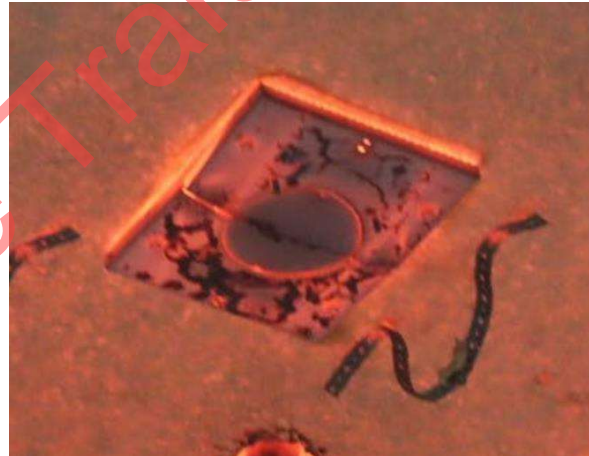


Foreword to the Fire Test Report

Foreword to the AS1530.4-2014 test report for the BladeRUNNER system

The BladeRUNNER was tested at the CSIRO on the 14th of November and the test report is attached below. There were numerous specimens tested including various prototypes of the retro fit floor waste collar. **Specimen 8 was the penetration system that used the current BladeRUNNER design.**

Images of specimen 8 from fire test FSP2317 – BladeRUNNER before and after the 4 hour fire test





Certificate of Test

No. 3762

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:

Trafalgar Group Pty Ltd
26A Fernfell Street
South Granville, NSW 2142

A full description of the test specimen and the complete test results are detailed in the Division's report FSP 2317.

Product Name: A Trafalgar 'Springbox – Blade with Intumescent' protecting a 100-mm diameter PVC pipe floor waste incorporating a P trap penetrating a 121-mm opening in the slab (Specimen 8)

Description: The specimen comprised an 1800-mm x 1800-mm x 150-mm thick concrete slab penetrated by nine service penetrations. For the purpose of the test, the specimens were referenced as specimens 1 to 9. Specimen 8 is the subject of this Certificate. The Trafalgar Springbox – Blade with intumescent was constructed from 1.1-mm mild steel plate and consisted of two symmetrical halves. Each half contained a baseplate measuring 140-mm wide x 120-mm long x 20-mm high. The top side of the baseplate contained a blade measuring 154-mm width x 69-mm length, with a 15-mm height flange. Each blade was lined with a Trafalgar Intumescent strip (730-kg/m³) measuring 55-mm wide x 150-mm long x 10-mm thick fitted with double sided tape. The blade was held into place with a 12-mm wide x 10-mm high x 137-mm long angles secured to the baseplate at the front by two 4-mm steel rivets and at the rear with two M5 x 20-mm press studs. Each blade contained a tensioned spring secured to the baseplate with the blade being pulled back to the rear and the blade held into place with 3.6-mm wide x 1.4-mm thick plastic cable ties as shown in drawing "Springbox – Blade with intumescent" dated 18/10/2022, by Trafalgar Fire. The penetrating service comprised an Iplex Pipelines DWV uPVC pipe with a 110-mm outside diameter and a wall thickness of 3-mm which penetrated the concrete slab through a 121-mm opening. On the exposed side of the slab, the pipe was fitted with two halves of the Trafalgar Springbox (blade with intumescent) and secured to the concrete slab using four M6 x 50-mm masonry anchors as shown in drawing "CP34 V3" dated 17/10/2022, by Trafalgar Fire. On the exposed side of the slab, a PVC P-trap was connected to the penetrating pipe with a coupling. The P-trap was fitted with a PVC end cap and supported on the exposed face with 30-mm wide steel strapping fixed to the concrete slab using two M6 x 50-mm masonry anchors. The trap was charged with 1.5-L of water prior to testing. On the unexposed face of the slab a floor waste system was fitted with a polypropylene puddle flange, an acrylonitrile-butadiene-styrene base and a chrome plated brass grate. A 30-mm thick sand and cement screed was laid on top of the concrete slab and finished flush with the grate. The Sponsor provided drawings titled "CP34 V3", Drawings numbered 1 to 11, dated 17 October 2022, "CP34 Specimen Descriptions V2", "Springbox with Pyrosafe", dated 18 October 2022, "Springbox with Fyrecollar", dated 18 October 2022, "Springbox blade with Fyrecollar", dated 18 October 2022, and "Springbox – blade with intumescent", dated 18 October 2022, all by Trafalgar Head Office 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 241 minutes
Insulation	no failure 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 is applicable when the system is exposed to fire from the same direction as tested. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik

Date of Test: 13 October 2022

Issued on the 14th day of November 2022 without alterations or additions.



Brett Roddy | Manager, Fire Testing and Assessments

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Accreditation No. 165 – Corporate Site No. 3625
Accredited for compliance with ISO/IEC 17025 - Testing

COPY OF CERTIFICATE OF TEST NUMBERED 3762

Fire-resistance test on services penetrating a concrete slab

Test Report

Author: Shaw Tran
Report number: FSP 2317
Date: 14 November 2022

Client: Trafalgar Group Pty Ltd

Commercial-in-confidence

Inquiries should be addressed to:

Fire Testing and Assessments
NATA Registered Laboratory
14 Julius Avenue
North Ryde, NSW 2113
Telephone +61 2 9490 5444


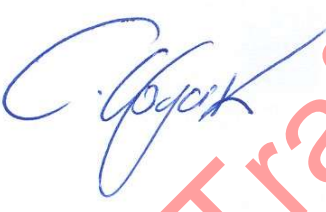

Author
Infrastructure Technologies
14 Julius Avenue
North Ryde, NSW 2113
Telephone +61 2 9490 5500

The Client
Trafalgar Group Pty Ltd
26A Ferndell Street
South Granville, NSW 2142
Telephone +61 1800 888 714

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AUTHOR	REVIEWED BY	AUTHORISED BY
Shaw Tran	Chris Wojcik	Brett Roddy
		
14 November 2022	14 November 2022	14 November 2022

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Property of the Trafalgar Group

Fire-resistance test on services penetrating a concrete slab

Sponsored Investigation No. FSP 2317

1 Introduction

1.1 Identification of specimen

The sponsor identified the test specimens as various retro-fit and cast-in fire collars protecting a 150-mm thick concrete floor slab penetrated by stack pipes and floor wastes.

1.2 Sponsor

Trafalgar Group Pty Ltd
26A Ferndell Street
South Granville, NSW 2142

1.3 Manufacturer

Trafalgar Group Pty Ltd
26A Ferndell Street
South Granville NSW 2142

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 5211/4798

1.7 Test date

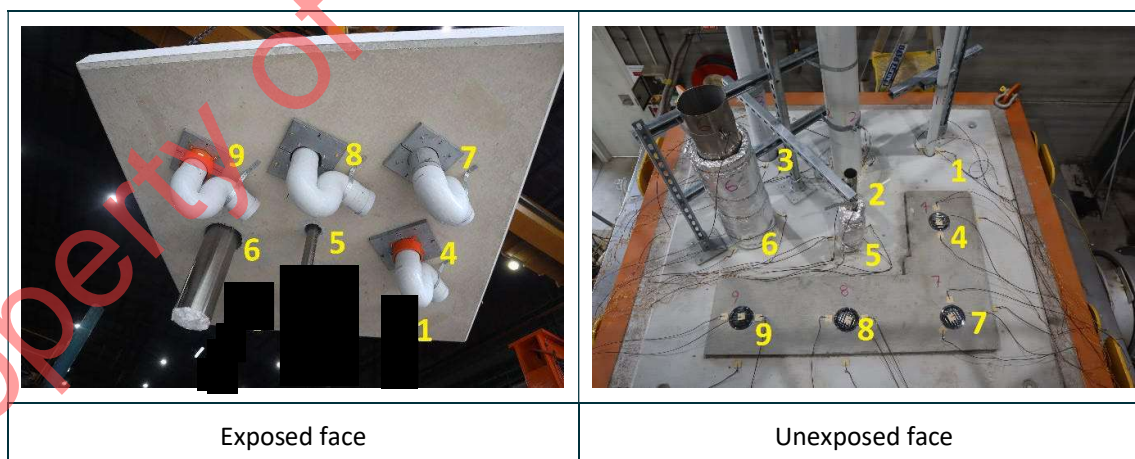
The fire-resistance test was conducted on 13 October 2022.

2 Description of specimen

2.1 General

The specimen comprised an 1800-mm x 1800-mm x 150-mm thick concrete slab penetrated by nine service penetrations. For the purpose of the test, the specimens were referenced as specimens 1 to 9, as detailed in the table below.

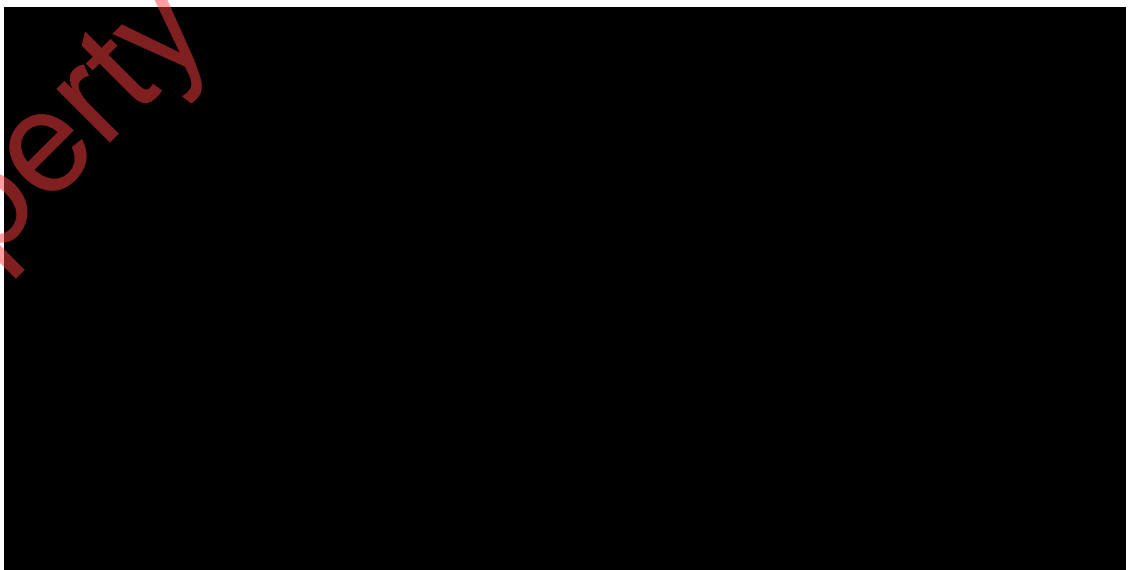
Specimen No.	Penetration details
1	
2	
3	
4	A 100-mm PVC floor waste system protected by a Trafalgar Springbox – Blade with Fyrecollar.
5	A 60-mm stainless steel pipe insulated with Twrap lagging.
6	A 170-mm stainless steel pipe insulated with Twrap lagging.
7	A 100-mm PVC floor waste system protected by a Trafalgar Springbox – with Pyrosafe DG cable bandage.
8	A 100-mm PVC floor waste system protected by a Trafalgar Springbox – Blade with intumescent.
9	A 100-mm PVC floor waste system protected by a Trafalgar Springbox – Blade with foil tape and Fyrecollar.

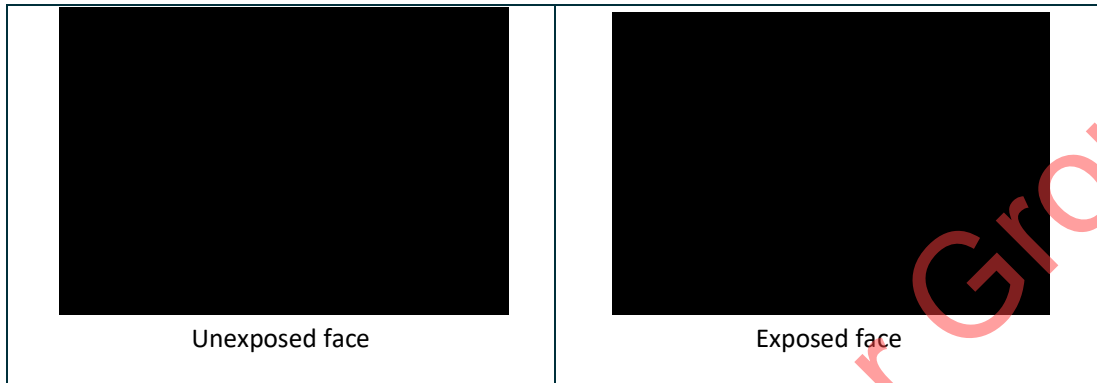


Specimen 1 – A Trafalgar



Specimen 2 – A Trafalgar





Specimen 3 – A Trafalgar



Specimen 4 – A Trafalgar ‘Springbox – Blade with Fyrecollar’ protecting a 100-mm diameter PVC pipe with floor waste incorporating a P trap penetrating a 121-mm opening in the slab

The Trafalgar Springbox – Blade with FyreCOLLAR was constructed from 1.1-mm mild steel plate and consisted of two symmetrical halves. Each half contained a baseplate measuring 140-mm wide x 120-mm long x 20-mm high. The top side of the baseplate contained a blade measuring 154-mm wide x 69-mm long x 15-mm high flange. The blade was held in place with a 12-mm wide x 10-mm high x 137-mm long angles which were secured to the baseplate at the front by two 4-mm steel rivets and at the rear with two M5 x 20-mm press studs. Each blade contained a tensioned spring secured to the baseplate with the blade being pulled back to the rear and held into place with 3.6-mm wide x 1.4-mm thick plastic cable ties. Details are shown in drawing “Springbox blade with FyreCOLLAR” dated 18/10/22, by Trafalgar Fire.

On the bottom side of the baseplate, a Trafalgar 100-mm FyreCHOKE Premium Hinged Retrofit collar was secured to the baseplate using M5 x 20-mm pressed stud with a M5 dome nut to suit all four fixing tabs.

The penetrating service comprised an Iplex Pipelines DWV uPVC pipe with a 110-mm outside diameter and a wall thickness of 3-mm. The pipe penetrated the concrete slab through a 121-mm opening. On the exposed side of the slab, the pipe was fitted with two halves of the Trafalgar Springbox and secured to the concrete slab using M6 x 50-mm masonry anchors. As shown in drawing “CP34 V3” dated 17/10/2022, by Trafalgar Fire.

On the exposed side of the slab, a PVC P-trap was connected to the penetrating pipe with a coupling. The P-trap was plugged with a PVC end cap and supported on the exposed face with 30-mm wide steel strapping fixed to the concrete slab using two M6 x 50-mm masonry anchors. The trap was charged with 1.5-L of water prior to testing. On the unexposed face of the slab a floor waste system was fitted with a polypropylene puddle flange, an acrylonitrile-butadiene-styrene base and a chrome plated brass grate. A 30-mm thick sand and cement screed was laid on top of the concrete slab and finished flush with the grate.



Unexposed face



Exposed face



Trafalgar Springbox Internal

Specimen 5 – A 60-mm diameter stainless steel pipe lagged with Twrap penetrating an 80-mm opening in the slab

The penetrating service comprised a stainless-steel pipe with a 60-mm outside diameter and a wall thickness of 1.5-mm which penetrated the concrete slab through a 80-mm opening. The pipe was installed off centre with a resulting annular gap of 8-mm to 18-mm which was backfilled with a bead of Trafalgar FyreFLEX sealant to a depth of 60-mm controlled by a PE backing rod and finished with a 20-mm x 30-mm fillet, as shown in drawing “CP34 V3” dated 17/10/2022, by Trafalgar Fire.

On the unexposed side only, a single layer of 300-mm wide x 25-mm thick TWrap (128-kg/m³) was cut to size and wrapped around the stainless-steel pipe with a 50-mm overlap and secured with two 4.6-mm wide stainless steel cable ties located at 50-mm from each end. Any cut edges in the Twrap were sealed with aluminium reinforced tape.

The pipe projected vertically, 500-mm away from the unexposed face of the slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 450-mm from the unexposed face of the concrete slab by a support clamp. The pipe was open at the unexposed end and closed with 100-mm of ceramic fibre plug on the exposed end.



Specimen 6 – A 170-mm diameter stainless steel pipe lagged with Twrap penetrating a 200-mm opening in the slab

The penetrating service comprised a stainless-steel pipe with a 170-mm outside diameter and a wall thickness of 1.5-mm, which penetrated the concrete slab through a 200-mm opening. The pipe was installed off centre with a resulting annular gap of 5-mm to 25-mm and was backfilled with a bead of Trafalgar FyreFLEX sealant to a depth of 60-mm controlled by a PE backing rod and finished with a 30-mm x 30-mm fillet, as shown in drawing “CP34 V3” dated 17/10/2022, by Trafalgar Fire.

On the unexposed side only, a single layer of 300-mm wide x 25-mm thick TWrap (128-kg/m³) was cut to size and wrapped around the stainless-steel pipe with a 50-mm overlap. Another layer of 300-mm TWrap was cut to size and wrapped around the stainless-steel pipe and service support with 50-mm overlap. The wrap was butt jointed together to form a total width of 600-mm with four 4.6-mm wide stainless steel cable ties securing the wrap at 50-mm from each end and 150mm centres. Any cut edges in the Twrap were sealed with aluminium reinforced tape.

The pipe projected vertically, 800-mm away from the unexposed face of the slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 300-mm and 700-mm from the unexposed face of the concrete slab using support clamps. The pipe was open at the unexposed end and closed with 100-mm of ceramic fibre plug on the exposed end.



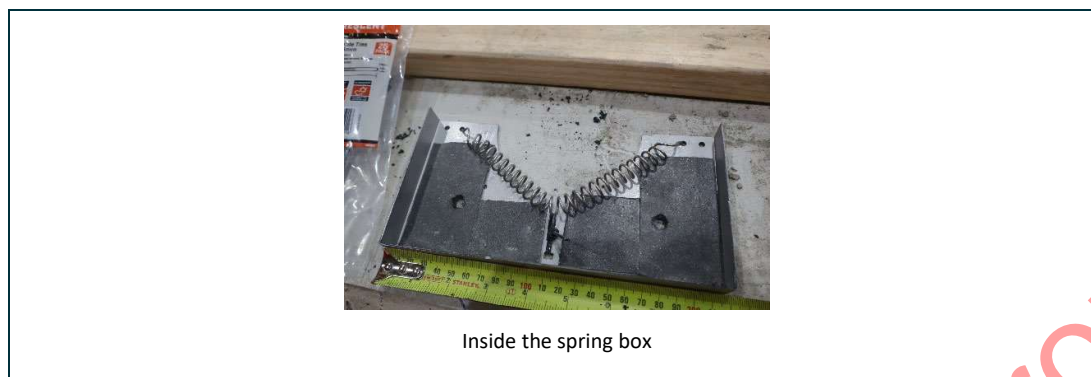
Specimen 7 – A Trafalgar Springbox – Blade with Pyrosafe DG cable bandage protecting a 100-mm diameter PVC pipe with floor waste incorporating a P-trap penetrating a 121-mm opening in the slab

The Trafalgar Springbox – Blade with Pyrosafe DG cable bandage was constructed from 1.1-mm mild steel plate and consisted of two symmetrical halves. Each half contained a baseplate measuring 120-mm wide x 120-mm long x 20-mm high. The top side of the baseplate was lined with two sets of Gee-Whiz intumescent strips (1100-1300-kg/m³) measuring 85-mm long x 55-mm wide x 1.8-mm thick and 50-mm long x 50-mm wide x 1.8-mm thick. A tensioned spring was secured to the baseplate and pulled back to the rear and held into place with 3.6-mm wide x 1.4-mm thick plastic cable ties, as shown in drawing “Springbox with Pyrosafe” dated 18/10/2022, by Trafalgar Fire.

The penetrating service comprised an Iplex Pipelines DWV uPVC pipe with a 110-mm outside diameter and a wall thickness of 3-mm which penetrated the concrete slab through a 121-mm opening. On the exposed side of the slab, the pipe was fitted with two halves of the Trafalgar Springbox (with Pyrosafe DG cable bandage wrapped around the pipe first) and secured to the concrete slab using four M6 x 50-mm masonry anchors. A 137-mm wide Pyrosafe DG cable bandage was applied around the uPVC pipe with a 22-mm overlap in line with the slab. The Pyrosafe DG cable bandage was secured to the uPVC pipe using 4.6-mm wide stainless steel cable ties located 13-mm and 97mm from the exposed face of the concrete slab. As shown in drawing “CP34 V3” dated 17/10/2022, by Trafalgar Fire.

On the exposed side of the slab, a PVC P-trap was connected to the penetrating pipe with a coupling. The P-trap was capped with a PVC end cap and supported on the exposed face with 30-mm wide steel strapping fixed to the concrete slab using two M6 x 50-mm masonry anchors. The trap was charged with 1.5-L of water prior to testing. On the unexposed face of the concrete slab a floor waste system was fitted with a polypropylene puddle flange, an acrylonitrile-butadiene-styrene base and a chrome plated brass grate. A 30-mm thick sand and cement screed was laid on top of the concrete slab and finished flush with the grate.





Specimen 8 – A Trafalgar ‘Springbox – Blade with Intumescent’ protecting a 100-mm diameter PVC pipe floor waste incorporating a P trap penetrating a 121-mm opening in the slab

The Trafalgar Springbox – Blade with intumescent was constructed from 1.1-mm mild steel plate and consisted of two symmetrical halves. Each half contained a baseplate measuring 140-mm wide x 120-mm long x 20-mm high. The top side of the baseplate contained a blade measuring 154-mm width x 69-mm length, with a 15-mm height flange. Each blade was lined with a Trafalgar Intumescent strip (730-kg/m³) measuring 55-mm wide x 150-mm long x 10-mm thick fitted with double sided tape. The blade was held into place with a 12-mm wide x 10-mm high x 137-mm long angles secured to the baseplate at the front by two 4-mm steel rivets and at the rear with two M5 x 20-mm press studs. Each blade contained a tensioned spring secured to the baseplate with the blade being pulled back to the rear and the blade held into place with 3.6-mm wide x 1.4-mm thick plastic cable ties as shown in drawing “Springbox – Blade with intumescent” dated 18/10/2022, by Trafalgar Fire.

The penetrating service comprised an Iplex Pipelines DWV uPVC pipe with a 110-mm outside diameter and a wall thickness of 3-mm which penetrated the concrete slab through a 121-mm opening. On the exposed side of the slab, the pipe was fitted with two halves of the Trafalgar Springbox (blade with intumescent) and secured to the concrete slab using four M6 x 50-mm masonry anchors as shown in drawing “CP34 V3” dated 17/10/2022, by Trafalgar Fire.

On the exposed side of the slab, a PVC P-trap was connected to the penetrating pipe with a coupling. The P-trap was fitted with a PVC end cap and supported on the exposed face with 30-mm wide steel strapping fixed to the concrete slab using two M6 x 50-mm masonry anchors. The trap was charged with 1.5-L of water prior to testing. On the unexposed face of the slab a floor waste system was fitted with a polypropylene puddle flange, an acrylonitrile-butadiene-styrene base and a chrome plated brass grate. A 30-mm thick sand and cement screed was laid on top of the concrete slab and finished flush with the grate.





Springbox Internal

Specimen 9 – A Trafalgar ‘Springbox with foil tape’ and Fyrecollar protecting a 100-mm diameter PVC pipe with floor waste incorporating a P trap penetrating a 121-mm opening in the slab

The Trafalgar Springbox – with foil tape and FyreCOLLAR was constructed from 1.1-mm mild steel plate and consisted of two symmetrical halves. Each half contained a baseplate measuring 120-mm wide x 120-mm long x 20-mm high. On the top side of the baseplate, a tensioned spring was secured to the baseplate and pulled back to the rear and held into place with 3.6-mm wide x 1.4-mm thick plastic cable ties. As shown in drawing “Springbox with FyreCOLLAR” dated 18/10/2022, by Trafalgar Fire.

On the bottom side of the baseplate, a Trafalgar 100mm FyreCHOKe Premium Hinged Retrofit collar secured to the baseplate using 8g x 16mm tech screws through all four fixing tabs.

The penetrating service comprised an Iplex Pipelines DWV uPVC pipe with a 110-mm outside diameter and a wall thickness of 3-mm which penetrated the concrete slab through a 121-mm opening. On the exposed side of the slab, a 95-mm wide aluminium reinforced foil tape was applied around the uPVC pipe with a 22-mm overlap in line with the slab. The Springbox with foil tape and FyreCOLLAR was secured to the exposed face of the concrete slab using four M6 x 50mm masonry anchors as shown in drawing “CP34 V3” dated 17/10/2022, by Trafalgar Fire.

On the exposed side of the slab, a PVC P-trap was connected to the penetrating pipe with a coupling. The P-trap was plugged with a PVC end cap and supported on the exposed face with 30-mm wide steel strapping fixed to the concrete slab using two M6 x 50-mm masonry anchors. The trap was charged with 1.5-L of water prior to testing. On the unexposed face of the slab a floor waste system was fitted with a polypropylene puddle flange, an acrylonitrile-butadiene-styrene base and a chrome plated brass grate. A 30-mm thick sand and cement screed was laid on top of the concrete slab and finished flush with the grate.



Unexposed face



Exposed face



2.2 Dimensions

The overall dimension of the specimen measured 1800-mm wide x 1800-mm long x 150-mm thick, to suit the opening in the specimen containing frame.

2.3 Orientation

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

2.4 Conditioning

The specimen installation was completed on 6 October 2022 and stored under laboratory atmospheric conditions until the test date.

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

The specimen installation and construction were 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:

- Drawings titled "CP34 V3", Drawings numbered 1 to 11, dated 17 October 2022, by Trafalgar Head Office
- Document titled "CP34 Specimen Descriptions V2", by Trafalgar Head Office.
- Drawing titled "Springbox with Pyrosafe", dated 18 October 2022, by Trafalgar Head Office.
- Drawing titled "Springbox with Fyrecollar", dated 18 October 2022, by Trafalgar Head Office.
- Drawing titled "Springbox blade with Fyrecollar", dated 18 October 2022, by Trafalgar Head Office.

- Drawing titled “Springbox – blade with intumescent”, dated 18 October 2022, by Trafalgar Head Office.

No confidential information about the test specimen has been submitted and is retained at CSIRO Infrastructure Technologies.

4 Equipment

4.1 Furnace

The furnace had a nominal opening of 1650-mm x 1650-mm as appropriate for horizontal specimens.

The furnace was lined with refractory bricks and materials with the thermal properties 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 specimens 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.

4.4 Pressure

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

The pressure probe was located approximately 300-mm below the underside of the concrete slab and then calculated at 100-mm below the exposed face of the concrete slab.

5 Ambient temperature

The temperature of the test area was 17°C at the commencement of the test.

6 Termination of test

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

7 Test results

7.1 Critical observations

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

- 1 minutes - A noise was emitted from specimens 7 and 8.
- 2 minutes - Smoke has begun fluing from the end of specimen 3.
A noise was emitted from specimen 9.
Cotton pad test was applied to the floor waste grate of specimens 4, 7 and 8 – No ignition was noted at this time.
- 4 minutes - The base of specimen 3 has collapsed on itself. The pipe has softened and slid through the top supports and folded on itself over the penetration opening (photograph 3). Integrity of the penetration system can no longer be monitored.
- 5 minutes - Cotton pad test applied to the floor waste grate of specimen 4 – No ignition noted at this time.
- 6 minutes - Cotton pad test applied to the floor waste grate of specimen 9 – No ignition noted at this time.
- 7 minutes - Cotton pad test applied to the floor waste grate of specimen 4 – No ignition noted at this time.
- 9 minutes - Fluing has decreased from the unexposed end of specimen 1.
- 10 minutes - The base of specimen 2 has begun to flue.
- 11 minutes - Discolouration of the floor waste grates is visible on specimens 7 and 8.
- 14 minutes - The base of specimen 2 has collapsed on itself. The pipe has softened and slid through the top supports and folded on itself over the penetration opening (photograph 4). Integrity of the penetration system can no longer be monitored.
- 16 minutes - Steam/smoke is increasing from the floor waste grate from specimens 7 and 8.
- 29 minutes - Cotton pad test applied to the floor waste grate of specimen 7 – No ignition noted at this time.
- 30 minutes - Cotton pad test applied to the floor waste grate of specimen 7 – No ignition noted at this time.
Insulation Failure of Specimen 7 – Maximum temperature rise of 180 K on the floor waste grate.
- 31 minutes - Cotton pad test applied to the floor waste grate of specimen 7 – No ignition noted at this time.
- 33 minutes - Steam/smoke is emitting from the wrap on specimen 6.
Steam/smoke is emitting from the floor waste grate on specimen 9.

- 34 minutes - Fluing has decreased from the base of specimen 2.
- 36 minutes - Steam/smoke is emitting from the floor waste grate on specimen 7.
- 37 minutes - Steam/smoke has increased from the floor waste grate of specimen 9.
- 38 minutes - Cotton pad test applied to the floor waste grate of specimen 7 – No ignition noted at this time.
- 39 minutes - Cotton pad test applied to the floor waste grate of specimen 7 – No ignition noted at this time.
- 40 minutes - Cotton pad test applied to the floor waste grate of specimen 7 – No ignition noted at this time.
- 42 minutes - Cotton pad test applied to the floor waste grate of specimen 7 – No ignition noted at this time.
- Moisture is beginning to form on the grout of specimen 2.
- 43 minutes - The sealant at the base of specimen 2 is beginning to swell.
- Steam/smoke being emitted from the base of specimen 2 has increased.
- 47 minutes - Integrity Failure of Specimen 7 - Cotton pad test applied to specimen 7 – Ignition of cotton pad noted at 48 minutes.
- 48 minutes - Insulation failure of Specimen 2 – Maximum temperature rise of 180 K on the PVC pipe.
- 54 minutes - A gap is visible at the base of specimen 2.
- Test terminated for Specimen 2 at the request of the sponsor.
- 62 minutes - Test terminated for Specimen 7 at the request of the sponsor.
- 84 minutes - The sealant at the base of specimen 6 is swelling up.
- 92 minutes - Insulation failure of Specimen 9 - Maximum temperature rise of 180 K on the floor waste grate.
- 95 minutes - Insulation Failure of Specimen 6 – Maximum temperature rise of 180 K on the stainless-steel pipe.
- 106 minutes - Cotton pad test applied to the floor waste grate of Specimen 9 – No ignition noted at this time.
- 117 minutes - The collar of specimen 9 appears to have fallen off, furnace chamber is visible through the grate (photograph 6).
- 119 minutes - Integrity Failure of Specimen 9 - Cotton pad test applied to Specimen 9 – Ignition noted at this time.
- Test terminated for Specimen 9 at the request of the sponsor.
- 165 minutes - Discolouration of the steel pipe on specimens 5 and 6.
- 209 minutes - Steam/smoke emitting from the base of specimen 1 has increased.
- 241 minutes - Test terminated.

7.2 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.

7.3 Furnace severity

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

7.4 Furnace pressure

Table 3 shows the curve of furnace pressure versus time during the heating period.

7.5 Specimen temperature

Figures 4 show the curve of temperature versus time associated with Specimen 1.

Figures 5 show the curve of temperature versus time associated with Specimen 2.

Figures 6 show the curve of temperature versus time associated with Specimen 3.

Figures 7 show the curve of temperature versus time associated with Specimen 4.

Figures 8 show the curve of temperature versus time associated with Specimen 5.

Figures 9 show the curve of temperature versus time associated with Specimen 6.

Figures 10 show the curve of temperature versus time associated with Specimen 7.

Figures 11 show the curve of temperature versus time associated with Specimen 8.

Figures 12 show the curve of temperature versus time associated with Specimen 9.

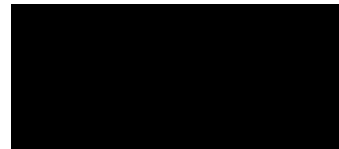
7.6 Performance

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

SPECIMEN 1

Structural adequacy
Integrity
Insulation

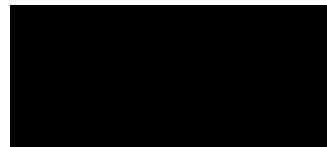
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-
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SPECIMEN 2

Structural adequacy
Integrity
Insulation

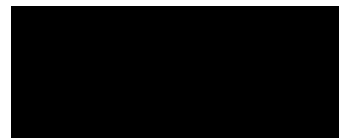
-
-
-



SPECIMEN 3

Structural adequacy
Integrity
Insulation

-
-
-



SPECIMEN 4

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

SPECIMEN 5

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

SPECIMEN 6

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	95 minutes

SPECIMEN 7

Structural adequacy	-	not applicable
Integrity	-	47 minutes
Insulation	-	30 minutes

SPECIMEN 8

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

SPECIMEN 9

Structural adequacy	-	not applicable
Integrity	-	119 minutes
Insulation	-	92 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, 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.

8 Fire-resistance level (FRL)

For the purpose of building regulations in Australia, the FRLs of the test specimens were as follows:

Specimen 1:	
Specimen 2:	
Specimen 3:	
Specimen 4:	-/240/240
Specimen 5:	-/240/240
Specimen 6:	-/240/90
Specimen 7:	-/30/30
Specimen 8:	-/240/240
Specimen 9:	-/90/90

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

The results of these fire tests may be used to directly assess fire hazard, but it should be recognized that a single test method will not provide a full assessment of fire hazard under all fire conditions.

9 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.

10 Tested by

Chris Wojcik
Testing Officer

Appendices

Appendix A – Measurement location

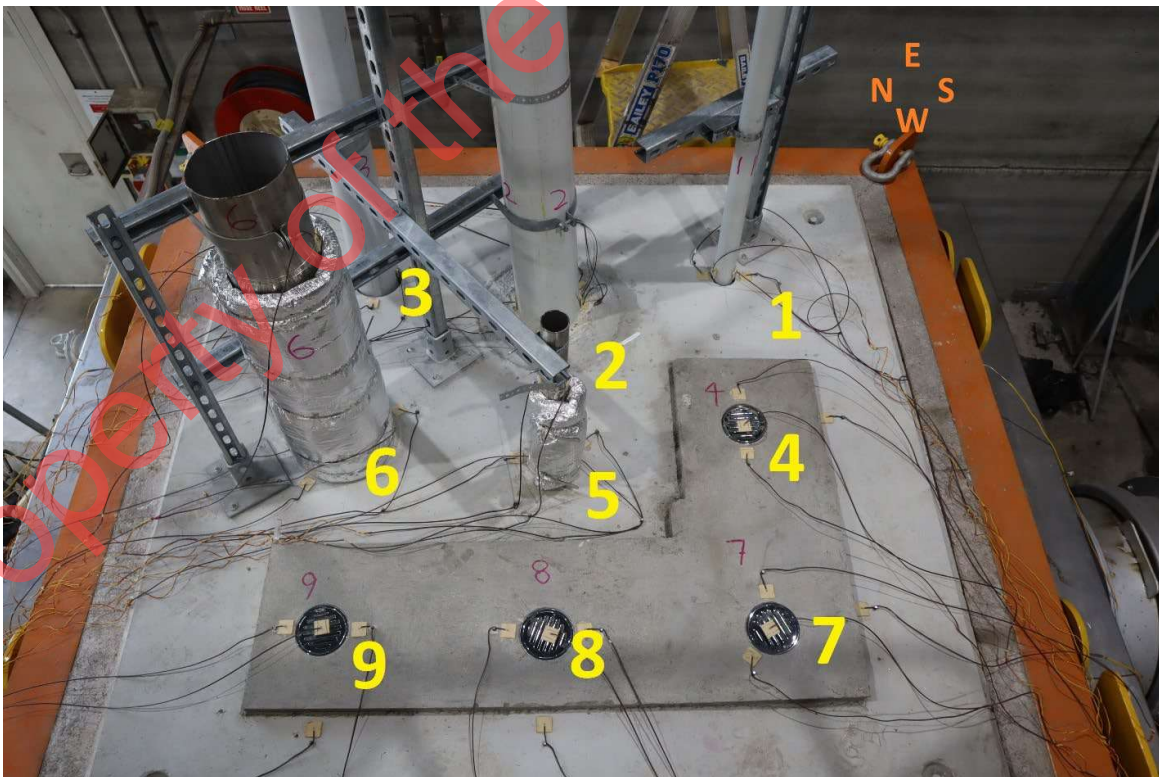
Specimen	T/C Position	T/C designation
Specimen 1 – [REDACTED]	On the slab, 25-mm north from the collar	S1
	On the slab, 25-mm south from the collar	S2
	On the pipe, 25-mm North from the slab	S3
	On the pipe, 25-mm South from the slab	S4
Specimen 4 – 100-mm PVC floor waste with springbox (Blade with Fyrecollar)	On the slab, 25-mm South from the grout	S5
	On the grout, 25-mm East from the grate	S6
	On the grout, 25-mm West from the grate.	S7
	On the grate	S8
Specimen 7 – 100-mm PVC floor waste with springbox (Pyrosafe cable bandages)	On the slab, 25-mm South from the grout	S9
	On the grout, 25-mm East from the grate	S10
	On the grout, 25-mm West from the grate	S11
	On the grate	S12
Specimen 8 – 100-mm PVC floor waste with springbox (Blade with intumescent)	On the slab, 25-mm South from the grout	S13
	On the grout, 25-mm East from the grate	S14
	On the grout, 25-mm West from the grate	S15
	On the grate	S16
Specimen 2 – [REDACTED]	On the slab, 25-mm North from the sealant.	S17
	On the slab, 25-mm South from the sealant.	S18
	On the sealant, 25-mm South from the pipe	S19
	On the sealant, 25-mm West from the pipe	S20
	On the pipe, 25-mm North from the sealant	S21
	On the pipe, 25-mm South from the sealant	S22
Specimen 3 – [REDACTED]	On the slab, 25-mm East from the collar	S23
	On the slab, 25-mm West from the collar	S24
	On the pipe, 25-mm North from the slab	S25
	On the pipe, 25-mm South from the slab	S26
Specimen 5 – 60-mm thin-wall stainless steel pipe with Fyreflex sealant and wrap.	On the slab, 25-mm North from the collar	S27
	On the slab, 25-mm South from the collar	S28
	On the wrap, 25-mm North from the collar	S29
	On the wrap, 25-mm South from the collar	S30
	On the pipe, 25-mm North from the collar	S31

Specimen 6 – 170-mm stainless steel pipe with Fyreflex sealant and wrap	On the pipe, 25-mm South from the collar	S32
	On the slab, 25-mm North West from the collar	S33
	On the slab, 25-mm South East from the collar	S34
	On the wrap, 25-mm North from the collar	S35
	On the wrap, 25-mm South from the collar	S36
	On the pipe, 25-mm North from the collar	S37
	On the pipe, 25-mm South from the collar	S38
Specimen 9 – 100-mm PVC floor waste with springbox and foil tape and Fyre-collar	On the slab, 25-mm West from the grout	S39
	On the grout, 25-mm North from the grate	S40
	On the grout, 25-mm South from the grate	S41
	On the grate	S42
Rover 2		S43
Ambient		S44

Appendix B – Test photographs



PHOTOGRAPH 1 – EXPOSED FACE OF THE SPECIMENS PRIOR TO TESTING



PHOTOGRAPH 2 – UNEXPOSED FACE OF THE SPECIMENS PRIOR TO TESTING



PHOTOGRAPH 3 – SPECIMENS AFTER 4 MINUTES OF TESTING



PHOTOGRAPH 4 – SPECIMEN 2 AFTER 8 MINUTES OF TESTING



PHOTOGRAPH 5 – SPECIMENS AFTER 60 MINUTES OF TESTING



PHOTOGRAPH 6 – SPECIMEN 9 AFTER 117 MINUTES OF TESTING



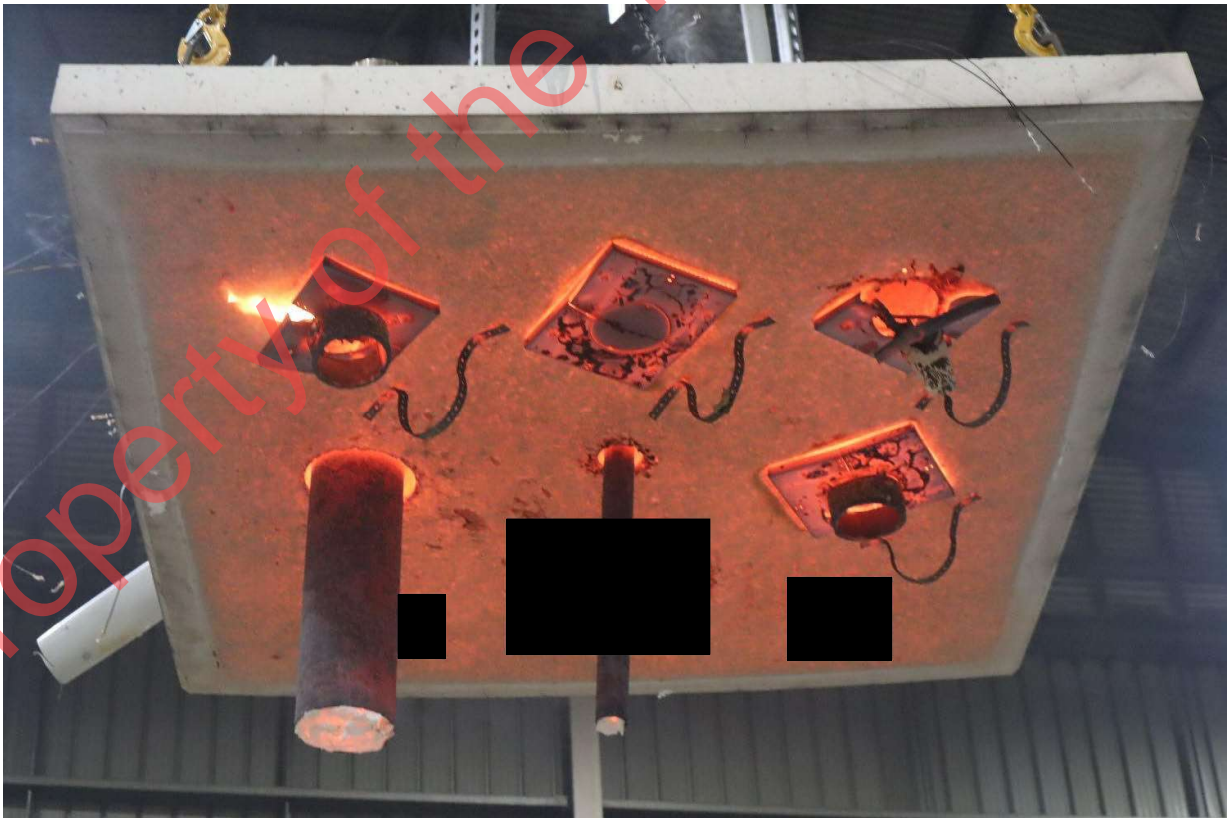
PHOTOGRAPH 7 – SPECIMENS AFTER 120 MINUTES OF TESTING



PHOTOGRAPH 8 – SPECIMENS AFTER 180 MINUTES OF TESTING



PHOTOGRAPH 9 – UNEXPOSED FACE OF SPECIMENS AT THE CONCLUSION OF TESTING



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

Appendix C – Test data charts

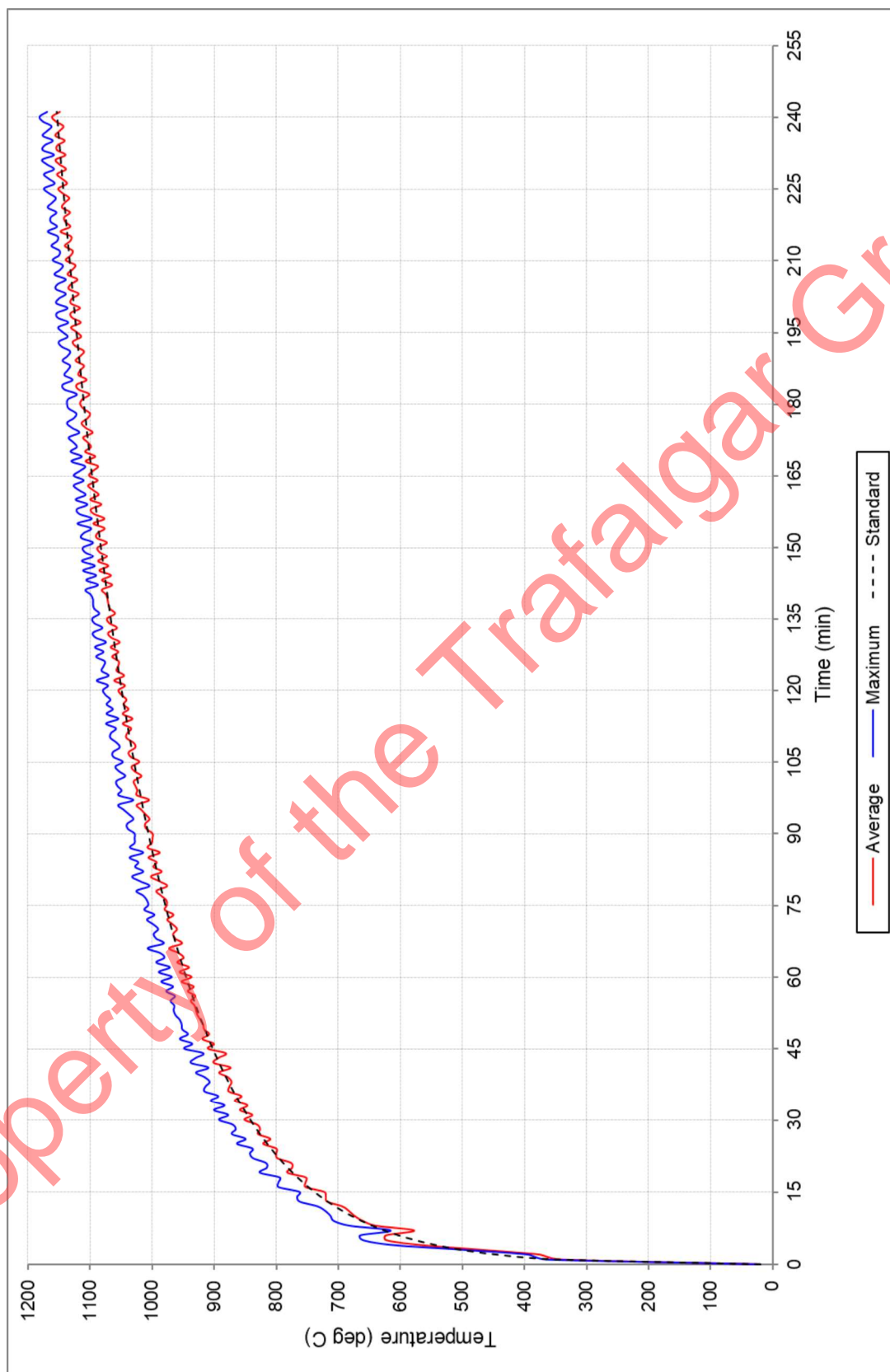


FIGURE 1 – FURNACE TEMPERATURE



FIGURE 2 – FURNACE SEVERITY

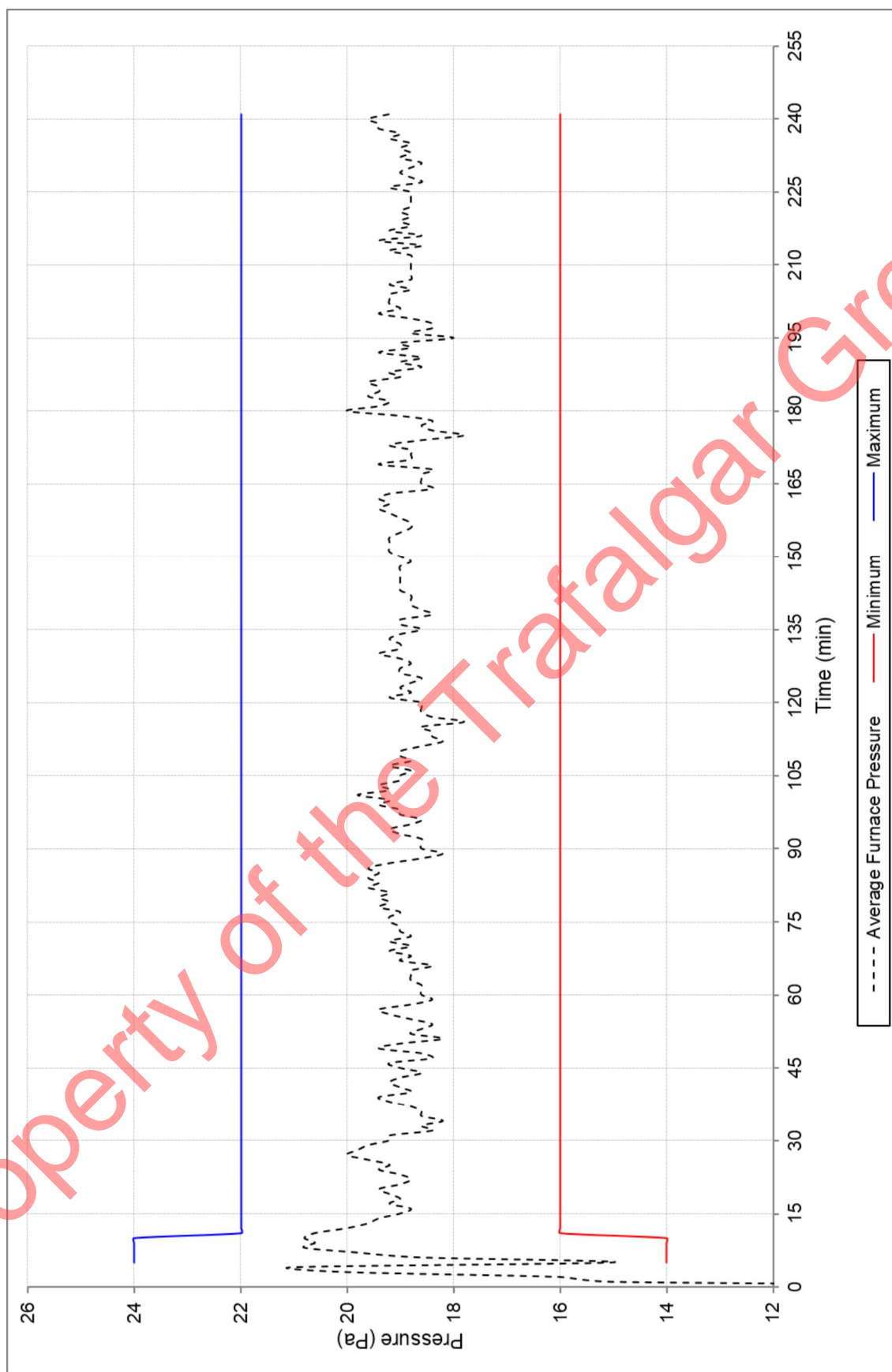


FIGURE 3 – FURNACE PRESSURE

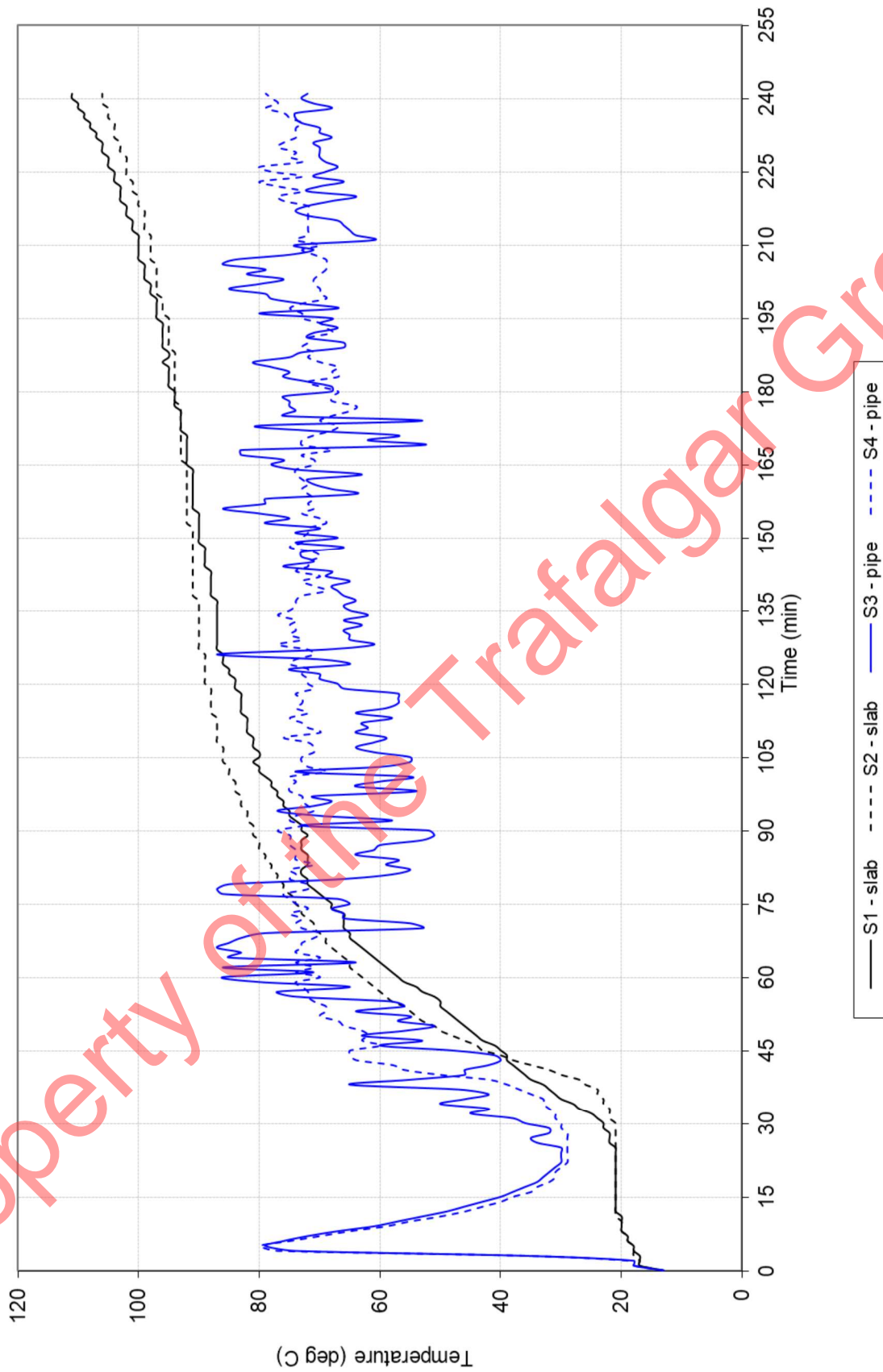


FIGURE 4 – TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN 1

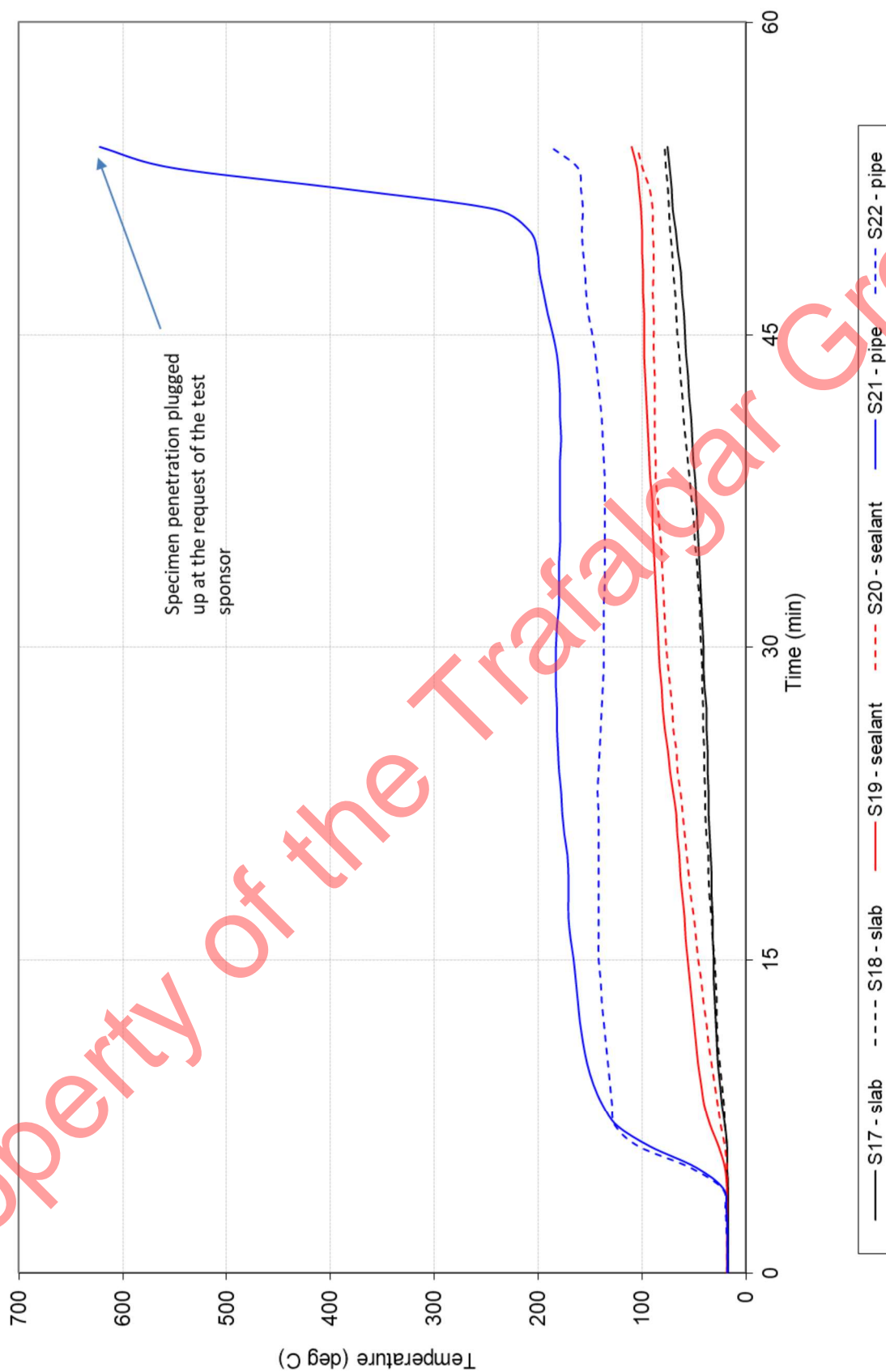


FIGURE 5 – TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN 2

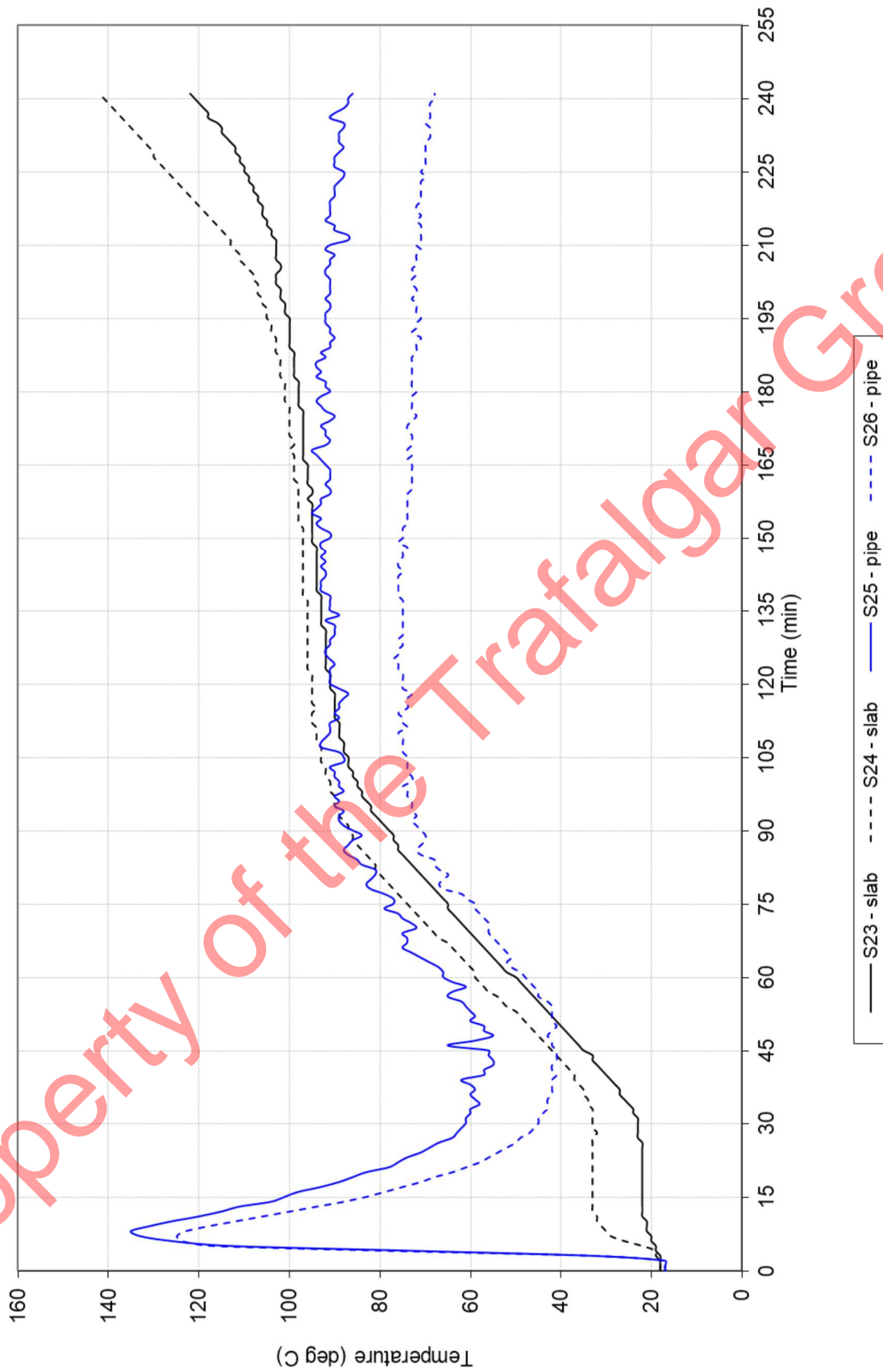


FIGURE 6 – TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN 3

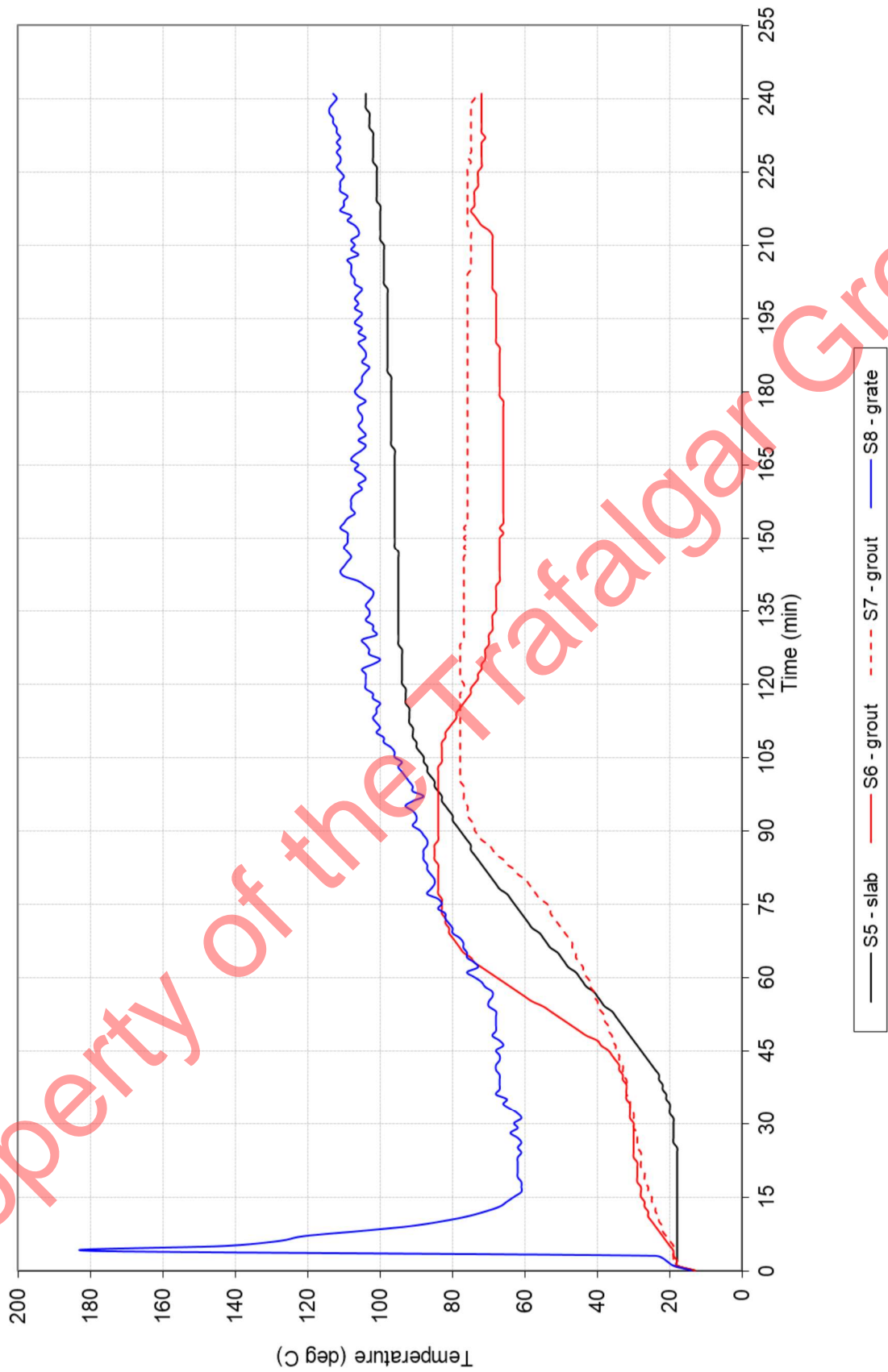


FIGURE 7 – UNEXPOSED FACE OF TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN 4

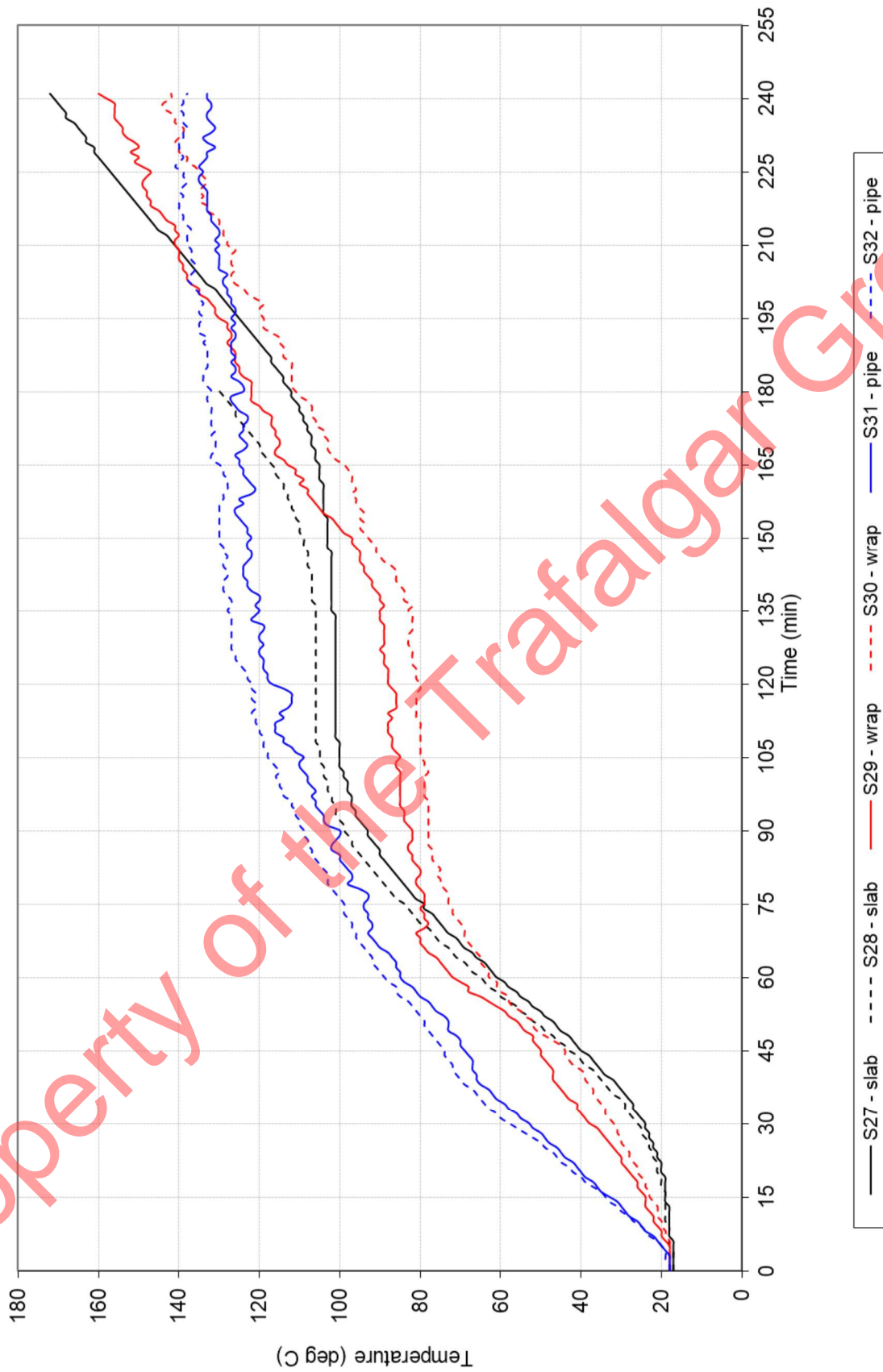


FIGURE 8 – TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN 5

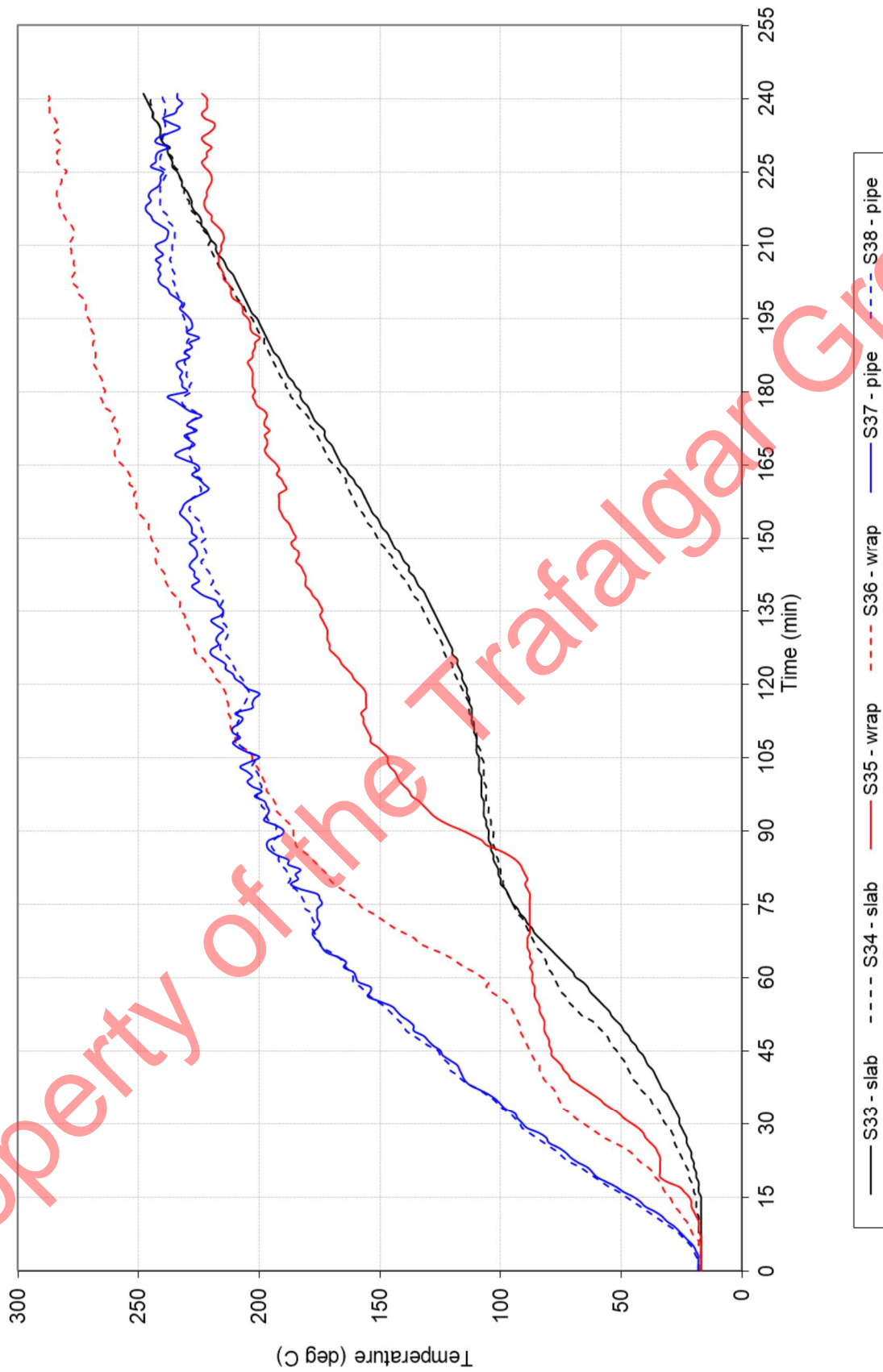


FIGURE 9 – TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN 6

Property of the Trafalgar Group

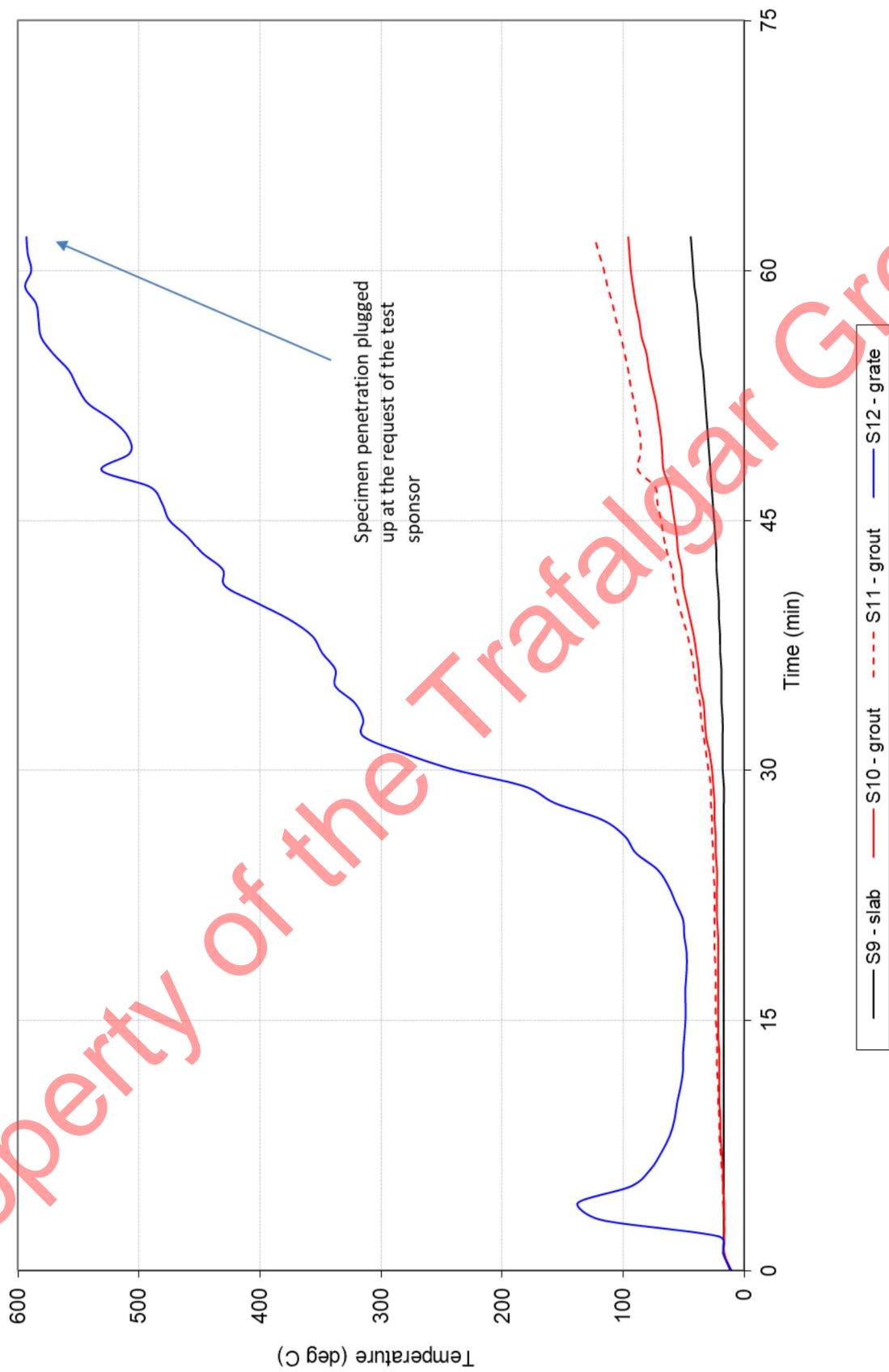


FIGURE 10 – TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN 7

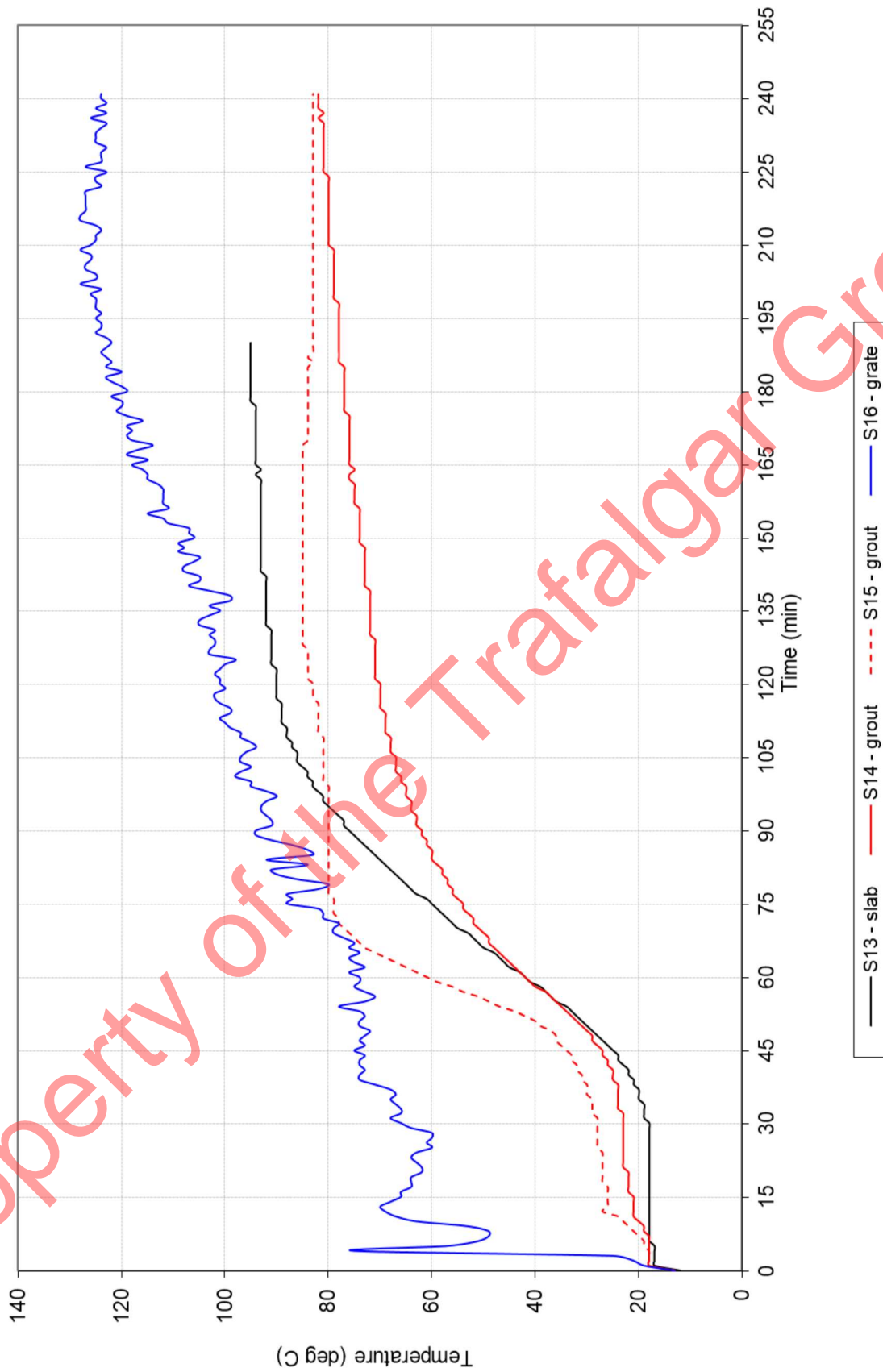


FIGURE 11 – TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN 8

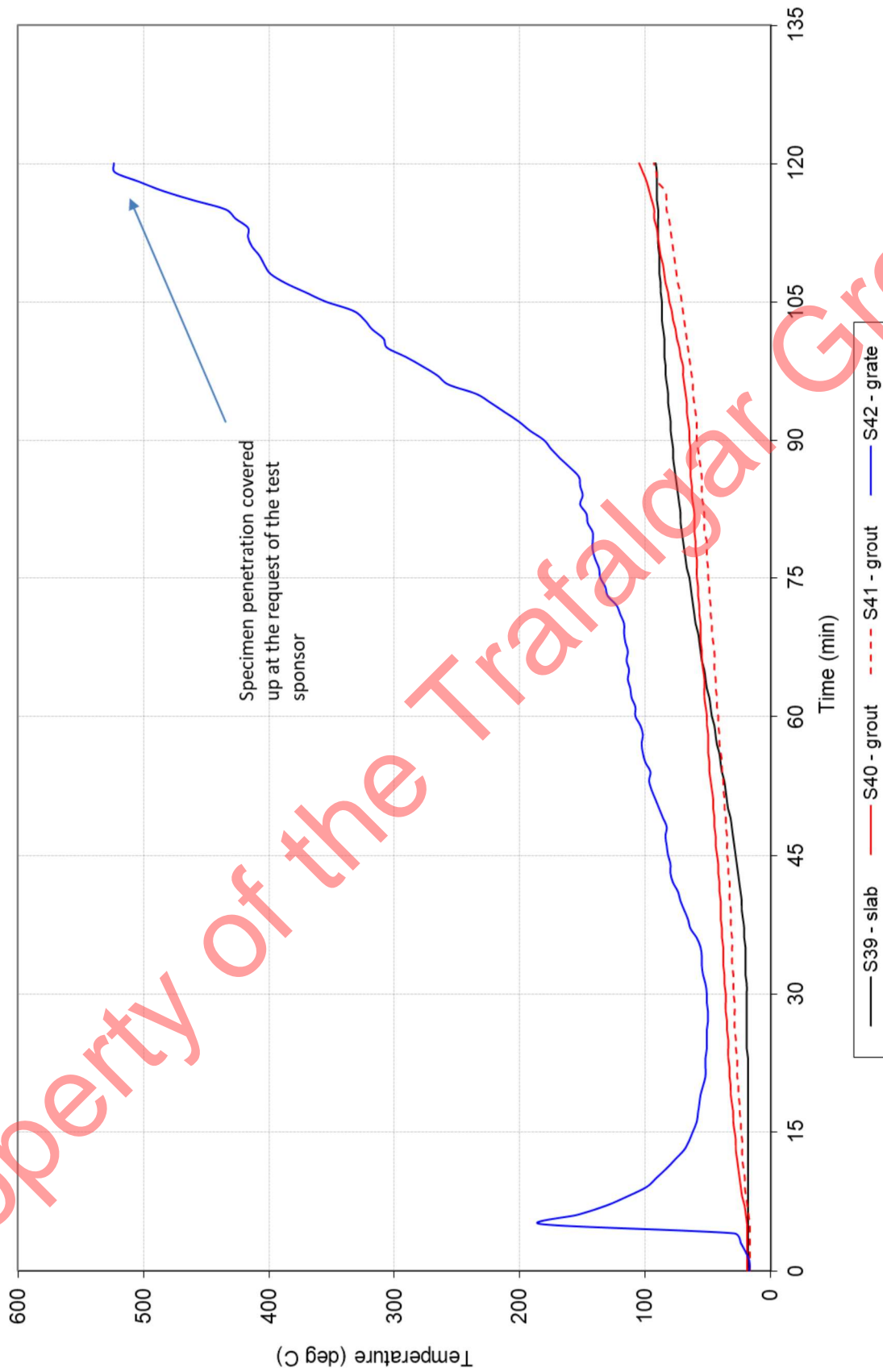


FIGURE 12 – TEMPERATURE VERSUS TIME ASSOCIATED WITH SPECIMEN 9

Appendix D – Specimen drawings

Specimen 1

Specimen 2

Specimen 3

Specimen 4

Specimen 5

Specimen 6

Specimen 7

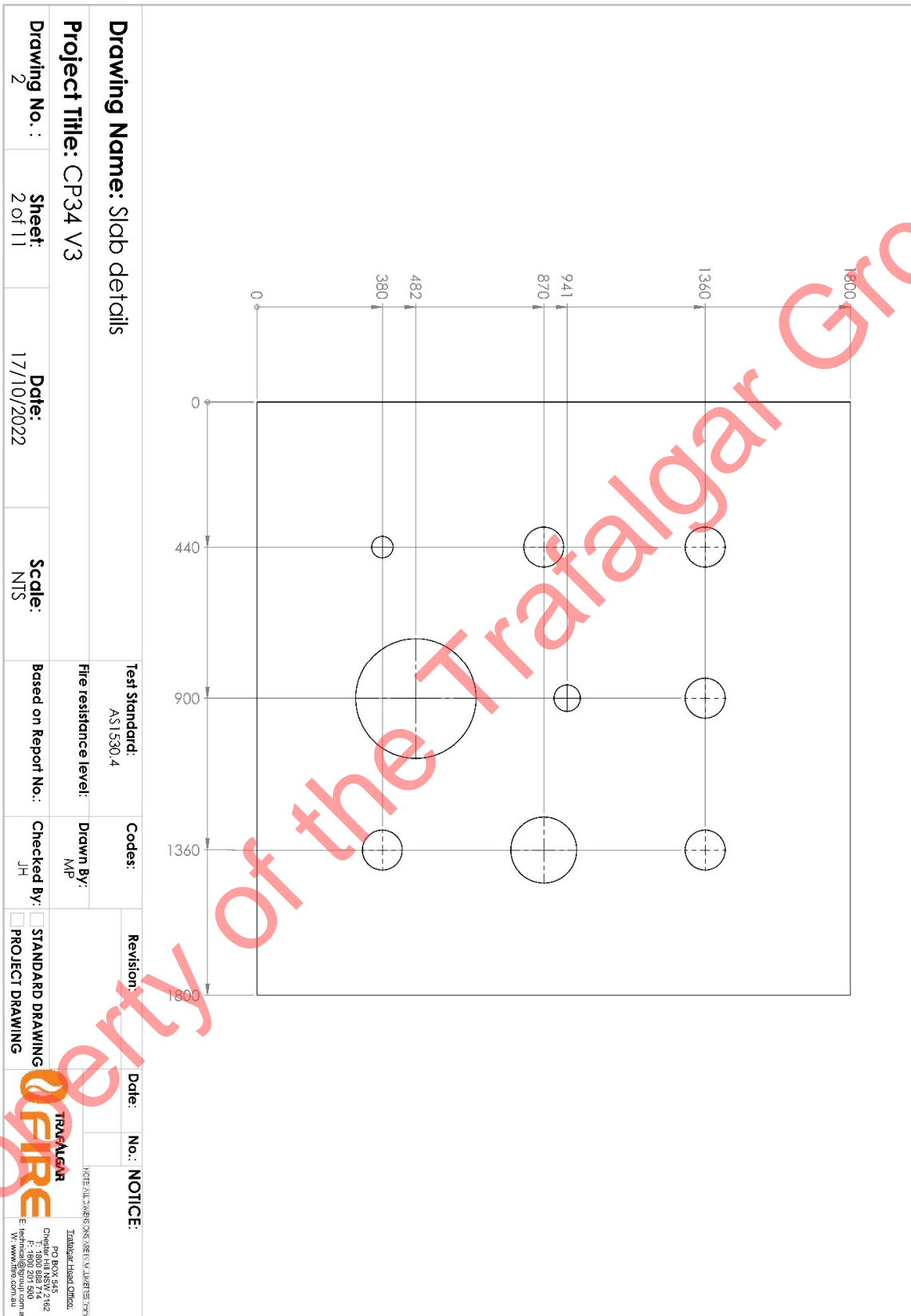
Specimen 8

Specimen 9

Specimen	Type	Service	Hole size
4	Springbox - Blade with FyreCOLLAR	100mm PVC Floorwaste	121mm
5	FyreFLEX sedant/wrap	60mm thin-wall stainless steel pipe	80mm
6	FyreFLEX sedant/wrap	170mm thin-wall stainless steel pipe	200mm
7	Springbox - with Pyrosafe cable bandage	100mm PVC Floorwaste	121mm
8	Springbox - Blade with Intumescent	100mm PVC Floorwaste	121mm
9	Springbox with foil tape and FyreCOLLAR	100mm PVC floorwaste	121mm

3D Perspective View: A 3D model of the assembly showing the internal components and the placement of the specimens.

DRAWING NAMED 'ASSEMBLY', DATED 17 OCTOBER 2022, BY TRAFALGAR GROUP PTY LTD



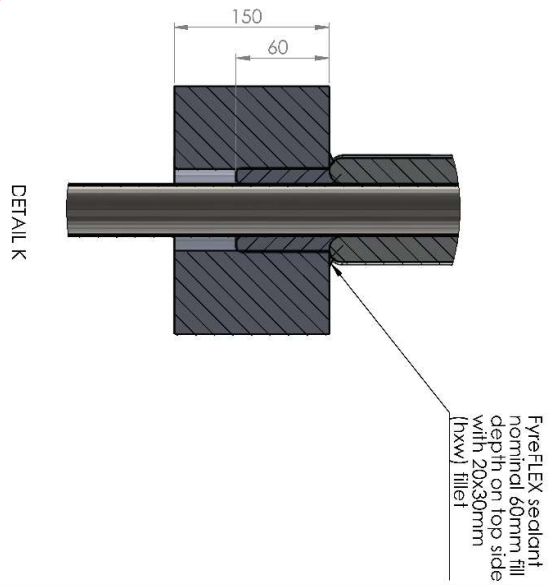
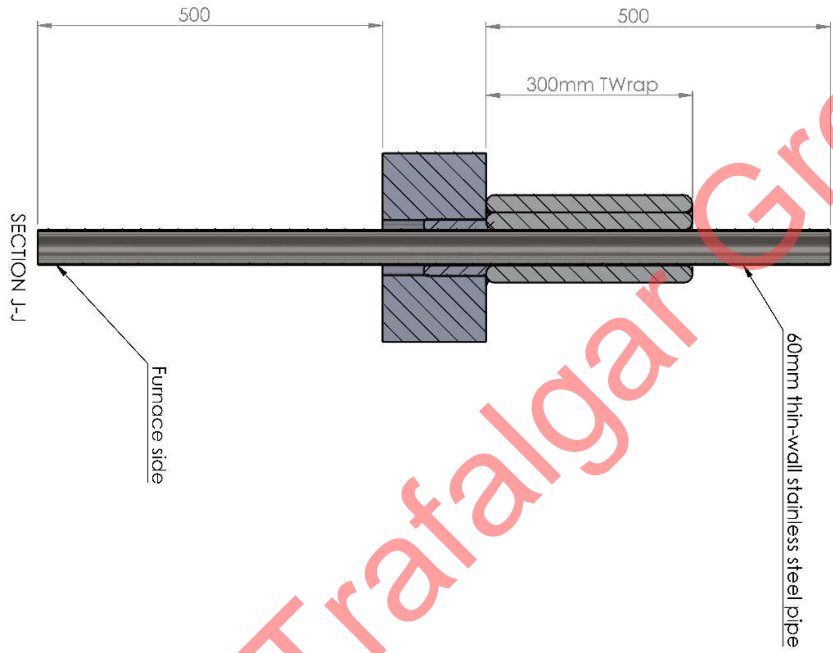
DRAWING NAMED 'SLAB DETAILS', DATED 17 OCTOBER 2022, BY TRAFALGAR GROUP PTY LTD

Drawing Name: Specimen 1				Test Standard: AS1530.4	Codes:	Revision:	Date:	No.:	NOTICE:
Project Title: CP34 V3				Fire resistance level:	Drawn By: M/P				
Drawing No.: 3	Sheet: 3 of 11	Date: 17/10/2022	Scale: NTS	Based on Report No.:	Checked By: JH	<input type="checkbox"/> STANDARD DRAWING	<input type="checkbox"/> PROJECT DRAWING	 <p>TRAFFALGAR OFFICE</p> <p>PO BOX 454 CHIPPY HART NSW 1505 T 1800 888 714 E technical@group.com.au W www.tfro.com.au</p>	

DRAWING NAMED 'SPECIMEN 1', DATED 17 OCTOBER 2022, BY TRAFALGAR GROUP PTY LTD

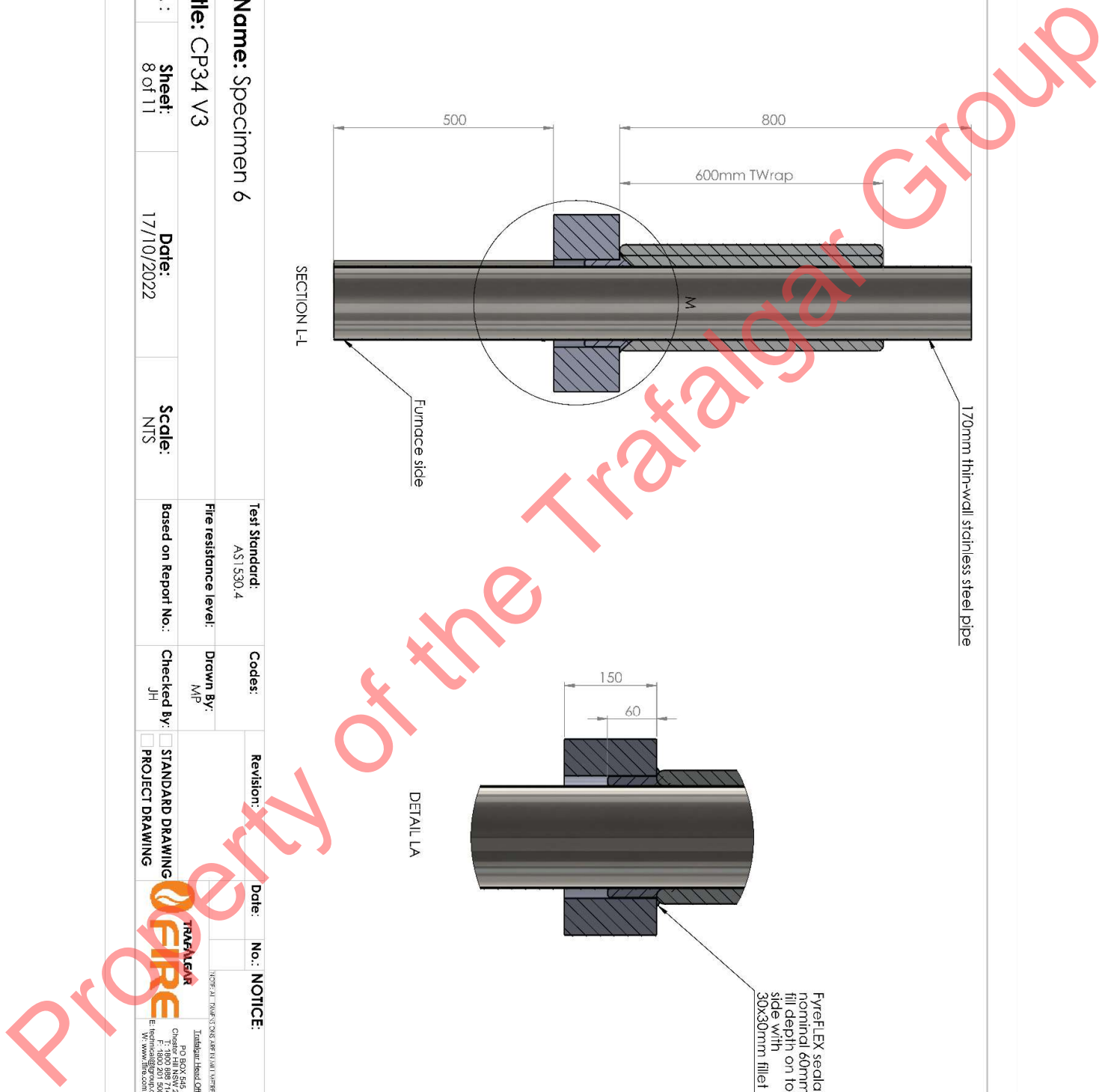
Drawing Name: Specimen 2				Test Standard: AS1530.4	Codes:	Revision	Date:	No.:	NOTICE:
Project Title: CP34 V3				Fire resistance level:	Drawn By: M/P				
Drawing No.: 4	Sheet: 4 of 11	Date: 17/10/2022	Scale: NTS	Based on Report No.:	Checked By: JH	<input type="checkbox"/> STANDARD DRAWING	<input type="checkbox"/> PROJECT DRAWING	 <p>TRAFFALGAR OFFICE</p> <p>PO BOX 414 CHIPPY CHASE NSW 2162 T: 1800 888 714 E: technical@group.com.au W: www.tfro.com.au</p>	

DRAWING NAMED 'SPECIMEN 2', DATED 17 OCTOBER 2022, BY TRAFALGAR GROUP PTY LTD

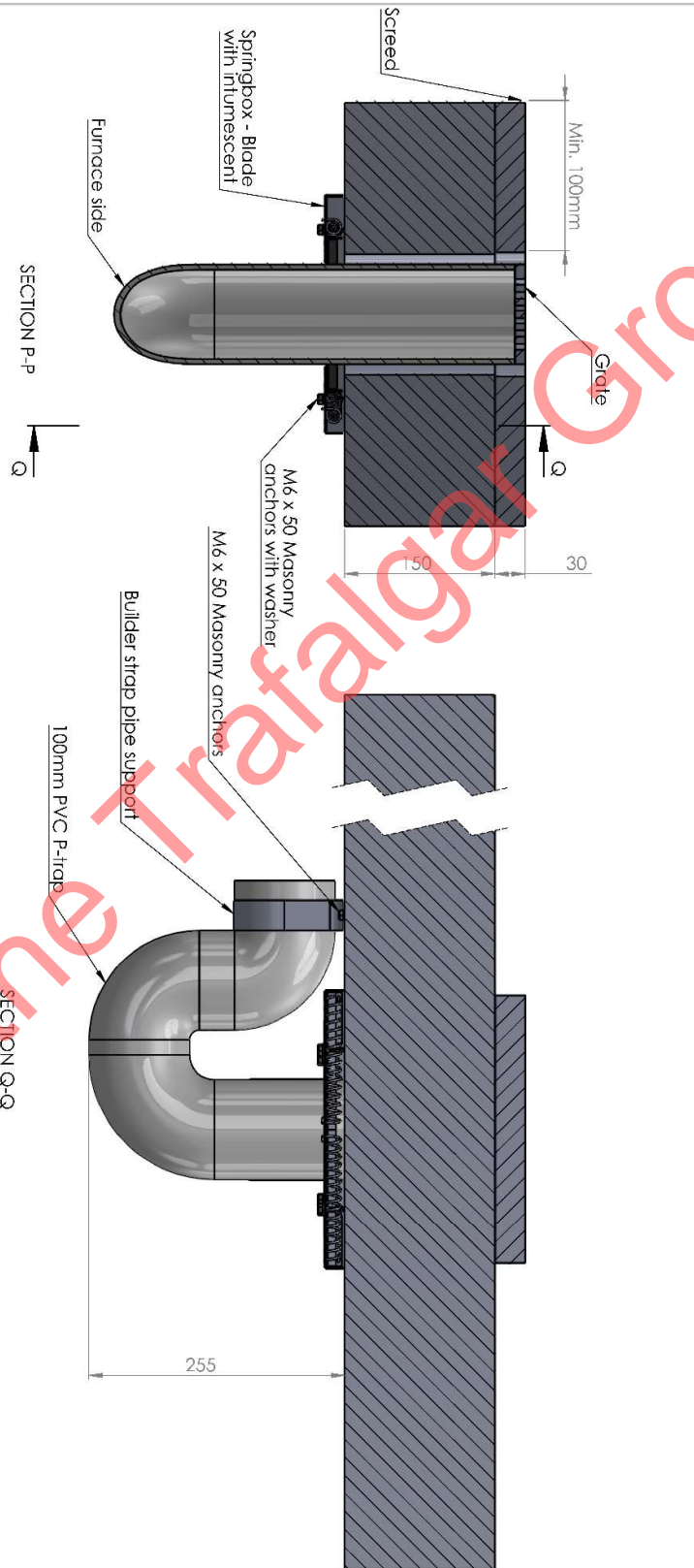


Drawing Name: Specimen 5				Test Standard: AS1530.4		Codes:		Revision		Date:		No.:		NOTICE:	
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Drawing No.: 7				Sheet: 7 of 11		Date: 17/10/2022		Scale: NTS		Based on Report No.:		Checked By: JH		<input type="checkbox"/> STANDARD DRAWING	
								<input type="checkbox"/> PROJECT DRAWING							

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PO Box 544
Cherry Hill NSW 2162
T: 1800 888 714
E: technical@trafalgar.com.au
W: www.trafalgar.com.au

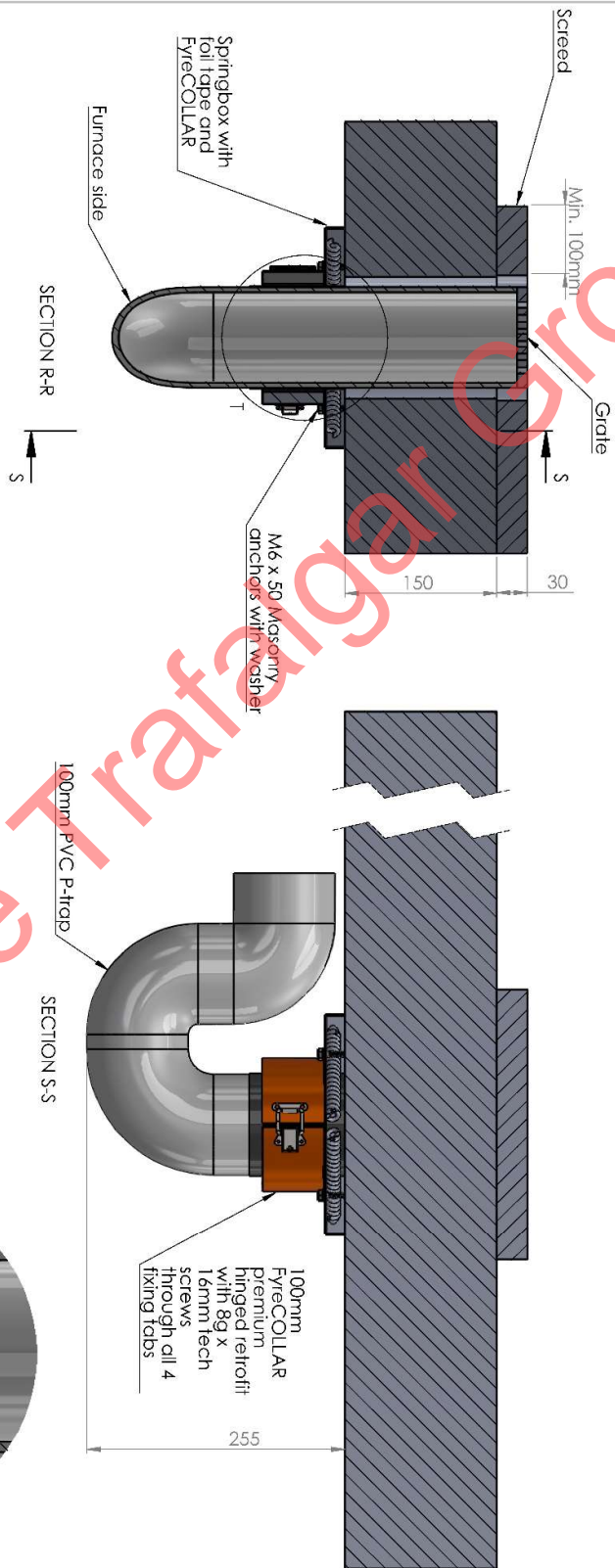


Drawing Name: Specimen 6		Codes:	Revision:	Date:	No.:	Invoice:
		Test standard: AST 1530.4				
Project Title: CP34 V3		File resistance level:	Drawn By: MP	INTERNAL TRAVELER'S SHOPS ARE IN ALL COUNTRIES		
Drawing No.: 8	Sheet: 8 of 11	Date: 17/10/2022	Scale: NTS	Based on Report No.:	Checked By: JH	<input type="checkbox"/> STANDARD DRAWING <input type="checkbox"/> PROJECT DRAWING
<div>TRAVELER'S FIRE PO BOX 545 Cheshire Hill NSW 2162 P : +61 2 9891 7244 F : +61 2 9891 7244 E : info@travelersfire.com.au W : www.travelersfire.com.au</div>						



Drawing Name: Specimen 8				Test Standard: AS1530.4		Codes:		Revision:		Date:		No.:		NOTICE:	
Project Title: CP34 V3				Fire resistance level:		Drawn By: M/P		Checked By: JH		Based on Report No.:		Scale: NTS		Sheet: 10 of 11	
Drawing No.: 10				Project Title: CP34 V3		Codes:		Revision:		Date:		No.:		NOTICE:	
Project Title: CP34 V3				Fire resistance level:		Drawn By: M/P		Checked By: JH		Based on Report No.:		Scale: NTS		Sheet: 10 of 11	
Drawing No.: 10				Project Title: CP34 V3		Codes:		Revision:		Date:		No.:		NOTICE:	

TRAFFALGAR
OFFICE
TRAFFALGAR GROUP PTY LTD
100 DOWLING STREET
SYDNEY NSW 2162
T: 1800 888 714
E: technical@traffalgar.com.au
W: www.traffalgar.com.au



Drawing Name: Specimen 9

Project Title: CP34 V3

Drawing No.: 11 of 11

Sheet: 11 of 11

Date: 17/10/2022

Scale: NTS

Based on Report No.:

Checked By: JH

Project Drawing:

Test Standard: AS1530.4

Fire resistance level:

Drawn By: M/P

Revision:

Date:

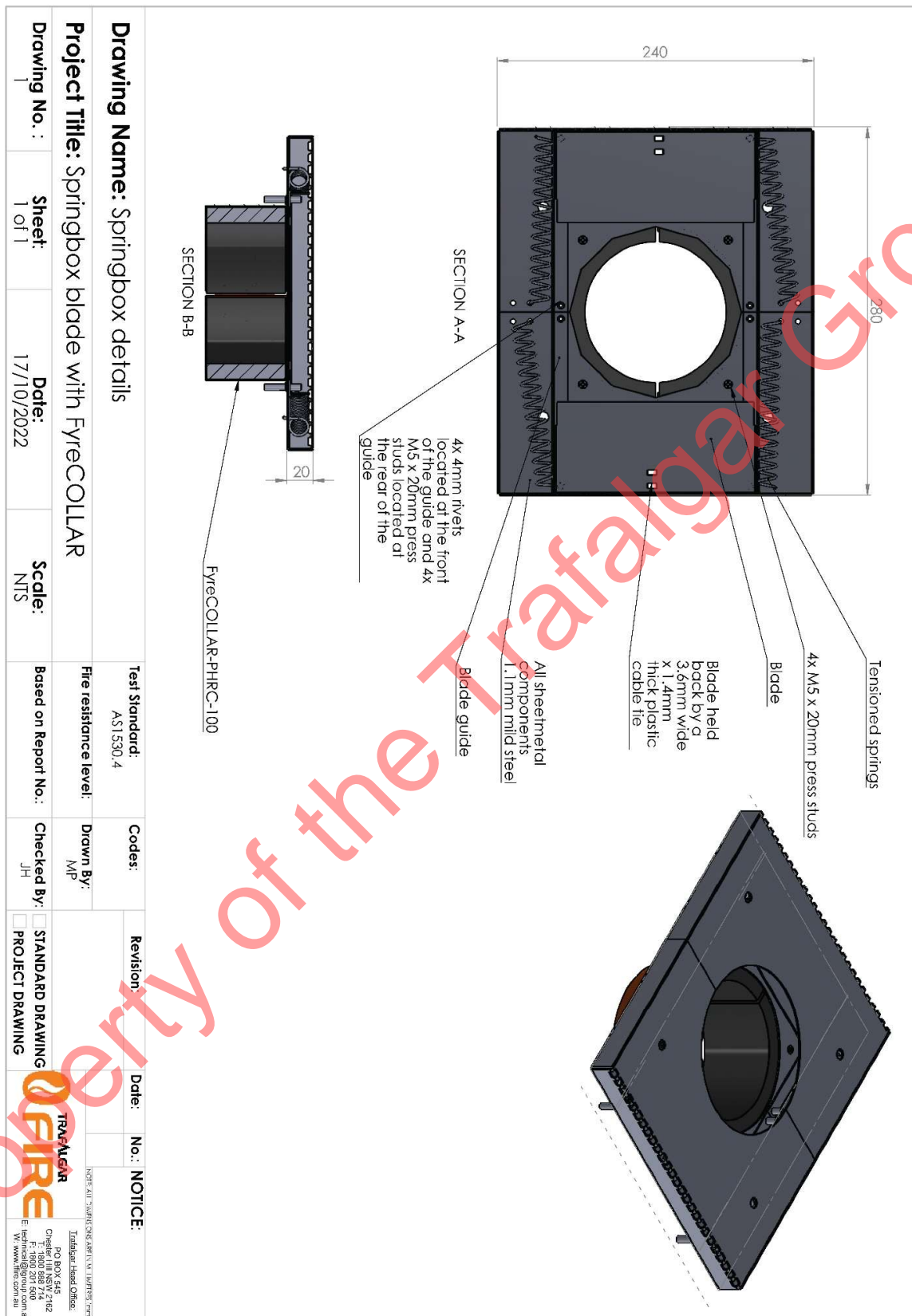
No.:

NOTICE:

Aluminium reinforced foil tape applied directly below slab onto PVC pipe

TRAFFALGAR FIRE

Technical Head Office
 PO BOX 414
 CHERRY LAKE NSW 2162
 T: 1800 888 714
 E: technical@traffalgar.com.au
 W: www.traffalgar.com.au



DRAWING TITLED "SPRINGBOX BLADE WITH FYRECOLLAR", DATED 18 OCTOBER 2022, BY TRAFALGAR

Appendix E – Certificate(s) of Test

INFRASTRUCTURE TECHNOLOGIES www.csiro.au		CSIRO
14 Julius Avenue, North Ryde NSW 2113 PO Box 52, North Ryde NSW 1670, Australia T (02) 9490 5444 • ABN 41 687 119 230		
<h3>Certificate of Test</h3>		No. 3757
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:		
Trafalgar Group Pty Ltd 26A Ferndell Street South Granville, NSW 2142		
A full description of the test specimen and the complete test results are detailed in the Division's report FSP 2317.		
Product Name:		
Description:		
Performance observed in respect of the following AS 1530.4-2014 criteria		
Structural adequacy		
Integrity		
Insulation		
and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of 		
The fire-resistance level is applicable when the system is exposed to fire from the same direction as tested. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.		
Testing Officer:	Chris Wojcik	Date of Test: 13 October 2022
Issued on the 14 th day of November 2022 without alterations or additions.		
 Brett Roddy Manager, Fire Testing and Assessments		
"Copyright CSIRO 2022. ©" Copying or alteration of this report without written authorisation from CSIRO is forbidden		
	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 NUMBERED 3757



Certificate of Test

No. 3758

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:

Trafalgar Group Pty Ltd
26A Ferndell Street
South Granville, NSW 2142

A full description of the test specimen and the complete test results are detailed in the Division's report FSP 2317.

Product Name: A Trafalgar 'Springbox – Blade with Fyrecollar' protecting a 100-mm diameter PVC pipe with floor waste incorporating a P trap penetrating a 121-mm opening in the slab (Specimen 4)

Description: The specimen comprised an 1800-mm x 1800-mm x 150-mm thick concrete slab penetrated by nine service penetrations. For the purpose of the test, the specimens were referenced as specimens 1 to 9. Specimen 4 is the subject of this Certificate. The Trafalgar Springbox – Blade with FyreCOLLAR was constructed from 1.1-mm mild steel plate and consisted of two symmetrical halves. Each half contained a baseplate measuring 140-mm wide x 120-mm long x 20-mm high. The top side of the baseplate contained a blade measuring 154-mm wide x 69-mm long x 15-mm high flange. The blade was held in place with a 12-mm wide x 10-mm high x 137-mm long angles which were secured to the baseplate at the front by two 4-mm steel rivets and at the rear with two M5 x 20-mm press studs. Each blade contained a tensioned spring secured to the baseplate with the blade being pulled back to the rear and held into place with 3.6 mm wide x 1.4-mm thick plastic cable ties. Details are shown in drawing "Springbox blade with FyreCOLLAR" dated 18/10/22, by Trafalgar Fire. On the bottom side of the baseplate, a Trafalgar 100-mm FyreCHOKE Premium Hinged Retrofit collar was secured to the baseplate using M5 x 20-mm pressed stud with a M5 dome nut to suit all four fixing tabs. The penetrating service comprised an Iplex Pipelines DWV uPVC pipe with a 110-mm outside diameter and a wall thickness of 3-mm. The pipe penetrated the concrete slab through a 121-mm opening. On the exposed side of the slab, the pipe was fitted with two halves of the Trafalgar Springbox and secured to the concrete slab using M6 x 50-mm masonry anchors. As shown in drawing "CP34 V3" dated 17/10/2022, by Trafalgar Fire. On the exposed side of the slab, a PVC P-trap was connected to the penetrating pipe with a coupling. The P-trap was plugged with a PVC end cap and supported on the exposed face with 30-mm wide steel strapping fixed to the concrete slab using two M6 x 50-mm masonry anchors. The trap was charged with 1.5-L of water prior to testing. On the unexposed face of the slab a floor waste system was fitted with a polypropylene puddle flange, an acrylonitrile-butadiene-styrene base and a chrome plated brass grate. A 30-mm thick sand and cement screed was laid on top of the concrete slab and finished flush with the grate. The Sponsor provided drawings titled "CP34 V3", Drawings numbered 1 to 11, dated 17 October 2022, "CP34 Specimen Descriptions V2", "Springbox with Pyrosafe", dated 18 October 2022, "Springbox with Fyrecollar", dated 18 October 2022, "Springbox blade with Fyrecollar", dated 18 October 2022, and "Springbox – blade with intumescent", dated 18 October 2022, all by Trafalgar Head Office 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	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 is applicable when the system is exposed to fire from the same direction as tested. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik

Date of Test: 13 October 2022

Issued on the 14th day of November 2022 without alterations or additions.

Brett Roddy | Manager, Fire Testing and Assessments

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Certificate of Test

No. 3759

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:

Trafalgar Group Pty Ltd
26A Ferndell Street
South Granville, NSW 2142

A full description of the test specimen and the complete test results are detailed in the Division's report FSP 2317.

Product Name: A 60-mm diameter stainless steel pipe lagged with Twrap penetrating an 80-mm opening in the slab (Specimen 5)

Description: The specimen comprised an 1800-mm x 1800-mm x 150-mm thick concrete slab penetrated by nine service penetrations. For the purpose of the test, the specimens were referenced as specimens 1 to 9. Specimen 5 is the subject of this Certificate. The penetrating service comprised a stainless-steel pipe with a 60-mm outside diameter and a wall thickness of 1.5-mm which penetrated the concrete slab through a 80-mm opening. The pipe was installed off centre with a resulting annular gap of 8-mm to 18-mm which was backfilled with a bead of Trafalgar FyreFLEX sealant to a depth of 60-mm controlled by a PE backing rod and finished with a 20-mm x 30-mm fillet, as shown in drawing "CP34 V3" dated 17/10/2022, by Trafalgar Fire. On the unexposed side only, a single layer of 300-mm wide x 25-mm thick TWrap (128-kg/m³) was cut to size and wrapped around the stainless-steel pipe with a 50-mm overlap and secured with two 4.6-mm wide stainless steel cable ties located at 50-mm from each end. Any cut edges in the Twrap were sealed with aluminium reinforced tape. The pipe projected vertically, 500-mm away from the unexposed face of the slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 450-mm from the unexposed face of the concrete slab by a support clamp. The pipe was open at the unexposed end and closed with 100-mm of ceramic fibre plug on the exposed end. The Sponsor provided drawings titled "CP34 V3", Drawings numbered 1 to 11, dated 17 October 2022, "CP34 Specimen Descriptions V2", "Springbox with Pyrosafe", dated 18 October 2022, "Springbox with Fyrecollar", dated 18 October 2022, "Springbox blade with Fyrecollar", dated 18 October 2022, and "Springbox – blade with intumescent", dated 18 October 2022, all by Trafalgar Head Office 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	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 is applicable when the system is exposed to fire from the same direction as tested. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik

Date of Test: 13 October 2022

Issued on the 14th day of November 2022 without alterations or additions.

Brett Roddy | Manager, Fire Testing and Assessments

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COPY OF CERTIFICATE OF TEST NUMBERED 3759



Certificate of Test

No. 3760

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:

Trafalgar Group Pty Ltd
26A Ferndell Street
South Granville, NSW 2142

A full description of the test specimen and the complete test results are detailed in the Division's report FSP 2317.

Product Name: A 170-mm diameter stainless steel pipe lagged with Twrap penetrating a 200-mm opening in the slab (Specimen 6)

Description: The specimen comprised an 1800-mm x 1800-mm x 150-mm thick concrete slab penetrated by nine service penetrations. For the purpose of the test, the specimens were referenced as specimens 1 to 9. Specimen 6 is the subject of this Certificate. The penetrating service comprised a stainless-steel pipe with a 170-mm outside diameter and a wall thickness of 1.5-mm, which penetrated the concrete slab through a 200-mm opening. The pipe was installed off centre with a resulting annular gap of 5-mm to 25-mm and was backfilled with a bead of Trafalgar FyreFLEX sealant to a depth of 60-mm controlled by a PE backing rod and finished with a 30-mm x 30-mm fillet, as shown in drawing "CP34 V3" dated 17/10/2022, by Trafalgar Fire. On the unexposed side only, a single layer of 300-mm wide x 25-mm thick Twrap (128-kg/m³) was cut to size and wrapped around the stainless-steel pipe with a 50-mm overlap. Another layer of 300 mm Twrap was cut to size and wrapped around the stainless-steel pipe and service support with 50-mm overlap. The wrap was butt jointed together to form a total width of 600-mm with four 4.6-mm wide stainless steel cable ties securing the wrap at 50-mm from each end and 150mm centres. Any cut edges in the Twrap were sealed with aluminium reinforced tape. The pipe projected vertically, 800-mm away from the unexposed face of the slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 300-mm and 700-mm from the unexposed face of the concrete slab using support clamps. The pipe was open at the unexposed end and closed with 100-mm of ceramic fibre plug on the exposed end. The Sponsor provided drawings titled "CP34 V3", Drawings numbered 1 to 11, dated 17 October 2022, "CP34 Specimen Descriptions V2", "Springbox with Pyrosafe", dated 18 October 2022, "Springbox with Fyrecollar", dated 18 October 2022, "Springbox blade with Fyrecollar", dated 18 October 2022, and "Springbox – blade with intumescent", dated 18 October 2022, all by Trafalgar Head Office 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	95 minutes

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

The fire-resistance level is applicable when the system is exposed to fire from the same direction as tested. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik

Date of Test: 13 October 2022

Issued on the 14th day of November 2022 without alterations or additions.

Brett Roddy | Manager, Fire Testing and Assessments

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COPY OF CERTIFICATE OF TEST NUMBERED 3760



Certificate of Test

No. 3761

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:

Trafalgar Group Pty Ltd
26A Ferndell Street
South Granville, NSW 2142

A full description of the test specimen and the complete test results are detailed in the Division's report FSP 2317.

Product Name: A Trafalgar Springbox – Blade with Pyrosafe DG cable bandage protecting a 100-mm diameter PVC pipe with floor waste incorporating a P-trap penetrating a 121-mm opening in the slab (Specimen 7)

Description: The specimen comprised an 1800-mm x 1800-mm x 150-mm thick concrete slab penetrated by nine service penetrations. For the purpose of the test, the specimens were referenced as specimens 1 to 9. Specimen 7 is the subject of this Certificate. The Trafalgar Springbox – Blade with Pyrosafe DG cable bandage was constructed from 1.1-mm mild steel plate and consisted of two symmetrical halves. Each half contained a baseplate measuring 120-mm wide x 120-mm long x 20-mm high. The top side of the baseplate was lined with two sets of Gee-Whiz intumescent strips (1100-1300-kg/m³) measuring 85-mm long x 55-mm wide x 1.8-mm thick and 50-mm long x 50-mm wide x 1.8-mm thick. A tensioned spring was secured to the baseplate and pulled back to the rear and held into place with 3.6-mm wide x 1.4-mm thick plastic cable ties, as shown in drawing "Springbox with Pyrosafe" dated 18/10/2022, by Trafalgar Fire. The penetrating service comprised an Iplex Pipelines DWV uPVC pipe with a 110-mm outside diameter and a wall thickness of 3-mm which penetrated the concrete slab through a 121-mm opening. On the exposed side of the slab, the pipe was fitted with two halves of the Trafalgar Springbox (with Pyrosafe DG cable bandage wrapped around the pipe first) and secured to the concrete slab using four M6 x 50-mm masonry anchors. A 137-mm wide Pyrosafe DG cable bandage was applied around the uPVC pipe with a 22-mm overlap in line with the slab. The Pyrosafe DG cable bandage was secured to the uPVC pipe using 4.6-mm wide stainless steel cable ties located 13-mm and 97mm from the exposed face of the concrete slab. As shown in drawing "CP34 V3" dated 17/10/2022, by Trafalgar Fire. On the exposed side of the slab, a PVC P-trap was connected to the penetrating pipe with a coupling. The P-trap was capped with a PVC end cap and supported on the exposed face with 30-mm wide steel strapping fixed to the concrete slab using two M6 x 50-mm masonry anchors. The trap was charged with 1.5-L of water prior to testing. On the unexposed face of the concrete slab a floor waste system was fitted with a polypropylene puddle flange, an acrylonitrile-butadiene-styrene base and a chrome plated brass grate. A 30-mm thick sand and cement screed was laid on top of the concrete slab and finished flush with the grate. The Sponsor provided drawings titled "CP34 V3", Drawings numbered 1 to 11, dated 17 October 2022, "CP34 Specimen Descriptions V2", "Springbox with Pyrosafe", dated 18 October 2022, "Springbox with Fyrecollar", dated 18 October 2022, "Springbox blade with Fyrecollar", dated 18 October 2022, and "Springbox – blade with intumescent", dated 18 October 2022, all by Trafalgar Head Office 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	47 minutes
Insulation	30 minutes

and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/30/30.

The fire-resistance level is applicable when the system is exposed to fire from the same direction as tested. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik

Date of Test: 13 October 2022

Issued on the 14th day of November 2022 without alterations or additions.

Brett Roddy | Manager, Fire Testing and Assessments

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COPY OF CERTIFICATE OF TEST NUMBERED 3761



Certificate of Test

No. 3762

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:

Trafalgar Group Pty Ltd
26A Fernfell Street
South Granville, NSW 2142

A full description of the test specimen and the complete test results are detailed in the Division's report FSP 2317.

Product Name: A Trafalgar 'Springbox – Blade with Intumescent' protecting a 100-mm diameter PVC pipe floor waste incorporating a P trap penetrating a 121-mm opening in the slab (Specimen 8)

Description: The specimen comprised an 1800-mm x 1800-mm x 150-mm thick concrete slab penetrated by nine service penetrations. For the purpose of the test, the specimens were referenced as specimens 1 to 9. Specimen 8 is the subject of this Certificate. The Trafalgar Springbox – Blade with intumescent was constructed from 1.1-mm mild steel plate and consisted of two symmetrical halves. Each half contained a baseplate measuring 140-mm wide x 120-mm long x 20-mm high. The top side of the baseplate contained a blade measuring 154-mm width x 69-mm length, with a 15-mm height flange. Each blade was lined with a Trafalgar Intumescent strip (730-kg/m³) measuring 55-mm wide x 150-mm long x 10-mm thick fitted with double sided tape. The blade was held into place with a 12-mm wide x 10-mm high x 137-mm long angles secured to the baseplate at the front by two 4-mm steel rivets and at the rear with two M5 x 20-mm press studs. Each blade contained a tensioned spring secured to the baseplate with the blade being pulled back to the rear and the blade held into place with 3.6-mm wide x 1.4-mm thick plastic cable ties as shown in drawing "Springbox – Blade with intumescent" dated 18/10/2022, by Trafalgar Fire. The penetrating service comprised an Iplex Pipelines DWV uPVC pipe with a 110-mm outside diameter and a wall thickness of 3-mm which penetrated the concrete slab through a 121-mm opening. On the exposed side of the slab, the pipe was fitted with two halves of the Trafalgar Springbox (blade with intumescent) and secured to the concrete slab using four M6 x 50-mm masonry anchors as shown in drawing "CP34 V3" dated 17/10/2022, by Trafalgar Fire. On the exposed side of the slab, a PVC P-trap was connected to the penetrating pipe with a coupling. The P-trap was fitted with a PVC end cap and supported on the exposed face with 30-mm wide steel strapping fixed to the concrete slab using two M6 x 50-mm masonry anchors. The trap was charged with 1.5-L of water prior to testing. On the unexposed face of the slab a floor waste system was fitted with a polypropylene puddle flange, an acrylonitrile-butadiene-styrene base and a chrome plated brass grate. A 30-mm thick sand and cement screed was laid on top of the concrete slab and finished flush with the grate. The Sponsor provided drawings titled "CP34 V3", Drawings numbered 1 to 11, dated 17 October 2022, "CP34 Specimen Descriptions V2", "Springbox with Pyrosafe", dated 18 October 2022, "Springbox with Fyrecollar", dated 18 October 2022, "Springbox blade with Fyrecollar", dated 18 October 2022, and "Springbox – blade with intumescent", dated 18 October 2022, all by Trafalgar Head Office 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 241 minutes
Insulation	no failure 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 is applicable when the system is exposed to fire from the same direction as tested. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik

Date of Test: 13 October 2022

Issued on the 14th day of November 2022 without alterations or additions.



Brett Roddy | Manager, Fire Testing and Assessments

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Certificate of Test

No. 3763

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:

Trafalgar Group Pty Ltd
26A Ferndell Street
South Granville, NSW 2142

A full description of the test specimen and the complete test results are detailed in the Division's report FSP 2317.

Product Name: A Trafalgar 'Springbox with foil tape' and Fyrecollar protecting a 100-mm diameter PVC pipe with floor waste incorporating a P trap penetrating a 121-mm opening in the slab (Specimen 9)

Description: The specimen comprised an 1800-mm x 1800-mm x 150-mm thick concrete slab penetrated by nine service penetrations. For the purpose of the test, the specimens were referenced as specimens 1 to 9. Specimen 9 is the subject of this Certificate. The Trafalgar Springbox – with foil tape and FyreCOLLAR was constructed from 1.1-mm mild steel plate and consisted of two symmetrical halves. Each half contained a baseplate measuring 120-mm wide x 120-mm long x 20-mm high. On the top side of the baseplate, a tensioned spring was secured to the baseplate and pulled back to the rear and held into place with 3.6-mm wide x 1.4-mm thick plastic cable ties. As shown in drawing "Springbox with FyreCOLLAR" dated 18/10/2022, by Trafalgar Fire. On the bottom side of the baseplate, a Trafalgar 100mm FyreCHOKE Premium Hinged Retrofit collar secured to the baseplate using 8g x 16mm tech screws through all four fixing tabs. The penetrating service comprised an Iplex Pipelines DWV uPVC pipe with a 110-mm outside diameter and a wall thickness of 3-mm which penetrated the concrete slab through a 121-mm opening. On the exposed side of the slab, a 95-mm wide aluminium reinforced foil tape was applied around the uPVC pipe with a 22-mm overlap in line with the slab. The Springbox with foil tape and FyreCOLLAR was secured to the exposed face of the concrete slab using four M6 x 50mm masonry anchors as shown in drawing "CP34 V3" dated 17/10/2022, by Trafalgar Fire. On the exposed side of the slab, a PVC P-trap was connected to the penetrating pipe with a coupling. The P-trap was plugged with a PVC end cap and supported on the exposed face with 30-mm wide steel strapping fixed to the concrete slab using two M6 x 50-mm masonry anchors. The trap was charged with 1.5-L of water prior to testing. On the unexposed face of the slab a floor waste system was fitted with a polypropylene puddle flange, an acrylonitrile-butadiene-styrene base and a chrome plated brass grate. A 30-mm thick sand and cement screed was laid on top of the concrete slab and finished flush with the grate. The Sponsor provided drawings titled "CP34 V3", Drawings numbered 1 to 11, dated 17 October 2022, "CP34 Specimen Descriptions V2", "Springbox with Pyrosafe", dated 18 October 2022, "Springbox with Fyrecollar", dated 18 October 2022, "Springbox blade with Fyrecollar", dated 18 October 2022, and "Springbox – blade with intumescent", dated 18 October 2022, all by Trafalgar Head Office 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	119 minutes
Insulation	92 minutes

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

The fire-resistance level is applicable when the system is exposed to fire from the same direction as tested. For the purposes of AS 1530.4-2014 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions. This certificate is provided for general information only and does not comply with regulatory requirements for evidence of compliance.

Testing Officer: Chris Wojcik

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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. |

** end of report **

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CONTACT US

t 1300 363 400
+61 3 9545 2176
e enquiries@csiro.au
w www.csiro.au

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FOR FURTHER INFORMATION

Infrastructure Technologies

Chris Wojcik
Manager Fire Resistance Testing
t +61 2 9490 5508
e chris.wojcik@csiro.au

w www.csiro.au/Organisation-Structure/Divisions/CMSE/Infrastructure-Technologies/Fire-safety.aspx

Infrastructure Technologies

Brett Roddy
Team Leader, Fire Testing and Assessments
t +61 2 94905449
e brett.rodby@csiro.au

w www.csiro.au/Organisation-Structure/Divisions/CMSE/Infrastructure-Technologies/Fire-safety.aspx