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

## Test Report

**Author:** Peter Gordon
**Report number:** FSP 2298
**Date:** 6 October 2022

**Client:** IG6 Pty Ltd

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## Report Authorisation:

| AUTHOR | REVIEWED BY | AUTHORISED BY |
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|  |  |  |
| 6 October 2022 | 6 October 2022 | 6 October 2022 |

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# Contents

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

# Sponsored Investigation No. FSP 2298

## 1 Introduction

### 1.1 Identification of specimen

The sponsor identified the specimens as SNAP fire collars protecting a 150-mm thick concrete floor slab penetrated by four services comprising three unplasticized polyvinyl chloride (uPVC) stack pipes and a Beer Python.

### 1.2 Sponsor(s)

IG6 Pty Ltd
1343 Wynnum Road
Tingalpa QLD

### 1.3 Manufacturer(s)

Snap Fire Systems Pty Ltd
1343 Wynnum Road
Tingalpa QLD

### 1.4 Test standard

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

Section 10: Service penetrations and control joints.

### 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 5193/4703

## 1.7 Test date

The fire-resistance test was conducted on 11 July 2022.

# 2 Description of specimen

## 2.1 General

The specimen comprised an 1150-mm x 1150-mm x 150-mm thick concrete slab which was penetrated by multiple services protected by three retrofit fire collars and one cast-in fire collar.

The 150-mm thick concrete slab was reinforced with a single layer of steel reinforcement providing a Fire Resistance Period (FRP) for insulation of 180 minutes in accordance with table 5.5.1 of AS 3600:2018 - Concrete structures.

For the purpose of the test, the penetrations were referenced as specimen 1, 2, 3 and 4. Documents containing a complete description of each specimen were supplied by the sponsor and are retained on file.

The uPVC 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.

<u>Specimen 1 – A SNAP LP100R-D Low Profile Retrofit fire collar protecting a nominal 100 uPVC pipe penetrating a 250-mm diameter core hole</u>

The SNAP LP100R-D Low Profile Retrofit fire collar comprised a 0.95-mm steel casing with a 122-mm inner diameter and a 260-mm diameter base flange. The 65-mm high fire collar casing incorporated a closing mechanism which comprised a 5-mm thick x 59-mm wide x 418-mm long Intumesh intumescent wrap which lined the internal circumference of the fire collar casing. The closing mechanism comprised four 4-mm diameter 304 stainless steel springs with black nylon fuse links and a 415-mm long x 120-mm wide wire mesh with a wire diameter of 0.15-mm as shown in drawing numbered LP100R-D-T dated 10 February 2017, by Snap Fire Systems Pty Ltd.

On the exposed face of the concrete slab a 300-mm x 300-mm section of 10-mm thick magnesium oxide (MgO) board, lined with a 1-mm thick galvanised steel sheet was centrally located over the 250-mm core hole. The MgO board and steel sheet were cut into two halves (300-mm x 150-mm) with a nominal 111-mm diameter aperture located in the centre, to be retrofitted around the penetrating service. The MgO board and galvanised steel sheets were fixed to the underside of the concrete slab using ten 5-mm x 30-mm long concrete screw bolts with 10-mm washers at nominally 130-mm centres.

The LP100R-D fire collar was centrally located over the 111-mm aperture on the underside (fire exposed face) of the MgO board and galvanised steel sheet and was fixed in position through 4 mounting brackets using 10-guage x 38-mm laminating screws.

The penetrating service comprised a Iplex DWV uPVC (sandwich construction) pipe with a 110-mm outside diameter and a wall thickness of 3.4-mm. The pipe was fitted through the fire collar sleeve, galvanised sheeting and MgO board and penetrated the concrete slab through a 250-mm diameter core hole as shown in drawing titled 'Specimen #1, 100 PVC(SC) Stack & LP100R-D', dated 23 September 2021, by Snap Fire Systems Pty Ltd.

The annular gap between the pipe and concrete slab core hole directly above the MgO board was filled (friction fitted) with a purpose cut section of a 60-mm thick coated mineral fibre batt, consisting of a 160-165 kg/m$^3$ fibrous lamella core (stone wool), sealed on both sides with a flexible ablative coating.

The pipe projected vertically 2000-mm above the unexposed face of the concrete slab and 500-mm into the furnace chamber and was supported at nominally 500-mm and 1500-mm from the unexposed face of the slab. The PVC pipe was left open at the unexposed end and was fitted with a PVC end cap on the exposed end.

Specimen 2 – A SNAP LP100R-D Low Profile Retrofit fire collar protecting a nominal 100-mm PVC-SC floor waste with a fitting inside the collar penetrating a 130-mm core hole

The SNAP LP100R-D Low Profile Retrofit fire collar comprised a 0.95-mm steel casing with a 122-mm inner diameter and a 260-mm diameter base flange. The 65-mm high collar casing incorporated a closing mechanism which comprised a 5-mm thick x 59-mm wide x 418-mm long Intumesh intumescent wrap lined within the internal circumference of the collar casing. The closing mechanism comprised four 4-mm diameter 304 stainless steel springs with black nylon fuse links and a 415-mm long x 120-mm wide wire mesh with a wire diameter of 0.15 mm as shown in drawing numbered LP100R-D-T dated 10 February 2017, by Snap Fire Systems Pty Ltd.

The LP100R-D fire collar was centrally located over a 130-mm core hole on the underside (exposed face) of the concrete slab and fixed through the four-fire collar mounting brackets using 5-mm x 35-mm mushroom head spikes.

The penetrating service comprised a Iplex 110-mm PVC-SC outside diameter pipe and a wall thickness of 3.27-mm fitted through the fire collars sleeve and penetrated the slab through a 130-mm core hole. The service pipe had a nominal 100 PVC coupling fitted inside the collar sleeve, having a total wall thickness of approximately 6.3-mm (PVC-SC pipe in addition with the PVC coupling). The floor waste was fitted with a chrome plated brass grate and a plastic puddle flange. A 15-mm thick grout 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 on the pipe above the trap with a 110-mm hanging nut clip with a galvanised steel strap fixed to the slab with 5-mm x 30-mm concrete screw anchors and a M10 threaded rod, nut clip and a steel drop-in anchor at the end of the P-Trap. On the exposed face, the P-Trap was capped using a PVC End Cap.

The floor waste gully was charged with 2500-mL of water to the level shown in drawing titled 'Specimen #2 100 PVC(SC) Floor Waste w/ fitting & LP100R-D', dated 23 February 2022, by Snap Fire Systems Pty Ltd.

Specimen 3 - A SNAP HP150R High Profile Retrofit fire collar protecting a tube bundle (beverage Python) penetrating a 135-mm diameter core hole

The SNAP retrofitted HP150R collar comprised a 0.95-mm thick steel casing with a 175-mm inner diameter and a 326-mm base flange. The 117-mm high collar casing incorporated a strip of 570-mm long x 112-mm wide x 8-mm thick Intumesh intumescent material. The closing mechanism comprised four SPR-SS400-102 stainless steel springs bound with nylon fuse links, and a 590-mm x 109 mm 316 stainless steel mesh as shown in drawing titled 'SNAP 150 High Profile Retro' dated 5 October 2017, by Snap Fire Systems Pty.

The SNAP HP150R fire collar was centrally located over a 135-mm diameter core hole on the underside (exposed face) of the concrete slab and fixed through the 4 mounting brackets using 6.5-mm x 40-mm steel sleeve anchors.

The penetrating service comprised a 128-mm outside diameter Valpar Andale Python pipe incorporating a bundle of 20 tube Brewmaster 2 nylon tubes (12 x 12-mm outside diameter tubes with a wall thickness of 2.5-mm and 8 x 16-mm outside diameter tubes with a wall thickness of 2.5-mm), lined with a 25-mm thick flexible closed-cell foam insulation jacket with an outer black PVC wrapping. The Python pipe was fitted through the fire collar sleeve and penetrated the concrete slab through the core hole as shown in drawing titled 'Specimen #3, 130 Beer Python Stack & HP150R', dated 24 February 2022, by Snap Fire Systems Pty Ltd. On the unexposed face concrete slab, the nominal 1-mm annular gap between the Python pipe and the core hole was left unprotected.

The pipe projected vertically 2000-mm above the unexposed face of the concrete slab and 500-mm below into the furnace chamber. The Beer Python was supported at nominally 500-mm and 1500-mm from the unexposed face of the slab, left open at the unexposed end and sealed with a ceramic fibre (Superwool) plug on the exposed end.

Specimen 4 – A SNAP LP50R Low Profile Retrofit fire collar protecting a nominal 50 uPVC pipe penetrating a 250-mm diameter core hole incorporating a pipe coupling inside the fire collar

The SNAP LP50R Low Profile Retrofit fire collar comprised a 0.75-mm steel casing with a 69-mm inner diameter and a 203-mm diameter base flange. The 61.5-mm high collar casing incorporated a closing mechanism which comprised a 252-mm x 58-mm x 4-mm thick Intumesh intumescent wrap lined within the internal circumference of the collar casing. The closing mechanism comprised three stainless steel springs, with black nylon fuse links and a 260-mm x 58 mm stainless steel mesh, as shown in drawing titled 'SNAP 50 Low Profile Retro', dated 25 March 2019, by Snap Fire Systems Pty Ltd.

On the exposed face of the concrete slab a 300-mm x 300-mm section of 10-mm thick magnesium oxide (MgO) board lined with a 1-mm thick galvanised steel sheet was centrally located over the 250-mm core hole. The MgO board and steel sheet were cut into two halves (300-mm x 150-mm) with a nominal 56-mm diameter aperture located in the centre, to be retrofitted around the penetrating service. The MgO board and galvanised steel sheets were fixed to the underside of the concrete slab using ten 5-mm x 30-mm long concrete screw bolts with 10-mm washers at nominally 130-mm centres.

A SNAP LP50R fire collar was centrally located over the 56-mm aperture on the underside (fire exposed face) of the MgO board and galvanised steel sheet and then fixed through the three-fire collar mounting brackets using 10-gauge x 38-mm laminating screws, as shown in drawing titled 'Test Slab S-21-A4 Layout', dated 29 July 2021, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a Iplex DWV uPVC pipe with a 55.8-mm outside diameter and a wall thickness of 2.4-mm. The pipe was fitted through the fire collar sleeve, galvanised sheeting and MgO board and penetrated the concrete slab through a 250-mm diameter core hole. The pipe incorporated a PVC coupling located inside the fire collar on the exposed face as shown in drawing titled 'Specimen #4, 50 PVC Stack + Fitting & LP50R', dated 23 September 2021, by Snap Fire Systems Pty Ltd.

The annular gap between the pipe and concrete slab core hole directly above the MgO board was filled (friction fitted) with a purposed cut section a 60-mm thick coated mineral fibre batt, consisting of a 160-165 kg/m$^3$ fibrous lamella core (stone wool), sealed on both sides with a flexible ablative coating.

The pipe projected vertically, 2000-mm above the unexposed face of the concrete slab and 500-mm into the furnace chamber and was supported at nominally 500-mm and 1500-mm from the unexposed face of the slab. The pipe was left open at the unexposed end and was fitted with a PVC end cap on the exposed end.

## 2.2 Dimensions

The specimen comprised an 1150-mm x 1150-mm x 150-mm thick concrete slab 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. The specimen was delivered on 13 October 2021 and stored under standard laboratory atmospheric conditions until the test date.

## 2.5 Selection, construction and installation of the specimen and the supporting construction

The supporting floor construction and specimen installation was organised by the sponsor. CSIRO was not involved in the selection of the materials.

# 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:

- Technical brochure titled 'Valpar Python', undated by Valpar Industries Limited.
- Drawing titled 'Test Slab S-21-A4 Layout', dated 29 July 2021, by, Snap Fire Systems Pty Ltd.
- Drawing titled 'Specimen #1 100 PVC(SC) Stack & LP100R-D', dated 23 September 2021, by Snap Fire Systems Pty Ltd.
- Drawing titled 'Specimen #2 100 PVC(SC) Floor Waste w/ fitting & LP100R-D', dated 23 February 2022, by Snap Fire Systems Pty Ltd.
- Drawing titled 'Specimen #3 130 Beer Python Stack & HP150R', dated 24 February 2022, by Snap Fire Systems Pty Ltd.
- Drawing titled 'Specimen #4, 50 PVC Stack + Fitting & LP500R', dated 23 September 2021, by Snap Fire Systems Pty Ltd.
- Drawing numbered LP100R-D-T dated 10 February 2017, by Snap Fire Systems Pty Ltd.
- Drawing titled 'SNAP 150 High Profile Retro' dated 5 October 2017, by Snap Fire Systems Pty.
- Drawing titled 'SNAP 50 Low Profile Retro', 25 March 2019, by Snap Fire Systems Pty Ltd.

Confidential information about the test specimen has been submitted to CSIRO Infrastructure Technologies.

# 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 Pressure

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

The pressure probe was located approximately 350-mm below the concrete slab supporting construction.

## 4.4 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

The furnace pressure was below the tolerances of the requirements of AS 1530.4-2014 for periods of time as shown in Figure 3. The test laboratory confirms that this departure in furnace pressure would not have significantly affected the results of this test.

# 7 Termination of test

The test was terminated at 220 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 |
|---|---|
| 0:30 minute - | Smoke is being emitted from the annular gap between the slab and the python pipe at the base of specimen 3. |
| 2 minutes - | Smoke is fluing from the end of the pipes of specimens 3 and 4. |
| 4 minutes - | Insulation failure of specimen 2 - maximum temperature rise of 180K is exceeded on the centre of the grate of the specimen.<br>Smoke is being emitted from the grate of specimen 2, cotton pad test applied above the grate – no ignition noted at this time. |
| 7 minutes - | Smoke is being emitted from the batt at the base of specimen 4. |
| 9 minutes - | Smoke has ceased fluing from the end of the pipe of specimen 4. |
| 10 minutes - | Smoke is being emitted from the batt at the base of specimen 1. |
| 13 minutes - | Smoke has ceased fluing from the floor waste grate of specimen 2. |
| 12 minutes - | Smoke is being emitted from the batt at the base of specimen 4 and has intensified. |
| 20 minutes - | Light smoke has begun fluing from the end of the pipe of specimen 1. |
| 22 minutes - | Smoke has ceased being emitted from the annular gap between the slab and the python pipe at the base of specimen 3. |

23 minutes - Light smoke has resumed fluing from the floor waste grate of specimen 2.

25 minutes - Smoke has ceased fluing from the end of the pipe of specimen 3.

30 minutes - Discolouration (smoke staining) is visible on the batts of both specimens 1 and 4.

58 minutes - Smoke has resumed fluing from the end of the pipe of specimen 4.

78 minutes - The light grey smoke is fluing from the floor waste grate of specimen 2 and has now changed to a greenish colour.

102 minutes - Insulation failure of specimen 4 - maximum temperature rise of 180K is exceeded on the slab inside the core hole, 25-mm above the batt (west side) at the base of the specimen.

104 minutes - A red glow is visible between the batt and the core hole (east side) at the base of specimen 4 (photograph 10). Cotton pad test was applied at the base of Specimen 4 – no ignition noted at this time.

117 minutes - Cotton pad test applied above the grate of specimen 2 – no ignition noted at this time.

118 minutes - Cotton pad test was applied at the base of Specimen 4 – no ignition noted at this time.

135 minutes - The python pipe at the base of Specimen 3 has begun to swell.

141 minutes - Cotton pad test was applied adjacent to the red glow at the base of Specimen 4 – no ignition noted at this time.

156 minutes - Insulation failure of specimen 1 - maximum temperature rise of 180K is exceeded on the batt, 25-mm from the slab (east side) at the base of the specimen.
The pipe at the base of specimen 1 has melted leaving a void and a red glow into the furnace visible. Cotton pad test was applied over the void – no ignition noted at this time.

158 minutes - Integrity failure of specimen 1 - Cotton pad test applied over the void where a red glow is visible at the base of specimen 1, ignition of cotton pad noted at this time.

160 minutes - The base of specimen 1 plugged with ceramic fibre. Testing of specimen 1 terminated at this time.

167 minutes - Cotton pad test applied above the grate of specimen 2 – no ignition noted at this time.

180 minutes - The pipe at the base of specimen 4 has deformed and bulged.

185 minutes - The pipe at the base of specimen 4 has melted leaving a void and a red glow into the furnace.
Integrity failure of specimen 4 - Cotton pad test applied over the void at the base of specimen 4, ignition of cotton pad noted at this time.

188 minutes - A bright orange glow of the furnace chamber is visible through the floor waste grate of specimen 2.
Integrity failure of specimen 2 - Cotton pad test applied over the floor waste grate of specimen 2, ignition of cotton pad noted at this time.

215 minutes - The pipe at the base of specimen 3 has begun to bulge.

216 minutes - Smoke has begun fluing through a split in the base of the pipe of specimen 3. A red glow can be seen through the spilt in the pipe.

218 minutes - Insulation and Integrity failure of specimen 3 - Cotton pad test applied over the split in the Python pipe at the base of specimen 3, ignition of cotton pad noted at this time.
Sustained flaming at the base of specimen 3 noted at this time, test terminated.

220 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 Furnace pressure

Figure 3 shows the curve of average pressure versus time inside the furnace chamber recorded during the heating period.

## 8.5 Specimen temperature

Figure 4 shows the curve of temperature versus time associated with Specimen 1.

Figure 5 shows the curve of temperature versus time associated with Specimen 2.

Figure 6 shows the curve of temperature versus time associated with Specimen 3.

Figure 7 shows the curve of temperature versus time associated with Specimen 4.

## 8.6 Performance

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

Specimen 1 – A SNAP LP100R-D Retrofit fire collar protecting a nominal 100 uPVC pipe penetrating a 250-mm diameter core hole

| | | |
|---|---|---|
| Structural adequacy | - | not applicable |
| Integrity | - | 158 minutes |
| Insulation | - | 156 minutes |

Specimen 2 - A SNAP LP100R-D Retrofit fire collar protecting a nominal 100 uPVC pipe incorporating a floor waste penetrating a 130-mm core hole incorporating a coupling inside the collar

| | | |
|---|---|---|
| Structural adequacy | - | not applicable |
| Integrity | - | 188 minutes |
| Insulation | - | 4 minutes |

Specimen 3 - A SNAP HP150R Retrofit fire collar protecting a nominal (BEER) Python bundle penetrating a 135-mm core hole

| | | |
|---|---|---|
| Structural adequacy | - | not applicable |
| Integrity | - | 218 minutes |
| Insulation | - | 218 minutes |

Specimen 4 - A SNAP LP50R Retrofit fire collar protecting a nominal 50 uPVC pipe penetrating a 250-mm diameter aperture incorporating a coupling inside the collar

| | | |
|---|---|---|
| Structural adequacy | - | not applicable |
| Integrity | - | 185 minutes |
| Insulation | - | 102 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 AS 1530.4. Any significant variation with respect to size, construction details, loads, stresses, edge of end conditions, other than that 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 the measurement of fire resistance, it is not possible to provide a stated degree for 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:

Specimen 1: -/120/120

Specimen 2: -/180/0

Specimen 3: -/180/180

Specimen 4: -/120/90

The fire-resistance level of the specimen is applicable when the system is exposed to fire from the same direction as tested.

Specimens were tested in a concrete slab with a Fire Resistance Period (FRP) for insulation of 180 minutes in accordance with Table 5.5.1 of AS 3600:2018 - Concrete structures. The maximum FRL of any test specimen cannot exceed the FRL achieved by the concrete slab in which it was installed.

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

# 11 Tested by

Peter Gordon
Testing Officer

# Appendices

## Appendix A – Measurement location

| Specimen | T/C Position | T/C designation |
|---|---|---|
| Specimen 1 - A SNAP LP100R-D Retrofit fire collar protecting a nominal 100 uPVC pipe penetrating a 250-mm diameter core hole incorporating a coupling inside the collar. | On top of the slab, 25-mm from the core hole (West) | S1 |
| | On top of the slab, 25-mm from the core hole (East) | S2 |
| | On the slab inside the core hole, 25-mm above Batt (West) | S3 |
| | On the slab inside the core, 25-mm above Batt (East) | S4 |
| | On the Batt, 25-mm from the slab (East) | S5 |
| | On the Batt, 25-mm from the slab (West) | S6 |
| | On the Batt, 25-mm from the pipe (S/W) | S7 |
| | On the Batt, 25-mm from the pipe (North) | S8 |
| | On the pipe, 25-mm above the Batt (N/W) | S9 |
| | On the pipe, 25-mm above the Batt (South) | S10 |
| Specimen 2 - A SNAP LP100R-D Retrofit fire collar protecting a nominal 100 uPVC pipe incorporating a floor waste penetrating a 130-mm core hole | On the centre of the grate | S11 |
| | On the screed, 25-mm from the grate (North) | S12 |
| | On the screed, 25-mm from the grate (South) | S13 |
| | On the slab, 25-mm from the screed (North) | S14 |
| Specimen 3 - A SNAP HP150R Retrofit fire collar protecting a nominal tube bundle (Beer Python) penetrating a 135-mm core hole. | On the slab, 25-mm from core hole (West) | S15 |
| | On the slab, 25-mm from core hole (East) | S16 |
| | On the pipe, 25-mm above the slab (West) | S17 |
| | On the pipe, 25-mm above the slab (East) | S18 |

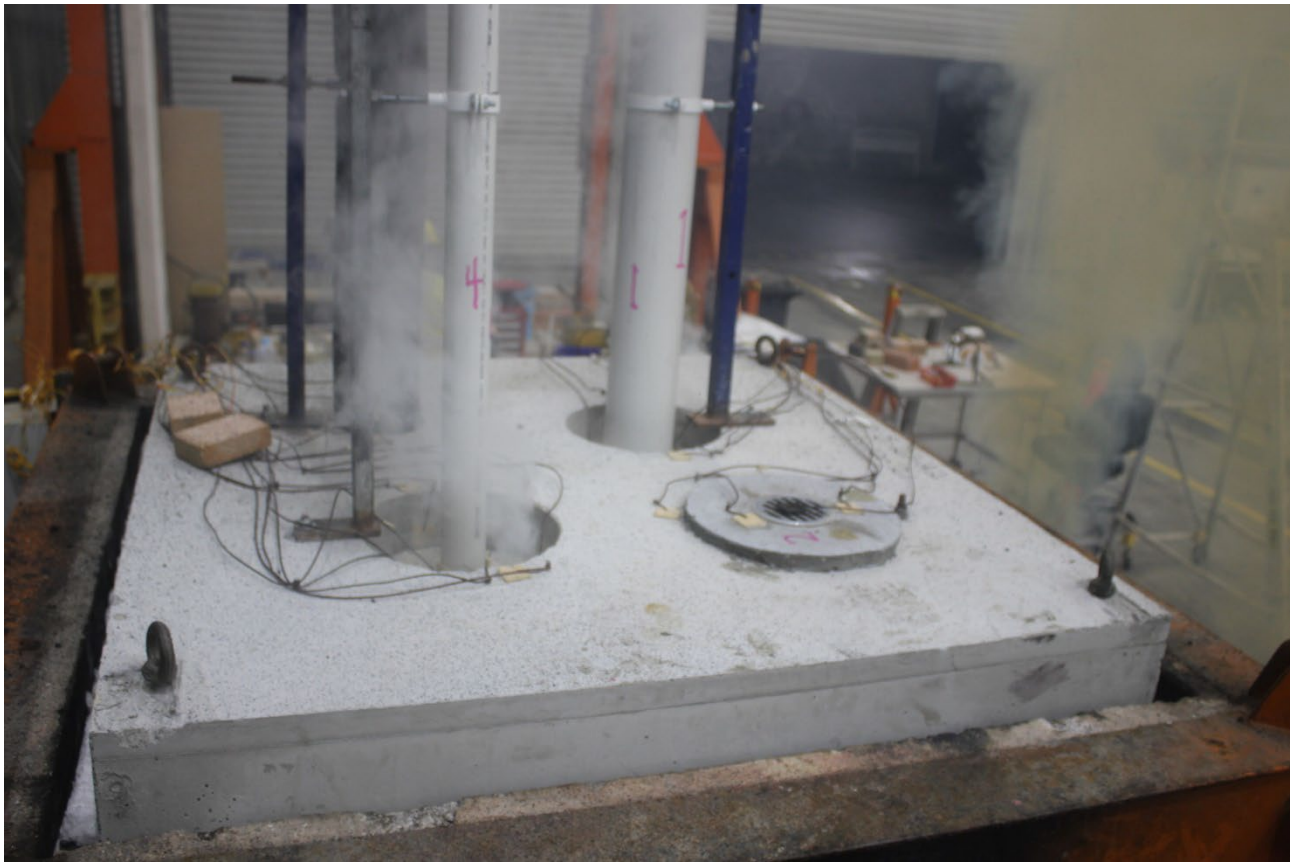
| Specimen | T/C Position | T/C designation |
|---|---|---|
| Specimen 4 - A SNAP LP50R Retrofit fire collar protecting a nominal 50 uPVC pipe penetrating a 250-mm diameter aperture incorporating a coupling inside the collar. | On top of the slab, 25-mm from the core hole (West) | S19 |
| | On top of the slab, 25-mm from the core hole (East) | S20 |
| | On the slab inside the core hole, 25-mm above Batt (West) | S21 |
| | On the slab inside the core, 25-mm above Batt (East) | S22 |
| | On the Batt, 25-mm from the slab (North) | S23 |
| | On the Batt, 25-mm from the slab (South) | S24 |
| | On the Batt, 25-mm from the pipe (North) | S25 |
| | On the Batt, 25-mm from the pipe (South) | S26 |
| | On the pipe, 25-mm above the Batt (North) | S27 |
| | On the pipe, 25-mm above the Batt (South) | S28 |
| Rover | | S29 |
| Ambient | | S30 |

# Appendix B – Photographs


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

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

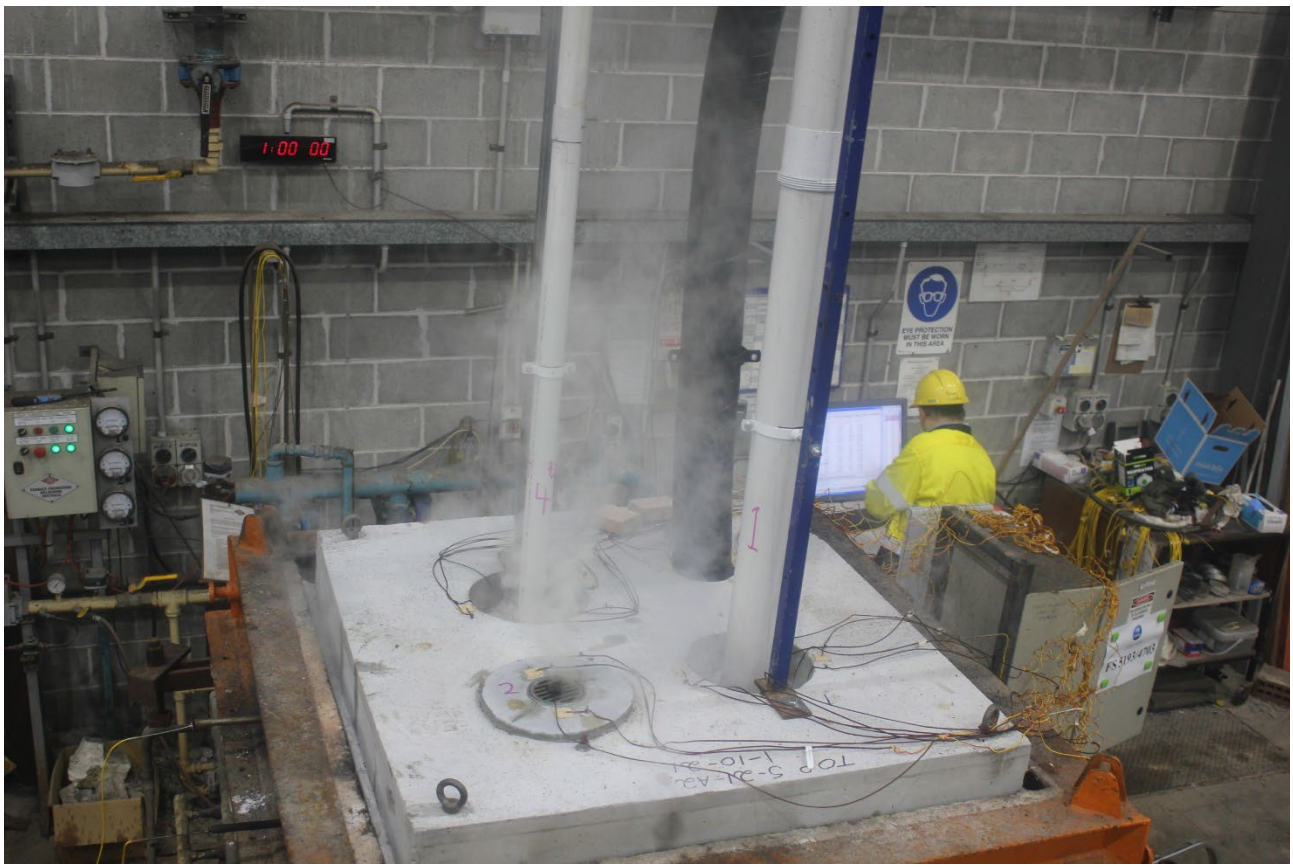
**PHOTOGRAPH 3 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING**



**PHOTOGRAPH 4 – SPECIMENS AT 12 MINUTES INTO THE TEST**

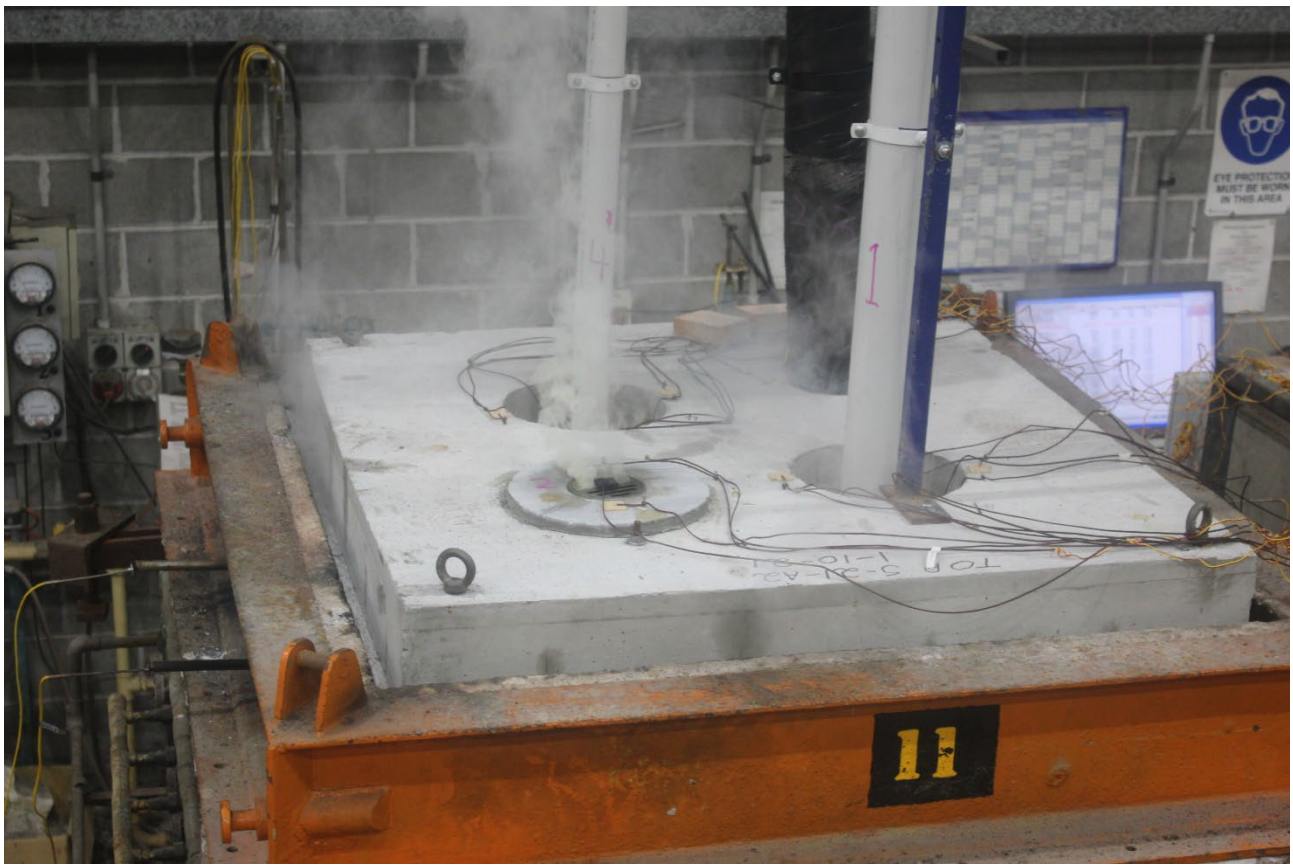

**PHOTOGRAPH 5 – SPECIMENS AT 30 MINUTES INTO THE TEST**


**PHOTOGRAPH 6 –SPECIMENS AT 30 MINUTES INTO THE TEST**




**PHOTOGRAPH 7 – SPECIMENS AT 60 MINUTES INTO THE TEST**

**PHOTOGRAPH 8 – SPECIMEN 2 AT 80 MINUTES INTO THE TEST**



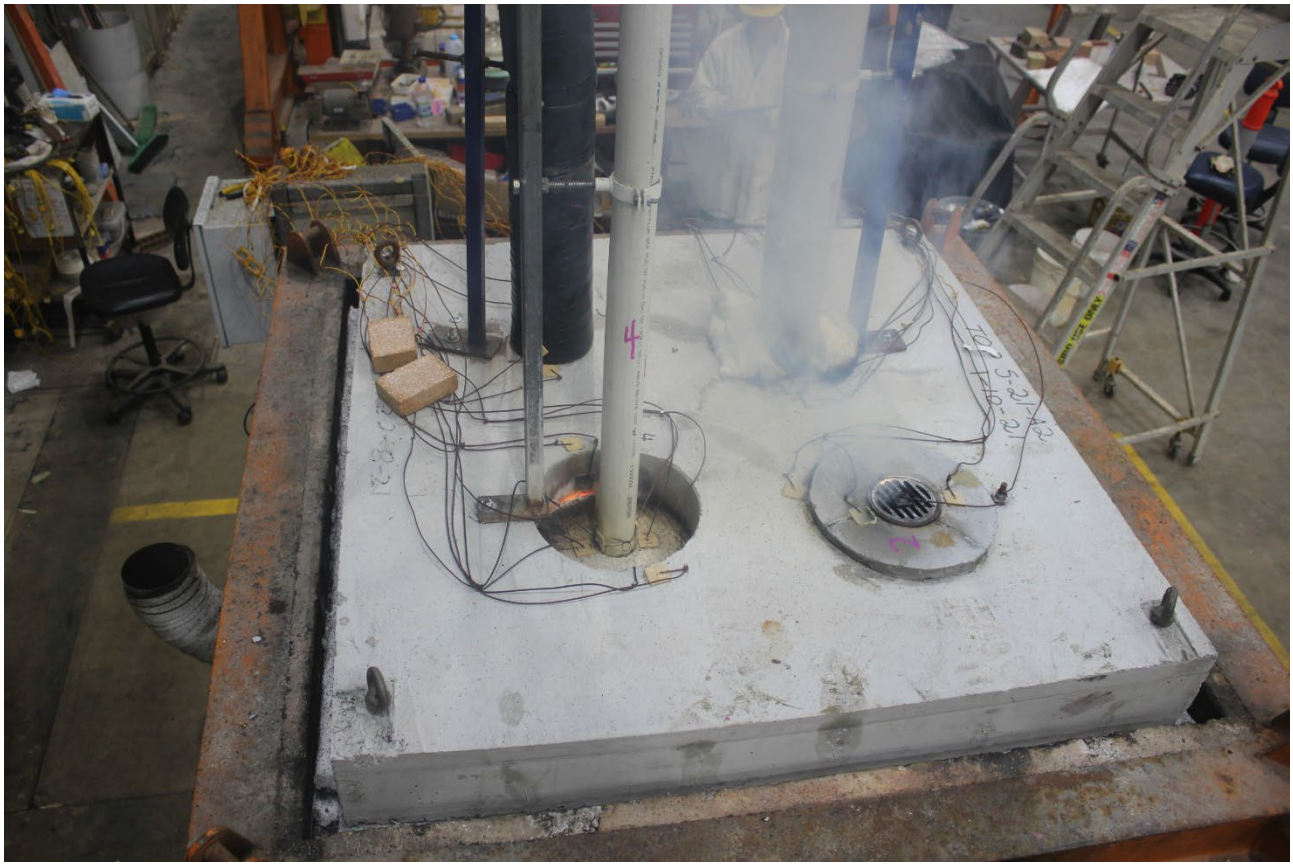

**PHOTOGRAPH 9 – SPECIMENS AT 90 MINUTES INTO THE TEST**

**PHOTOGRAPH 10 – SPECIMEN 4 AT 104 MINUTES INTO THE TEST**


**PHOTOGRAPH 11 – SPECIMENS AT 120 MINUTES INTO THE TEST**

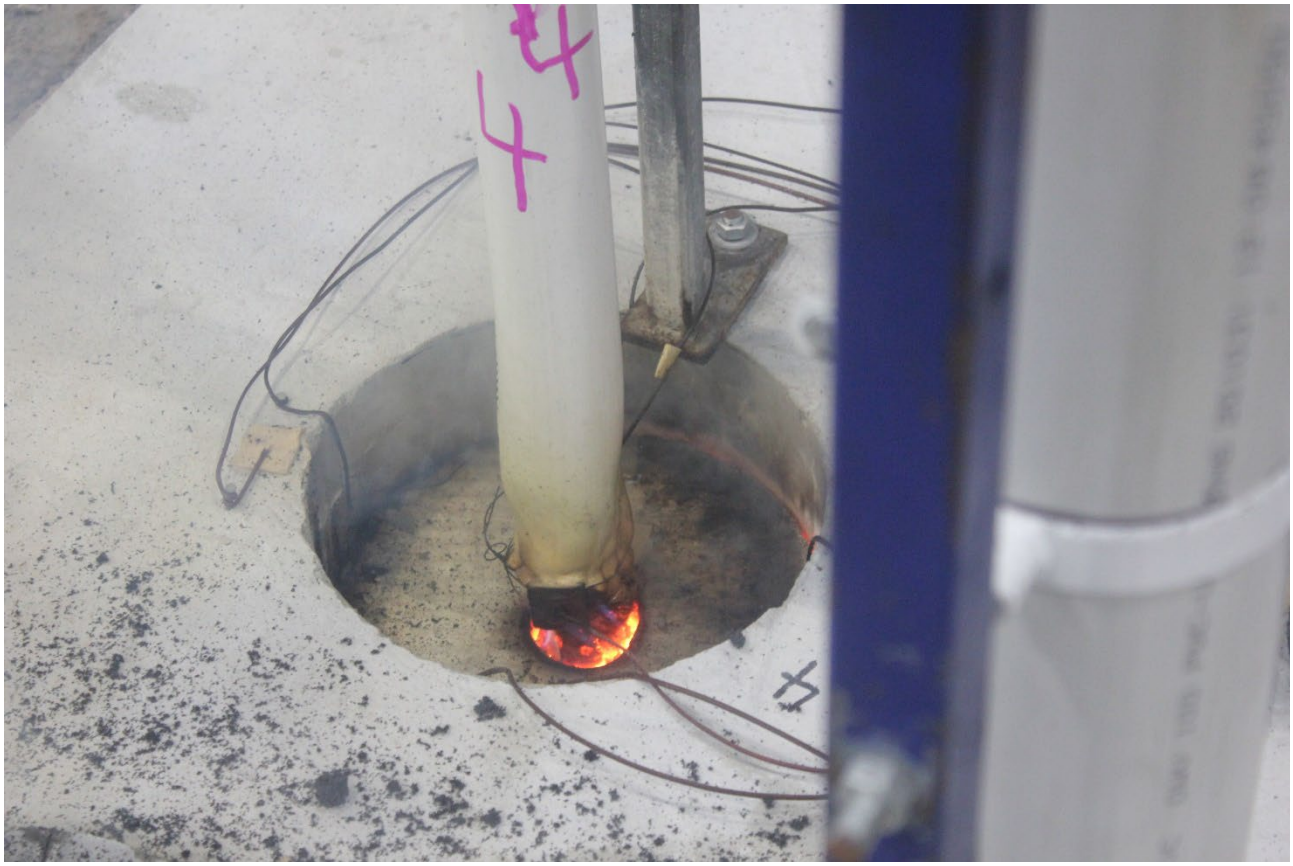

**PHOTOGRAPH 12 –SPECIMENS AT 152 MINUTES INTO THE TEST**


**PHOTOGRAPH 13 – SPECIMEN 1 AT 154 MINUTES INTO THE TEST**



**PHOTOGRAPH 14 –SPECIMENS AT 180 MINUTES INTO THE TEST**

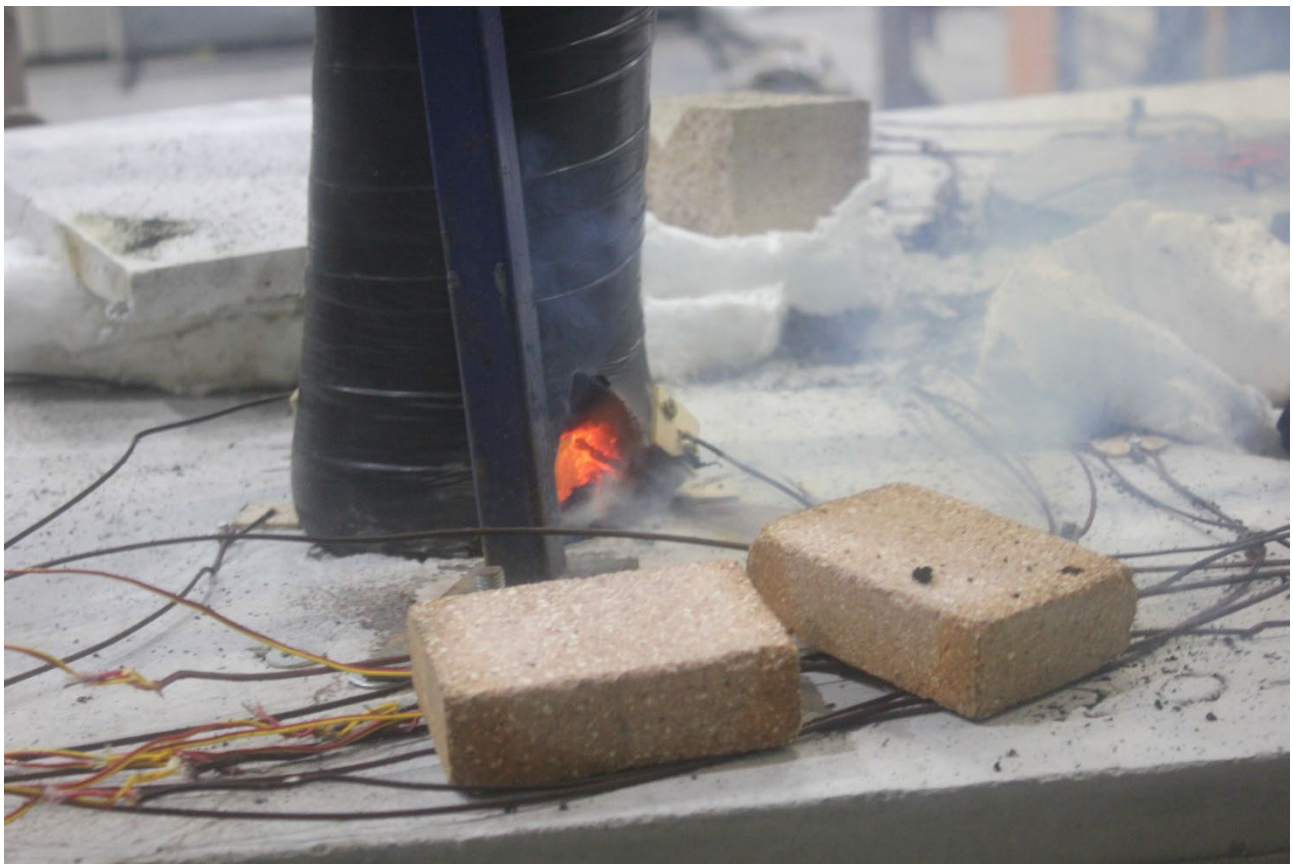
**PHOTOGRAPH 15 – SPECIMEN 2 AT 185 MINUTES INTO THE TEST.**



**PHOTOGRAPH 16 – SPECIMEN 4 AT 185 MINUTES INTO THE TEST**

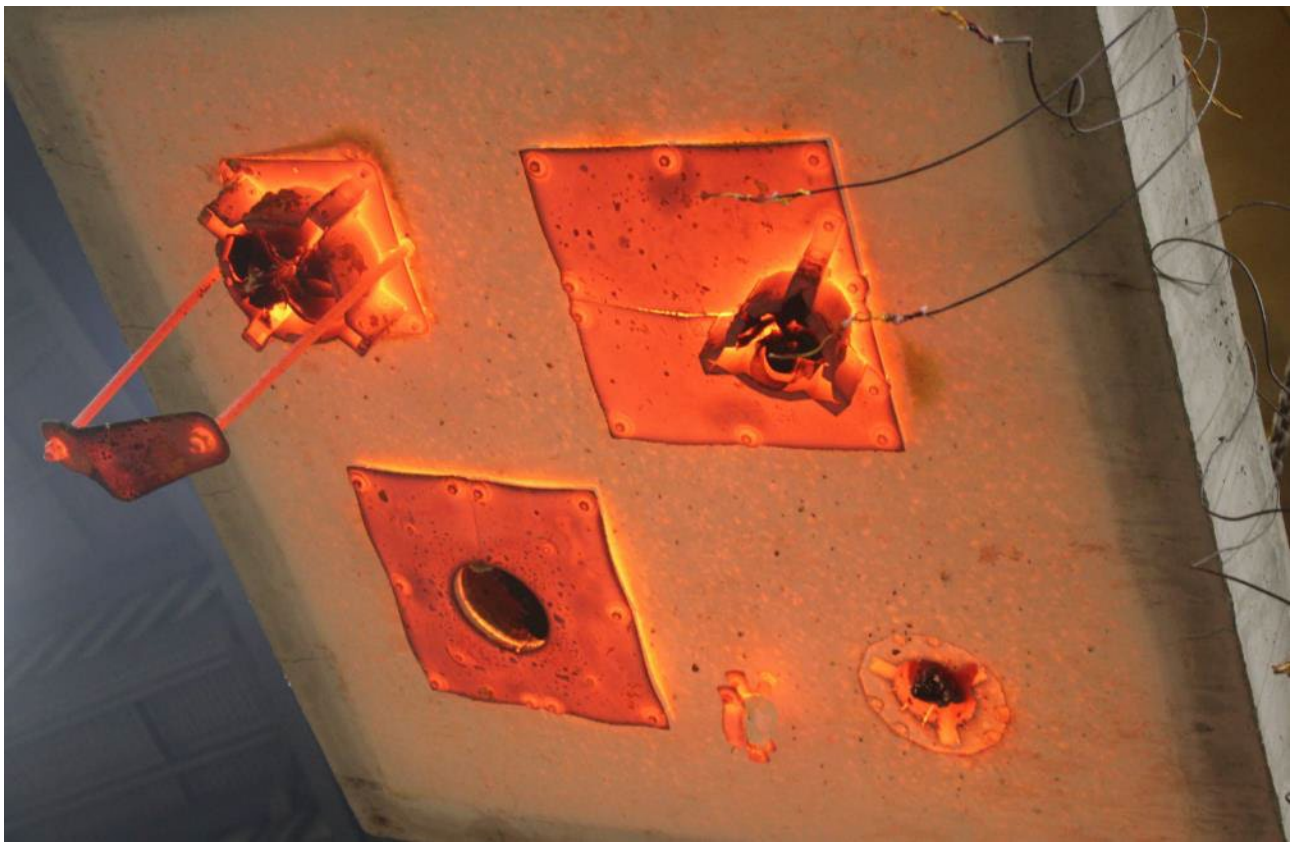
**PHOTOGRAPH 17 – SPECIMEN 2 AT 211 MINUTES INTO THE TEST**

**PHOTOGRAPH 18 – SPECIMEN 3 AT 215 MINUTES INTO THE TEST**



**PHOTOGRAPH 19 – SPECIMEN3 AT 216 MINUTES INTO THE TEST**


**PHOTOGRAPH 20 – SPECIMENS AT 223 MINUTES INTO THE TEST**



**PHOTOGRAPH 21 – EXPOSED FACE OF SPECIMENS AT THE CONCLUSION OF TESTING**

# Appendix C – Test Data charts

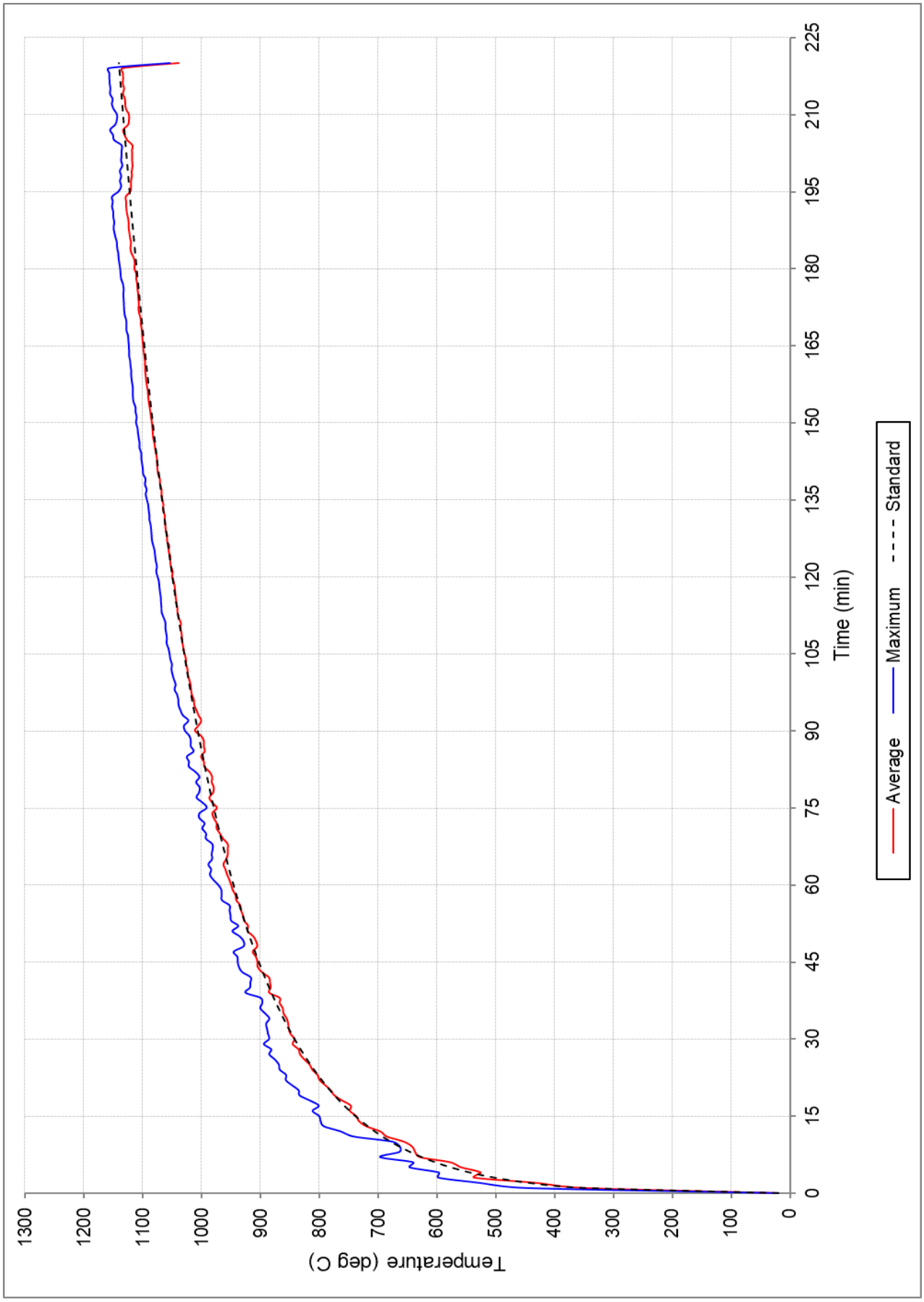



**FIGURE 1 – FURNACE TEMPERATURE**

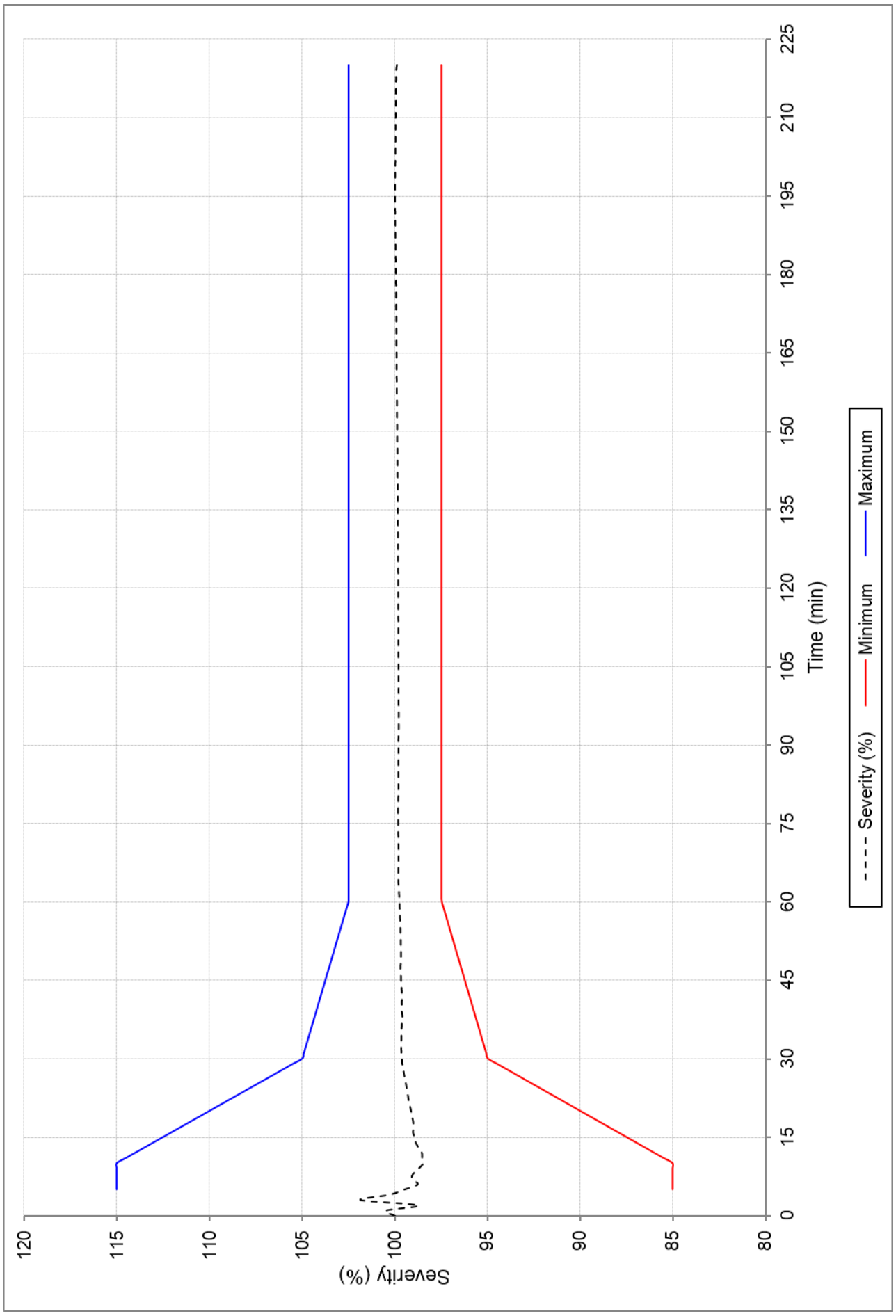



**FIGURE 2 – FURNACE SEVERITY**

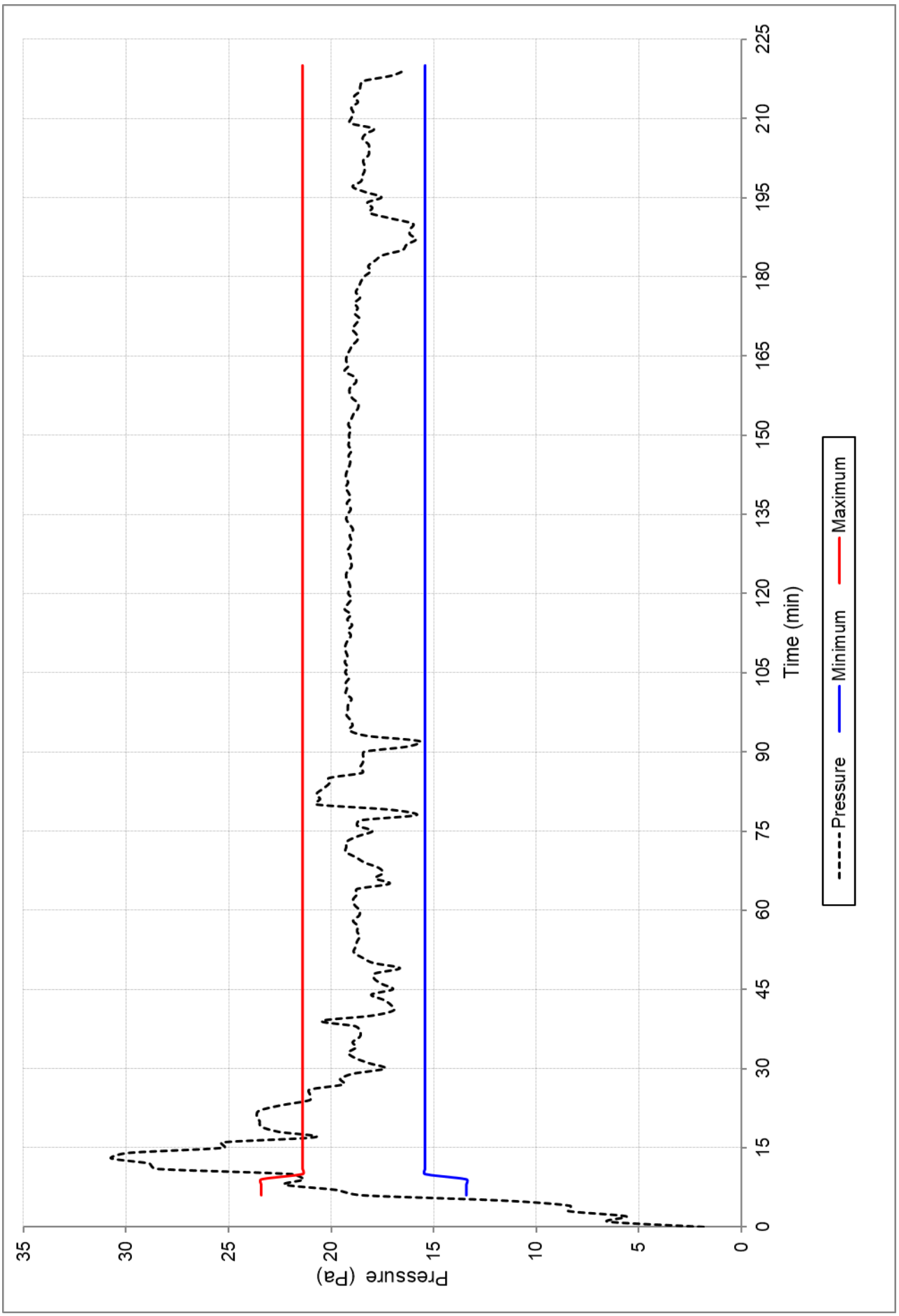



**FIGURE 3 – FURNACE PRESSURE**

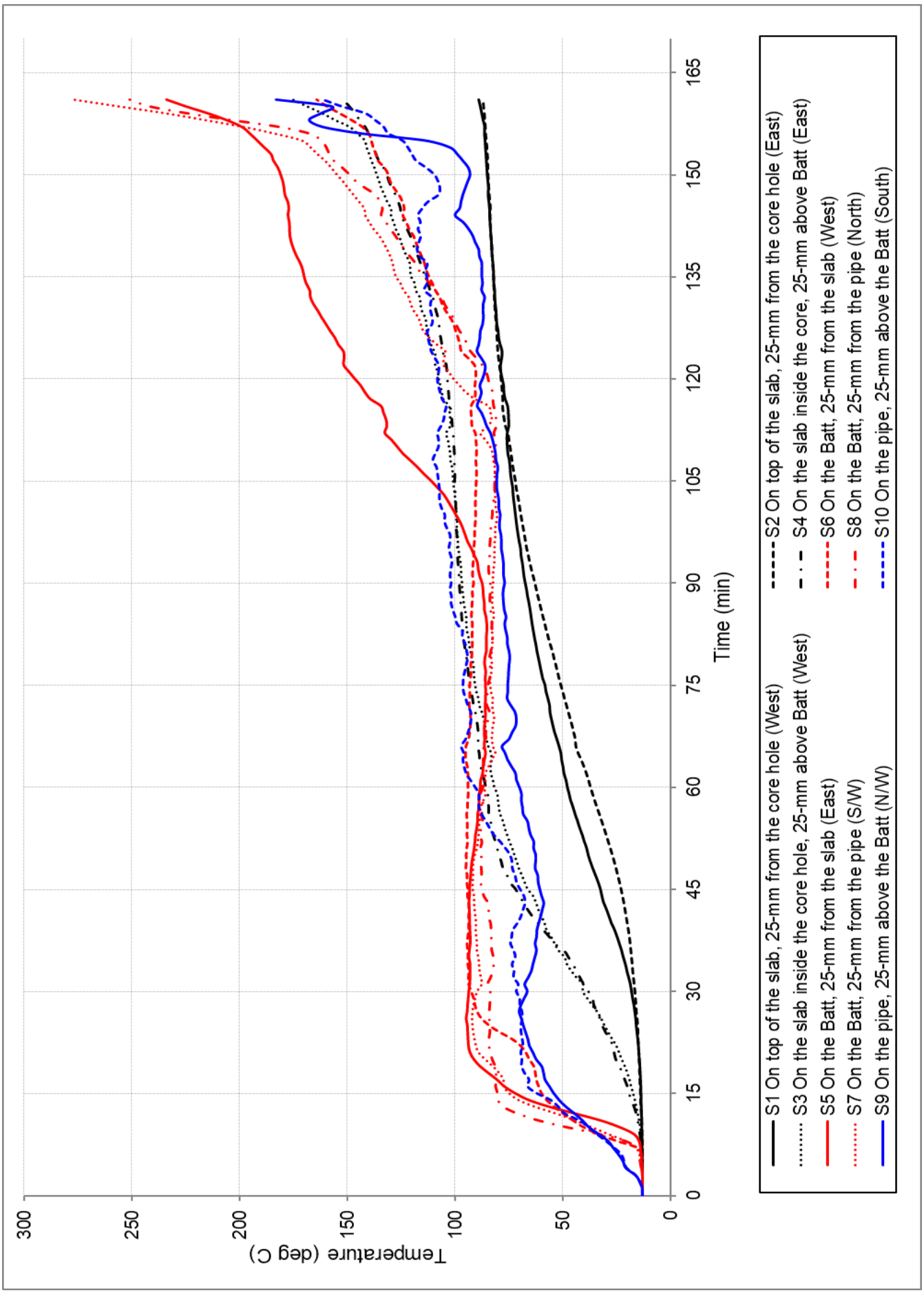



**FIGURE 4 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 1**

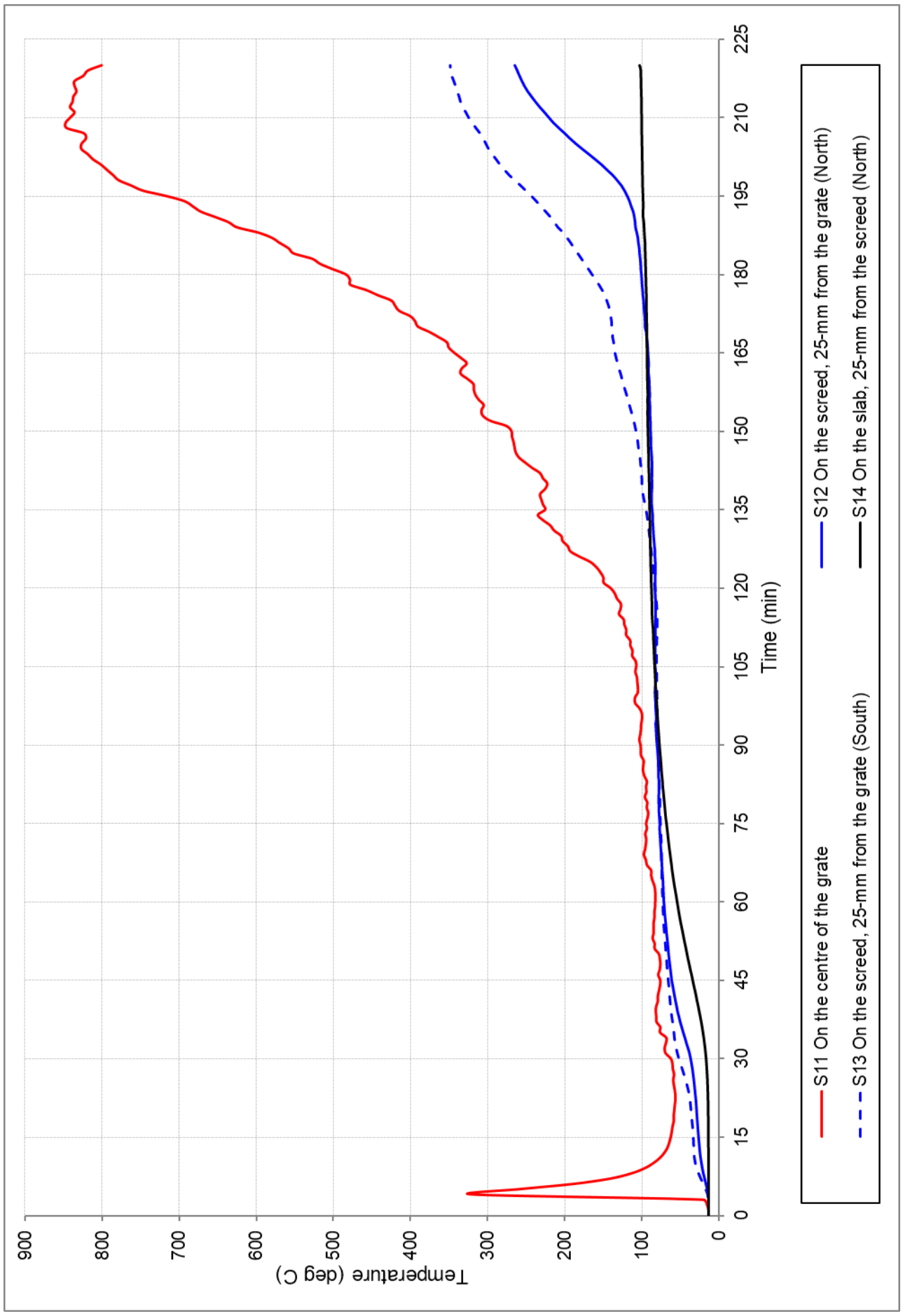



**FIGURE 5 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 2**

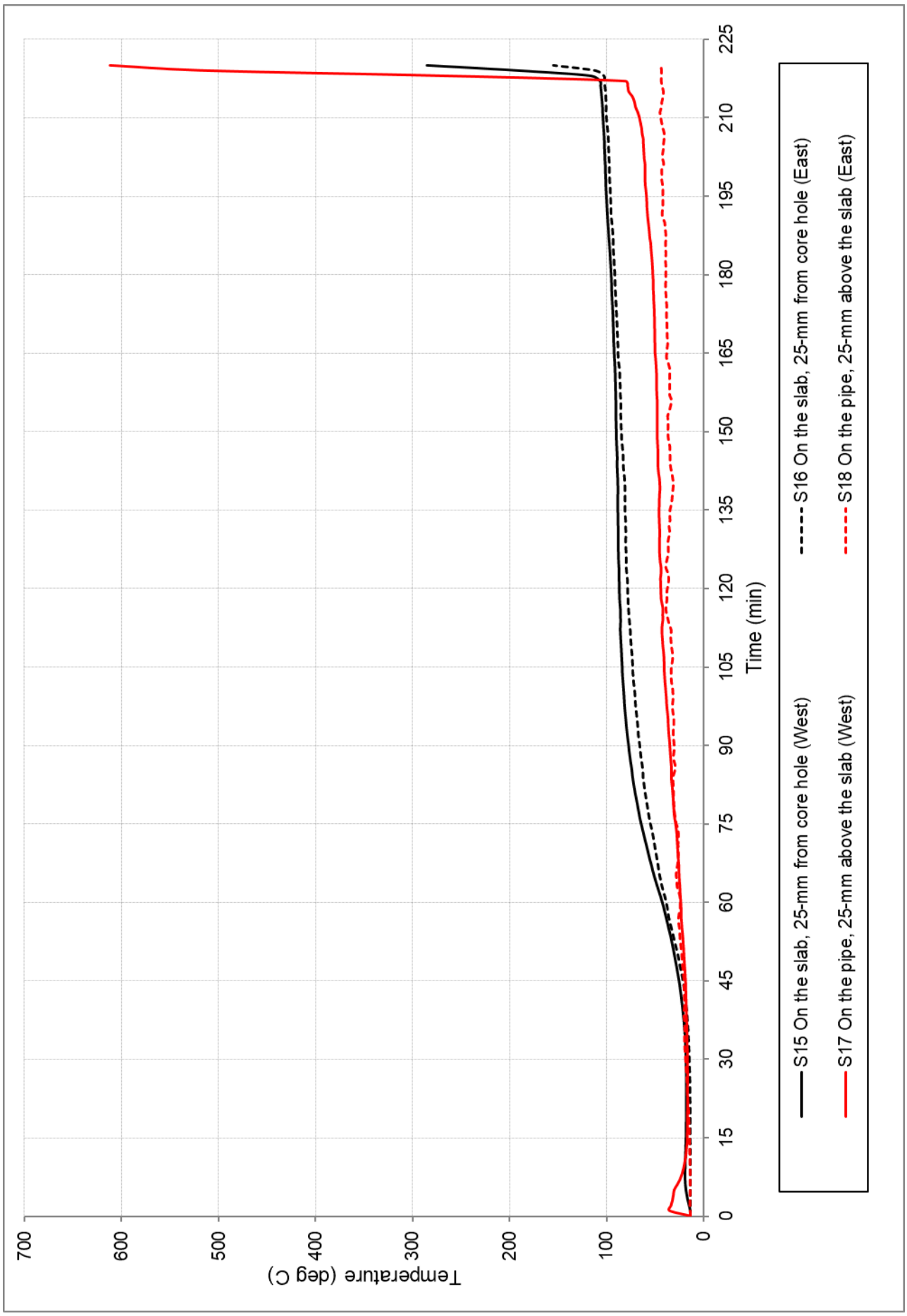



**FIGURE 6 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 3**

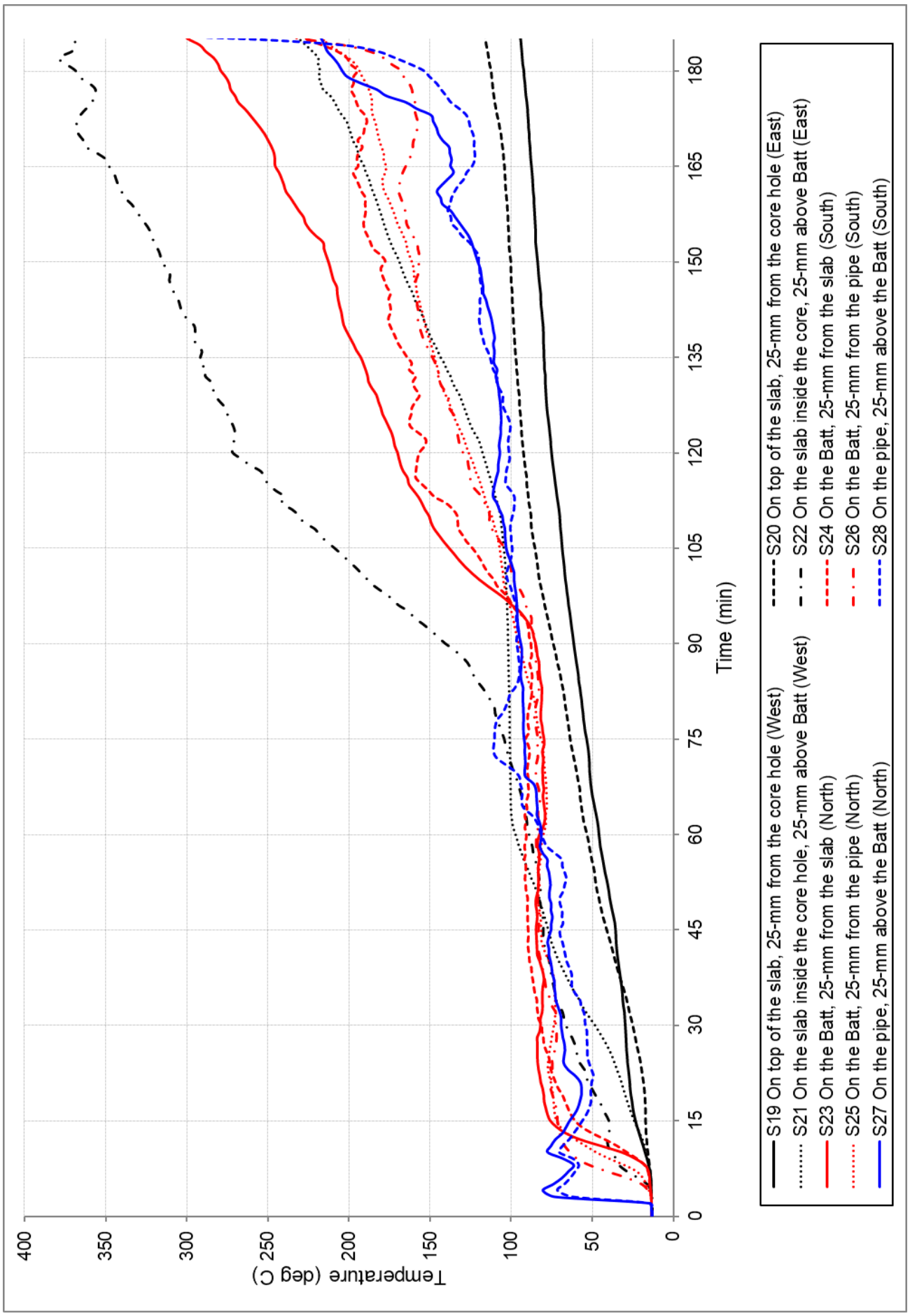


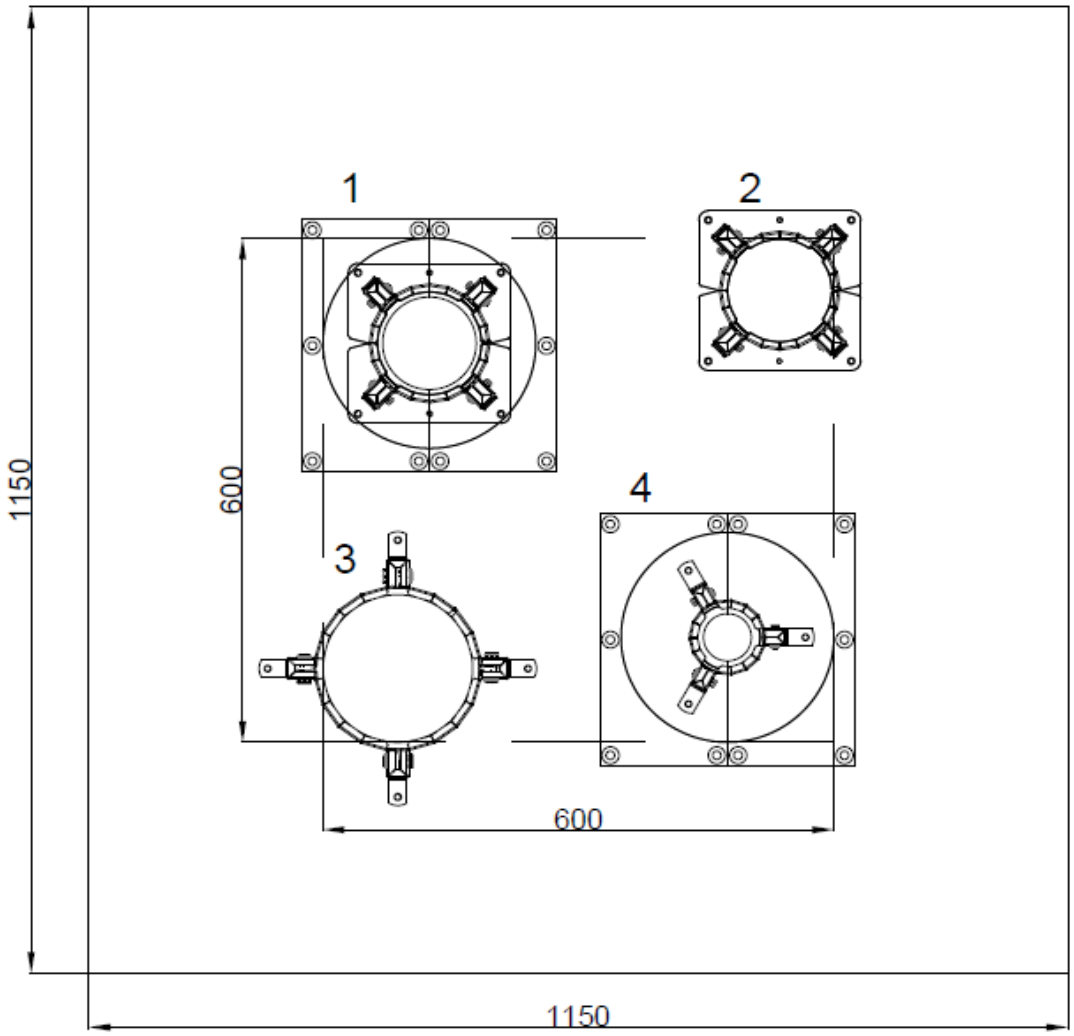

**FIGURE 7 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 4**

## Appendix D – Installation drawings

# Snap Fire Systems Pty Ltd

Test Slab S-21-A2 Layout

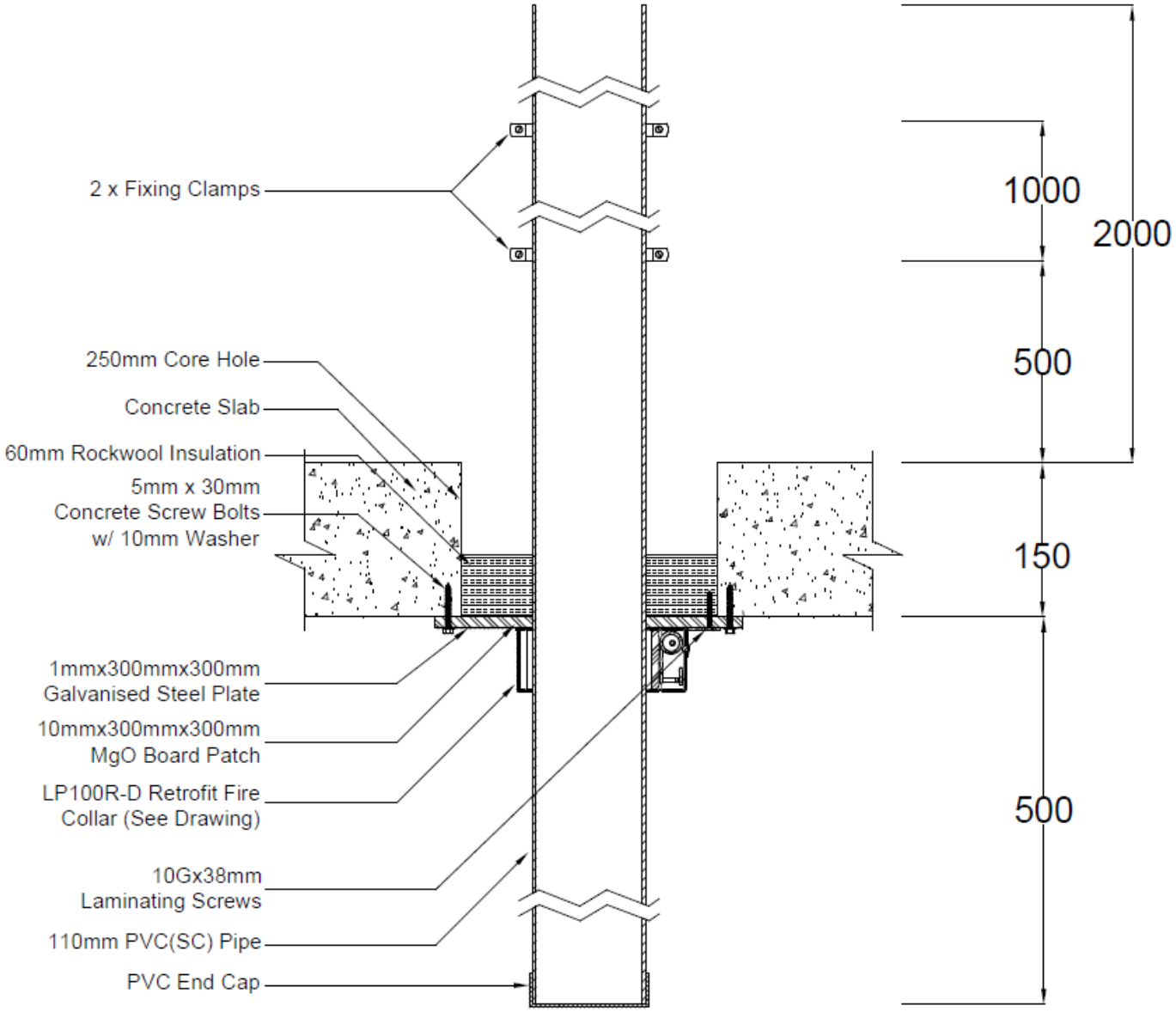
Date:29 JUL 2021




| Penetration | Collar Code | Pipe Type | Pipe Diameter |
|---|---|---|---|
| 1 | LP100R-D | PVC(SC) | 100 |
| 2 | LP100R-D | PVC(SC) | 100 |
| 3 | HP150R | Beer Python | 130 |
| 4 | LP50R | PVC+Fitting | 50 |

**DRAWING TITLED "TEST SLAB S-21-A2 LAYOUT", DATED 29 JULY 2021, BY SNAP FIRE SYSTEMS PTY LTD**

# Snap Fire Systems Pty Ltd
# Specimen #1
# 100 PVC(SC) Stack & LP100R-D
# Date: 23 SEPT 2021



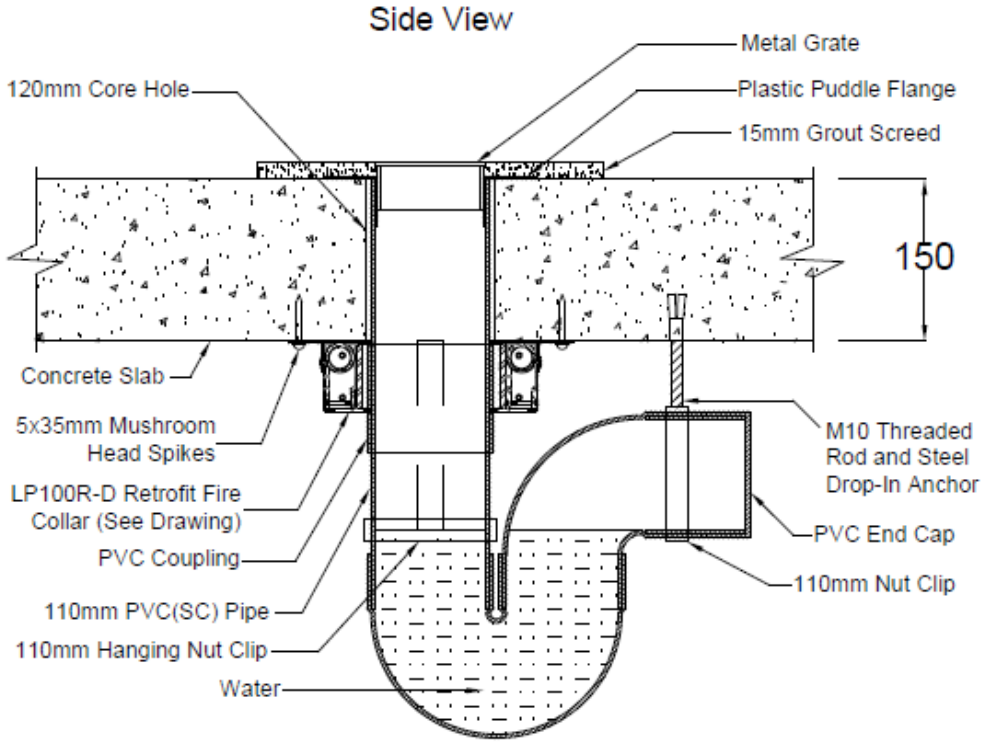

**DRAWING TITLED 'SPECIMEN #1 '100 PVC(SC) STACK LP100R-D', DATED 15 FEBRUARY 2022, BY SNAP FIRE SYSTEMS PTY LTD**

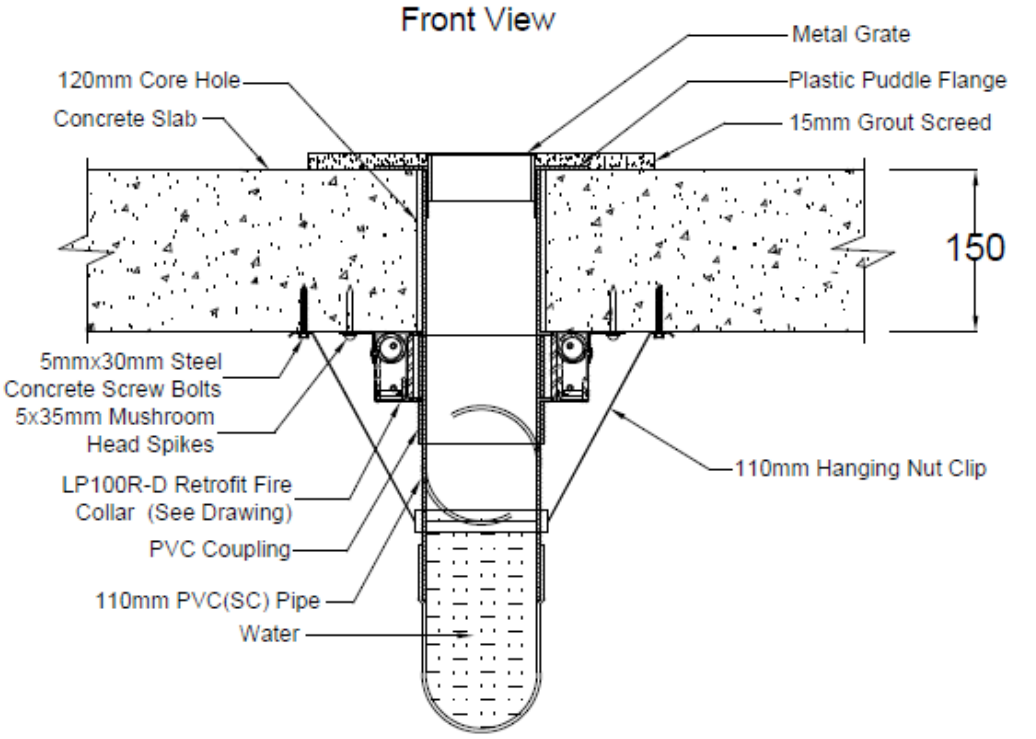
# Snap Fire Systems Pty Ltd

Specimen #2

100 PVC(SC) Floor Waste w/ Fitting & LP100R-D

23 FEB 2022



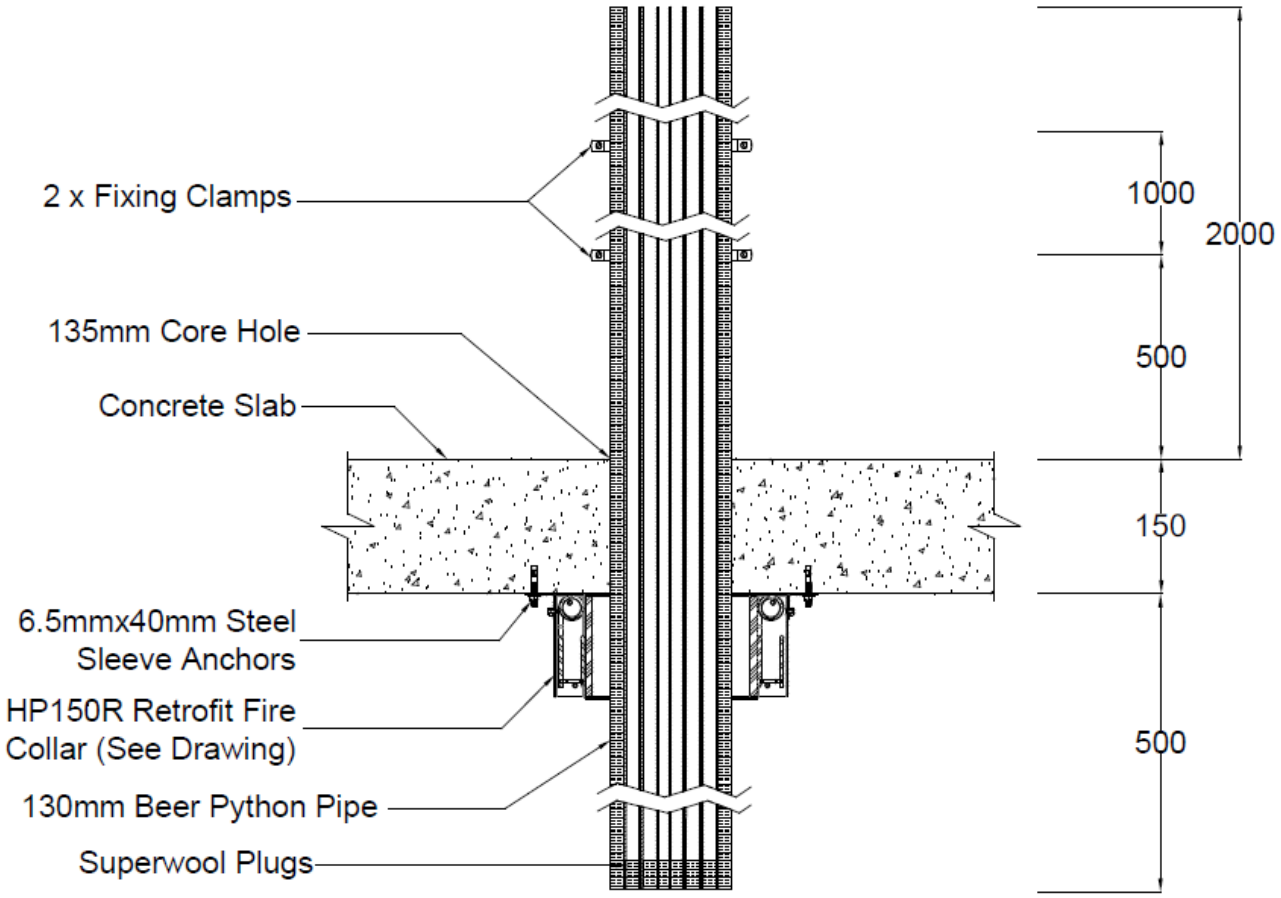

**DRAWING TITLED 'SPECIMEN #2 100 PVC(SC) FLOOR WASTE W/FITTING &LP100R-D', DATED 23 FEBRUARY 2022, BY SNAP FIRE SYSTEMS PTY LTD**

# Snap Fire Systems Pty Ltd

Specimen #3
130 Beer Python Stack & HP150R
Date: 24 FEB 2022

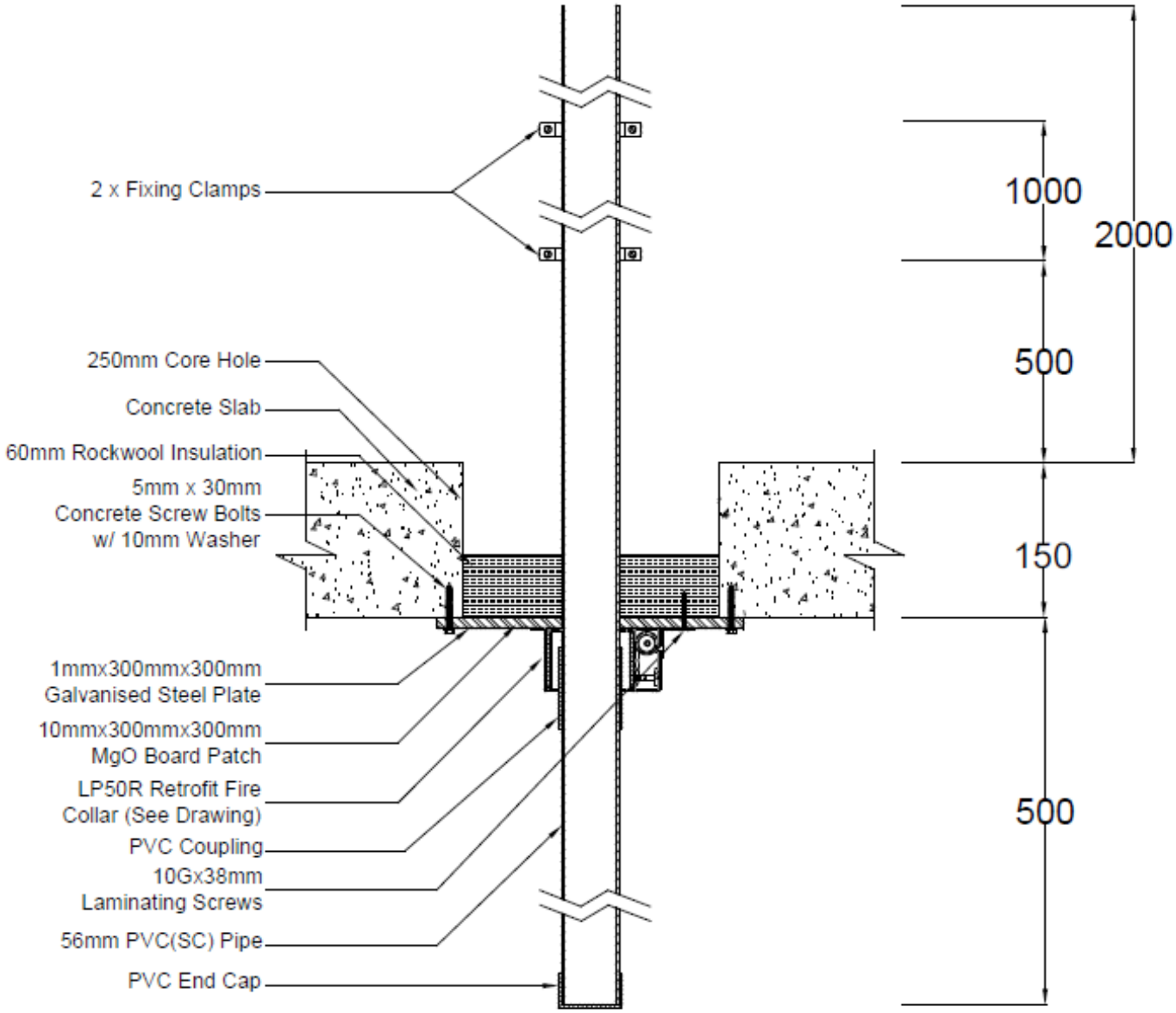

## Snap Fire Systems Pty Ltd

Specimen #3
130 Beer Python Stack & HP150R
Date: 24 FEB 2022

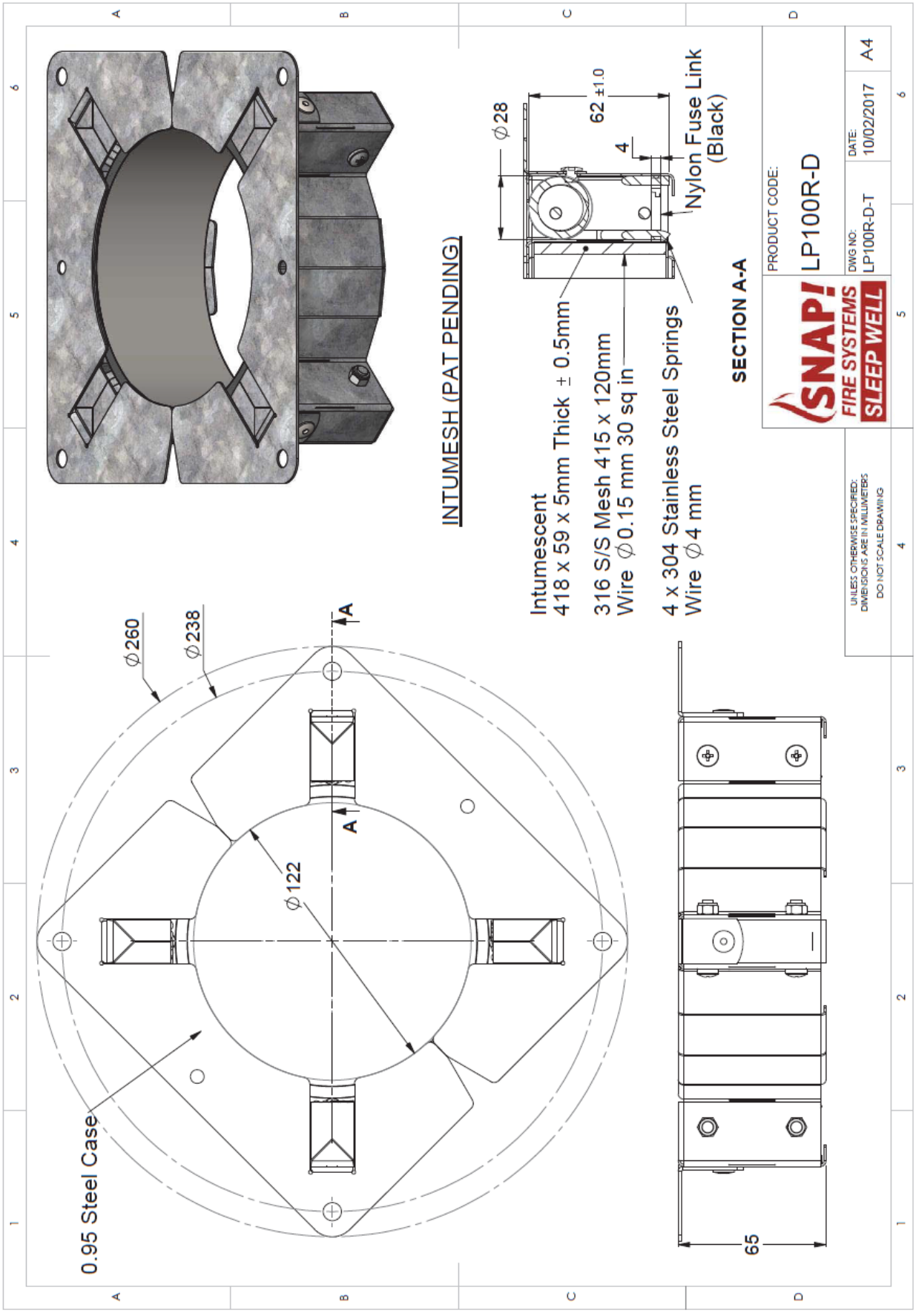

**DRAWING TITLED 'SPECIMEN #3 130 BEER PYTHON STACK & HP150R', DATED 24 FEBRUARY 2022, BY SNAP FIRE SYSTEMS PTY LTD**

# Snap Fire Systems Pty Ltd
# Specimen #4
# 50 PVC Stack + Fitting & LP50R
# Date: 23 SEPT 2021

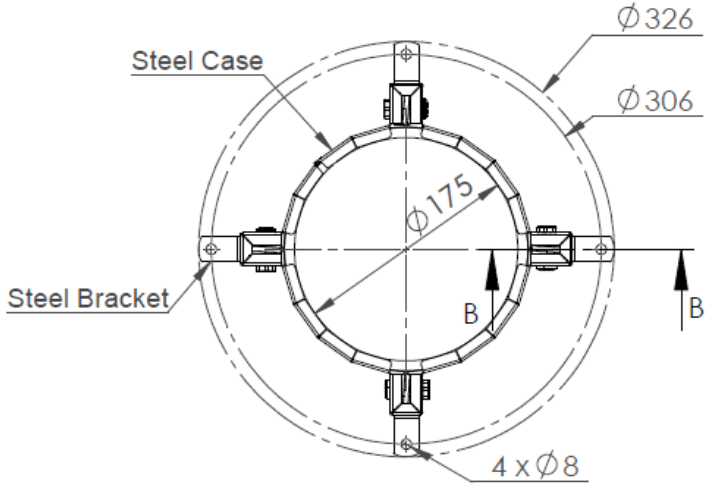


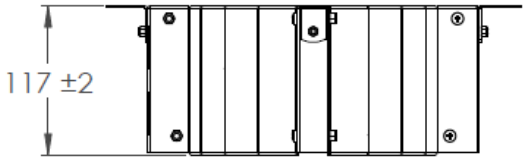

**DRAWING TITLED 'SPECIMEN #4 50 PVC STACK + FITTING & LP50R', DATED 15 FEBRUARY 2022, BY SNAP FIRE SYSTEMS PTY LTD**

# Appendix E – Specimen Drawings

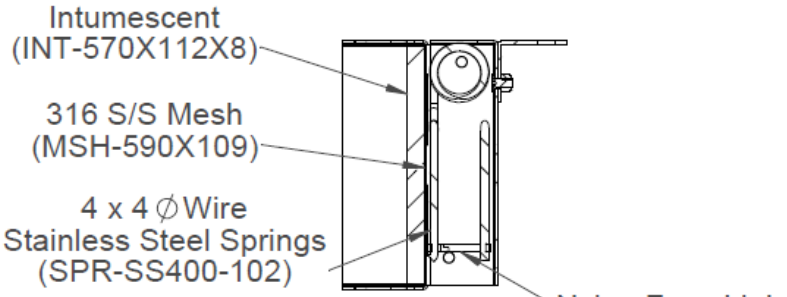



**DRAWING NUMBERED LP100R-D-T, DATED 10 FEBRUARY 2017, BY SNAP FIRE SYSTEMS PTY LTD**




INTUMESH (PAT PENDING)




SECTION B-B
SCALE 1 : 3

**SNAP FIRE SYSTEMS**
1343 Wynnum Rd, Tingalpa, QLD, 4173, Australia
☎ 1300 76 46 26
☎ +61 (0)7 3390 5420
+61 (0)7 3348 9417
info@snapcollars.com.au
www.snapcollars.com.au

Product Information Including Installation Instructions and full test reports are available at www.snapcollars.com.au

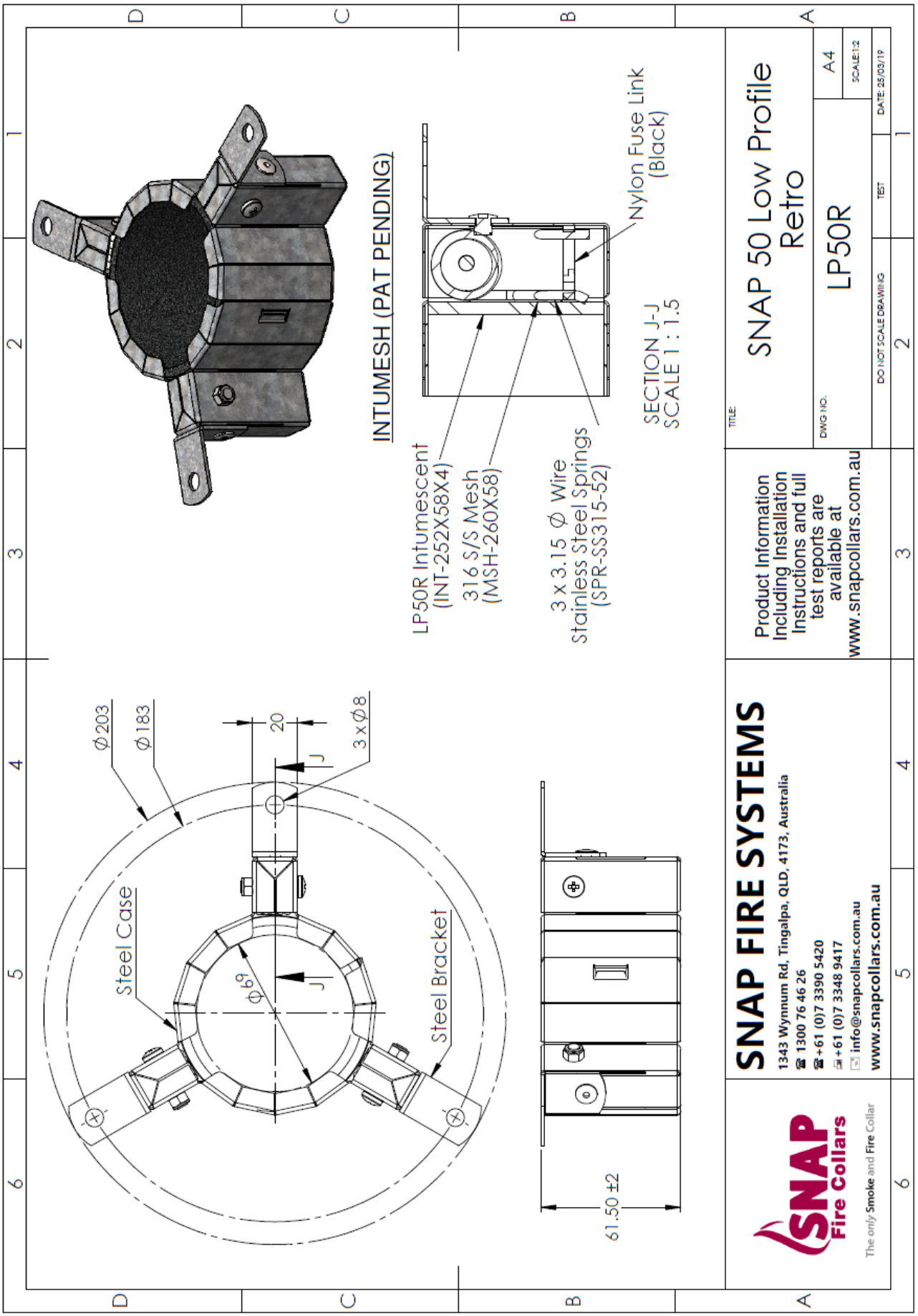
TITLE: SNAP 150 High Profile Retro

DWG NO. HP150R

A4

SCALE:1:5

DO NOT SCALE DRAWING | TEST | DATE: 05/10/17




**DRAWING TITLED 'SNAP 50 LOW PROFILE RETRO', DATED 25 MARCH 2019, BY SNAP FIRE SYSTEMS PTY LTD**

# Appendix F – Certificate(s) of Test

INFRASTRUCTURE TECHNOLOGIES
www.csiro.au

14 Julius Avenue, North Ryde NSW 2113
**T** (02) 9490 5444 • **ABN** 41 687 119 230

## Certificate of Test

No. 3741

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, Section 10: Service penetrations and control joints, on behalf of:

IG6 Pty Ltd
1343 Wynnum Road
Tingalpa QLD

A full description of the test specimen and the complete test results are detailed in the Division's report numbered FSP 2298.

Product Name: SNAP LP100R-D Low Profile Retrofit fire collar protecting a nominal 100 uPVC pipe penetrating a 250-mm dia. core hole (Specimen 1)

Description: The sponsor identified the specimens as three retrofit fire collars and one cast-in SNAP fire collars protecting a 1150-mm x 1150-mm x 150-mm thick concrete floor slab penetrated by four services comprising three unplasticized polyvinyl chloride (uPVC) stack pipes and a Beer Python. The 150-mm thick concrete slab was reinforced with a single layer of steel reinforcement providing a Fire Resistance Period (FRP) for insulation of 180 minutes in accordance with table 5.5.1 of AS 3600:2018 - Concrete structures. For the purpose of the test, the penetrations were referenced as Specimen 1, 2, 3 and 4. Specimen 1 is the subject of this Certificate. The SNAP LP100R-D Low Profile Retrofit fire collar comprised a 0.95-mm steel casing with a 122 mm inner diameter and a 260-mm diameter base flange. The 65-mm high fire collar casing incorporated a closing mechanism which comprised a 5-mm thick x 59-mm wide x 418-mm long Intumesh intumescent wrap which lined the internal circumference of the fire collar casing. The closing mechanism comprised four 4-mm diameter 304 stainless steel springs with black nylon fuse links and a 415-mm long x 120-mm wide wire mesh with a wire diameter of 0.15-mm. On the exposed face of the concrete slab a 300-mm x 300-mm section of 10-mm thick magnesium oxide (MgO) board, lined with a 1-mm thick galvanised steel sheet was centrally located over the 250-mm core hole. The MgO board and steel sheet were cut into two halves (300-mm x 150-mm) with a nominal 111 mm diameter aperture located in the centre, to be retrofitted around the penetrating service. The MgO board and galvanised steel sheets were fixed to the underside of the concrete slab using ten 5 mm x 30-mm long concrete screw bolts with 10-mm washers at nominally 130-mm centres. The LP100R-D fire collar was centrally located over the 111-mm aperture on the underside (fire exposed face) of the MgO board and galvanised steel sheet and was fixed in position through 4 mounting brackets using 10-guage x 38-mm laminating screws. The penetrating service comprised a Iplex DWV uPVC (sandwich construction) pipe with a 110-mm outside diameter and a wall thickness of 3.4-mm. The pipe was fitted through the fire collar sleeve, galvanised sheeting and MgO board and penetrated the concrete slab through a 250-mm diameter core hole. The annular gap between the pipe and concrete slab core hole directly above the MgO board was filled (friction fitted) with a purpose cut section of a 60-mm thick coated mineral fibre batt, consisting of a 160-165 kg/m3 fibrous lamella core (stone wool), sealed on both sides with a flexible ablative coating. The pipe projected vertically 2000-mm above the unexposed face of the concrete slab and 500-mm into the furnace chamber and was supported at nominally 500-mm and 1500-mm from the unexposed face of the slab. The PVC pipe was left open at the unexposed end and was fitted with a PVC end cap on the exposed end. The Sponsor provided Technical brochure titled 'Valpar Python', undated by Valpar Industries Limited, drawing titled 'Test Slab S-21-A4 Layout', dated 29 July 2021, by Snap Fire Systems Pty Ltd, drawing titled 'Specimen #1 100 PVC(SC) Stack & LP100R-D', dated 23 September 2021, by Snap Fire Systems Pty Ltd and drawing numbered LP100R-D-T dated 10 February 2017, by Snap Fire Systems Pty Ltd as a complete description of the specimen and should be read in conjunction with this Certificate.

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

| | | |
|---|---|---|
| Structural Adequacy | - | not applicable |
| Integrity | - | 158 minutes |
| Insulation | - | 156 minutes |

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/120/120.

The FRL of the specimen is applicable when the system is exposed to fire from the same direction as tested. Specimens were tested in a concrete slab with a Fire Resistance Period (FRP) for insulation of 180 minutes in accordance with Table 5.5.1 of AS 3600:2018 - Concrete structures. The maximum FRL of any test specimen cannot exceed the FRL achieved by the concrete slab in which it was installed. 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. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon Date of Test: 11 July 2022

Issued on the 18th day of August 2022 without alterations or additions.

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. 3741**

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. 3742

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, Section 10: Service penetrations and control joints, on behalf of:

IG6 Pty Ltd
1343 Wynnum Road
Tingalpa QLD

A full description of the test specimen and the complete test results are detailed in the Division's report numbered FSP 2298.

Product Name: SNAP LP100R-D Low Profile Retrofit fire collar protecting a nominal 100-mm PVC-SC floor waste with a fitting inside the collar penetrating a 130-mm core hole (Specimen 2)

Description: The sponsor identified the specimens as three retrofit fire collars and one cast-in SNAP fire collars protecting a 1150-mm x 1150-mm x 150-mm thick concrete floor slab penetrated by four services comprising three unplasticized polyvinyl chloride (uPVC) stack pipes and a Beer Python. The 150-mm thick concrete slab was reinforced with a single layer of steel reinforcement providing a Fire Resistance Period (FRP) for insulation of 180 minutes in accordance with table 5.5.1 of AS 3600:2018 - Concrete structures. For the purpose of the test, the penetrations were referenced as Specimen 1, 2, 3 and 4. Specimen 2 is the subject of this Certificate. The SNAP LP100R-D Low Profile Retrofit fire collar comprised a 0.95-mm steel casing with a 122 mm inner diameter and a 260-mm diameter base flange. The 65-mm high collar casing incorporated a closing mechanism which comprised a 5-mm thick x 59-mm wide x 418-mm long Intumesh intumescent wrap lined within the internal circumference of the collar casing. The closing mechanism comprised four 4-mm dia. 304 stainless steel springs with black nylon fuse links and a 415-mm long x 120-mm wide wire mesh with a wire diameter of 0.15 mm. The LP100R-D fire collar was centrally located over a 130-mm core hole on the underside (exposed face) of the slab and fixed through the four-fire collar mounting brackets using 5-mm x 35-mm mushroom head spikes. The penetrating service comprised a Iplex 110-mm PVC-SC outside diameter pipe and a wall thickness of 3.27-mm fitted through the collars sleeve and penetrated the slab through a 130 mm core hole. The service pipe had a nominal 100 PVC coupling fitted inside the collar sleeve, having a total wall thickness of approximately 6.3-mm (PVC-SC pipe in addition with the PVC coupling). The floor waste was fitted with a chrome plated brass grate and a plastic puddle flange. A 15-mm thick grout screed was laid on top of slab and finished flush with floor grate. On the exposed side of the slab, a PVC P-Trap was connected to the penetrating pipe, supported on the pipe above trap with a 110-mm hanging nut clip with a galvanised steel strap fixed to slab with 5-mm x 30-mm concrete screw anchors and a M10 threaded rod, nut clip and a steel drop-in anchor at the end of the P-Trap. On exposed face, the P-Trap was capped using a PVC End Cap. The Sponsor provided Technical brochure titled 'Valpar Python', undated by Valpar Industries Ltd, drawing titled 'Test Slab S-21-A4 Layout', dated 29 July 2021, by Snap Fire Systems Pty Ltd, drawing titled 'Specimen #2 100 PVC(SC) Floor Waste w/ fitting & LP100R-D', dated 23 February 2022, by Snap Fire Systems Pty Ltd and drawing numbered LP100R-D-T dated 10 February 2017, by Snap Fire Systems Pty Ltd as a complete description of specimen and should be read in conjunction with this Certificate.

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

| | | |
|---|---|---|
| Structural Adequacy | - | not applicable |
| Integrity | - | 188 minutes |
| Insulation | - | 4 minutes |

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/180/0.

The FRL of the specimen is applicable when the system is exposed to fire from the same direction as tested. Specimens were tested in a concrete slab with a Fire Resistance Period (FRP) for insulation of 180 minutes in accordance with Table 5.5.1 of AS 3600:2018 - Concrete structures. The maximum FRL of any test specimen cannot exceed the FRL achieved by the concrete slab in which it was installed. 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. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon Date of Test: 11 July 2022

Issued on the 18th day of August 2022 without alterations or additions.

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. 3742**

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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. 3743

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, Section 10: Service penetrations and control joints, on behalf of:

IG6 Pty Ltd
1343 Wynnum Road
Tingalpa QLD

A full description of the test specimen and the complete test results are detailed in the Division's report numbered FSP 2298.

Product Name: SNAP HP150R High Profile Retrofit fire collar protecting a tube bundle (beverage Python) penetrating a 135-mm diameter core hole (Specimen 3)

Description: The sponsor identified the specimens as three retrofit fire collars and one cast-in SNAP fire collars protecting a 1150-mm x 1150-mm x 150-mm thick concrete floor slab penetrated by four services comprising three unplasticized polyvinyl chloride (uPVC) stack pipes and a Beer Python. The 150-mm thick concrete slab was reinforced with a single layer of steel reinforcement providing a Fire Resistance Period (FRP) for insulation of 180 minutes in accordance with table 5.5.1 of AS 3600:2018 - Concrete structures. For the purpose of the test, the penetrations were referenced as Specimen 1, 2, 3 and 4. Specimen 3 is the subject of this Certificate. The SNAP retrofitted HP150R collar comprised a 0.95-mm thick steel casing with a 175-mm inner diameter and a 326-mm base flange. The 117-mm high collar casing incorporated a strip of 570 mm long x 112-mm wide x 8-mm thick Intumesh intumescent material. The closing mechanism comprised four SPR-SS400-102 stainless steel springs bound with nylon fuse links, and a 590-mm x 109 mm 316 stainless steel mesh. The SNAP HP150R fire collar was centrally located over a 135-mm diameter core hole on the underside (exposed face) of the concrete slab and fixed through the 4 mounting brackets using 6.5 mm x 40-mm steel sleeve anchors. The penetrating service comprised a 128 mm outside diameter Valpar Andale Python pipe incorporating a bundle of 20 tube Brewmaster 2 nylon tubes (12 x 12-mm outside diameter tubes with a wall thickness of 2.5 mm and 8 x 16-mm outside diameter tubes with a wall thickness of 2.5 mm), lined with a 25 mm thick flexible closed-cell foam insulation jacket with an outer black PVC wrapping. The Python pipe was fitted through the fire collar sleeve and penetrated the concrete slab through the core hole. On the unexposed face concrete slab, the nominal 1-mm annular gap between the Python pipe and the core hole was left unprotected. The pipe projected vertically 2000-mm above the unexposed face of the concrete slab and 500 mm below into the furnace chamber. The Beer Python was supported at nominally 500-mm and 1500 mm from the unexposed face of the slab, left open at the unexposed end and sealed with a ceramic fibre (Superwool) plug on the exposed end. The Sponsor provided Technical brochure titled 'Valpar Python', undated by Valpar Industries Limited, drawing titled 'Test Slab S-21-A4 Layout', dated 29 July 2021, by Snap Fire Systems Pty Ltd, drawing titled 'Specimen #3 130 Beer Python Stack & HP150R', dated 24 February 2022, by Snap Fire Systems Pty Ltd and drawing titled 'SNAP 150 High Profile Retro' dated 5 October 2017, by Snap Fire Systems Pty as a complete description of the specimen and should be read in conjunction with this Certificate.

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

| | | |
|---|---|---|
| Structural Adequacy | - | not applicable |
| Integrity | - | 218 minutes |
| Insulation | - | 218 minutes |

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/180/180.

The FRL of the specimen is applicable when the system is exposed to fire from the same direction as tested. Specimens were tested in a concrete slab with a Fire Resistance Period (FRP) for insulation of 180 minutes in accordance with Table 5.5.1 of AS 3600:2018 - Concrete structures. The maximum FRL of any test specimen cannot exceed the FRL achieved by the concrete slab in which it was installed. 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. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon Date of Test: 11 July 2022

Issued on the 18th day of August 2022 without alterations or additions.

Brett Roddy | Manager, Fire Testing and Assessments



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# Certificate of Test

No. 3744

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, Section 10: Service penetrations and control joints, on behalf of:

IG6 Pty Ltd
1343 Wynnum Road
Tingalpa QLD

A full description of the test specimen and the complete test results are detailed in the Division's report numbered FSP 2298.

Product Name: SNAP LP50R Low Profile Retrofit fire collar protecting a nominal 50 uPVC pipe penetrating a 250-mm diameter core hole incorporating a pipe coupling inside the fire collar (Specimen 4)

Description: The sponsor identified the specimens as three retrofit fire collars and one cast-in SNAP fire collars protecting a 1150-mm x 1150-mm x 150-mm thick concrete floor slab penetrated by four services comprising three unplasticized polyvinyl chloride (uPVC) stack pipes and a Beer Python. The 150-mm thick concrete slab was reinforced with a single layer of steel reinforcement providing a Fire Resistance Period (FRP) for insulation of 180 minutes in accordance with table 5.5.1 of AS 3600:2018 - Concrete structures. For the purpose of the test, the penetrations were referenced as Specimen 1, 2, 3 and 4. Specimen 4 is the subject of this Certificate. The SNAP LP50R Low Profile Retrofit fire collar comprised a 0.75-mm steel casing with a 69-mm inner dia. and a 203-mm dia. base flange. The 61.5-mm high collar casing incorporated a closing mechanism which comprised a 252-mm x 58-mm x 4-mm thick Intumesh intumescent wrap lined within the internal circumference of the collar casing. The closing mechanism comprised three stainless steel springs, with black nylon fuse links and a 260-mm x 58 mm stainless steel mesh. On the exposed face of the concrete slab a 300-mm x 300-mm section of 10-mm thick magnesium oxide (MgO) board lined with a 1-mm thick galvanised steel sheet was centrally located over the 250-mm core hole. The MgO board and steel sheet were cut into two halves (300-mm x 150-mm) with a nominal 56 mm diameter aperture located in the centre, to be retrofitted around the penetrating service. The MgO board and galvanised steel sheets were fixed to the underside of the slab using ten 5 mm x 30-mm long concrete screw bolts with 10-mm washers at nominally 130-mm centres. A SNAP LP50R fire collar was centrally located over the 56-mm aperture on the underside (fire exposed face) of the MgO board and galvanised steel sheet and then fixed through the three-fire collar mounting brackets using 10-gauge x 38-mm laminating screws. The penetrating service comprised a Iplex DWV uPVC pipe with a 55.8-mm outside dia. and a wall thickness of 2.4-mm. The pipe was fitted through the collar sleeve, galvanised sheeting and MgO board and penetrated the slab through a 250-mm dia. core hole. The pipe incorporated a PVC coupling located inside the fire collar on the exposed face. The annular gap between the pipe and concrete slab core hole directly above the MgO board was filled (friction fitted) with a purposed cut section a 60-mm thick coated mineral fibre batt, consisting of a 160-165 kg/m3 fibrous lamella core (stone wool), sealed on both sides with a flexible ablative coating. The pipe projected vertically, 2000-mm above the unexposed face of the concrete slab and 500 mm into the furnace chamber and was supported at nominally 500-mm and 1500-mm from the unexposed face of the slab. The pipe was left open at the unexposed end and was fitted with a PVC end cap on the exposed end. The Sponsor provided Technical brochure titled 'Valpar Python', undated by Valpar Industries Limited, drawing titled 'Test Slab S-21-A4 Layout', dated 29 July 2021, by Snap Fire Systems Pty Ltd, drawing titled 'Specimen #4, 50 PVC Stack + Fitting & LP50OR', dated 23 September 2021, by Snap Fire Systems Pty Ltd and drawing titled 'SNAP 50 Low Profile Retro', 25 March 2019, by Snap Fire Systems Pty Ltd as a complete description of the specimen and should be read in conjunction with this Certificate.

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

| | | |
|---|---|---|
| Structural Adequacy | - | not applicable |
| Integrity | - | 185 minutes |
| Insulation | - | 102 minutes |

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/180/90.

The FRL of the specimen is applicable when the system is exposed to fire from the same direction as tested. Specimens were tested in a concrete slab with a Fire Resistance Period (FRP) for insulation of 180 minutes in accordance with Table 5.5.1 of AS 3600:2018 - Concrete structures. The maximum FRL of any test specimen cannot exceed the FRL achieved by the concrete slab in which it was installed. 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. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Peter Gordon Date of Test: 11 July 2022

Issued on the 18th day of August 2022 without alterations or additions.

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. 3744**

# References

The following informative documents are referred to in this Report:

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|---|---|
| AS 1530.4-2014 | Methods for fire tests on building materials, components and structures Part 4: Fire-resistance tests for 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. |
| AS 3600-2018 | Concrete structures. |

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FOR FURTHER INFORMATION

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