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

Test Report

Author: Peter Gordon

Report number: FSP 2111
(Revision B)

Date: 29 July 2020

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

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Report Authorisation:

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29 July 2020	29 July 2020	29 July 2020

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

Sponsored Investigation No. FSP 2111

1 Introduction

1.1 Identification of specimen

The sponsor identified the specimen as two (2) cast-in fire collars protecting a 180-mm thick concrete floor slab penetrated by stack pipes and a 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 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 4986/4527

1.7 Test date

The fire-resistance test was conducted on 25 May 2020.

2 Description of specimen

2.1 General

The specimen comprised an 1150-mm x 1150-mm x 180-mm thick concrete slab with 300-mm x 300-mm square section recessed to a thickness of 120-mm. The slab was penetrated by multiple services protected by two (2) cast-in fire collars.

The penetrated section of the slab in Specimen 1 comprised a 180-mm thick concrete slab reinforced with a single layer of steel reinforcement providing a Fire Resistance Period (FRP) for insulation of 240 minutes in accordance with Table 5.5.1 of AS 3600:2018 - Concrete structures.

The penetrated section of the slab in Specimen 2 comprised a 300-mm x 300-mm square recess section with a 100-mm thick concrete topped with a 20-mm thick layer of grout providing a Fire Resistance Period (FRP) for insulation of 120 minutes in accordance with Table 5.5.1 of AS 3600:2018 - Concrete structures.

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.

For the purpose of the test, the specimens were referenced as Specimen 1 and 2.

Specimen 1 – SNAP UL100FWS Cast-in fire collar protecting a 100-mm PVC 4-way riser incorporating a nominal 100-mm PVC-SC stack pipe, two nominal 50-mm PVC stack pipes, two nominal 40-mm PVC stack pipes and a PVC coupling fitted inside the collar

The SNAP UL100FWS Cast-in fire collar comprised a moulded plastic casting with a 110-mm inner diameter and a 194-mm x 194-mm base flange. The 67-mm high collar casing incorporated 4-mm thick x 60-mm wide x 426-mm long Intumesh intumescent strip. The closing mechanism comprised four 4-mm diameter (SPR-SS400-60-Z) stainless steel springs, a nylon fuse link and a 455-mm x 58-mm stainless steel mesh as shown in drawing numbered UL100FWS dated 25 May 2020, by SNAP Fire Systems.

The penetrating service comprised a PVC 4-way riser fitted through the collars sleeve within the slab incorporating; a 100-mm PVC-SC stack pipe, two 50-mm PVC stack pipes and two 40-mm stack pipes, a PVC coupling fitted inside the fire collars' sleeve joining a second PVC-SC pipe.

The Iplex polyvinyl chloride sandwich construction stack pipe had a 110-mm outside diameter with a wall thickness of 3.47-mm and projected vertically 2000-mm above the slab on the unexposed face. Two Pipemakers 50-mm stack pipes were attached to the 4-way riser via two side arms using a 90-degree PVC elbow section that extended 170-mm horizontally through the concrete slab before projecting up vertically 2000-mm above the unexposed face. The nominal 50-mm PVC pipe had an outside diameter of 56-mm and a wall thickness of 2.2-mm. Two Iplex 40-mm stack pipes were attached to the 4-way riser via two of the side arms using a 90-degree elbow section that extended 160-mm horizontally through the concrete slab before projecting up vertically 2000-mm above the unexposed face. The nominal 40-mm PVC pipe had an outside diameter of 42.7-mm and a wall thickness of 2.12-mm. All five stack pipes were supported above the unexposed face at 500-mm and 1500-mm and their ends left open.

A 110–mm PVC-SC pipe was connected to the base of the 4-way riser via a PVC coupling which was fitted inside the collar's sleeve. The pipe projected vertically 500-mm down into the furnace chamber and was capped with a 110-mm PVC end cap.

The specimen was constructed as shown in drawings titled "Specimen #1 100mm PVC-SC Stack, 4-Way Riser in the Slab & UL100FWS", parts 1 & 2, dated 29 May 2020, provided by Snap Fire Systems Pty Ltd.

Specimen 2 – SNAP UL100FWS Cast-in fire collar protecting a nominal 100-mm polyvinyl chloride sandwich construction (PVC-SC) floor waste incorporating a PVC 4-way riser fitted below the collar

The SNAP UL100FWS Cast-in fire collar comprised a moulded plastic casting with a 110-mm inner diameter and a 194-mm x 194-mm base flange. The 67-mm high collar casing incorporated 4-mm thick x 60-mm wide x 426-mm long Intumesh intumescent strip. The closing mechanism comprised four 4-mm diameter (SPR-SS400-60-Z) stainless steel springs, a nylon fuse link and a 455-mm x 58-mm stainless steel mesh as shown in drawing numbered UL100FWS dated 25 May 2020, by SNAP Fire Systems.

The penetrating service comprised a nominal 100-mm Iplex floor waste system. The floor waste pipe had a 110-mm outside diameter polyvinyl chloride sandwich construction pipe with a wall thickness of 3.4-mm fitted through the collar's sleeve.

The floor waste system was fitted with a chrome brass grate. A 20-mm thick grout screed was laid on top of the 100-mm thick concrete slab and finished flush with the floor grate. On the exposed side of the slab, a 4-way riser was connected below the fire collar to the penetrating pipe and supported by two M5 30-mm concrete screw bolts and a steel strap. The 4-way riser was capped using a polyvinyl chloride end cap. The floor waste gully was charged with water to the level shown in drawing titled "Specimen #2, 100 PVC-SC FWS with 4-Way Riser & UL100FWS", dated 16 March 2020, provided by Snap Fire Systems Pty Ltd.

2.2 Dimensions

The specimen comprised an 1150-mm x 1150-mm x 180-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.

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:

Drawing titled “Test Slab S-20-D Layout”, dated 16 March 2020 provided by Snap Fire Systems Pty Ltd.

Drawing titled “Specimen #1 100mm PVC-SC Stack, 4-Way Riser in the Slab & UL100FWS”, part 1, dated 29 May 2020, provided by Snap Fire Systems Pty Ltd.

Drawing titled “Specimen #1 100mm PVC-SC Stack, 4-Way Riser in the Slab & UL100FWS”, part 2, dated 29 May 2020, provided by Snap Fire Systems Pty Ltd.

Drawing titled “Specimen #2 100 PVC-SC FWS with 4-Way Riser & UL100FWS”, dated 16 March 2020, provided by Snap Fire Systems Pty Ltd.

Drawing titled “SNAP 100 Ultra Low-Top Floor Waste Shower” with Drawing No. UL100FWS, dated 25 May 2020, 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 16°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
1 minutes -	Smoke has begun fluing from the end of the 100 PVC stack pipe of Specimen 1.
2 minutes -	Smoke has begun fluing from the grate of the Specimen 2 floor waste.
4 minutes -	The level of smoke fluing from the 100-mm stack pipe of Specimen 1 and the grate of Specimen 2 has increased. No smoke appears to be fluing from any of the 40 and 50 pipes of Specimen 1.
6 minutes -	Cotton pad test applied above the grate of Specimen 2 – no ignition noted at this time.
9 minutes -	The level of smoke fluing from the end of the pipes of Specimen 1 has reduced.
15 minutes -	The level of smoke fluing from the grate of the Specimen 2 floor waste has reduced.
28 minutes -	Water has begun pooling on the concrete slab at the base of Specimen 1.
31 minutes -	Water has begun pooling on the concrete slab at the base of Specimen 2.
35 minutes -	Moisture is now visible on the sides of the concrete slab.
65 minutes -	Steam is being emitted from the concrete slab.
90 minutes -	Smoke has begun fluing from the grate of the Specimen 2 floor waste and the temperature has begun to rise.
102 minutes -	Cotton pad test applied above the grate of Specimen 2 – no ignition noted at this time.
120 minutes -	Smoke continues to flue from end of the 100 PVC stack pipe of Specimen 1.
179 minutes -	Cotton pad test applied above the grate of Specimen 2 – no ignition noted at this time.
184 minutes -	Insulation failure of Specimen 2 - maximum temperature rise of 180K is exceeded on the centre of the metal grate of Specimen 2 floor waste.
203 minutes -	Smoke / steam has begun venting at the base of the 100 PVC stack pipe adjacent to thermocouples 4 and 6.
226 minutes -	Smoke / steam continues to vent at the base of the 100 PVC stack pipe adjacent to thermocouples 4 and 6. Photograph 10
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 temperature versus time associated with the 100-mm stack pipe of Specimen 1.

Figure 4 shows the curve of temperature versus time associated with the two 40-mm stack pipes of Specimen 1.

Figure 5 shows the curve of temperature versus time associated with the two 50-mm stack pipe of Specimen 1.

Figure 6 shows the curve of temperature versus time associated with Specimen 2.

8.5 Performance

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

Specimen 1 – SNAP UL100FWS Cast-in fire collar protecting a 100-mm PVC 4-way riser incorporating a 100-mm PVC-SC stack pipe, two 50-mm PVC stack pipes, two 40-mm PVC stack pipes and a PVC coupling fitted inside the collar

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

Specimen 2 – SNAP UL100FWS Cast-in fire collar protecting a nominal 110-mm polyvinyl chloride sandwich construction (PVC-SC) floor waste incorporating a PVC 4-way riser fitted below the collar

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	184 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:

Specimen 1 - -/240/240

Specimen 2 - -/240/120*

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

* Test Specimen 2 test was conducted in a concrete slab with a Fire Resistance Period (FRP) for insulation of 120 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
Specimen 2 – SNAP UL100FWS Cast-in fire collar protecting a nominal 110-mm polyvinyl chloride sandwich construction (PVC-SC) floor waste incorporating a PVC 4-way riser fitted inside the collar.	On top of the slab – 25-mm from screed (North/East)	S1
	On top of the slab – 25-mm from screed (South/West)	S2
	On centre of the Grate	S3
Specimen 1 – SNAP UL100FWS Cast-in fire collar protecting a 100-mm PVC 4-way riser incorporating a 100-mm PVC-SC stack pipe, two 50-mm PVC stack pipes, two 40-mm PVC stack pipes and a PVC coupling fitted below the collar.	On top of the slab, 25-mm from 100-mm pipe (North)	S4
	On top of the slab, 25-mm from 100-mm pipe (South)	S5
	On 100-mm pipe – 25-mm from slab (North)	S6
	On 100-mm pipe – 25-mm from slab (South)	S7
	On top of the slab, 25-mm from 40-mm pipe (North)	S8
	On top of the slab, 25-mm from 40-mm pipe (South)	S9
	On 40-mm pipe, 25-mm from slab (North)	S10
	On 40-mm pipe, 25-mm from slab (South)	S11
	On top of the slab, 25-mm from 50-mm pipe (West)	S12
	On top of the slab, 25-mm from 50-mm pipe (East)	S13
	On 50-mm pipe, 25-mm from slab (West)	S14
	On 50-mm pipe, 25-mm from slab (East)	S15
	On top of the slab, 25-mm from 40-mm pipe (North)	S16
	On top of the slab, 25-mm from 40-mm pipe (South)	S17
	On 40-mm pipe, 25-mm from slab (North)	S18
	On 40-mm pipe, 25-mm from slab (South)	S19
	On top of the slab, 25-mm from 50-mm pipe (West)	S20
	On top of the slab, 25-mm from 50-mm pipe (East)	S21
	On 50-mm pipe, 25-mm from slab (West)	S22
	On 50-mm pipe, 25-mm from slab (East)	S23
Rover	Rover	S24
Ambient	Ambient	S25

Appendix B – Photographs

PHOTOGRAPH 1 –SPECIMENS PRIOR TO CONCRETE CASTING

PHOTOGRAPH 2 – EXPOSED FACE OF SPECIMENS 2 AND 3 PRIOR TO TESTING

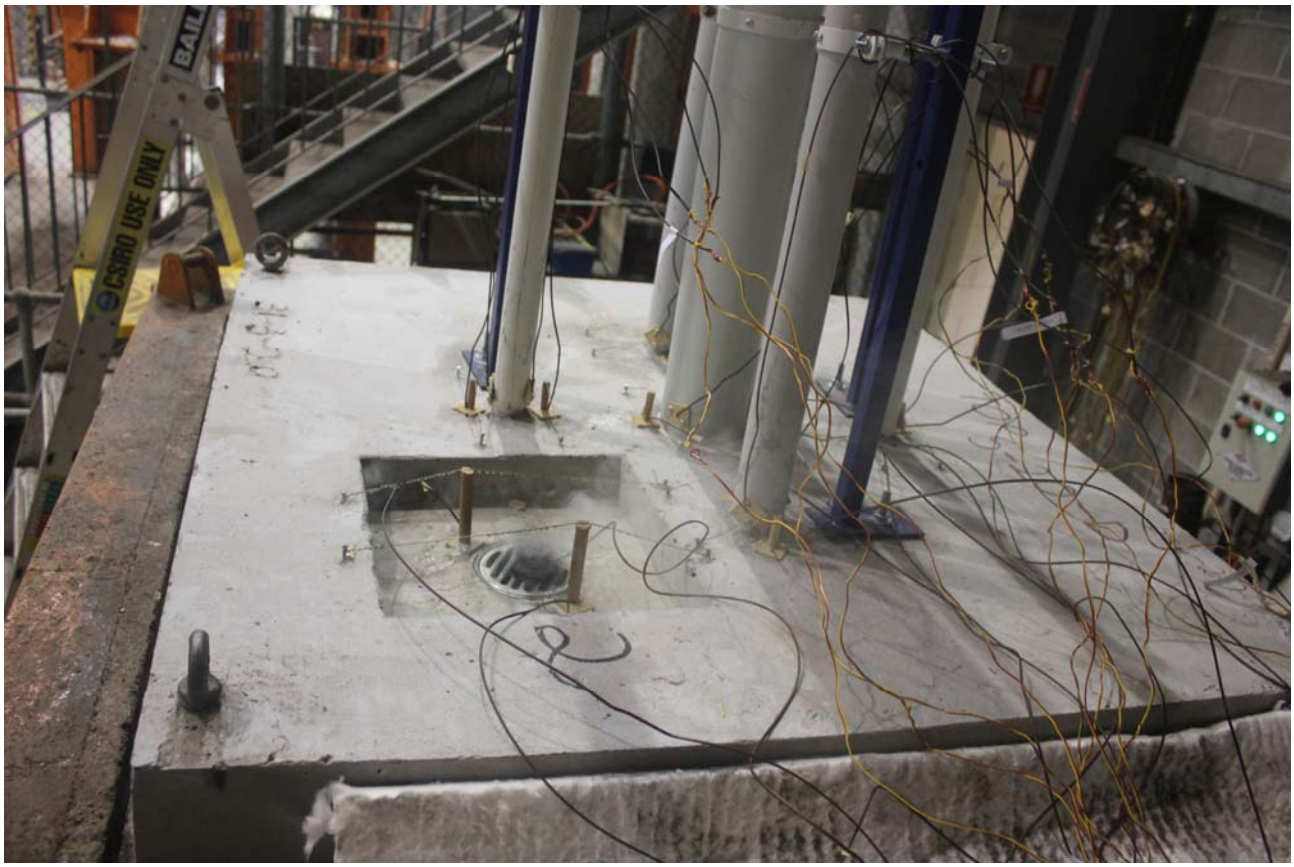
PHOTOGRAPH 3 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING

PHOTOGRAPH 4 – SPECIMEN 2 AFTER 5 MINUTES OF TESTING

PHOTOGRAPH 5 – SPECIMENS AFTER 30 MINUTES OF TESTING

PHOTOGRAPH 6 – SPECIMENS AFTER 60 MINUTES OF TESTING

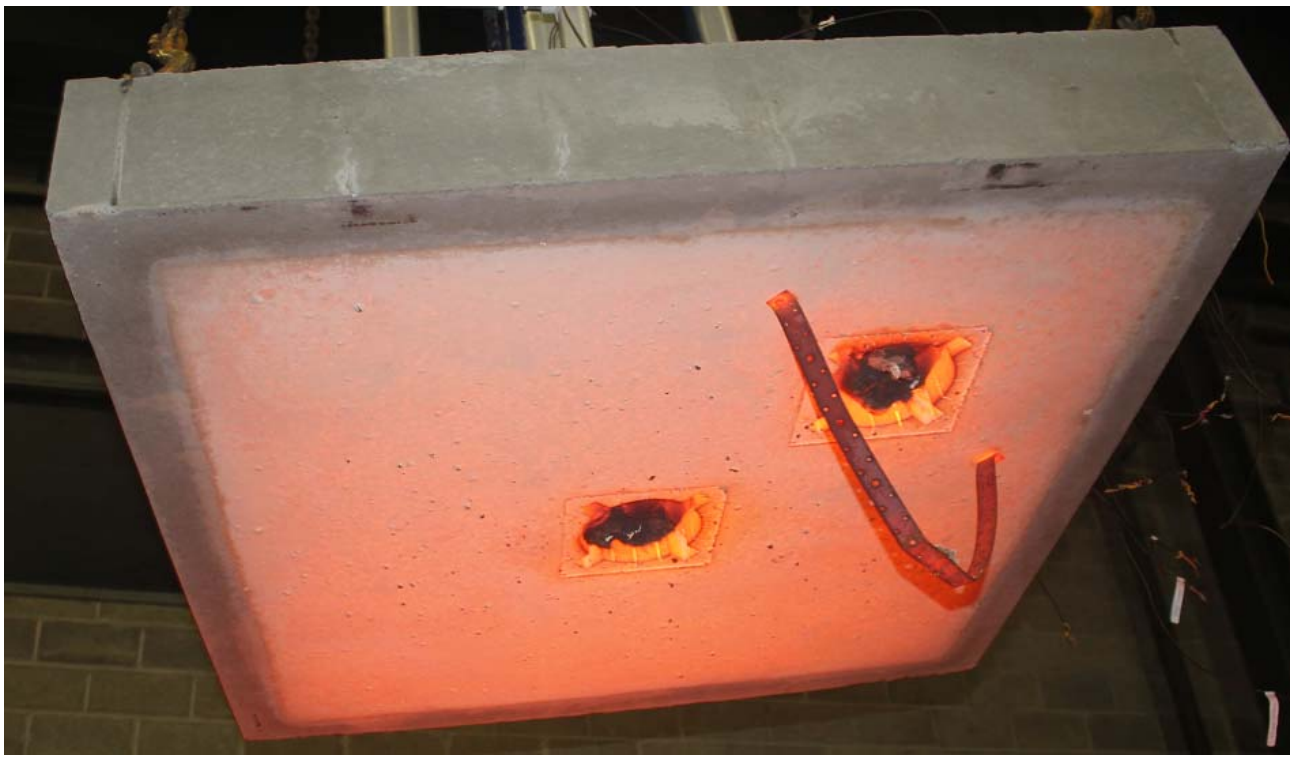
PHOTOGRAPH 7 – SPECIMENS AFTER 120 MINUTES OF TESTING



PHOTOGRAPH 8 – SPECIMENS AFTER 180 MINUTES OF TESTING

PHOTOGRAPH 9 – SPECIMEN 1 AFTER 225 MINUTES OF TESTING

PHOTOGRAPH 10 – SPECIMENS AFTER 240 MINUTES OF TESTING



PHOTOGRAPH 11 – EXPOSED FACE OF SPECIMENS AT THE CONCLUSION OF TESTING

Appendix C – Test Data charts

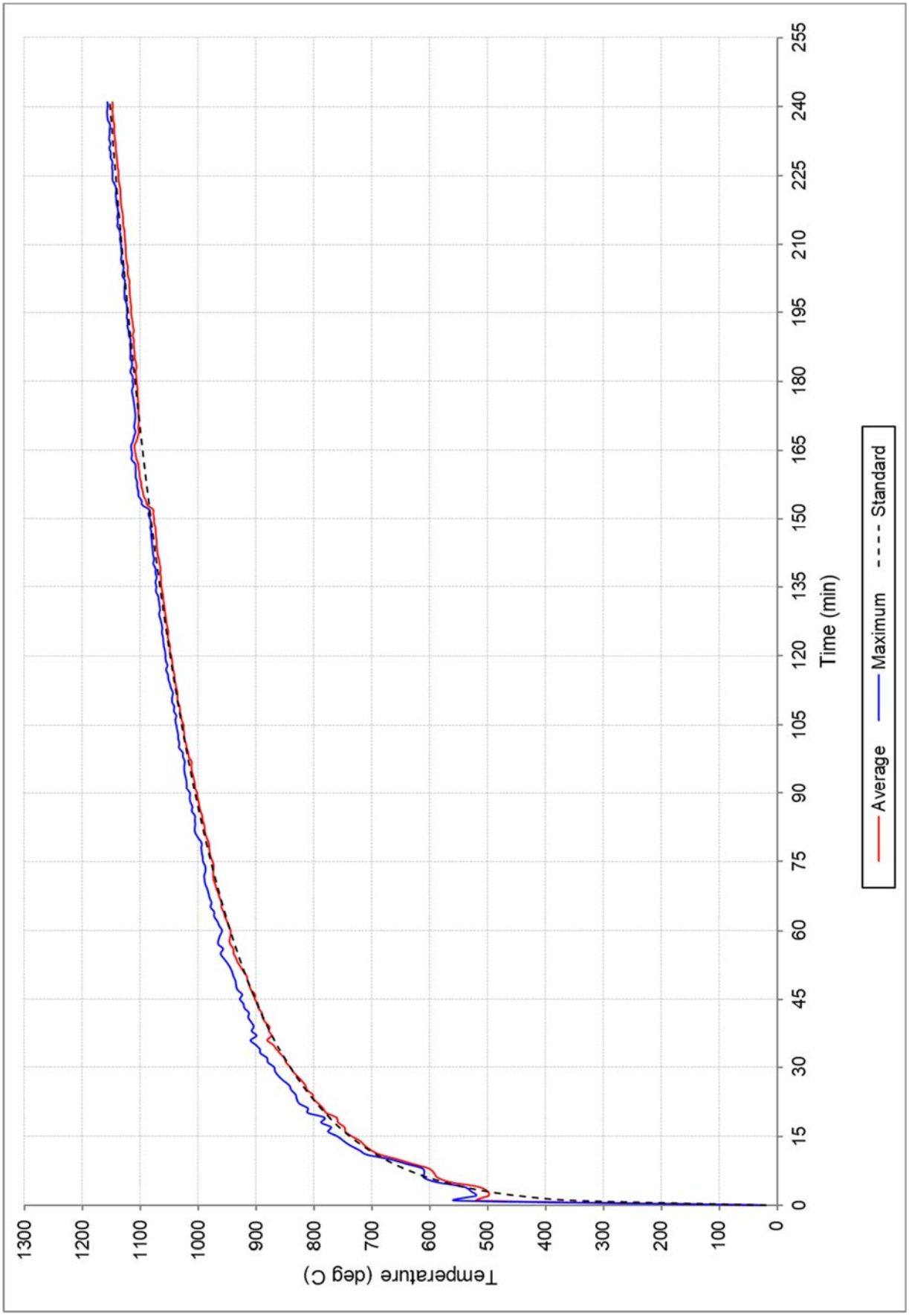


FIGURE 1 – FURNACE TEMPERATURE

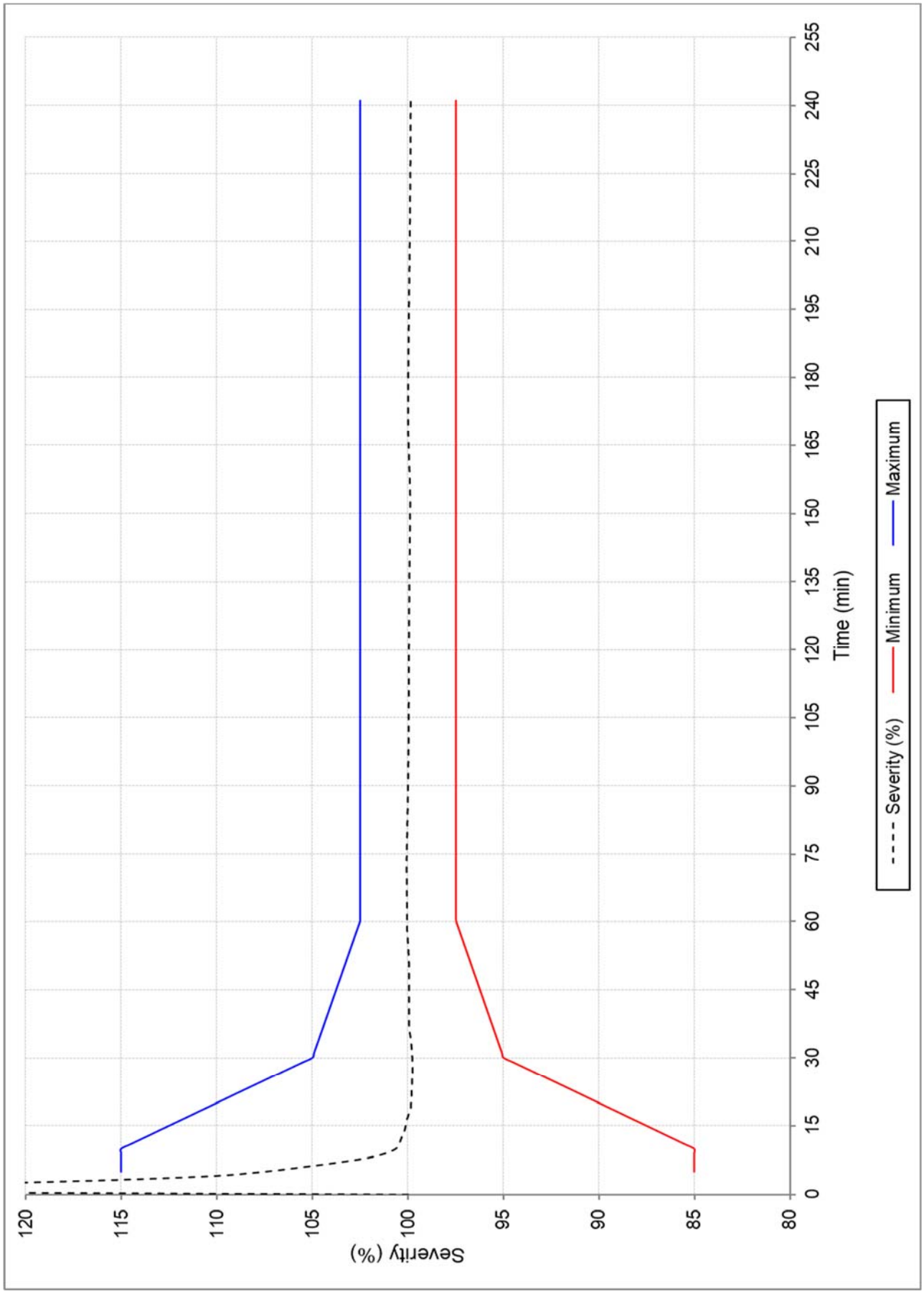


FIGURE 2 – FURNACE SEVERITY

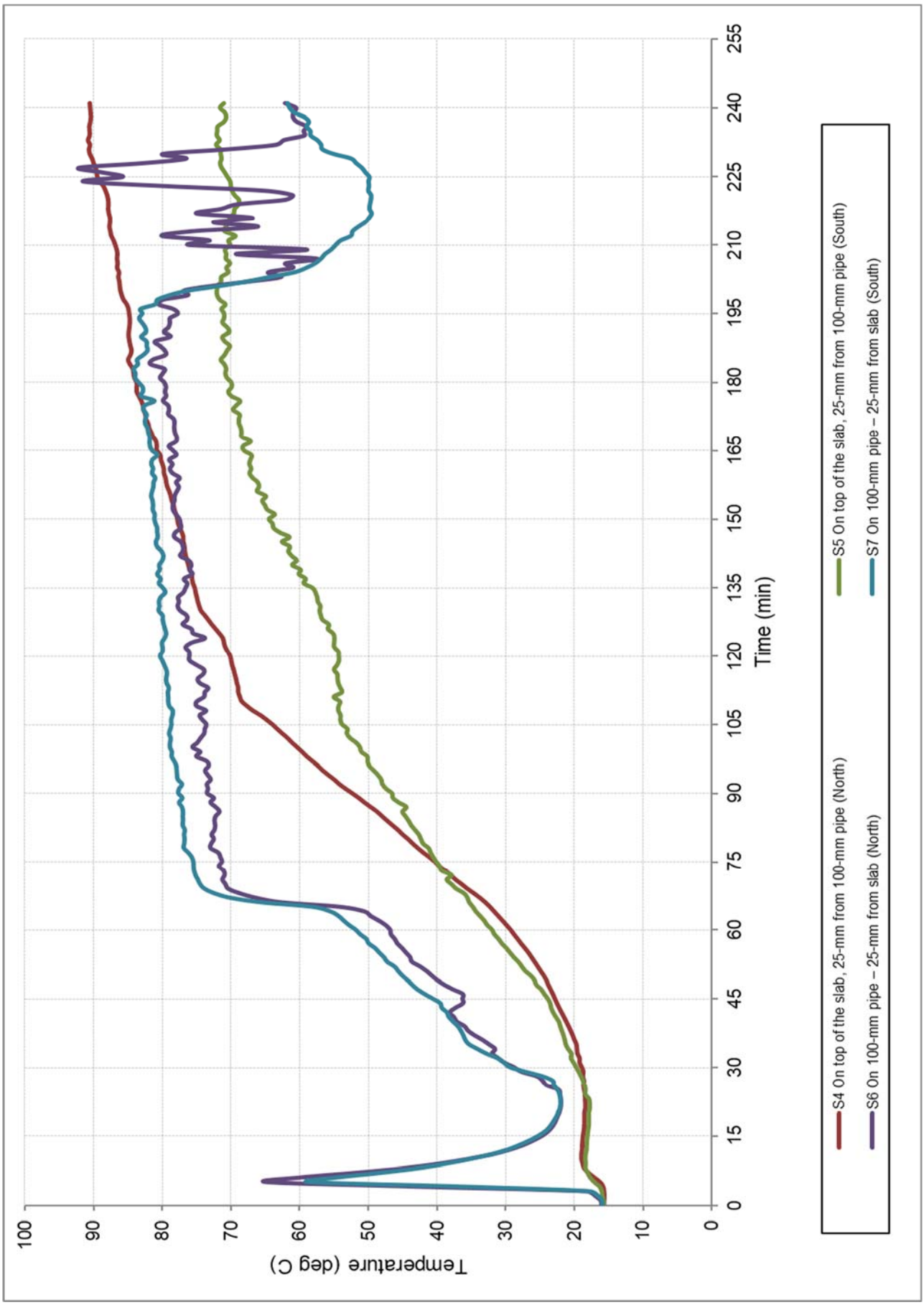


FIGURE 3 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 1, 100-MM STACK PIPE

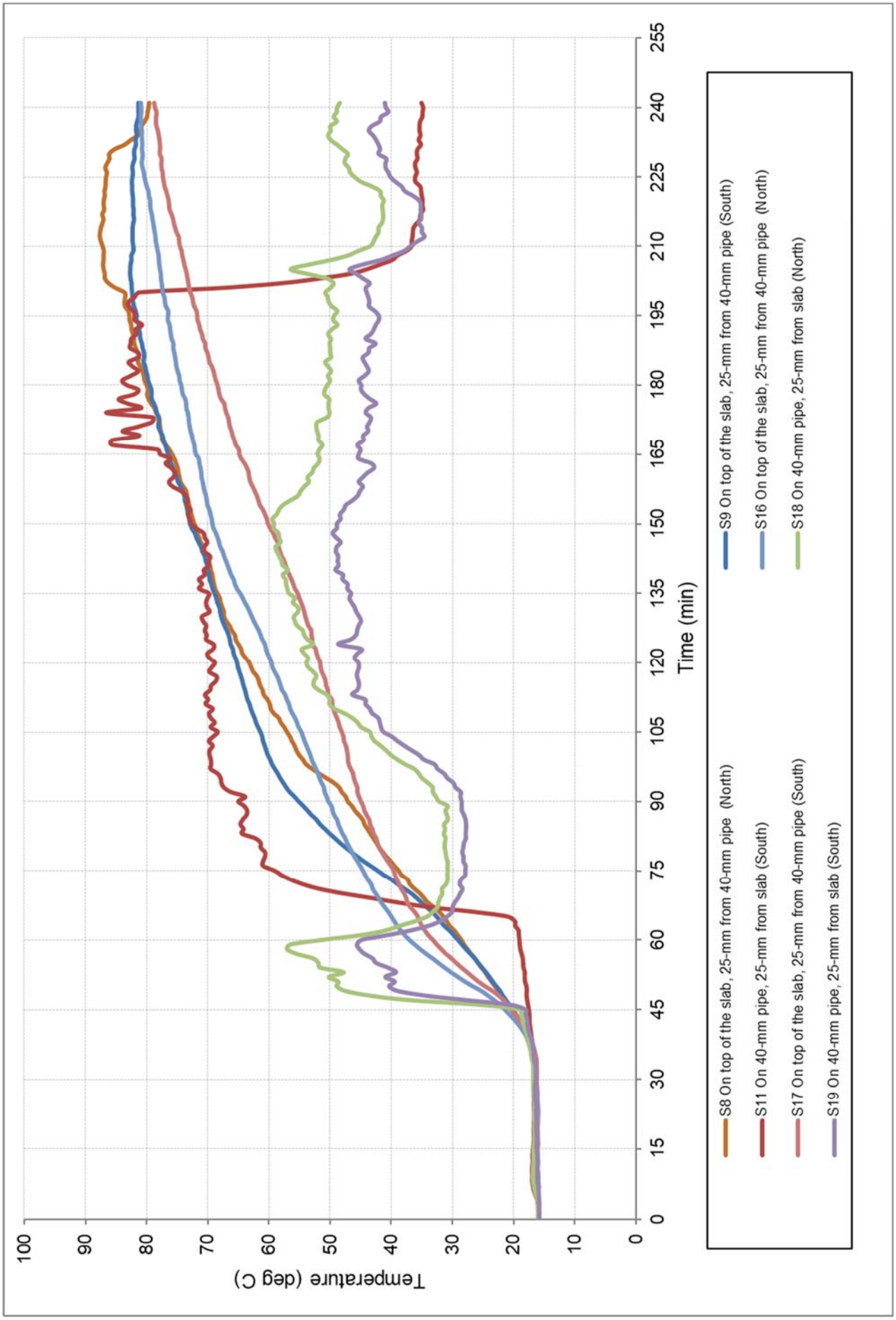


FIGURE 4 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 1, 40-MM STACK PIPES

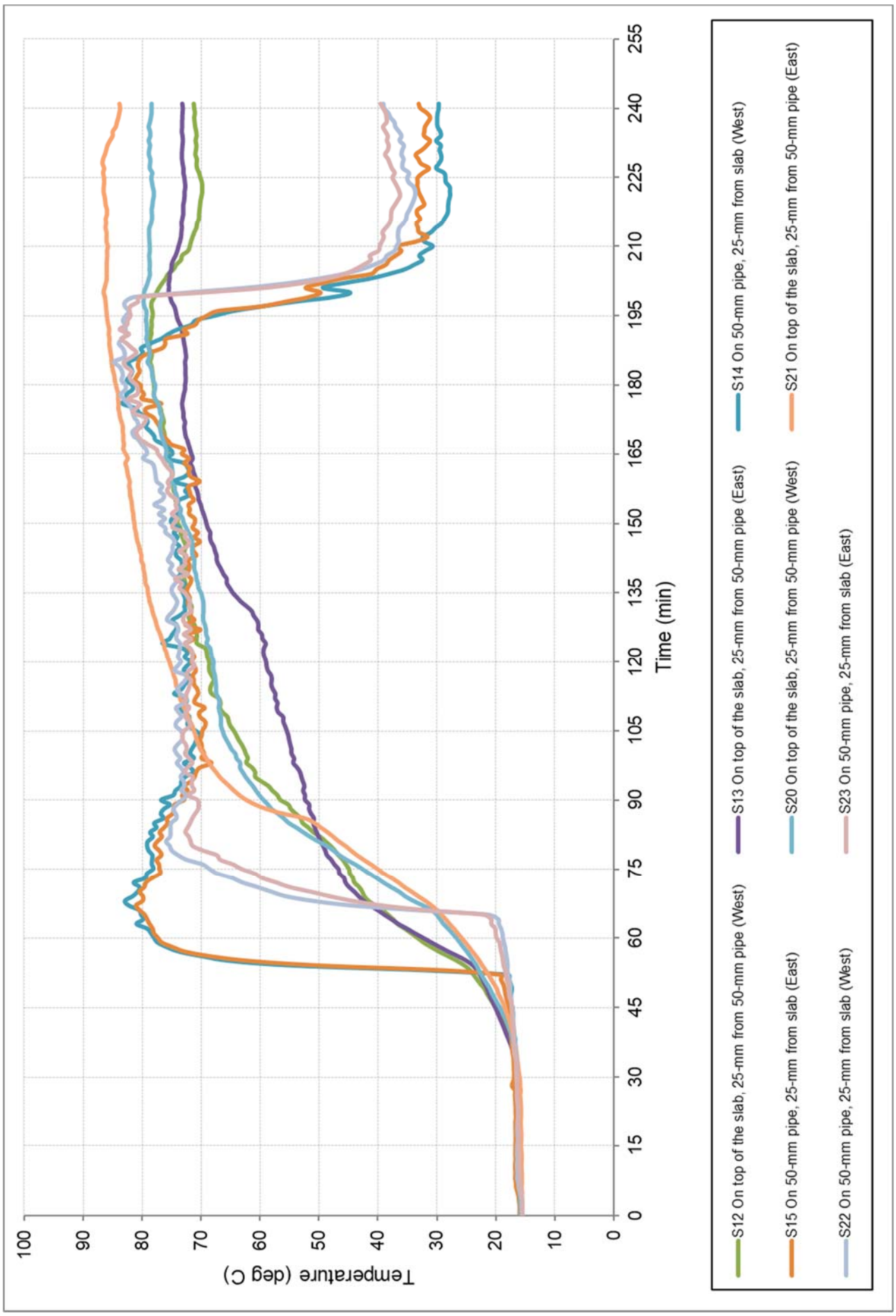


FIGURE 5 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 1, 50-MM STACK PIPES

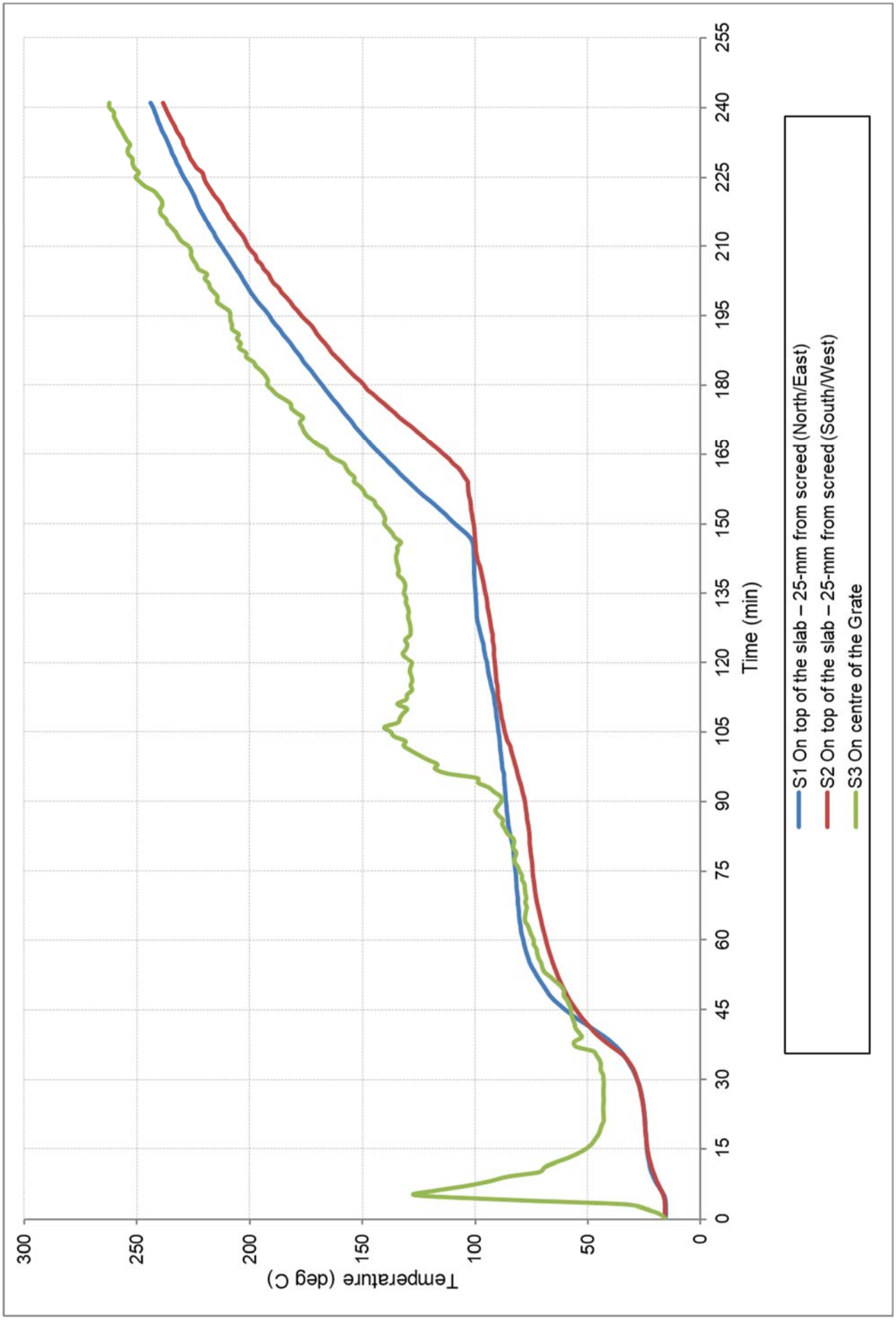
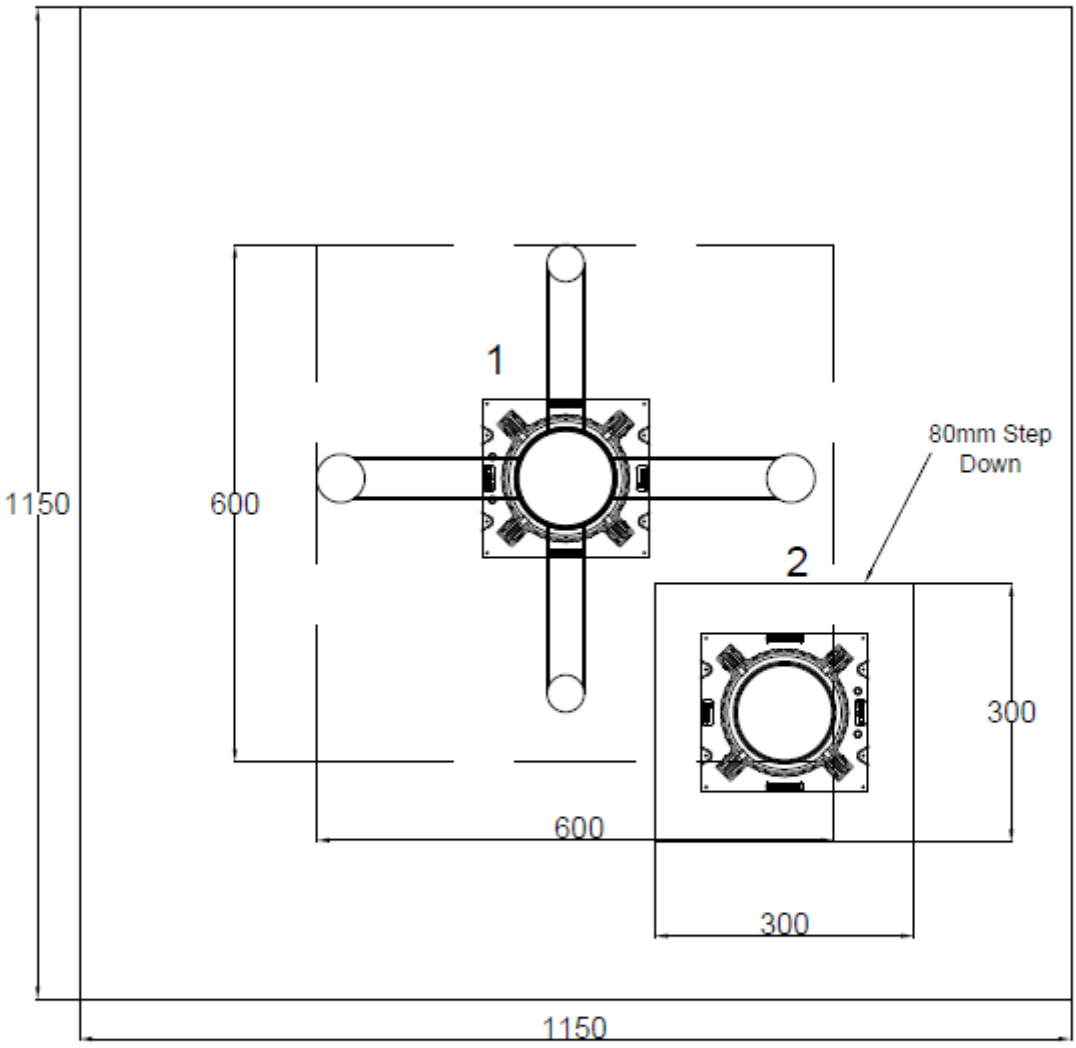


FIGURE 6 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 2

Appendix D – Installation drawings

Snap Fire Systems Pty Ltd
Test Slab S-20-D Layout
Date: 29 MAY 2020



Penetration	Collar Code	Pipe Type	Pipe Diameter (mm)	Fitting
1	UL100FWS	PVC-SC	100	Yes
2	UL100FWS	PVC-SC	100	Yes

DRAWING TITLED "TEST SLAB S-20-D LAYOUT", DATED 29 MAY 2020, BY SNAP FIRE SYSTEMS PTY LTD

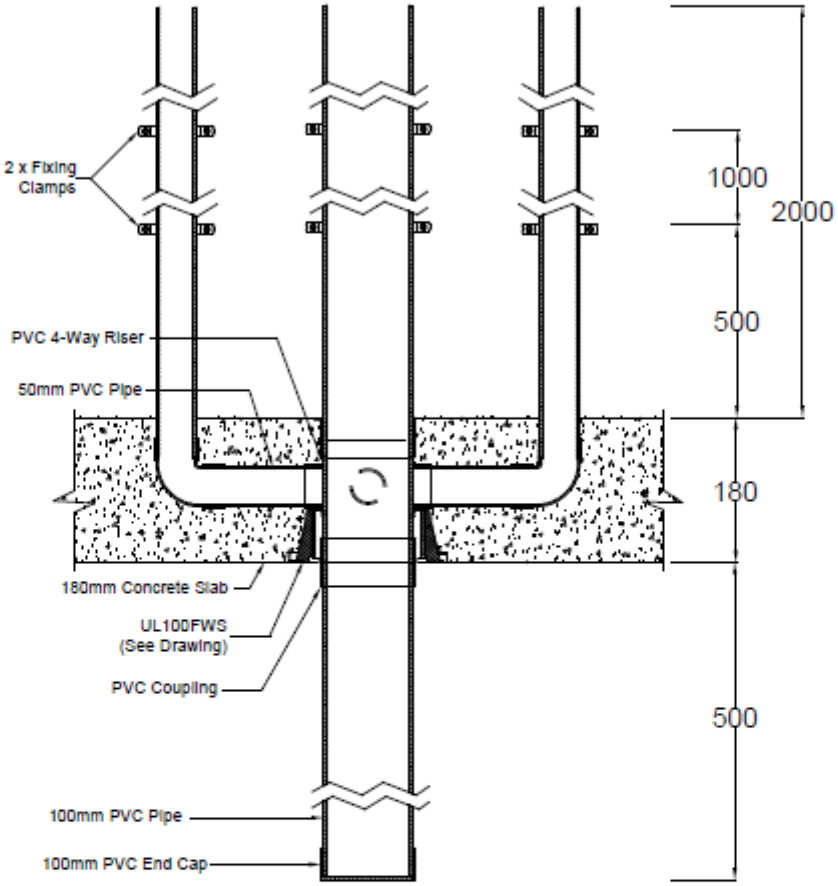
Snap Fire Systems Pty Ltd

Specimen #1

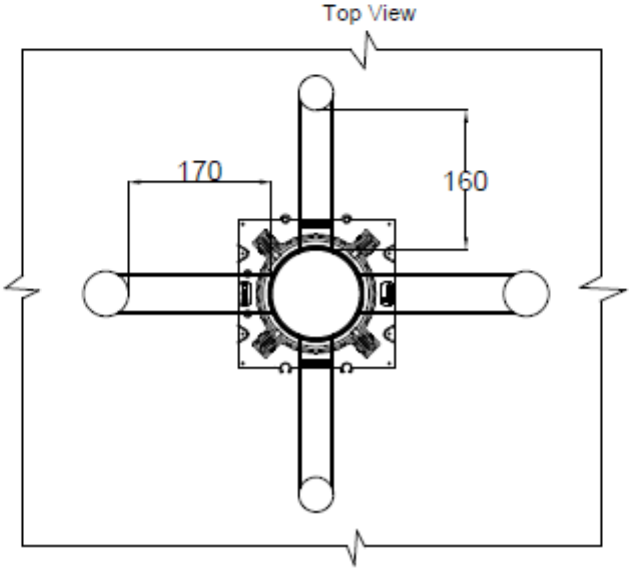
100mm PVC-SC Stack, 4-Way Riser in the Slab & UL100FWS

29 MAY 2020

Front View



Top View



DRAWING TITLED "SPECIMEN #1 100MM PVC-SC STACK, 4-WAY RISER IN THE SLAB & UL100FWS", PART 1 DATED 29 MAY 2020, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

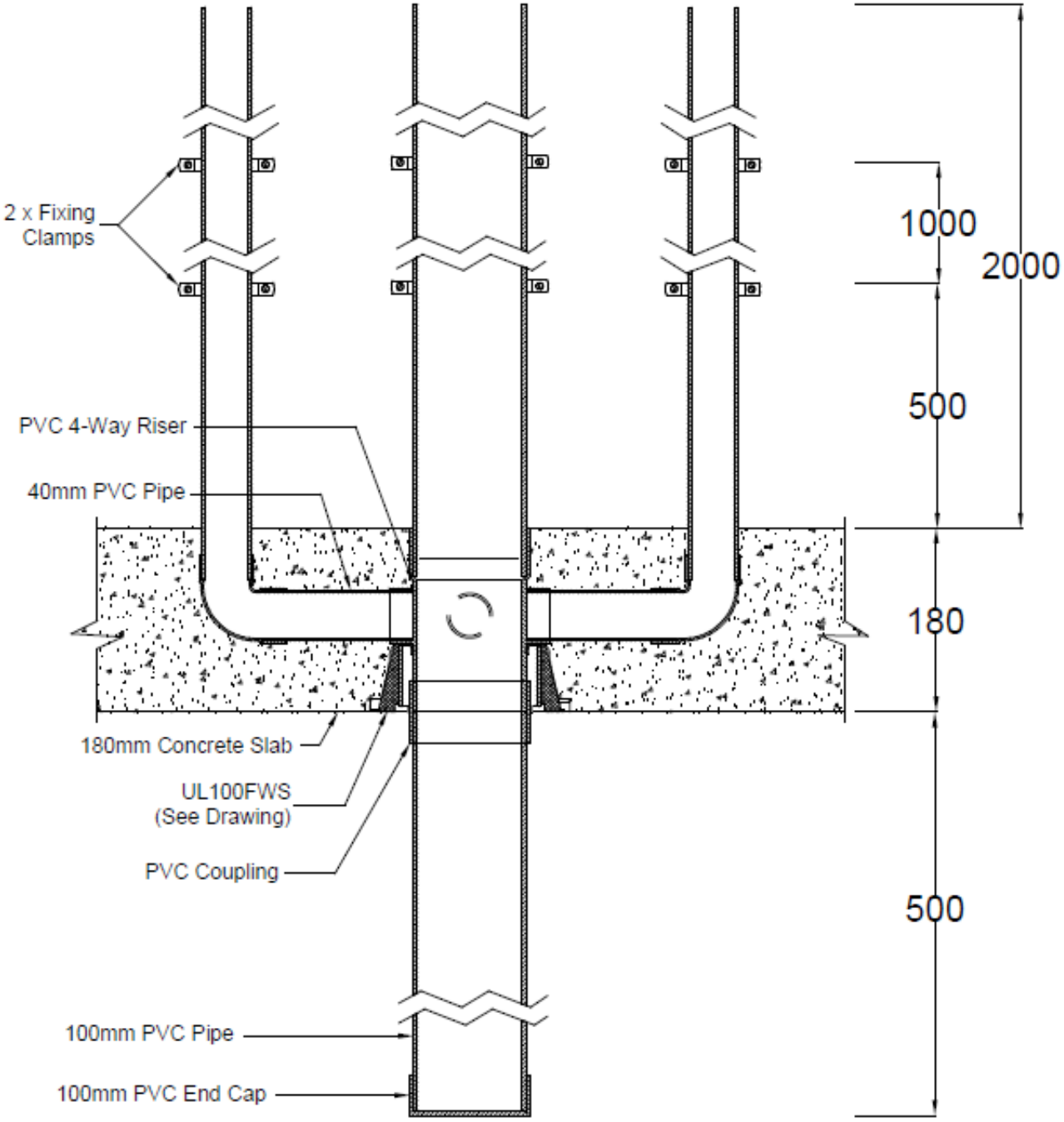
Snap Fire Systems Pty Ltd

Specimen #1

100mm PVC-SC Stack, 4-Way Riser in the Slab & UL100FWS

29 MAY 2020

Side View



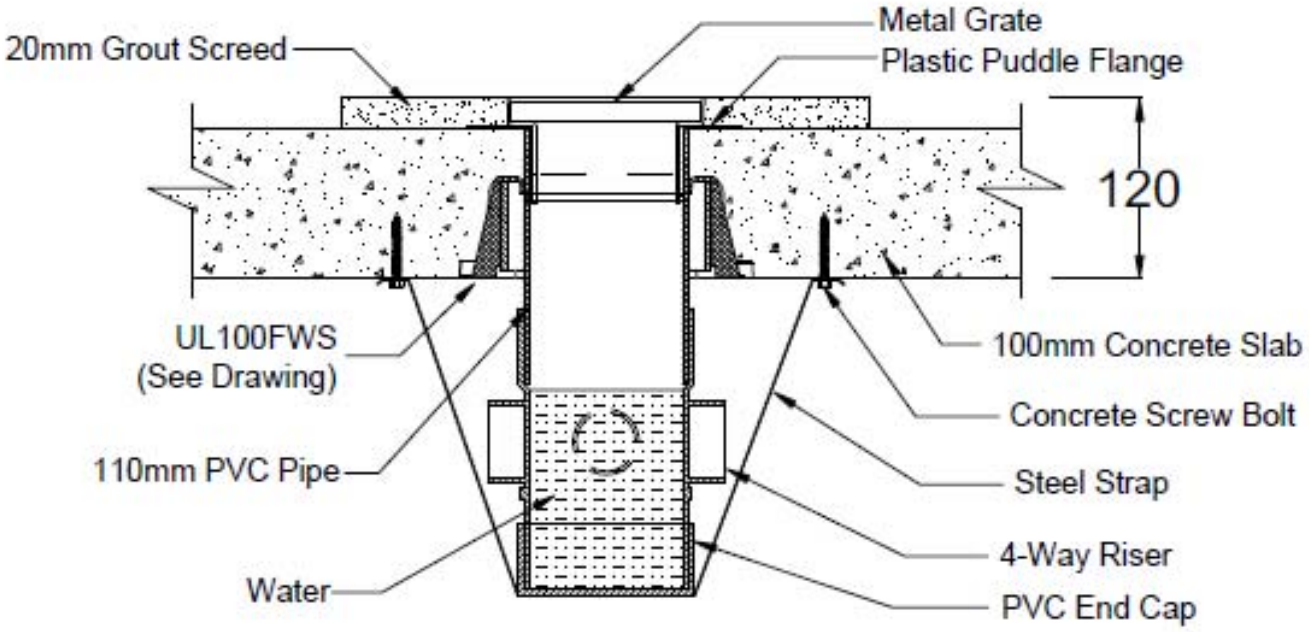
DRAWING TITLED "SPECIMEN #1 100MM PVC-SC STACK, 4-WAY RISER IN THE SLAB & UL100FWS", PART 2 DATED 29 MAY 2020, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #2

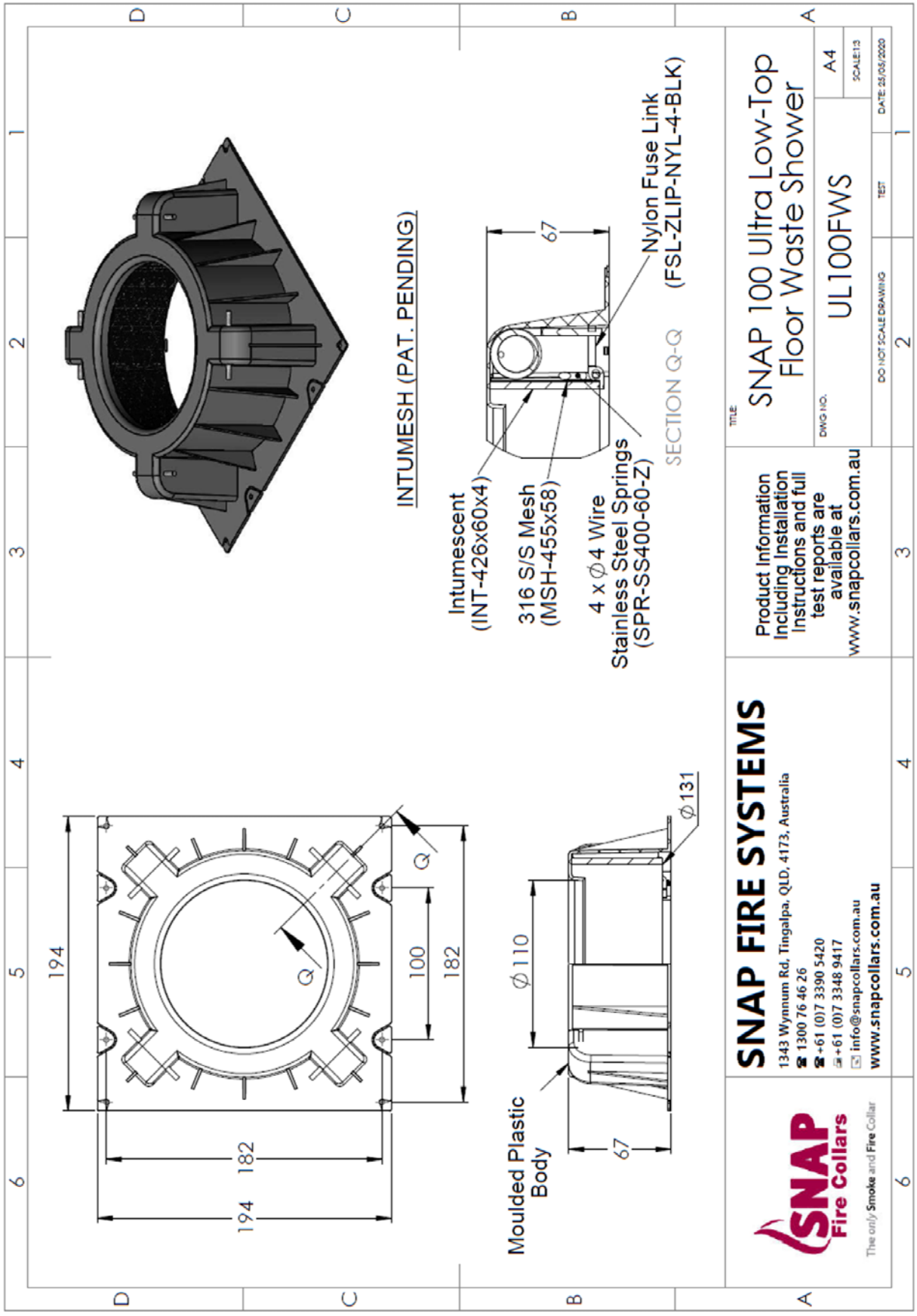
100 PVC-SC FWS with 4-Way Riser & UL100FWS

Date: 16 MAR 2020



DRAWING TITLED "SPECIMEN #2 100 PVC-SC FWS WITH 4-WAY RISER & UL100FWS", DATED 16 MARCH 2020, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Appendix E – Specimen Drawing



DRAWING NUMBER UL100FWS, DATED 25 MAY 2020, BY SNAP FIRE SYSTEMS PTY LTD

Appendix F – Certificate(s) of Test

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. 3456a

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 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 report numbered FSP 2111 (Revision B).

Product Name: SNAP UL100FWS Cast-in fire collar protecting a 100-mm PVC 4-way riser incorporating a nominal 100-mm PVC-SC stack pipe, two nominal 50-mm PVC stack pipes, two nominal 40-mm PVC stack pipes and a PVC coupling fitted inside the collar (Specimen 1)

Description: The specimen comprised an 1150-mm x 1150-mm x 180-mm thick concrete slab with 300-mm x 300-mm square section recessed to a thickness of 120-mm. The slab was penetrated by multiple services protected by two (2) cast-in fire collars. The penetrated section of the slab in Specimen 1 comprised a 180-mm thick concrete slab reinforced with a single layer of steel reinforcement providing a Fire Resistance Period (FRP) for insulation of 240 minutes in accordance with Table 5.5.1 of AS 3600:2018 - Concrete structures. The SNAP UL100FWS Cast-in fire collar comprised a moulded plastic casting with a 110 mm inner diameter and a 194-mm x 194-mm base flange. The 67-mm high collar casing incorporated 4-mm thick x 60-mm wide x 426-mm long Intumesh intumescent strip. The closing mechanism comprised four 4-mm diameter (SPR-SS400-60-Z) stainless steel springs, a nylon fuse link and a 455-mm x 58 mm stainless steel mesh as shown in drawing numbered UL100FWS dated 25 May 2020, by SNAP Fire Systems. The penetrating service comprised a PVC 4-way riser fitted through the collars sleeve within the slab incorporating; a 100-mm PVC-SC stack pipe, two 50-mm PVC stack pipes and two 40-mm stack pipes, a PVC coupling fitted inside the fire collars' sleeve joining a second PVC-SC pipe. The specimen was constructed as shown in drawings titled "Specimen #1 100mm PVC-SC Stack, 4 Way Riser in the Slab & UL100FWS", parts 1 & 2, dated 29 May 2020, provided by Snap Fire Systems Pty Ltd.

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

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 fire-resistance level (FRL) of the specimen is applicable when the system is exposed to fire from the same direction as tested. 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: 25 May 2020

Issued on the 29th day of July 2020 without alterations or additions. This Certificate supersedes issue dated 22nd July 2020.

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. 3456A

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Certificate of Test

No. 3457a

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 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 report numbered FSP 2111 (Revision B).

Product Name: SNAP UL100FWS Cast-in fire collar protecting a nominal 100-mm polyvinyl chloride sandwich construction (PVC-SC) floor waste incorporating a PVC 4-way riser fitted below the collar (Specimen 2)

Description: The specimen comprised an 1150-mm x 1150-mm x 180-mm thick concrete slab with 300-mm x 300-mm square section recessed to a thickness of 120-mm. The slab was penetrated by multiple services protected by two (2) cast-in fire collars. The penetrated section of the slab in Specimen 2 comprised a 300-mm x 300-mm square recess section with a 100-mm thick concrete topped with a 20-mm thick layer of grout providing a Fire Resistance Period (FRP) for insulation of 120 minutes in accordance with Table 5.5.1 of AS 3600:2018 - Concrete structures. The SNAP UL100FWS Cast-in fire collar comprised a moulded plastic casting with a 110 mm inner diameter and a 194-mm x 194-mm base flange. The 67-mm high collar casing incorporated 4-mm thick x 60-mm wide x 426-mm long Intumesh intumescent strip. The closing mechanism comprised four 4-mm diameter (SPR-SS400-60-Z) stainless steel springs, a nylon fuse link and a 455-mm x 58 mm stainless steel mesh as shown in drawing numbered UL100FWS dated 25 May 2020, by SNAP Fire Systems. The penetrating service comprised a nominal 100-mm Iplex floor waste system. The floor waste pipe had a 110-mm outside diameter polyvinyl chloride sandwich construction pipe with a wall thickness of 3.4-mm fitted through the collar's sleeve. The floor waste gully was charged with water to the level shown in drawing titled "Specimen #2, 100 PVC-SC FWS with 4-Way Riser & UL100FWS", dated 16 March 2020, provided by Snap Fire Systems Pty Ltd.

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

Structural Adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	184 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/120.

The fire-resistance level (FRL) of the specimen is applicable when the system is exposed to fire from the same direction as tested. Specimen 2 test was conducted in a concrete slab with a Fire Resistance Period (FRP) for insulation of 120 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: 25 May 2020

Issued on the 29th day of July 2020 without alterations or additions. This issue supersedes issue dated 22nd July 2020.

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
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COPY OF CERTIFICATE OF TEST – NO. 3457A

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 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.

**** end of report ****

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FOR FURTHER INFORMATION

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