50GAS fire collar protecting a nominal 32-mm GAS PEX PE(X)-AL-PE(X) gas pipe

Structural adequacy - not applicable

Integrity - no failure at 241 minutes

Insulation - no failure at 241 minutes

Penetration 4 – Retrofit SNAP32GAS fire collar protecting a nominal 32-mm GAS PEX PE(X)-AL-PE(X) gas pipe

Structural adequacy - not applicable

Integrity - no failure at 241 minutes

Insulation - no failure at 241 minutes

Penetration 5 – Retrofit SNAP32GAS fire collar protecting a nominal 16-mm GAS PEX PE(X)-AL-PE(X) gas pipe

Structural adequacy - not applicable

Integrity - no failure at 241 minutes

Insulation - no failure at 241 minutes

Penetration 6 – Retrofit SNAP32GAS 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 7 – Retrofit 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 - 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:

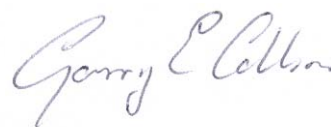
Penetration 1	-	-/240/240;
Penetration 2	-	-/240/240;
Penetration 3	-	-/240/240;
Penetration 4	-	-/240/240;
Penetration 5	-	-/240/240;
Penetration 6	-	-/240/240; and
Penetration 7	-	-/240/240

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.

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 – Specimen after 44 minutes of testing



Photograph 4 – Specimen after 60 minutes of testing



Photograph 5 – Specimen after 120 minutes of testing



Photograph 6 – Specimen after 180 minutes of testing



Photograph 7 – Unexposed face of the specimen at the conclusion of testing



Photograph 8 – Exposed face of the specimen after the conclusion of testing

APPENDIX 2

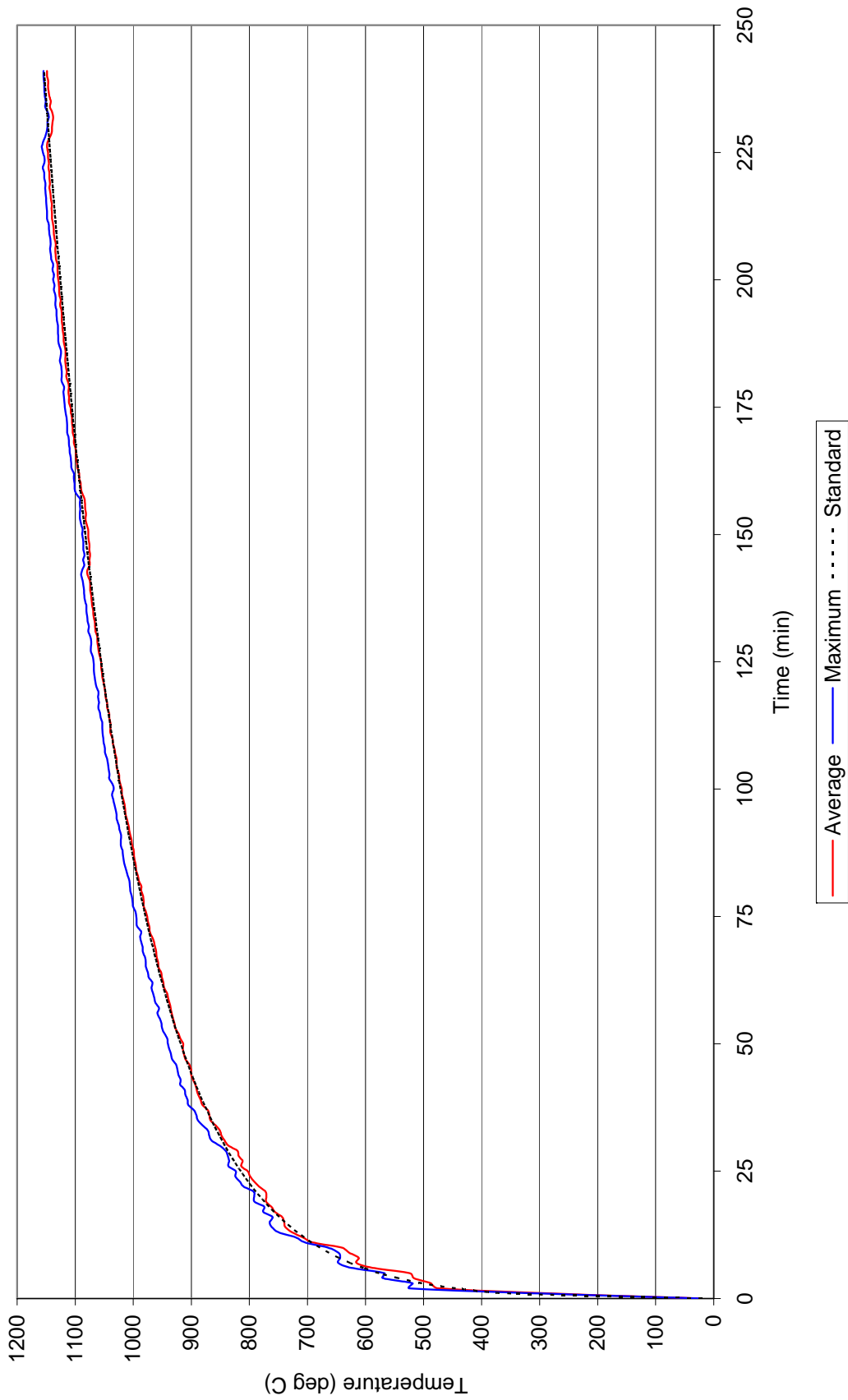


Figure 1 - Furnace temperature



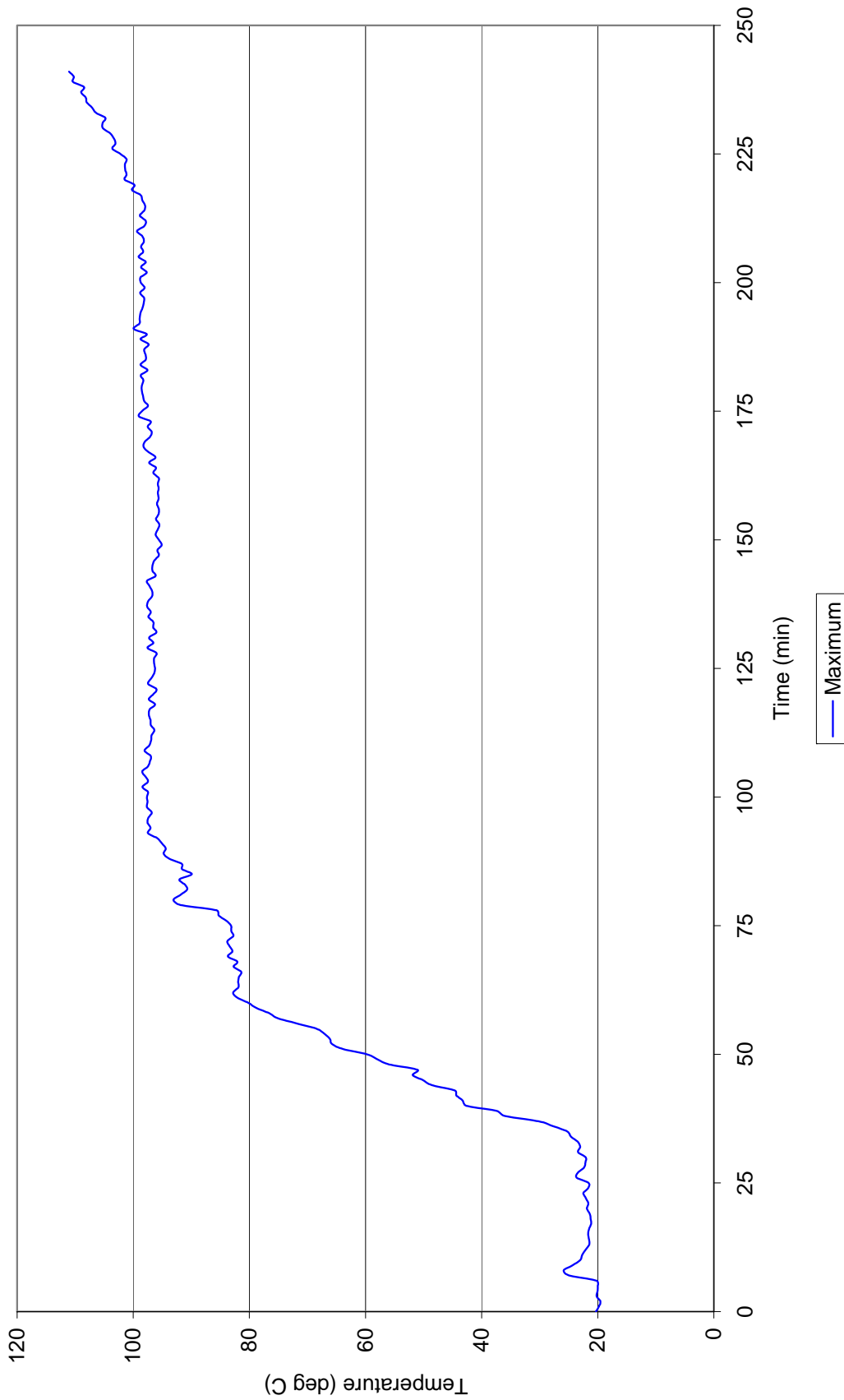


Figure 2 - Specimen temperature – Penetration 1



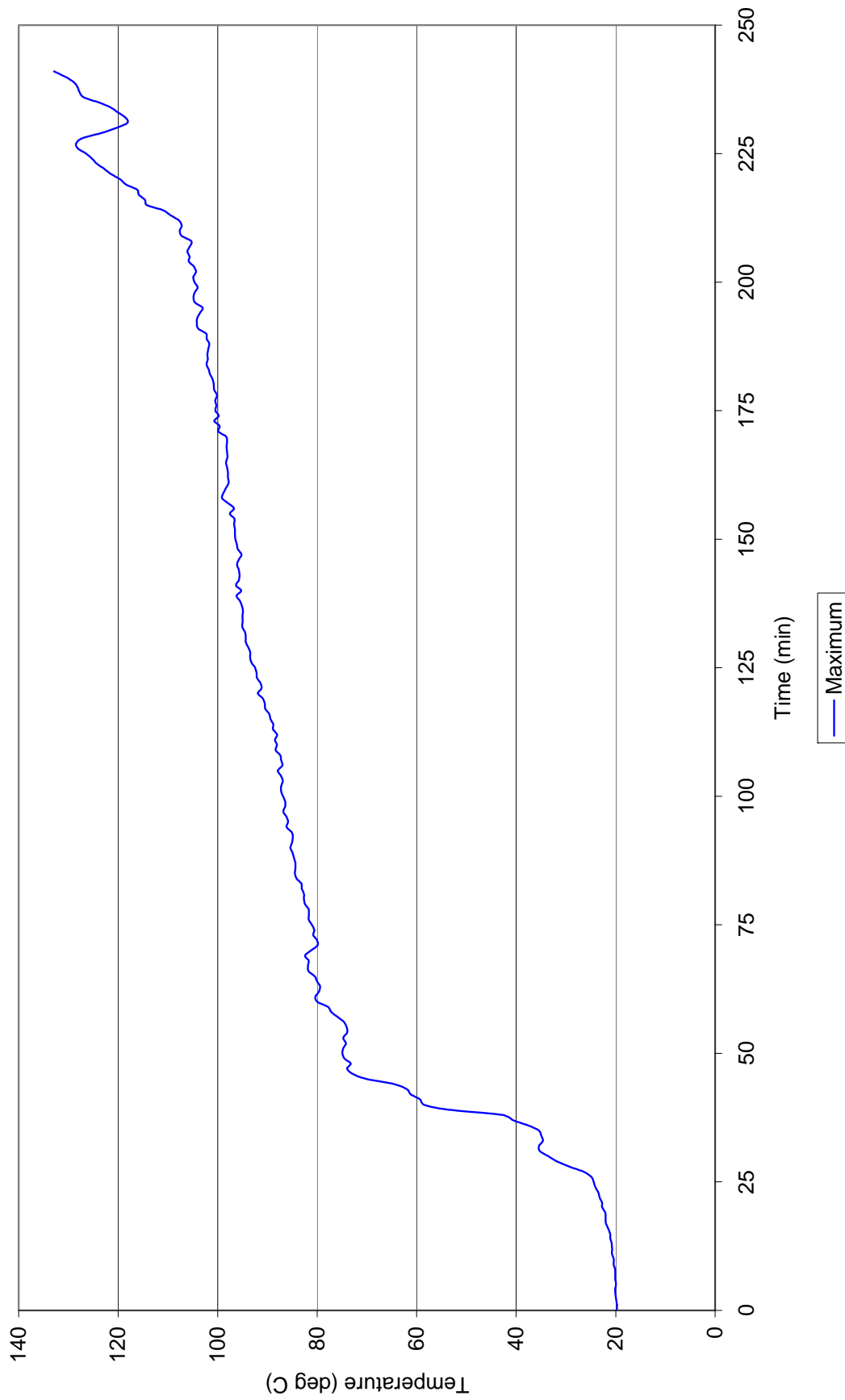


Figure 3 - Specimen temperature – Penetration 2



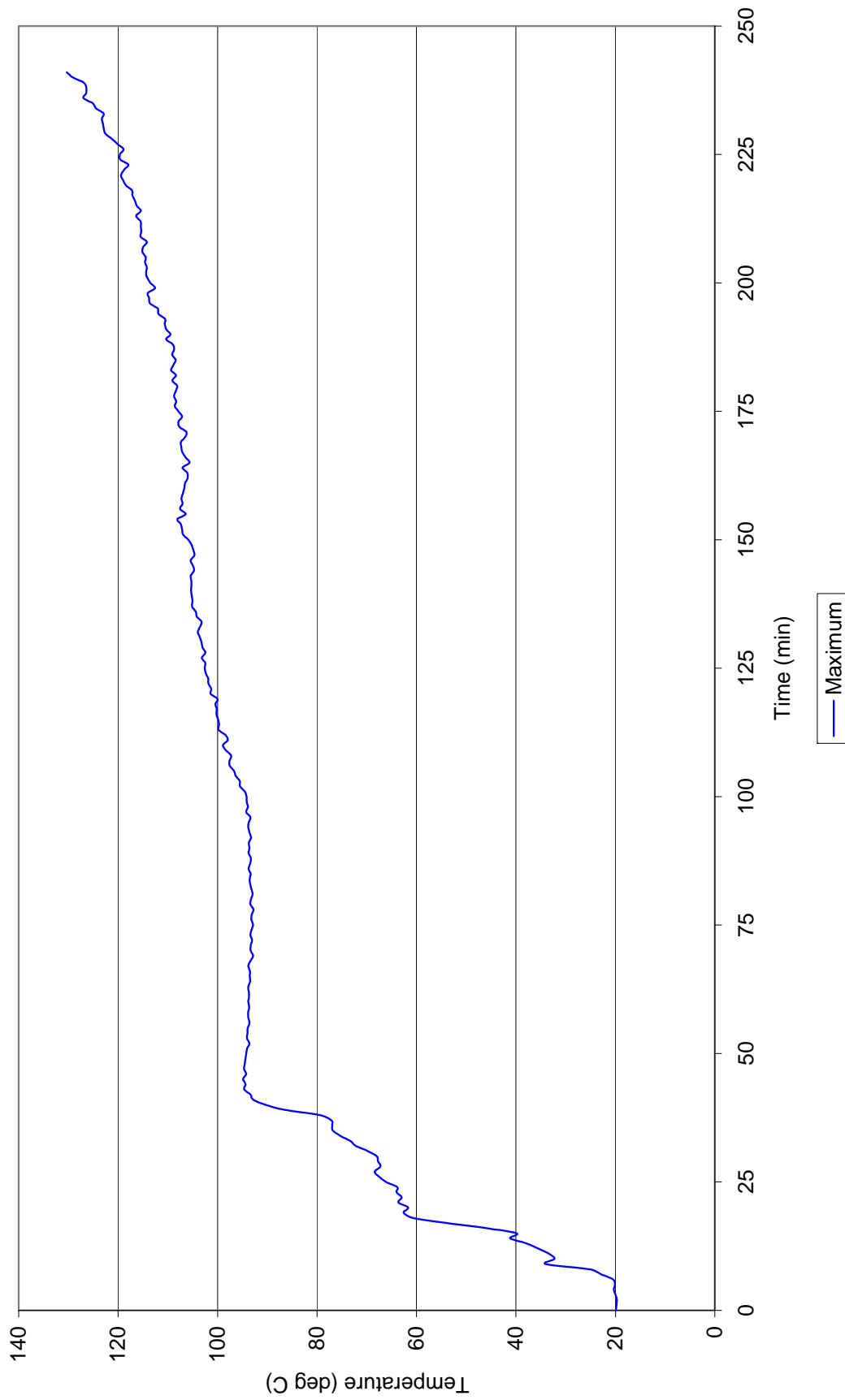


Figure 4 - Specimen temperature – Penetration 3



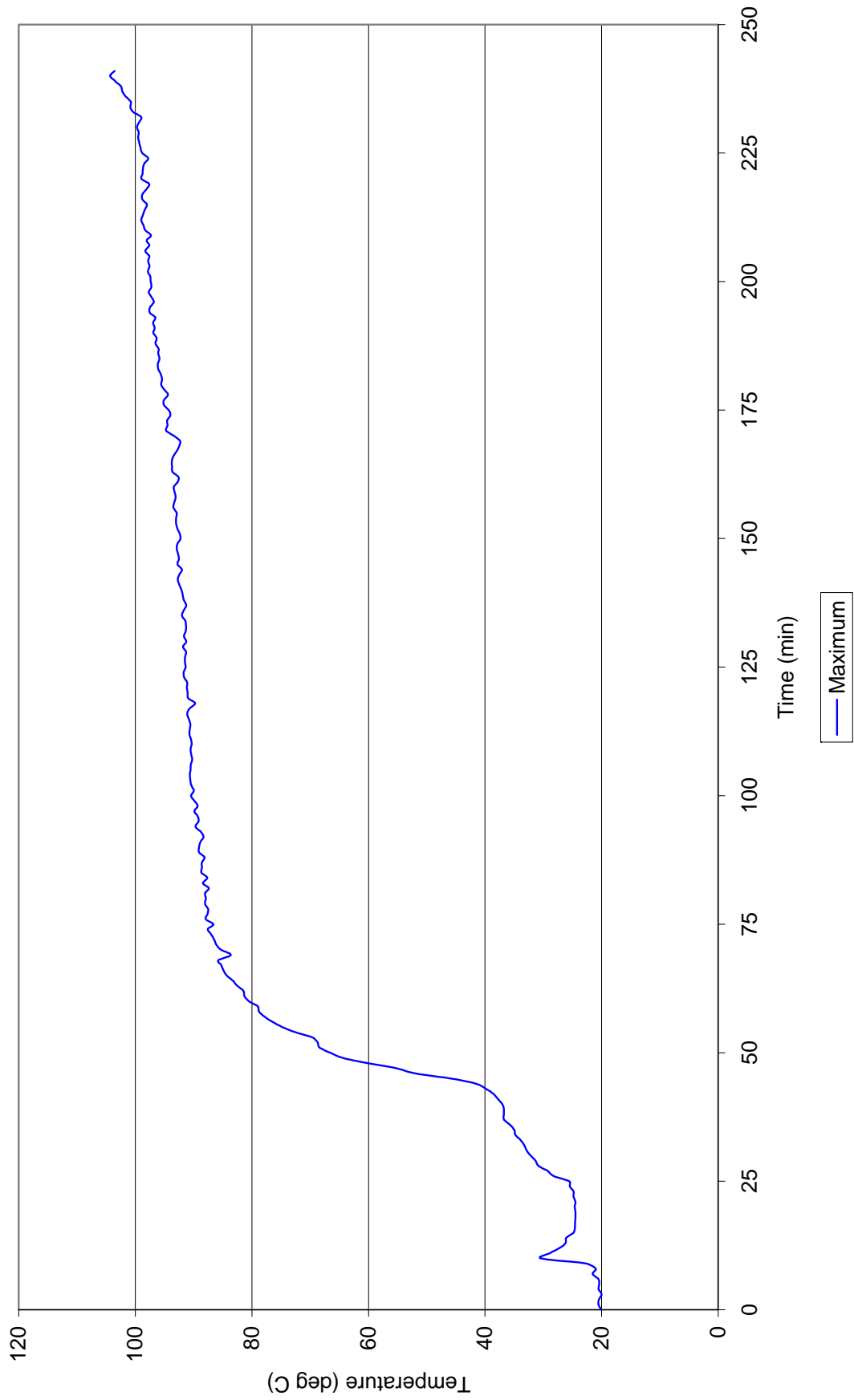


Figure 5 - Specimen temperature – Penetration 4



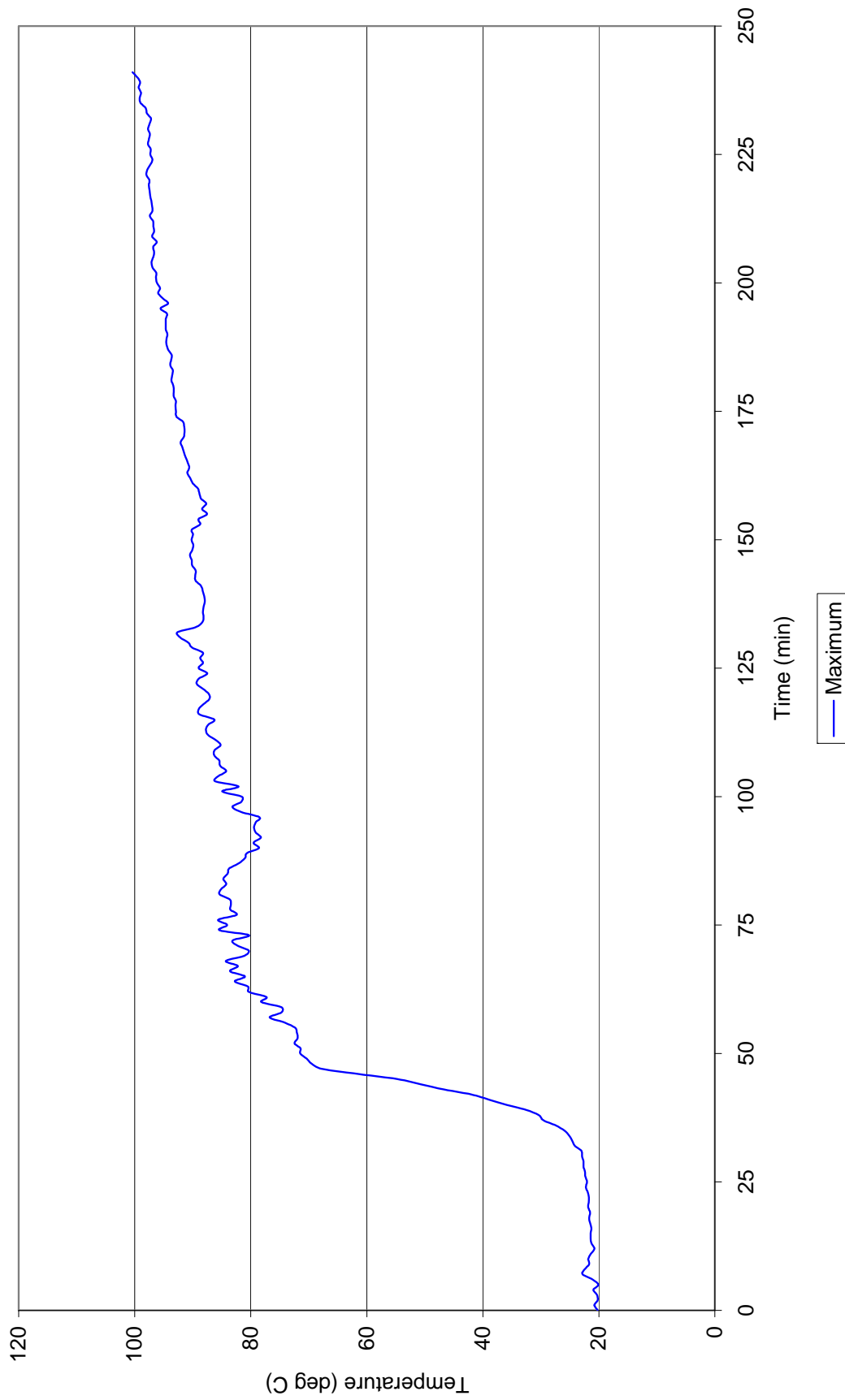


Figure 6 - Specimen temperature – Penetration 5



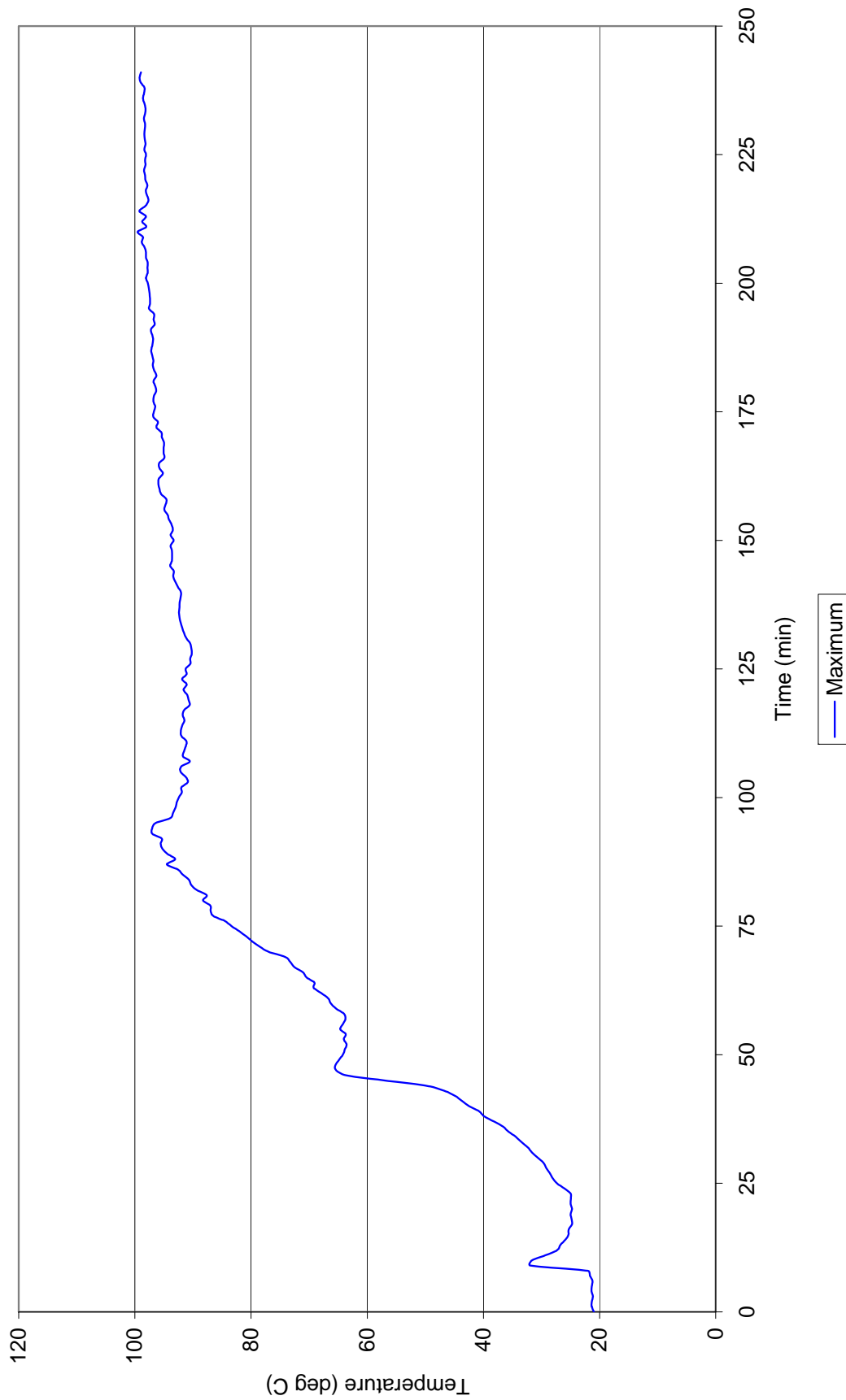


Figure 7 - Specimen temperature – Penetration 6



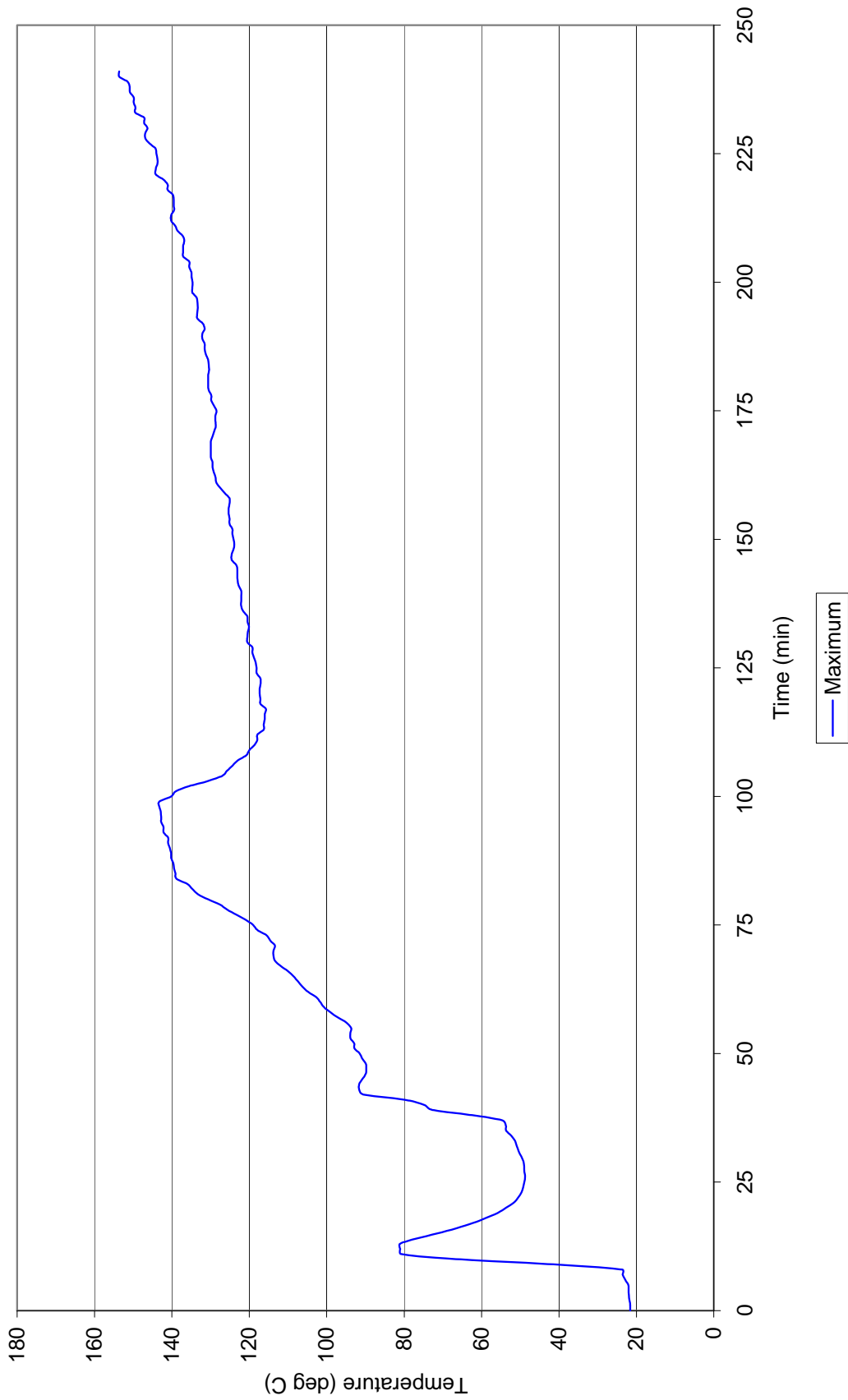
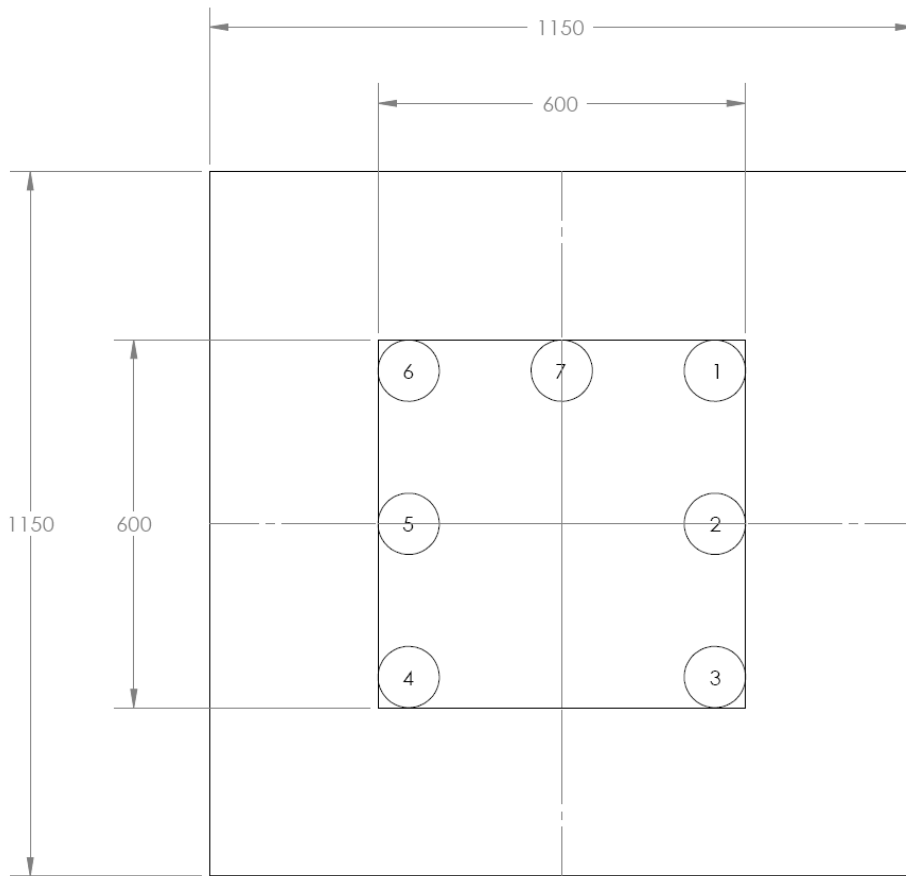


Figure 8 - Specimen temperature – Penetration 7




APPENDIX 3



TOP VIEW

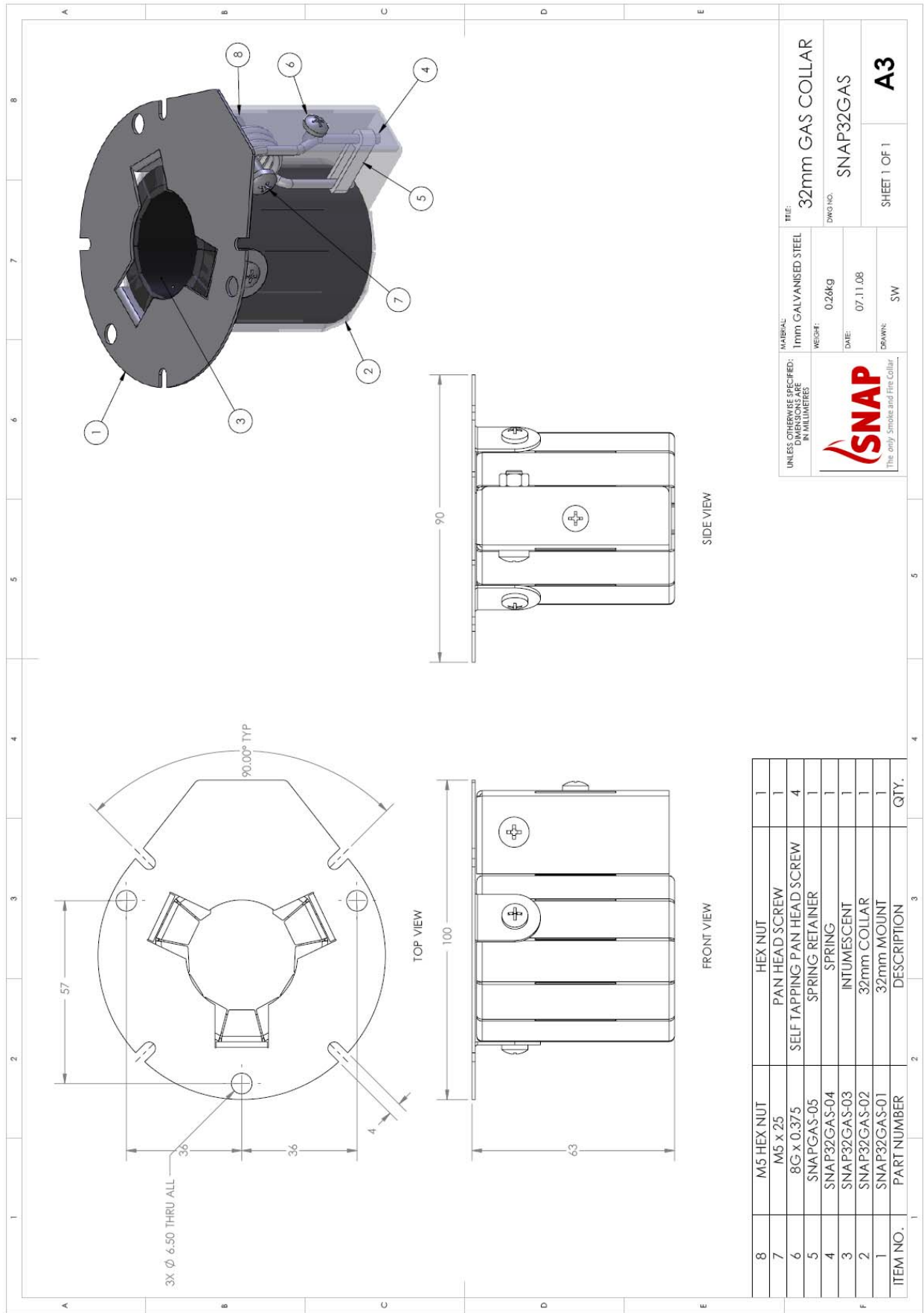
FRONT VIEW

BRAND	DESCRIPTION	DIAMETER	SLAB POSITION	COLLAR	TYPE
IPLX	PE-AL-PE	16	1	SNAP32GAS	RETRO
REHAU	PE(X)-AL-PE	32	2	SNAP32GAS	RETRO
GASPEX	PE(X)-AL-PE(X)	32	3	SNAP50GAS	RETRO
GASPEX	PE(X)-AL-PE(X)	32	4	SNAP32GAS	RETRO
GASPEX	PE(X)-AL-PE(X)	16	5	SNAP32GAS	RETRO
IPLX	PE-AL-PE	32	6	SNAP32GAS	RETRO
IPLX	PE-AL-PE	50	7	SNAP50GAS	RETRO

SNAP FIRE SYSTEMS	
	DWG No. TESTSLAB-2
	COLLAR TEST LOCATIONS
	NOV 2008 SCALE 1:10

Specification numbered TESTLAB-2, dated November 2008 by Snap Fire Systems





Specification numbered SNAP32GAS, dated 07 November 2008 by Snap Fire Systems



APPENDIX 4

Certificate of Test

No. 2107

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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 1339.

Product Name: Penetration 1 – Retrofit SNAP32GAS fire collar protecting a nominal 16-mm IPLEX PE-AL-PE gas pipe.

Description: The SNAP32GAS, fire collar consisted of a galvanised steel case 54-mm diameter x 63-mm high, with a single spring pocket and a 90-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 57-mm wide x 130-mm long. Between the wraps was a layer 0.15-mm thick x 57-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 6.5-mm diameter holes in three brackets screw fixed to the case of the collar.

The penetrating service comprised a nominally 16-mm IPLEX PE-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: 13 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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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 1339.

Product Name: Penetration 3 – Retrofit SNAP50GAS fire collar protecting a nominal 32-mm GASPEX PEX-AL-PEX gas pipe

Description: 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 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.

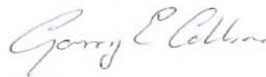
The penetrating service comprised a nominally 32-mm GASPEX PEX-AL-PEX gas pipe penetrating an oversized hole cored through the concrete slab. Once the pipe was fitted through the hole and restrained, the resulting gap around the pipe was backfilled flush with both sides of the concrete slab using a quick 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:** 13 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 1339.

Product Name: Penetration 4 – Retrofit SNAP32GAS fire collar protecting a nominal 32-mm GASPEX PEX-AL-PEX gas pipe.

Description: The SNAP32GAS, fire collar consisted of a galvanised steel case 54-mm diameter x 63-mm high, with a single spring pocket and a 90-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 57-mm wide x 130-mm long. Between the wraps was a layer 0.15-mm thick x 57-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 6.5-mm diameter holes in three brackets screw fixed to the case of the collar.

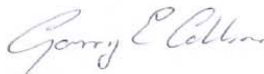
The penetrating service comprised a nominally 32-mm GASPEX PEX-AL-PEX gas pipe penetrating an oversized hole cored through the concrete slab. Once the pipe was fitted through the hole and restrained, the resulting gap around the pipe was backfilled flush with both sides of the concrete slab using a quick 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:** 13 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 1339.

Product Name: Penetration 5 – Retrofit SNAP32GAS fire collar protecting a nominal 16-mm GASPEX PEX-AL-PEX gas pipe.

Description: The SNAP32GAS, fire collar consisted of a galvanised steel case 54-mm diameter x 63-mm high, with a single spring pocket and a 90-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 57-mm wide x 130-mm long. Between the wraps was a layer 0.15-mm thick x 57-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 6.5-mm diameter holes in three brackets screw fixed to the case of the collar.

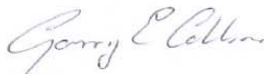
The penetrating service comprised a nominally 16-mm GASPEX PEX-AL-PEX gas pipe penetrating an oversized hole cored through the concrete slab. Once the pipe was fitted through the hole and restrained, the resulting gap around the pipe was backfilled flush with both sides of the concrete slab using a quick 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:** 13 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 1339.

Product Name: Penetration 6 – Retrofit SNAP32GAS fire collar protecting a nominal 32-mm IPLEX PE-AL-PE gas pipe.

Description: The SNAP32GAS, fire collar consisted of a galvanised steel case 54-mm diameter x 63-mm high, with a single spring pocket and a 90-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 57-mm wide x 130-mm long. Between the wraps was a layer 0.15-mm thick x 57-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 6.5-mm diameter holes in three brackets screw fixed to the case of the collar.

The penetrating service comprised a nominally 32-mm IPLEX PE-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: 13 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 1339.

Product Name: Penetration 7 – Retrofit SNAP50GAS fire collar protecting a nominal 50-mm IPLEX PE-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 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 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.

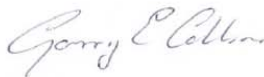
The penetrating service comprised a nominally 50-mm IPLEX PEX-AL-PEX gas pipe penetrating an oversized hole cored through the concrete slab. Once the pipe was fitted through the hole and restrained, the resulting gap around the pipe was backfilled flush with both sides of the concrete slab using a quick 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.

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