

TEST REPORT

PF25013

Fire resistance test for penetrations through a vertical separating element

Client:	BOSS Products (Australia) Pty Ltd
Test method:	AS1530.4-2014
Report Date:	17/04/2025
Test number:	PF25013

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1.1 Document revision schedule

Revision #	Date	Description
1	15/04/2025	Initial issue for Client review
2	17/04/2025	Issued to Client

1.2 Signatories

Report	Name	Signature	Date
Prepared by:	Alexey Kokorin		17/04/2025
Authorised by:	Andrew Bain (Authorized signatory)		17/04/2025



All tests reported herein
have been performed in
accordance with the
laboratory's scope of
accreditation

2. Report Summary

Service penetrations were tested passing through a 92mm steel frame insulated wall lined with one layer of 13mm fire rated plasterboard on each side.

SP #	Service	Actual Integrity (min)	Actual Insulation (min)	FRL *
1	20mm Copper Pipe with heat trace cable and 13mm thick nitrile insulation	93NF	93NF	-/60/60
2	20mm Pex pipe with heat trace cable and 13mm thick nitrile insulation	93NF	89	-/60/60
3	HVAC Bundle – 1 x 19.05mm & 9.52mm Copper pipes with 13mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm ² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe	93NF	93NF	-/60/60
4	HVAC Bundle – 1 x 19.05mm & 9.52mm Copper pipes with 25mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm ² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe	93NF	43	-/60/30
5	HVAC Bundle – 1 x 32mm & 25mm Copper pipes with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm ² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe	93NF	93NF	-/60/60
6	HVAC Bundle – 2 x 19.05mm & 9.52mm Copper pipes with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm ² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe	93NF	93NF	-/60/60
7	65mm Sprinkler pipe	93NF	44	-/60/30
8	2 x 20mm & 1 x 25mm uPVC Conduit	93NF	93NF	-/60/60
9	32mm Copper pipe with 25mm thick nitrile insulation	93NF	93NF	-/60/60

NF – No Failure

* - FRL was reduced to the published performance of the wall.

3. General Information

3.1 Testing Scope

Applicable Standards:

AS 1530.4-2014 Section 10: Service penetrations and control joints

AS 4072.1-2005 (r. 2016) Components for the protection of openings in fire-resistant separating elements. Part 1: Service penetrations and control joints

Departures from Testing Method:

No departures from the testing method

Performance Criteria:

Failure shall be deemed to have occurred when one of the following occurs:

- a) The temperature at any location on the unexposed face of the test specimen exceeds the initial temperature by more than 180°C
- b) Integrity failure shall be deemed to have occurred upon ignition of the cotton pad when glowing or flaming occurs for a period of 30 seconds.
- c) Flaming to the unexposed face for 10 seconds or longer shall be deemed to be an Integrity failure.

Documentation:

Testing products were checked and tested based on the Client description, refer to the Specimens description below. Documents provided by the Client:

- Test 3 – Elevation – Aperture Location Fire Side – Horizontal.pdf
- Test 3 – Elevation – Aperture Location Fire Side – Vertical.pdf
- Test 3 – Elevation – Aperture Size Fire Side.pdf
- Test 3 – Elevation – Fire Side.pdf
- Test 3 – Elevation – Framing Fire Side.pdf
- Test 3 – Elevation – Non Fire Side.pdf
- Test 3 – Section A.pdf
- Test 3 – Specimen Sections.pdf

3.2 Contact Details

Accredited Testing Laboratory

FTSL - Passive Fire Inspection and Test Services Ltd

Accreditation Number - 1335

1/113 Pavilion Drive, Mangere, Auckland, 2022

New Zealand

Contact e-mail: tests@firelab.co.nz

Client/Applicant:

BOSS Products (Australia) Pty Ltd

Unit 1, 16 Atkinson Road, Tarren Point 2229, New South Wales

Australia

Contact e-mail: mark.prior@bossfire.com.au

Supplier/Manufacturer:

Same as Client/Applicant

3.3 Specimen Preparation, Conditioning and Timeline

Specimens conditioning and delivery to Laboratory:

Separating element was built by the Laboratory in line with Client instructions. Installation of fire stopping system was performed by the Client. The Laboratory was not involved in sampling of the materials. The Laboratory checked materials during construction of the specimen. Services were capped on the fire side.

Testing date:

08/04/2025

Installation completion date:

13/03/2025

Termination of The Test:

The test was discontinued at 93 minutes.

3.4 Use of the Report

This report shall not be reproduced, except in full.

This report details the methods of construction, 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 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 measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

The test results relate to the specimens of the product in the form in which they were tested. Differences in the composition or thickness of the product may significantly affect the performance during the test and may therefore invalidate the test results. Care should be taken to ensure that any product, which is supplied or used, is fully represented by the specimens, which were tested.

The specimens were supplied by the sponsor and the Laboratory was not involved in any of selection or sampling procedures.

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.

4. Specimen Description

4.1 Supporting Construction

Separating element		
1.1	Item	92mm (nominal) steel stud insulated frame with one layer of 13mm FR Plasterboard fitted to each side of the separating element
	Dimensions	Width x Height: 1200mm x 1200mm

Materials		
1.2	Item	Ramset AnkaScrew AS06075WGM
	Dimensions	6mm x 75mm
	Installation	Fixing top and bottom plates to refractory frame
1.3	Item	Steel Stud 0.50bmt
	Dimensions	Width x Height: 92mm x 1200mm
	Installation	Used to construct studs and nogs in steel frame
1.4	Item	Steel Deflection Head 0.75bmt
	Dimensions	Width x Height: 92mm x 1200mm
	Installation	Used to construct top plate
1.4	Item	Steel Track 0.50bmt
	Dimensions	Width x Height: 92mm x 1200mm
	Installation	Used to construct bottom plate
1.5	Item	Self-Tapping Screw
	Dimensions	10g x 16mm
	Installation	Used to construct steel stud frame
1.6	Item	GIB Fyreline
	Dimensions	Width x Height: 1200mm x 1200mm
		Thickness: 13mm
	Installation	1 layer applied to each face of separating element
1.7	Item	GIB Grabber Self Tapping Screw
	Dimensions	41mm
	Installation	Used to secure GIB Fyreline to frame

1.8	Item	GIB Plus 4 Plaster
	Dimensions	15L Pail
	Installation	Used to cover screw heads on plasterboard
1.9	Item / Product Name	Boss FireMastic-300
	Dimensions	600mL sausage
	Installation	Used to seal between separating element and refractory frame
1.10	Item	Boss Batt
	Dimensions	Width x Height: 600mm x 1200mm
	Installation	Cut to fit flush in studs and nogs between fire cells
1.11	Item	Earthwool insulation – glass wool insulation
	Dimensions	R2.2 90mm thick
	Installation	Insulation in cavity of each cell in the separating element

4.2 Specimens

Services		
2.1	Item	Kembla NZS3501 1 20x1.02 20mm Copper Pipe
	Dimensions	Diameter (OD): 21.2mm
		Diameter (ID): 19.2mm
		Wall Thickness (T): 1.0mm
2.2	Item	Chemelex Raychem EM2-XR Heat Trace Cable 2 Core
	Cable	Width x Depth: 13.6mm x 6.4mm
		Sheath Material: Modified Polyolefin
		Sheath Thickness: 0.7mm
	Core	Number of Cores: 2
		Overall Diameter: 10.0mm x 2.5mm
		Conductor Diameter: 0.27mm
		Conductor Material: Copper
		Insulation Material: Tinned Copper Braid

		Insulation Thickness: 0.48mm
2.3	Item	K Flex Fire-Retardant Nitrile Insulation 20x13
	Dimensions	Diameter (OD): 46.0mm
		Diameter (ID): 20.0mm
		Insulation Thickness (T): 13.0mm
2.4	Item	Auspex DN20 PN20 SDR9 PE-Xb Pipe
	Dimensions	Diameter (OD): 20.4mm
		Diameter (ID): 14.3mm
		Wall Thickness (T): 3.05mm
2.5	Item	Ardent Super Pair FR Rubber Insulated Fire Retardant Pair Coil 13mm
	Copper Tube 1	Diameter (OD): 15.88mm
		Diameter (ID): 13.84mm
		Wall Thickness (T): 1.02mm
	Copper Tube 2	Diameter (OD): 9.52mm
		Diameter (ID): 7.9mm
		Wall Thickness (T): 0.81mm
	Insulation	Thickness (T): 13mm
		Material: Fire rated closed cell rubber
2.6	Item	Maser MAS5102ES Instrumentation Cable 1PR 2 Core 1.5mm ²
	Cable	Overall Diameter: 7.1mm
		Sheath Material: 5V-90 PVC
		Sheath Thickness: 0.9mm
	Core	Number of Cores: 2
		Overall Diameter: 2.3mm
		Conductor Diameter: 0.5mm
		Conductor Material: Tinned Copper
		Insulation Material: V90HT
		Insulation Thickness: 0.5mm
2.7	Item	Nexans Olex 2024 V-90 Electrical Cable 450/750V 2C+E 2.5mm ²

	Cable	Width x Depth: 11.7mm x 5.2mm
		Sheath Material: PVC
		Sheath Thickness: 0.95mm
	Core	Number of Cores: 2 (circular shaped)
		Overall Diameter: 3.26mm
		Conductor Diameter: 0.63mm
		Conductor Material: Copper
		Insulation Material: V-90 PVC
		Insulation Thickness: 0.8mm
	Earth	Overall Diameter: 3.1mm
		Wire Diameter: 0.65mm
2.8	Item	Marley Pressure Pipe S1 PVC-U DN20 PN15
	Dimensions	Diameter (OD): 26.2mm
		Diameter (ID): 22.9mm
		Wall Thickness (T): 1.65mm
2.9	Item	Ardent 9.52mm Copper Coil
	Dimensions	Diameter (OD): 9.4mm
		Diameter (ID): 7.9mm
		Wall Thickness (T): 1.15mm
2.10	Item	Ardent 19.05mm Copper Coil
	Dimensions	Diameter (OD): 19.4mm
		Diameter (ID): 13.8mm
		Wall Thickness (T): 1.3mm
2.11	Item	K Flex Fire-Retardant Nitrile Insulation 10x25
	Dimensions	Diameter (OD): 60.0mm
		Diameter (ID): 10.0mm
		Insulation Thickness (T): 25.0mm
2.12	Item	K Fire-Retardant Nitrile Insulation 20x25
	Dimensions	Diameter (OD): 70.0mm
		Diameter (ID): 20.0mm
		Insulation Thickness (T): 25.0mm

2.13	Item	Kembla NZS3501 2 25x1.02 B 25mm Copper Pipe
	Dimensions	Diameter (OD): 27.5mm
		Diameter (ID): 24.5mm
		Wall Thickness (T): 1.5mm
2.14	Item	Kembla NZS3501 2 32x1.22 B 32mm Copper Pipe
	Dimensions	Diameter (OD): 34.2mm
		Diameter (ID): 31.1mm
		Wall Thickness (T): 1.65mm
2.15	Item	K Flex Fire-Retardant Nitrile Insulation 25x19
	Dimensions	Diameter (OD): 63.0mm
		Diameter (ID): 25.0mm
		Insulation Thickness (T): 19.0mm
2.16	Item	K Flex Fire-Retardant Nitrile Insulation 32x19
	Dimensions	Diameter (OD): 70.0mm
		Diameter (ID): 32.0mm
		Insulation Thickness (T): 19.0mm
2.17	Item	K Flex Fire-Retardant Nitrile Insulation 10x19
	Dimensions	Diameter (OD): 48.0mm
		Diameter (ID): 15.0mm
		Insulation Thickness (T): 13.0mm
2.18	Item	K Flex Fire-Retardant Nitrile Insulation 20x19
	Dimensions	Diameter (OD): 58.0mm
		Diameter (ID): 20.0mm
		Insulation Thickness (T): 19.0mm
2.19	Item	65mm Steel Pipe
	Dimensions	Diameter (OD): 76.0mm
		Diameter (ID): 69.1mm
		Wall Thickness (T): 3.45mm
2.20	Item	Marley Arma Above Ground uPVC Electrical Conduit 20mm
	Dimensions	Diameter (OD): 20.0mm

		Diameter (ID): 16.0mm
		Wall Thickness (T): 2.0mm
2.21	Item	Marley Arma Above Ground uPVC Electrical Conduit 25mm
	Dimensions	Diameter (OD): 26.9mm
		Diameter (ID): 23.0mm
		Wall Thickness (T): 1.95mm
2.22	Item	K Flex Fire-Retardant Nitrile Insulation 32x25
	Dimensions	Diameter (OD): 82.0mm
		Diameter (ID): 25.0mm
		Insulation Thickness (T): 32.0mm

Sealants

3.1	Item	Boss FireMastic-300
	Dimensions	600mL sausage
3.2	Item	Boss FireMastic-HPE
	Dimensions	600mL sausage

Intumescent

4.1	Item	BOSS Collar Shell 150 (no intumescent included)
	Collar	Height: 40mm
		Maximum Opening: 163mm
		Steel Thickness: 0.70BMT
	Fixing Points	3

Fixings

5.1	Item	Bremick Hex Head Screw Type 17
	Dimensions	12g x 25mm
5.2	Item	Ramset RD16 16mm Steel Disc
	Dimensions	Diameter (OD): 16mm
5.3	Item	Ramset Hollow Wall Anchor 16-24mm
	Description	Cavity fixing for plasterboard up to 38mm

5. Test Conditions

5.1 Equipment

Furnace:

1200X1200mm Indicative Furnace designed to operate to AS1530.4:2014

Temperature:

Furnace Temperature measurements were controlled with 3mm Type K MIMS thermocouples set within 50-100 mm from the face of the specimens in line with AS1530.4-2014. All thermocouples are calibrated by ISO/IEC 17025 accredited laboratory - a signatory to the International Laboratory Accreditation Corporation (ILAC) through their Mutual Recognition Agreement (MRA) to the accuracy required by AS 1530.4-2014.

Pressure measurement:

Keypare Siemens Data logging system including multi-channel recording data at 5 second intervals. Calibrated by ISO/IEC 17025 accredited laboratory - a signatory to the International Laboratory Accreditation Corporation (ILAC) through their Mutual Recognition Agreement (MRA) to the accuracy required by AS 1530.4-2014.

Ambient Temperature:

Ambient temperature was recorded 15 minutes before the test was commenced, at the start of the test and monitored during the test. All thermocouples are calibrated by ISO/IEC 17025 accredited laboratory - a signatory to the International Laboratory Accreditation Corporation (ILAC) through their Mutual Recognition Agreement (MRA) to the accuracy required by AS 1530.4-2014.

Specimen thermocouples:

Specimen thermocouples were installed to the unexposed face. Type K copper disk thermocouples fixed within the required locations referenced from AS1530.4-2014. Thermocouples are calibrated by ISO/IEC 17025 accredited laboratory - a signatory to the International Laboratory Accreditation Corporation (ILAC) through their Mutual Recognition Agreement (MRA) to the accuracy required by AS 1530.4-2014.

Dimensional measurements:

All linear measurements are made with equipment calibrated by ISO/IEC 17025 accredited laboratory - a signatory to the International Laboratory Accreditation Corporation (ILAC) through their Mutual Recognition Agreement (MRA) to the accuracy required by AS 1530.4-2014.

5.2 Furnace Data

Furnace Temperature:

The furnace was controlled to follow the temperature/time relationship specified in AS 1530.4-2014.

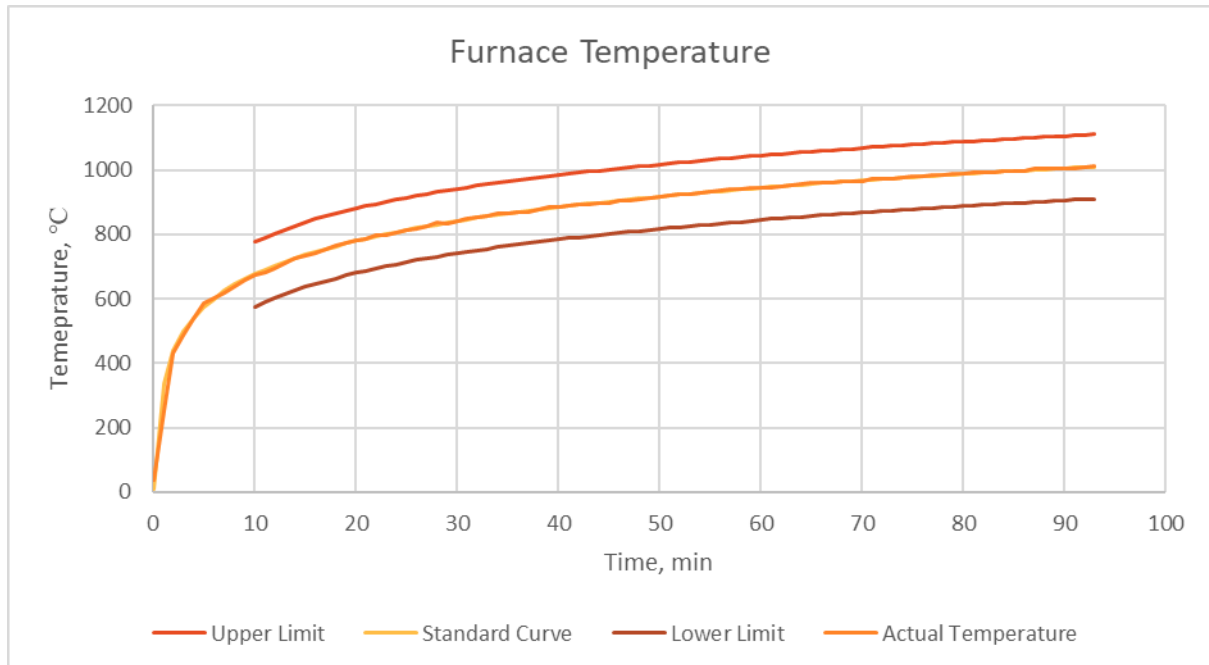


Figure 1 - Furnace Temperature during the test

Ambient Temperature:

The ambient temperature of the test area 15 minutes before the test and at the commencement of the test was 21°C.

Furnace Pressure:

After the first 5 minutes of the test, the furnace pressure was maintained at 15 ± 3 Pa with respect to atmosphere. The probe was located 500mm above the furnace floor.

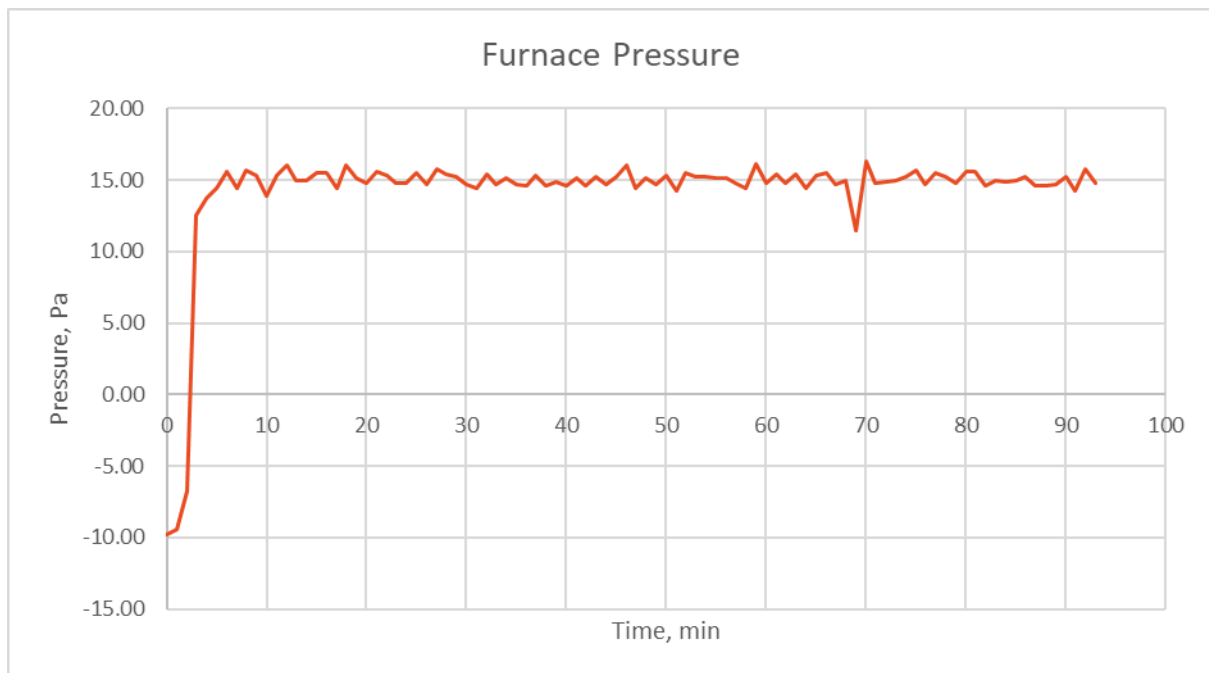


Figure 2 - Furnace Pressure during the test

5.3 Thermocouple locations

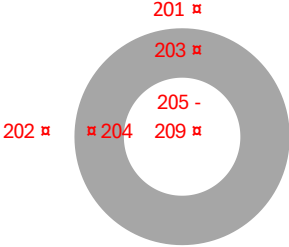
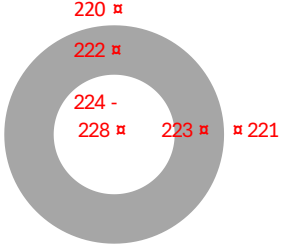
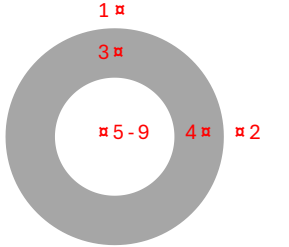
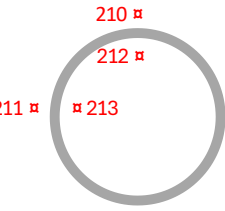
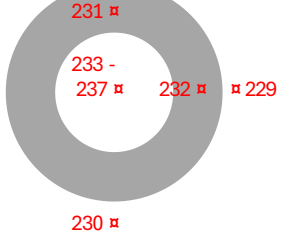
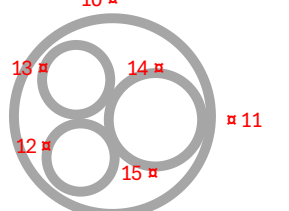
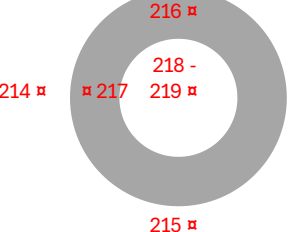
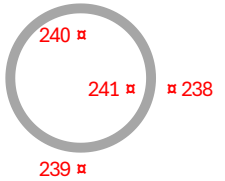
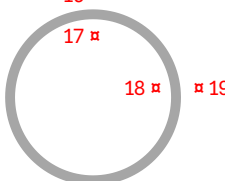
Service: OTHER # of Thermocouples: 9 Start: TC201 Finish: TC209 SP5 - HVAC Bundle  TC205 - PAIR COIL TC206 - CONTROL CABLE TC207 - TPS CABLE TC208 - CONDENSATE TC209 - PAIR COIL	Service: OTHER # of Thermocouples: 9 Start: TC220 Finish: TC228 SP3 - HVAC Bundle  TC224 - TPS CABLE TC225 - CONDENSATE TC226 - CONTROL CABLE TC227 - PAIR COIL TC228 - PAIR COIL	Service: OTHER # of Thermocouples: 9 Start: TC1 Finish: TC9 SP4 - HVAC Bundle  TC5 - CONDENSATE TC6 - CONTROL CABLE TC7 - PAIR COIL TC8 - TPS CABLE TC9 - PAIR COIL
Service: COPPER - 20 # of Thermocouples: 4 Start: TC210 Finish: TC213 SP1 	Service: OTHER # of Thermocouples: 9 Start: TC229 Finish: TC237 SP6 - HVAC Bundle  TC233 - PAIR COIL TC234 - CONDENSATE TC235 - TPS CABLE TC236 - CONTROL CABLE TC237 - PAIR COIL	Service: OTHER # of Thermocouples: 6 Start: TC10 Finish: TC15 SP8 - Conduit Bundle 
Service: STEEL PIPE - 65 # of Thermocouples: 6 Start: TC214 Finish: TC219 SP7 - 	Service: COPPER PIPE - 32 # of Thermocouples: 4 Start: TC238 Finish: TC241 SP9 - 	Service: PEX PIPE - 20 # of Thermocouples: 4 Start: TC16 Finish: TC19 SP2 

Figure 3 - Thermocouple locations

6. Test Results

6.1 Observations during the test

Time min	Test face	SP#	OBSERVATIONS/REMARKS
1	U	3, 5, 6, 8	Smoke coming from between the services
5	E	ALL	PVC in all services have fallen away from the separating element and intumescent is beginning to engage
8	U	2	Pipe beginning to distort
12	U	1, 3, 4, 5, 6	Nitrile rubber insulation around pipe beginning to expand
14	U	2, 9	Nitrile rubber insulation around pipe beginning to expand
23	U	1, 2, 3	Visible cracks beginning to appear in sealant
23	U	8	Visible cracks beginning to appear in sealant, smoke coming through
30	U	8	Sealant beginning to expand
38	U	4	Hole developing in nitrile rubber insulation, smoke coming through
41	U	1	Hole visible in the sealant, smoke coming through
41	U	8	Hole visible in the sealant, smoke coming through
41	U	7	Sealant beginning to expand
43	U	4	Nitrile rubber insulation showing discolouration, intumescent beginning to expand
52	U	2	Nitrile rubber insulation starting to melt close to the separating element
52	U	1	Nitrile rubber insulation showing discolouration
52	U	7	Sealant beginning to discolour
52	U	9	Sealant beginning to expand, smoke coming through
58	U	9	Intumescent from sealant falling away from the specimen
61	U	1	Sealant beginning to expand
66	U	8	Discolouration of the separating element in the top left corner

70	U	3	Sealant cracking and beginning to expand
71	U	5	Sealant beginning to expand
79	U	4	Intumescent from sealant falling away from the specimen
82	U	6	Crack visible in pipe by collar, smoke coming through
89	U	1	Intumescent from sealant falling away from the specimen
93			TEST DISCONTINUED

NOTE: E – Exposed Face (inside furnace)
U – Unexposed Face (outside furnace)
SE – Separating element

6.2 Specimen 1

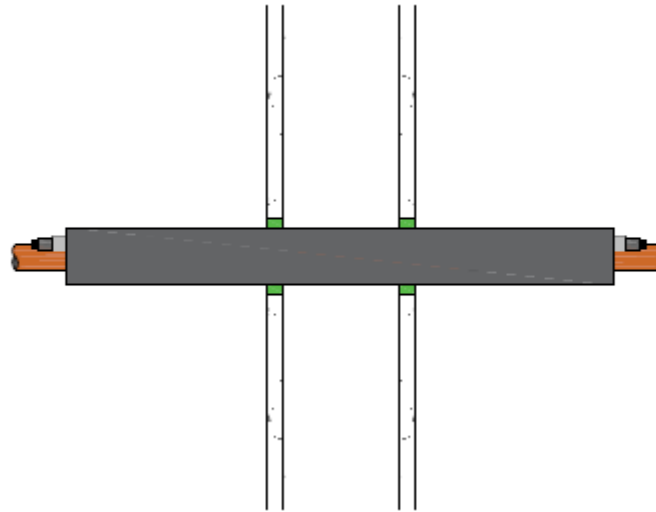


Figure 4 - Specimen 1

Service penetration details	
Service	20mm Copper Pipe + Heat Trace Cable with 13mm thick Nitrile Insulation
Service Support	Exposed Face: 280mm Unexposed Face: 480mm
Aperture Size	60.6mm
Annular Spacing	Min: 5.1mm, Max: 8.3mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	FireMastic-HPE
Procedure	1. FireMastic-HPE applied to the annular gap, 13mm (nominal) deep and finished flush with the separating element.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 93 minutes
Insulation	No failure at 93 minutes

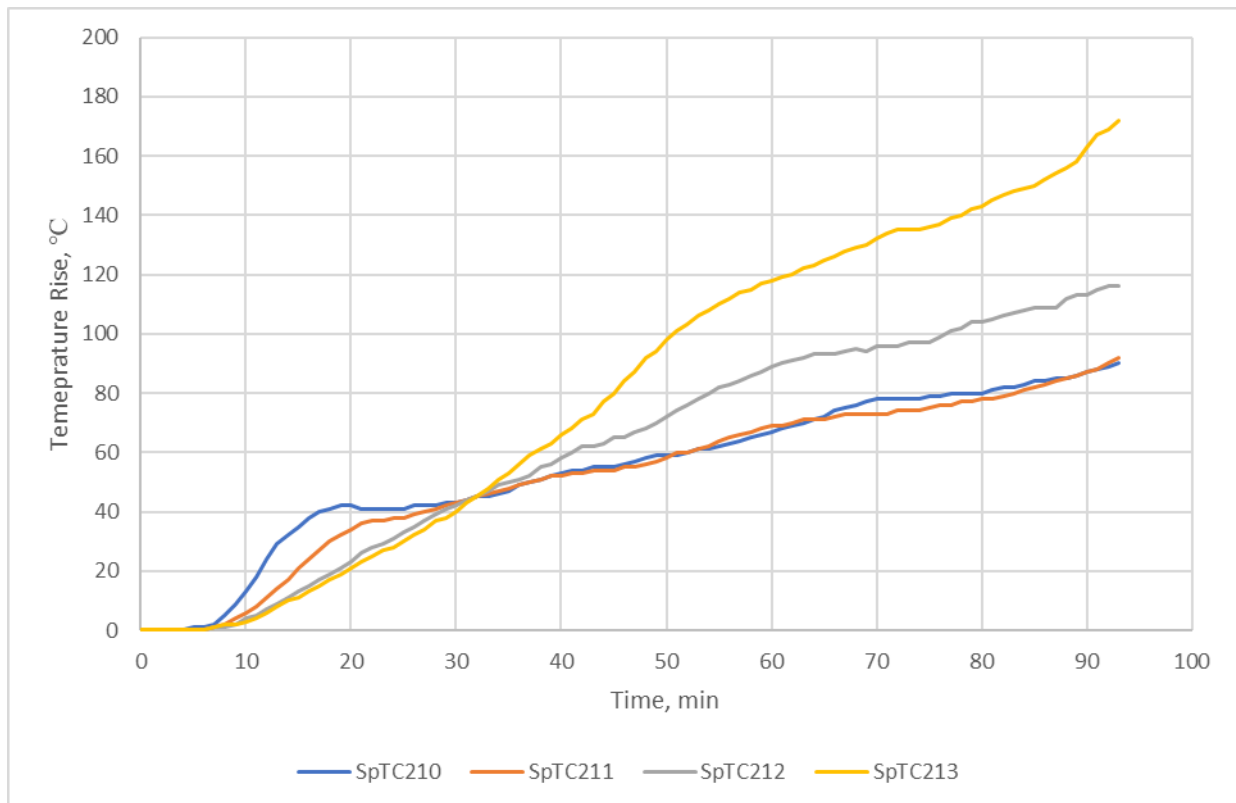


Figure 5 - Specimen 1 thermocouple temperature rise readings

6.3 Specimen 2

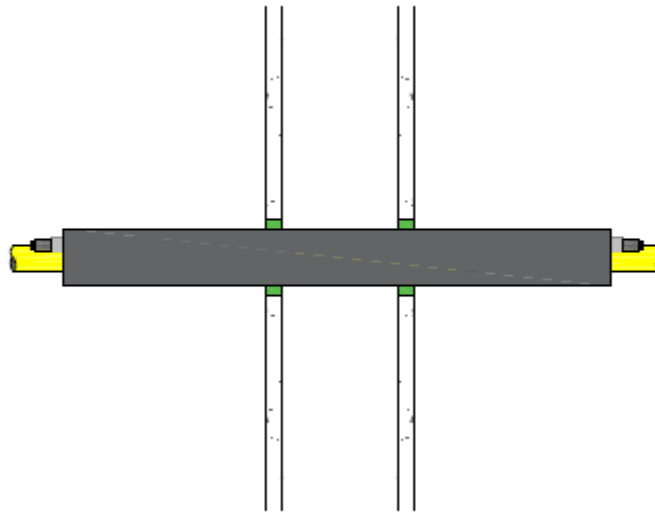


Figure 6 - Specimen 2

Service penetration details	
Service	20mm Pex Pipe + Heat Trace Cable with 13mm thick Nitrile Insulation
Service Support	Exposed Face: 280mm Unexposed Face: 480mm and 1620mm
Aperture Size	59.8mm
Annular Spacing	Min: 5.8mm, Max: 7.6mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	FireMastic-HPE
Procedure	1. FireMastic-HPE applied to the annular gap, 13mm (nominal) deep and finished flush with the separating element.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 93 minutes
Insulation	89 minutes

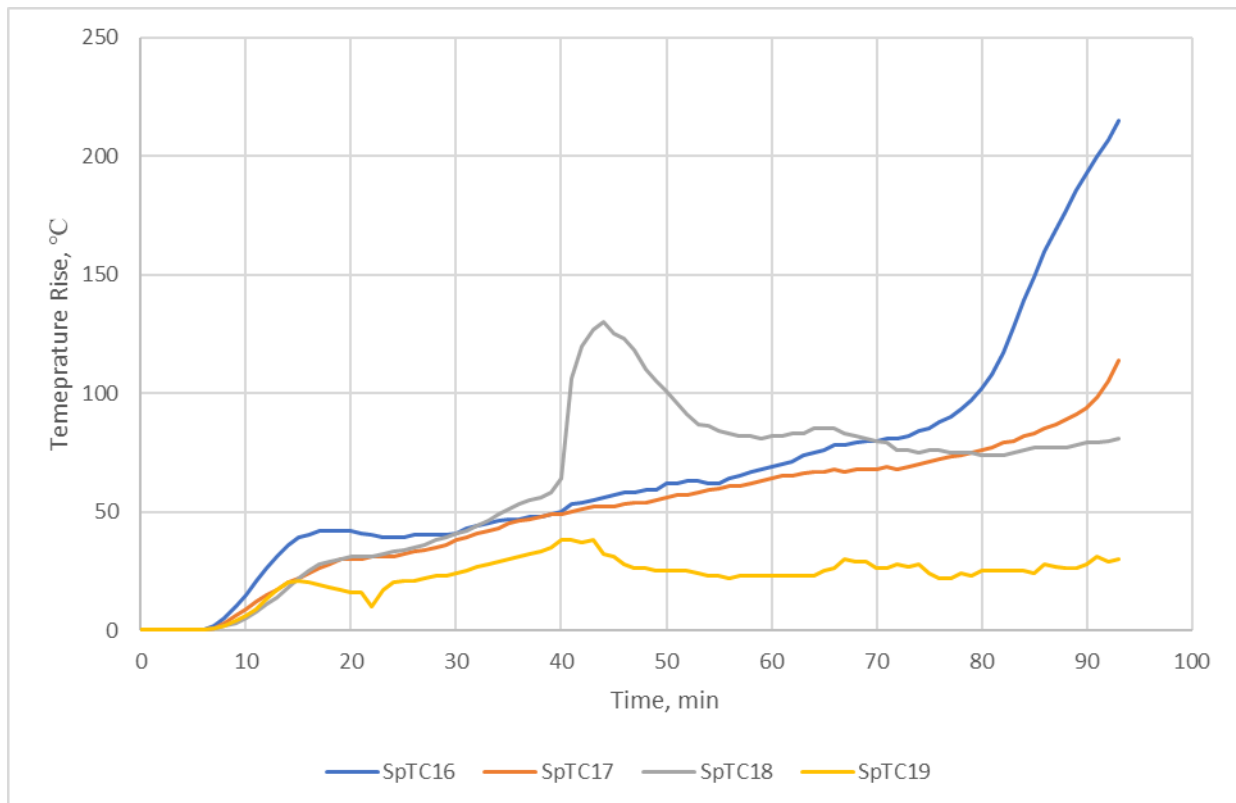


Figure 7 - Specimen 2 thermocouple temperature rise readings

6.4 Specimen 3

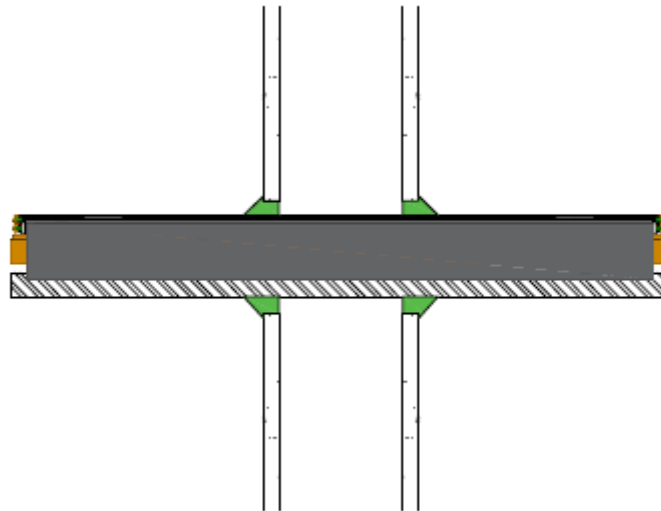


Figure 8 - Specimen 3

Service penetration details	
Service	HVAC Bundle – 19.05mm & 9.52mm Copper Pipes with 13mm Insulation + Control Cable + TPS Cable + 20mm Condensate Pipe
Service Support	Exposed Face: 280mm Unexposed Face: 480mm and 1620mm
Aperture Size	92.1mm
Annular Space	Min: 3.6mm, Max: 8.9mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	FireMastic-HPE
Procedure	1. FireMastic-HPE applied to the annular gap, 13mm (nominal) deep and finished flush with the separating element. 2. 15mm x 15mm FireMastic-HPE applied around the services.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 93 minutes
Insulation	No failure at 93 minutes

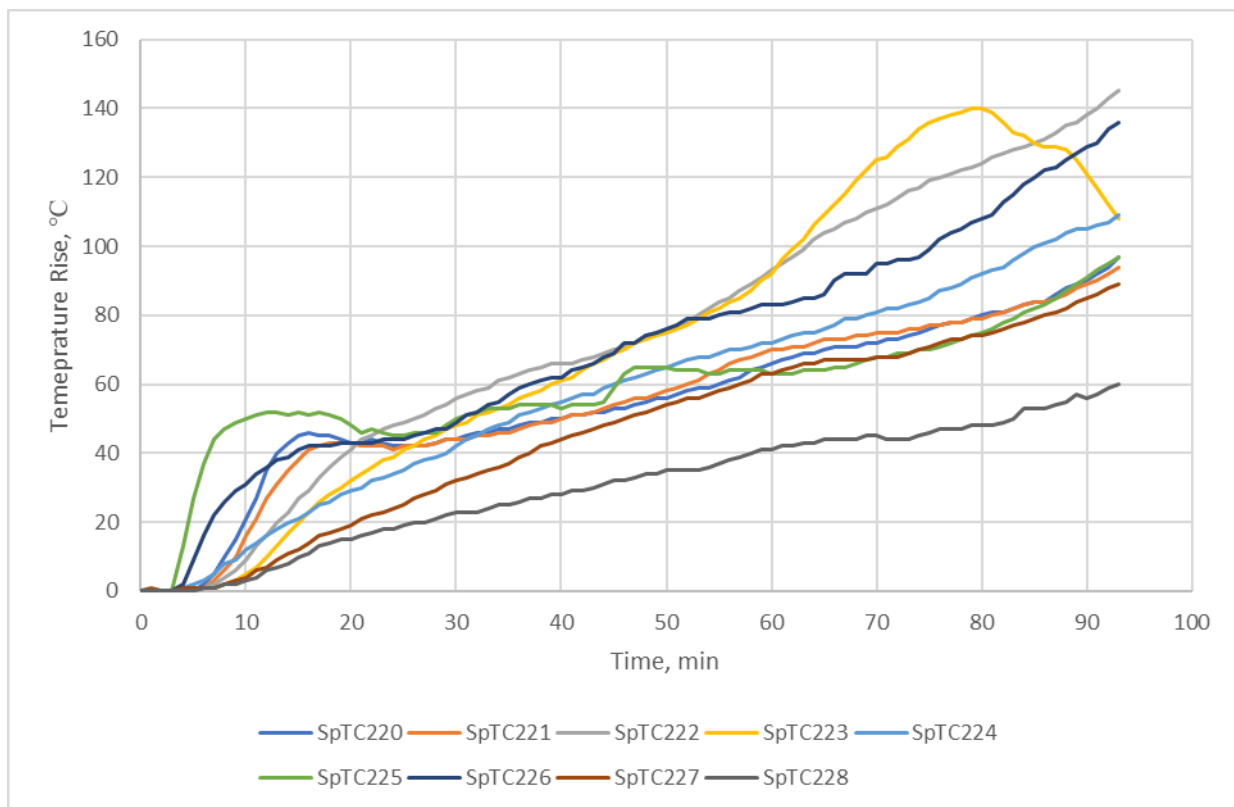


Figure 9 - Specimen 3 thermocouple temperature rise readings

6.5 Specimen 4

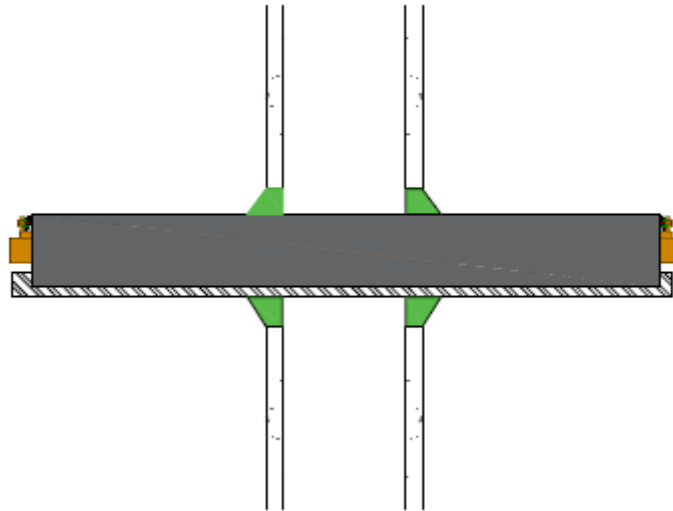


Figure 10 - Specimen 4

Service penetration details	
Service	HVAC Bundle – 19.05mm & 9.52mm Copper Pipes with 25mm Insulation + Control Cable + TPS Cable + 20mm Condensate Pipe
Service Support	Exposed Face: 280mm Unexposed Face: 480mm and 1620mm
Aperture Size	109.8mm
Annular Space	Min: 2.5mm, Max: 7.3mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	FireMastic-HPE
Procedure	1. FireMastic-HPE applied to the annular gap, 13mm (nominal) deep and finished flush with the separating element. 2. 15mm x 15mm FireMastic-HPE applied around the services.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 93 minutes
Insulation	43 minutes

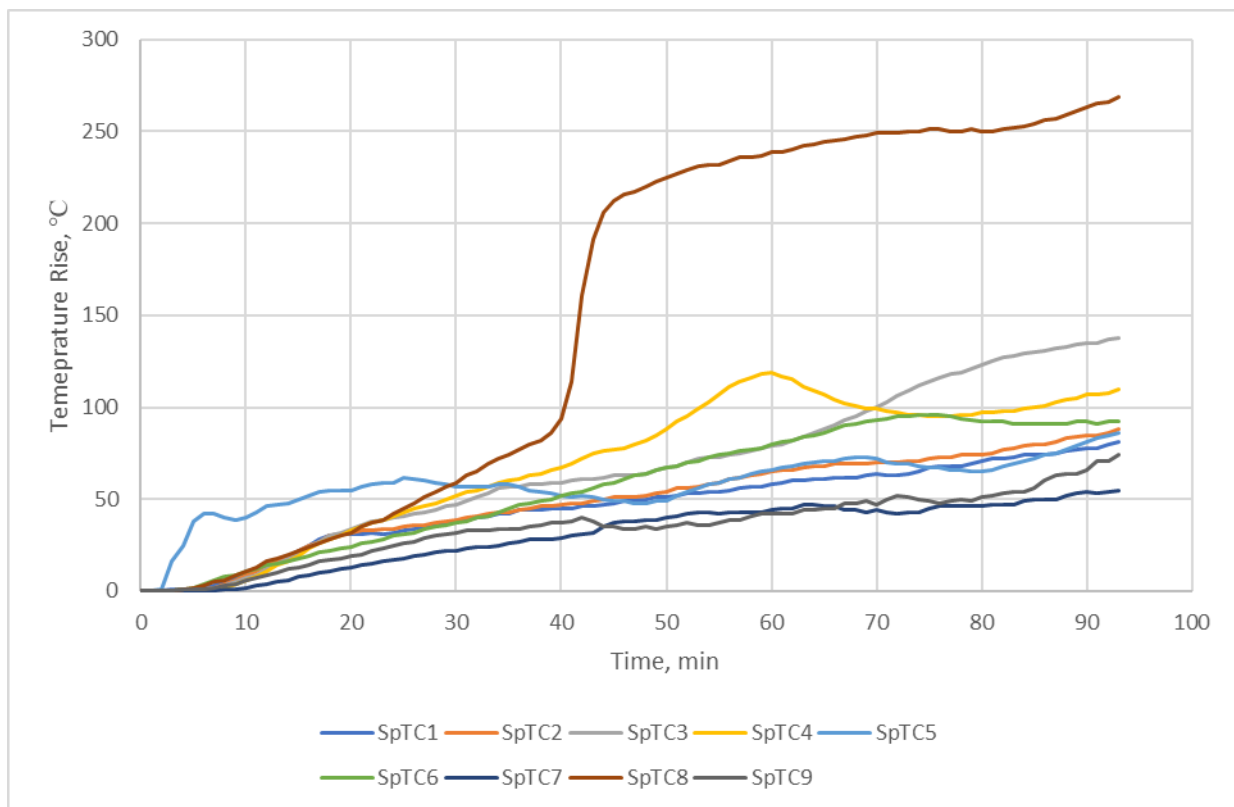


Figure 11 - Specimen 4 thermocouple temperature rise readings

6.6 Specimen 5

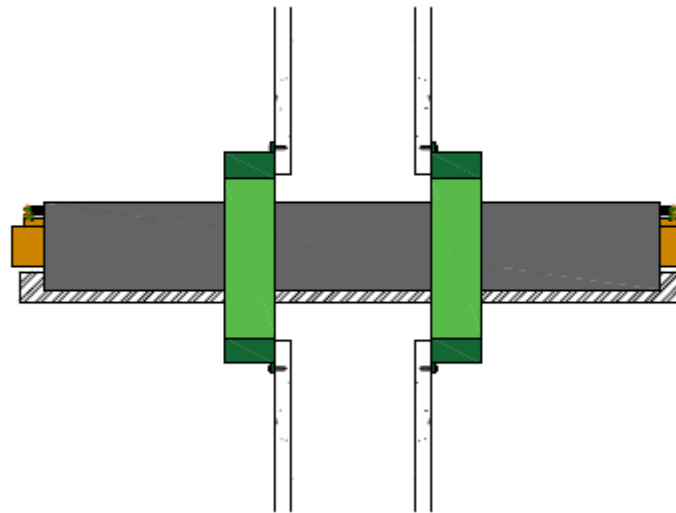


Figure 12 - Specimen 5

Service penetration details	
Service	HVAC Bundle – 32mm & 25mm Copper Pipes with 19mm Insulation + Control Cable + TPS Cable + 20mm Condensate Pipe
Service Support	Exposed Face: 280mm Unexposed Face: 480mm and 1620mm
Aperture Size	137.2mm
Annular Space	Min: 4.6mm, Max: 8.9mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	Boss Collar Shell 150, FireMastic-HPE
Procedure	1. Collar wrapped around services and secured to the separating element in the fixing points with screws and washers. 2. FireMastic-HPE applied in the collar around cables, finished flush with the top of the collar.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 93 minutes
Insulation	No failure at 93 minutes

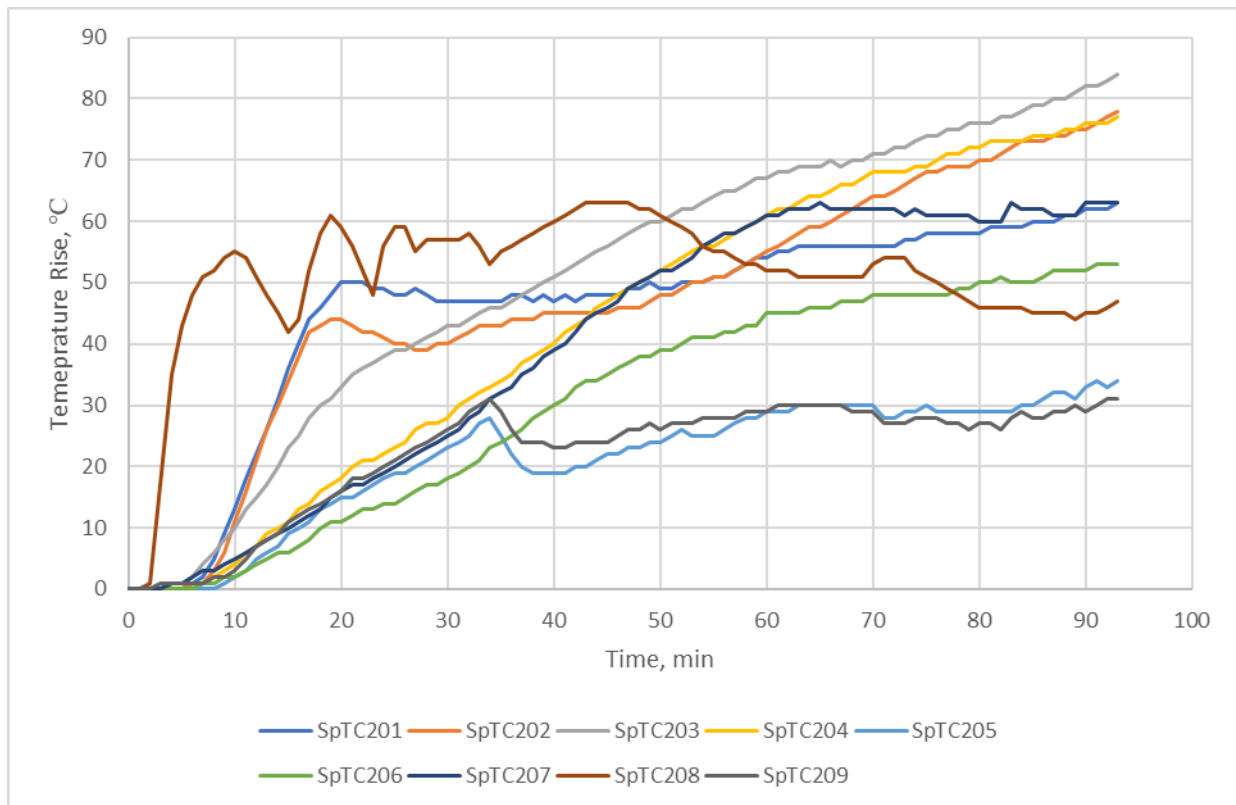


Figure 13 - Specimen 5 thermocouple temperature rise readings

6.7 Specimen 6

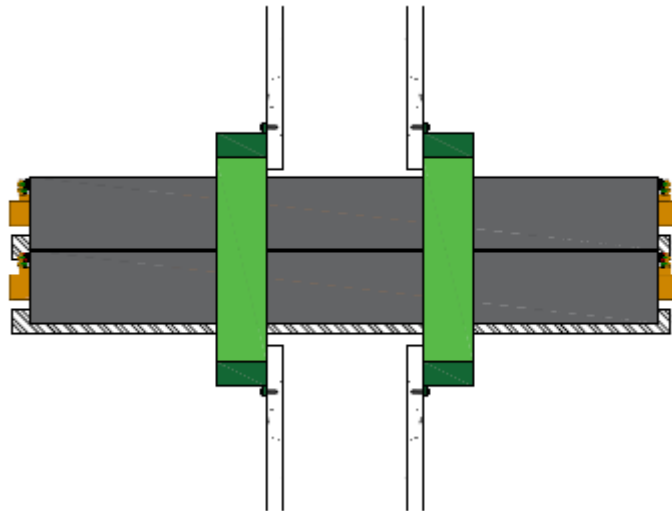


Figure 14 - Specimen 6

Service penetration details	
Service	HVAC Bundle – 2 x 19.05mm & 9.52mm Copper Pipes with 19mm Insulation + 2 x Control Cables + 2 x TPS Cables + 2 x 20mm Condensate Pipes
Service Support	Exposed Face: 280mm Unexposed Face: 480mm and 1620mm
Aperture Size	137.4mm
Annular Space	Min: 2.1mm, Max: 10.4mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	Boss Collar 150, FireMastic-HPE
Procedure	1. Collar wrapped around services and secured to the separating element in the fixing points with screws and washers. 2. FireMastic-HPE applied in the collar around cables, finished flush with the top of the collar.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 93 minutes
Insulation	No failure at 93 minutes

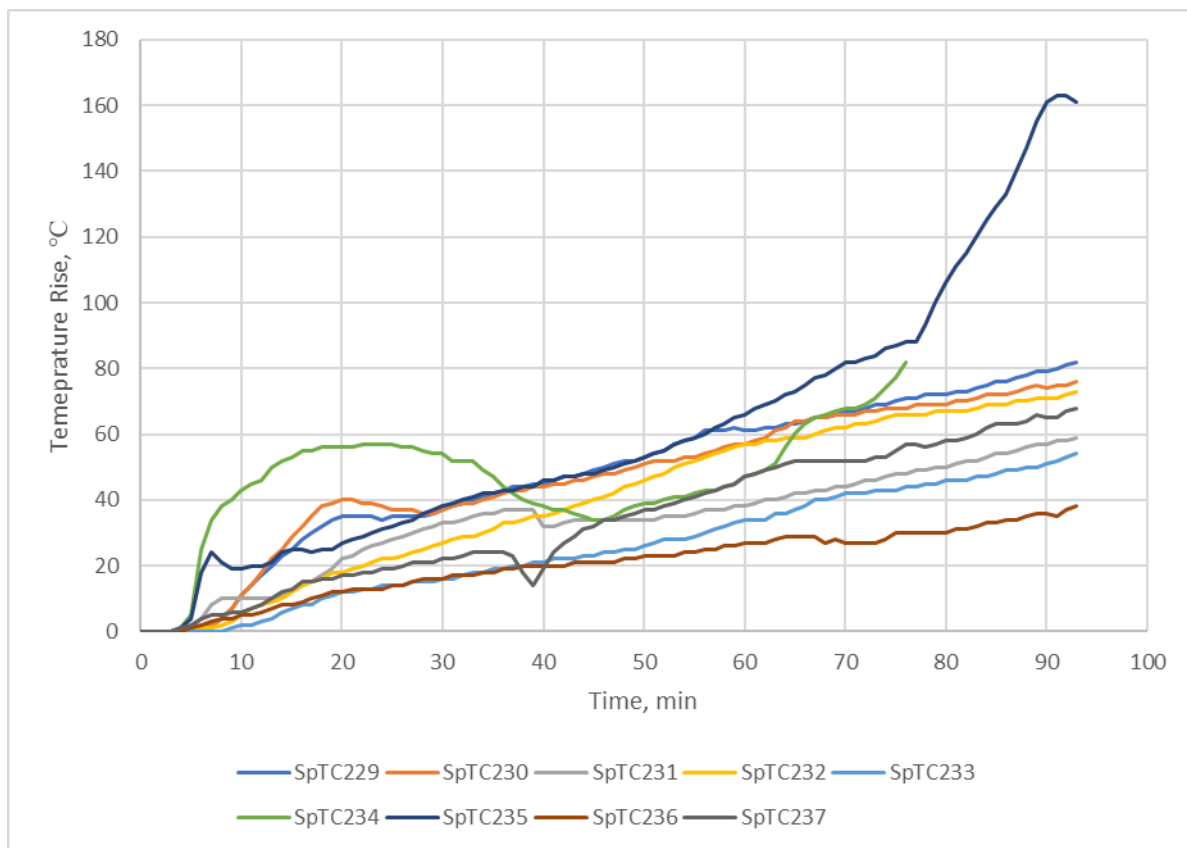


Figure 15 - Specimen 6 thermocouple temperature rise readings

NOTES:

- SpTC234 dislodged at 69 minutes

6.8 Specimen 7

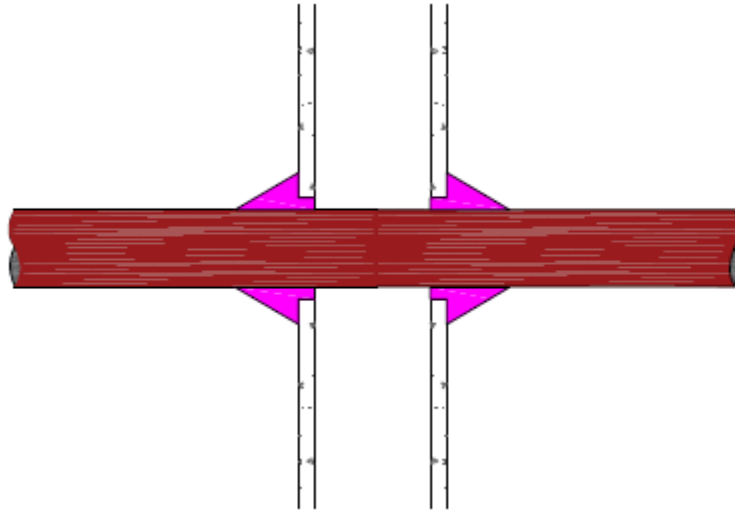


Figure 16 - Specimen 7

Service penetration details	
Service	65mm Steel Pipe
Service Support	Exposed Face: 280mm Unexposed Face: 480mm
Aperture Size	93.2mm
Annular Spacing	Min: 8.2mm, Max: 9.0mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	FireMastic-300
Procedure	1. FireMastic-300 applied to the annular gap, 13mm (nominal) deep and finished flush with the separating element. 2. 30mm (wide) x 50mm (high) FireMastic-300 applied around the pipe.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 93 minutes
Insulation	44 minutes

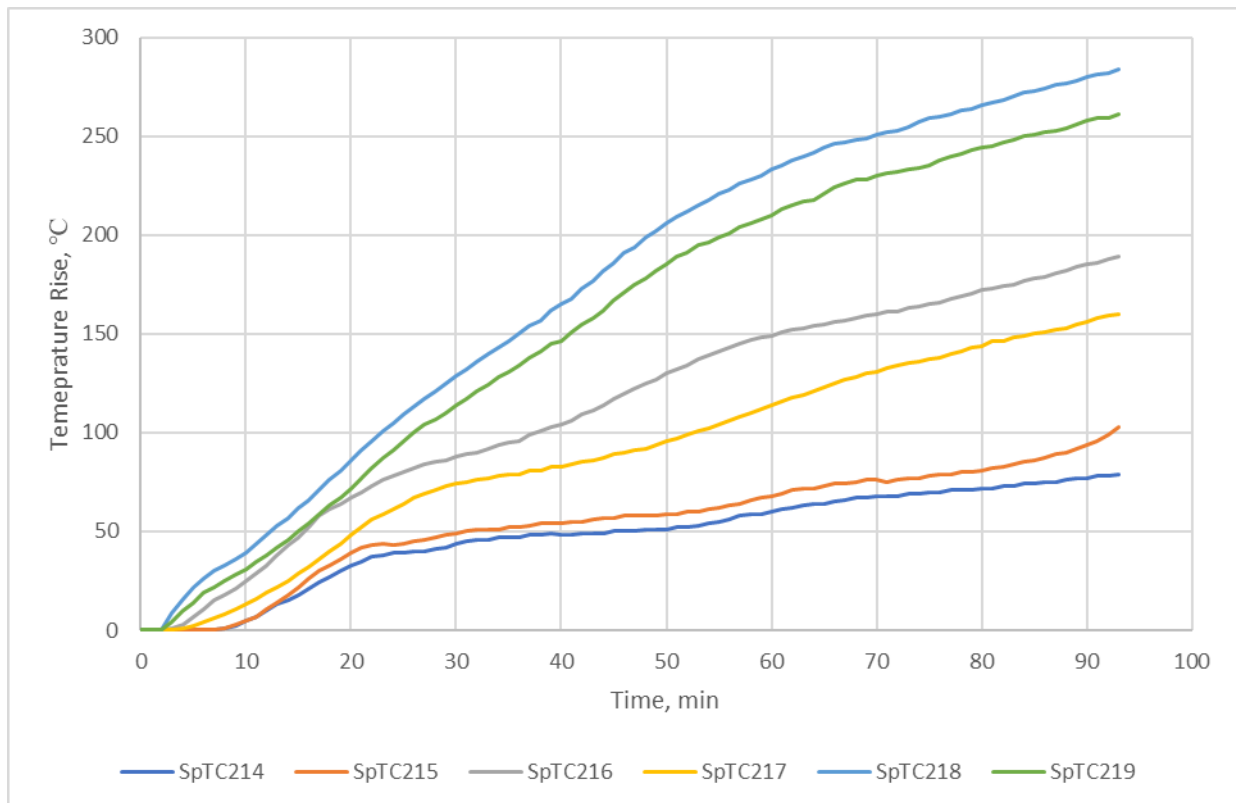


Figure 17 - Specimen 7 thermocouple temperature rise readings

6.9 Specimen 8

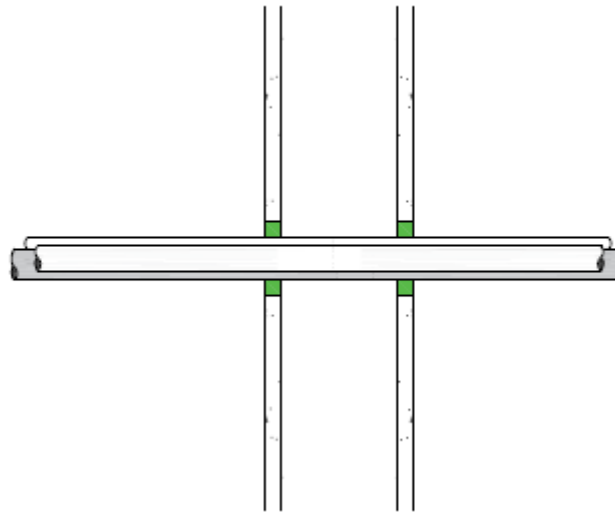


Figure 18 - Specimen 8

Service penetration details	
Service	2 x 20mm Conduit Pipes + 1 x 25mm Conduit Pipe
Service Support	Exposed Face: 280mm Unexposed Face: 480mm and 1620mm
Aperture Size	61.3mm
Annular Spacing	Min: 4.2mm, Max: 7.0mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	FireMastic-HPE
Procedure	1. FireMastic-HPE applied to the annular gap, 13mm (nominal) deep and finished flush with the separating element.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 93 minutes
Insulation	No failure at 93 minutes

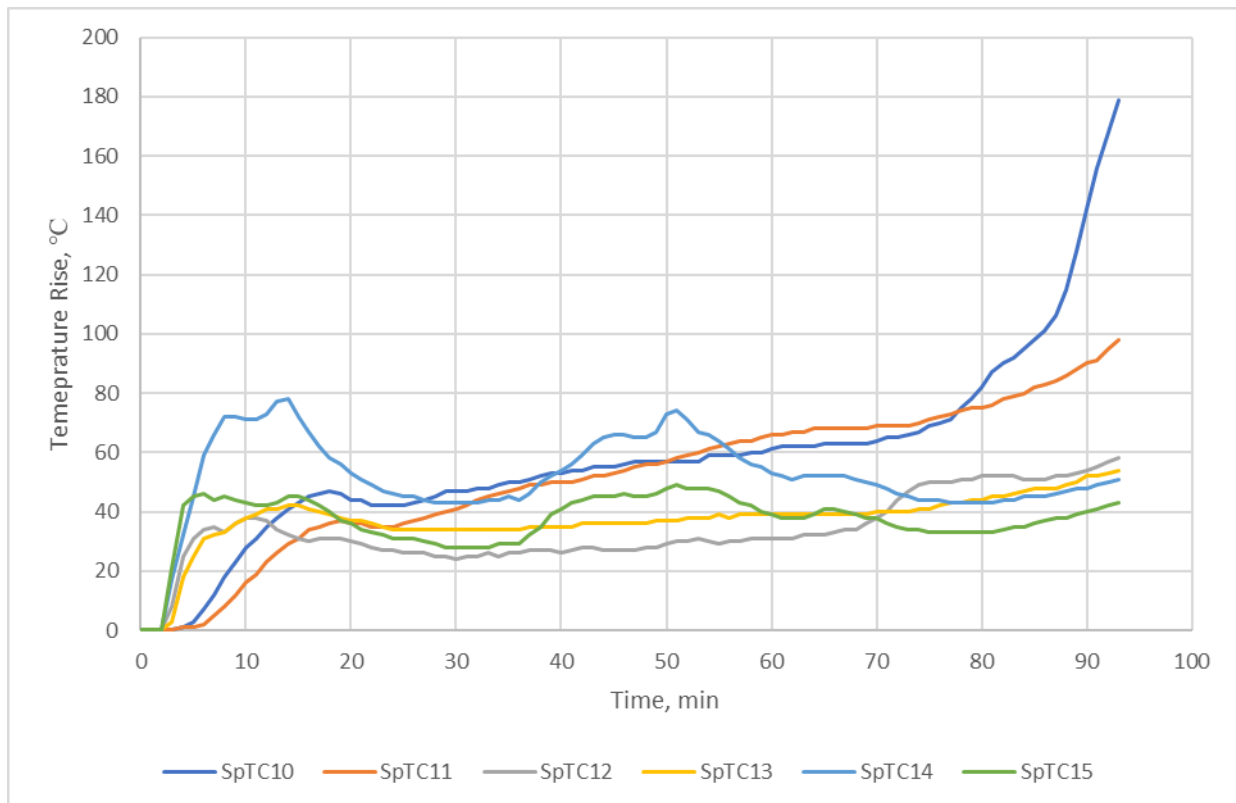


Figure 19 - Specimen 8 thermocouple temperature rise readings

6.10 Specimen 9

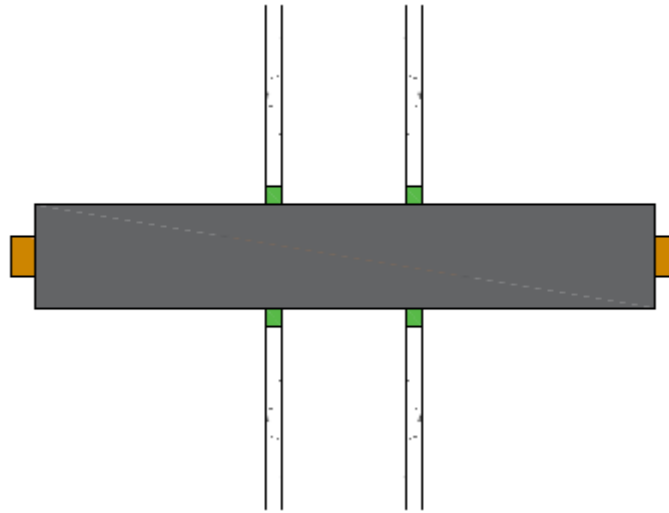


Figure 20 - Specimen 9

Service penetration details	
Service	32mm Copper Pipe with 25mm thick Nitrile Insulation
Service Support	Exposed Face: 280mm Unexposed Face: 480mm
Aperture Size	117.2mm
Annular Spacing	Min: 14.2mm, Max: 18.8mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	FireMastic-HPE
Procedure	1. FireMastic-HPE applied to the annular gap, 13mm (nominal) deep and finished flush with the separating element.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 93 minutes
Insulation	No failure at 93 minutes



Figure 21 - Specimen 9 thermocouple temperature rise readings

NOTES

- SpTC241 dislodged at 26 minutes

7. Photos

7.1 Photos before the test

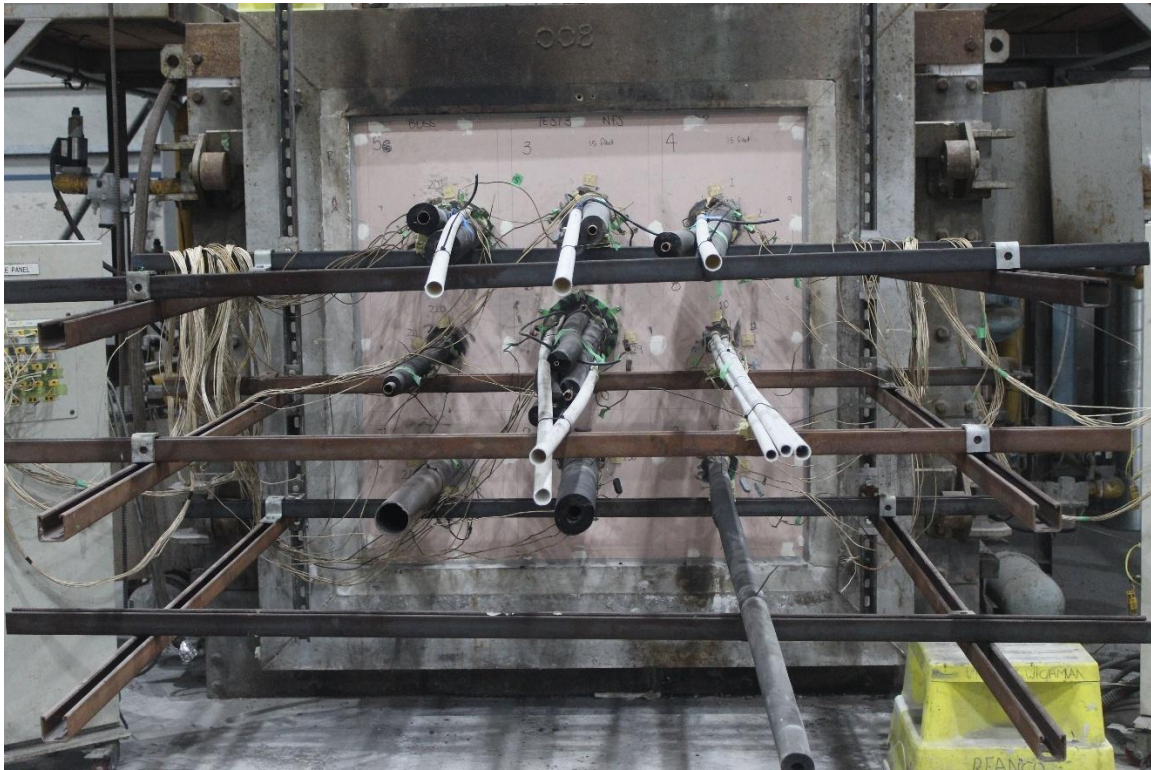


Figure 22 - Unexposed face prior to test commencement



Figure 23 - Exposed face prior to test commencement

7.2 During and after the test



Figure 24 - Unexposed face at 15 minutes

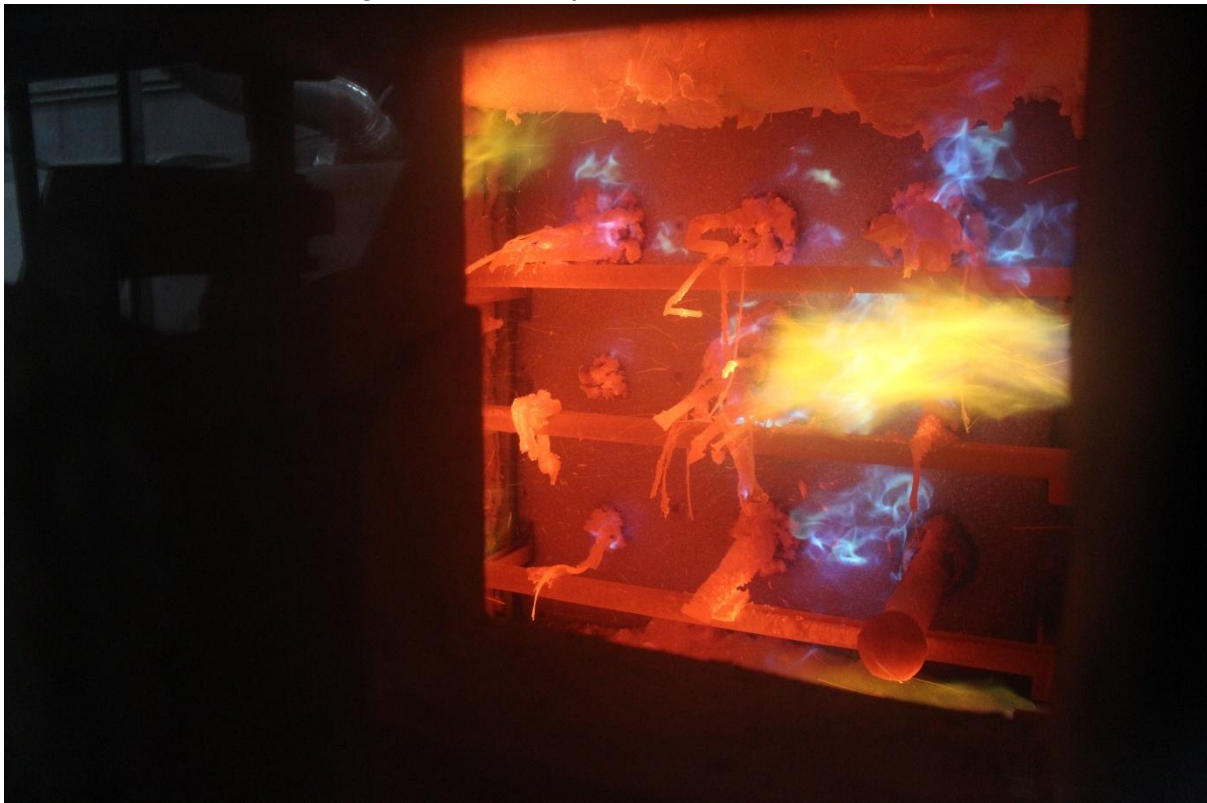


Figure 25 - Exposed face at 15 minutes

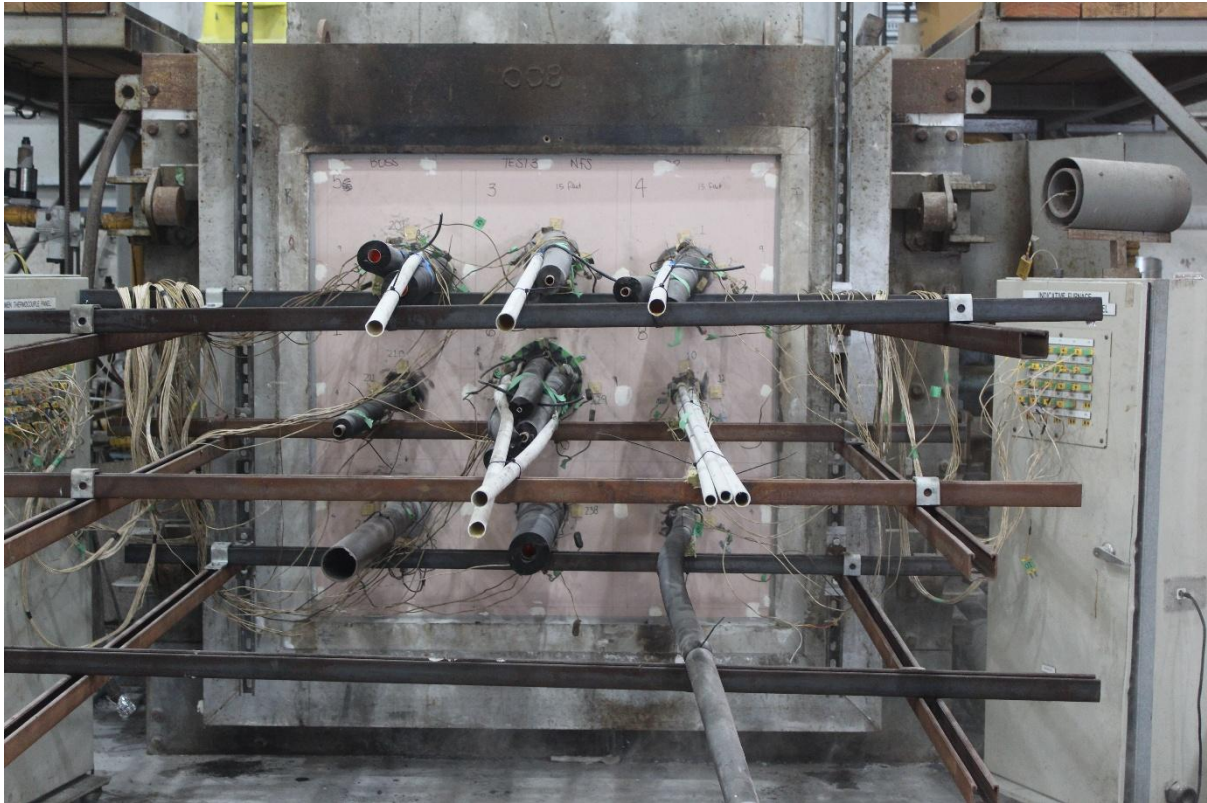


Figure 26 - Unexposed face at 30 minutes



Figure 27 - Exposed face at 30 minutes



Figure 28 - Unexposed face at 45 minutes



Figure 29 - Exposed face at 45 minutes

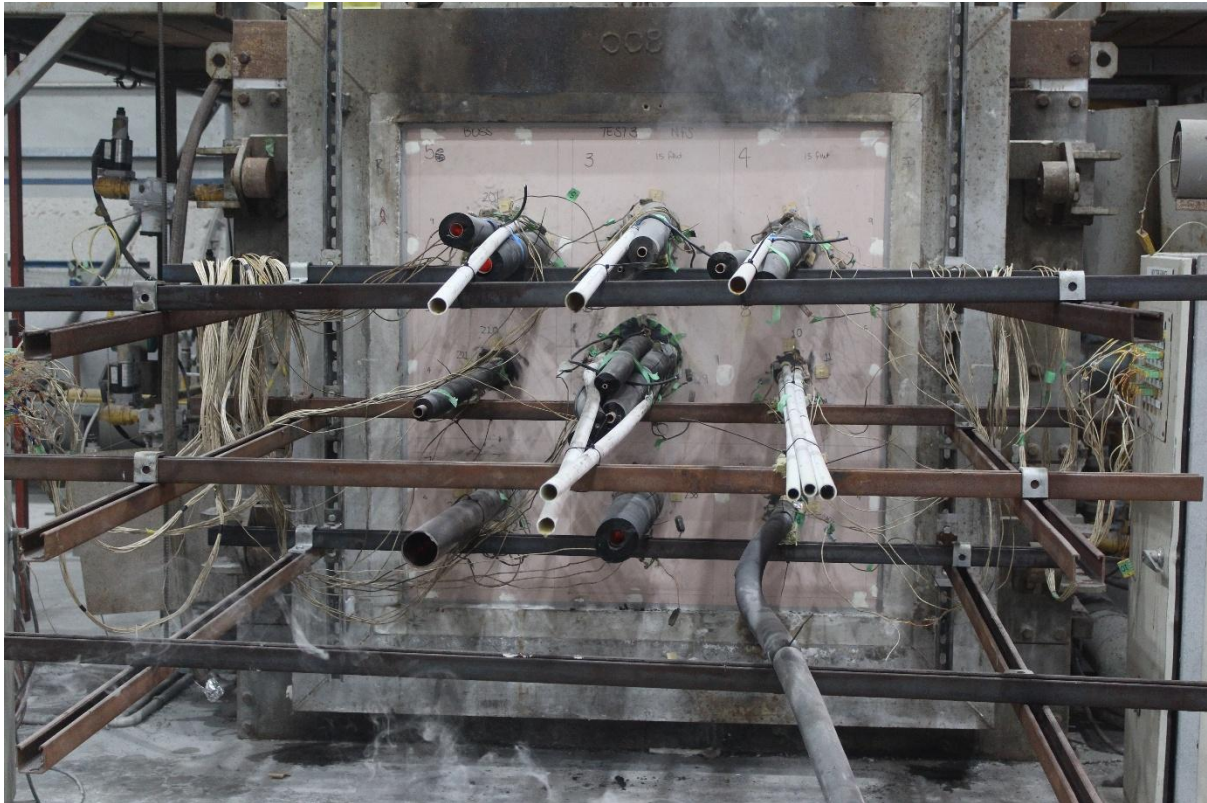


Figure 30 - Unexposed face at 60 minutes

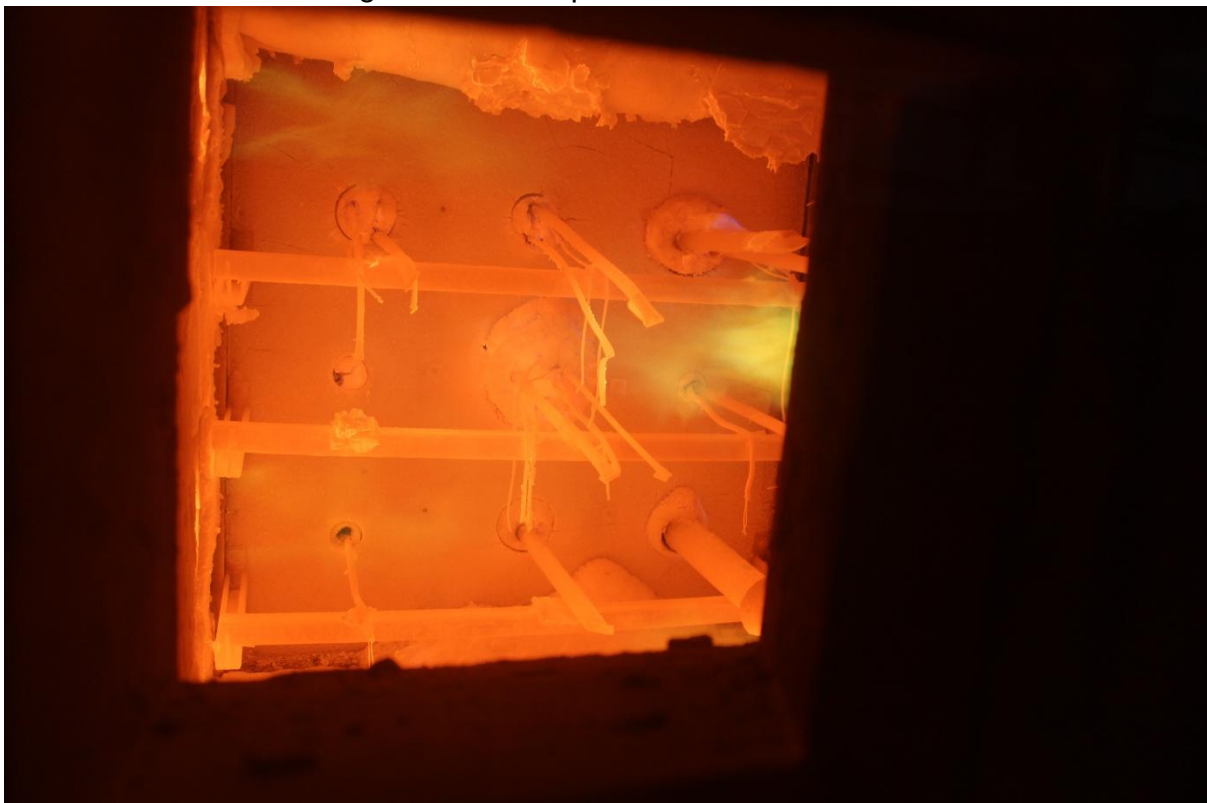


Figure 31 - Exposed face at 60 minutes



Figure 32 - Unexposed face at at 75 minutes



Figure 33 - Exposed face at 75 minutes

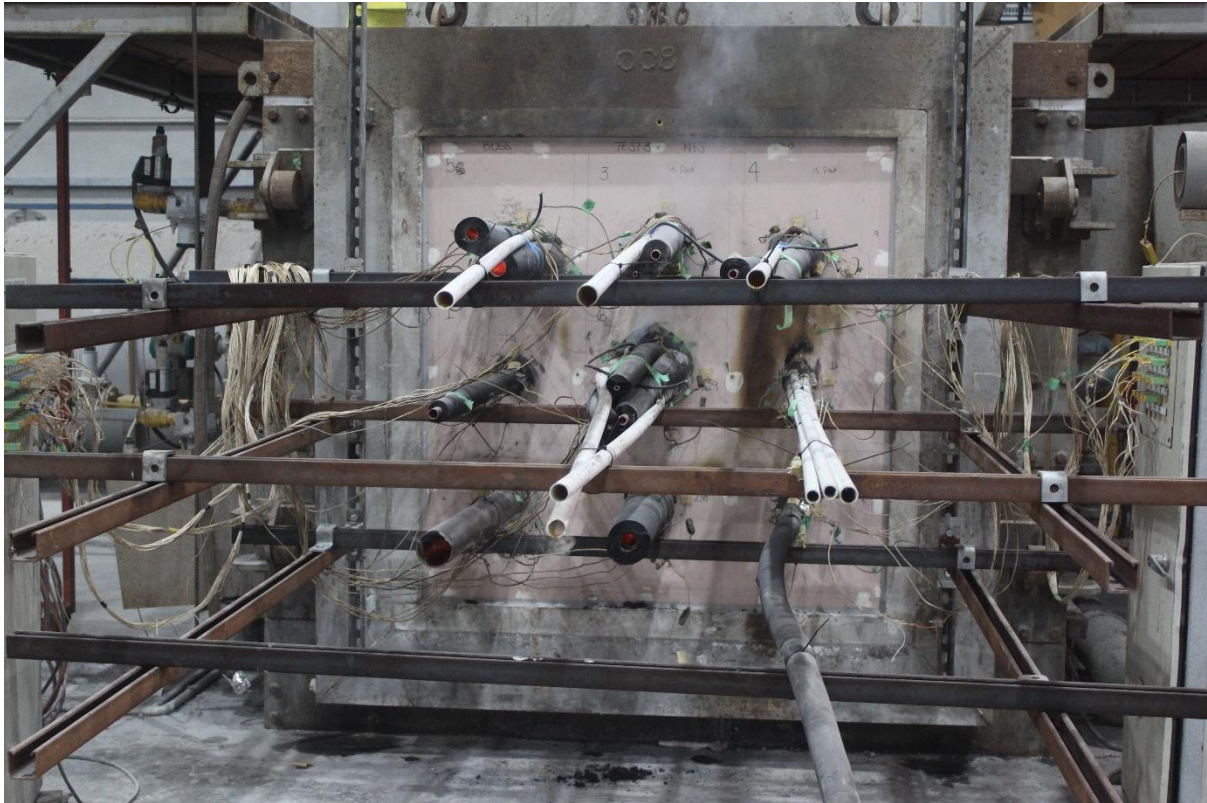


Figure 34 - Unexposed face at 90 minutes



Figure 35 - Exposed face after the test

8. Appendix

8.1 Client supplied drawings

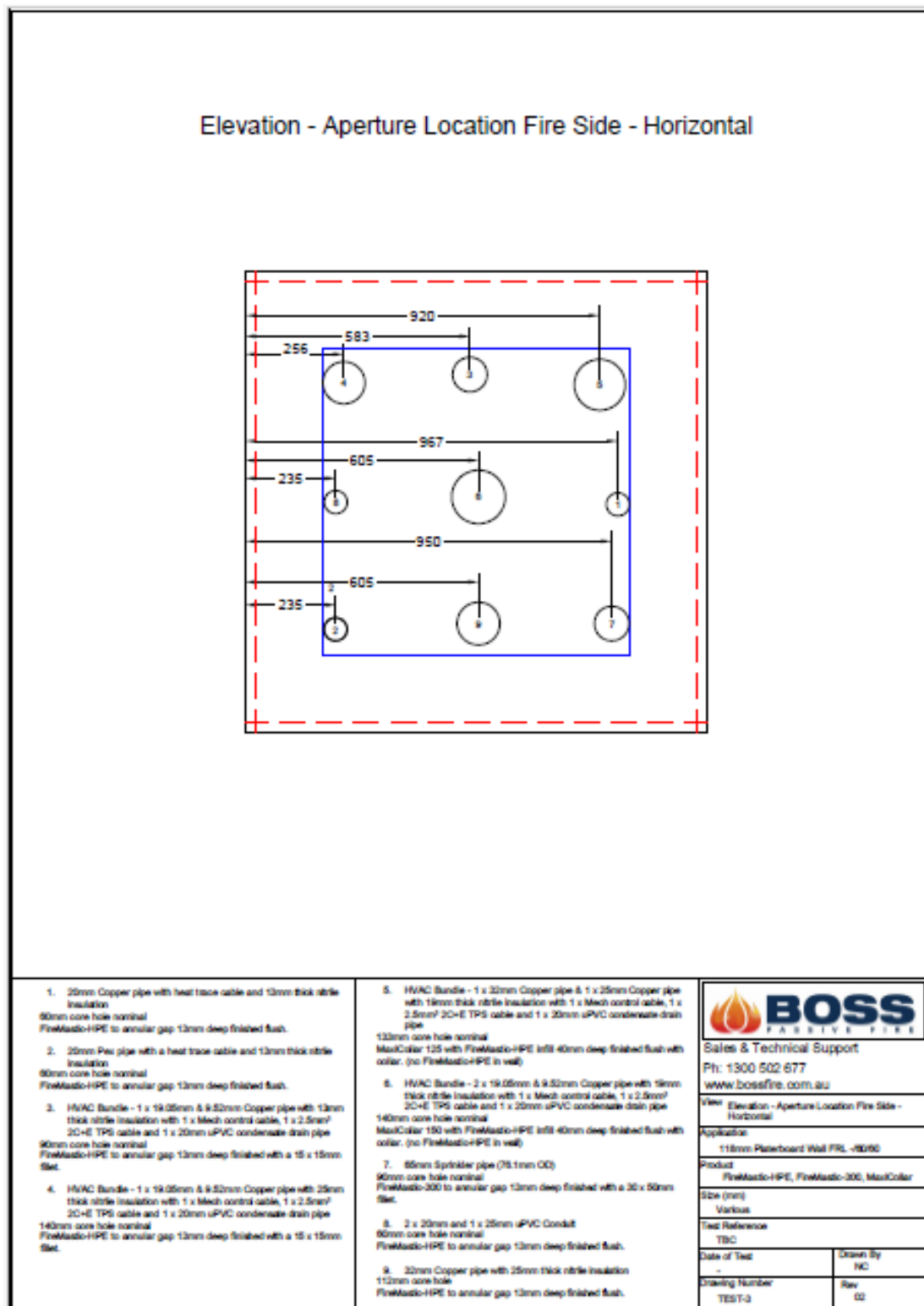
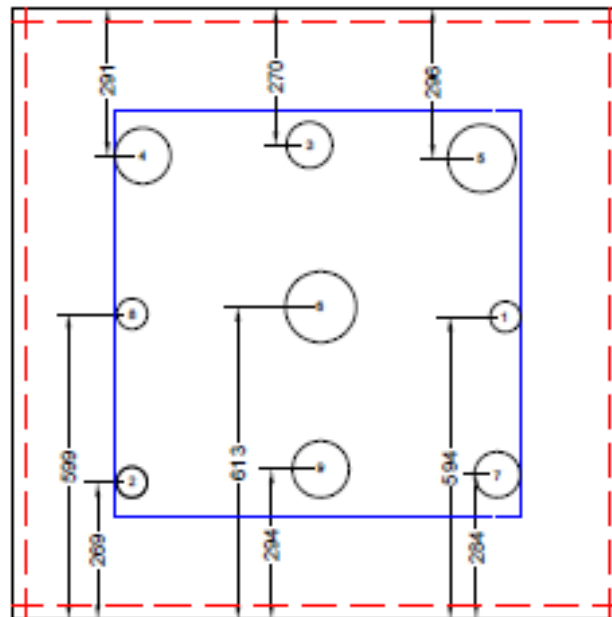


Figure 36 - Test 3 – Elevation – Aperture Location Fire Side – Horizontal

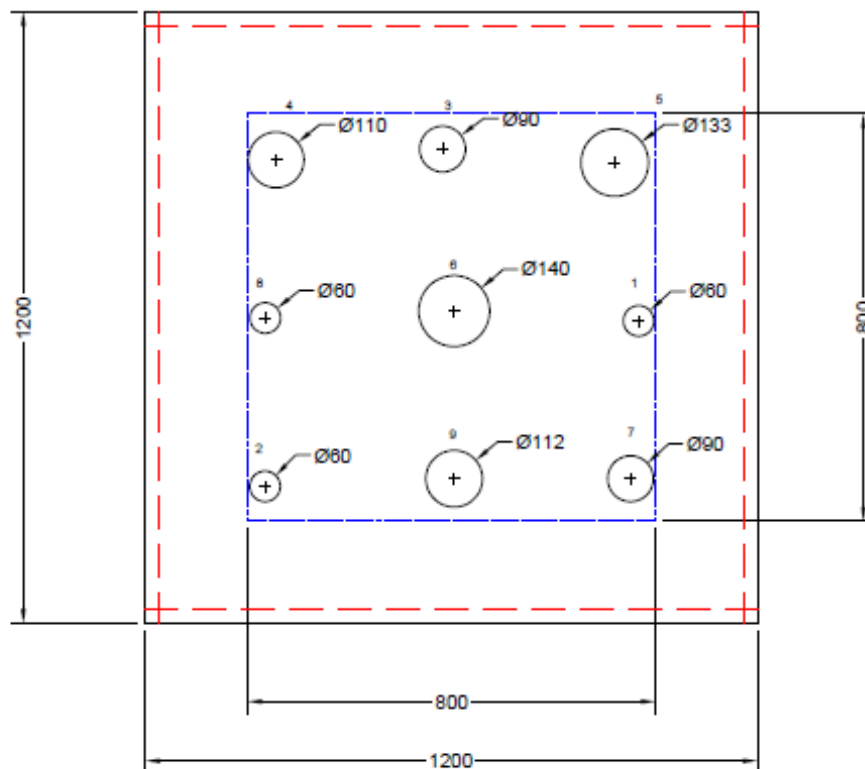
Elevation - Aperture Location Fire Side - Vertical



1. 25mm Copper pipe with heat trace cable and 13mm thick nitrile insulation 60mm core hole nominal FireMastic-HPE to annular gap 13mm deep finished flush. 2. 25mm Pex pipe with a heat trace cable and 13mm thick nitrile insulation 60mm core hole nominal FireMastic-HPE to annular gap 13mm deep finished flush. 3. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 13mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe 90mm core hole nominal FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm flt. 4. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 25mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe 140mm core hole nominal FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm flt.	5. HVAC Bundle - 1 x 32mm Copper pipe & 1 x 25mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe 133mm core hole nominal MaxiCollar 125 with FireMastic-HPE in flt 40mm deep finished flush with collar. (no FireMastic-HPE in wall) 6. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe 140mm core hole nominal MaxiCollar 150 with FireMastic-HPE in flt 40mm deep finished flush with collar. (no FireMastic-HPE in wall) 7. 65mm Sprinkler pipe (75.1mm OD) 90mm core hole nominal FireMastic-300 to annular gap 13mm deep finished with a 30 x 50mm flt. 8. 2 x 20mm and 1 x 25mm uPVC Conduit 60mm core hole nominal FireMastic-HPE to annular gap 13mm deep finished flush. 9. 22mm Copper pipe with 25mm thick nitrile insulation 112mm core hole FireMastic-HPE to annular gap 13mm deep finished flush.	 Sales & Technical Support Ph: 1300 502 677 www.bossfire.com.au View Elevation - Aperture Location Fire Side - Vertical Application 118mm Plasterboard Wall FRL -R200 Product FireMastic-HPE, FireMastic-300, MaxiCollar Size (mm) Various Test Reference TBC <table><tr><td>Date of Test -</td><td>Drawn By NC</td></tr><tr><td>Drawing Number TEST-3</td><td>Rev 02</td></tr></table>	Date of Test -	Drawn By NC	Drawing Number TEST-3	Rev 02
Date of Test -	Drawn By NC					
Drawing Number TEST-3	Rev 02					

Figure 37 - Test 3 – Elevation – Aperture Location Fire Side – Vertical

Elevation - Aperture Size Fire Side



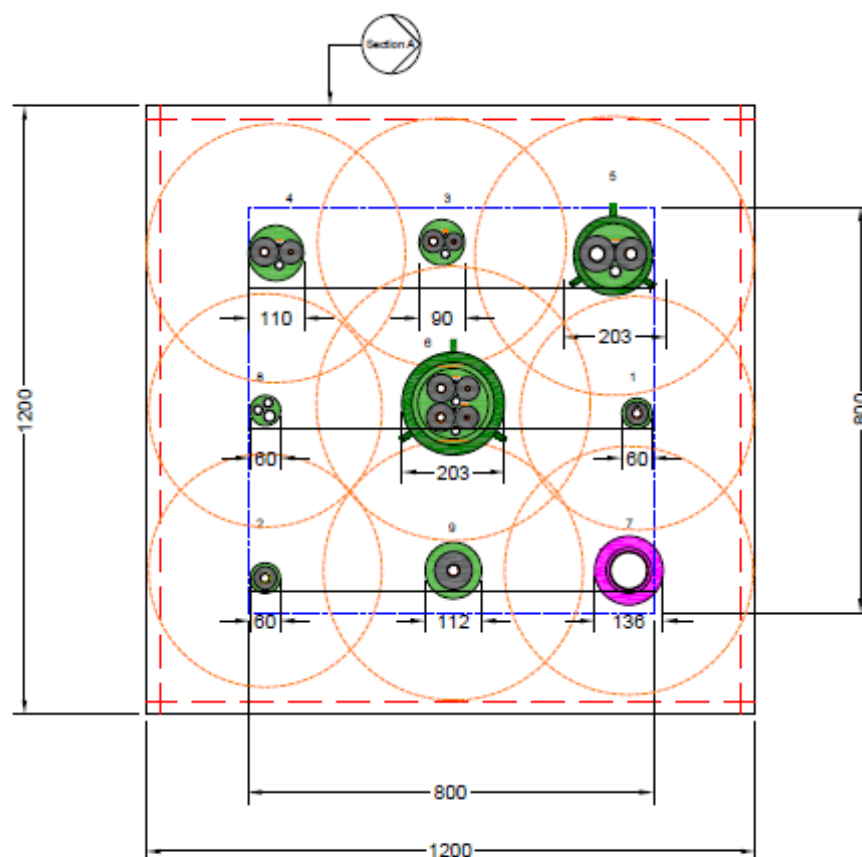
1. 20mm Copper pipe with heat trace cable and 13mm thick nitrile insulation
60mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished flush.
2. 20mm Pex pipe with a heat trace cable and 13mm thick nitrile insulation
60mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished flush.
3. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 13mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe
60mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm fillet.
4. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 25mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe
140mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm fillet.

5. HVAC Bundle - 1 x 32mm Copper pipe & 1 x 25mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe
133mm core hole nominal
MaxiCollar 125 with FireMastic-HPE infill 40mm deep finished flush with collar. (no FireMastic-HPE in wall)
6. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe
140mm core hole nominal
MaxiCollar 150 with FireMastic-HPE infill 40mm deep finished flush with collar. (no FireMastic-HPE in wall)
7. 65mm Sprinkler pipe (78.1mm OD)
60mm core hole nominal
FireMastic-300 to annular gap 13mm deep finished with a 30 x 50mm fillet.
8. 2 x 20mm and 1 x 25mm uPVC Conduit
60mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished flush.
9. 32mm Copper pipe with 25mm thick nitrile insulation
112mm core hole
FireMastic-HPE to annular gap 13mm deep finished flush.

	
Sales & Technical Support	
Ph: 1300 502 677	
www.bossfire.com.au	
View	Elevation - Aperture Size Fire Side
Application	118mm Plasterboard Wall FRL -60/60
Product	FireMastic-HPE, FireMastic-300, MaxiCollar
Size (mm)	Various
Test Reference	TBC
Date of Test	-
Drawn By	NC
Drawing Number	Rev 02
TEST-3	

Figure 38 - Test 3 – Elevation – Aperture Size Fire Side

Elevation - Fire Side



1. 20mm Copper pipe with heat trace cable and 13mm thick nitrile insulation
60mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished flush.
2. 20mm Pex pipe with a heat trace cable and 13mm thick nitrile insulation
60mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished flush.
3. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 13mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe
90mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm fillet.
4. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 25mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe
140mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm fillet.

5. HVAC Bundle - 1 x 32mm Copper pipe & 1 x 25mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe
133mm core hole nominal
MaxiCollar 125 with FireMastic-HPE infill 40mm deep finished flush with collar. (no FireMastic-HPE in wall)
6. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe
140mm core hole nominal
MaxiCollar 150 with FireMastic-HPE infill 40mm deep finished flush with collar. (no FireMastic-HPE in wall)
7. 65mm Sprinkler pipe (76.1mm OD)
90mm core hole nominal
FireMastic-300 to annular gap 13mm deep finished with a 30 x 50mm fillet.
8. 2 x 20mm and 1 x 25mm uPVC Conduit
60mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished flush.
9. 32mm Copper pipe with 25mm thick nitrile insulation
112mm core hole
FireMastic-HPE to annular gap 13mm deep finished flush.

	
Sales & Technical Support	
Ph: 1300 502 877	
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View	
Elevation - Fire Side	
Application	
118mm Plasterboard Wall FRL -60/60	
Product	
FireMastic-HPE, FireMastic-300, MaxiCollar	
Size (mm)	
Various	
Test Reference	
TBC	
Date of Test	Drawn By
-	NC
Drawing Number	Rev
TEST-3	02

Figure 39 - Test 3 – Elevation – Fire Side

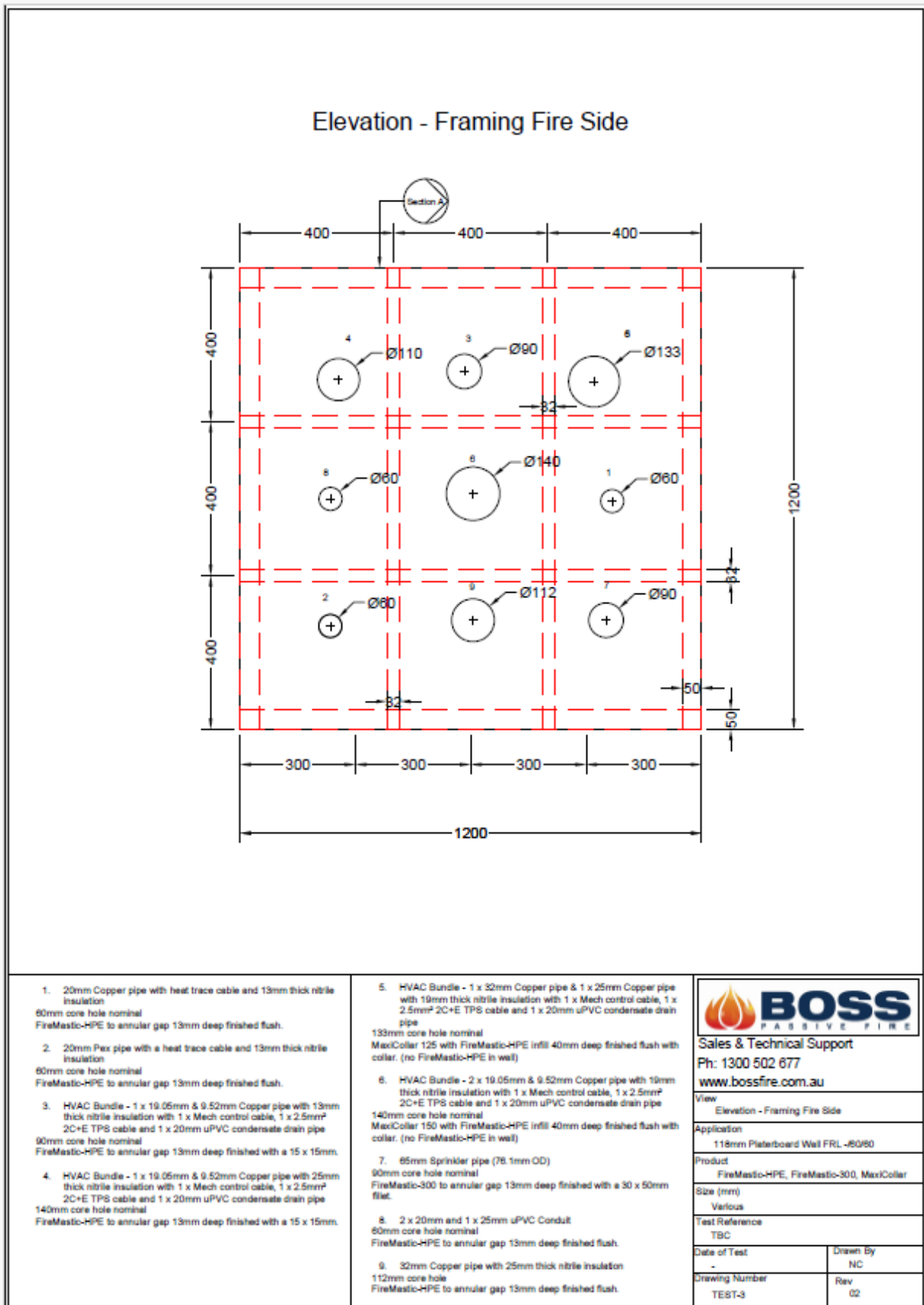
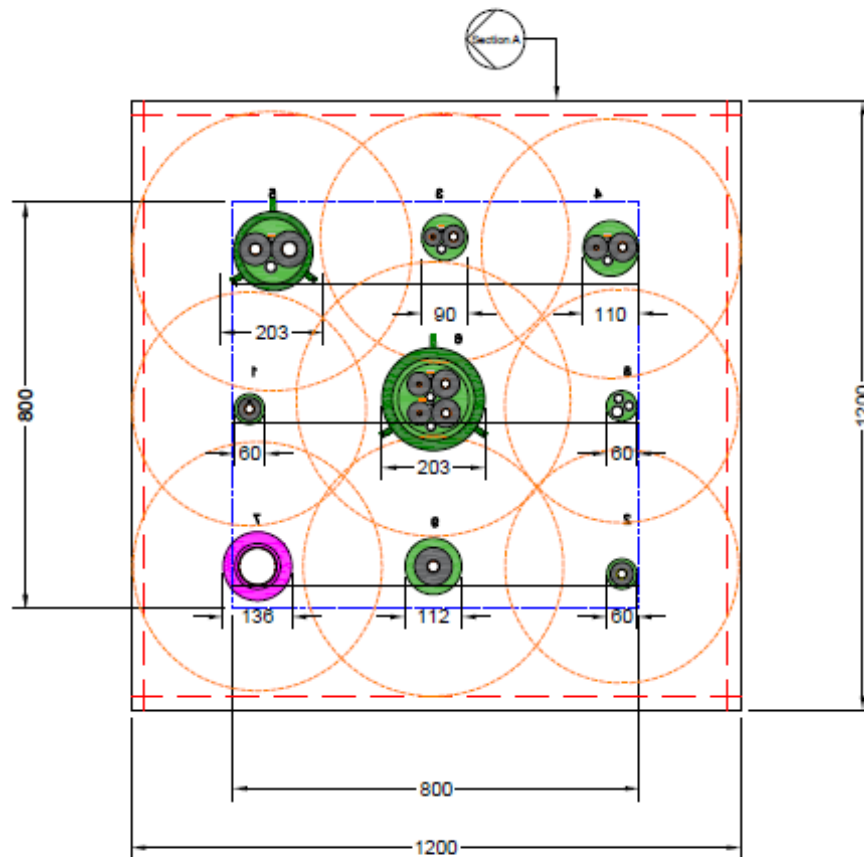


Figure 40 - Test 3 – Elevation – Framing Fire Side

Elevation - Non Fire Side



- 20mm Copper pipe with heat trace cable and 13mm thick nitrile insulation
60mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished flush.
- 20mm Pex pipe with a heat trace cable and 13mm thick nitrile insulation
60mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished flush.
- HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 13mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe
90mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm fillet.
- HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 25mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe
140mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm fillet.

- HVAC Bundle - 1 x 32mm Copper pipe & 1 x 25mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe
133mm core hole nominal
MaxiCollar 125 with FireMastic-HPE infill 40mm deep finished flush with collar. (no FireMastic-HPE in well)
- HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPS cable and 1 x 20mm uPVC condensate drain pipe
140mm core hole nominal
MaxiCollar 150 with FireMastic-HPE infill 40mm deep finished flush with collar. (no FireMastic-HPE in well)
- 65mm Sprinkler pipe (76.1mm OD)
90mm core hole nominal
FireMastic-300 to annular gap 13mm deep finished with a 30 x 50mm fillet.
- 2 x 20mm and 1 x 25mm uPVC Conduit
60mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished flush.
- 32mm Copper pipe with 25mm thick nitrile insulation
112mm core hole
FireMastic-HPE to annular gap 13mm deep finished flush.

	
Sales & Technical Support	
Ph: 1300 502 677	
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View	Elevation - Non Fire Side
Application	118mm Plasterboard Wall FRL-40/60
Product	FireMastic-HPE, FireMastic-300, MaxiCollar
Size (mm)	Various
Test Reference	TBC
Date of Test	-
Drawn By	NC
Drawing Number	Rev 02
TEST-3	

Figure 41 - Test 3 – Elevation – Non Fire Side

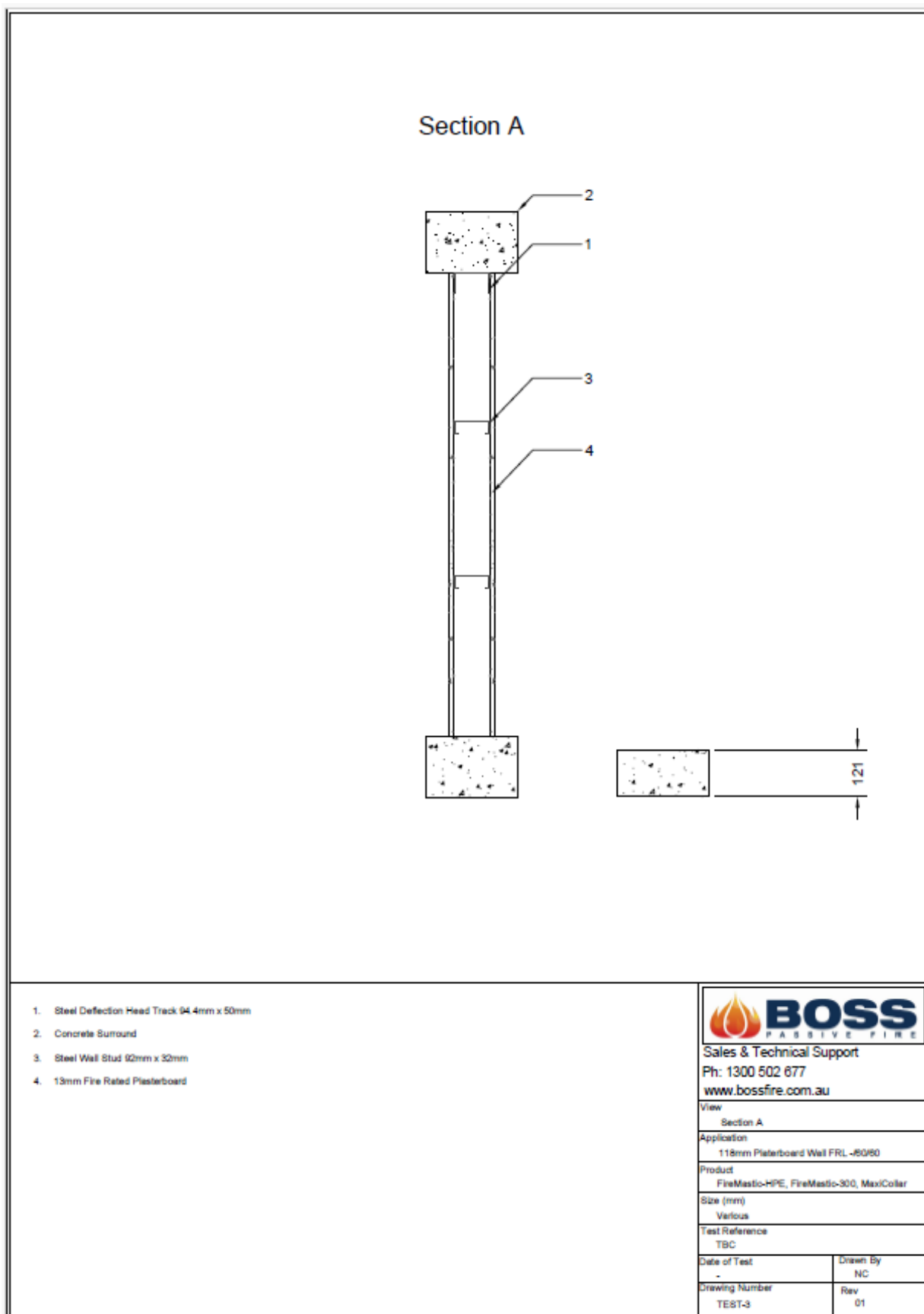


Figure 42 - Test 3 – Section A

Specimen Sections

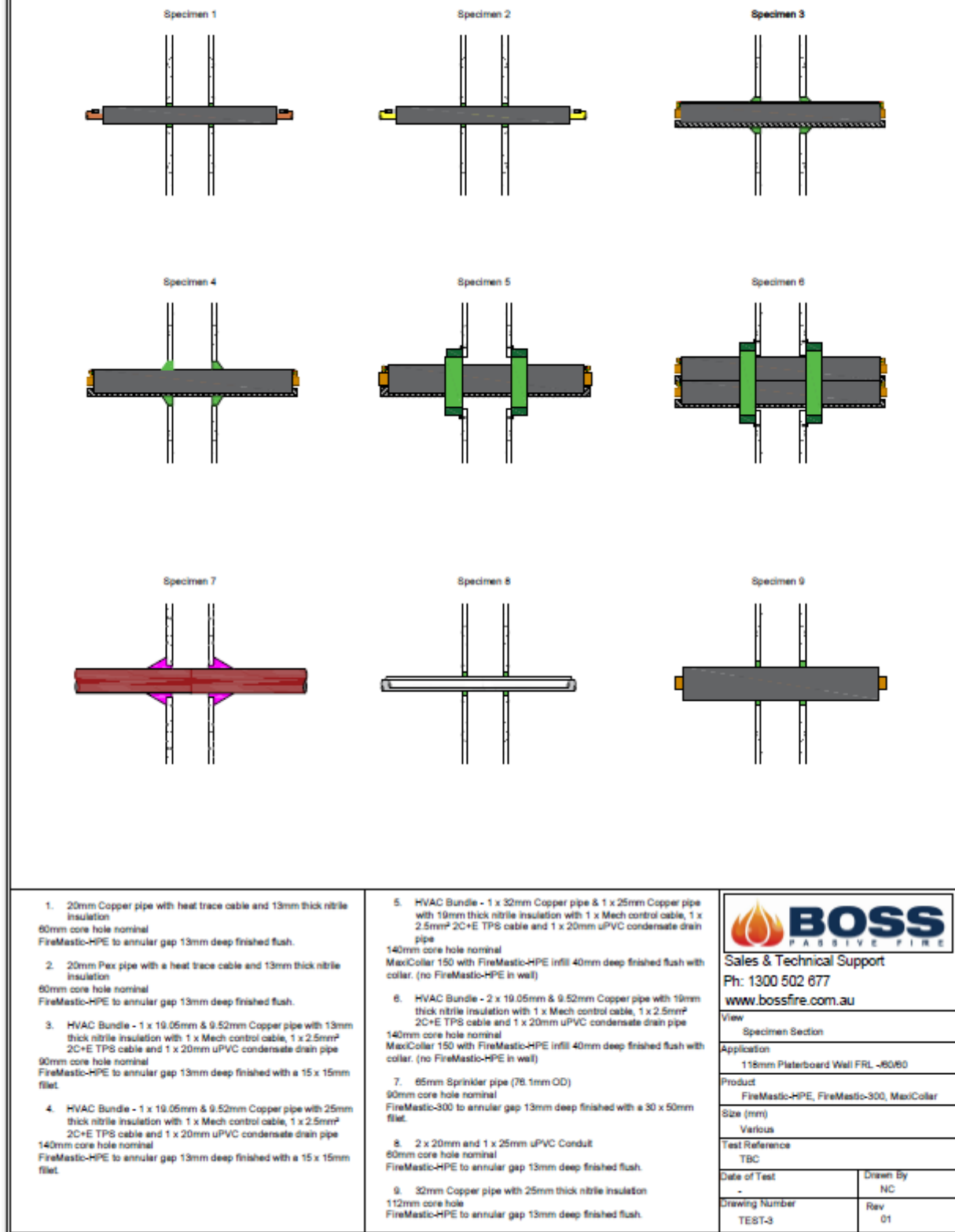


Figure 43 - Test 3 – Specimen Sections