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

Test Report

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

Commercial-in-confidence

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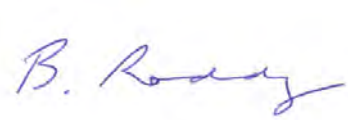
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Fire-resistance test on fire collars protecting a concrete slab penetrated by services

Sponsored Investigation No. FSP 2231

1 Introduction

1.1 Identification of specimen

The sponsor identified the specimen as SNAP fire collars protecting a 150-mm thick concrete floor slab penetrated by seven services comprising; lagged copper pipes and thermoplastic-sheathed (TPS) power cables.

1.2 Sponsor

IG6 Pty Ltd as trustee for the IG6 IP Trust
1343 Wynnum Road
Tingalpa QLD

1.3 Manufacturers

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 5120/4669

1.7 Test date

The fire-resistance test was conducted on 2 September 2021.

2 Description of specimen

2.1 General

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

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, 4, 5, 6, and 7. Documents containing a complete description of each specimen were supplied by the sponsor and are retained on file.

The copper pipes and the Armaflex FRV lagging used in the test are stated to be manufactured in accordance with:

- AS 1432:2004 Copper tubes for plumbing, gas fitting and drainage applications and
- AS/NZS 4859.1:2018 Thermal insulation materials for buildings

Specimen 1 – A SNAP MS70C Multi Service cast-in fire collar protecting a DN25 copper pipe with 19-mm thick E-Flex fire-rated lagging and a 2.5-mm² 3-core TPS power cable

The SNAP MS70C Multi Services cast-in fire collar comprised a 1.6-mm thick polypropylene casing with a 79 mm inner diameter and a 168-mm outer diameter base flange. The 250-mm high collar casing incorporated a 280-mm x 65-mm x 5-mm thick Intumesh intumescent material and a rubber ring seal. The closing mechanism comprised three stainless-steel springs bound with nylon fuse links and a 322-mm x 63-mm 316 stainless steel mesh as shown in drawing titled 'SNAP 70 Multi Service Cast-In', dated 20 May 2021, by Snap Fire Systems Pty Ltd.

The MS70C collar was cast into a 150-mm thick concrete slab with the collar's casing projecting 100-mm vertically above the unexposed face.

The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm^2 TPS power cable. The Brasshards type B copper pipe had a 25.4-mm (1-inch) outside diameter, a wall thickness of 1.22-mm and was lagged with 19-mm thick E-Flex ST nitrile foam insulation. The lagged pipe and cable were fitted through the MS70C collar's sleeve and penetrated the concrete slab as shown in drawing titled 'Specimen #1 1inch Copper Tube with 19mm Fire-rated Lagging (E-Flex), 2.5mm² 3C TPS Cable & MS70C', dated 24 August 2021, by Snap Fire Systems Pty Ltd.

The lagged pipe and cable projected vertically 550-mm above the concrete slab and approximately 500 mm below into the furnace chamber. The lagged pipe and cable were supported at 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable and top of the collar casing was filled with a 10-mm deep bead of H.B Fullers Firesound sealant.

Specimen 2 – A SNAP MS70R Multi Service Retrofit fire collar protecting a DN25 copper pipe with 19-mm thick SuperMax fire-rated lagging and a 2.5-mm² 3-core TPS power cable penetrating a 67-mm diameter aperture

The SNAP MS70R Multi Service Retrofit fire collar comprised a 0.75-mm thick steel casing with a 69-mm inner diameter and a 0.95-mm thick steel base flange with a 162-mm outer diameter. The 95 mm high collar casing incorporated a 4-mm thick x 90-mm wide x 250-mm long soft Intumesh intumescent wrap lined within the internal circumference of the collar casing. The closing mechanism comprised three stainless steel springs, a nylon fuse link, and a 258-mm long x 88-mm wide 316 stainless steel mesh located around the intumescent strip, as shown in drawing titled 'SNAP 70 Multi Service Retro', dated 23 September 2019, by Snap Fire Systems Pty Ltd.

The MS70R collar was centrally located over a 67-mm core hole on the underside (exposed face) of the concrete slab and fixed through the 3 mounting brackets using 6.5-mm x 40-mm steel wedge anchors.

The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm^2 TPS power cable. The Brasshards type B copper pipe had a 25.4-mm (1-inch) outside diameter, a wall thickness of 1.22-mm and was lagged with 19-mm thick SuperMax foam insulation. The lagged pipe and cable were fitted through the collar's sleeve and penetrated the concrete slab through a 67-mm diameter cut-out hole as shown in drawing titled 'Specimen #2 1inch Copper Tube with 19mm Fire-rated Lagging (SuperMax), 2.5mm² 3C TPS Cable & MS70R', dated 24 August 2021, by Snap Fire Systems Pty Ltd.

The lagged pipe and cable projected vertically 520-mm above the unexposed face of the concrete slab and approximately 500-mm below into the furnace chamber. The lagged pipe and cable were supported at 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable and the concrete slab was filled with a bead of H.B Fullers Firesound sealant.

Specimen 3 – A SNAP MS70C Multi Service cast-in fire collar protecting a DN25 copper pipe with 19-mm thick SuperMax fire-rated lagging and a 2.5-mm² 3-core TPS power cable

The SNAP MS70C Multi Services cast-in fire collar comprised a 1.6-mm thick polypropylene casing with a 79 mm inner diameter and a 168-mm outer diameter base flange. The 250-mm high collar casing incorporated a 280-mm x 65-mm x 5-mm thick Intumesh intumescent material and a rubber ring seal. The closing mechanism comprised three stainless-steel springs bound with nylon fuse links and a 322-mm x 63-mm 316 stainless steel mesh as shown in drawing titled 'SNAP 70 Multi Service Cast-In', dated 20 May 2021, by Snap Fire Systems Pty Ltd.

The MS70C collar was cast into a 150-mm thick concrete slab with the collar's casing projecting 100-mm vertically above the unexposed face.

The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm^2 TPS power cable. The Brasshards copper type B pipe had a 25.4-mm (1-inch) outside diameter, a wall thickness of 1.22-mm and was lagged with 19-mm thick Supermax FR. The lagged pipe and cable were fitted through the MS70C collar's sleeve and penetrated the concrete slab as shown in drawing titled 'Specimen #3 1inch Copper Tube with 19mm Fire-rated Lagging (SuperMax), 2.5mm² 3C TPS Cable & MS70C', dated 24 August 2021, by Snap Fire Systems Pty Ltd.

The lagged pipe and cable projected vertically 550-mm above the concrete slab and approximately 500 mm below into the furnace chamber. The lagged pipe and cable were supported at 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable and top of the collar casing was filled with a 10-mm deep bead of H.B Fullers Firesound sealant.

Specimen 4 – A SNAP MS70C Multi Service cast-in fire collar protecting a DN25 copper pipe with 19-mm thick K-Flex fire-rated lagging and a 2.5-mm² 3-core TPS power cable

The SNAP MS70C Multi Services cast-in fire collar comprised a 1.6-mm thick polypropylene casing with a 79 mm inner diameter and a 168-mm outer diameter base flange. The 250-mm high collar casing incorporated a 280-mm x 65-mm x 5-mm thick Intumesh intumescent material and a rubber ring seal. The closing mechanism comprised three stainless-steel springs bound with nylon fuse links and a 322-mm x 63-mm 316 stainless steel mesh as shown in drawing titled 'SNAP 70 Multi Service Cast-In', dated 20 May 2021, by Snap Fire Systems Pty Ltd.

The MS70C collar was cast into a 150-mm thick concrete slab with the collar's casing projecting 100-mm vertically above the unexposed face.

The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm^2 TPS power cable. The Brasshards copper type B pipe had a 25.4-mm (1-inch) outside diameter, a wall thickness of 1.22-mm and was lagged with 19-mm thick K-Flex ST nitrile foam insulation. The lagged pipe and cable were fitted through the MS70C collar's sleeve and penetrated the concrete slab as shown in drawing titled 'Specimen #4 1inch Copper Tube with 19mm Fire-rated Lagging (K-Flex), 2.5mm² 3C TPS Cable & MS70C', dated 24 August 2021, by Snap Fire Systems Pty Ltd.

The lagged pipe and cable projected vertically 550-mm above the concrete slab and approximately 500 mm below into the furnace chamber. The lagged pipe and cable were supported at 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable and top of the collar casing was filled with a 10-mm deep bead of H.B Fullers Firesound sealant.

Specimen 5 – A SNAP MS70R Multi Service Retrofit fire collar protecting a DN25 copper pipe with 19-mm thick K-Flex ST fire-rated lagging and a 2.5-mm² 3-core TPS power cable penetrating a 67-mm diameter aperture

The SNAP MS70R Multi Service Retrofit fire collar comprised a 0.75-mm thick steel casing with a 69-mm inner diameter and a 0.95-mm thick steel base flange with a 162-mm outer diameter. The 95 mm high collar casing incorporated a 4-mm thick x 90-mm wide x 250-mm long soft Intumesh intumescent wrap lined within the internal circumference of the collar casing. The closing mechanism comprised three stainless steel springs, a nylon fuse link, and a 258-mm long x 88-mm wide 316 stainless steel mesh located around the intumescent strip, as shown in drawing titled 'SNAP 70 Multi Service Retro', dated 23 September 2019, by Snap Fire Systems Pty Ltd.

The MS70R collar was centrally located over a 67-mm core hole on the underside (exposed face) of the concrete slab and fixed through the 3 mounting brackets using 5-mm x 35-mm Mushroom Head Spikes.

The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm^2 TPS power cable. The Brasshards copper type B pipe had a 25.4-mm (1-inch) outside diameter, a wall thickness of 1.22-mm and was lagged with 19-mm thick K-Flex ST foam insulation. The lagged pipe and cable were fitted through the MS70R collar's sleeve and penetrated the concrete slab through a 67-mm diameter cut-out hole as shown in drawing titled 'Specimen #5 1inch Copper Tube with 19mm Fire-rated Lagging (K-Flex), 2.5mm² 3C TPS Cable & MS70R', dated 24 August 2021, by Snap Fire Systems Pty Ltd.

The lagged pipe and cable projected vertically approximately 550-mm above the concrete slab and 500 mm below into the furnace chamber. The lagged pipe and cable were supported at nominally 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable and the concrete slab was filled with a bead of H.B Fullers Firesound sealant.

Specimen 6 – A SNAP MS70R Multi Service Retrofit fire collar protecting a DN20 copper pipe with 9-mm thick Armaflex fire-rated lagging and a 2.5-mm² 3-core TPS power cable penetrating a 67-mm diameter aperture

The SNAP MS70R Multi Service Retrofit fire collar comprised a 0.75-mm thick steel casing with a 69-mm inner diameter and a 0.95-mm thick steel base flange with a 162-mm outer diameter. The 95 mm high collar casing incorporated a 4-mm thick x 90-mm wide x 250-mm long soft Intumesh intumescent wrap lined within the internal circumference of the collar casing. The closing mechanism comprised three stainless steel springs, a nylon fuse link, and a 258-mm long x 88-mm wide 316 stainless steel mesh located around the intumescent strip, as shown in drawing titled 'SNAP 70 Multi Service Retro', dated 23 September 2019, by Snap Fire Systems Pty Ltd.

The MS70R collar was centrally located over a 67-mm core hole on the underside (exposed face) of the concrete slab and fixed through the 3 mounting brackets using 6-mm x 40-mm long steel sleeved anchors.

The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm^2 TPS power cable. The Brasshards copper type B pipe had a 19.05-mm (¾-inch) outside diameter, a wall thickness of 1.02-mm and was lagged with 9-mm thick Armaflex FRV nitrile rubber. The Prysmian power cable was located on the outside of the lagging. The lagged pipe and cable were fitted through the MS70R collar's sleeve and penetrated the concrete slab through a 67-mm diameter cut-out hole as shown in drawing titled 'Specimen #6 ¾inch Copper Tube with 9mm Fire-rated Lagging (Armaflex), 2.5mm² 3C TPS Cable & MS70R', dated 24 August 2021, by Snap Fire Systems Pty Ltd. The lagged pipe and cable projected vertically approximately 550-mm above the concrete slab and 500 mm below into the furnace chamber. The lagged pipe and cable were supported at nominally 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable and concrete slab incorporated a PE backing rod and backfilled with a 10-mm deep bead of H.B Fullers Firesound sealant.

Specimen 7 – A SNAP MS70C Multi Service cast-in fire collar protecting a DN20 copper pipe with 9-mm thick Armaflex fire-rated lagging and a 2.5-mm² 3-core TPS power cable

The SNAP MS70C Multi Services cast-in fire collar comprised a 1.6-mm thick polypropylene casing with a 79 mm inner diameter and a 168-mm outer diameter base flange. The 250-mm high collar casing incorporated a 280-mm x 65-mm x 5-mm thick Intumesh intumescent material and a rubber ring seal. The closing mechanism comprised three stainless-steel springs bound with nylon fuse links and a 322-mm x 63-mm 316 stainless steel mesh as shown in drawing titled 'SNAP 70 Multi Service Cast-In', dated 20 May 2021, by Snap Fire Systems Pty Ltd.

The MS70C collar was cast into a 150-mm thick concrete slab with the collar's casing projecting 100-mm vertically above the unexposed face.

The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm^2 TPS power cable. The Brasshards copper type B pipe had a 19.05-mm (¾-inch) outside diameter, a wall thickness of 1.02-mm and was lagged with 9-mm thick Armaflex FRV nitrile foam rubber insulation. The lagged pipe and cable were fitted through the MS70C collar's sleeve and penetrated the concrete slab as shown in drawing titled 'Specimen #7 ¾inch Copper Tube with 9mm Fire-rated Lagging (Armaflex), 2.5mm² 3C TPS Cable & MS70C', dated 24 August 2021, by Snap Fire Systems Pty Ltd. The lagged pipe and cable projected vertically 550-mm above the concrete slab and approximately 500 mm below into the furnace chamber.

The lagged pipe and cable were supported at 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable, and the top of the collar casing incorporated a PE backing rod and backfilled with a 10-mm deep bead of H.B Fullers Firesound sealant.

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 21 July 2021 and stored under standard laboratory atmospheric conditions until the test date.

2.5 Selection, construction and installation of 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-21-E Layout', dated 20 April 2021, by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #1 1inch Copper Tube with 19mm Fire-rated Lagging (E-Flex), 2.5mm² 3C TPS Cable & MS70C', dated 24 August 2021, by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #2 1inch Copper Tube with 19mm Fire-rated Lagging (SuperMax), 2.5mm² 3C TPS Cable & MS70R', dated 24 August 2021, by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #3 1inch Copper Tube with 19mm Fire-rated Lagging (SuperMax), 2.5mm² 3C TPS Cable & MS70C', dated 24 August 2021, by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #4 1inch Copper Tube with 19mm Fire-rated Lagging (K-Flex), 2.5mm² 3C TPS Cable & MS70C', dated 24 August 2021, by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #5 1inch Copper Tube with 19mm Fire-rated Lagging (K-Flex), 2.5mm² 3C TPS Cable & MS70R', dated 24 August 2021, by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #6 ¾inch Copper Tube with 9mm Fire-rated Lagging (Armaflex), 2.5mm² 3C TPS Cable & MS70R', dated 24 August 2021, by Snap Fire Systems Pty Ltd.

Drawing titled 'Specimen #7 ¾inch Copper Tube with 9mm Fire-rated Lagging (Armaflex), 2.5mm² 3C TPS Cable & MS70C', dated 24 August 2021, by Snap Fire Systems Pty Ltd.

Drawing titled ‘SNAP 70 Multi Service Cast-In’, dated 20 May 2021, by Snap Fire Systems Pty Ltd.

Drawing titled ‘SNAP 70 Multi Service Retro’, dated 23 September 2019, by Snap Fire Systems Pty Ltd.

No 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 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 19°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 minute -	Smoke is being emitted between the sealant and the pipe lagging at the base of Specimen 3.
2 minutes -	Smoke is being emitted at the base of Specimen 6.
3 minutes -	Smoke is being emitted between the sealant and the pipe lagging at the base of Specimen 4.
5 minutes -	Smoke is being emitted from the end of the pipe and lagging of Specimen 7.
7 minutes -	Smoke has ceased emitting from the base of Specimens 3 and 6.
10 minutes -	Smoke has ceased emitting from Specimen 7.
18 minutes -	The lagging of Specimen 6 has rippled (photograph 5).
21 minutes -	The pipe lagging of Specimens 1, 3, 4 and 7 has been pushed upwards approximately 10-mm, exposing more swollen sealant (photograph 6).
24 minutes -	Moisture has begun pooling around the base of Specimen 6 (photograph 6).
25 minutes -	Steam is venting from a crack in the sealant at the base of Specimen 6 adjacent to thermocouple #38 attached to the power cable (photograph 7).
26 minutes -	Moisture has begun forming on the concrete slab around the base of Specimens 1, 3 and 4.
29 minutes -	The rippled pipe lagging of Specimen 6 has straightened.
34 minutes -	Moisture has started to pool on the concrete slab around the remaining specimens.
43 minutes -	The pipe lagging around the base of Specimen 2 and has swollen.
59 minutes -	Smoke / steam is being emitted around the base of Specimen 2; the pipe's lagging has also swollen (photograph 12).
72 minutes -	Moisture around the base of all penetrations has started to dry up.
80 minutes -	The pipe lagging at the base of Specimen 1 has spilt exposing the copper pipe (photograph 13).
81 minutes -	Insulation failure of Specimen 1 - maximum temperature rise of 180K is exceeded (using the roving thermocouple) on the exposed copper pipe, approximately 100-mm above the collar casing.
83 minutes -	The pipe large at the base of specimen 5 has begun to swell (photograph 14).
85 minutes -	Insulation failure of Specimen 5 - maximum temperature rise of 180K is on the exposed pipe lagging (Thermocouple #29), 25-mm above the mastic.
91 minutes -	Roving thermocouple applied to the sealant at the base of Specimen 3. A temperature 52°C degrees was recorded at this time.
99 minutes -	Roving thermocouple applied to pipe lagging at the base of Specimen 5 approximately 25-mm above the slab. A temperature 145°C degrees was recorded at this time.

114 minutes - A large amount of smoke and furnace gases has suddenly begun venting from the base of Specimen 2 on the south side adjacent to thermocouples #11 and #12.

115 minutes - Insulation failure of Specimen 2 - maximum temperature rise of 180K is exceeded on the power cable (Thermocouple #12), approximately 25-mm above the slab.

118 minutes - The pipe lagging of Specimen 3 has ruptured with hot gases and smoke venting through a hole approximately 30-mm above the collar casing is visible.

119 minutes - The pipe lagging at the base of Specimen 3 has begun to split. Rover applied to the split surface of the lagging, with a maximum temperature of 119°C noted at this time.

120 minutes - Insulation failure of Specimen 2 - maximum temperature rise of 180K is exceeded on the lagging – north side, 25-mm above the collar casing.
Insulation failure of Specimen 3 - maximum temperature rise of 180K is exceeded on the lagging – north side, 25-mm above the collar casing.

125 minutes - Roving thermocouple applied to pipe lagging at the base of Specimen 3 on the split lagging approximately 75-mm above the collar casing. A temperature of 221°C degrees was recorded at this time.

130 minutes - The collar sleeve above the concrete slab of Specimen 3 has begun to melt leaving a hole on the east side.

132 minutes - The pipe lagging at the base of Specimen 4 has begun to split vertically.

134 minutes - Roving thermocouple applied to the split pipe lagging at the base of Specimen 4 above the collar. A temperature of 352°C degrees was recorded at this time.
Insulation failure of Specimen 4 - maximum temperature rise of 180K is exceeded (roving thermocouple recorded a temperature of 352°C) on the split pipe lagging of the specimen above the collar (photograph 21).

152 minutes - The collar sleeve above the concrete slab of Specimen 4 has begun to melt leaving a hole on the north side (photograph 23).

189 minutes - Insulation failure of Specimen 6 - maximum temperature rise of 180K is exceeded on the pipe lagging, 25-mm above the concrete slab (north side).

191 minutes - Large blisters have formed on the lower section of the pipe lagging of Specimen 6 (photograph 25).

195 minutes - The collar sleeve above the concrete slab of Specimen 7 has begun to melt.

199 minutes - A large amount of smoke is now being emitted from the pipe lagging of Specimens 6 and 7.

219 minutes - Insulation failure of Specimen 7 - maximum temperature rise of 180K is exceeded on the pipe lagging, 25-mm above the concrete slab (north side).

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 1.

Figure 4 shows the curve of temperature versus time associated with Specimen 2.

Figure 5 shows the curve of temperature versus time associated with Specimen 3.

Figure 6 shows the curve of temperature versus time associated with Specimen 4.

Figure 7 shows the curve of temperature versus time associated with Specimen 5.

Figure 8 shows the curve of temperature versus time associated with Specimen 6.

Figure 9 shows the curve of temperature versus time associated with Specimen 7.

8.5 Performance

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

Specimen 1 - A SNAP MS70C Multi Service cast-in fire collar protecting a DN25 copper pipe with 19 mm thick E-Flex fire-rated lagging and a 2.5-mm² 3-core TPS power cable

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	81 minutes

Specimen 2 - A SNAP MS70R Multi Service Retrofit fire collar protecting a DN25 copper pipe with 19 mm thick SuperMax fire-rated lagging and a 2.5-mm² 3-core TPS power cable penetrating a 67-mm diameter aperture

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	115 minutes

Specimen 3 - A SNAP MS70C Multi Service cast-in fire collar protecting a DN25 copper pipe with 19 mm thick SuperMax fire-rated lagging and a 2.5-mm² 3-core TPS power cable

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	120 minutes

Specimen 4 - A SNAP MS70C Multi Service cast-in fire collar protecting a DN25 copper pipe with 19 mm thick K-Flex fire-rated lagging and a 2.5-mm² 3-core TPS power cable

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	134 minutes

Specimen 5 - A SNAP MS70R Multi Service Retrofit fire collar protecting a DN25 copper pipe with 19-mm thick K-Flex fire-rated lagging and a 2.5-mm² 3-core TPS power cable penetrating a 67 mm diameter aperture

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	85 minutes

Specimen 6 - A SNAP MS70R Multi Service Retrofit fire collar protecting a DN20 copper pipe with 9 mm thick Armaflex fire-rated lagging and a 2.5-mm² 3-core TPS power cable penetrating a 67-mm diameter aperture

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	189 minutes

Specimen 7 - A SNAP MS70C Multi Service cast-in fire collar protecting a DN20 copper pipe with 9 mm thick Armaflex fire-rated lagging and a 2.5-mm² 3-core TPS power cable.

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	219 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	-	-/240/60
Specimen 2	-	-/240/90
Specimen 3	-	-/240/120
Specimen 4	-	-/240/120
Specimen 5	-	-/240/60
Specimen 6	-	-/240/180
Specimen 7	-	-/240/180

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

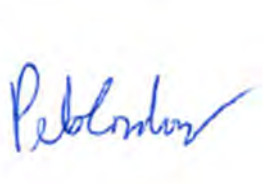
Specimens were tested in a concrete slab with a Fire Resistance Period (FRP) for insulation of 180 minutes in accordance with Table 5.5.1 of AS 3600:2018 - Concrete structures. The maximum FRL of any test specimen cannot exceed the FRL achieved by the concrete slab in which it was installed.

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 MS70C Multi Service cast-in fire collar protecting a DN25 copper pipe with 19-mm thick E-Flex fire-rated lagging and a 2.5-mm² 3-core TPS power cable.	On the slab, 25-mm from collar (North)	S1
	On the slab, 25-mm from collar (South)	S2
	On the collar, 25-mm above slab (North)	S3
	On the collar, 25-mm above slab (South)	S4
	On the lagging, 25-mm above the collar (North)	S5
	On the lagging, 25-mm above the collar (South)	S6
	On the cable, 25-mm above the collar (E)	S7
Specimen 2 - A SNAP MS70R Multi Service Retrofit fire collar protecting a DN25 copper pipe with 19-mm thick Supermax fire-rated lagging and a 2.5-mm² 3-core TPS power cable penetrating a 67-mm diameter aperture.	On the slab, 25-mm from lagging (North)	S8
	On the slab, 25-mm from lagging (South)	S9
	On the lagging, 25-mm above slab (North)	S10
	On the lagging, 25-mm above slab (South)	S11
	On the cable, 25-mm above the collar (E)	S12
Specimen 3 - A SNAP MS70C Multi Service cast-in fire collar protecting a DN25 copper pipe with 19-mm thick SuperMax fire-rated lagging and a 2.5-mm² 3-core TPS power cable.	On the slab, 25-mm from collar (West)	S13
	On the slab, 25-mm from collar (East)	S14
	On the collar, 25-mm above slab (West)	S15
	On the collar, 25-mm above slab (East)	S16
	On the lagging, 25-mm above the collar (West)	S17
	On the lagging, 25-mm above the collar (East)	S18
	On the cable, 25-mm above the collar (E)	S19
Specimen 4 - A SNAP MS70C Multi Service cast-in fire collar protecting a DN25 copper pipe with 19-mm thick K-Flex fire-rated lagging and a 2.5-mm² 3-core TPS power cable.	On the slab, 25-mm from lagging (N/W)	S20
	On the slab, 25-mm from lagging (S/E)	S21
	On the collar, 25-mm above slab (West)	S22
	On the collar, 25-mm above slab (East)	S23
	On the lagging, 25-mm above slab (West)	S24
	On the lagging, 25-mm above slab (East)	S25
	On the cable, 25-mm above the slab (South)	S26

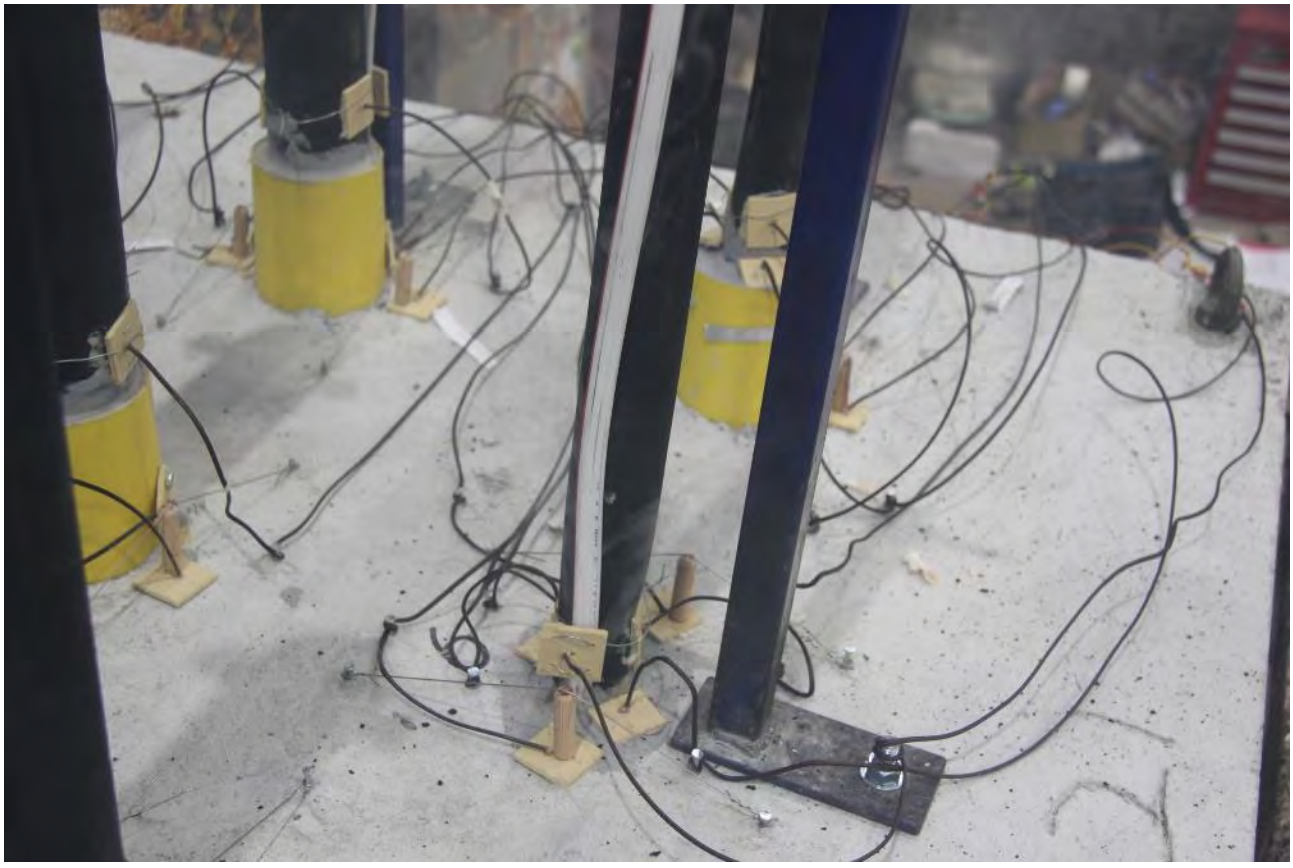
Specimen	T/C Position	T/C designation
Specimen 5 - A SNAP MS70R Multi Service Retrofit fire collar protecting a DN25 copper pipe with 19-mm thick K-Flex fire-rated lagging and a 2.5-mm² 3-core TPS power cable penetrating a 67 mm diameter aperture.	On the slab, 25-mm from lagging (N/E)	S27
	On the slab, 25-mm from lagging (S/W)	S28
	On the lagging, 25-mm above slab (West)	S29
	On the lagging, 25-mm above slab (East)	S30
	On the cable, 25-mm above the slab	S31
Specimen 6 - A SNAP MS70R Multi Service Retrofit fire collar protecting a DN20copper pipe with 9-mm thick Armaflex fire-rated lagging and a 2.5-mm² 3-core TPS power cable penetrating a 67 mm diameter aperture.	On the slab, 25-mm from cables (West)	S32
	On the slab, 25-mm from cables (East)	S33
	On the sealant (North)	S34
	On the sealant (South)	S35
	On the lagging, 25-mm above slab (West)	S36
	On the lagging, 25-mm above slab (East)	S37
	On the cable, 25-mm above the slab	S38
Specimen 7 - A SNAP MS70C Multi Service cast-in fire collar protecting a DN20 copper pipe with 9-mm thick Armaflex fire-rated lagging and a 2.5-mm² 3-core TPS power cable.	On the slab, 25-mm from collar (North)	S39
	On the slab, 25-mm from collar (South)	S40
	On the collar, 25-mm above slab (North)	S41
	On the collar, 25-mm above slab (South)	S42
	On the sealant (North)	S43
	On the sealant (South)	S44
	On the lagging, 25-mm above slab (West)	S45
	On the lagging, 25-mm above slab (East)	S46
	On the cable, 25-mm above the slab	S47
Ambient		S49
Rover		S50

Appendix B – Photographs

PHOTOGRAPH 1 – EXPOSED FACE OF SPECIMENS PRIOR TO TESTING

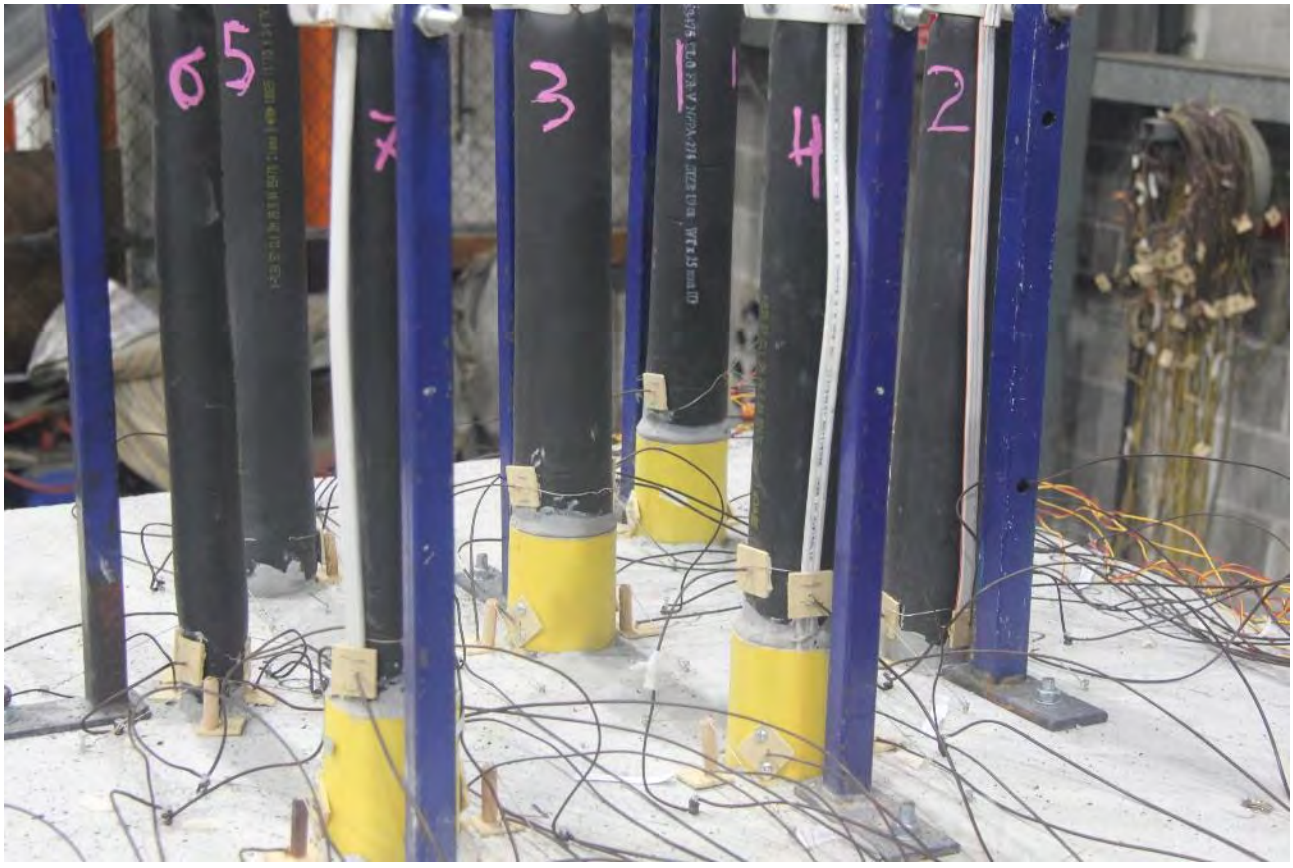
PHOTOGRAPH 2 – UNEXPOSED FACE OF SPECIMENS PRIOR TO TESTING

PHOTOGRAPH 3 – SPECIMEN 3 AT 3 MINUTES INTO THE TEST

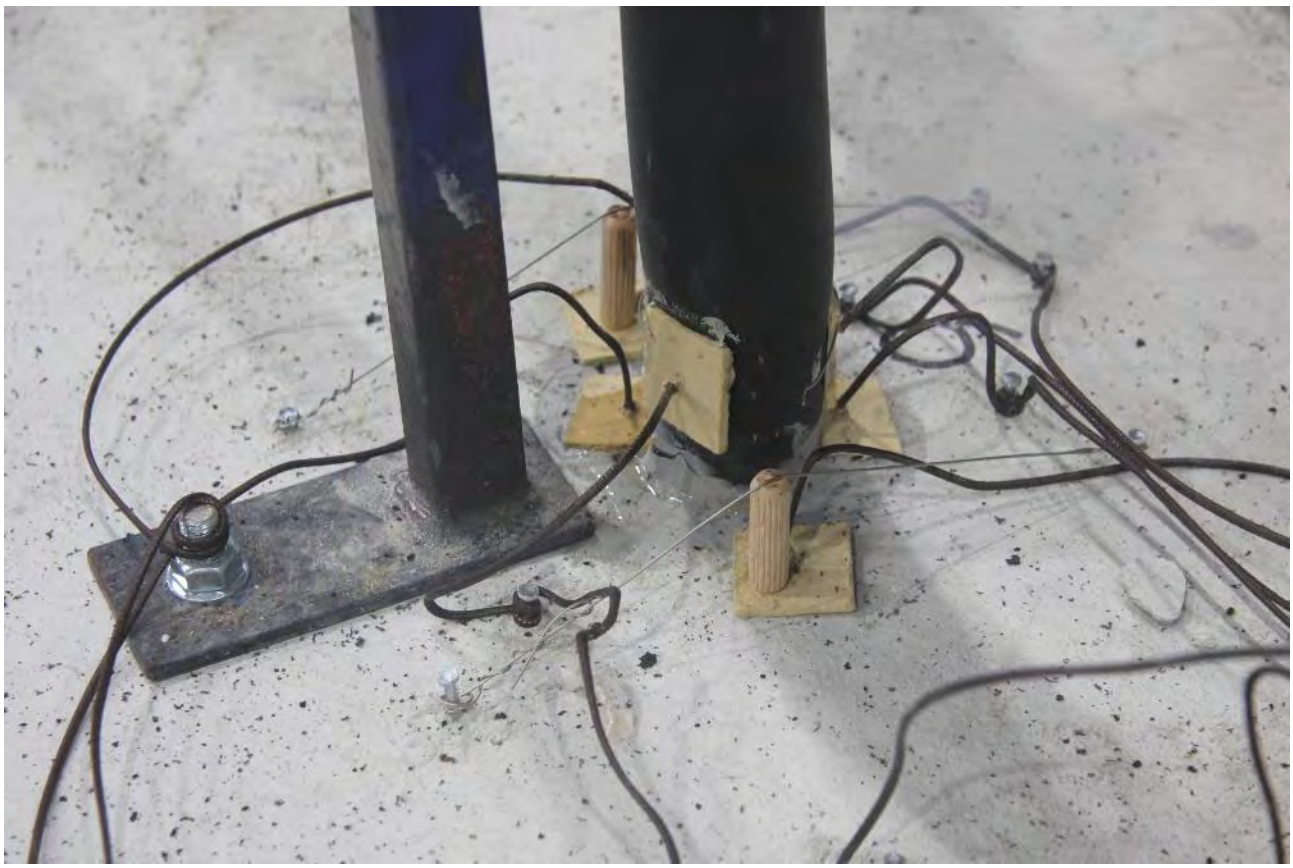


PHOTOGRAPH 4 – SPECIMEN 6 AT 3 MINUTES INTO THE TEST

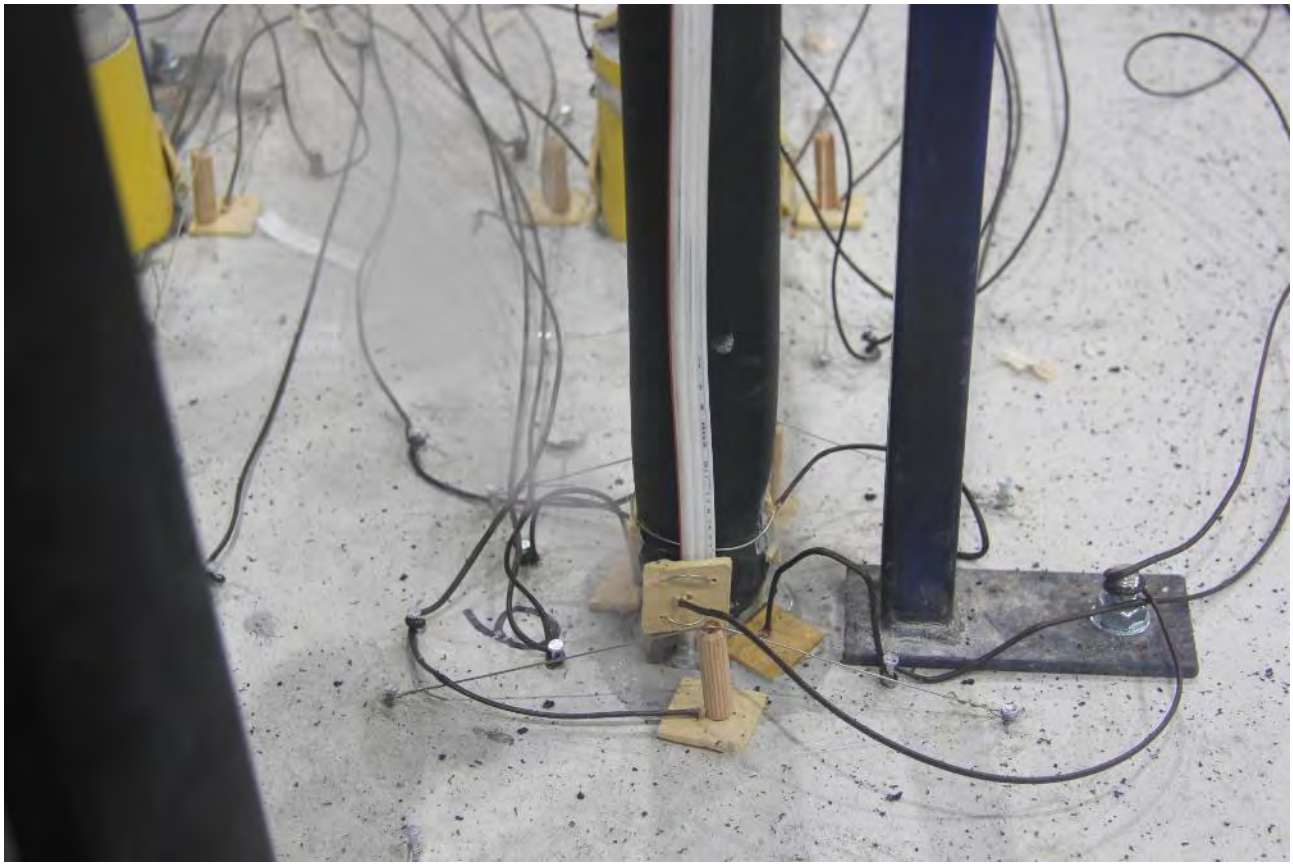
PHOTOGRAPH 5 – SPECIMEN 6 AT 18 MINUTES INTO THE TEST



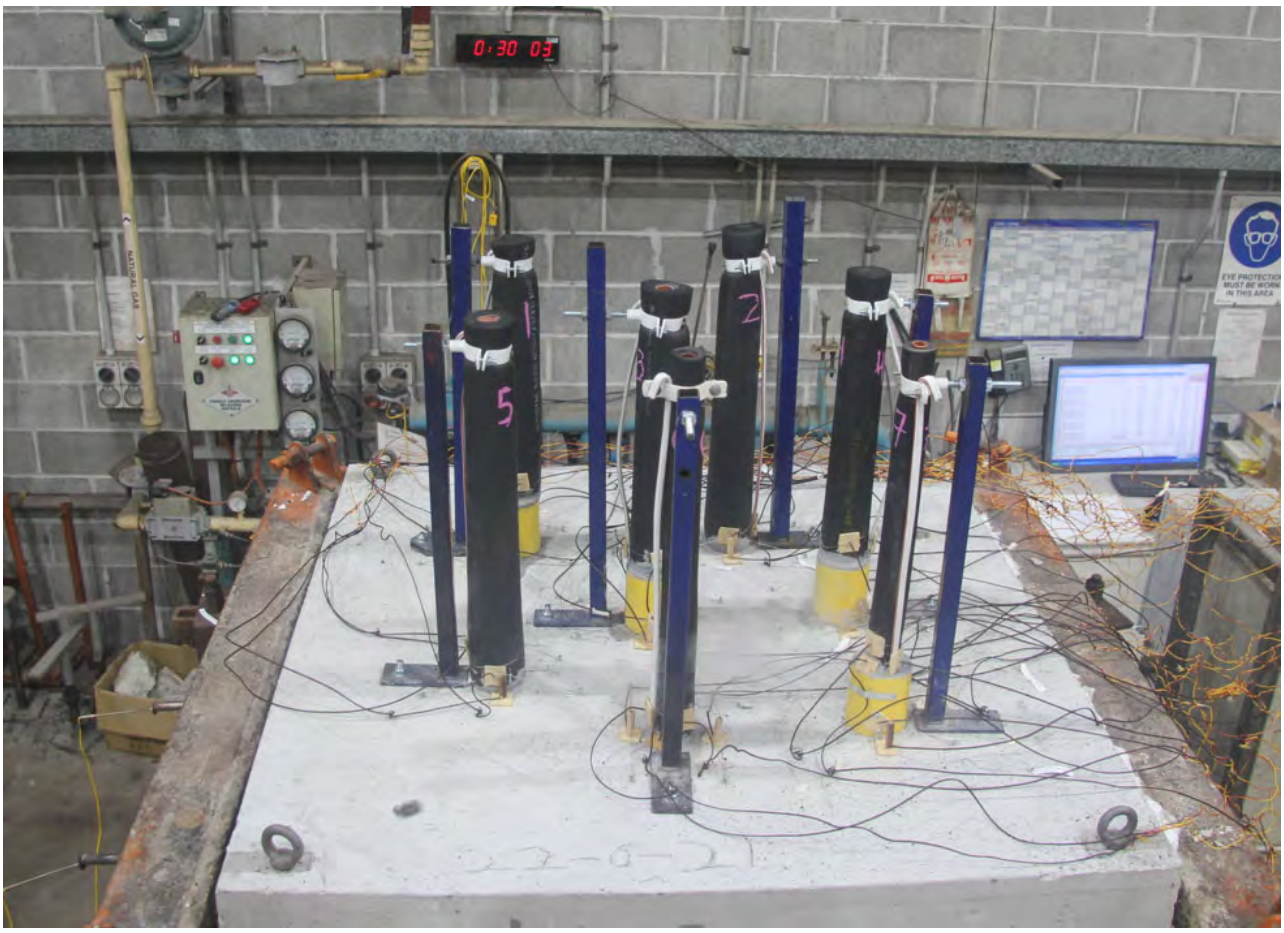
PHOTOGRAPH 6 –SPECIMENS AT 21 MINUTES INTO THE TEST



PHOTOGRAPH 7 – SPECIMEN 6 AT 24 MINUTES INTO THE TEST

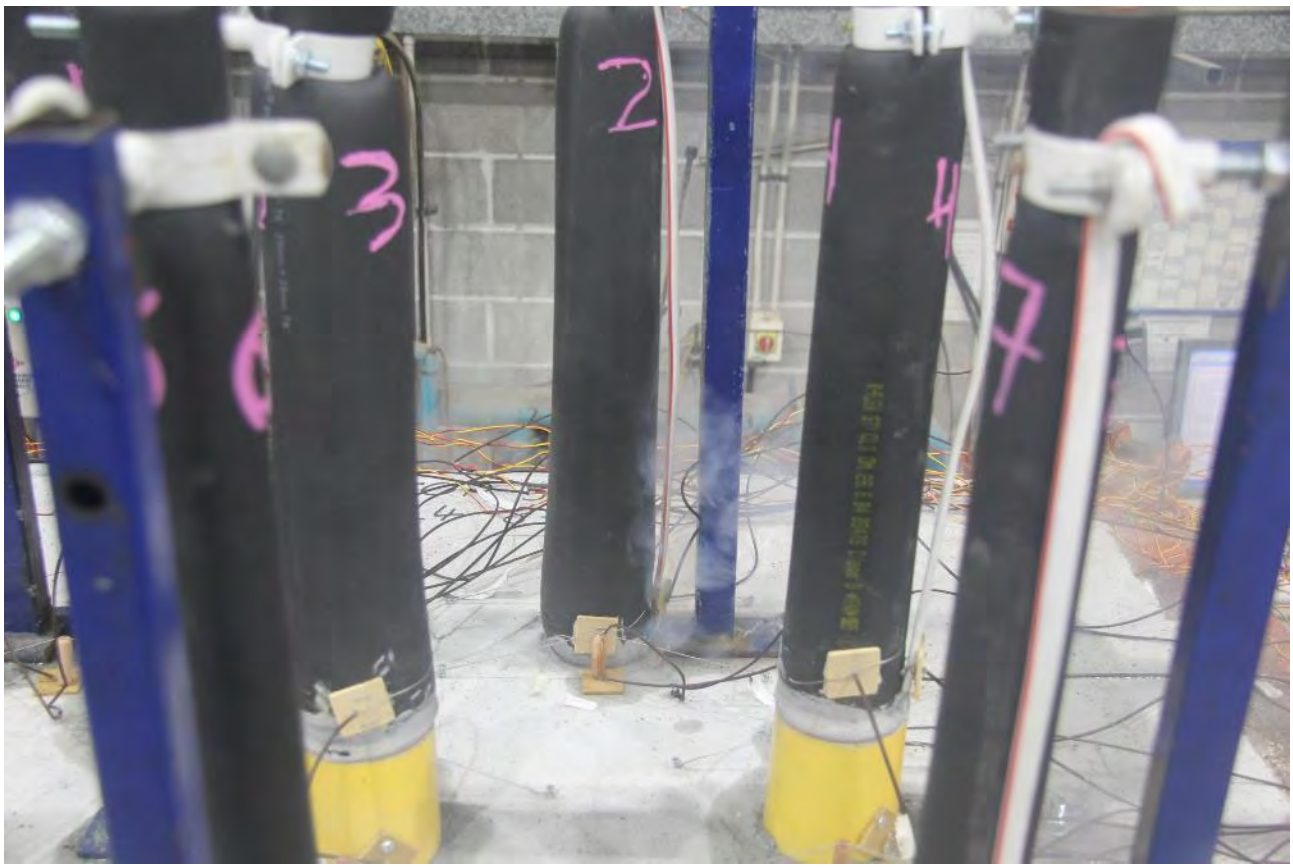


PHOTOGRAPH 8 – SPECIMEN 6 AT 25 MINUTES INTO THE TEST

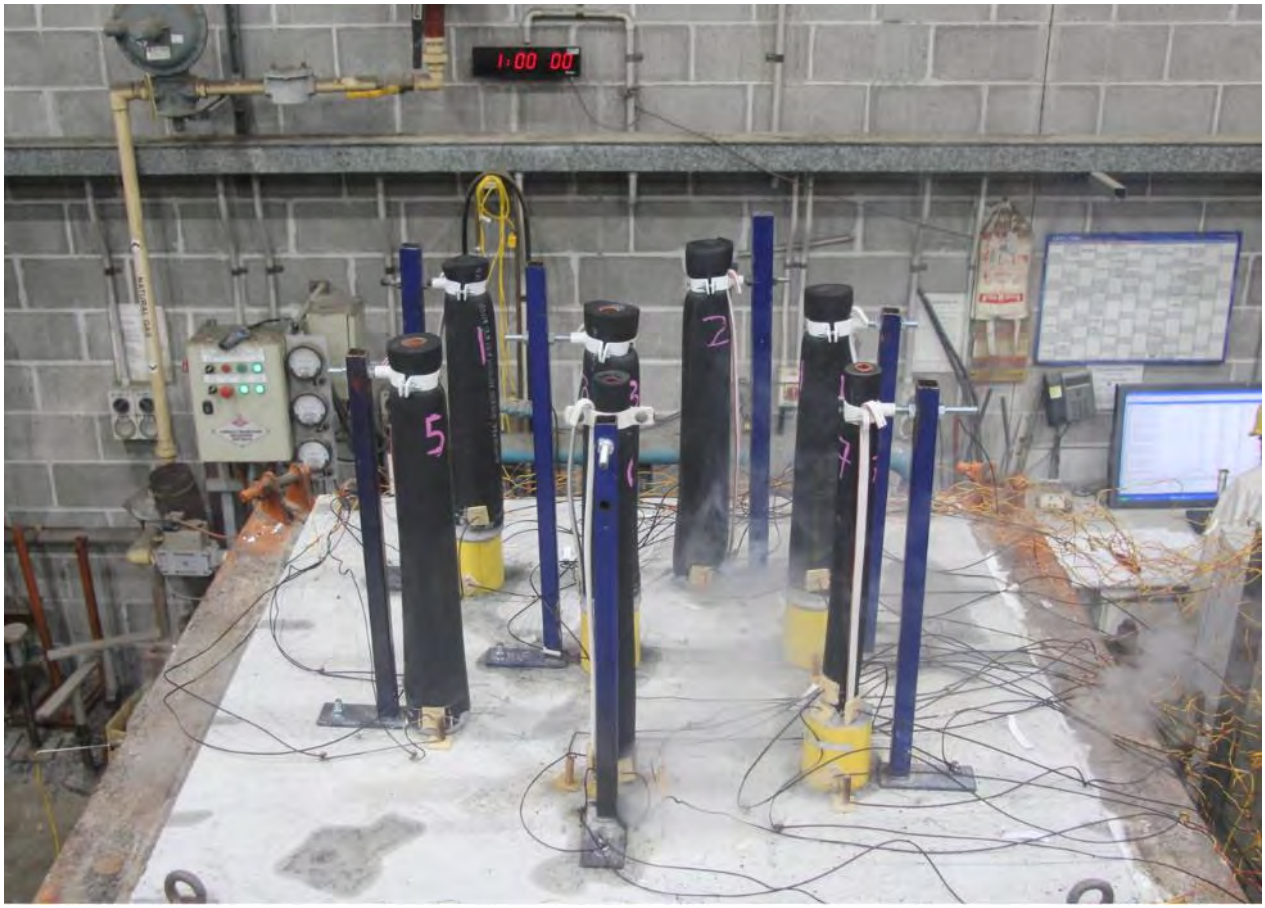


PHOTOGRAPH 9 – SPECIMENS AT 30 MINUTES INTO THE TEST

PHOTOGRAPH 10 – SPECIMENS AT 34 MINUTES INTO THE TEST

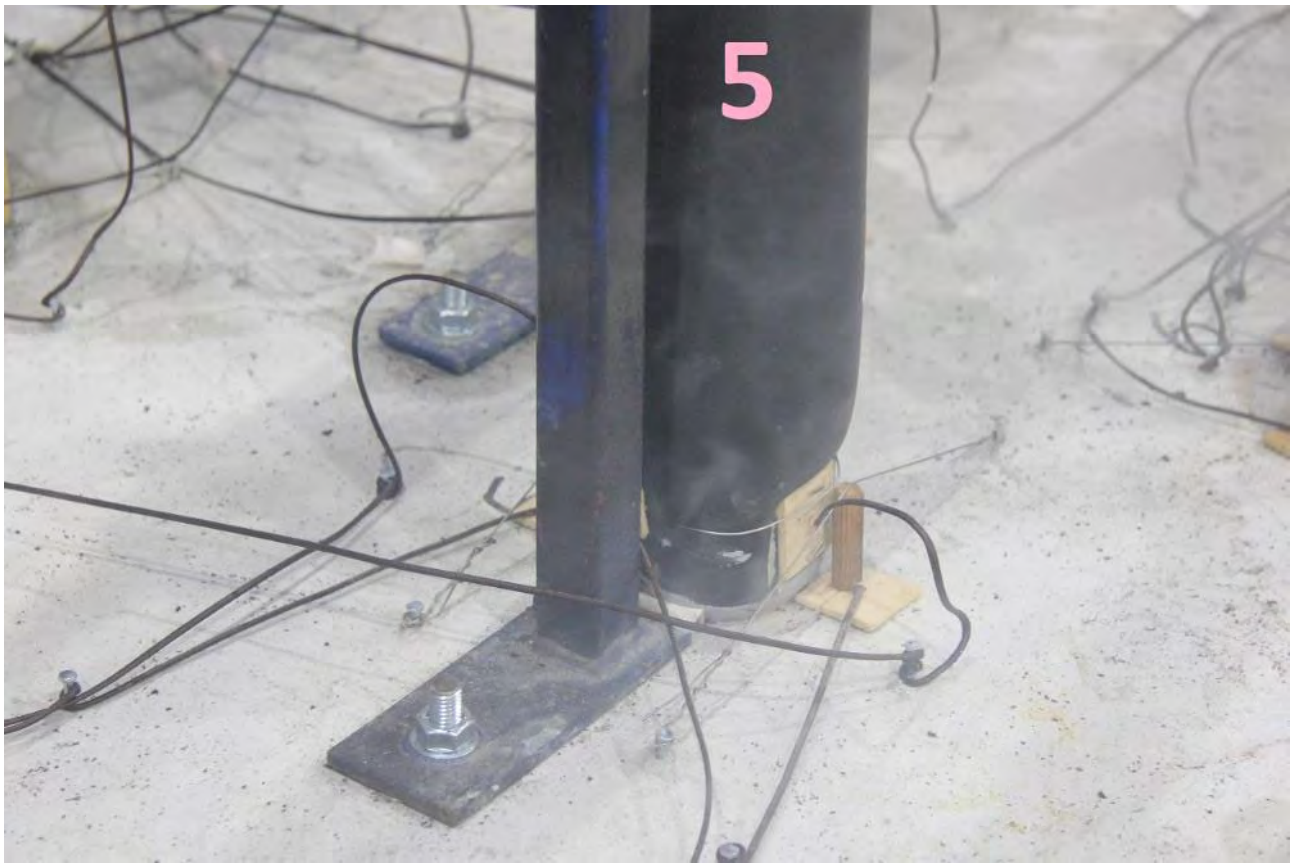


PHOTOGRAPH 11 – SPECIMENS AT 59 MINUTES INTO THE TEST

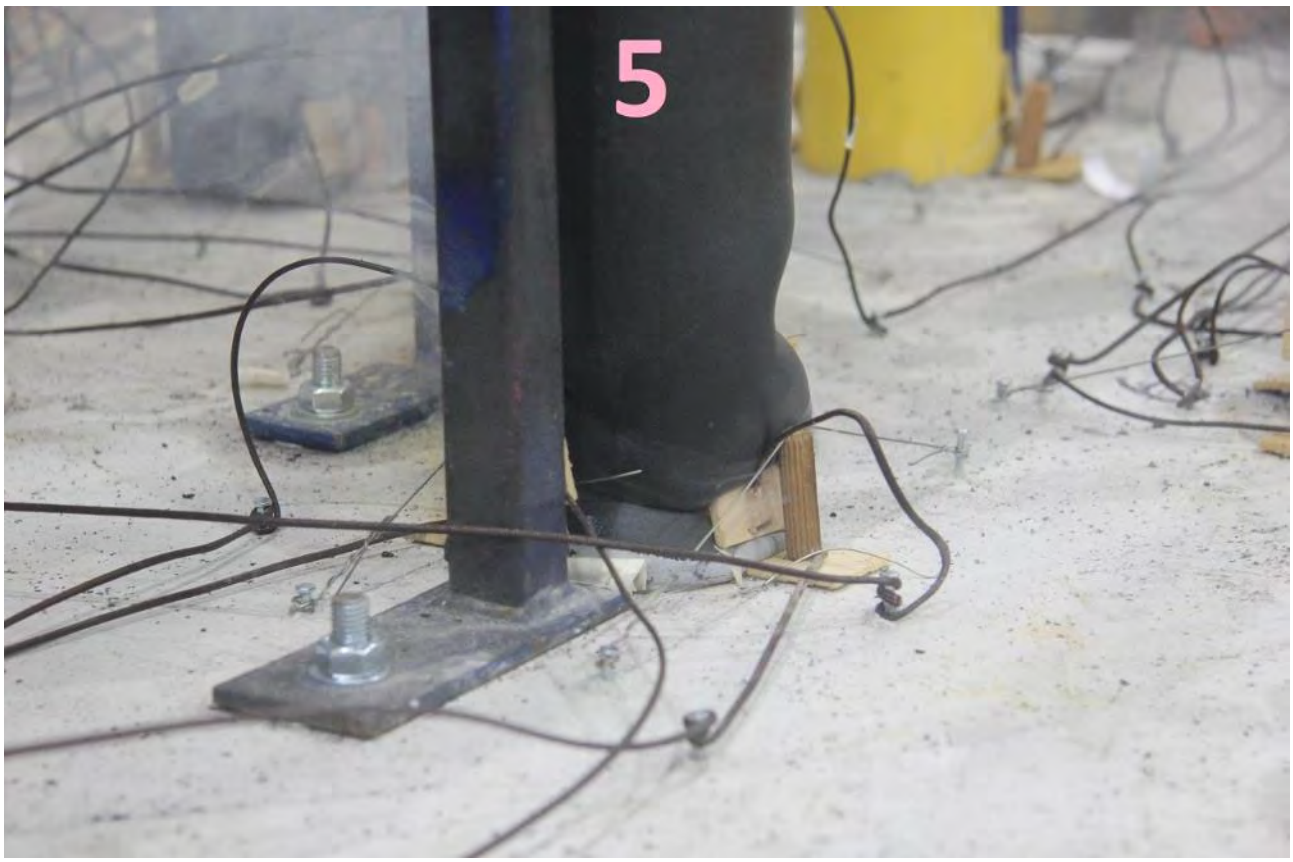


PHOTOGRAPH 12 – SPECIMENS AT 60 MINUTES INTO THE TEST

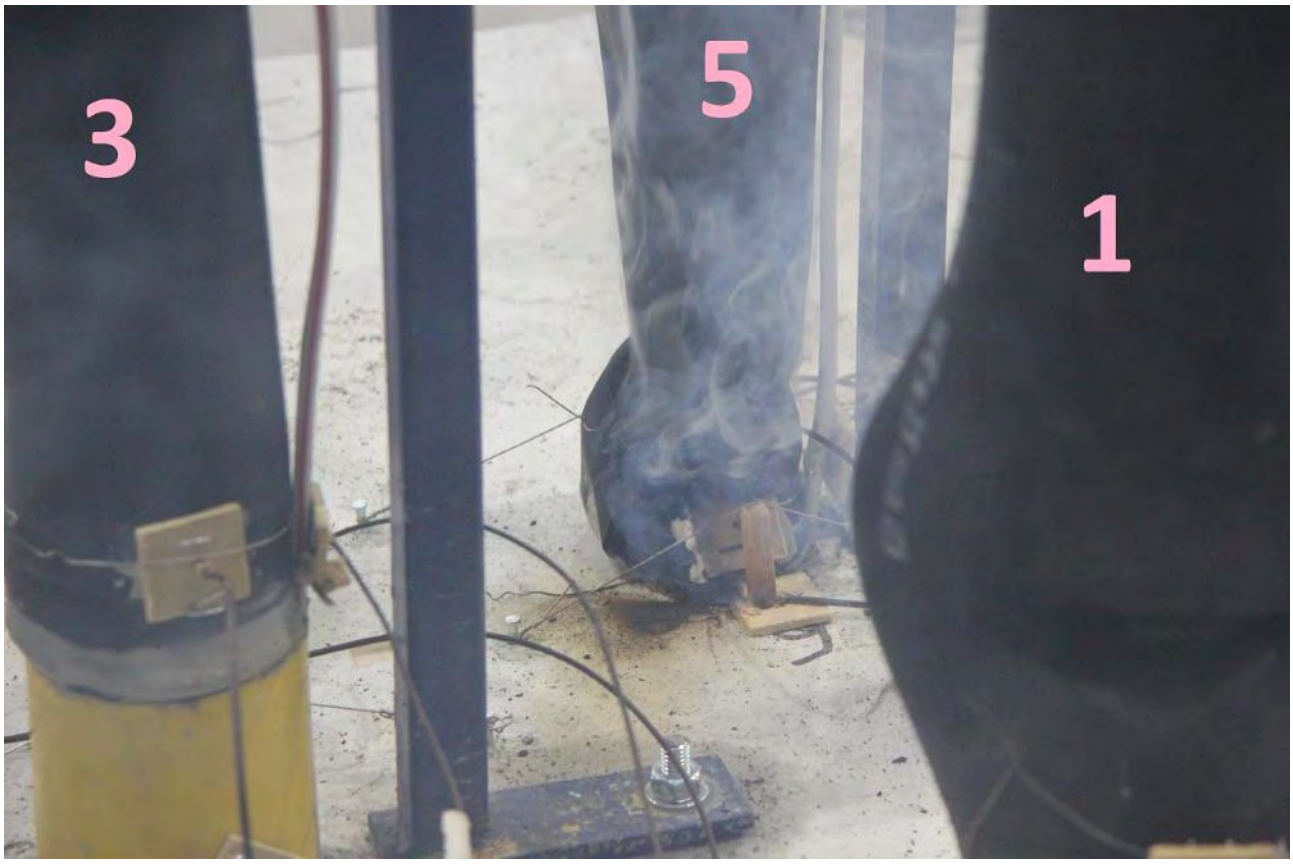
PHOTOGRAPH 13 – SPECIMENS AT 80 MINUTES INTO THE TEST



PHOTOGRAPH 14 – SPECIMEN 5 AT 83 MINUTES INTO THE TEST

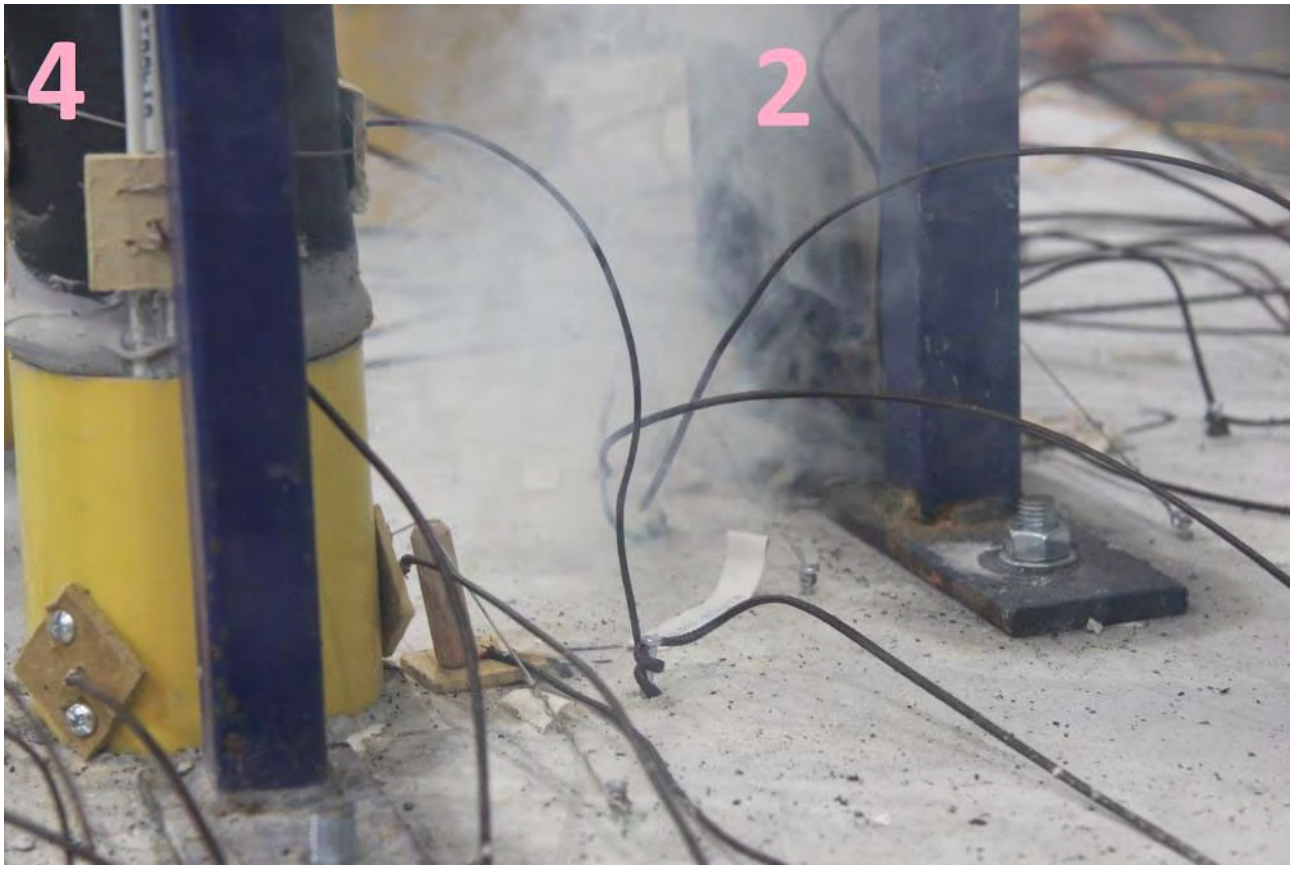


PHOTOGRAPH 15 – SPECIMEN 5 AT 86 MINUTES INTO THE TEST



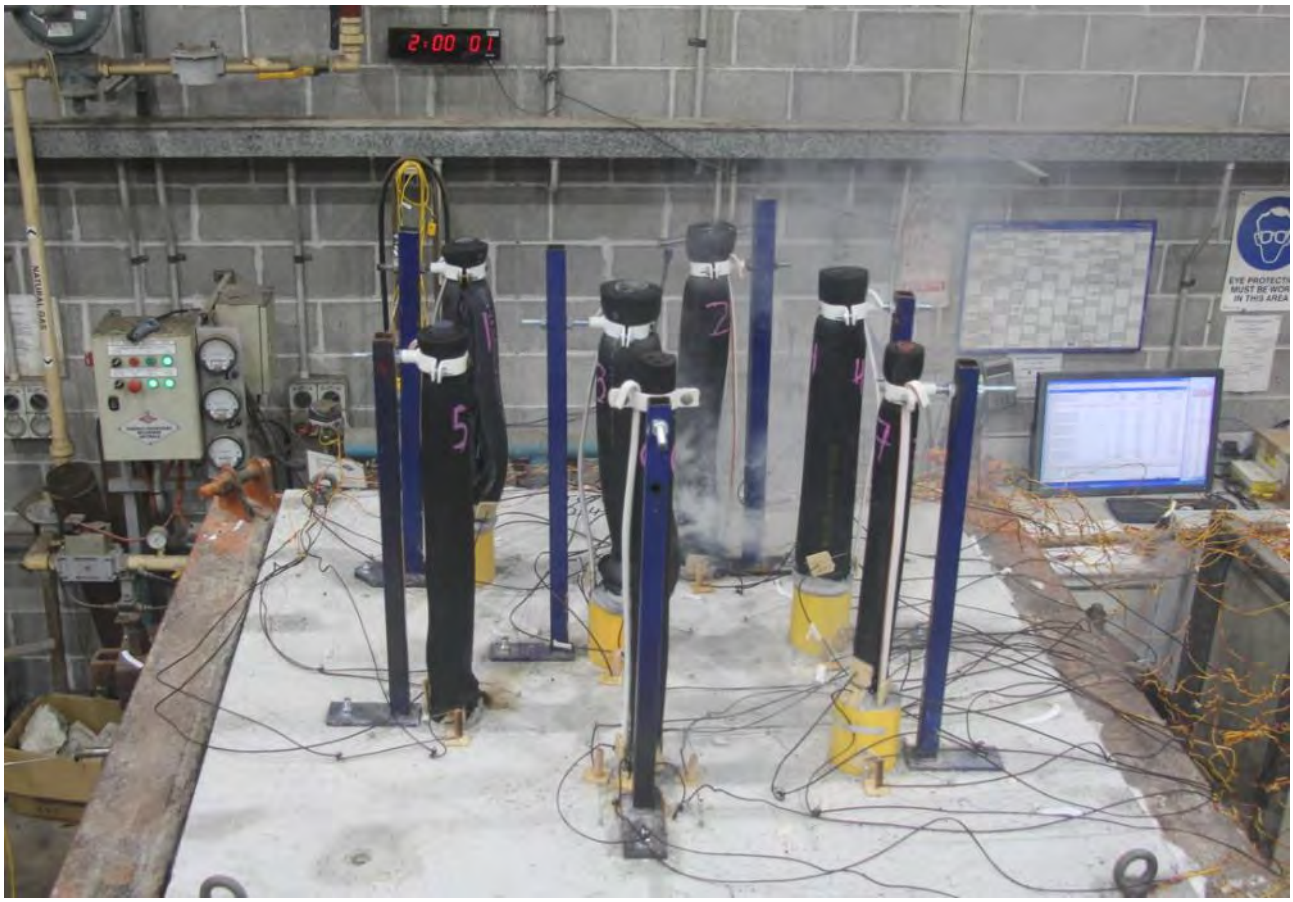
PHOTOGRAPH 16 – SPECIMENS AT 88 MINUTES INTO THE TEST

PHOTOGRAPH 17 – SPECIMENS AT 90 MINUTES INTO THE TEST



PHOTOGRAPH 18 – SPECIMENS AT 114 MINUTES INTO THE TEST

PHOTOGRAPH 19 –SPECIMEN 3 AT 119 MINUTES INTO THE TEST



PHOTOGRAPH 20 – SPECIMENS AT 120 MINUTES INTO THE TEST

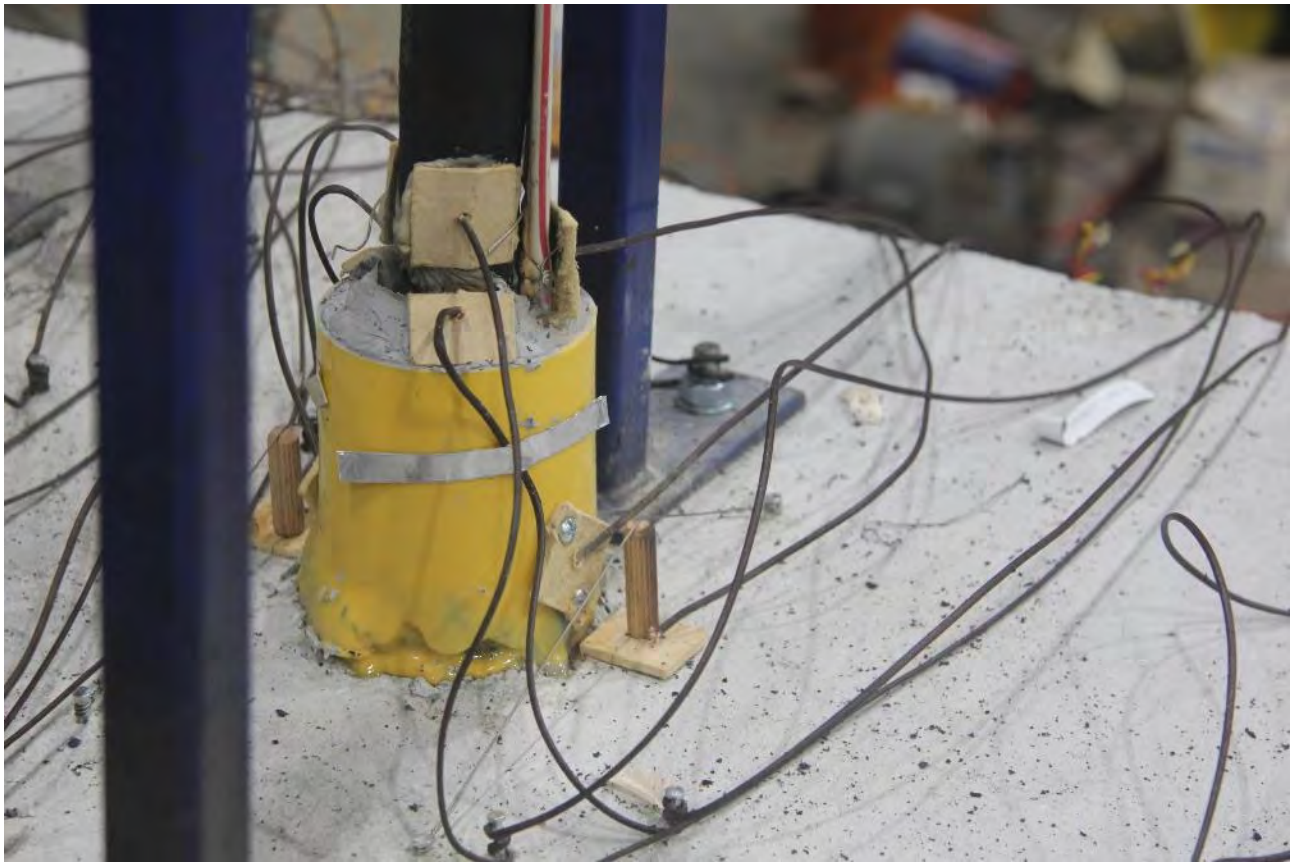
PHOTOGRAPH 21 –SPECIMEN 4 AT 134 MINUTES INTO THE TEST

PHOTOGRAPH 22 – SPECIMENS AT 150 MINUTES INTO THE TEST

PHOTOGRAPH 23 – SPECIMENS AT 152 MINUTES INTO THE TEST

PHOTOGRAPH 24 – SPECIMENS AT 180 MINUTES INTO THE TEST

PHOTOGRAPH 25 – SPECIMENS 5, 6 AND 7 AT 191 MINUTES INTO THE TEST



PHOTOGRAPH 26 – SPECIMEN 7 AT 197 MINUTES INTO THE TEST

PHOTOGRAPH 27 – SPECIMENS AT 210 MINUTES INTO THE TEST

PHOTOGRAPH 28 – SPECIMENS AT 240 MINUTES INTO THE TEST

PHOTOGRAPH 29 – SPECIMENS AT THE CONCLUSION OF TESTING

PHOTOGRAPH 30 – EXPOSED FACE OF SPECIMENS AT THE CONCLUSION OF TESTING

Appendix C – Test Data charts

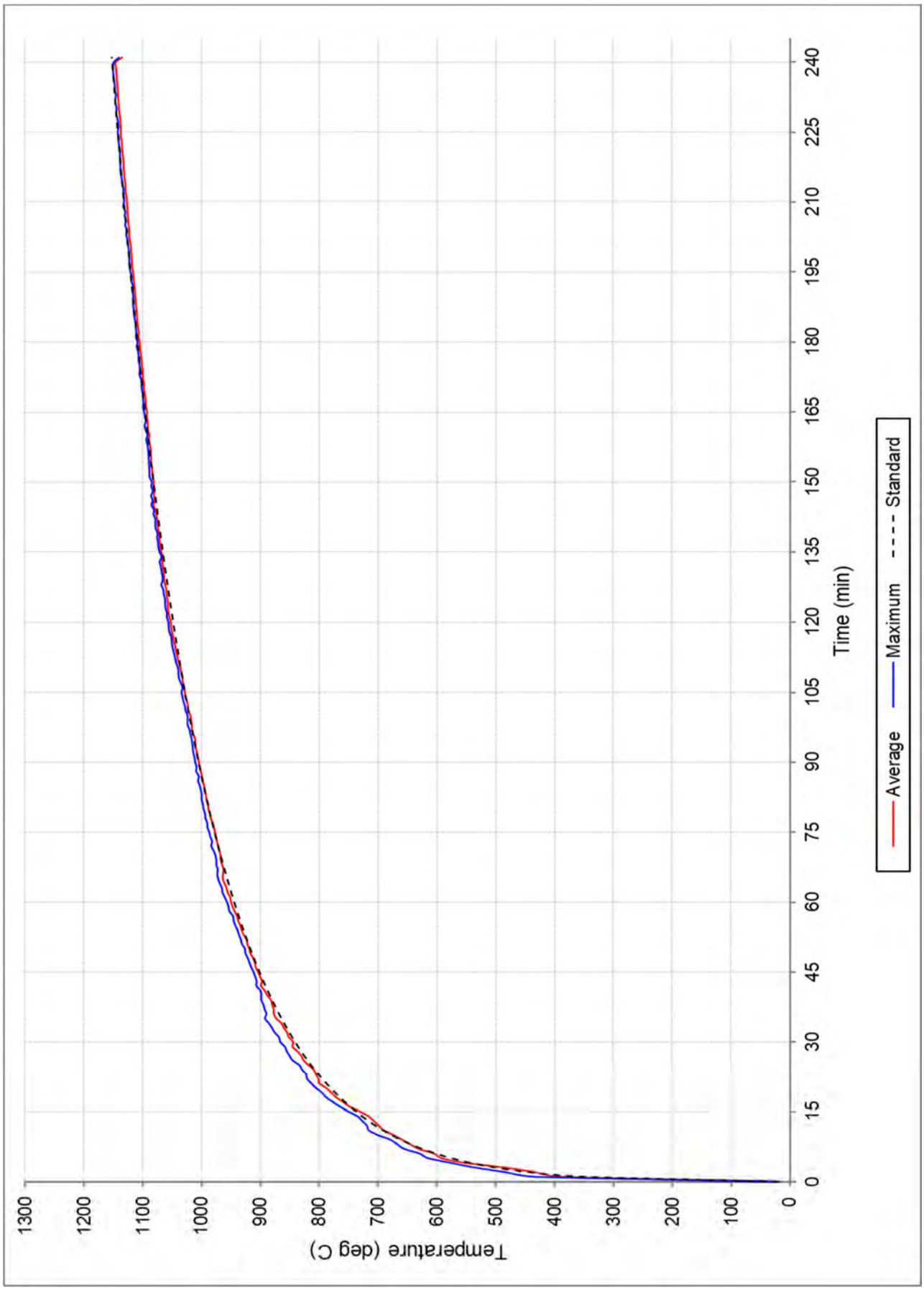


FIGURE 1 – FURNACE TEMPERATURE

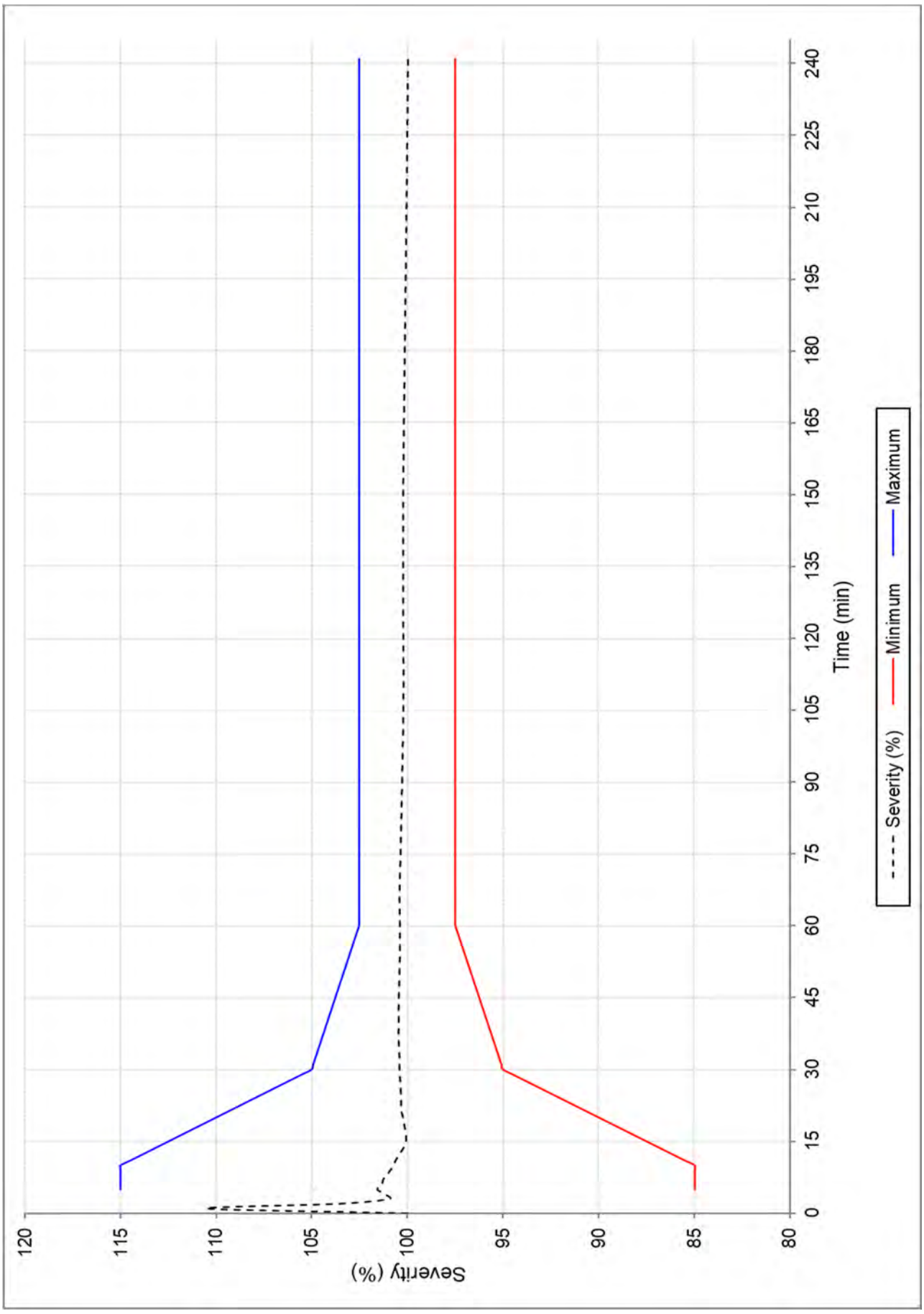


FIGURE 2 – FURNACE SEVERITY

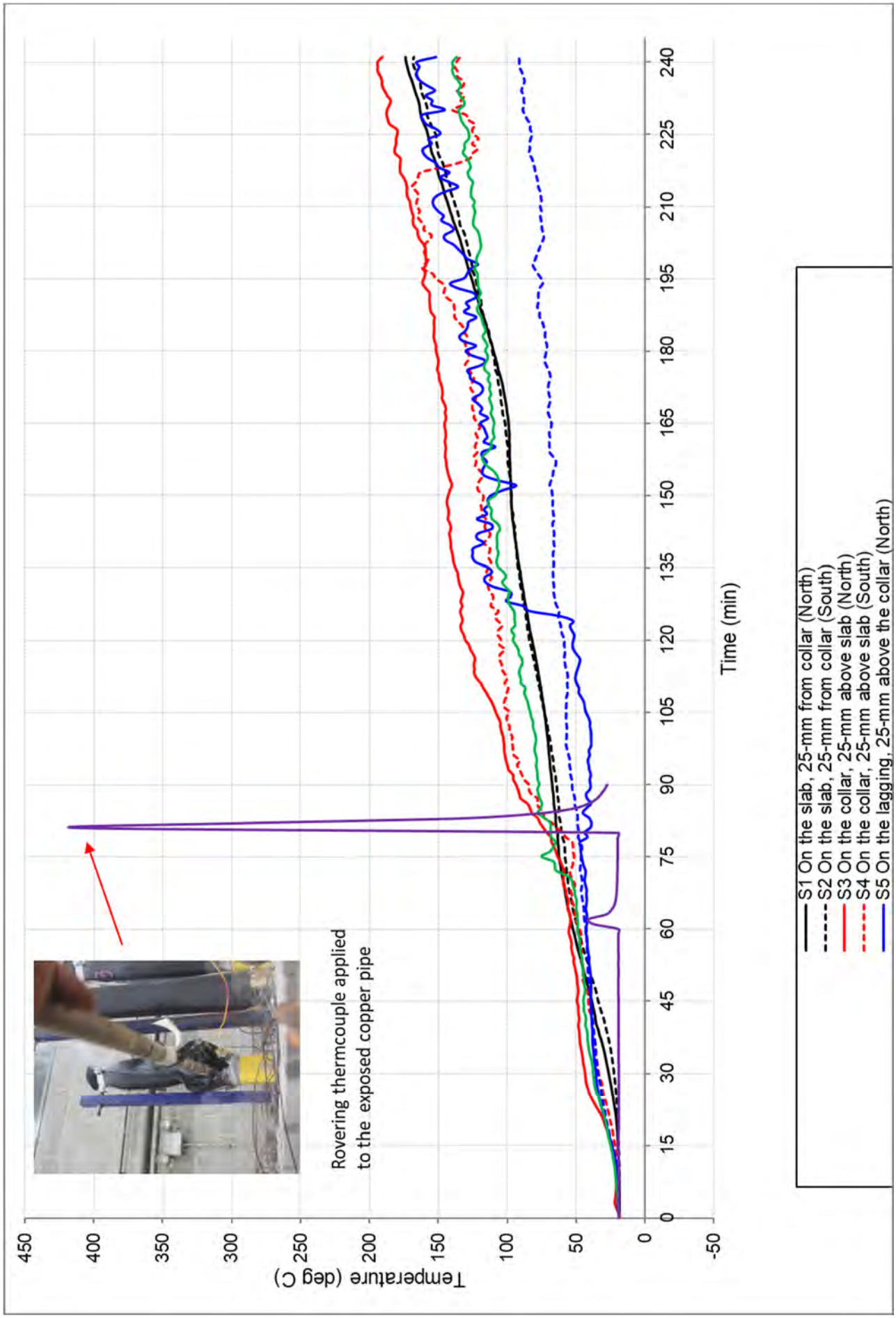


FIGURE 3 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 1

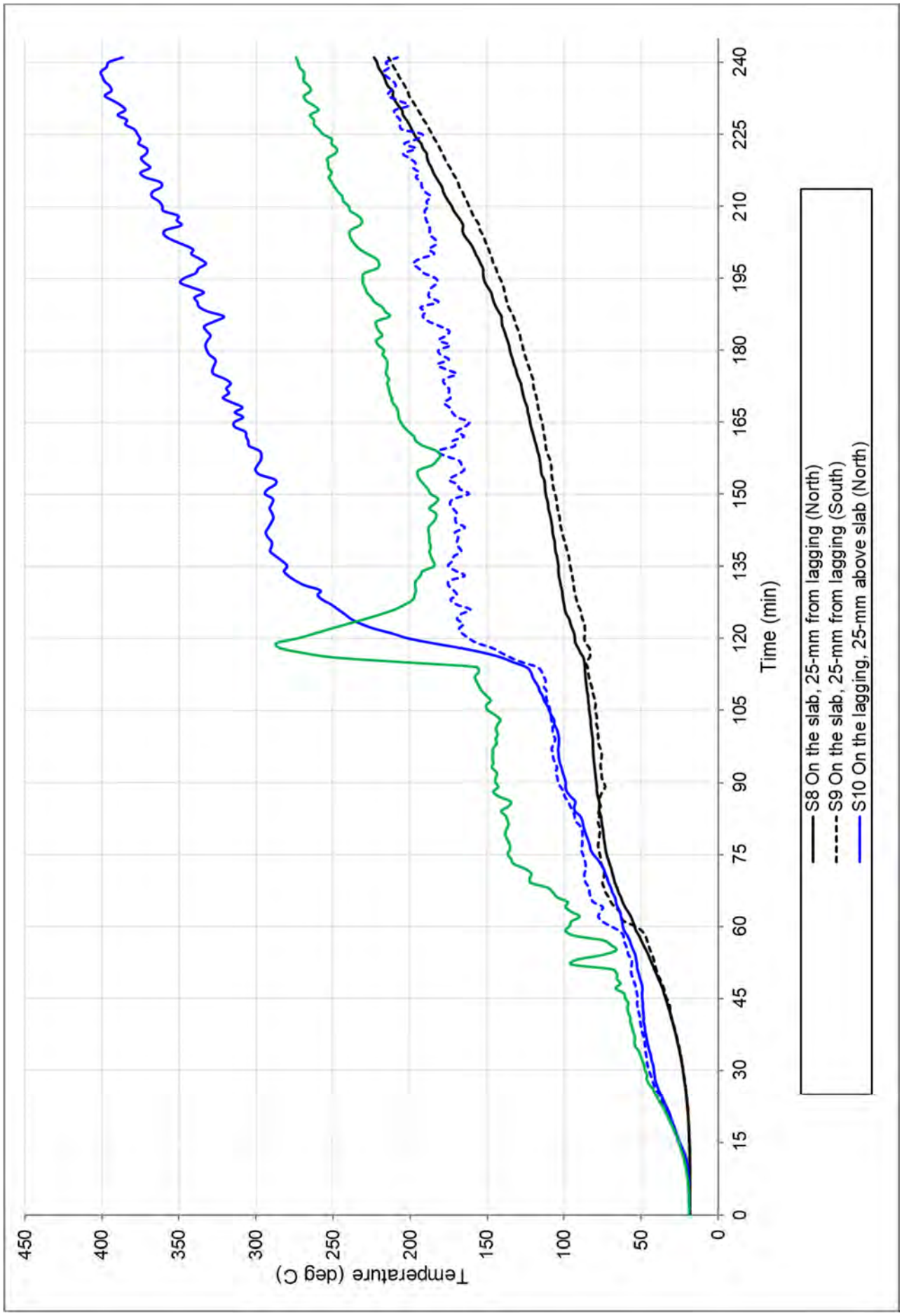


FIGURE 4 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 2

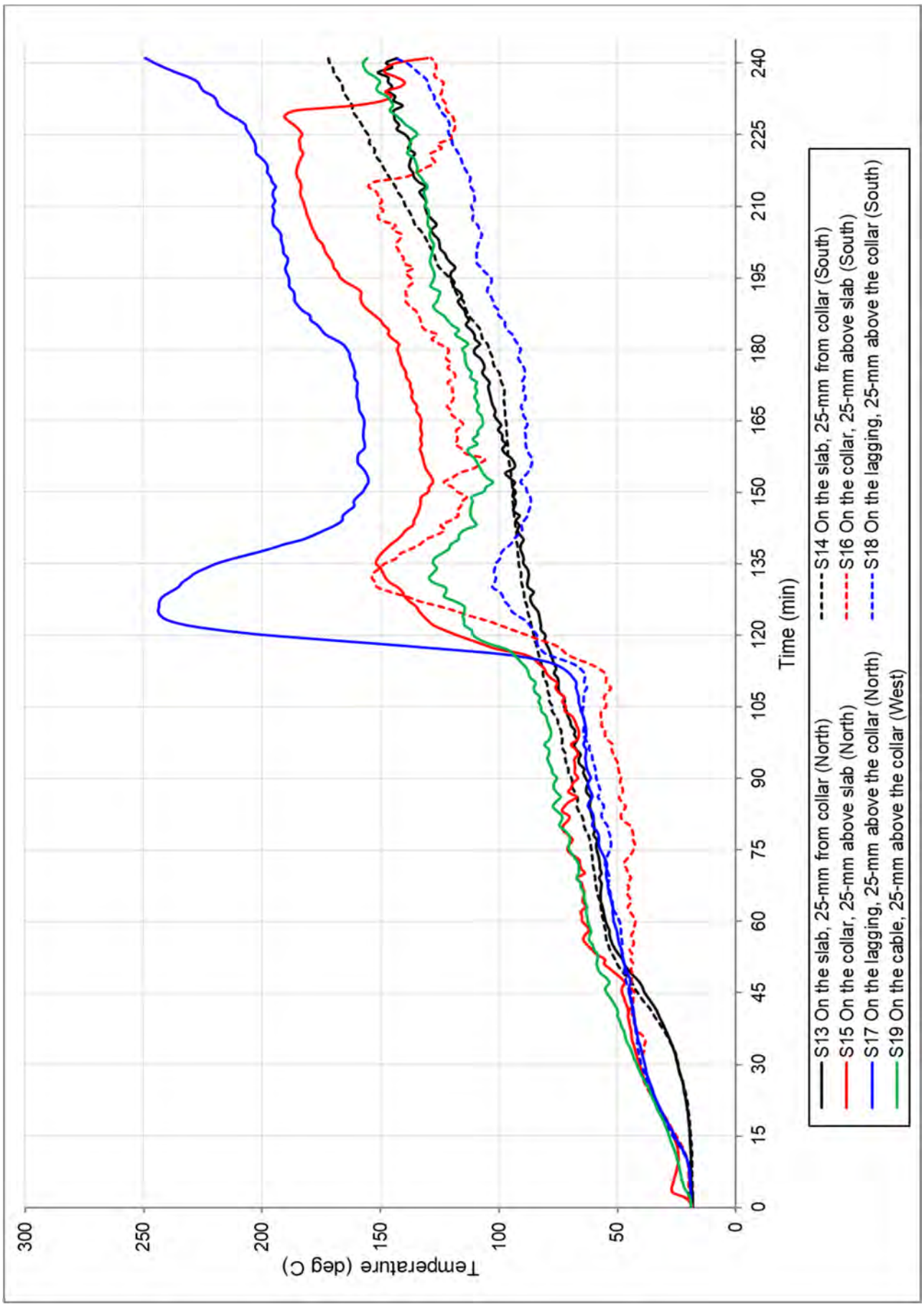


FIGURE 5 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 3

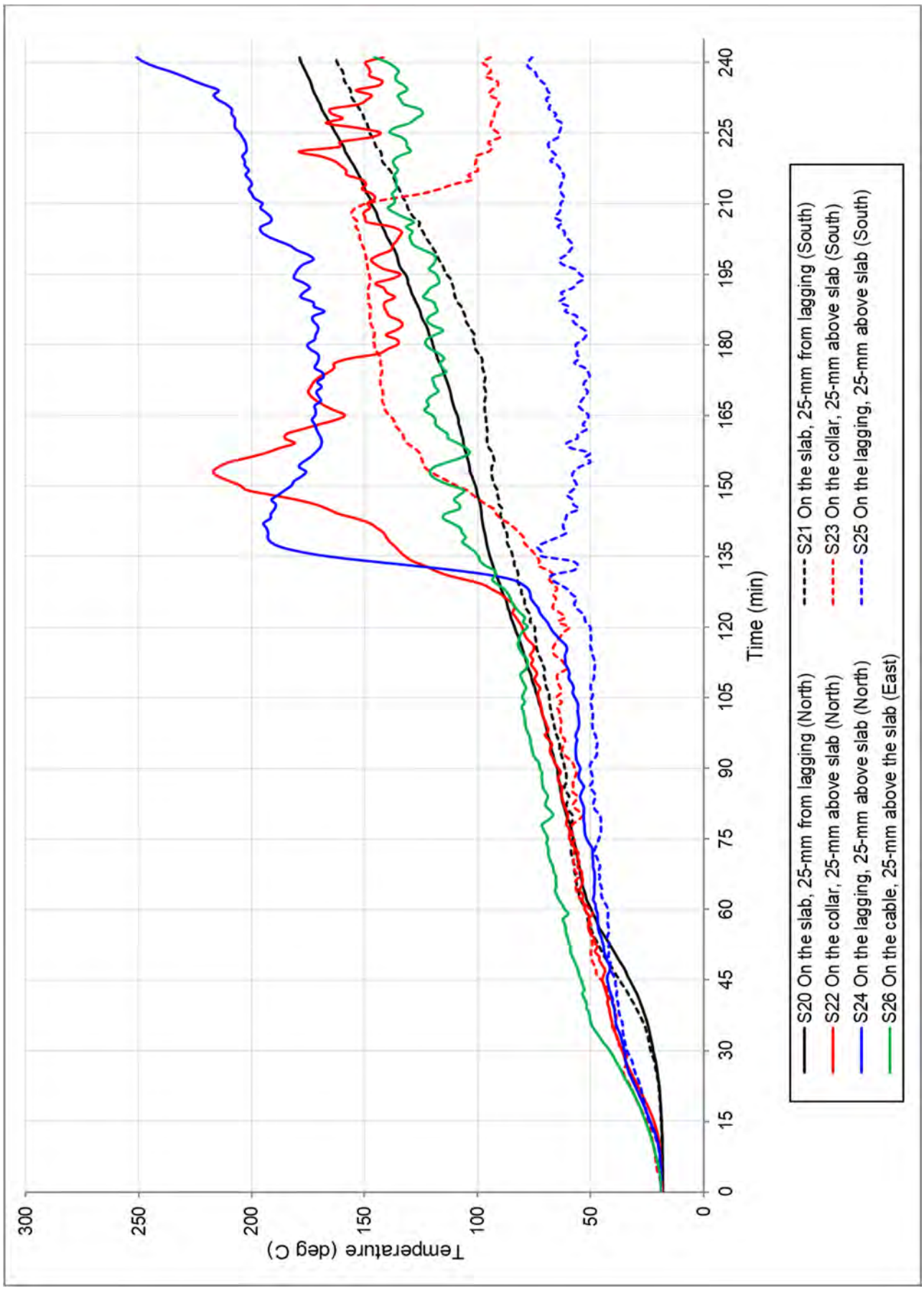


FIGURE 6 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 4

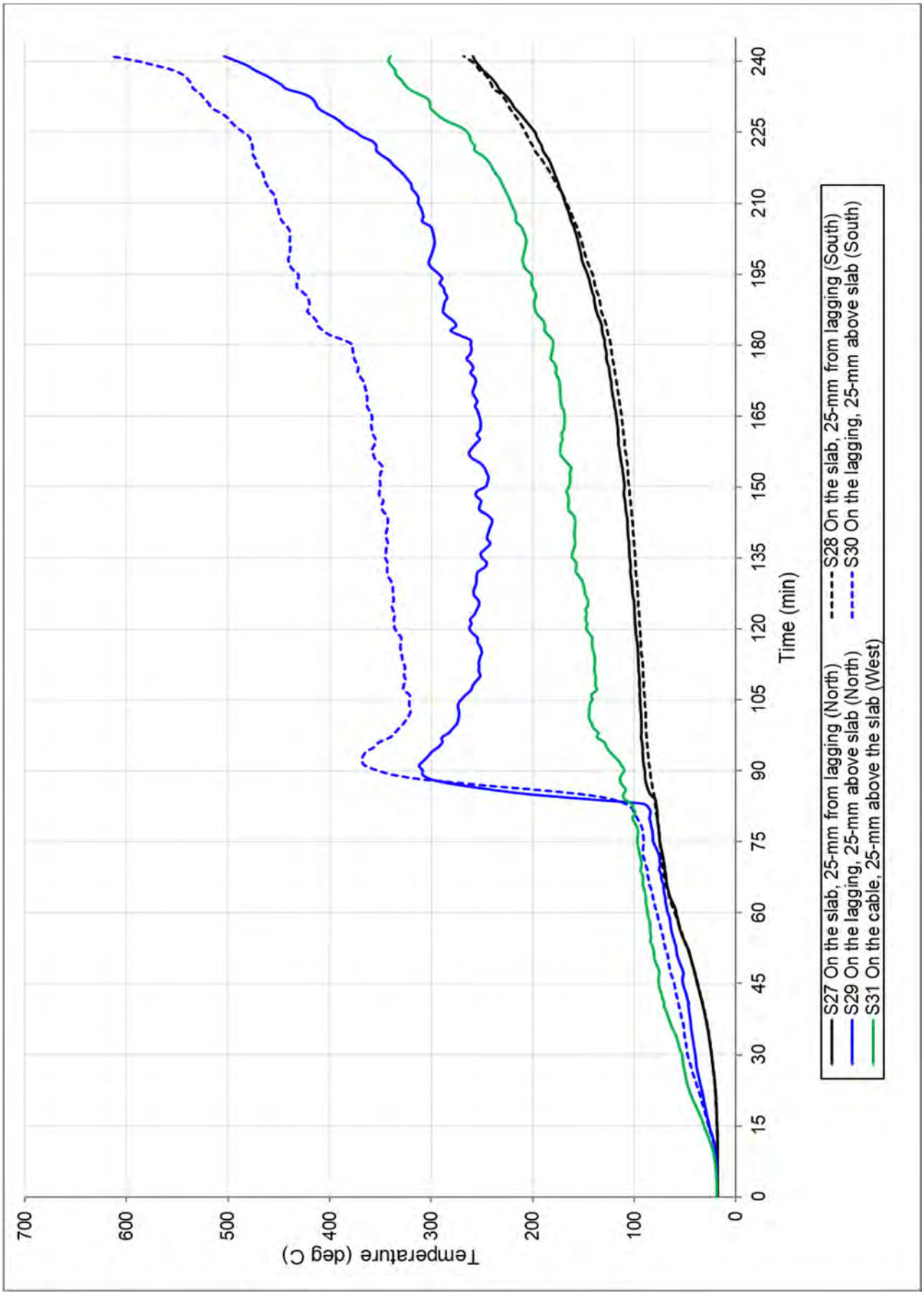


FIGURE 7 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 5

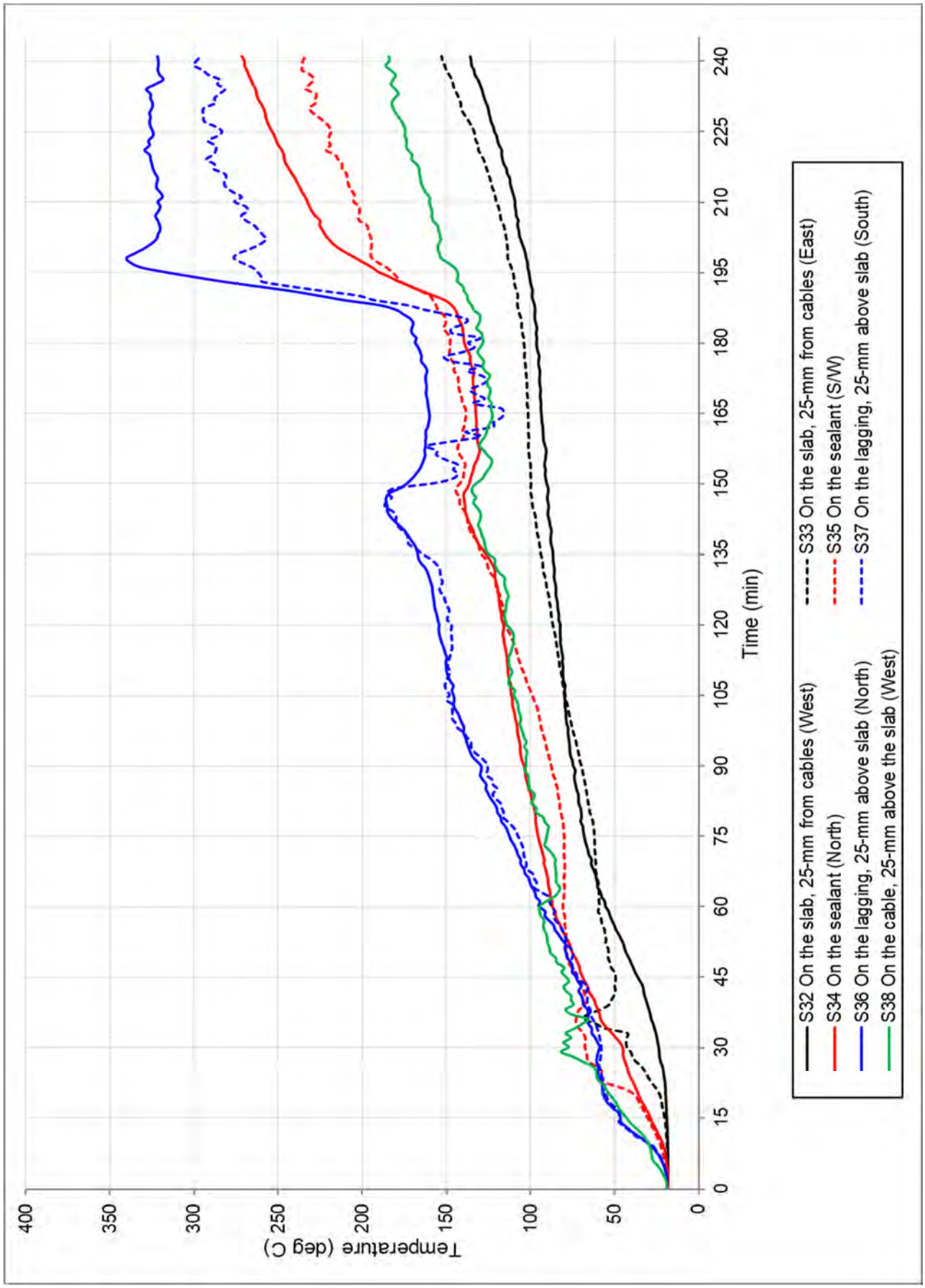


FIGURE 8 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 6

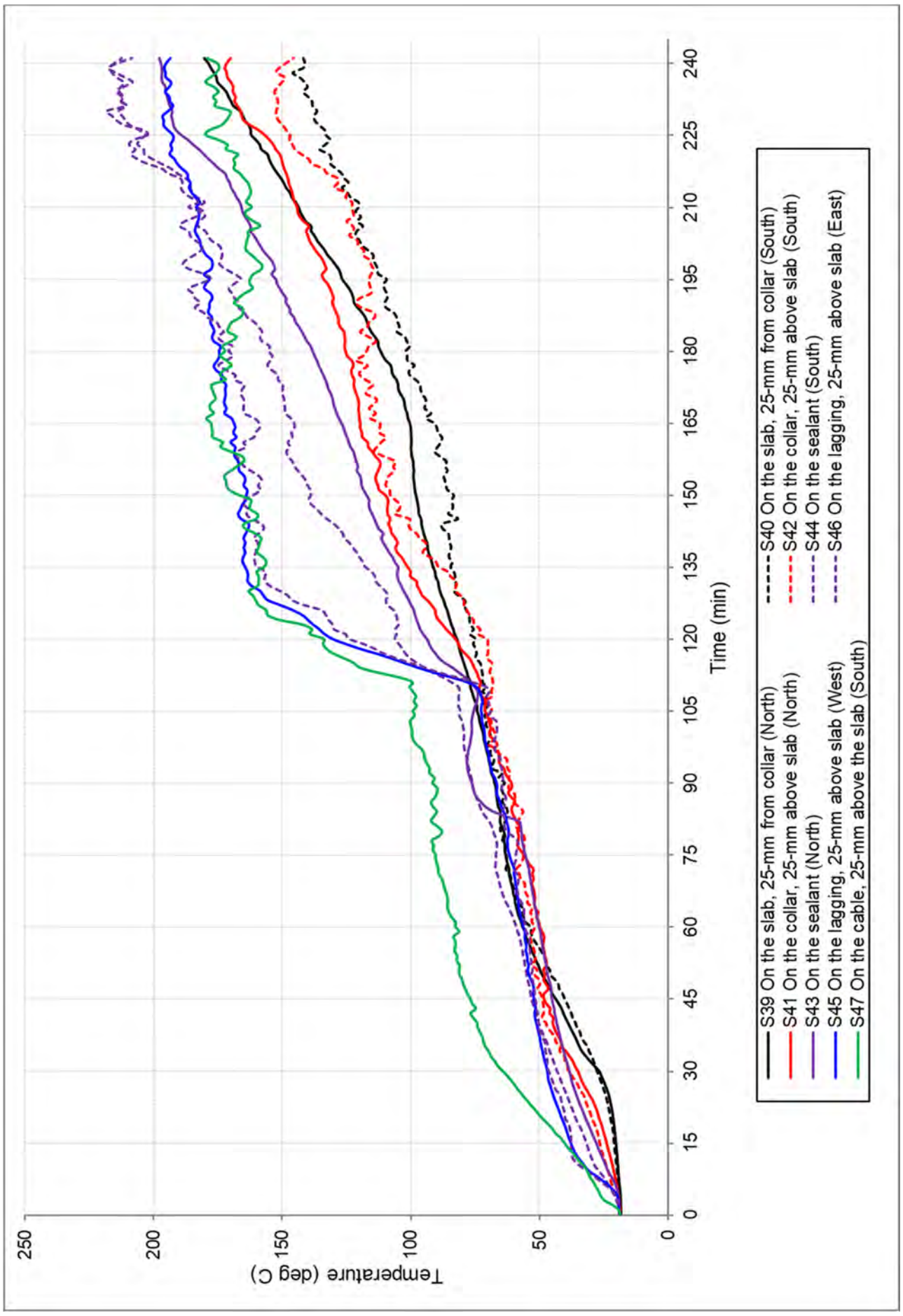


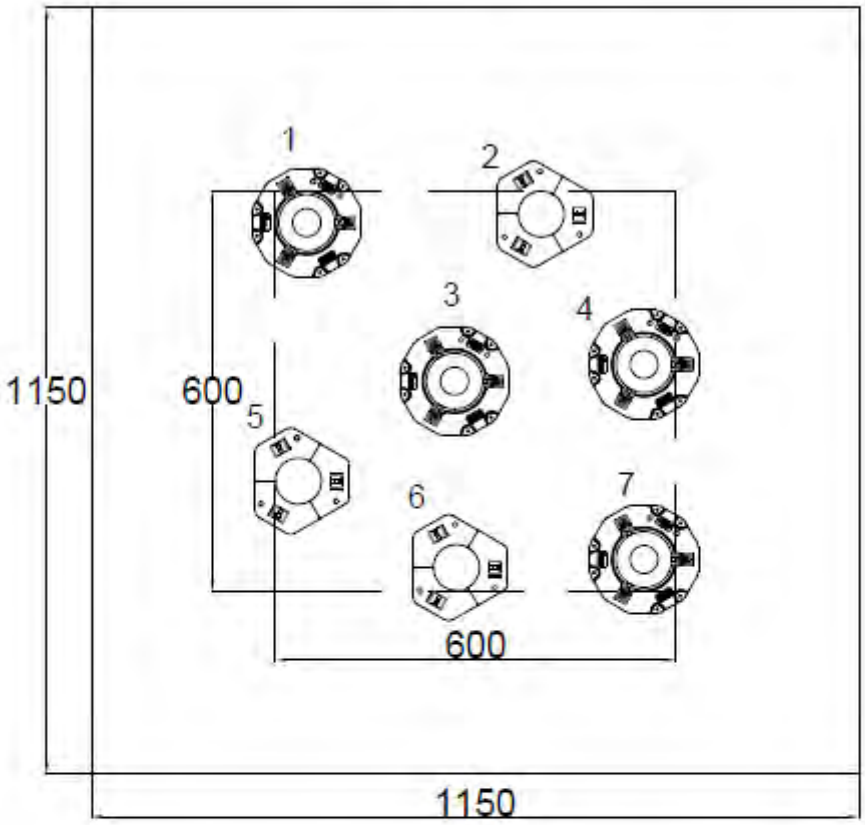
FIGURE 9 – SPECIMEN TEMPERATURE – ASSOCIATED WITH SPECIMEN 7

Appendix D – Installation drawings

Snap Fire Systems Pty Ltd

Test Slab S-21-E Layout

Date: 20 APR 2021



Penetration	Collar Code	Pipe Type	Pipe Diameter
1	MS70C	Copper Tube w/ F/R Lagging and TPS Cable	1in(19mm Lagging) & 2.5mm² 3C
2	MS70R	Copper Tube w/ F/R Lagging and TPS Cable	1in(19mm Lagging) & 2.5mm² 3C
3	MS70C	Copper Tube w/ F/R Lagging and TPS Cable	1in(19mm Lagging) & 2.5mm² 3C
4	MS70C	Copper Tube w/ F/R Lagging and TPS Cable	1in(19mm Lagging) & 2.5mm² 3C
5	MS70R	Copper Tube w/ F/R Lagging and TPS Cable	1in(19mm Lagging) & 2.5mm² 3C
6	MS70R	Copper Tube w/ F/R Lagging and TPS Cable	¾in(9mm Lagging) & 2.5mm² 3C
7	MS70C	Copper Tube w/ F/R Lagging and TPS Cable	¾in(9mm Lagging) & 2.5mm² 3C

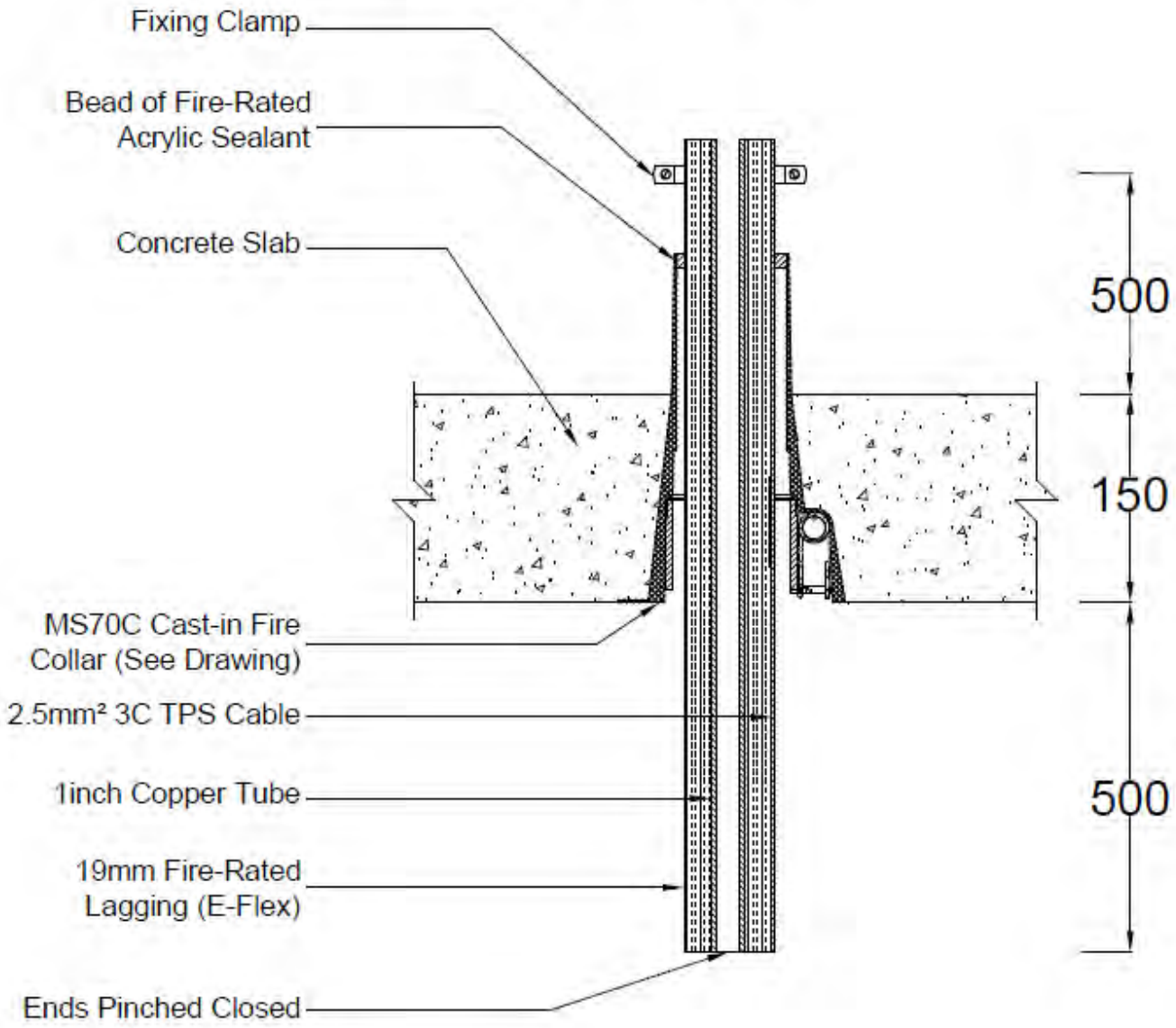
DRAWING TITLED "TEST SLAB S-21-E LAYOUT", DATED 20 APRIL 2021, BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #1

1inch Copper Tube with 19mm Fire-Rated Lagging (E-Flex), 2.5mm² 3C TPS Cable & MS70C

Date: 24 AUG 2021



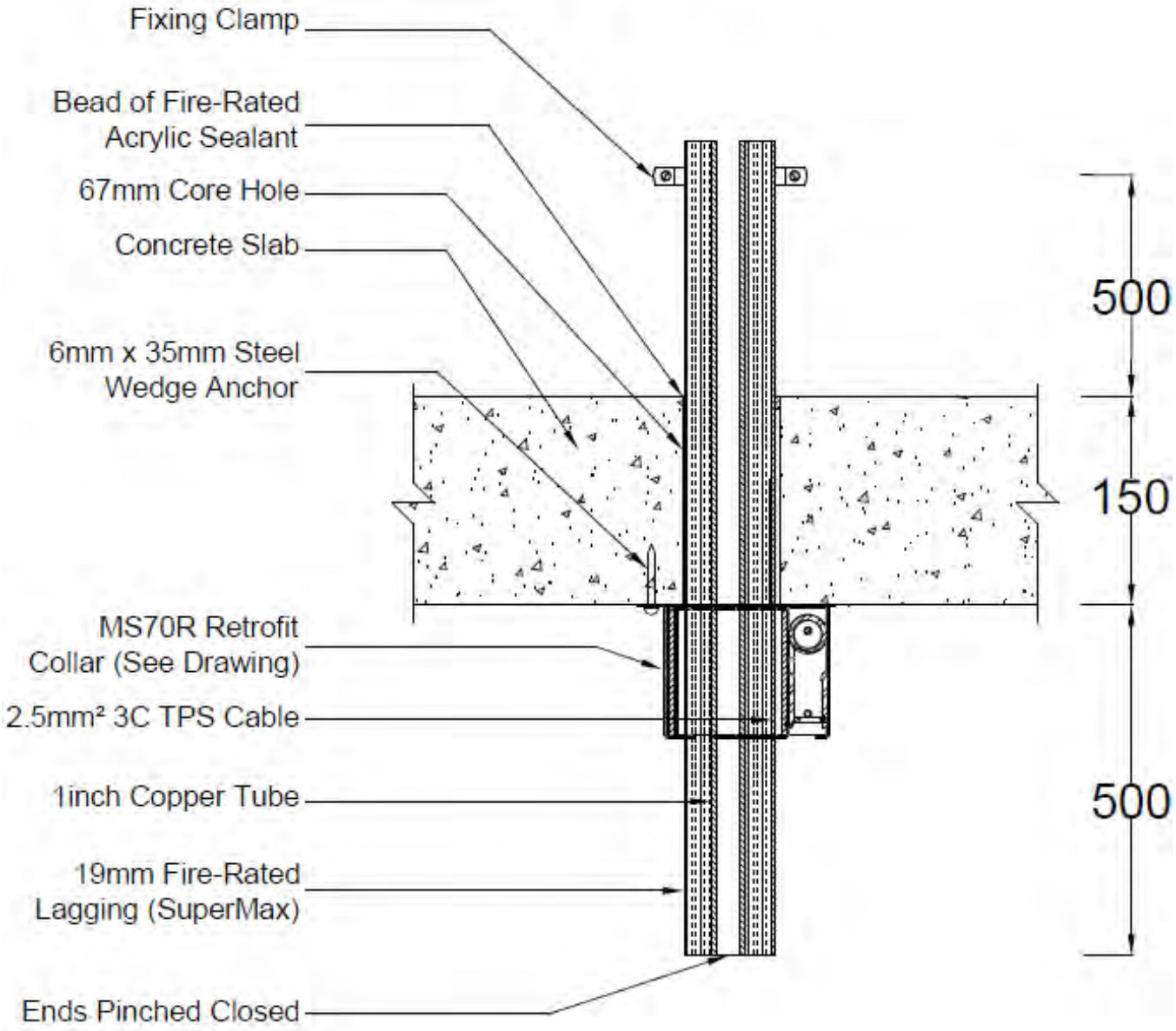
DRAWING TITLED 'SPECIMEN #1, 1INCH COPPER TUBE WITH 19MM FIRE-RATED LAGGING (E-FLEX), 2.5MM² 3C TPS CABLE & MS70C', DATED 24 AUGUST 2021 BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #2

1inch Copper Tube with 19mm Fire-Rated Lagging (SuperMax), 2.5mm² 3C TPS Cable & MS70R

Date: 24 AUG 2021



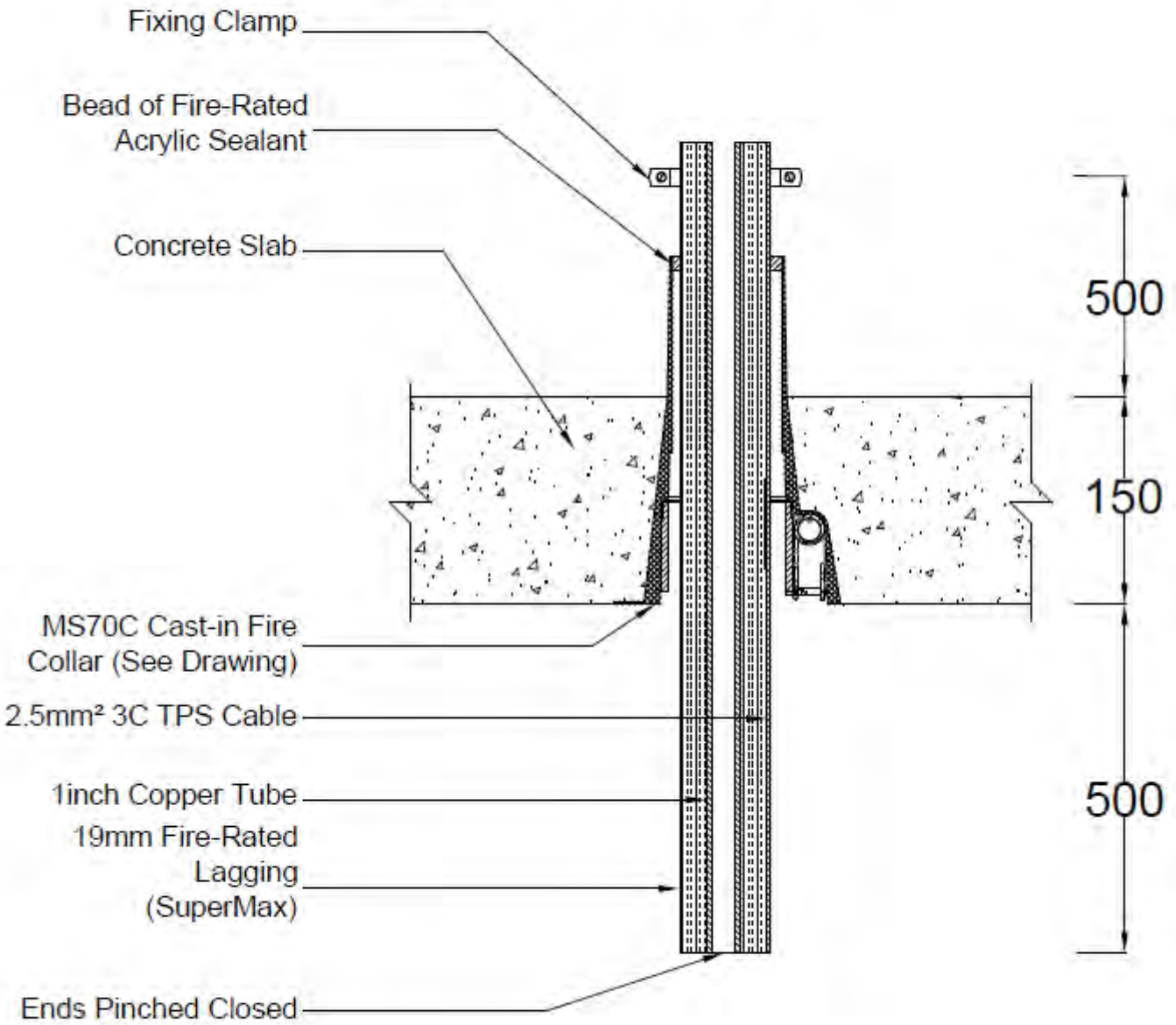
DRAWING TITLED 'SPECIMEN #2, 1INCH COPPER TUBE WITH 19MM FIRE-RATED LAGGING (SUPERMAX), 2.5MM² 3C TPS CABLE & MS70R', DATED 24 AUGUST 2021 BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #3

1inch Copper Tube with 19mm Fire-Rated Lagging (SuperMax), 2.5mm² 3C TPS Cable & MS70C

Date: 24 AUG 2021



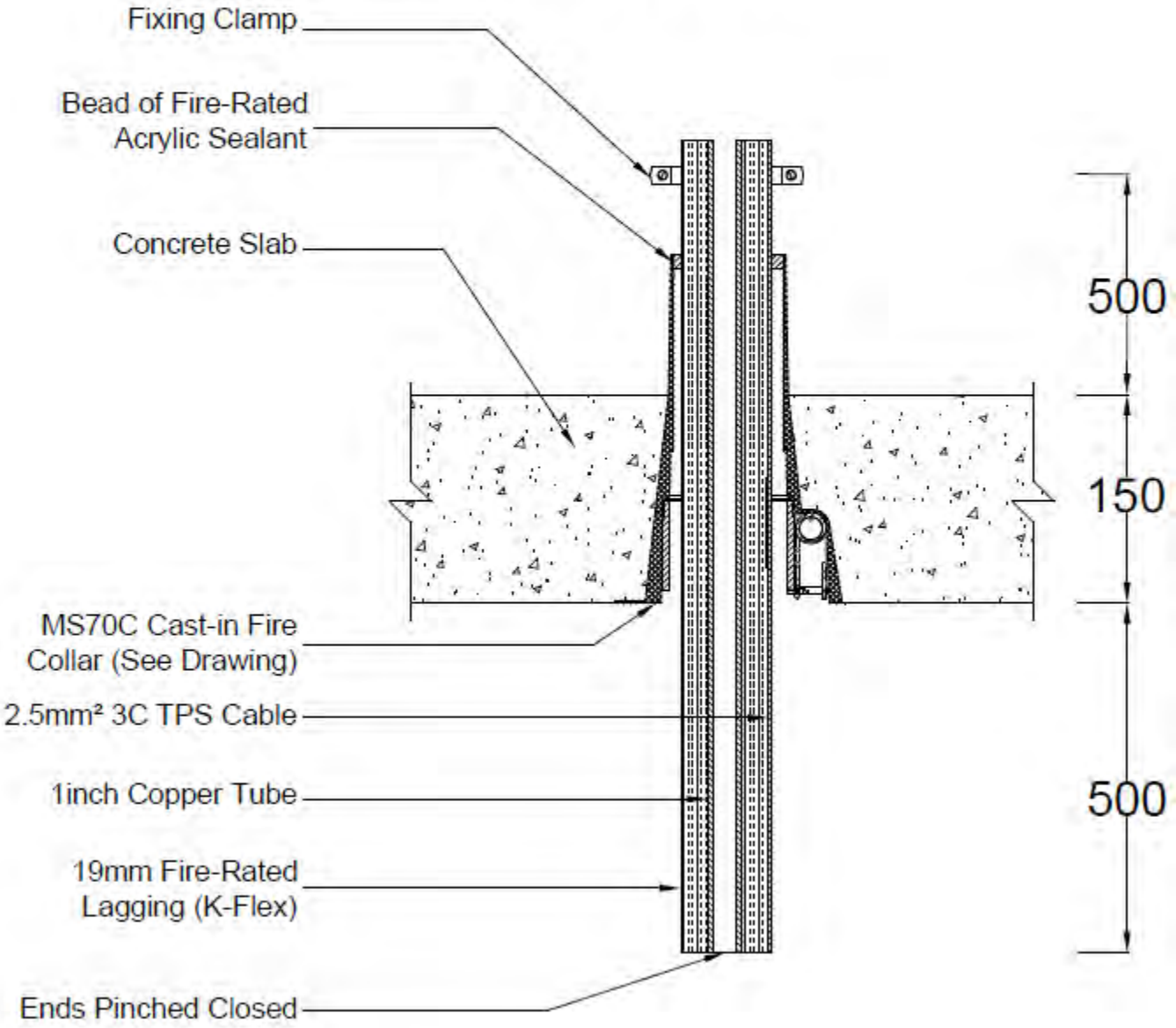
DRAWING TITLED 'SPECIMEN #3, 1INCH COPPER TUBE WITH 19MM FIRE-RATED LAGGING (SUPERMAX), 2.5MM² 3C TPS CABLE & MS70C', DATED 24 AUGUST 2021 BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #4

1inch Copper Tube with 19mm Fire-Rated Lagging (K-Flex), 2.5mm² 3C TPS Cable & MS70C

Date: 24 AUG 2021



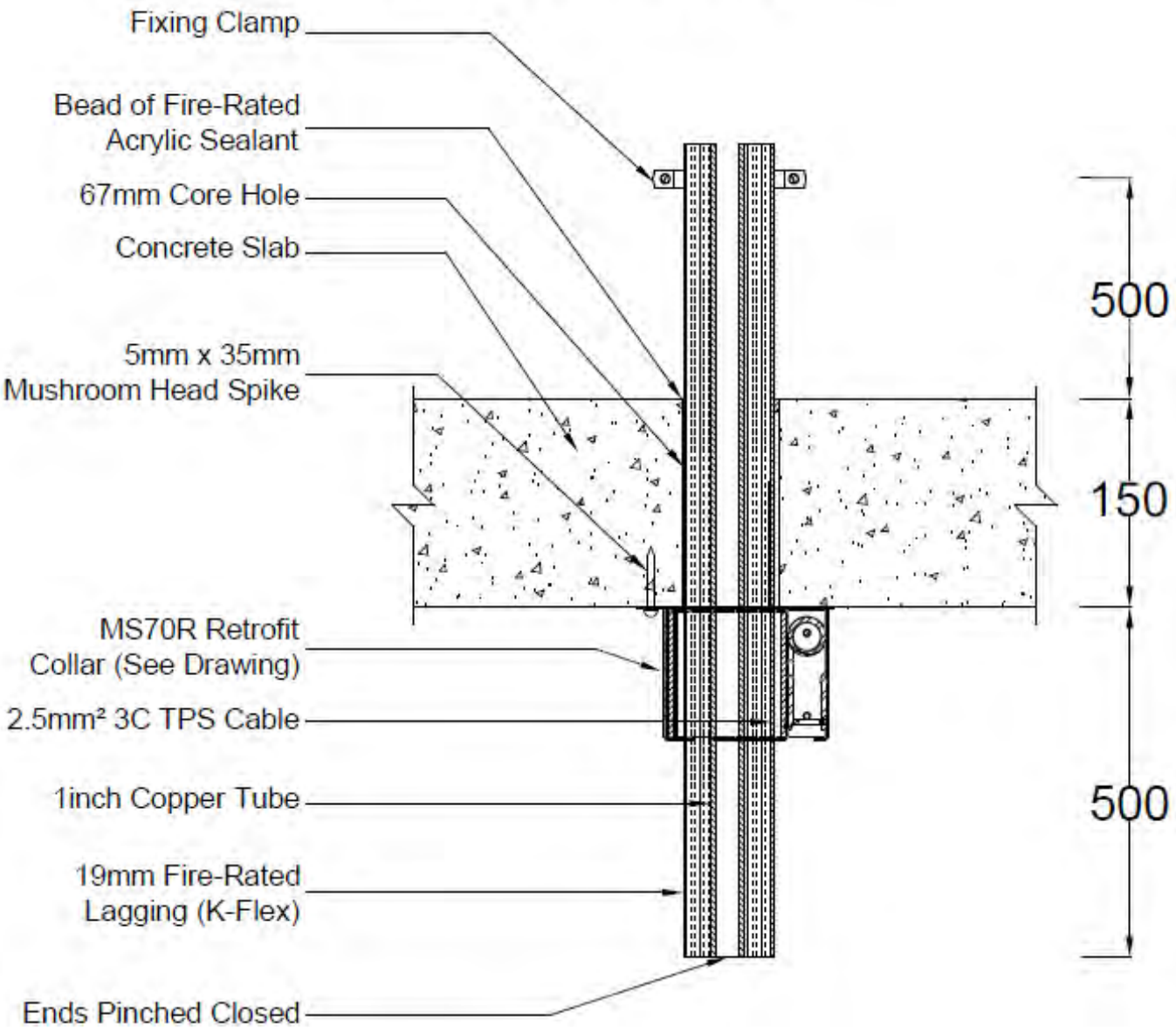
DRAWING TITLED 'SPECIMEN #4 1INCH COPPER TUBE WITH 19MM FIRE-RATED LAGGING (K-FLEX), 2.5MM² 3C TPS CABLE & MS70C', DATED 24 AUGUST 2021 BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #5

1inch Copper Tube with 19mm Fire-Rated Lagging (K-Flex), 2.5mm² 3C TPS Cable & MS70R

Date: 24 AUG 2021



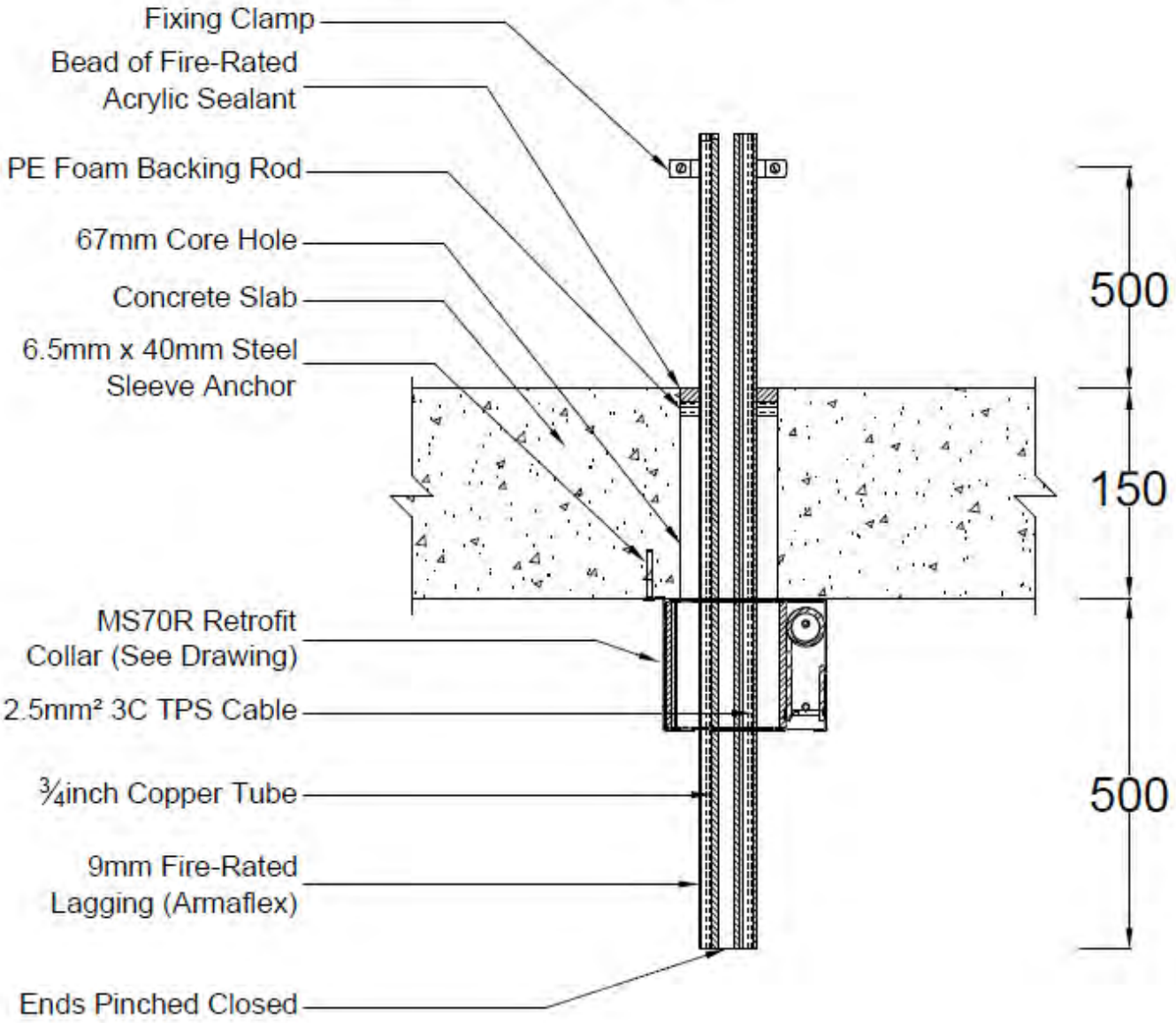
DRAWING TITLED 'SPECIMEN #5, 1INCH COPPER TUBE WITH 19MM FIRE-RATED LAGGING (K-FLEX), 2.5MM² 3C TPS CABLE & MS70R', DATED 24 AUGUST 2021 BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #6

¾inch Copper Tube with 9mm Fire-Rated Lagging (Armaflex), 2.5mm² 3C TPS Cable & MS70R

Date: 24 AUG 2021



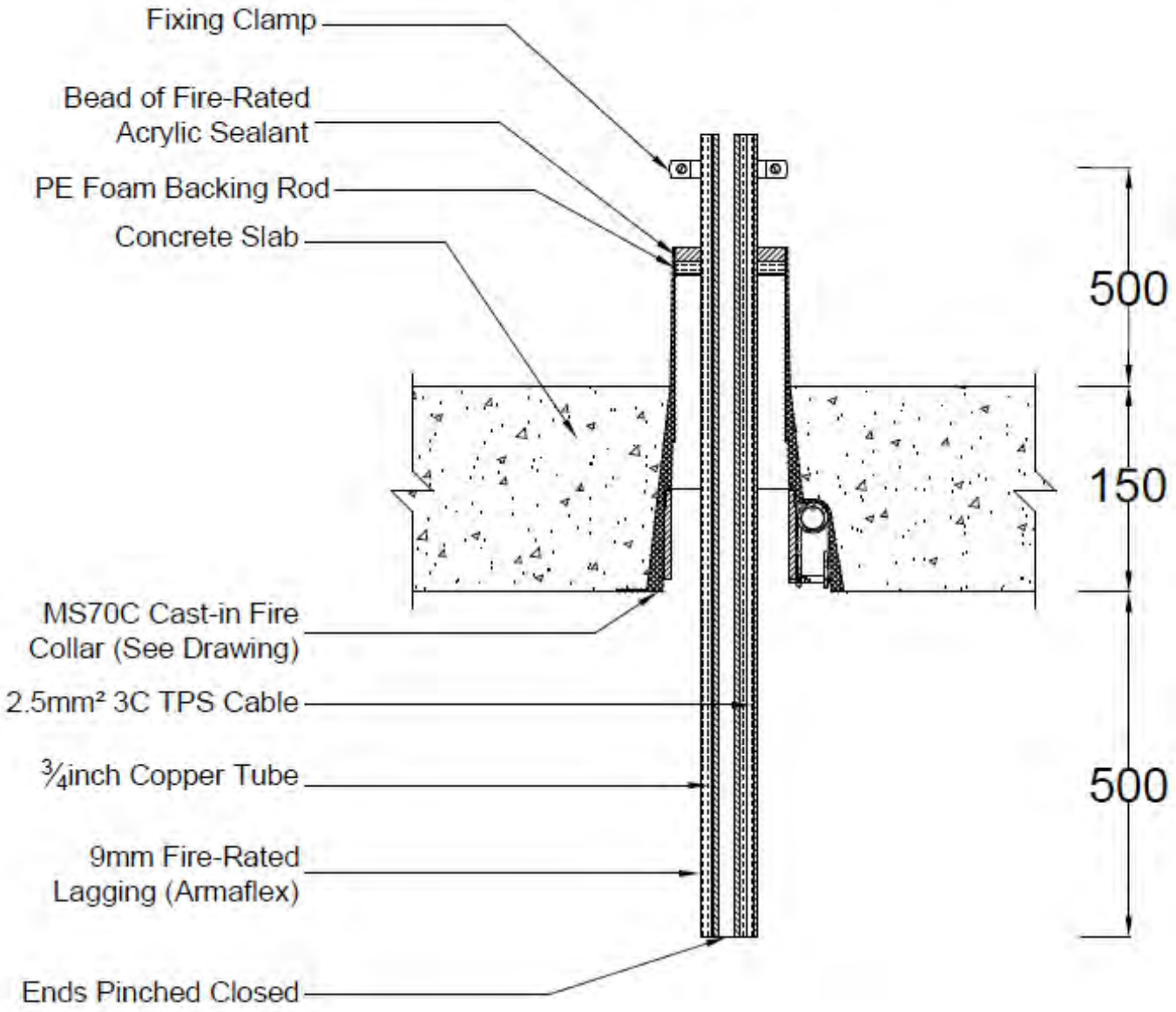
DRAWING TITLED 'SPECIMEN #6, ¾ INCH COPPER TUBE WITH 9MM FIRE-RATED LAGGING (ARMAFLEX), 2.5MM² 3C TPS CABLE & MS70R', DATED 24 AUGUST 2021 BY SNAP FIRE SYSTEMS PTY LTD

Snap Fire Systems Pty Ltd

Specimen #7

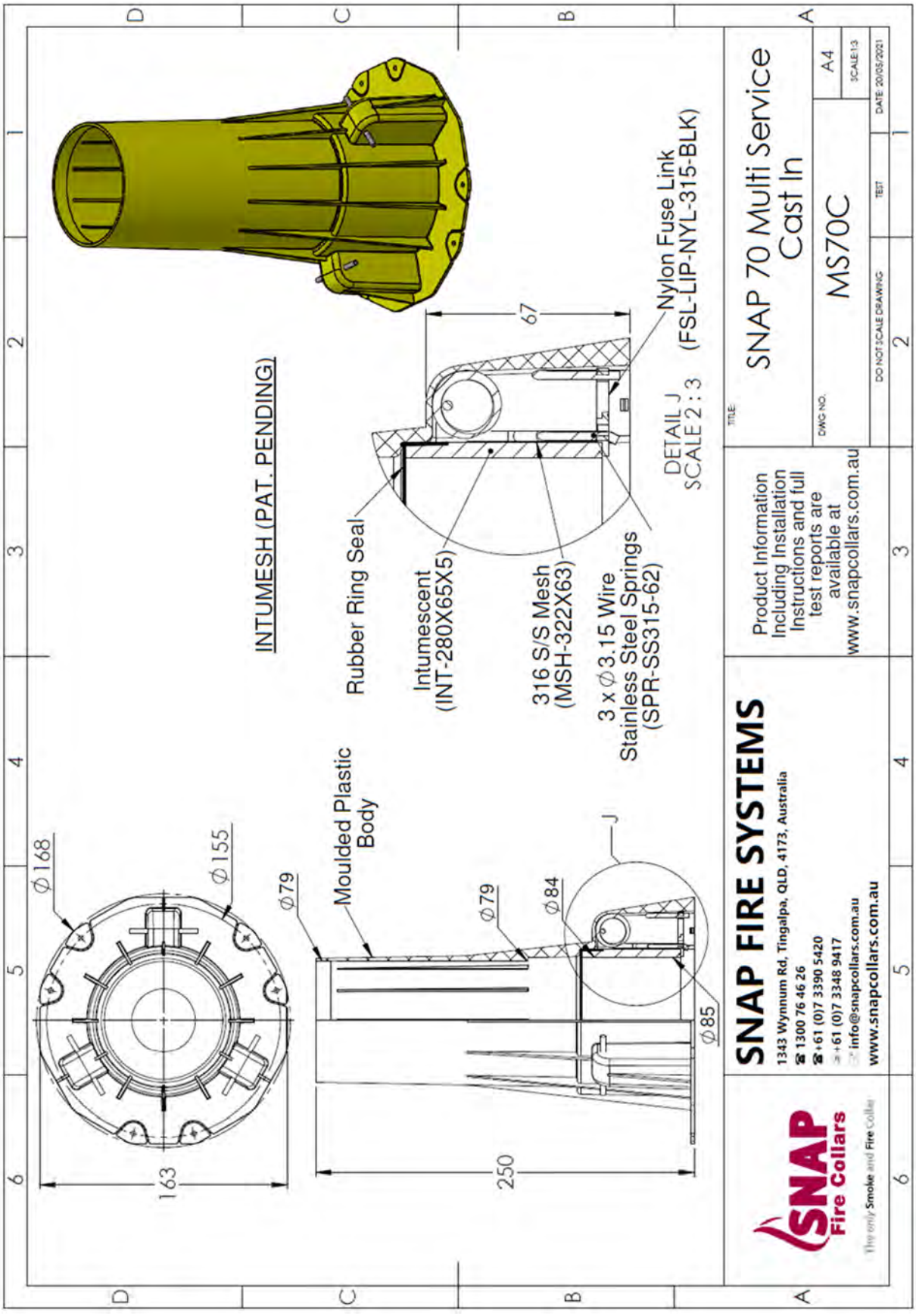
¾inch Copper Tube with 9mm Fire-Rated Lagging (Armaflex), 2.5mm² 3C TPS Cable & MS70C

Date: 24 AUG 2021



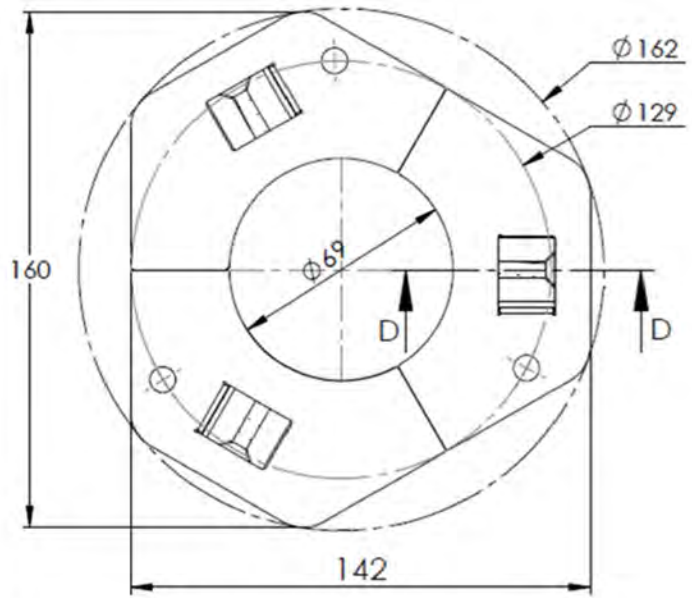
DRAWING TITLED 'SPECIMEN #7, ¾ INCH COPPER TUBE WITH 9MM FIRE-RATED LAGGING (ARMAFLEX), 2.5MM² 3C TPS CABLE & MS70R', DATED 24 AUGUST 2021 BY SNAP FIRE SYSTEMS PTY LTD

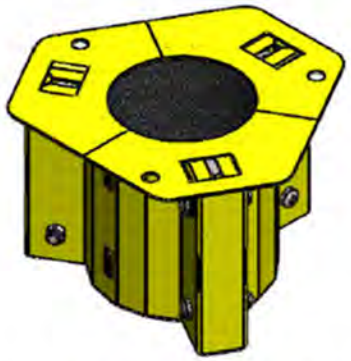
Appendix E – Specimen Drawings



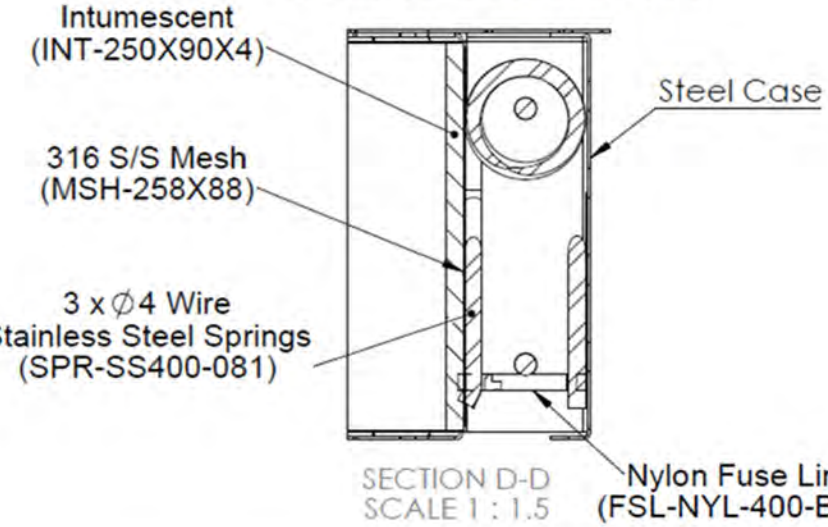
DRAWING TITLED 'SNAP 70 MULTI SERVICE CAST IN', DATED 20 MAY 2021, BY SNAP FIRE SYSTEMS PTY LTD

DRAWING TITLED 'SNAP 70 MULTI SERVICE RETRO', DATED 23 SEPTEMBER 2019, BY SNAP FIRE SYSTEMS P/L





INTUMESH (PAT. PENDING)



SECTION D-D
SCALE 1 : 1.5

SNAP FIRE SYSTEMS
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TITLE: SNAP 70 Multi Service Retro

DWG NO. MS70R | A4 | SCALE:1:2

DO NOT SCALE DRAWING | TEST | DATE: 23/09/19

Appendix F – Certificate(s) of Test

INFRASTRUCTURE TECHNOLOGIES
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14 Julius Avenue, North Ryde NSW 2113
PO Box 52, North Ryde NSW 1670, Australia
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Certificate of Test

No. 3631

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
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 2231.

Product Name: SNAP MS70C Multi Service cast-in fire collar protecting a DN25 copper pipe with 19 mm thick E-Flex fire-rated lagging and a 2.5-mm² 3-core TPS power cable (Specimen 1)

Description: The specimen comprised an 1150-mm x 1150-mm x 150-mm thick concrete slab penetrated by multiple services protected by four cast-in collars and three retrofit fire collars. 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. Specimen 1 is the subject of this Certificate. The SNAP MS70C Multi Services cast-in fire collar comprised a 1.6-mm thick polypropylene casing with a 79 mm inner diameter and a 168-mm outer diameter base flange. The 250-mm high collar casing incorporated a 280-mm x 65-mm x 5-mm thick intumesh intumescent material and a rubber ring seal. The closing mechanism comprised three stainless-steel springs bound with nylon fuse links and a 322-mm x 63-mm 316 stainless steel mesh. The MS70C collar was cast into a 150-mm thick concrete slab with the collar's casing projecting 100 mm vertically above the unexposed face. The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm² TPS power cable. The Brasshards type B copper pipe had a 25.4-mm (1-inch) outside diameter, a wall thickness of 1.22 mm and was lagged with 19-mm thick E-Flex ST nitrile foam insulation. The lagged pipe and cable were fitted through the MS70C collar's sleeve and penetrated the concrete slab. The lagged pipe and cable projected vertically 550-mm above the concrete slab and approximately 500 mm below into the furnace chamber. The lagged pipe and cable were supported at 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable and top of the collar casing was filled with a 10-mm deep bead of H.B Fullers Firesound sealant. The Sponsor provided documents 'Test Slab S-21-E Layout', dated 20 April 2021, 'Specimen #1 1inch Copper Tube with 19mm Fire-rated Lagging (E-Flex), 2.5mm² 3C TPS Cable & MS70C', dated 24 August 2021 and 'SNAP 70 Multi Service Cast-In', dated 20 May 2021 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	-	no failure at 241 minutes
Insulation	-	81 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/60.

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. 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: 2 September 2021

Issued on the 2nd day of November 2021 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. 3631

INFRASTRUCTURE TECHNOLOGIES
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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. 3632

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
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 2231.

Product Name: SNAP MS70R Multi Service Retrofit fire collar protecting a DN25 copper pipe with 19 mm thick SuperMax fire-rated lagging and a 2.5-mm² 3-core TPS power cable penetrating a 67 mm diameter aperture (Specimen 2)

Description: The specimen comprised an 1150-mm x 1150-mm x 150-mm thick concrete slab penetrated by multiple services protected by four cast-in collars and three retrofit fire collars. 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. Specimen 2 is the subject of this Certificate. The SNAP MS70R Multi Service Retrofit fire collar comprised a 0.75-mm thick steel casing with a 69-mm inner dia. and a 0.95-mm thick steel base flange with a 162-mm outer dia. The 95 mm high collar casing incorporated a 4-mm thick x 90-mm wide x 250-mm long soft Intumesh intumescent wrap lined within the internal circumference of the collar casing. The closing mechanism comprised three stainless steel springs, a nylon fuse link, and a 258-mm long x 88-mm wide 316 stainless steel mesh located around the intumescent strip. The MS70R collar was centrally located over a 67-mm core hole on the underside (exposed face) of the concrete slab and fixed through the 3 mounting brackets using 6.5-mm x 40-mm steel wedge anchors. The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm2 TPS power cable. The Brasshards type B copper pipe had a 25.4-mm (1-inch) outside dia., a wall thickness of 1.22 mm and was lagged with 19-mm thick SuperMax foam insulation. The lagged pipe and cable were fitted through the collar's sleeve and penetrated the concrete slab through a 67-mm dia. cut out hole. The lagged pipe and cable projected vertically 520-mm above the unexposed face of the concrete slab and approx. 500 mm below into the furnace chamber. The lagged pipe and cable were supported at 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable and the concrete slab was filled with a bead of H.B Fullers Firesound sealant. The Sponsor provided documents 'Test Slab S-21-E Layout', dated 20 April 2021, 'Specimen #2 1inch Copper Tube with 19mm Fire-rated Lagging (SuperMax), 2.5mm² 3C TPS Cable & MS70R', dated 24 August 2021 and 'SNAP 70 Multi Service Retro', dated 23 September 2019 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	-	no failure at 241 minutes
Insulation	-	115 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/90.

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. 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: 2 September 2021

Issued on the 2nd day of November 2021 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
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Certificate of Test

No. 3633

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
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 2231.

Product Name: SNAP MS70C Multi Service cast-in fire collar protecting a DN25 copper pipe with 19 mm thick SuperMax fire-rated lagging and a 2.5-mm² 3-core TPS power cable (Specimen 3)

Description: The specimen comprised an 1150-mm x 1150-mm x 150-mm thick concrete slab penetrated by multiple services protected by four cast-in collars and three retrofit fire collars. 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. Specimen 3 is the subject of this Certificate. The SNAP MS70C Multi Services cast-in fire collar comprised a 1.6-mm thick polypropylene casing with a 79 mm inner diameter and a 168-mm outer diameter base flange. The 250-mm high collar casing incorporated a 280-mm x 65-mm x 5-mm thick Intumesh intumescent material and a rubber ring seal. The closing mechanism comprised three stainless-steel springs bound with nylon fuse links and a 322-mm x 63-mm 316 stainless steel mesh. The MS70C collar was cast into a 150-mm thick concrete slab with the collar's casing projecting 100 mm vertically above the unexposed face. The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm2 TPS power cable. The Brasshards copper type B pipe had a 25.4-mm (1-inch) outside diameter, a wall thickness of 1.22 mm and was lagged with 19-mm thick Supermax FR. The lagged pipe and cable were fitted through the MS70C collar's sleeve and penetrated the concrete slab. The lagged pipe and cable projected vertically 550-mm above the concrete slab and approximately 500 mm below into the furnace chamber. The lagged pipe and cable were supported at 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable and top of the collar casing was filled with a 10-mm deep bead of H.B Fullers Firesound sealant. The Sponsor provided documents 'Test Slab S-21-E Layout', dated 20 April 2021, 'Specimen #3 1inch Copper Tube with 19mm Fire-rated Lagging (SuperMax), 2.5mm² 3C TPS Cable & MS70C', dated 24 August 2021 and 'SNAP 70 Multi Service Cast-In', dated 20 May 2021 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	-	no failure at 241 minutes
Insulation	-	120 minutes

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

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. 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: 2 September 2021

Issued on the 2nd day of November 2021 without alterations or additions.

Brett Roddy | Manager, Fire Testing and Assessments

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Certificate of Test

No. 3634

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
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 2231.

Product Name: SNAP MS70C Multi Service cast-in fire collar protecting a DN25 copper pipe with 19 mm thick K-Flex fire-rated lagging and a 2.5-mm² 3-core TPS power cable (Specimen 4)

Description: The specimen comprised an 1150-mm x 1150-mm x 150-mm thick concrete slab penetrated by multiple services protected by four cast-in collars and three retrofit fire collars. 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. Specimen 4 is the subject of this Certificate. The SNAP MS70C Multi Services cast-in fire collar comprised a 1.6-mm thick polypropylene casing with a 79 mm inner diameter and a 168-mm outer diameter base flange. The 250-mm high collar casing incorporated a 280-mm x 65-mm x 5-mm thick Intumesh intumescent material and a rubber ring seal. The closing mechanism comprised three stainless-steel springs bound with nylon fuse links and a 322-mm x 63-mm 316 stainless steel mesh. The MS70C collar was cast into a 150-mm thick concrete slab with the collar's casing projecting 100 mm vertically above the unexposed face. The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm2 TPS power cable. The Brasshards copper type B pipe had a 25.4-mm (1-inch) outside diameter, a wall thickness of 1.22 mm and was lagged with 19-mm thick K-Flex ST nitrile foam insulation. The lagged pipe and cable were fitted through the MS70C collar's sleeve and penetrated the concrete slab. The lagged pipe and cable projected vertically 550-mm above the concrete slab and approximately 500 mm below into the furnace chamber. The lagged pipe and cable were supported at 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable and top of the collar casing was filled with a 10-mm deep bead of H.B Fullers Firesound sealant. The Sponsor provided documents 'Test Slab S-21-E Layout', dated 20 April 2021, 'Specimen #4 1inch Copper Tube with 19mm Fire-rated Lagging (K-Flex), 2.5mm² 3C TPS Cable & MS70C', dated 24 August 2021 and 'SNAP 70 Multi Service Cast-In', dated 20 May 2021 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	-	no failure at 241 minutes
Insulation	-	134 minutes

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

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. 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: 2 September 2021

Issued on the 2nd day of November 2021 without alterations or additions.

Brett Roddy | Manager, Fire Testing and Assessments

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Certificate of Test

No. 3635

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
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 2231.

Product Name: SNAP MS70R Multi Service Retrofit fire collar protecting a DN25 copper pipe with 19-mm thick K-Flex ST fire-rated lagging and a 2.5-mm² 3-core TPS power cable penetrating a 67 mm diameter aperture (Specimen 5)

Description: The specimen comprised an 1150-mm x 1150-mm x 150-mm thick concrete slab penetrated by multiple services protected by four cast-in collars and three retrofit fire collars. 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. Specimen 5 is the subject of this Certificate. The SNAP MS70R Multi Service Retrofit fire collar comprised a 0.75-mm thick steel casing with a 69-mm inner dia. and a 0.95-mm thick steel base flange with a 162-mm outer dia. The 95 mm high collar casing incorporated a 4-mm thick x 90-mm wide x 250-mm long soft Intumesh intumescent wrap lined within the internal circumference of the collar casing. The closing mechanism comprised three stainless steel springs, a nylon fuse link, and a 258-mm long x 88-mm wide 316 stainless steel mesh located around the intumescent strip. The MS70R collar was centrally located over a 67-mm core hole on the underside (exposed face) of the concrete slab and fixed through the 3 mounting brackets using 5-mm x 35-mm Mushroom Head Spikes. The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm2 TPS power cable. The Brasshards copper type B pipe had a 25.4-mm (1-inch) outside dia., a wall thickness of 1.22 mm and was lagged with 19-mm thick K-Flex ST foam insulation. The lagged pipe and cable were fitted through the MS70R collar's sleeve and penetrated the concrete slab through a 67-mm diameter cut-out hole. The lagged pipe and cable projected vertically approximately 550-mm above the concrete slab and 500 mm below into the furnace chamber. The lagged pipe and cable were supported at nominally 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable and the concrete slab was filled with a bead of H.B Fullers Firesound sealant. The Sponsor provided documents 'Test Slab S-21-E Layout', dated 20 April 2021, 'Specimen #5 1inch Copper Tube with 19mm Fire-rated Lagging (K-Flex), 2.5mm² 3C TPS Cable & MS70R', dated 24 August 2021 and 'SNAP 70 Multi Service Retro', dated 23 September 2019 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	-	no failure at 241 minutes
Insulation	-	85 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/60.

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. 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: 2 September 2021

Issued on the 2nd day of November 2021 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
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Certificate of Test

No. 3636

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
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 2231.

Product Name: SNAP MS70R Multi Service Retrofit fire collar protecting a DN20 copper pipe with 9-mm thick Armaflex fire-rated lagging and a 2.5-mm² 3-core TPS power cable penetrating a 67 mm diameter aperture (Specimen 6)

Description: The specimen comprised an 1150-mm x 1150-mm x 150-mm thick concrete slab penetrated by multiple services protected by four cast-in collars and three retrofit fire collars. 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. Specimen 6 is the subject of this Certificate. The SNAP MS70R Multi Service Retrofit fire collar comprised a 0.75-mm thick steel casing with a 69-mm inner dia. and a 0.95-mm thick steel base flange with a 162-mm outer dia. The 95 mm high collar casing incorporated a 4-mm thick x 90-mm wide x 250-mm long soft Intumesh intumescent wrap lined within the internal circumference of the collar casing. The closing mechanism comprised three stainless steel springs, a nylon fuse link, and a 258-mm long x 88-mm wide 316 stainless steel mesh located around the intumescent strip. The MS70R collar was centrally located over a 67-mm core hole on underside (exposed face) of concrete slab and fixed through 3 mounting brackets using 6-mm x 40-mm long steel sleeved anchors. Penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm2 TPS power cable. Brasshards copper type B pipe had a 19.05-mm (¾-inch) outside dia., a wall thickness of 1.02 mm and was lagged with 9-mm thick Armaflex FRV nitrile rubber. Prysmian power cable was located on outside of lagging. Lagged pipe and cable were fitted through MS70R collar's sleeve and penetrated concrete slab through a 67-mm dia. cut-out hole. Lagged pipe and cable projected vertically approx. 550-mm above concrete slab and 500 mm below into furnace chamber. Lagged pipe and cable were supported at nom. 500-mm above unexposed face of concrete slab. Copper pipe was left open on unexposed face and crimped closed on exposed end. On unexposed face the annular gap between pipe, cable and concrete slab incorporated a PE backing rod and backfilled with a 10-mm deep bead of H.B Fullers Firesound sealant. The Sponsor provided documents 'Test Slab S-21-E Layout', dated 20 April 2021, 'Specimen #6 ¾inch Copper Tube with 9mm Fire-rated Lagging (Armaflex), 2.5mm² 3C TPS Cable & MS70R', dated 24 August 2021 and 'SNAP 70 Multi Service Retro', dated 23 September 2019 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	-	no failure at 241 minutes
Insulation	-	189 minutes

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

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. 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: 2 September 2021

Issued on the 2nd day of November 2021 without alterations or additions.

Brett Roddy | Manager, Fire Testing and Assessments

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Certificate of Test

No. 3637

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
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 2231.

Product Name: SNAP MS70C Multi Service cast-in fire collar protecting a DN20 copper pipe with 9 mm thick Armaflex fire-rated lagging and a 2.5-mm² 3-core TPS power cable (Specimen 7)

Description: The specimen comprised an 1150-mm x 1150-mm x 150-mm thick concrete slab penetrated by multiple services protected by four cast-in collars and three retrofit fire collars. 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. Specimen 7 is the subject of this Certificate. The SNAP MS70C Multi Services cast-in fire collar comprised a 1.6-mm thick polypropylene casing with a 79 mm inner diameter and a 168-mm outer diameter base flange. The 250-mm high collar casing incorporated a 280-mm x 65-mm x 5-mm thick Intumesh intumescent material and a rubber ring seal. The closing mechanism comprised three stainless-steel springs bound with nylon fuse links and a 322-mm x 63-mm 316 stainless steel mesh. The MS70C collar was cast into a 150-mm thick concrete slab with the collar's casing projecting 100 mm vertically above the unexposed face. The penetrating service comprised a lagged copper pipe and a Prysmian 3-core 2.5-mm2 TPS power cable. The Brasshards copper type B pipe had a 19.05-mm (¾-inch) outside diameter, a wall thickness of 1.02 mm and was lagged with 9-mm thick Armaflex FRV nitrile foam rubber insulation. The lagged pipe and cable were fitted through the MS70C collar's sleeve and penetrated the concrete slab. The lagged pipe and cable projected vertically 550-mm above the concrete slab and approximately 500 mm below into the furnace chamber. The lagged pipe and cable were supported at 500-mm above the unexposed face of the concrete slab. The copper pipe was left open on the unexposed face and crimped closed on the exposed end. On the unexposed face the annular gap between the pipe, cable, and the top of the collar casing incorporated a PE backing rod and backfilled with a 10-mm deep bead of H.B Fullers Firesound sealant. The Sponsor provided documents 'Test Slab S-21-E Layout', dated 20 April 2021, 'Specimen #7 ¾inch Copper Tube with 9mm Fire-rated Lagging (Armaflex), 2.5mm² 3C TPS Cable & MS70C', dated 24 August 2021 and 'SNAP 70 Multi Service Cast-In', dated 20 May 2021 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	-	no failure at 241 minutes
Insulation	-	219 minutes

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

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. 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: 2 September 2021

Issued on the 2nd day of November 2021 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. 3637

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.

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FOR FURTHER INFORMATION

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