# Fire-resistance test on fire collars protecting a concrete floor slab penetrated by services

## Test Report

**Author:** Chris Wojcik
**Report number:** FSP 1789
**Date:** 27 March 2017

**Client:** IG6 Pty Ltd as trustee for the IG6 IP Trust



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## Report Status and Revision History:

| VERSION | STATUS | DATE | DISTRIBUTION | ISSUE NUMBER |
|---|---|---|---|---|
| Revision A | Draft for review | 25/01/2017 | CSIRO | FSP 1789 |
| Revision B | Final for issue | 27/03/2017 | CSIRO and Client | FSP 1789 |

## Report Authorization:

| AUTHOR | REVIEWED BY | AUTHORISED BY |
|---|---|---|
| Chris Wojcik | Brett Roddy | Brett Roddy |
|  |  |  |
| 27 March 2017 | 27 March 2017 | 27 March 2017 |

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# Fire-resistance test on fire collars protecting a concrete floor slab penetrated by services

## Sponsored Investigation No. FSP 1789

# 1 Introduction

## 1.1 Identification of specimen

The sponsor identified the specimen as six (6) retrofit Fire Collars protecting a 150-mm thick concrete floor slab penetrated by three (3) PVC pipes, two (2) HDPE Pipe and one (1) Rehau Raupiano Pipe and floor waste.

## 1.2 Sponsor

IG6 Pty Ltd as trustee for the IG6 IP Trust
3 Skirmish Court
Victoria Point Qld 4165

## 1.3 Manufacturer

Snap Fire Systems Pty Ltd
Building A, 1343 Wynnum Road
Tingalpa QLD 4173

## 1.4 Test standard

Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-2014, Fire-resistance tests of elements of construction.

## 1.5 Reference standard

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

## 1.6 Test number

CSIRO Reference test number: FS 4627/4043

## 1.7 Test date

The fire-resistance test was conducted on 16 November 2016.

# 2 Description of specimen

## 2.1 General

The specimen comprised an 1150-mm x 1150-mm x 150-mm thick reinforced concrete slab penetrated by six (6) floor wastes protected by retrofitted Snap Fire Systems fire collars.

The pipes used in the test are stated to be manufactured in accordance with:

- AS/NZS 1260 - PVC-U pipes and fittings for drain, waste and vent application
- AS/NZS 5065:2005 'Polyethylene and polypropylene pipes and fittings for drainage and sewerage applications'
- AS/NZS 7671:2010 'Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings - Polypropylene (PP)(ISO 7671:2003), MOD'

For the purpose of the test, the specimens were referenced as Penetrations 1, 2, 3, 4, 5 and 6. Three (3) specimens are included in this report (Penetration 4, 5 and 6). Documents containing a complete description of each specimen were supplied by the sponsor and are retained on file.

Penetration 4 – LP65R Retrofit fire collar protecting a nominal 65-mm Polyvinyl Chloride (PVC) Pipe incorporating a floor waste and fitting inside the collar

The SNAP Retrofit LP65R fire collar comprised a 0.7-mm steel casing with a 85-mm inner diameter and a 202-mm diameter base flange. The 61-mm high collar casing incorporated a 300-mm x 55-mm x 4-mm thick Intumesh intumescent material. The closing mechanism comprised three stainless steel springs bound with nylon fuse links and a 300-mm x 55-mm stainless steel mesh as shown in drawing numbered LP65R-T dated 13 June 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to the underside of the slab using 30 x 5-mm concrete screws.

The penetrating service comprised a 69-mm PVC pipe and a PVC Coupling, with a total wall thickness of 5.4-mm fitted through the collar's sleeve. The floor waste system was fitted with a chrome brass grate. A 35-mm thick sand/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 65-mm PVC P-Trap was connected to the penetrating pipe, supported by an HKD Anchor and steel clamp to the concrete slab. On the exposed face, the gully trap was capped using a 65-mm PVC End Cap.

The floor waste gully was charged with water to the level shown in drawing titled "Test Slab S-16-C Penetration # 4 65-mm PVC Pipe with Fitting Inside Collar– LP65R-D, dated 21 November 2016, by Snap Fire Systems Pty Ltd.

Penetration 5 – LP65R Retrofit fire collar protecting a nominal 40-mm High-density polyethylene (HDPE) Pipe incorporating a Floorwaste

The SNAP Retrofit LP65R fire collar comprised a 0.7-mm steel casing with a 85-mm inner diameter and a 202-mm diameter base flange. The 61-mm high collar casing incorporated a 300-mm x 55-mm x 4-mm thick Intumesh intumescent material. The closing mechanism comprised three stainless steel springs bound with nylon fuse links and a 300-mm x 55-mm stainless steel mesh as shown in drawing numbered LP65R-T dated 13 June 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to the underside of the slab using 30 x 5-mm concrete screws.

The penetrating service comprised a 50-mm HDPE pipe, with a wall thickness of 2.5-mm fitted through the collar's sleeve. The floor waste system was fitted with a chrome brass grate. A 35-mm thick sand/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 40-mm HDPE P-Trap was connected to the penetrating pipe, supported by an HKD Anchor and steel clamp to the concrete slab. On the exposed face, the gully trap was capped using a 40-mm HDPE End Cap.

The floor waste gully was charged with water to the level shown in drawing titled "Test Slab S-16-C Penetration # 5 40-mm HDPE Pipe – LP65R, dated 21 November 2016, by Snap Fire Systems Pty Ltd.

Penetration 6 – LP100R-D Retrofit collar protecting a nominal 80-mm Polyvinyl Chloride (PVC) Pipe incorporating a floorwaste and a fitting inside the collar

The SNAP Retrofit LP100R-D collar comprised a 0.95-mm thick steel casing with a 122-mm inner diameter and a 260-mm base flange. The 65-mm high collar casing incorporated a layer of 418-mm x 59-mm x 5-mm thick Intumescent material. The closing mechanism comprised 4 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 415 x 120-mm as shown in drawing numbered LP100R-D-T dated 2 November 2016, by Snap Fire Systems Pty Ltd. One collar was fixed to the underside of the slab using 32-mm Mushroom Head Spikes.

The penetrating service comprised a 82-mm PVC pipe and a 80-mm PVC Coupling, with a total wall thickness of 6-mm fitted through the collar's sleeve. The floor waste system was fitted with a chrome brass grate. A 35-mm thick sand/cement screed was laid on top of the concrete slab and finished flush with the floor grate. On the exposed side of the slab, a PVC P-Trap was connected to the penetrating pipe, supported by an HKD Anchor and steel clamp to the concrete slab. On the exposed face, the gully trap was capped using a PVC End Cap.

The floor waste gully was charged with water to the level shown in drawing titled "Test Slab S-16-C Penetration # 6 80-mm PVC Pipe with Fitting Inside Collar– LP100R-D, dated 21 November 2016, by Snap Fire Systems Pty Ltd.

## 2.2 Dimensions

The overall dimension of the concrete slab was 1150-mm wide x 1150-mm long x 150-mm thick, to suit the opening in the specimen containing frame.

## 2.3 Orientation

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

## 2.4 Conditioning

The concrete slab was left to cure for a period longer than 30 days.

# 3 Documentation

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

Drawing numbered LP100R-D-T dated 2 November 2016, by Snap Fire Systems Pty Ltd.

Drawing numbered LP65R-T dated 13 June 2014, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Slab S-16-C Penetration # 4 65-mm PVC Pipe with Fitting Inside Collar– LP65R-D, dated 21 November 2016, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Slab S-16-C Penetration # 5 40-mm HDPE Pipe – LP65R, dated 21 November 2016, by Snap Fire Systems Pty Ltd.

Drawing titled “Test Slab S-16-C Penetration # 6 80-mm PVC Pipe with Fitting Inside Collar– LP100R-D, dated 21 November 2016, by Snap Fire Systems Pty Ltd.

# 4 Equipment

## 4.1 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 1530.4-2014 and was heated by combustion of a mixture of natural gas and air.

## 4.2 Temperature

The temperature in the furnace chamber was measured by four type K, 3-mm diameter, and 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 are described in Appendix A.

## 4.3 Measurement system

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

# 5 Ambient temperature

The temperature of the test area was 23°C at the commencement of the test.

# 6 Departure from standard

There were no departures from the requirements of AS 1530.4-2014.

# 7 Termination of test

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

# 8 Test results

## 8.1 Critical observations

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

| Time | Observation |
|---|---|
| 3 minutes - | Smoke is being emitted from Penetration # 4. |
| 4 minutes - | Cotton Wool pad applied to Penetration # 4 and 6. No ignition. |
| 7 minutes - | Smoke has ceased fluing from Penetration # 4. No smoke is being emitted from Penetration # 5. Light smoke is fluing from Penetration # 6. |
| 30 minutes - | Light smoke is being emitted from Penetration # 6. |
| 45 minutes - | Smoke is being emitted from all specimens with the exception of Penetration # 5. |
| 60 minutes - | No change. |
| 90 minutes - | Light smoke is being emitted from all specimens with the exception of Penetration # 5. |
| 108 minutes - | Smoke is increasing from Penetration # 6. |
| 235 minutes - | Cotton wool pad test applied over Penetration # 6. No ignition. |
| 241 minutes - | Test terminated. |

## 8.2 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.

## 8.3 Furnace severity

Figure 2 shows the curve of furnace severity versus time during the heating period.

## 8.4 Specimen temperature

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

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

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

## 8.5 Performance

Performance observed in respect of the following AS 1530.4-2014 criteria:

Penetration 4 – LP65R Retrofit fire collar protecting a nominal 65-mm Polyvinyl Chloride (PVC) Pipe incorporating a floor waste and fitting inside the collar

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

Penetration 5 – LP65R Retrofit fire collar protecting a nominal 40-mm High-density polyethylene (HDPE) Pipe incorporating a Floorwaste

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

Penetration 6 – LP100R-D Retrofit collar protecting a nominal 80-mm Polyvinyl Chloride (PVC) Pipe incorporating a floorwaste and a fitting inside the collar

| | | |
|---|---|---|
| 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 the 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.

# 9 Fire-resistance level (FRL)

For the purpose of building regulations in Australia, the FRL's of the test specimens were as follows:

Penetration 4 - -/240/240

Penetration 5 -/240/240

Penetration 6 - -/240/240

For the purposes of AS 1530.4-2014 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.

# 10 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 AS 1530.4-2014, have been made provided no individual component is removed or reduced.

# 11 Tested by

Chris Wojcik
Testing Officer

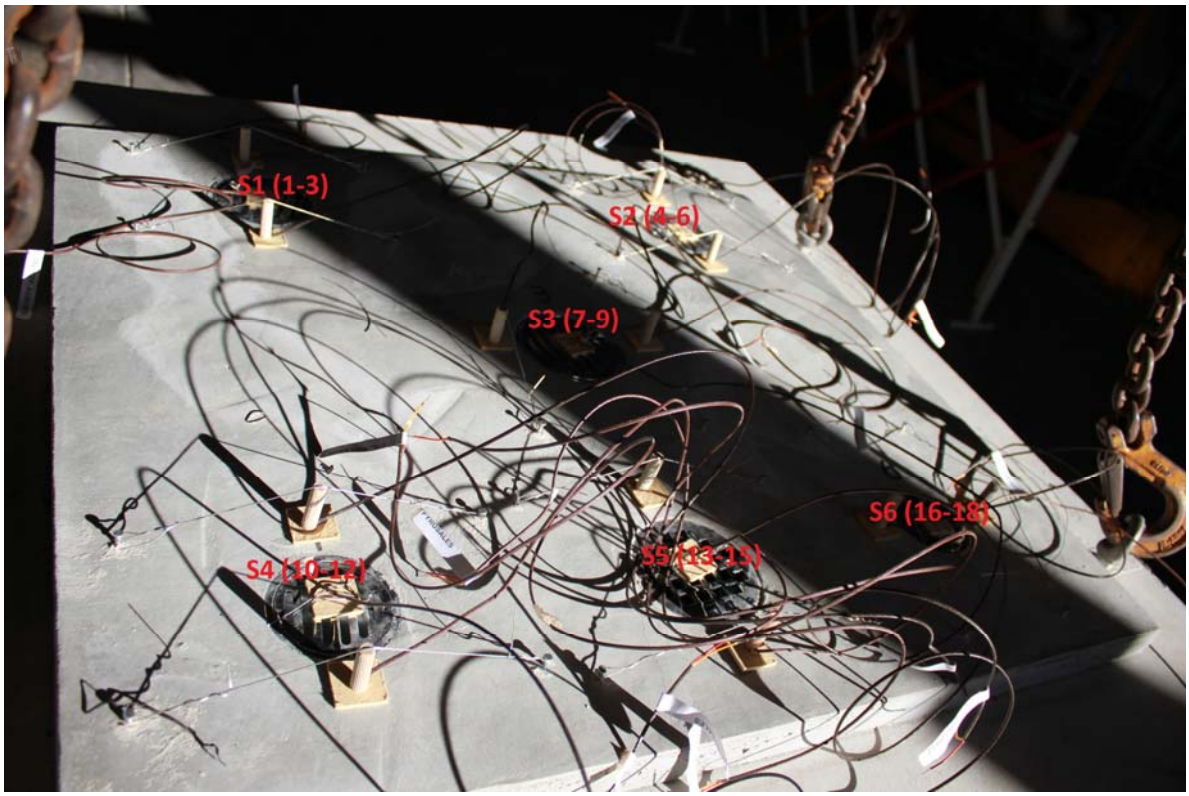
# Appendices

## Appendix A – Measurement location

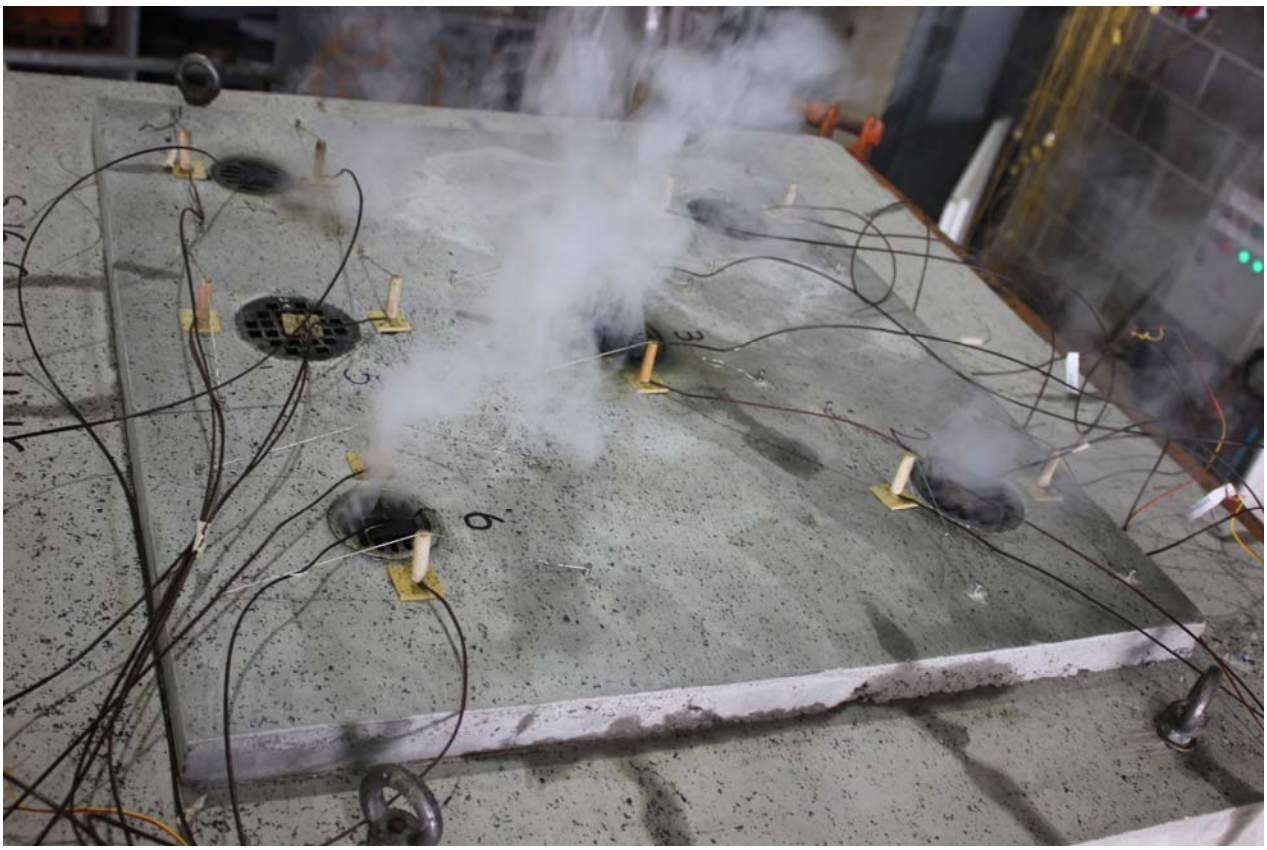
| Measurement Location | | |
|---|---|---|
| **Group location**<br>**Specimen** | **T/C Position** | **T/C designation** |
| Penetration 4 – LP65R Retrofit fire collar protecting a 65-mm Polyvinyl Chloride (PVC) Pipe with fitting inside the collar and Floorwaste | On top of the grate | S10 |
| | On concrete, 25-mm from the opening | S11 |
| | On concrete, 25-mm from the opening | S12 |
| Penetration 5 – LP65R Retrofit fire collar protecting a 40-mm High-density polyethylene (HDPE) Pipe and Floorwaste | On top of the grate | S13 |
| | On concrete, 25-mm from the opening | S14 |
| | On concrete, 25-mm from the opening | S15 |
| Penetration 6 – LP100R-D Retrofit collar protecting a nominal 80-mm Polyvinyl Chloride (PVC) Pipe with fitting inside the collar and Floorwaste | On top of the grate | S16 |
| | On concrete, 25-mm from the opening | S17 |
| | On concrete, 25-mm from the opening | S18 |

# Appendix B – Photographs

**PHOTOGRAPH 1 – EXPOSED FACE OF SPECIMENS PRIOR TO TESTING**



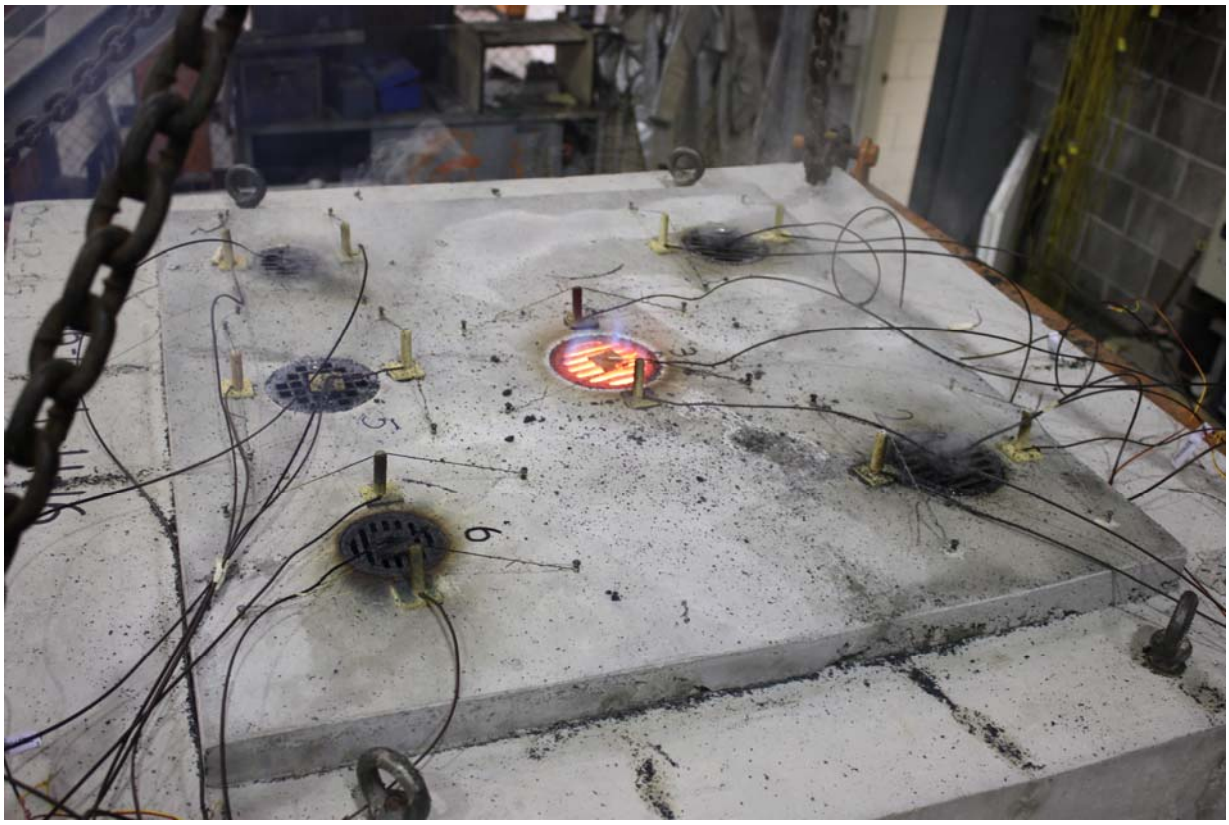

**PHOTOGRAPH 2 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING**



**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 – UNEXPOSED FACED OF SPECIMEN AT CONCLUSION OF TESTING**

**PHOTOGRAPH 7 – EXPOSED FACE OF SPECIMENS AT CONCLUSION OF TESTING**

# Appendix C – Furnace Temperature

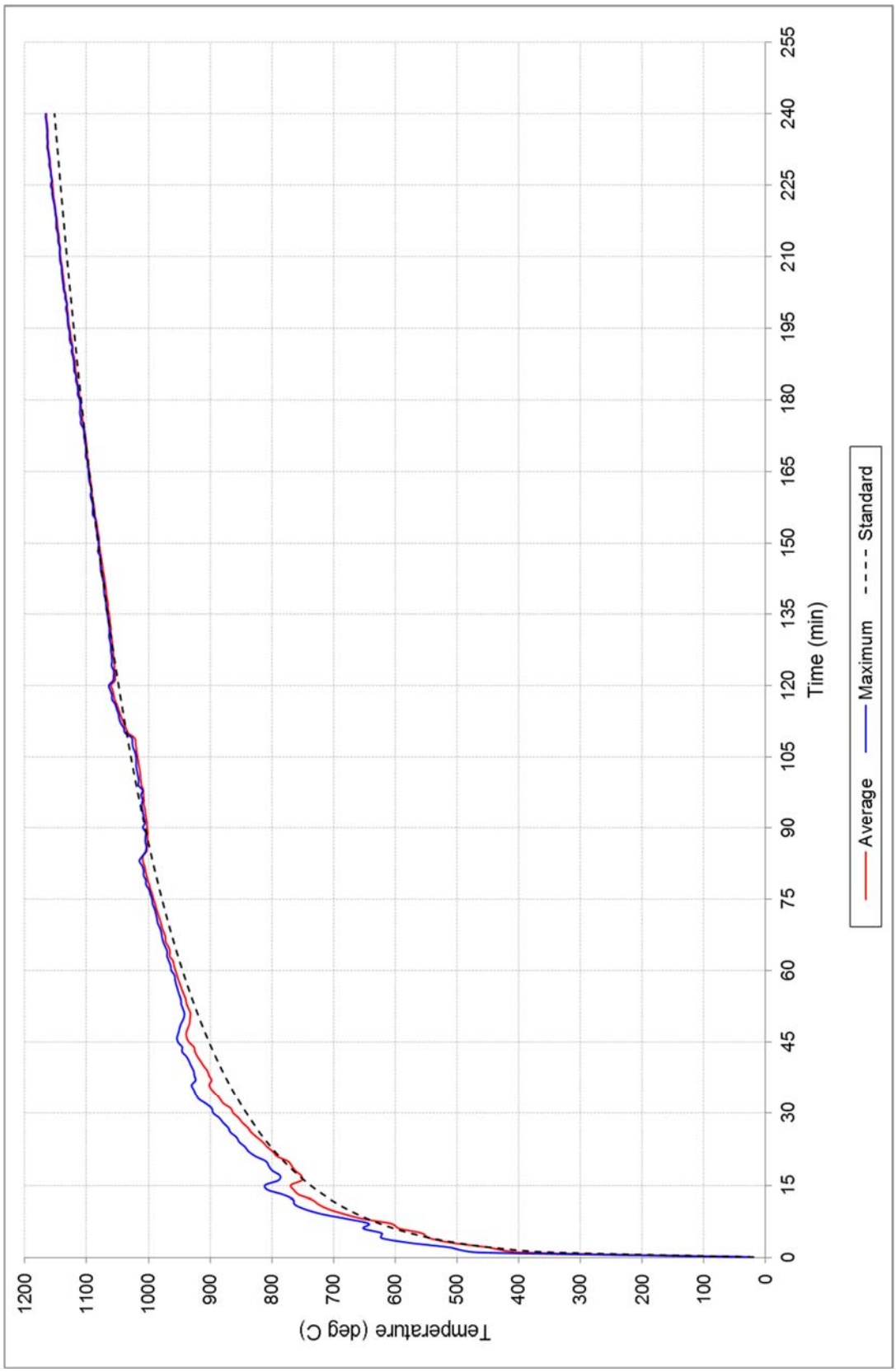



**FIGURE 1 – FURNACE TEMPERATURE**

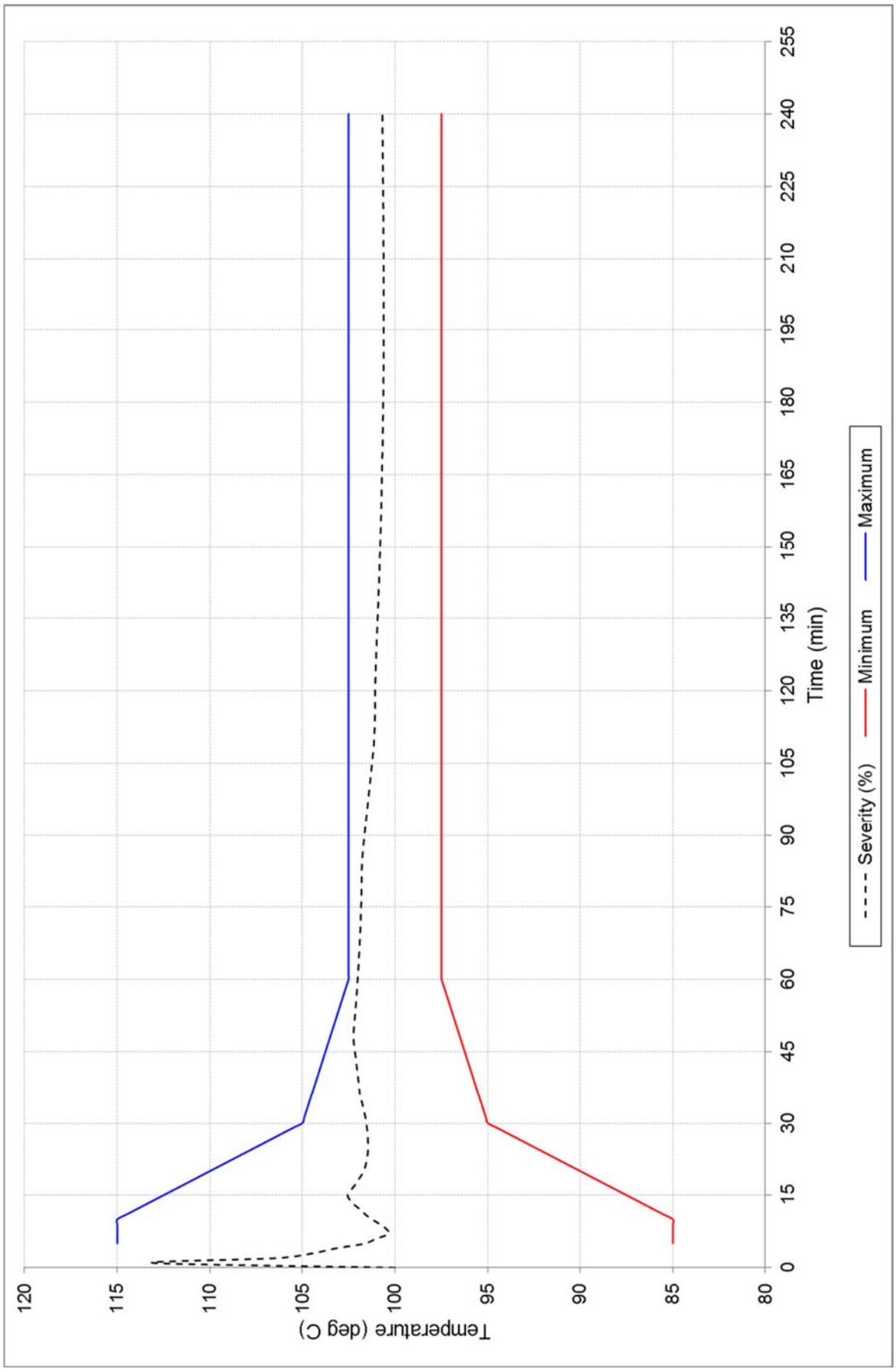



**FIGURE 2 – FURNACE SEVERITY**

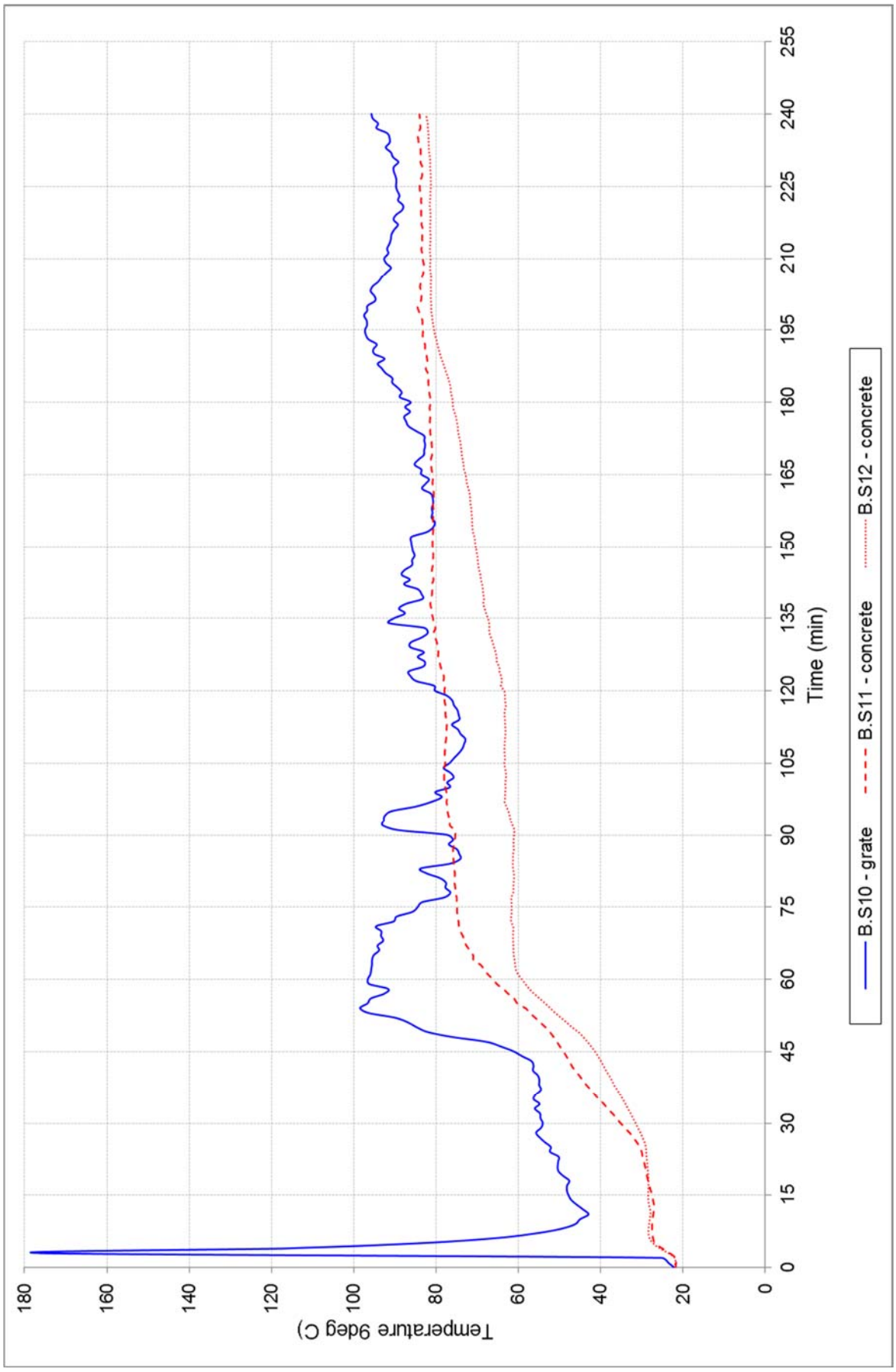



**FIGURE 3 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 4**

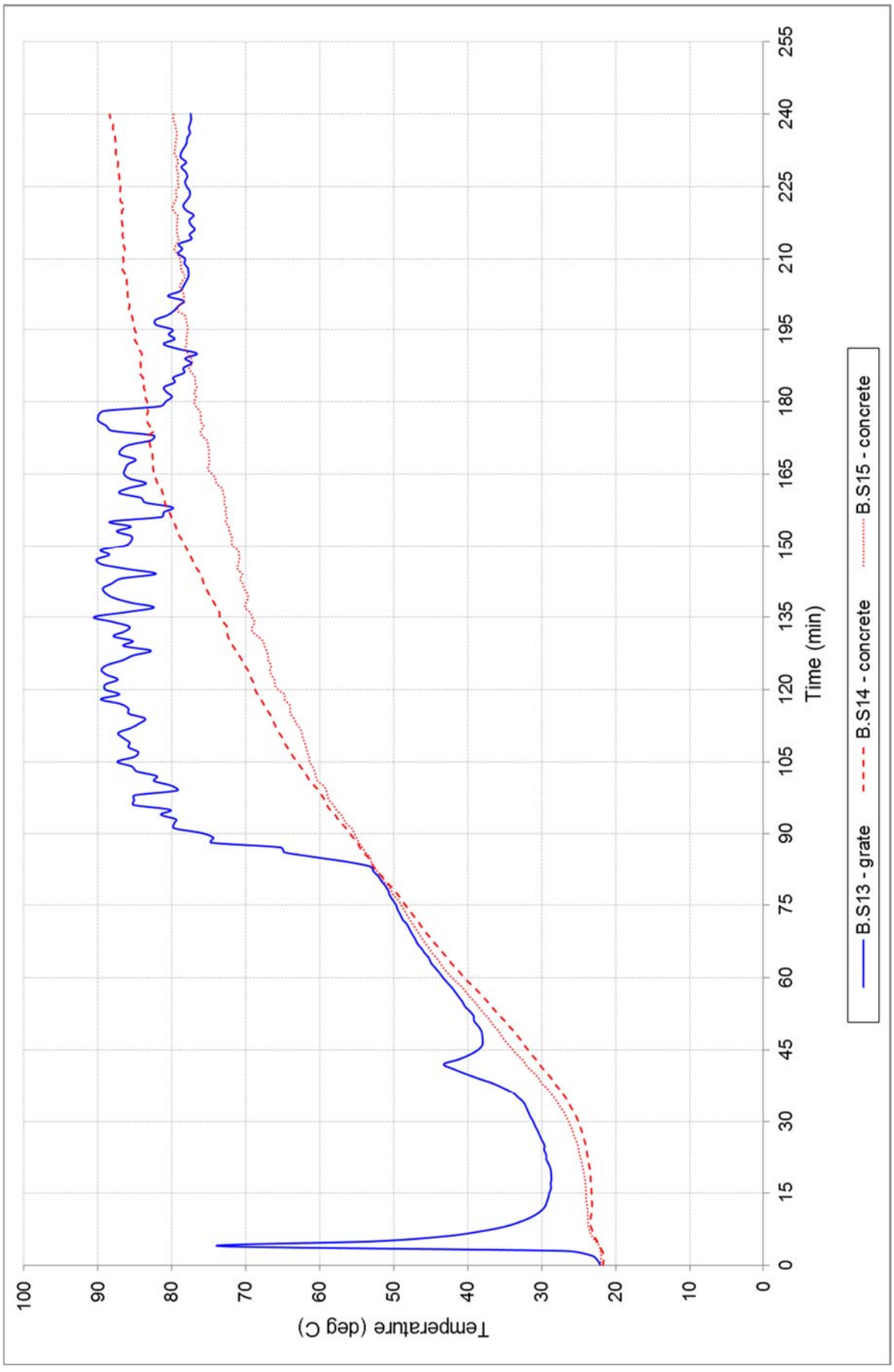



**FIGURE 4 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 5**

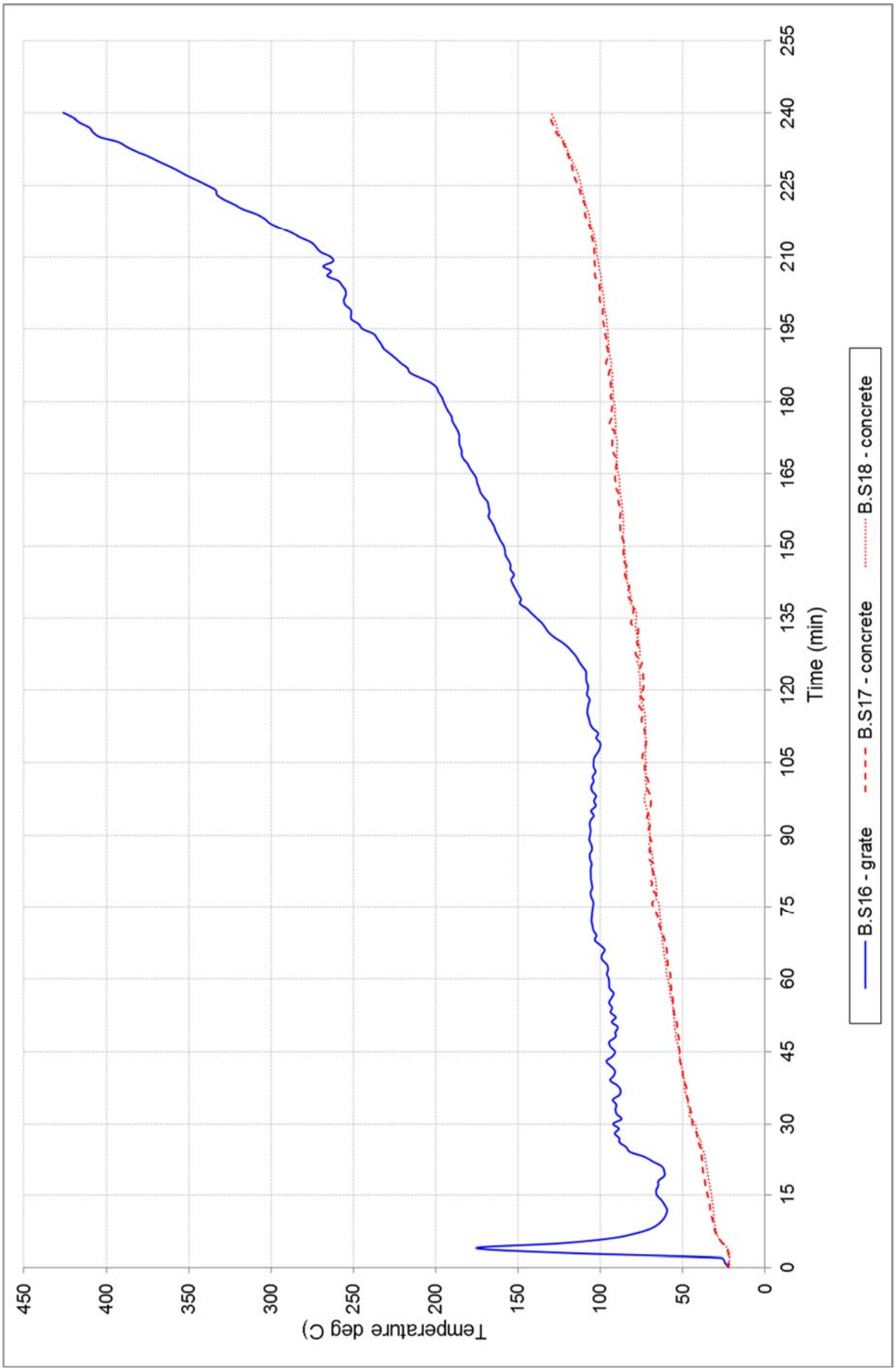
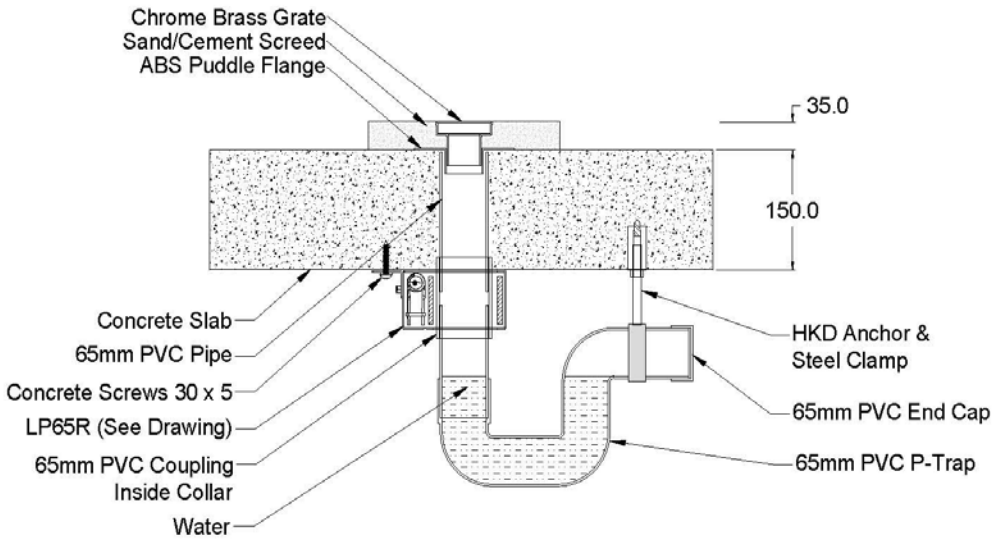



**FIGURE 5 – SPECIMEN TEMPERATURE – ASSOCIATED WITH PENETRATION # 6**

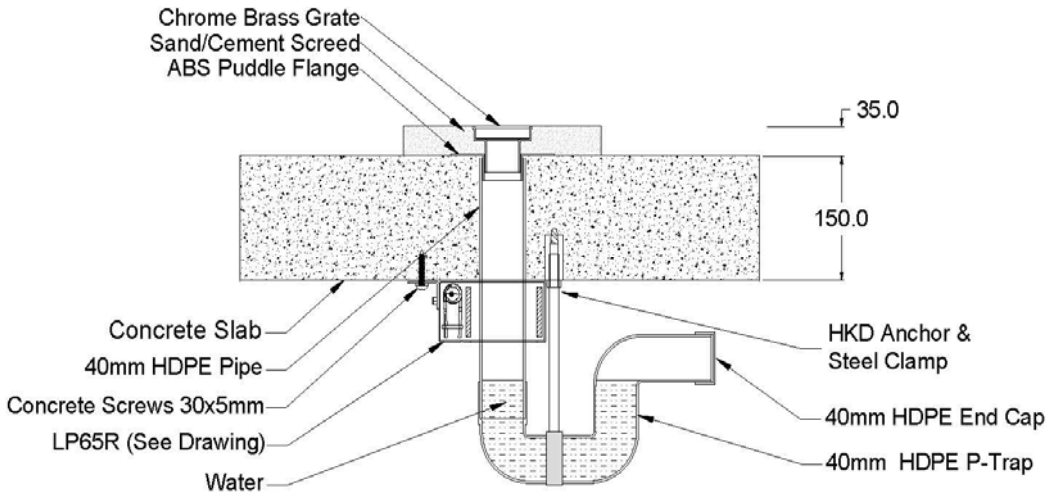
# Appendix D – Installation drawings

Test Slab S-16-C Penetration # 4
65mm PVC Pipe w Fitting Inside Collar – LP65R
Date 21 NOV 2016




**DRAWING TITLED "TEST SLAB S-16-C PENETRATION # 4 65-MM PVC PIPE WITH FITTING INSIDE COLLAR– LP65R-D, DATED 21 NOVEMBER 2016, BY SNAP FIRE SYSTEMS PTY LTD.**

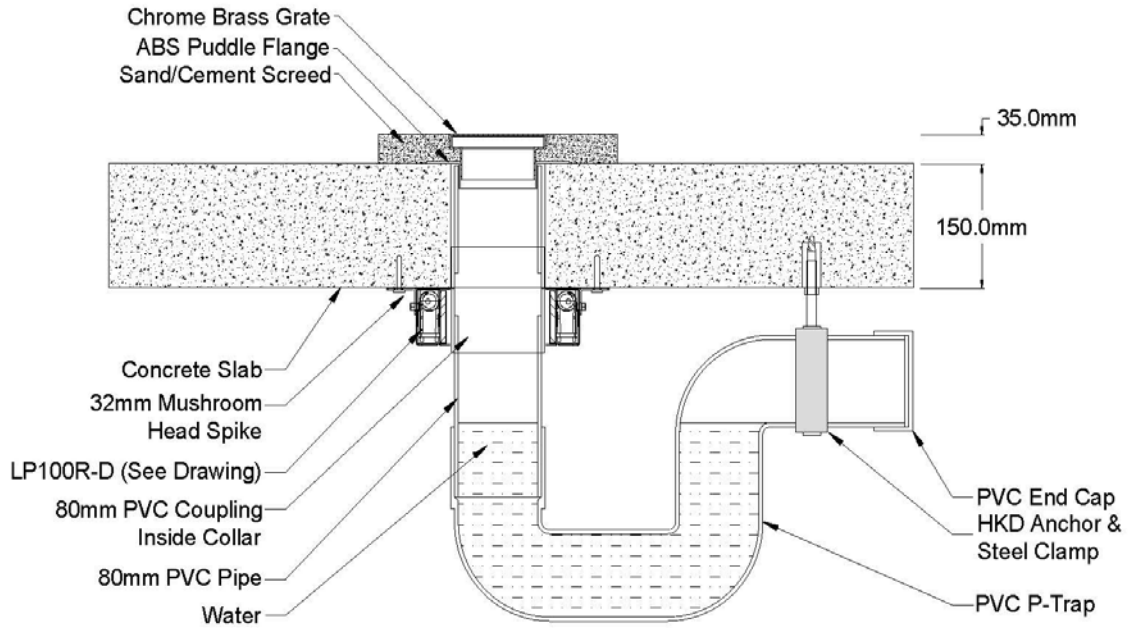
Test Slab S-16-C Penetration # 5
40mm HDPE Pipe – LP65R
Date 21 NOV 2016




11/30/2016 8:10:30 AM

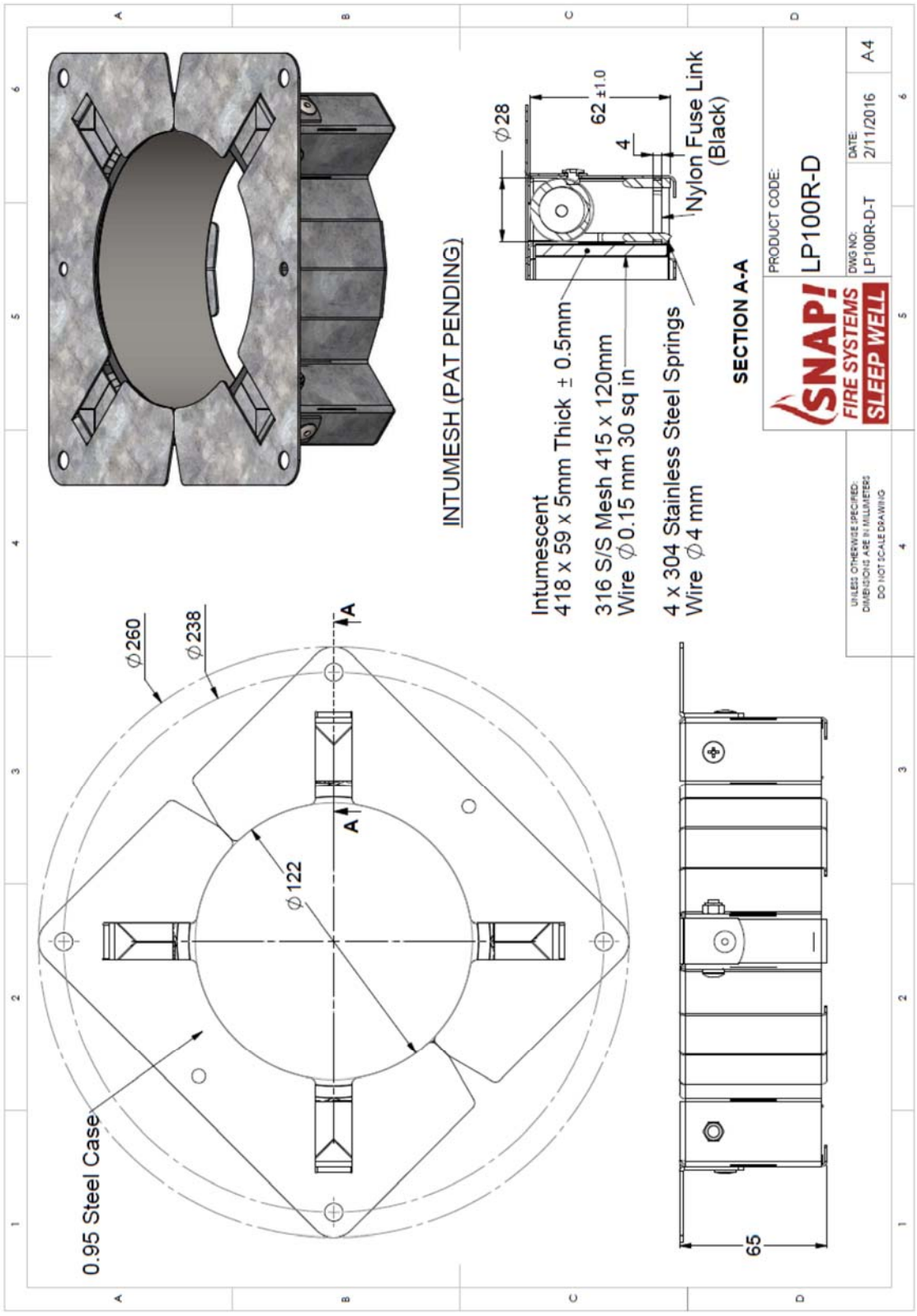
**DRAWING TITLED "TEST SLAB S-16-C PENETRATION # 5 40-MM HDPE PIPE – LP65R, DATED 21 NOVEMBER 2016, BY SNAP FIRE SYSTEMS PTY LTD.**

Test Slab S-16-C Penetration # 6
80mm PVC Pipe w Fitting Inside Collar – LP100R-D
Date 21 NOV 2016

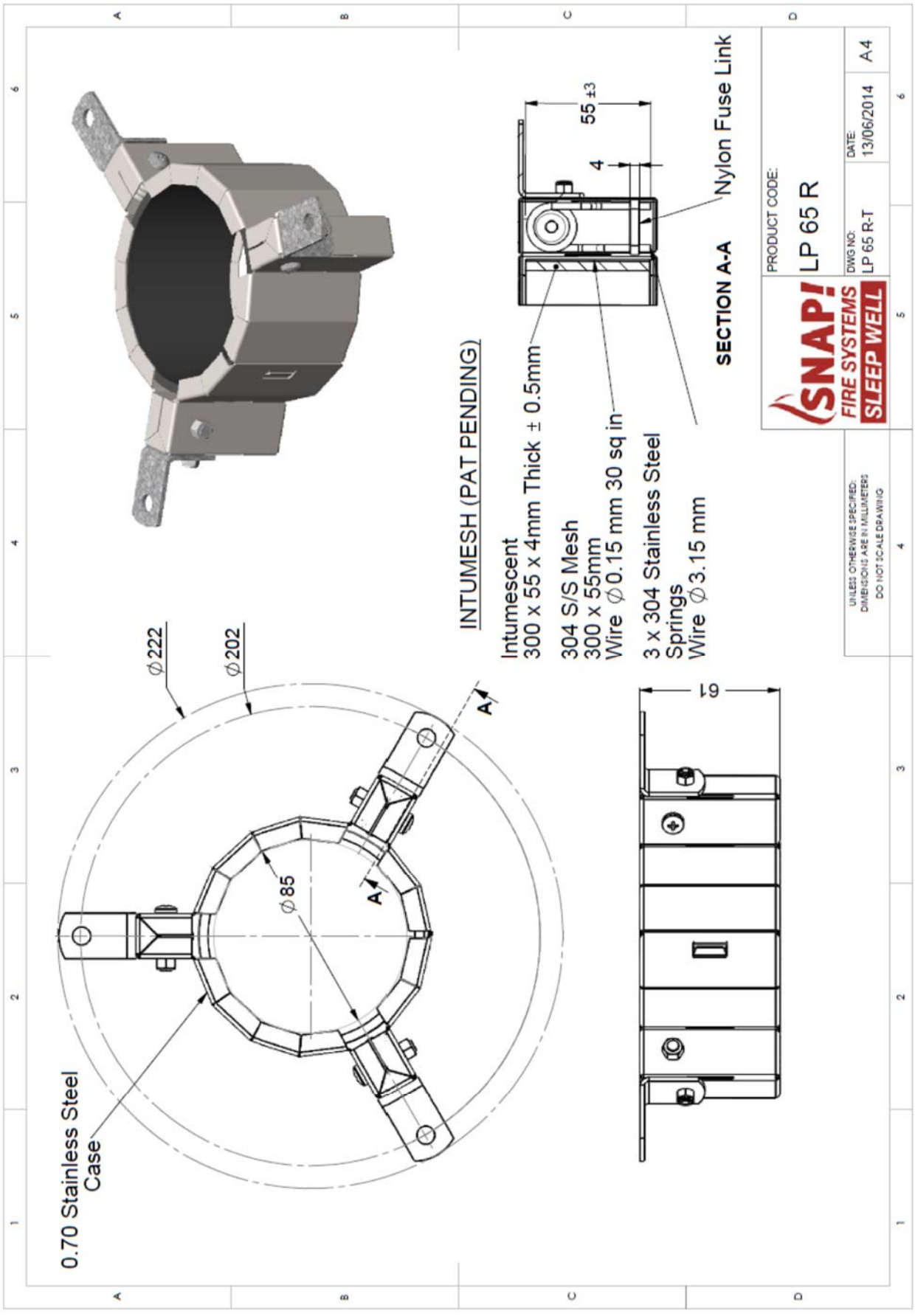



**DRAWING TITLED "TEST SLAB S-16-C PENETRATION # 6 80-MM PVC PIPE WITH FITTING INSIDE COLLAR– LP100R-D, DATED 21 NOVEMBER 2016, BY SNAP FIRE SYSTEMS PTY LTD.**

# Appendix E – Specimen Drawings




**DRAWING NUMBERED LP100R-D-T DATED 2 NOVEMBER 2016, BY SNAP FIRE SYSTEMS PTY LTD.**




**DRAWING NUMBERED LP65R-T DATED 13 JUNE 2014, BY SNAP FIRE SYSTEMS PTY LTD.**

# Appendix F – Certificates

INFRASTRUCTURE TECHNOLOGIES
www.csiro.au

14 Julius Avenue, North Ryde NSW 2113
PO Box 52, North Ryde NSW 1670, Australia
T (02) 9490 5444 • ABN 41 687 119 230

## Certificate of Test

No. 2933



This is to certify that the element of construction described below was tested by CSIRO Infrastructure Technologies in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4 Fire-resistance tests of elements of construction, 2014 on behalf of:

IG6 Pty Ltd as trustee for the IG6 IP Trust
3 Skirmish Court
Victoria Point Qld 4165

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1789.

Product Name: Penetration 4 – LP65R Retrofit fire collar protecting a nominal 65-mm Polyvinyl Chloride (PVC) Pipe incorporating a floor waste and fitting inside the collar

Description: The SNAP Retrofit LP65R fire collar comprised a 0.7-mm steel casing with a 85-mm inner diameter and a 202-mm diameter base flange. The 61-mm high collar casing incorporated a 300-mm x 55-mm x 4-mm thick Intumesh intumescent material. The closing mechanism comprised three stainless steel springs bound with nylon fuse links and a 300-mm x 55-mm stainless steel mesh as shown in drawing numbered LP65R-T dated 13 June 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to the underside of the slab using 30 x 5-mm concrete screws. The penetrating service comprised a 69-mm PVC pipe and a PVC Coupling, with a total wall thickness of 5.4-mm fitted through the collar's sleeve. The floor waste system was fitted with a chrome brass grate. A 35-mm thick sand/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 65-mm PVC P-Trap was connected to the penetrating pipe, supported by an HKD Anchor and steel clamp to the concrete slab. On the exposed face, the gully trap was capped using a 65-mm PVC End Cap. The floor waste gully was charged with water to the level shown in drawing titled "Test Slab S-16-C Penetration # 4 65-mm PVC Pipe with Fitting Inside Collar– LP65R-D, dated 21 November 2016, by Snap Fire Systems Pty Ltd.

| | |
|---|---|
| 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. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 16 November 2016

Issued on the 27th day of March 2017 without alterations or additions.

Brett Roddy
Manager, Fire Testing and Assessments

This document is issued in accordance with NATA's accreditation requirements.
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# Certificate of Test

No. 2934



This is to certify that the element of construction described below was tested by CSIRO Infrastructure Technologies in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4 Fire-resistance tests of elements of construction, 2014 on behalf of:

IG6 Pty Ltd as trustee for the IG6 IP Trust
3 Skirmish Court
Victoria Point Qld 4165

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1789.

Product Name: Penetration 5 – LP65R Retrofit fire collar protecting a nominal 40-mm High-density polyethylene (HDPE) Pipe incorporating a Floorwaste

Description: The SNAP Retrofit LP65R fire collar comprised a 0.7-mm steel casing with a 85-mm inner diameter and a 202-mm diameter base flange. The 61-mm high collar casing incorporated a 300-mm x 55-mm x 4-mm thick Intumesh intumescent material. The closing mechanism comprised three stainless steel springs bound with nylon fuse links and a 300-mm x 55-mm stainless steel mesh as shown in drawing numbered LP65R-T dated 13 June 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to the underside of the slab using 30 x 5-mm concrete screws. The penetrating service comprised a 50-mm HDPE pipe, with a wall thickness of 2.5-mm fitted through the collar's sleeve. The floor waste system was fitted with a chrome brass grate. A 35-mm thick sand/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 40-mm HDPE P-Trap was connected to the penetrating pipe, supported by an HKD Anchor and steel clamp to the concrete slab. On the exposed face, the gully trap was capped using a 40-mm HDPE End Cap. The floor waste gully was charged with water to the level shown in drawing titled "Test Slab S-16-C Penetration # 5 40-mm HDPE Pipe – LP65R, dated 21 November 2016, by Snap Fire Systems Pty Ltd.

| | |
|---|---|
| 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. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 16 November 2016

Issued on the 27th day of March 2017 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

This document is issued in accordance with NATA's accreditation requirements.
Accreditation No. 165 – Corporate Site No. 3625
Accredited for compliance with ISO/IEC 17025 - Testing

**COPY OF CERTIFICATE OF TEST – NO. 2934**

INFRASTRUCTURE TECHNOLOGIES
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**T** (02) 9490 5444 • **ABN** 41 687 119 230

# Certificate of Test

No. 2935



This is to certify that the element of construction described below was tested by CSIRO Infrastructure Technologies in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4 Fire-resistance tests of elements of construction, 2014 on behalf of:

IG6 Pty Ltd as trustee for the IG6 IP Trust
3 Skirmish Court
Victoria Point Qld 4165

A full description of the test specimen and the complete test results are detailed in the Division's Sponsored Investigation report numbered FSP 1789.

Product Name: Penetration 6 – LP100R-D Retrofit collar protecting a nominal 80-mm Polyvinyl Chloride (PVC) Pipe incorporating a floorwaste and a fitting inside the collar

Description: The SNAP Retrofit LP100R-D collar comprised a 0.95-mm thick steel casing with a 122-mm inner diameter and a 260-mm base flange. The 65-mm high collar casing incorporated a layer of 418-mm x 59-mm x 5-mm thick Intumescent material. The closing mechanism comprised 4 x 304 stainless steel spring bound with a black nylon fuse link and a 316 stainless steel mesh measuring 415 x 120-mm as shown in drawing numbered LP100R-D-T dated 2 November 2016, by Snap Fire Systems Pty Ltd. One collar was fixed to the underside of the slab using 32-mm Mushroom Head Spikes. The penetrating service comprised a 82-mm PVC pipe and a 80-mm PVC Coupling, with a total wall thickness of 6-mm fitted through the collar's sleeve. The floor waste system was fitted with a chrome brass grate. A 35-mm thick sand/cement screed was laid on top of the concrete slab and finished flush with the floor grate. On the exposed side of the slab, a PVC P-Trap was connected to the penetrating pipe, supported by an HKD Anchor and steel clamp to the concrete slab. On the exposed face, the gully trap was capped using a PVC End Cap. The floor waste gully was charged with water to the level shown in drawing titled "Test Slab S-16-C Penetration # 6 80-mm PVC Pipe with Fitting Inside Collar– LP100R-D, dated 21 November 2016, by Snap Fire Systems Pty Ltd.

| | |
|---|---|
| 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. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik Date of Test: 16 November 2016

Issued on the 27th day of March 2017 without alterations or additions.

B. Roddy

Brett Roddy
Manager, Fire Testing and Assessments

This document is issued in accordance with NATA's accreditation requirements.
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**COPY OF CERTIFICATE OF TEST – NO. 2935**

# References

The following informative documents are referred to in this Report:


| | |
|---|---|
| AS 1530.4-2014 | Methods for fire tests on building materials, components and structures Part 4: Fire-resistance tests of elements of building construction. |
| AS 4072.1-2005 | Components for the protection of openings in fire-resistant separating elements. Part 1: Service penetrations and control joints. |


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Australia is founding its future on science and innovation. Its national science agency, CSIRO, is a powerhouse of ideas, technologies and skills for building prosperity, growth, health and sustainability. It serves governments, industries, business and communities across the nation.

FOR FURTHER INFORMATION

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