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

Test Report

Author: Peter Gordon
Report number: FSP 2088
Date: 26 May 2020

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

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

Sponsored Investigation No. FSP 2088

1 Introduction

1.1 Identification of specimen

The sponsor identified the specimen as four (4) cast-in fire collars protecting a 180-mm thick concrete floor slab penetrated by a stack pipe and floor wastes.

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.

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 4963/4487

1.7 Test date

The fire-resistance test was conducted on 27 February 2020.

2 Description of specimen

2.1 General

The specimen comprised an 1150-mm x 1150-mm x 180-mm thick concrete slab. The slab was penetrated by multiple services protected by four (4) cast-in fire collars.

The penetrated slab 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 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, 2, 3, and 4. Only two (2) specimens are the subject of this report (Specimens 2 and 3). Documents containing a complete description of each specimen were supplied by the sponsor and are retained on file.

Specimen 2 – SNAP UL100FWS Cast-in fire collar protecting a nominal 100-mm PVC 4-way riser cast in the slab incorporating a nominal 100-mm PVC-SC stack pipe, a nominal 50-mm PVC side arm with a floor waste 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 196-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 31 January 2020, by SNAP Fire Systems.

The penetrating service comprised a PVC 4-way riser fitted through the collar's sleeve within the slab incorporating a PVC-SC stack pipe, a PVC side arm with a waste trap and a PVC coupling fitted through the fire collar's sleeve joining a second PVC-SC pipe. The PVC-SC stack pipe had a 110-mm outside diameter with a wall thickness of 3.62-mm and projected vertically 2000-mm above the slab on the unexposed face and was supported at 500-mm and 1500-mm. From the side of the 4-way riser within the slab a 56.3-mm outside diameter pipe with a wall thickness of 2.6-mm incorporated a nominal 50-mm PVC floor waste that penetrated the unexposed face. The floor waste system was fitted with a chrome brass grate and an PVC 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 concrete slab, the lower section of 110-mm PVC-SC pipe was connected to the 4-way riser with a PVC coupling fitted inside the collar's sleeve. The 110-mm PVC-SC pipe projected vertically 500-mm down into the furnace chamber and was capped with a 110-mm PVC end cap.

The floor waste was charged with water to the level as shown in drawing titled "Specimen #2 100mm PVC-SC stack, 4 way Riser in the slab & UL100FWS", dated 24 February 2020, provided by Snap Fire Systems Pty Ltd.

Specimen 3 – SNAP UL100FWS Cast-in fire collar protecting a nominal 100-mm PVC 4-way riser cast in the slab incorporating a 100-mm floor waste, a nominal 50-mm PVC side arm with a 50-mm floor waste, a P-trap 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 196-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 31 January 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 floor waste, a PVC side arm with a second 50-mm floor waste, a PVC coupling and a p-trap. Both the 100-mm floor waste directly above the 4-way riser and the second 50-mm PVC floor waste attached through a 56.3-mm outside diameter side arm pipe with a 2.5-mm thick wall were fitted with a chrome brass grate and a PVC puddle flange. A 15-mm thick grout screed was laid on top of the concrete slab and finished flush with the floor grates. On the exposed side of the concrete slab, a PVC P-trap was connected to the 4-way riser with the PVC coupling fitted inside the collar's sleeve , the P-trap was supported by a single M10 threaded rod and steel and drop-in anchor fixed to the concrete slab and a 110-mm nut clip to the P-trap and capped with PVC end cap.

The floor waste gully was charged with water to the level shown in drawing titled "Specimen #3 100mm PVC-SC FWS, 4-Way riser in slab & UL100FWS", dated 24 February 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-A Layout”, dated 3 March 2020 provided by Snap Fire Systems Pty Ltd.

Drawing titled “Specimen #2 100mm PVC-SC Stack, 4-Way Riser in the Slab & UL100FWS”, dated 24 February 2020, provided by Snap Fire Systems Pty Ltd.

Drawing titled “Specimen #3 100mm PVC-SC FWS, 4-Way Riser in the Slab & UL100FWS”, dated 24 February 2020, provided by Snap Fire Systems Pty Ltd.

Drawing titled “SNAP 100 Ultra Low-Top Floor Waste Shower” with Drawing No. UL100FWS, dated 31 January 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 25°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 has begun fluing from the grate of the Specimen 3 floor waste.
3 ½ minutes -	Smoke has begun fluing from the end of the PVC pipe of Specimen 2.
4 minutes -	Smoke has begun fluing from the small grate of the Specimen 2 floor waste.
5 minutes -	Cotton pad test applied above the large grate of Specimen 3 – no ignition noted at this time.
7 minutes -	Smoke has ceased fluing from the grate of the Specimen 2 floor waste.
8 minutes -	Cotton pad test applied above the large grate of Specimen 3 – no ignition noted at this time.
15 minutes -	Loud popping noises are emitted from the specimens, indicating possible spalling of the concrete slab.
24 minutes -	Smoke has almost ceased fluing from the end of the pipes of Specimen 2. Loud popping noises indicating possible spalling of the slab are again heard.
26 minutes -	Smoke has ceased fluing from the large grate of the Specimen 3 floor waste.
30 minutes -	Roving thermocouple applied to the grate of specimen 2 adjacent to fixed thermocouple 14 (thermocouples read 26 and 27^{o}C respectively).
31 minutes -	Smoke continues to flue from the grates of Specimens 1, 2 and 4.
40 minutes -	Smoke has resumed fluing from the grate of the Specimen 3 floor waste.
41 minutes -	Water has begun pooling on the concrete slab at the base of Specimen 1.
43 minutes -	Smoke has ceased fluing from the grate of the Specimen 3 floor waste.
55 minutes -	A small amount of smoke is being emitted from all specimens.
118 minutes -	Cotton pad test applied above the grate of Specimen 3 – no ignition noted at this time.
128 minutes -	Smoke has begun fluing from the small grate of the Specimen 2 floor waste.

135 minutes - The level of smoke being emitted from the grates of the Specimens 1, 3 and 4 floor waste has increased.

183 minutes - Insulation failure of Specimen 3 - maximum temperature rise of 180K is exceeded on the centre of metal grate of Specimen 3 floor waste.

231 minutes - Cotton pad test applied above the grates of Specimen3 – no ignition noted at this time.

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 Specimen 2.

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

8.5 Performance

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

Specimen 2 – SNAP UL100FWS Cast-in fire collar protecting a nominal 100-mm PVC 4-way riser incorporating a nominal 100-mm PVC-SC stack pipe, a 50-mm PVC side arm with a floor waste 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 3 – SNAP UL100FWS Cast-in fire collar protecting a nominal 100-mm PVC 4-way riser incorporating a 100-mm floor waste, a nominal 50-mm PVC side arm with a 50-mm floor waste, a P-trap and a PVC coupling fitted inside the collar

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	183 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 2 - -/240/240

Specimen 3 - -/240/180

The fire-resistance level 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.

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

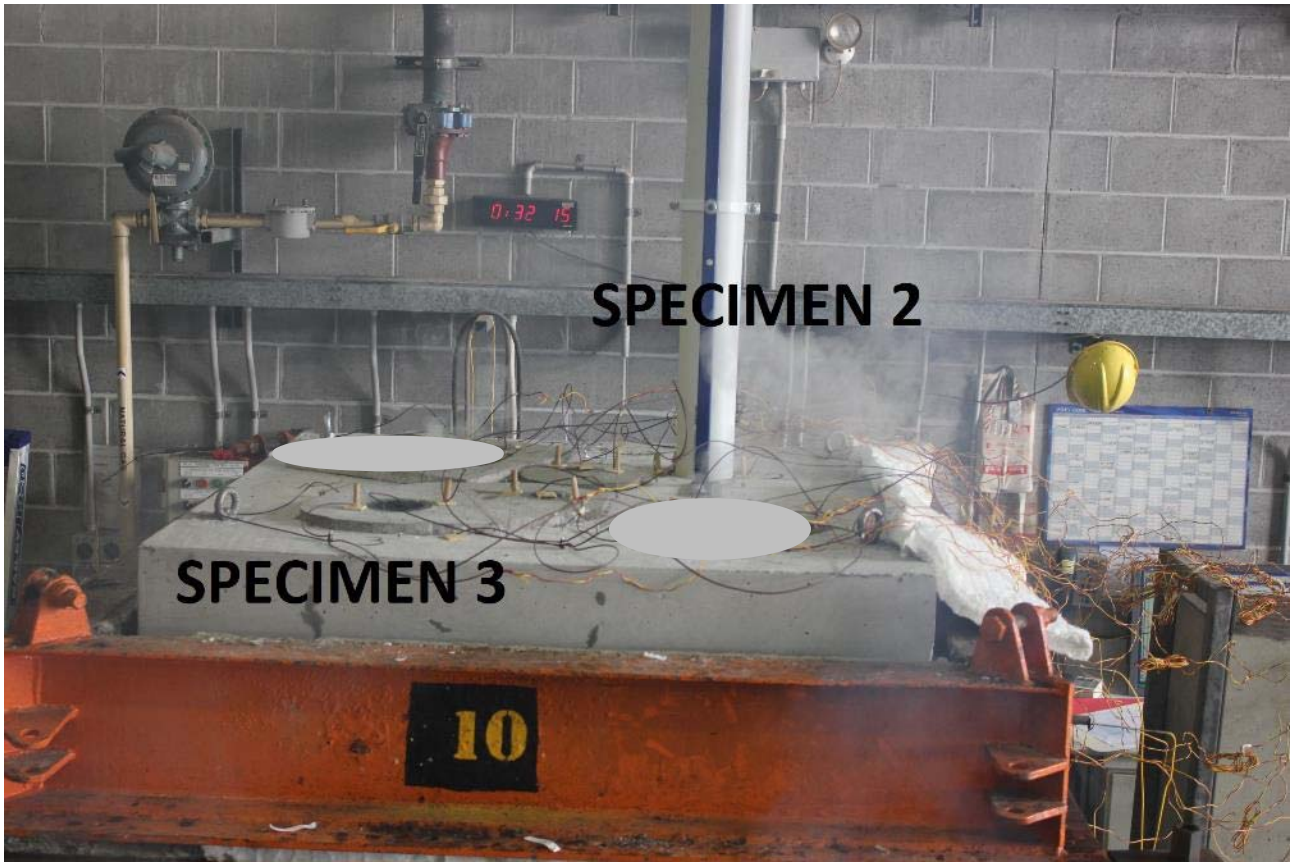
SPECIMEN	T/C Position	T/C Designation
Specimen 2 – SNAP UL100FWS Cast-in fire collar protecting a nominal 100-mm PVC 4-way riser incorporating a nominal 100-mm PVC-SC stack pipe, a 50-mm PVC side arm with a floor waste and a PVC coupling fitted inside the collar	On top of the slab – 25-mm from pipe (West)	S8
	On top of the slab – 25-mm from pipe (East)	S9
	On pipe – 25-mm from slab (North)	S10
	On pipe – 25-mm from slab (East)	S11
	On Screed 25-mm from Grate (N/W)	S12
	On Screed 25-mm from Grate (East)	S13
	On centre of the Grate	S14
Specimen 3 – SNAP UL100FWS Cast-in fire collar protecting a nominal 100-mm PVC 4-way riser incorporating a 100-mm floor waste, a nominal 50-mm PVC side arm with a 50-mm floor waste, a p-trap and a PVC coupling fitted inside the collar.	On top of the slab – 25-mm from screed (NW)	S15
	On top of the slab – 25-mm from screed (SE)	S16
	On Screed 25-mm from large Grate (West)	S17
	On Screed 25-mm from large Grate (East)	S18
	On centre of the large Grate	S19
	On Screed 25-mm from small Grate (NW)	S20
	On Screed 25-mm from small Grate (SE)	S21
	On centre of the small Grate	S22
Rover	Rover	S26
Ambient	Ambient	S27

Appendix B – Photographs

PHOTOGRAPH 1 – EXPOSED FACE OF SPECIMENS 2 AND 3 PRIOR TO TESTING

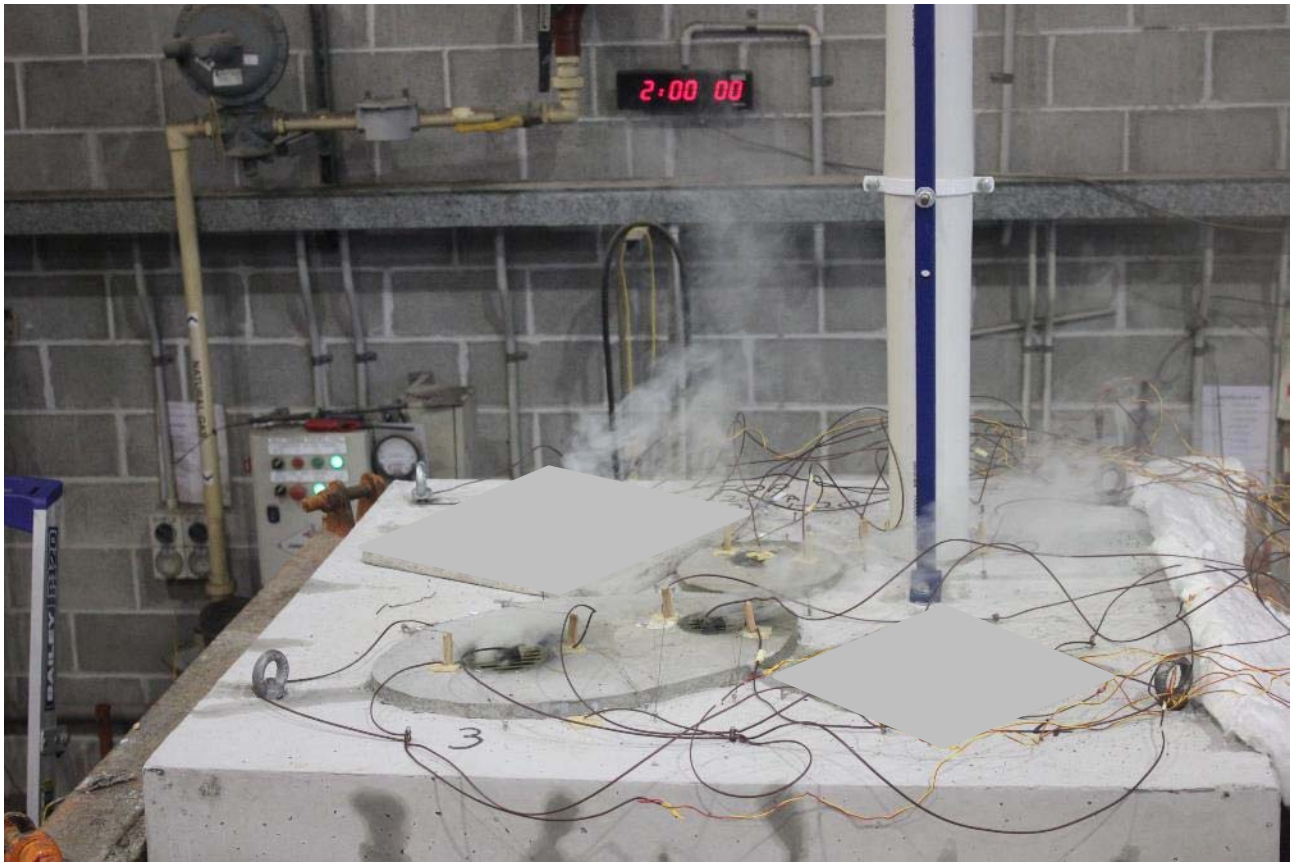
PHOTOGRAPH 2 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING

PHOTOGRAPH 3 – SPECIMEN 3 AFTER 3 MINUTES OF TESTING

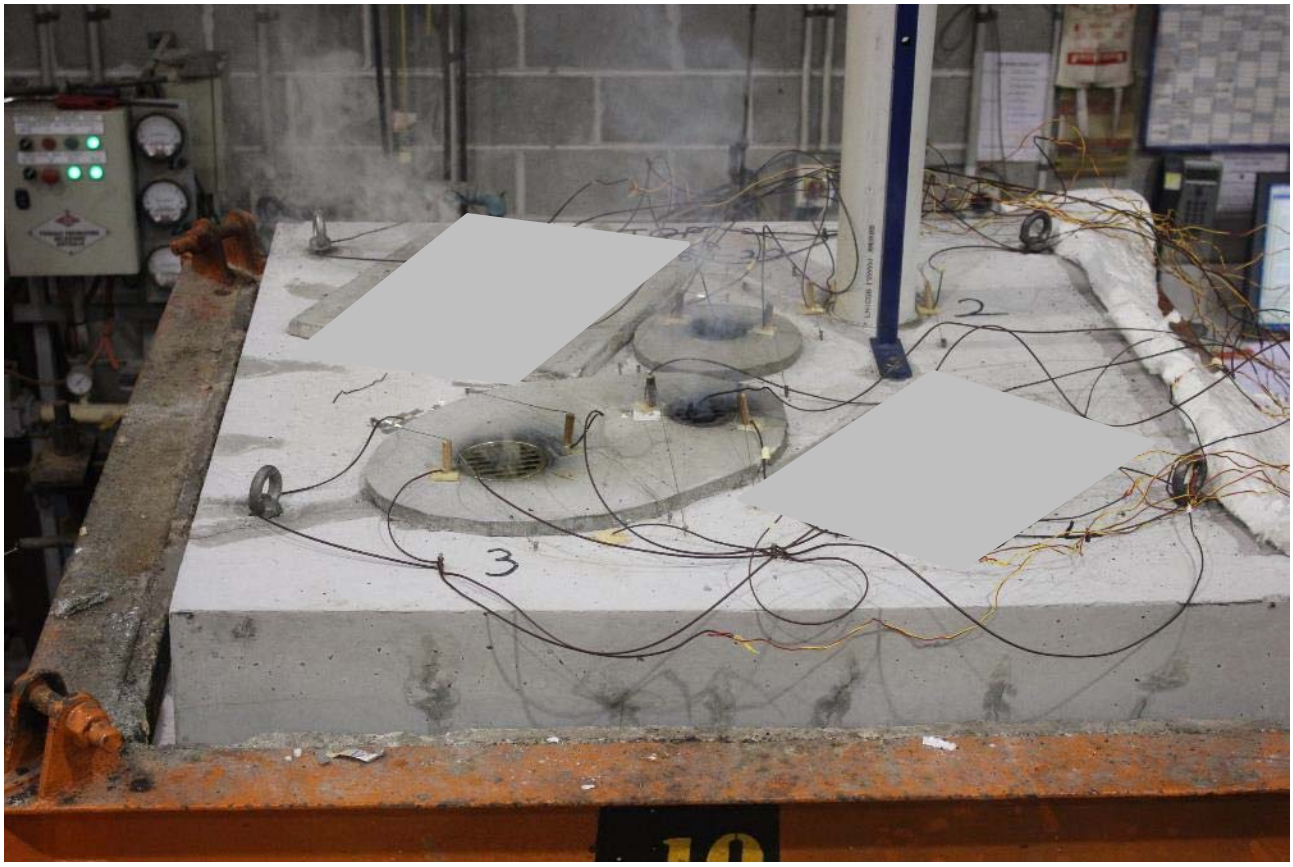


PHOTOGRAPH 4 – SPECIMENS AFTER 32 MINUTES OF TESTING

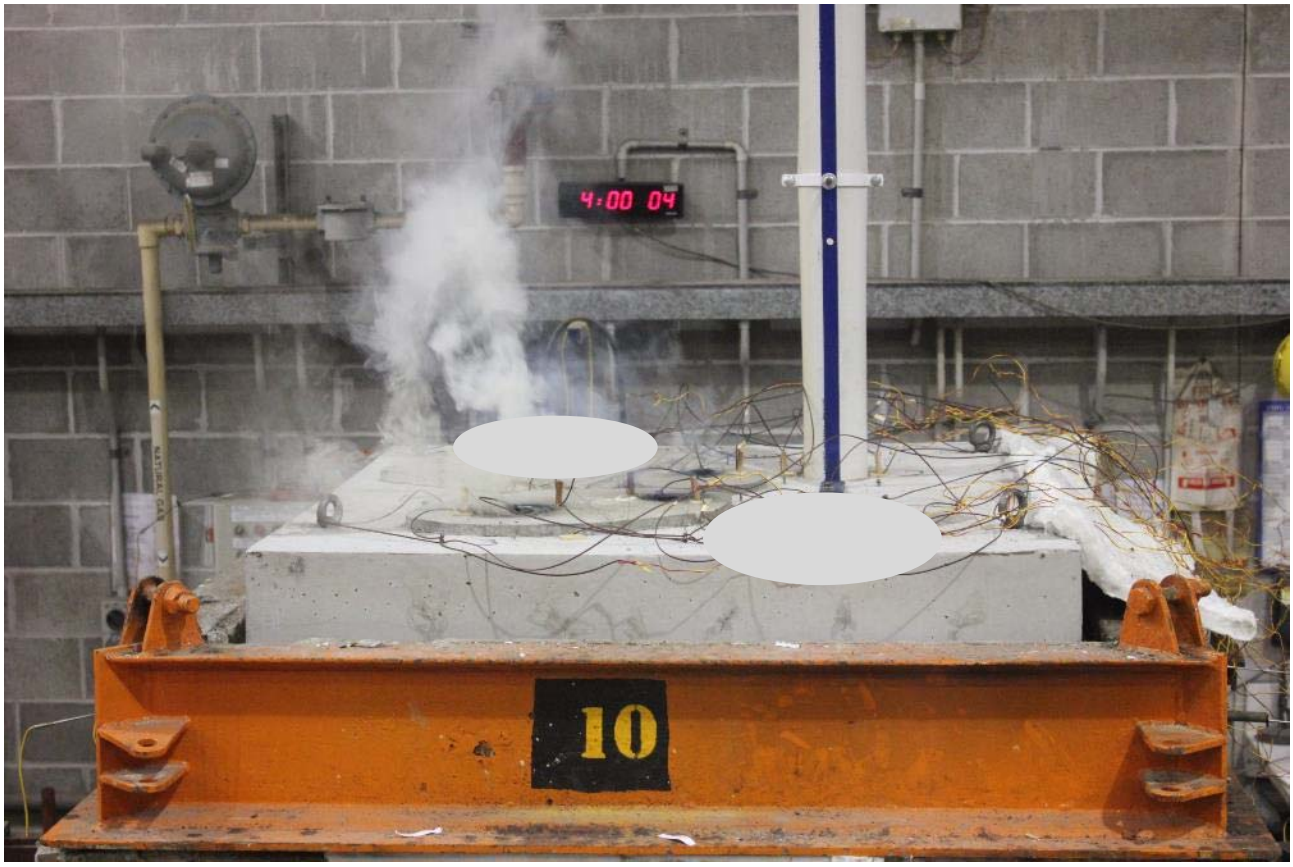
PHOTOGRAPH 5 – SPECIMENS AFTER 60 MINUTES OF TESTING



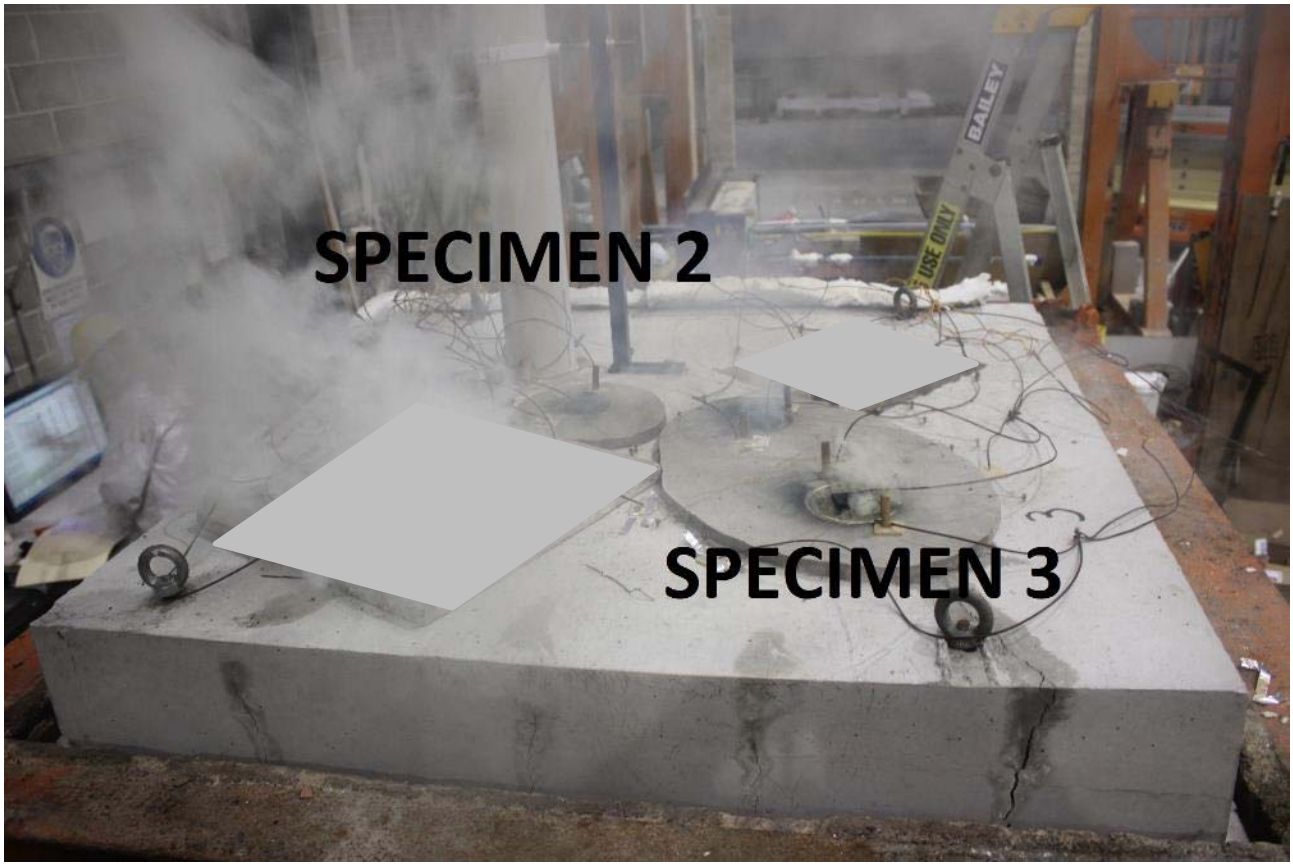
PHOTOGRAPH 6 – SPECIMENS AFTER 120 MINUTES OF TESTING



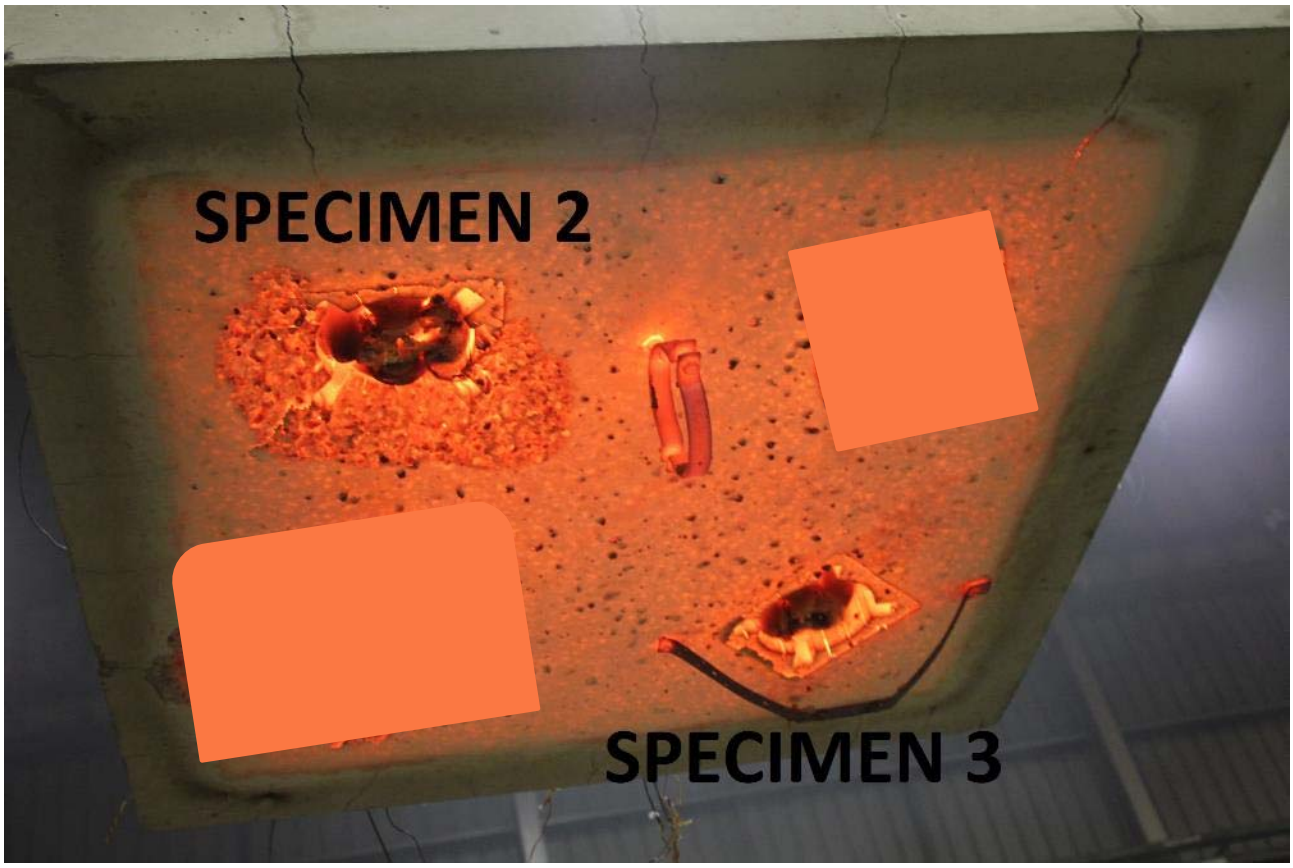
PHOTOGRAPH 7 – SPECIMENS AFTER 183 MINUTES OF TESTING



PHOTOGRAPH 8 – SPECIMENS AFTER 240 MINUTES OF TESTING



PHOTOGRAPH 9 – AT THE CONCLUSION OF TESTING



PHOTOGRAPH 10 – EXPOSED FACE OF SPECIMENS AT THE CONCLUSION OF TESTING

Appendix C – Test Data charts

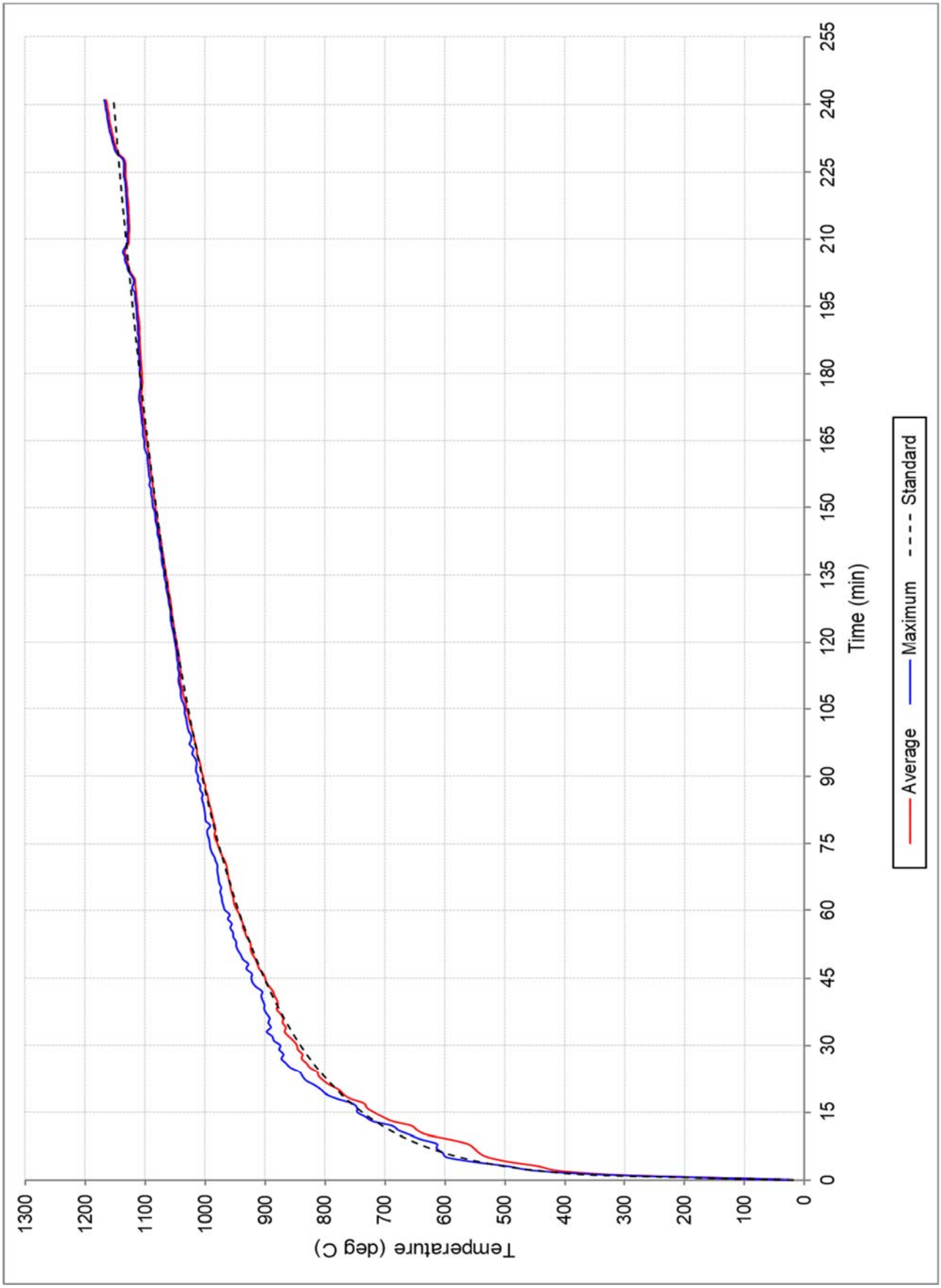


FIGURE 1 – FURNACE TEMPERATURE

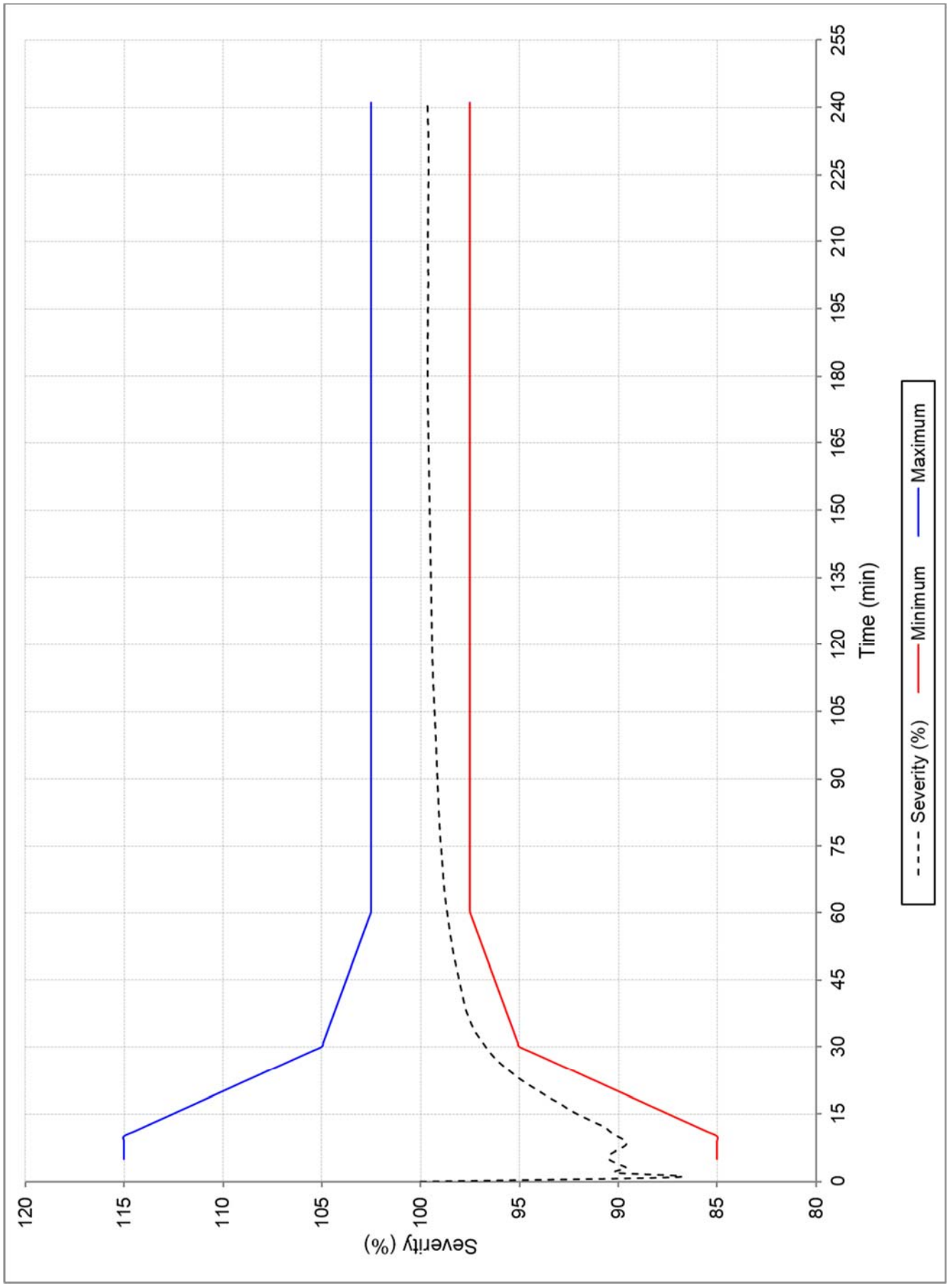


FIGURE 2 – FURNACE SEVERITY

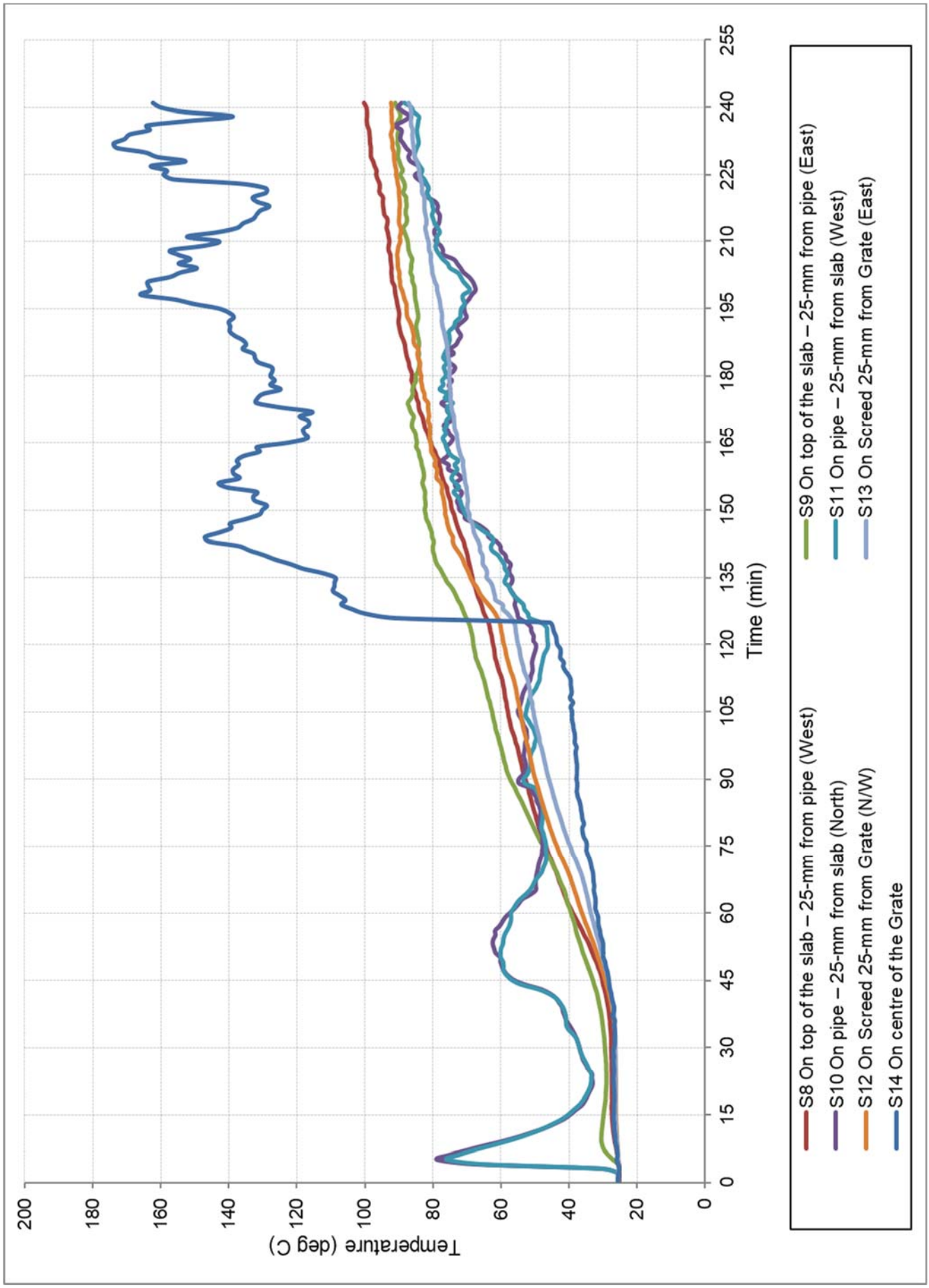


FIGURE 3 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 2

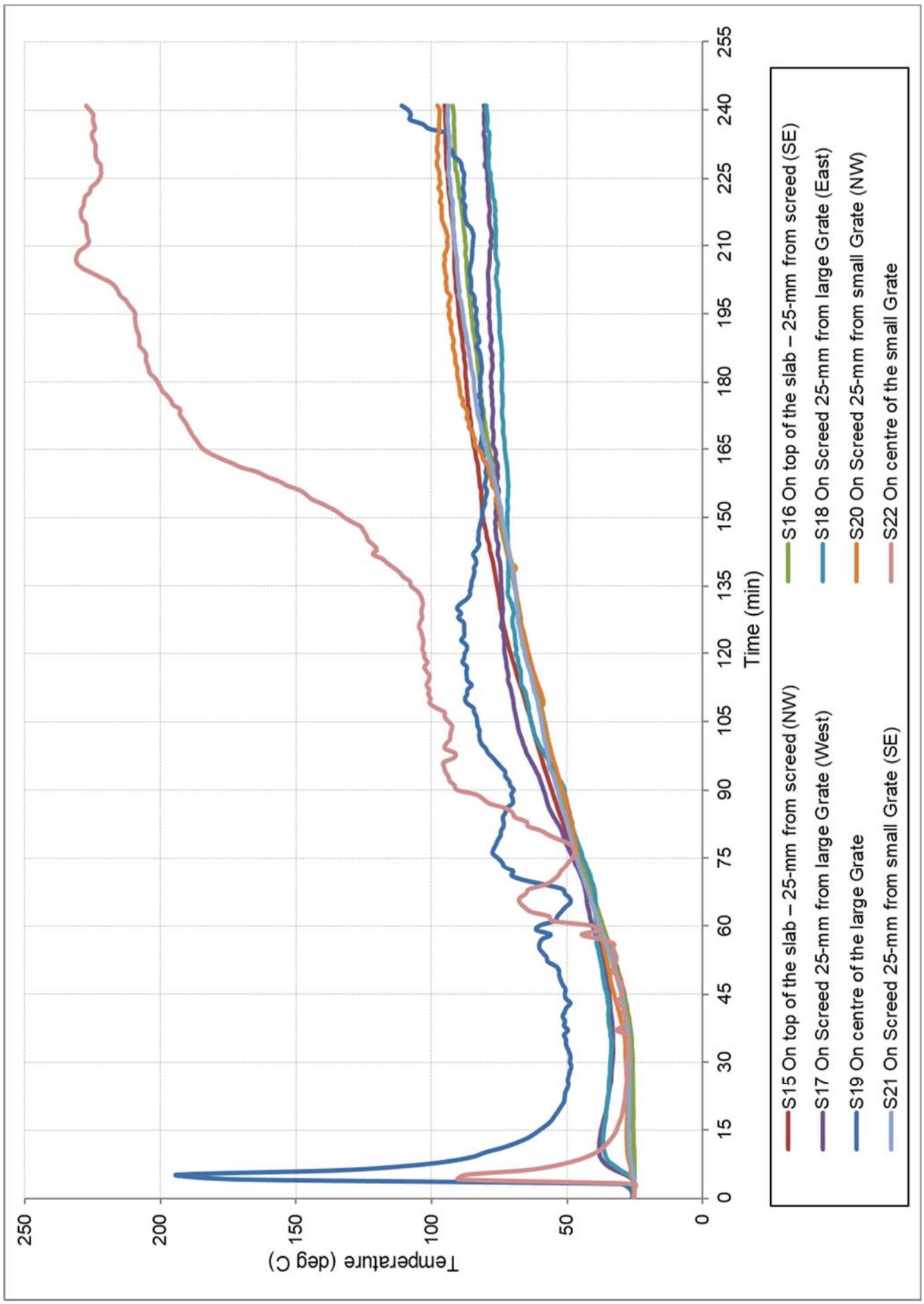
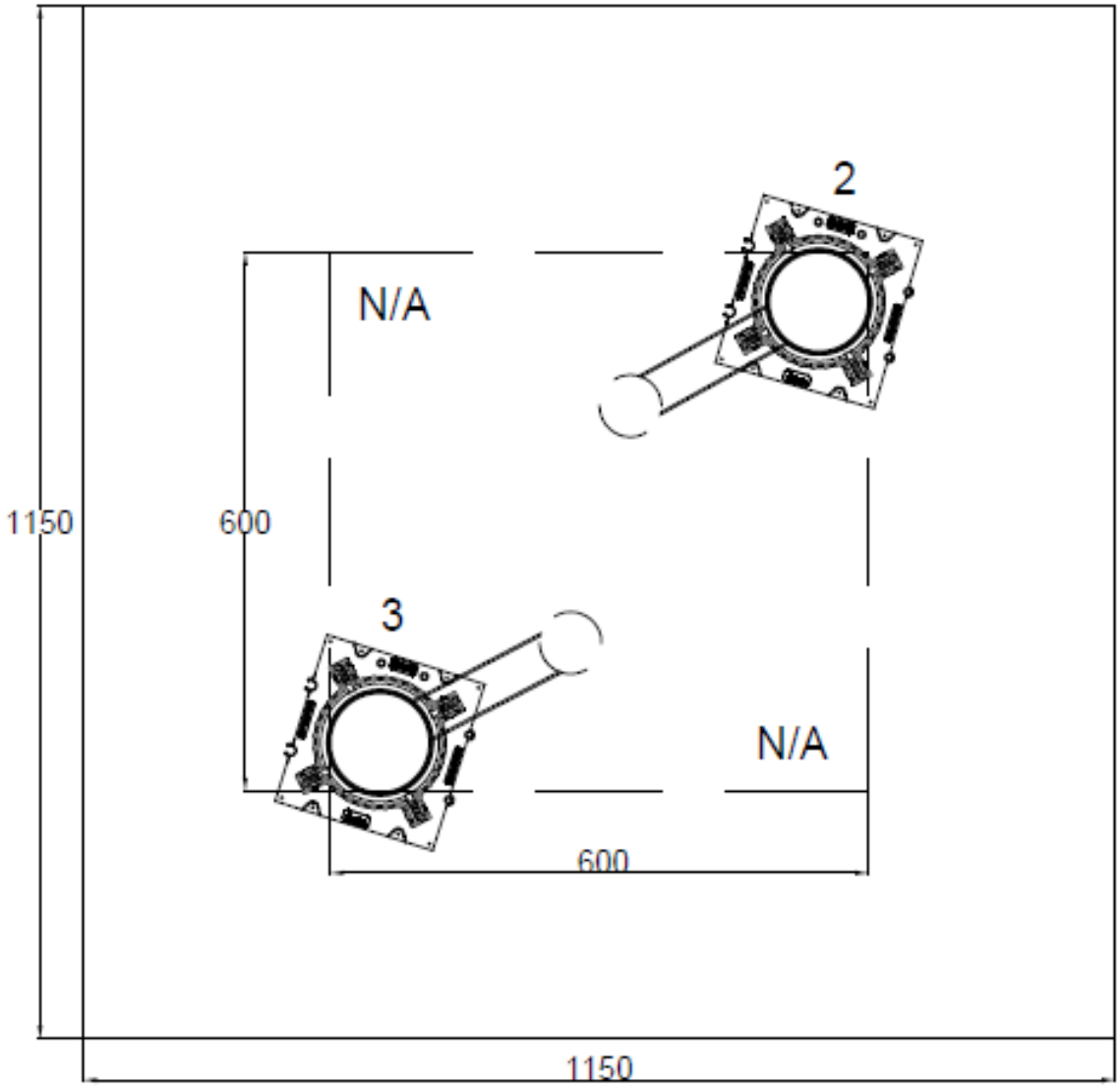


FIGURE 4 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 3

Appendix D – Installation drawings

Snap Fire Systems Pty Ltd
Test Slab S-20-A Layout
Date: 03 MAR 2020



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

DRAWING TITLED "TEST SLAB S-20-A LAYOUT", DATED 3 MARCH 2020, BY SNAP FIRE SYSTEMS PTY LTD

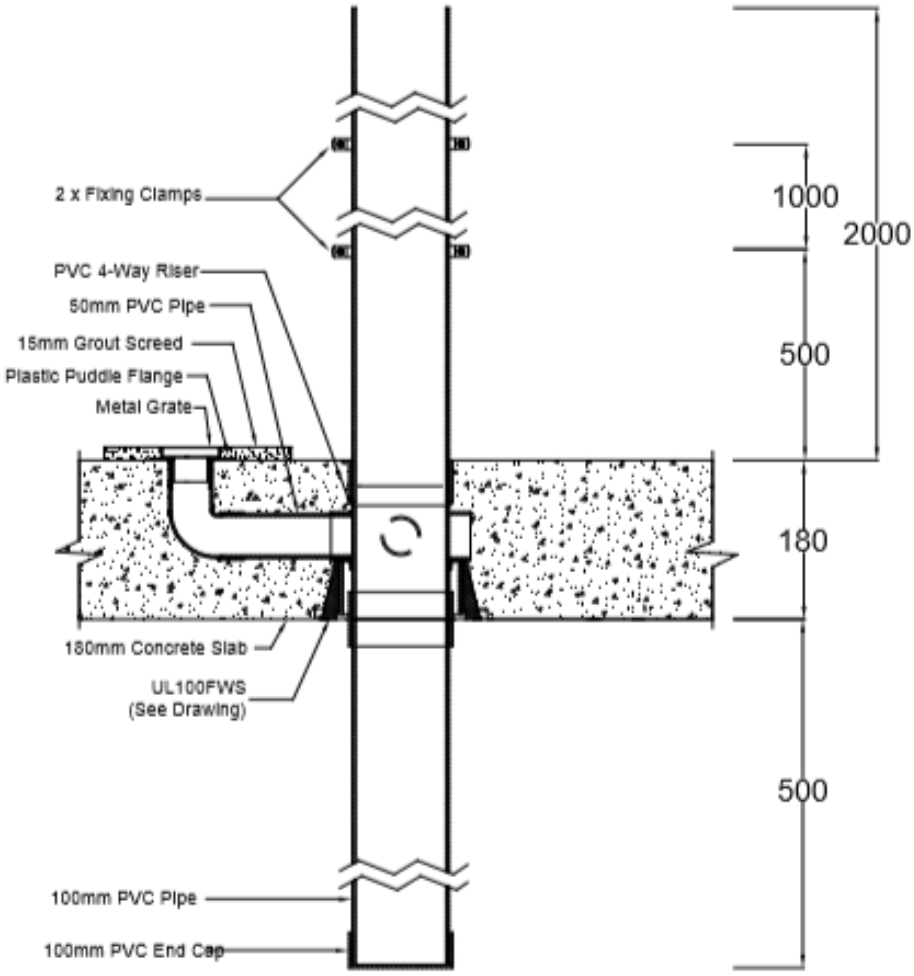
Snap Fire Systems Pty Ltd

Specimen #2

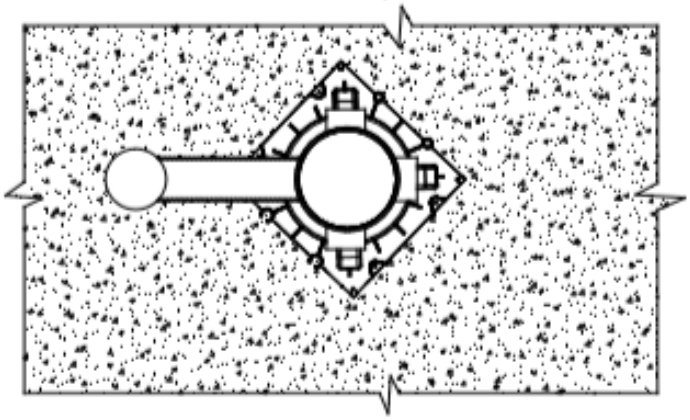
100mm PVC-SC Stack, 4-Way Riser in the Slab & UL100FWS

24 FEB 2020

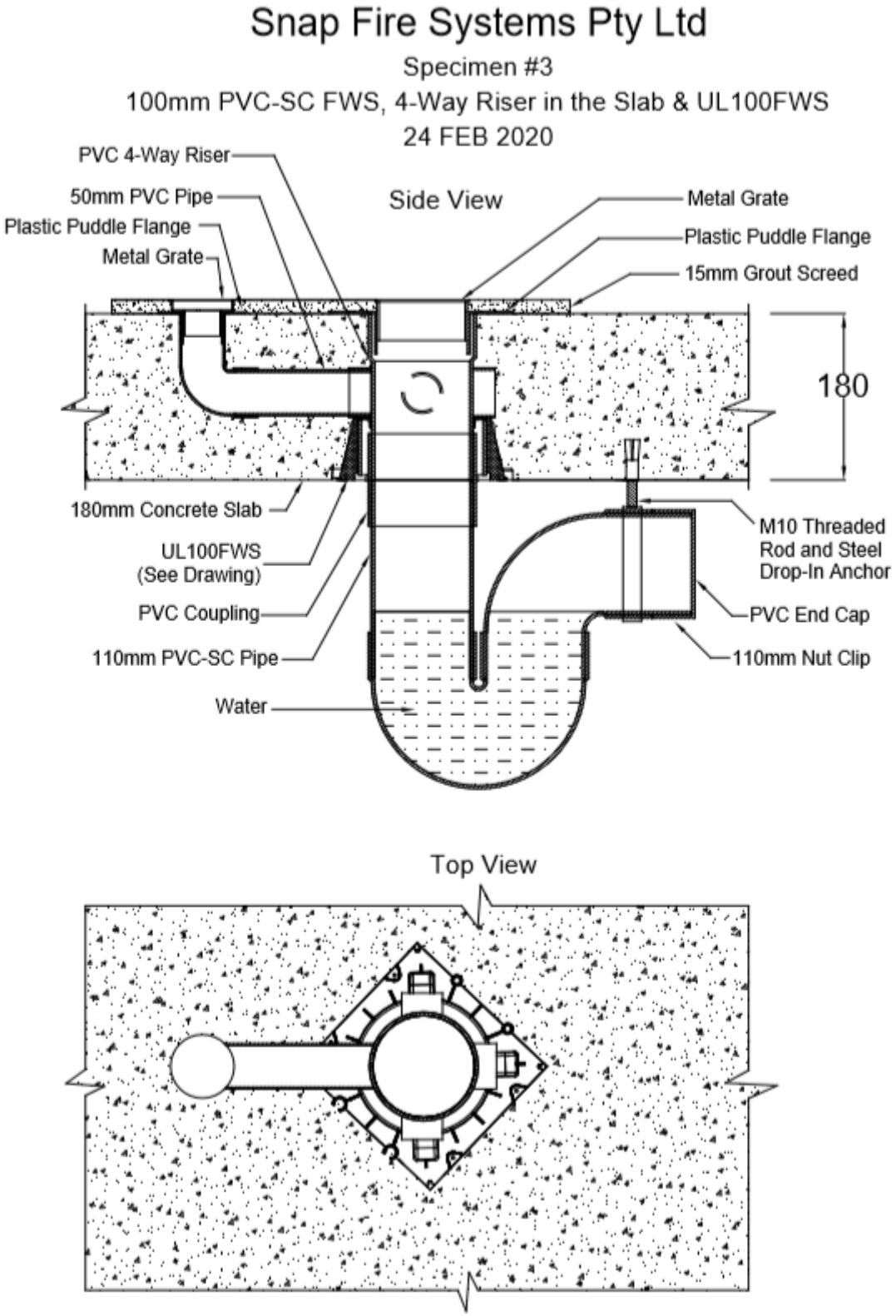
Side View



Top View

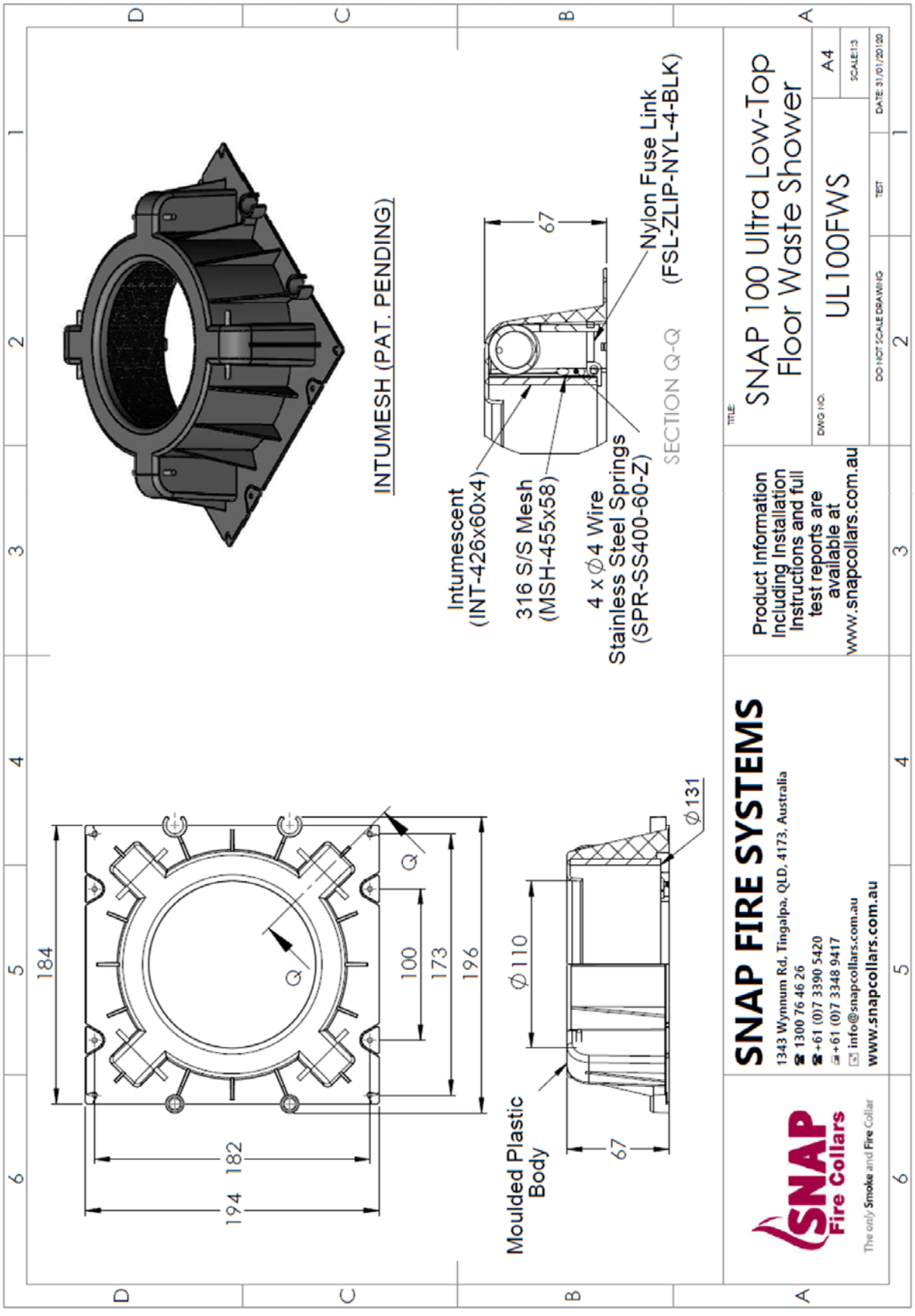


DRAWING TITLED "SPECIMEN #2 100MM PVC-SC STACK, 4-WAY RISER IN THE SLAB & UL100FWS", DATED 24 FEBRUARY 2020, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD



DRAWING TITLED "SPECIMEN #3 100MM PVC-SC FWS, 4-WAY RISER IN THE SLAB & UL100FWS", DATED 24 FEBRUARY 2020, PROVIDED BY SNAP FIRE SYSTEMS PTY LTD

Appendix E – Specimen Drawings



DRAWING NUMBER UL100FWS, DATED 31 JANUARY 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. 3420

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 2088.

Product Name: SNAP UL100FWS Cast-in fire collar protecting a nominal 100-mm PVC 4-way riser cast in the slab incorporating a nominal 100-mm PVC-SC stack pipe, a nominal 50-mm PVC side arm with a floor waste and a PVC coupling fitted inside the collar (Specimen 2)

Description: The specimen comprised an 1150-mm x 1150-mm x 180-mm thick concrete slab, penetrated by a nominal 100-mm PVC 4-way riser cast in the slab incorporating a nominal 100-mm PVC-SC stack pipe, a nominal 50-mm PVC side arm with a floor waste, protected by a cast-in fire collar. The penetrated slab 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 dia. and a 194-mm x 196-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 dia. (SPR-SS400-60-Z) stainless steel springs, a nylon fuse link and a 455-mm x 58 mm stainless steel mesh. The penetrating service comprised a PVC 4-way riser fitted through the collar's sleeve within the slab incorporating a PVC-SC stack pipe, a PVC side arm with a waste trap and a PVC coupling fitted through the fire collar's sleeve joining a second PVC-SC pipe. The PVC-SC stack pipe had a 110-mm outside dia. with a wall thickness of 3.62-mm and projected vertically 2000-mm above the slab on the unexposed face and was supported at 500-mm and 1500-mm. From the side of the 4 way riser within the slab a 56.3-mm outside diameter pipe with a wall thickness of 2.6-mm incorporated a nominal 50-mm PVC floor waste that penetrated the unexposed face. The floor waste system was fitted with a chrome brass grate and an PVC 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 concrete slab, the lower section of 110-mm PVC-SC pipe was connected to the 4-way riser with a PVC coupling fitted inside the collar's sleeve. The 110-mm PVC-SC pipe projected vertically 500-mm down into the furnace chamber and was capped with a 110-mm PVC end cap. The floor waste was charged with water to the level as shown in drawing titled "Specimen #2 100mm PVC-SC stack, 4 way Riser in the slab & UL100FWS", dated 24 February 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. The maximum FRL of any test specimen cannot exceed the FRL achieved by the system 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: 27 February 2020

Issued on the 25th day of May 2020 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. 3420

INFRASTRUCTURE TECHNOLOGIES
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Certificate of Test

No. 3421

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 2088.

Product Name: SNAP UL100FWS Cast-in fire collar protecting a nominal 100-mm PVC 4-way riser cast in the slab incorporating a 100-mm floor waste, a nominal 50-mm PVC side arm with a 50-mm floor waste, a P-trap and a PVC coupling fitted inside the collar (Specimen 3)

Description: The specimen comprised an 1150-mm x 1150-mm x 180-mm thick concrete slab, penetrated by a nominal 100-mm PVC 4-way riser cast in the slab incorporating a 100-mm floor waste, a nominal 50-mm PVC side arm with a 50-mm floor waste and a P-trap, protected by a cast-in fire collar. The penetrated slab 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 196-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 31 January 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 floor waste, a PVC side arm with a second 50-mm floor waste, a PVC coupling and a p-trap. Both the 100-mm floor waste directly above the 4-way riser and the second 50-mm PVC floor waste attached through a 56.3-mm outside diameter side arm pipe with a 2.5-mm thick wall were fitted with a chrome brass grate and a PVC puddle flange. A 15-mm thick grout screed was laid on top of the concrete slab and finished flush with the floor grates. On the exposed side of the concrete slab, a PVC P-trap was connected to the 4-way riser with the PVC coupling fitted inside the collar's sleeve , the P-trap was supported by a single M10 threaded rod and steel and drop-in anchor fixed to the concrete slab and a 110-mm nut clip to the P-trap and capped with PVC end cap. The floor waste gully was charged with water to the level shown in drawing titled "Specimen #3 100mm PVC-SC FWS, 4-Way riser in slab & UL100FWS", dated 24 February 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	-	183 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/180.

The fire-resistance level (FRL) of the specimen is applicable when the system is exposed to fire from the same direction as tested. The maximum FRL of any test specimen cannot exceed the FRL achieved by the system 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: 27 February 2020

Issued on the 25th day of May 2020 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. 3421

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.
AS 3600-2018	Concrete structures

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FOR FURTHER INFORMATION

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