Fire Testing Laboratory

TEST REPORT

PF25016

Fire resistance test for penetration through a vertical separating element

Client:	BOSS Products (Australia) Pty Ltd
Test method:	AS1530.4-2014
Report Date:	06/08/2025
Test number:	PF25016

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1.1 Document revision schedule

Revision #	Date	Description
1	01/05/2025	Initial issue for Client review
2	06/08/2025	Issued to Client

1.2 Signatories

Report	Name	Signature	Date
Prepared by:	Alexey Kokorin		06/08/2025
Authorised by:	Andrew Bain (Authorized signatory)		06/08/2025

ACCREDITED
ILAC
TESTING LABORATORY

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 64mm steel frame lined with two layers of 13mm fire rated plasterboard on each side.

SP #	Service	Actual Integrity (min)	Actual Insulation (min)	FRL
1	Cable Bundle – 8 x COAX and 8 x CAT6 cables	125NF	125NF	-/120/120
2	40mm cPVC Pipe	125NF	92	-/120/90
3	50mm cPVC Pipe	84	80	-/60/60
4	HVAC Bundle – 2 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with 2 x Mech control cable, 2 x 2.5mm² 3C+E TPS cable and 2 x 20mm uPVC condensate drain pipe	125NF	125NF	-/120/120
5	HVAC Bundle – 2 x 19.05mm & 9.52mm Copper pipe with 25mm thick nitrile insulation with 2 x Mech control cable, 2 x 2.5mm² 3C+E TPS cable and 2 x 25mm uPVC condensate drain pipe	125NF	125NF	-/120/120
6	HVAC Bundle – 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 3C+E TPS cable and 1 x 25mm uPVC condensate drain pipe ***(Unexposed side)***	125NF	125NF	-/120/120
7	HVAC Bundle – 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 3C+E TPS cable and 1 x 25mm uPVC condensate drain pipe ***(Exposed side)***	125NF	125NF	-/120/120
8	20mm Pex-Al-Pex Pipe ***(Exposed side)***	125NF	125NF	-/120/120
9	20mm Pex-Al-Pex Pipe ***(Unexposed side)***	125NF	125NF	-/120/120

NF – No Failure

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℃

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. The follow documentation was provided:

- Test 6 – Aperture Location – Fire Side – Horizontal.pdf
- Test 6 – Aperture Location – Fire Side – Vertical.pdf
- Test 6 – Aperture Location – Non Fire Side – Horizontal.pdf
- Test 6 – Aperture Location – Non Fire Side – Vertical.pdf
- Test 6 – Aperture Size – Fire Side.pdf
- Test 6 – Aperture Size – Non Fire Side.pdf
- Test 6 – Elevation – Fire Side.pdf
- Test 6 – Elevation – Framing – Fire Side.pdf
- Test 6 – Elevation – Non Fire Side.pdf
- Test 6 – Section A.pdf
- Test 6 – 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:

14/04/2025

Installation completion date:

26/03/2025

Termination of The Test:

The test was discontinued at 125 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	64mm (nominal) steel stud frame with two layers of 13mm FR Plasterboard fitted to each side of the frame
	Dimensions	Width x Height: 1200mm × 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: 64mm x 1200mm
	Installation	Used to construct studs and nogs in steel frame
1.4	Item	Steel Deflection Head 0.75bmt
	Dimensions	Width x Height: 64mm x 1200mm
	Installation	Used to construct top plate
1.5	Item	Steel Track 0.50bmt
	Dimensions	Width x Height: 64mm x 1200mm
	Installation	Used to construct bottom plate
1.6	Item	Self-Tapping Screw
	Dimensions	10g x 16mm
	Installation	Used to construct steel stud frame
1.7	Item	GIB Fyreline
	Dimensions	Width x Height: 1200mm x 1200mm
		Thickness: 13mm
	Installation	2 layers applied to each face of separating element
1.8	Item	GIB Grabber Self Tapping Screw
	Dimensions	41mm
	Installation	Used to secure GIB Fyreline to frame

1.9	Item	GIB Plus 4 Plaster
	Dimensions	15L Pail
	Installation	Used to cover screw heads on plasterboard
1.10	Item / Product Name	Boss FireMastic-300
	Dimensions	600mL sausage
	Installation	Used to seal between separating element and refractory frame
1.11	Item	Boss Batt
	Dimensions	Width x Height: 600mm x 1200mm
	Installation	Cut to fit flush in studs and nogs between fire cells

4.2 Specimens

Services		
2.1	Item	Belden Coax Cable RG6 2.25GHz Sky Satellite Black
	Cable	Overall Diameter: 6.5mm
		Sheath Material: PVC
		Sheath Thickness: 0.85mm
		Conductor Diameter: 0.12mm
		Conductor Material: Copper Clad Steel
	Specimen #	1
2.2	Item	Dynamix UTP CAT6 Blue Solid Cable
	Cable	Overall Diameter: 6.3mm
		Sheath Material: PVC
		Sheath Thickness: 0.5mm
	Core	Overall Diameter: 2.6mm
		Conductor Diameter: 0.24mm
		Conductor Material: Copper
		Insulation Material: V-90 PVC
		Insulation Thickness: 0.65mm
	Specimen #	1

2.3	Item	Spears FlameGuard SDR-13.5 cPVC 40mm Pipe
	Dimensions	Diameter (OD): 48.2mm
		Diameter (ID): 40.6mm
		Wall Thickness (T): 3.8mm
	Specimen #	2
2.4	Item	Spears FlameGuard SDR-13.5 cPVC 50mm Pipe
	Dimensions	Diameter (OD): 60.2mm
		Diameter (ID): 49.6mm
		Wall Thickness (T): 5.3mm
	Specimen #	3
2.5	Item	Ardent 19.05mm Copper Coil
	Dimensions	Diameter (OD): 19.4mm
		Diameter (ID): 13.8mm
		Wall Thickness (T): 1.3mm
	Specimen #	4, 5, 6, 7
2.6	Item	Ardent 9.52mm Copper Coil
	Dimensions	Diameter (OD): 9.4mm
		Diameter (ID): 7.9mm
		Wall Thickness (T): 1.15mm
	Specimen #	4, 5, 6, 7
2.7	Item	K Flex Black Nitrile Fire Retardant Insulation 20x19
	Dimensions	Diameter (OD): 58.0mm
		Diameter (ID): 20.0mm
		Insulation Thickness (T): 19.0mm
	Specimen #	4, 6, 7
2.8	Item	K Flex Black Nitrile Fire Retardant Insulation 10x19
	Dimensions	Diameter (OD): 48.0mm
		Diameter (ID): 15.0mm
		Insulation Thickness (T): 13.0mm
	Specimen #	4, 6, 7

2.9	Item	Maser MAS5102ES Instrumentation Cable 1PR 2C 1.5mm²
	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
	Specimen #	4, 5, 6, 7
2.10	Item	Nexans 3C+E Flat TPS Blue Sheath 2.5mm²
	Cable	Width x Depth: 15.5mm x 5.8mm
		Sheath Material: PVC
		Sheath Thickness: 1.8mm
	Core	Number of Cores: 3 (circular shaped)
		Overall Diameter: 3.3mm
		Conductor Diameter: 0.7mm
		Conductor Material: Copper
		Insulation Material: V-90 PVC
		Insulation Thickness: 1.0mm
	Earth	Overall Diameter: 3.2mm
		Wire Diameter: 0.6mm
	Specimen #	4, 5, 6, 7
2.11	Item	Marley Pressure Pipe S1 PVC-U DN20 PN15
	Dimensions	Diameter (OD): 26.2mm
		Diameter (ID): 22.9mm
		Wall Thickness (T): 1.65mm
	Specimen #	4
	Item	K Flex Black Nitrile Fire Retardant Insulation 20x25

2.12	Dimensions	Diameter (OD): 70.0mm
		Diameter (ID): 20.0mm
		Insulation Thickness (T): 25.0mm
	Specimen #	5
2.13	Item	K Flex Black Nitrile Fire Retardant Insulation 10x25
	Dimensions	Diameter (OD): 60.0mm
		Diameter (ID): 10.0mm
		Insulation Thickness (T): 25.0mm
	Specimen #	5
2.14	Item	Marley Pressure Pipe S1 PVC-U DN25 PN15
	Dimensions	Diameter (OD): 33.6mm
		Diameter (ID): 28.3mm
		Wall Thickness (T): 2.65mm
	Specimen #	5, 6, 7
2.15	Item	Duopex Gas 26X3 DN16-20 PE-X/AL/PE-X Pipe
	Dimensions	Diameter (OD): 20.0mm
		Diameter (ID): 16.0mm
		Wall Thickness (T): 2.0mm
	Specimen #	8, 9

Sealants		
3.1	Item	Boss FireMastic-HPE
	Dimensions	600mL sausage

Collars		
4.1	Item	BOSS Collar Shell 150 (no intumescent included)
	Collar	Height: 40mm Maximum Opening: 203mm Steel Thickness: 0.70BMT
	Fixing Points	3
	Item	BOSS Collar Shell 125 (no intumescent included)

4.2	Collar	Height: 40mm Maximum Opening: 156mm Steel Thickness: 0.70BMT
	Fixing Points	3
4.3	Item	BOSS Collar Shell 60 (no intumescent included)
	Collar	Height: 30mm Maximum Opening: 80mm Steel Thickness: 0.70BMT
	Fixing Points	3
4.4	Item	BOSS Collar Shell 50 (no intumescent included)
	Collar	Height: 30mm Maximum Opening: 70mm Steel Thickness: 0.70BMT
	Fixing Points	3

Fixings		
5.1	Item	Ramset RD16 16mm Steel Disc
	Dimensions	Diameter (OD): 16mm
5.2	Item	Ramset Hollow Wall Anchor 16-24mm
	Description	Cavity fixing for plasterboard up to 38mm
5.3	Item	Hex Head Screws
	Dimensions	14g x 35mm

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:

Kepware 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.

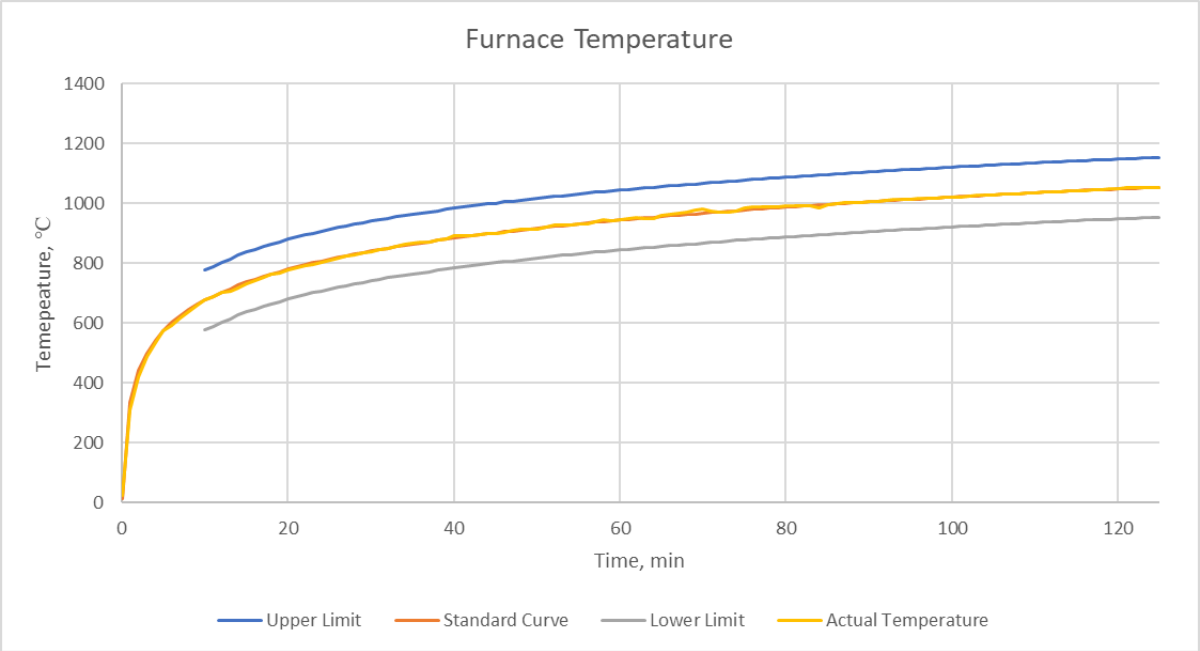


Figure 1 - Furnace Temperature during the test

Ambient Temperature:

The ambient temperature of the test area 15 minutes before the test and at the commencement of the test was 20°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.

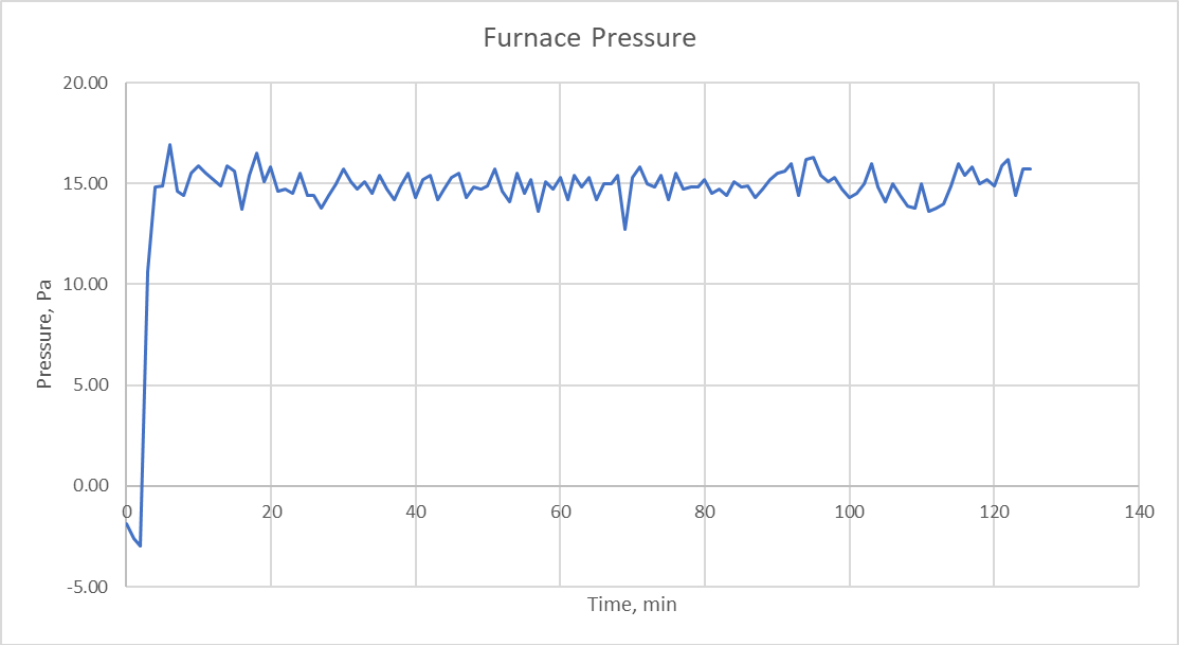


Figure 2 - Furnace Pressure during the test

5.3 Thermocouple locations

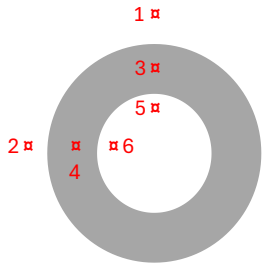
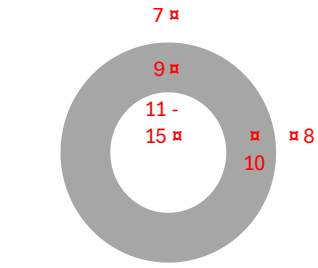
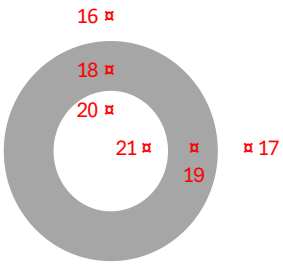
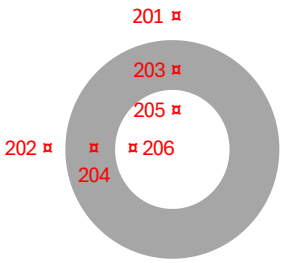
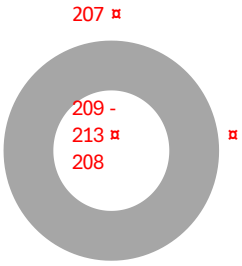
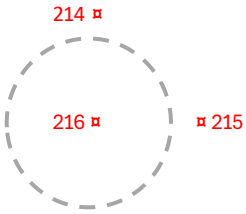
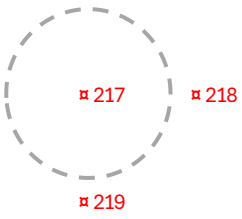
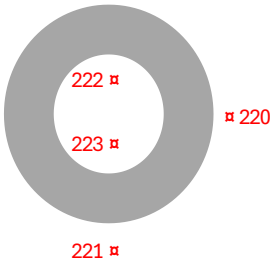
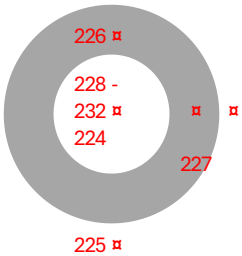
Service: SP3 - CPVC - 50	**Service:** SP4 - OTHER	**Service:** SP 2 - CPVC - 40
# of Thermocouples: 6	**# of Thermocouples:** 9	**# of Thermocouples:** 6
Start: TC1 **Finish:** TC6	**Start:** TC7 **Finish:** TC15	**Start:** TC16 **Finish:** TC21
	**HVAC BUNDLE**  TC11 - CONDENSATE TC12 - PAIR COIL TC13 - CONTROL CABLE TC14 - PAIR COIL TC15 - TPS CABLE	
Service: SP1 - OTHER	**Service:** SP6 - OTHER	**Service:** SP8 - PEX/AL/PEX PIPE - 20
# of Thermocouples: 6	**# of Thermocouples:** 7	**# of Thermocouples:** 3
Start: TC201 **Finish:** TC206	**Start:** TC207 **Finish:** TC213	**Start:** TC214 **Finish:** TC216
	**HVAC BUNDLE (unexposed face only)**  TC209 - PAIR COIL TC210 - PAIR COIL TC211 - TPS CABLE TC212 - CONDENSATE TC213 - CONTROL CABLE	**(exposed face only)** 
Service: SP7 - OTHER	**Service:** SP9 - PEX/AL/PEX PIPE - 20	**Service:** SP5 - OTHER
# of Thermocouples: 3	**# of Thermocouples:** 4	**# of Thermocouples:** 9
Start: TC217 **Finish:** TC219	**Start:** TC220 **Finish:** TC223	**Start:** TC224 **Finish:** TC232
HVAC BUNDLE (exposed face only) 	**(unexposed face only)** 	**HVAC BUNDLE**  TC228 - PAIR COIL TC229 - PAIR COIL TC230 - TPS CABLE TC231 - CONDENSATE TC232 - CONTROL CABLE

Figure 3 - Thermocouple locations

6. Test Results

6.1 Observations during the test

Time min	Test face	SP#	OBSERVATIONS/REMARKS
2	U	4, 5, 6	Smoke coming through from between the services
3	U	1	Smoke coming through from between the cables
5	U	2, 3, 8, 9	Pipes fallen away from the separating element
5	U	4, 5, 6	Condensate pipes fallen away from the separating element
5	U	ALL	Intumescent from sealant beginning to engage
12	U	4, 5	Nitrile rubber insulation beginning to expand
15	U	4, 5	Sealant beginning to push out of the collar shell
26	U	4	Condensate pipe beginning to distort
30	U	6	Condensate pipe beginning to distort
37	U	6	Nitrile rubber insulation beginning to expand
41	U	5	Sealant continues to push past the top of the collar shell
47	U	6	Sealant beginning to crack, smoke coming through
54	U	5	Split developing in the nitrile rubber insulation
64	U	4	Hole developed in the nitrile rubber insulation, smoke coming through
68	U	4	Another hole has developed in the nitrile rubber insulation, smoke coming through
68	U	6	Sealant beginning to crack and expand
68	U	3	Pipe beginning to distort
75	U	3	Holes visible in pipe close to the collar shell
75	U	4	Tear in the nitrile rubber insulation, close to the collar shell
80	U	3	Pipe dislodged from the separating element, cotton pad test – PASS
84	U	3	Cotton pad test – FAIL
92	U	2	Large hole developed in pipe close the collar shell

93	U	2	Pipe dislodged from the separating element, cotton pad test - PASS
125			**TEST DISCONTINUED**

NOTE: E – Exposed Face (inside furnace)

U – Unexposed Face (outside furnace)

SE – Separating element

6.2 Specimen 1

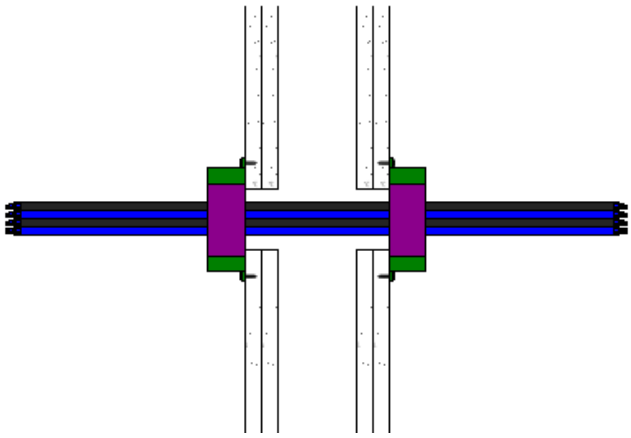


Figure 4 - Specimen 1

Service penetration details	
Service	Cable Bundle – 8 x COAX + 8 x CAT6
Service Support	Exposed Side: 275mm Unexposed Side: 480mm
Aperture Size	55.3mm
Annular Space	Min: 2.1mm, Max: 8.6mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	Boss Collar Shell 50, FireMastic-HPE
Procedure	1. Collar wrapped around cables 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 125 minutes
Insulation	No failure at 125 minutes

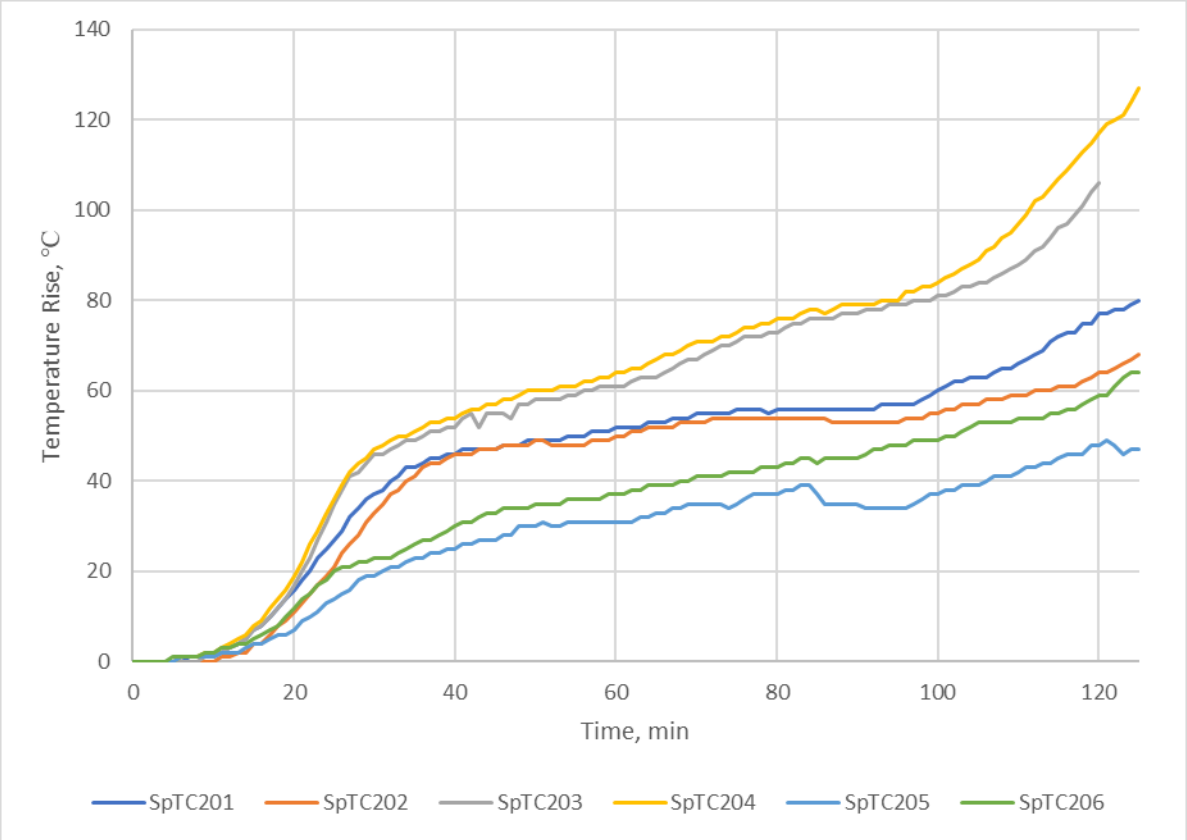


Figure 5 - Specimen 1 thermocouple temperature rise readings

6.3 Specimen 2

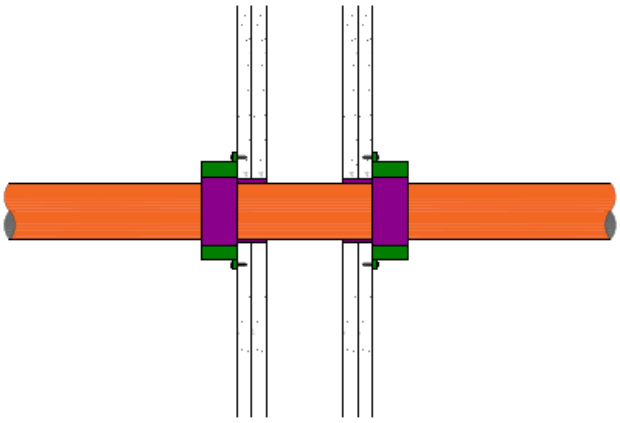


Figure 6 - Specimen 2

Service penetration details	
Service	40mm cPVC Pipe
Service Support	Exposed Side: 275mm Unexposed Side: 480mm and 1625mm
Aperture Size	55.4mm
Annular Space	Min: 2.8mm, Max: 4.4mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	Boss Collar Shell 50, FireMastic-HPE
Procedure	1. FireMastic-HPE applied to the annular gap, 26mm (nominal) deep and finished flush with the separating element. 2. Collar wrapped around cables and secured to the separating element in the fixing points with screws and washers. 3. 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 125 minutes
Insulation	92 minutes

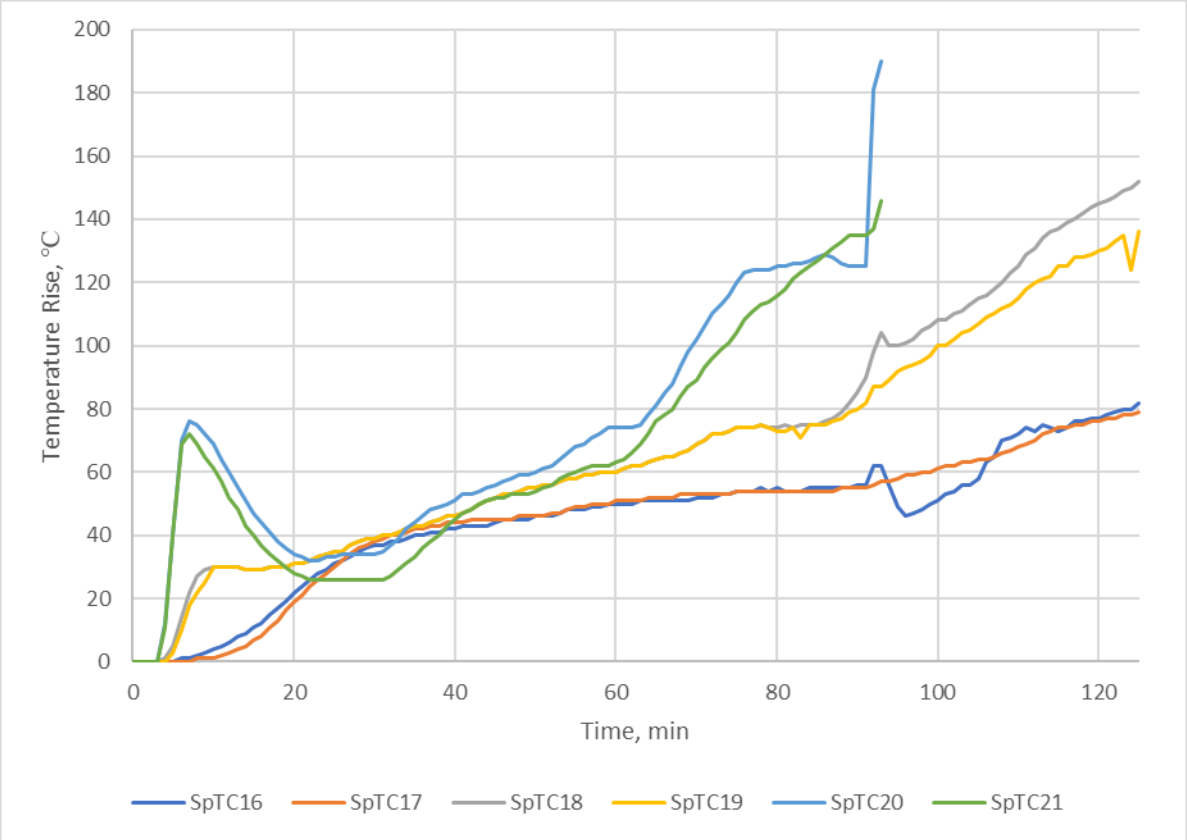


Figure 7 - Specimen 2 thermocouple temperature rise readings

NOTES:

- Pipe dislodged from separating element at 93 minutes

6.4 Specimen 3

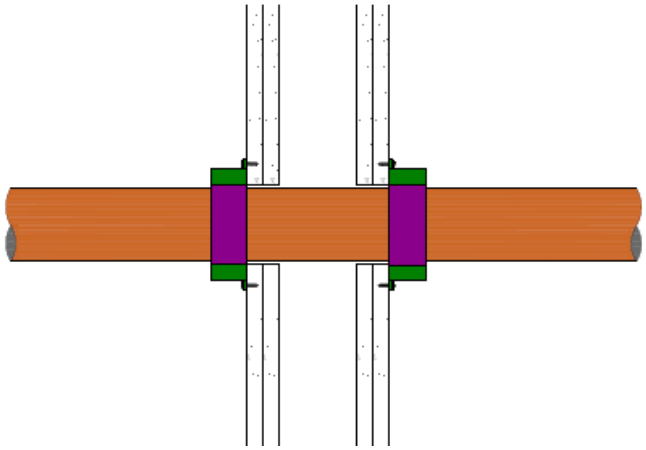


Figure 8 - Specimen 3

Service penetration details	
Service	50mm cPVC Pipe
Service Support	Exposed Side: 275mm Unexposed Side: 480mm and 1625mm
Aperture Size	66.0mm
Annular Space	Min: 2.2mm, Max: 3.6mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	Boss Collar Shell 65, FireMastic-HPE
Procedure	1. Collar wrapped around cables 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	84 minutes
Insulation	80 minutes

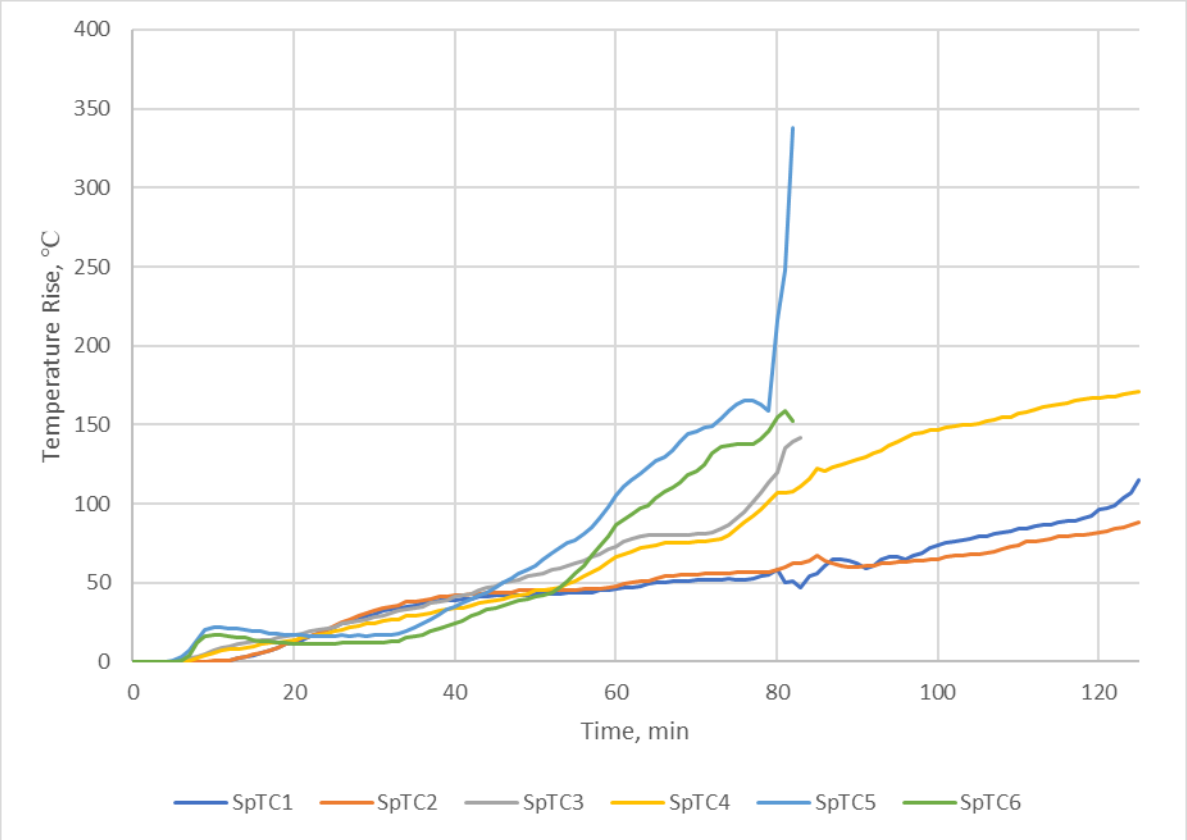


Figure 9 - Specimen 3 thermocouple temperature rise readings

NOTES:

- Pipe dislodged at 80 minutes
- SPTC3 dislodged at 84 minutes

6.5 Specimen 4

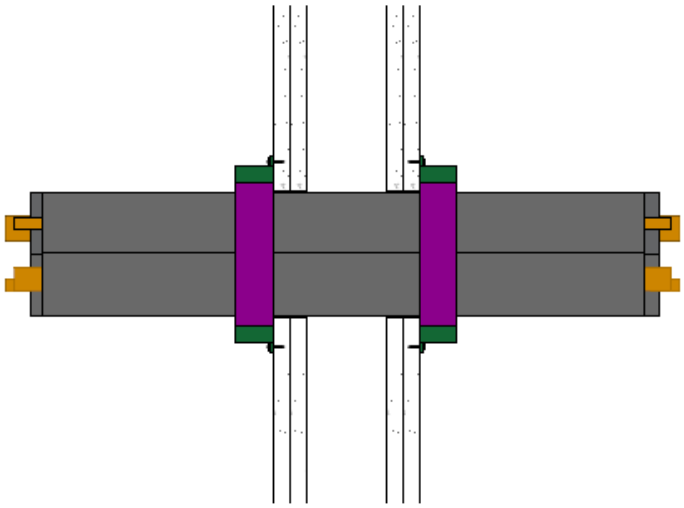


Figure 10 - Specimen 4

Service penetration details	
Service	HVAC Bundle – 2 x 19.05 & 9.52mm Copper Pipes with 19mm thick nitrile insulation + 2 x Mech control cables + 2 x 2.5mm² 3C+E TPS cables + 2 x 20mm uPVC condensate drain pipes
Service Support	Exposed Side: 275mm Unexposed Side: 480mm and 1625mm
Aperture Size	102.4mm
Annular Space	Min: 3.2mm, Max: 7.5mm

Local Fire-stopping system	
Application	Symmetrical – applied to both faces of the separating element
Products	Boss Collar Shell 125, FireMastic-HPE
Procedure	1. Collar wrapped around cables and secured to the separating element in the fixing points with screws. 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 125 minutes
Insulation	No failure at 125 minutes

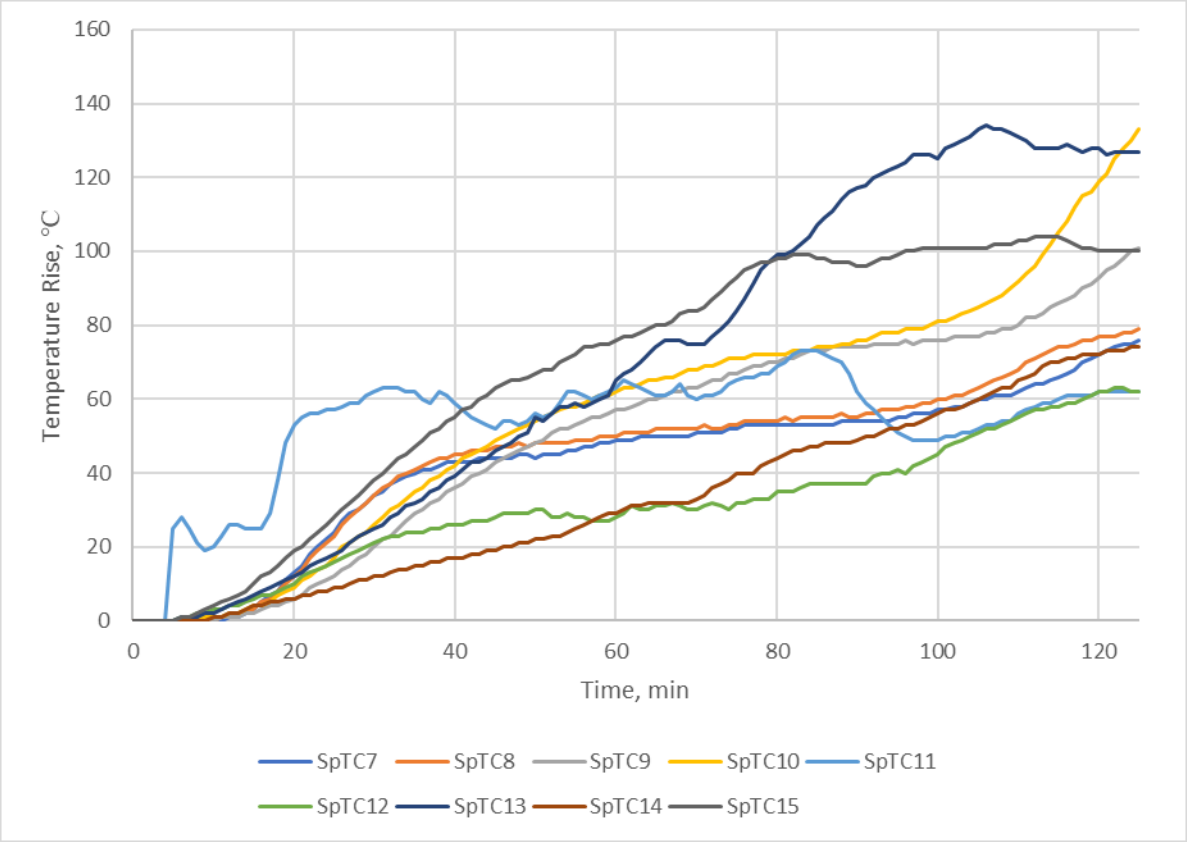


Figure 11 - Specimen 4 thermocouple temperature rise readings

6.6 Specimen 5

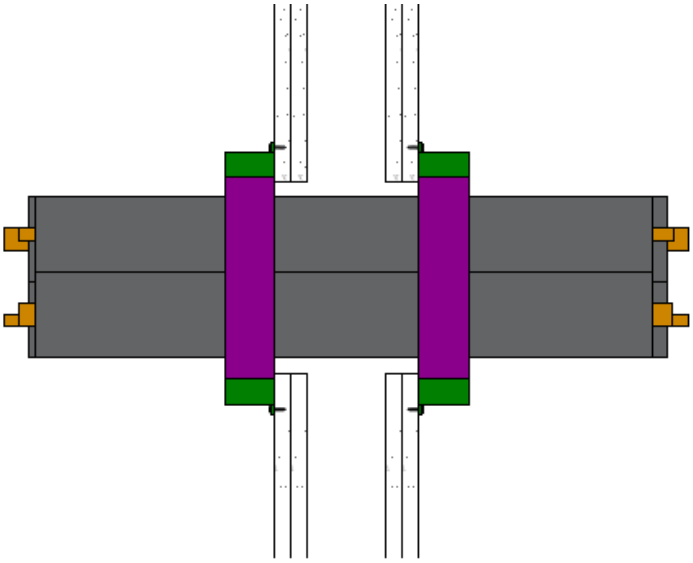


Figure 12 - Specimen 5

Service penetration details	
Service	HVAC Bundle – 2 x 19.05 & 9.52mm Copper Pipes with 25mm thick nitrile insulation + 2 x Mech control cables + 2 x 2.5mm² 3C+E TPS cables + 2 x 25mm uPVC condensate drain pipes
Service Support	Exposed Side: 275mm Unexposed Side: 480mm and 1625mm
Aperture Size	153.8mm
Annular Space	Min: 1.8mm, Max: 5.1mm

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 cables 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 125 minutes
Insulation	No failure at 125 minutes

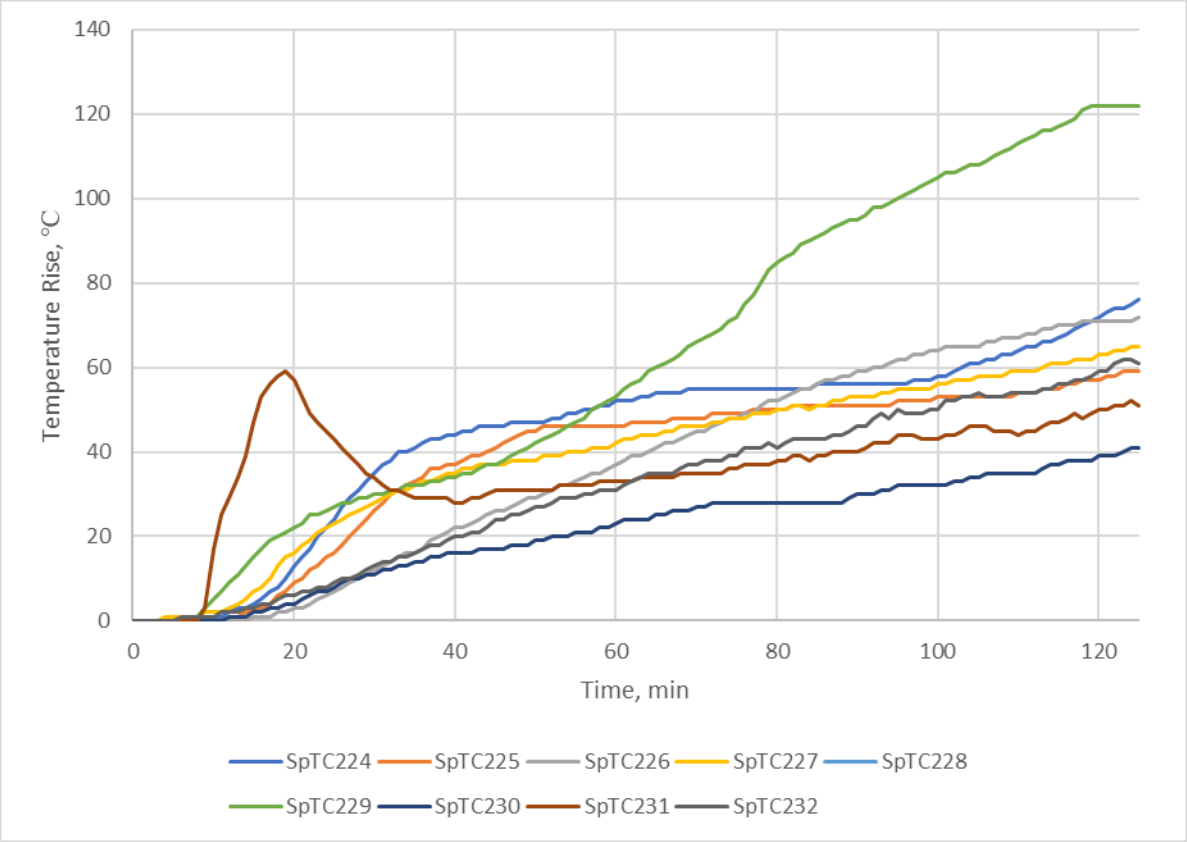


Figure 13 - Specimen 5 thermocouple temperature rise readings

6.7 Specimen 6

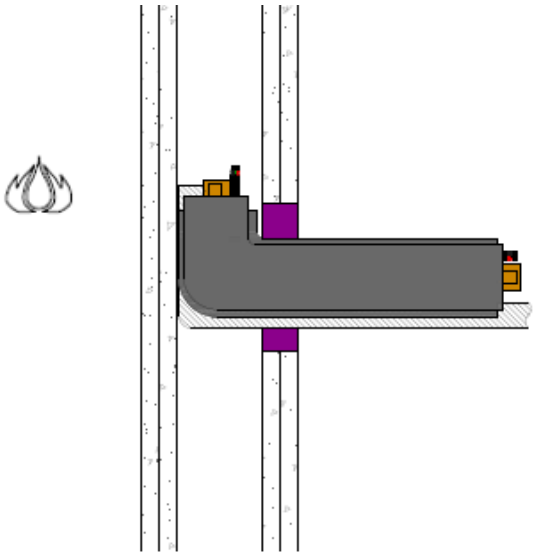


Figure 14 - Specimen 6

Service penetration details	
Service	HVAC Bundle – 19.05 & 9.52mm Copper Pipe with 19mm thick nitrile insulation + Mech control cables + 2.5mm² 3C+E TPS cables + 25mm uPVC condensate drain pipes
Service Support	Unexposed Side: 480mm and 1625mm
Aperture Size	111.8mm
Annular Space	Min: 2.2mm, Max: 5.1mm

Local Fire-stopping system	
Application	Asymmetrical – applied to unexposed side of the separating element
Products	FireMastic-HPE
Procedure	1. FireMastic-HPE applied to the annular gap, 26mm (nominal) deep and finished flush with the separating element.

Test results	
Structural adequacy	Not applicable
Integrity	No failure at 125 minutes
Insulation	No failure at 125 minutes

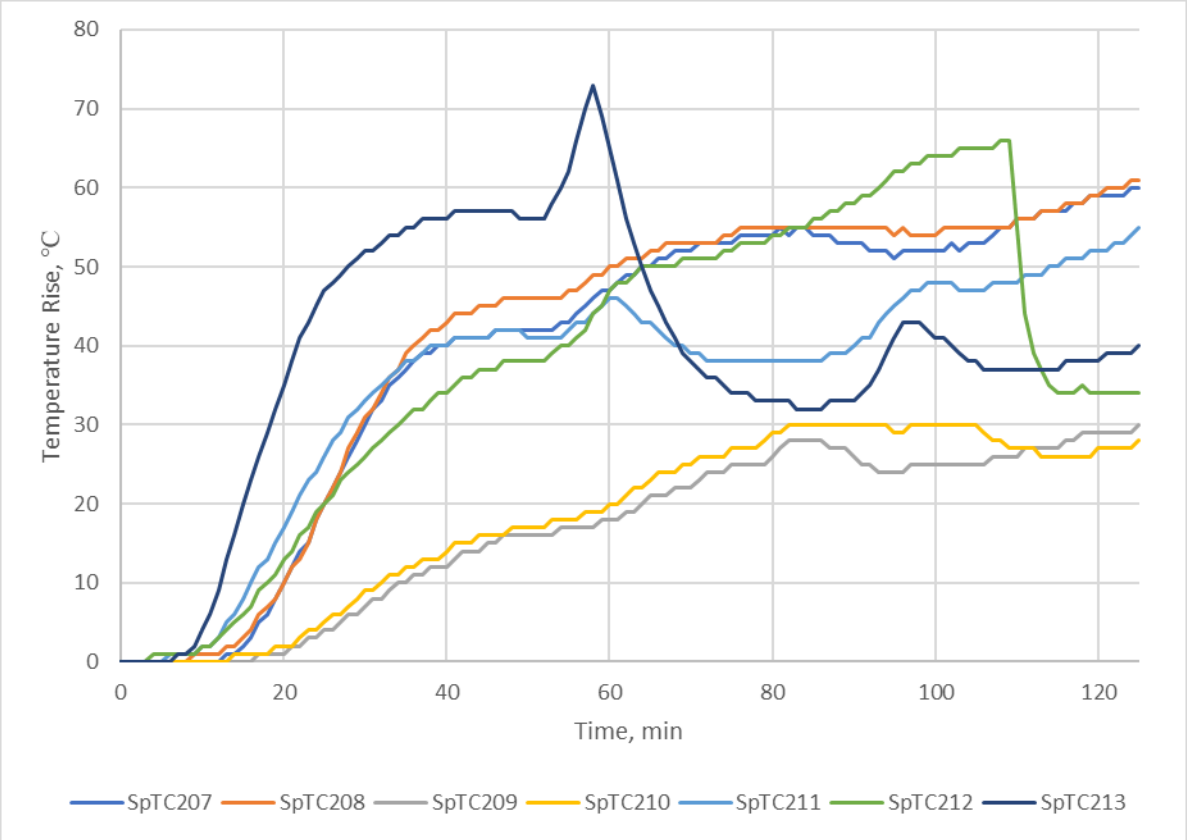


Figure 15 - Specimen 6 thermocouple temperature rise readings

6.8 Specimen 7

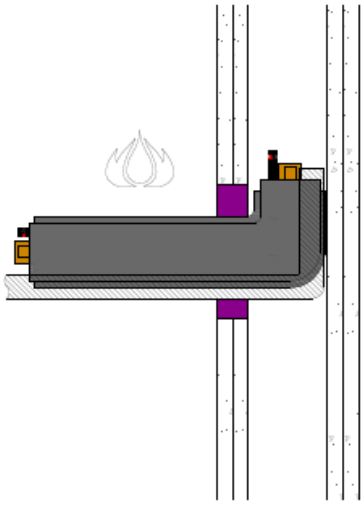


Figure 16 - Specimen 7

Service penetration details	
Service	HVAC Bundle – 19.05 & 9.52mm Copper Pipe with 19mm thick nitrile insulation + Mech control cables + 2.5mm² 3C+E TPS cables + 25mm uPVC condensate drain pipes
Service Support	Exposed Side: 275mm
Aperture Size	112.1mm
Annular Space	Min: 2.8mm, Max: 12.1mm

Local Fire-stopping system	
Application	Asymmetrical – applied to exposed side of the separating element
Products	FireMastic-HPE
Procedure	1. FireMastic-HPE applied to the annular gap, 26mm (nominal) deep and finished flush with the separating element.

Test results	
Structural adequacy	Not applicable
Integrity	No failure at 125 minutes
Insulation	No failure at 125 minutes

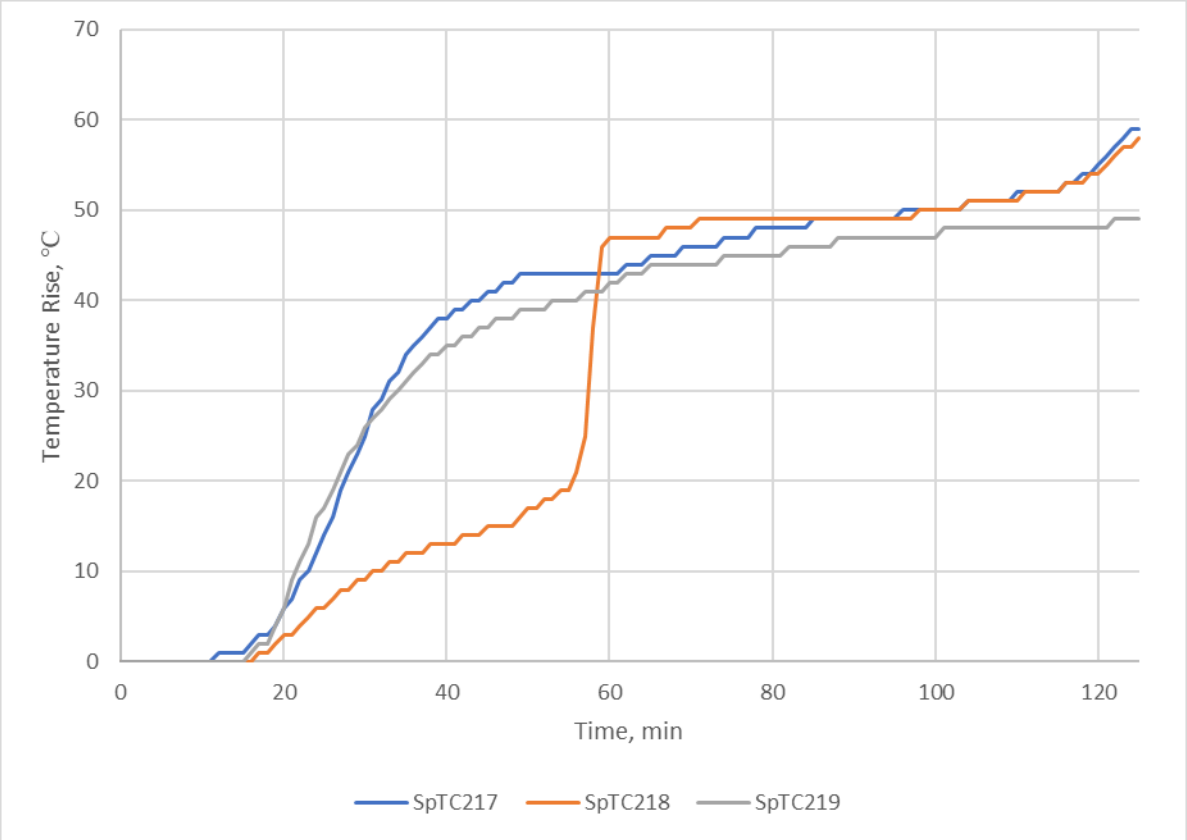


Figure 17 - Specimen 7 thermocouple temperature rise readings

6.9 Specimen 8

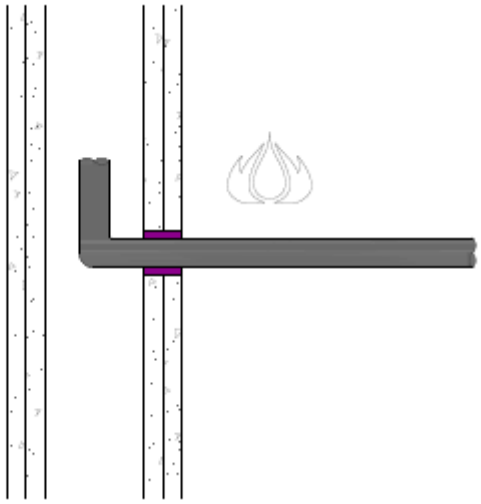


Figure 18 - Specimen 8

Service penetration details	
Service	20mm Pex-Al-Pex Pipe
Service Support	Exposed Side: 275mm
Aperture Size	27.7mm
Annular Space	Min: 3.2mm, Max: 4.5mm

Local Fire-stopping system	
Application	Asymmetrical – applied to exposed side of the separating element
Products	FireMastic-HPE
Procedure	1. FireMastic-HPE applied to the annular gap, 26mm (nominal) deep and finished flush with the separating element.

Test results	
Structural adequacy	Not applicable
Integrity	No failure at 125 minutes
Insulation	No failure at 125 minutes

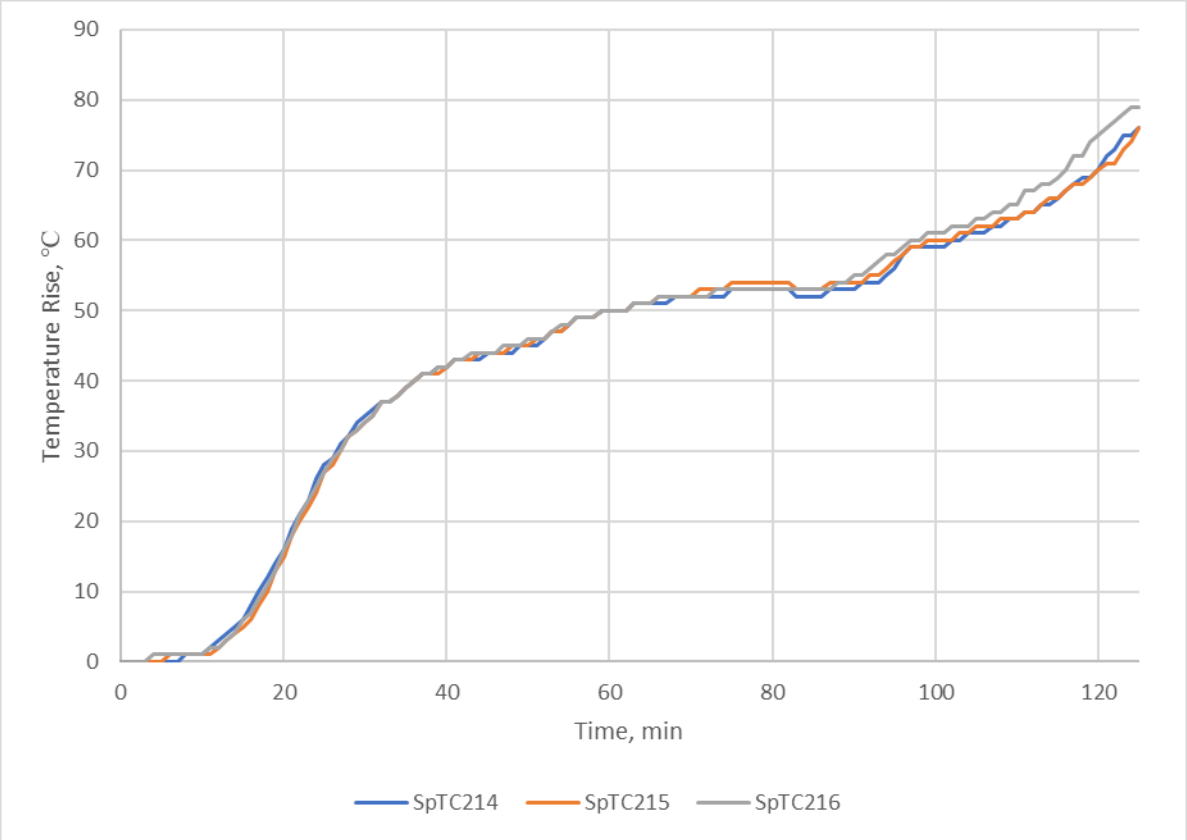


Figure 19 - Specimen 8 thermocouple temperature rise readings

6.10Specimen 9

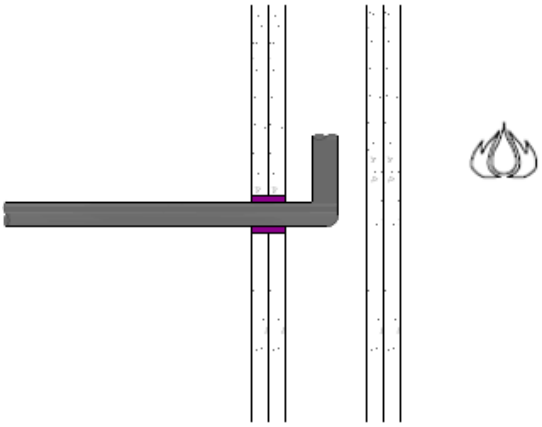


Figure 20 - Specimen 9

Service penetration details	
Service	20mm Pex-Al-Pex Pipe
Service Support	Unexposed Side: 480mm and 1625mm
Aperture Size	28.8mm
Annular Space	Min: 4.1mm, Max: 4.7mm

Local Fire-stopping system	
Application	Asymmetrical – applied to unexposed side of the separating element
Products	FireMastic-HPE
Procedure	1. FireMastic-HPE applied to the annular gap, 26mm (nominal) deep and finished flush with the separating element.

Test results	
Structural adequacy	Not applicable
Integrity	No failure at 125 minutes
Insulation	No failure at 125 minutes

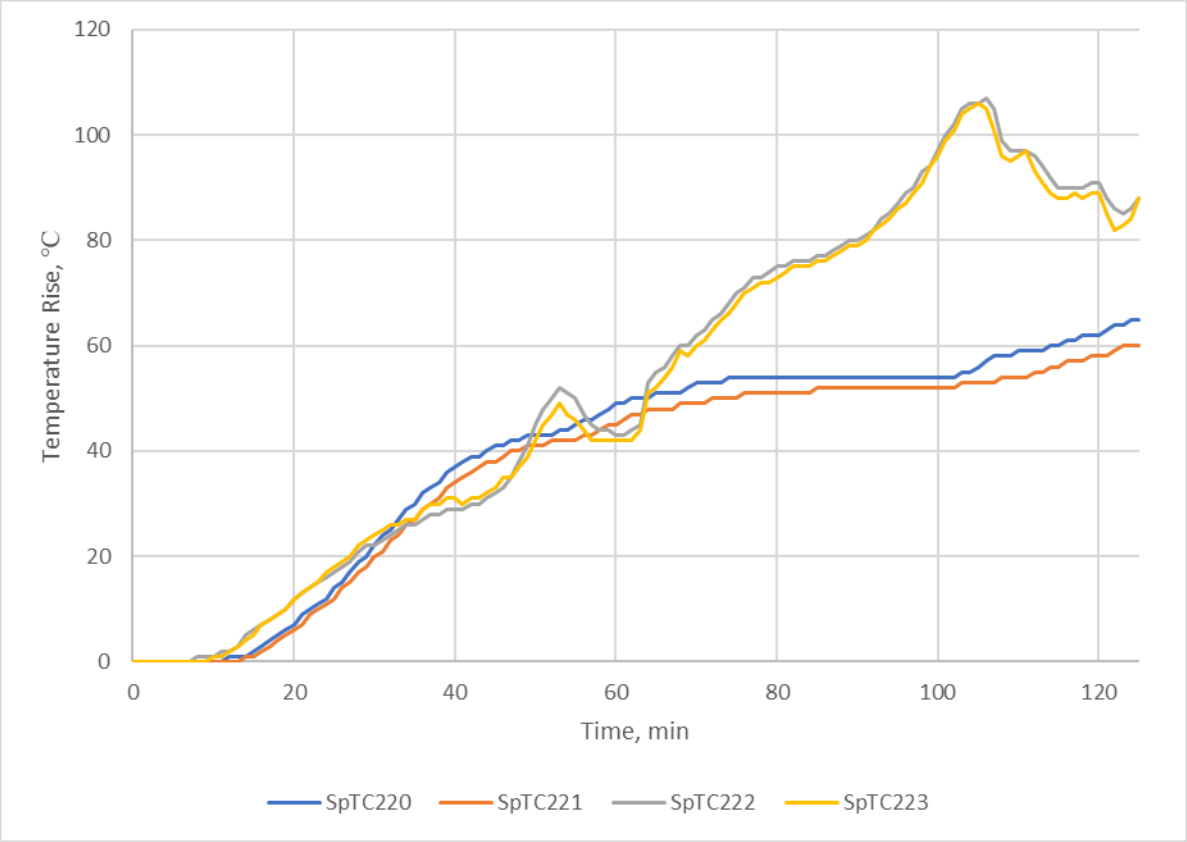


Figure 21 - Specimen 9 thermocouple temperature rise readings

7. Photos

7.1 Photos before the test

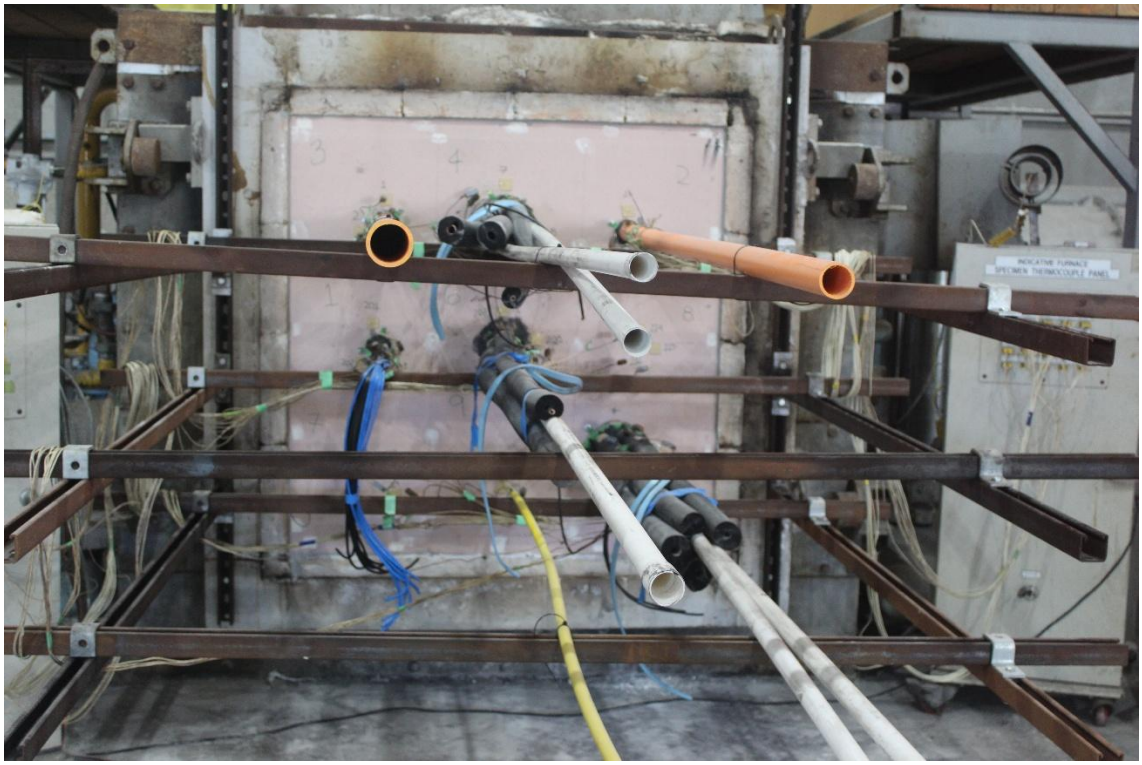


Figure 22 - Unexposed face prior to test commencement

Figure 23 - Exposed face prior to test commencement

7.2 During and after the test

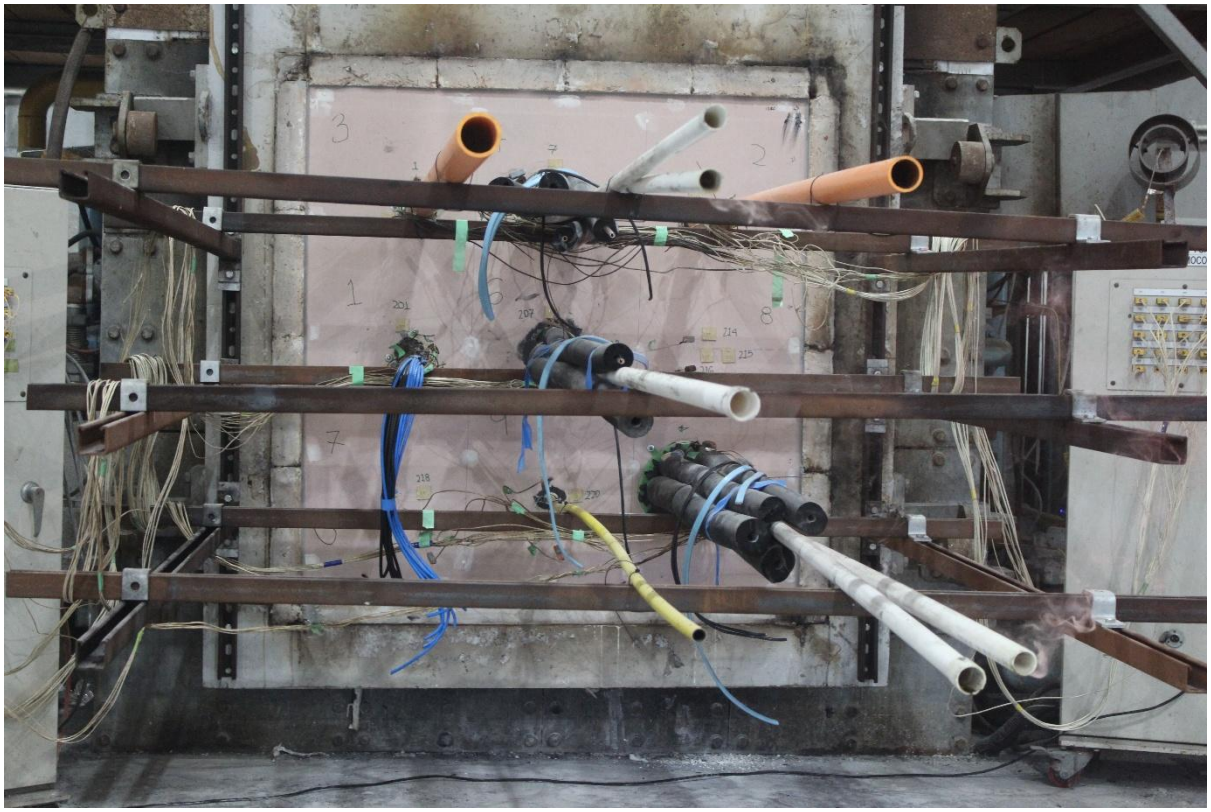


Figure 24 - Unexposed face at 15 minutes

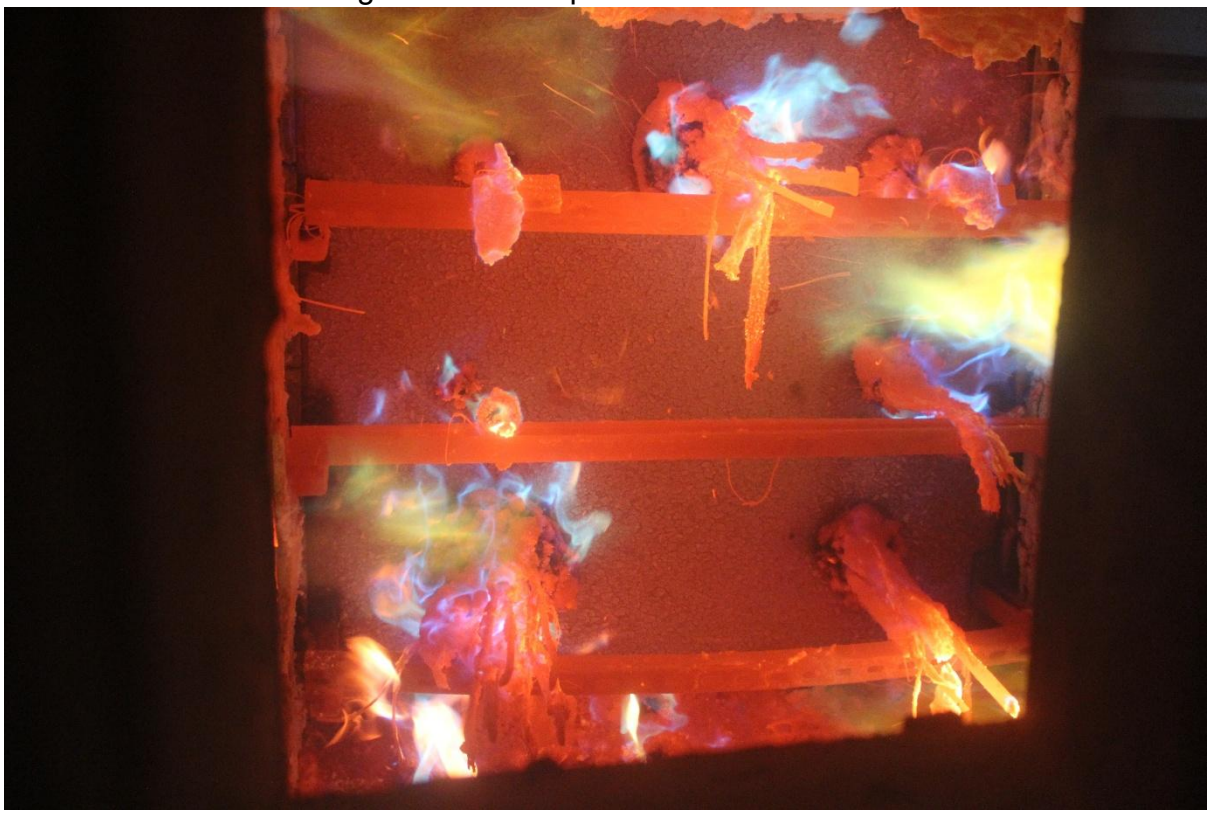


Figure 25 - Exposed face at 15 minutes

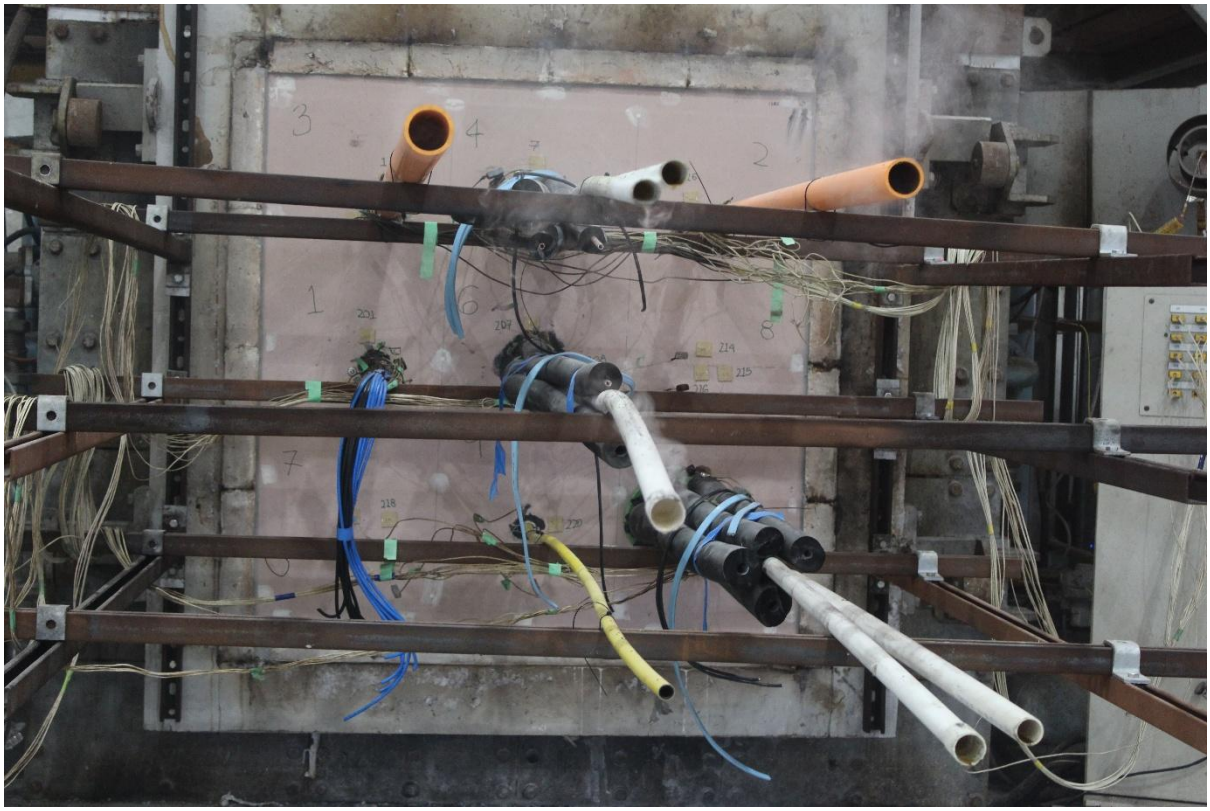


Figure 26 - Unexposed face at 30 minutes

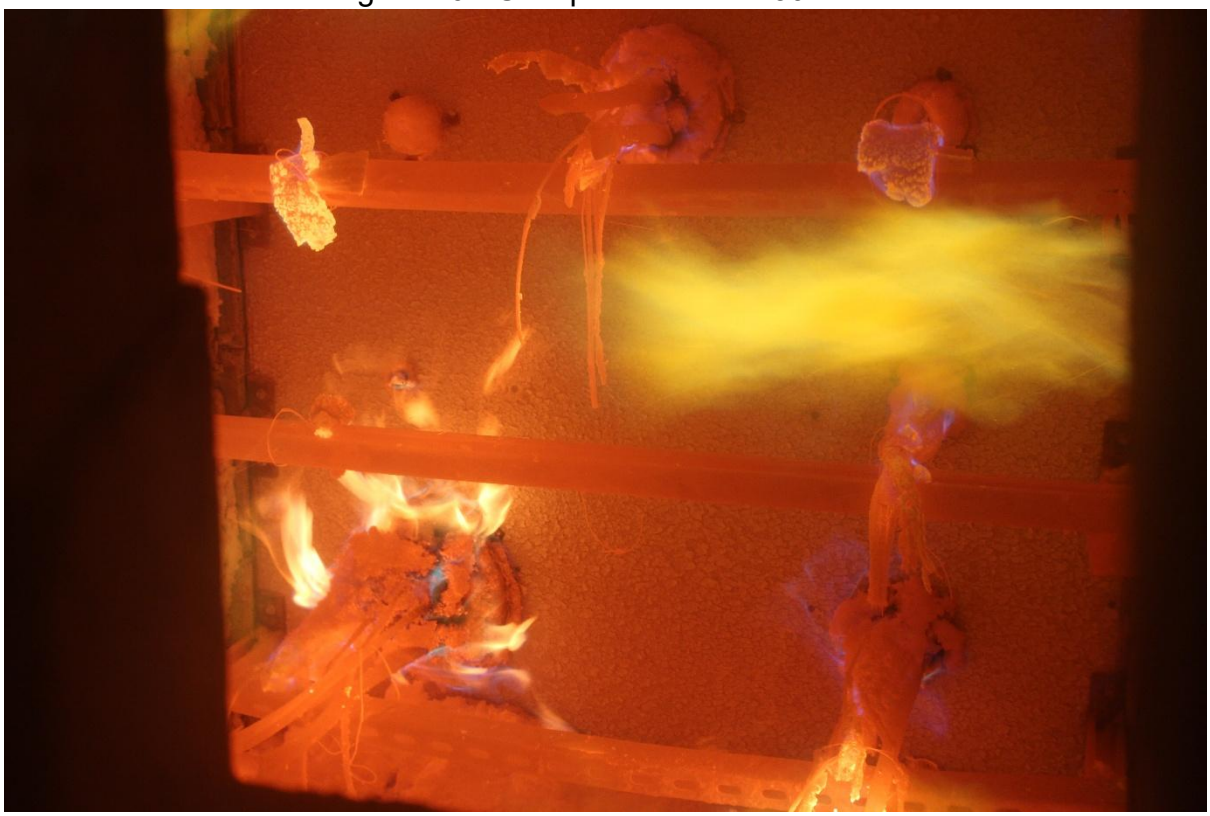


Figure 27 - Exposed face at 30 minutes

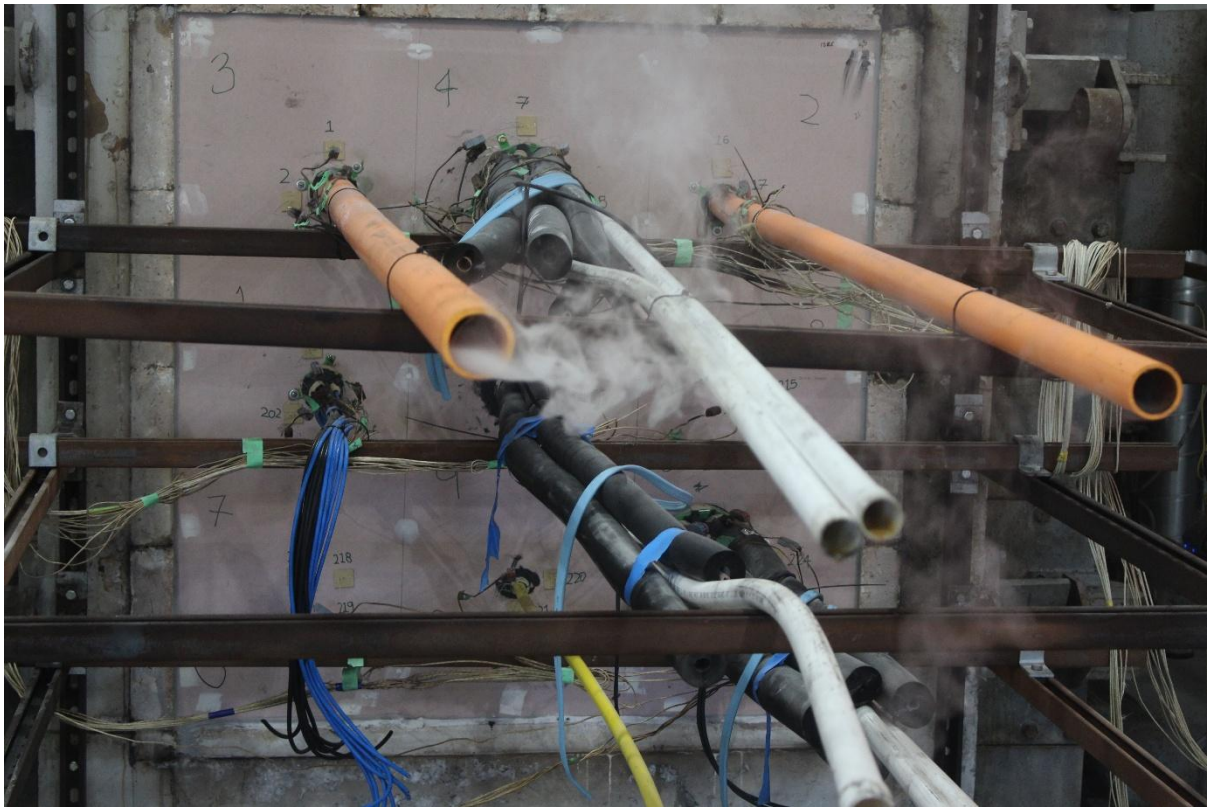


Figure 28 - Unexposed face at 45 minutes

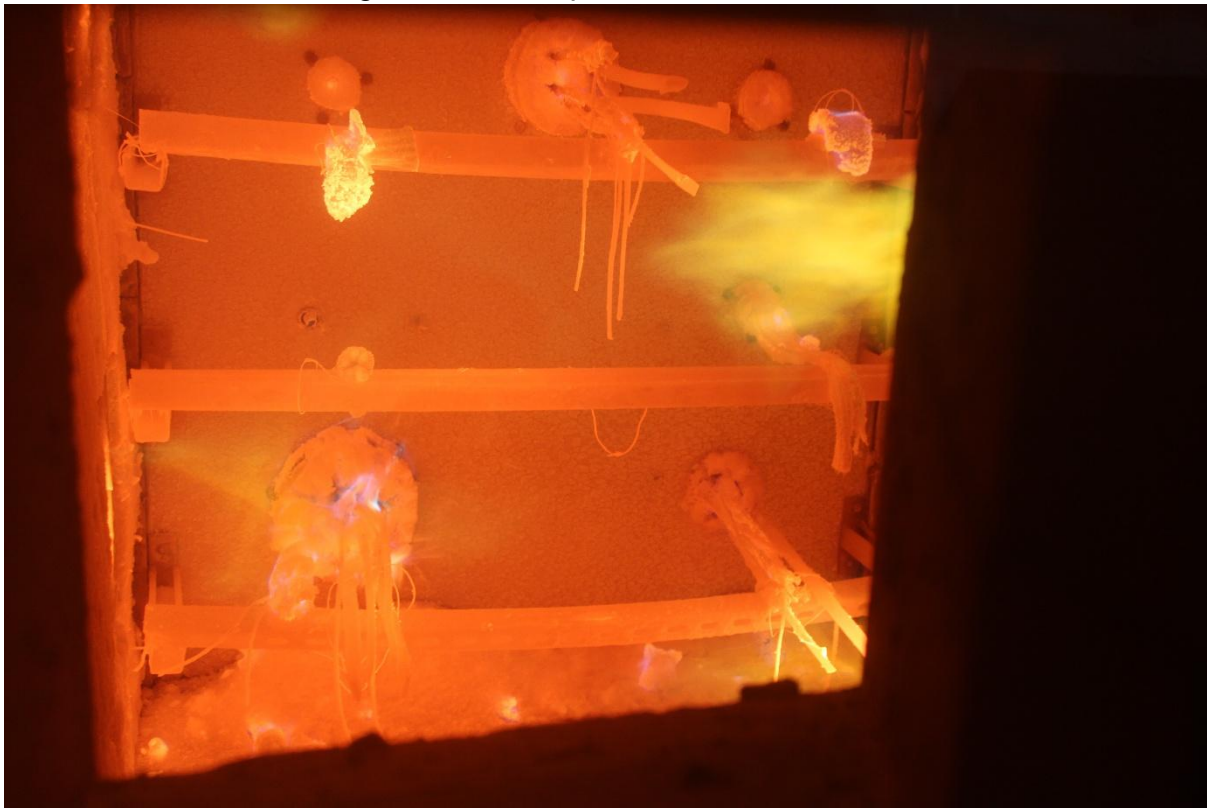


Figure 29 - Exposed face at 45 minutes

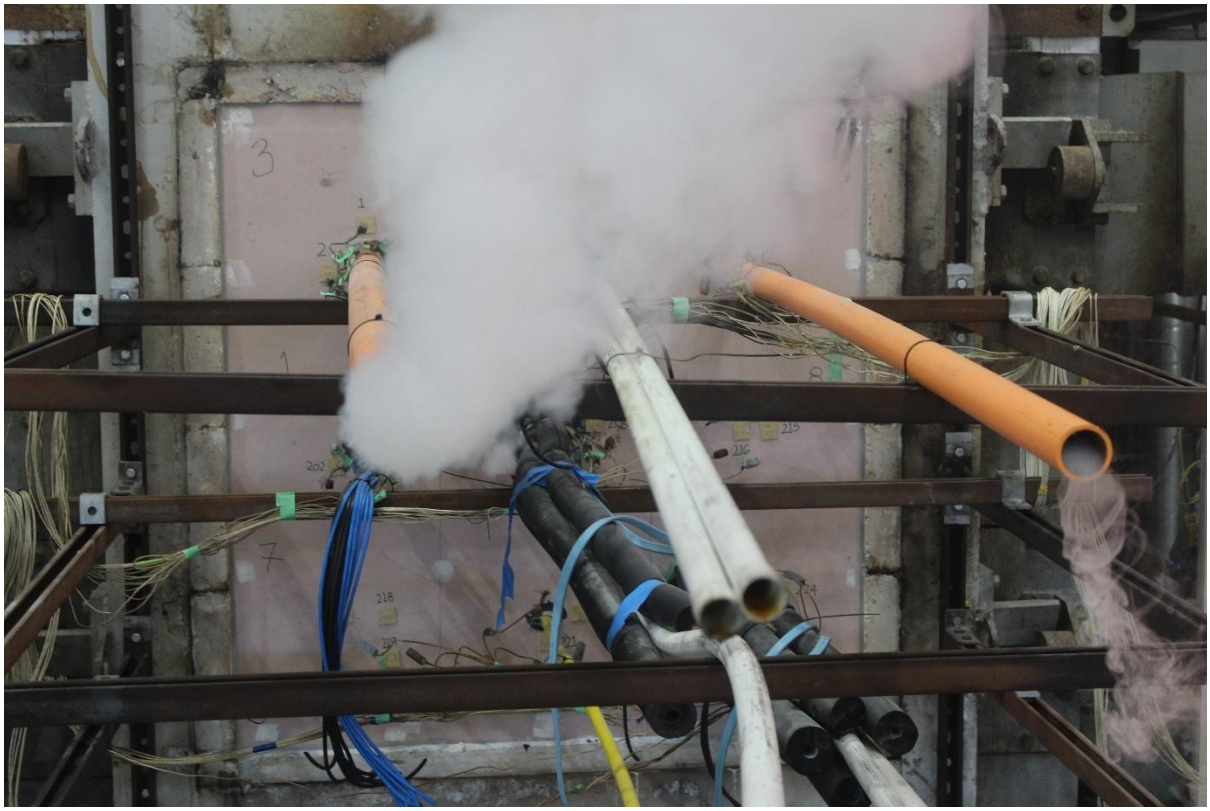


Figure 30 - Unexposed face at 60 minutes

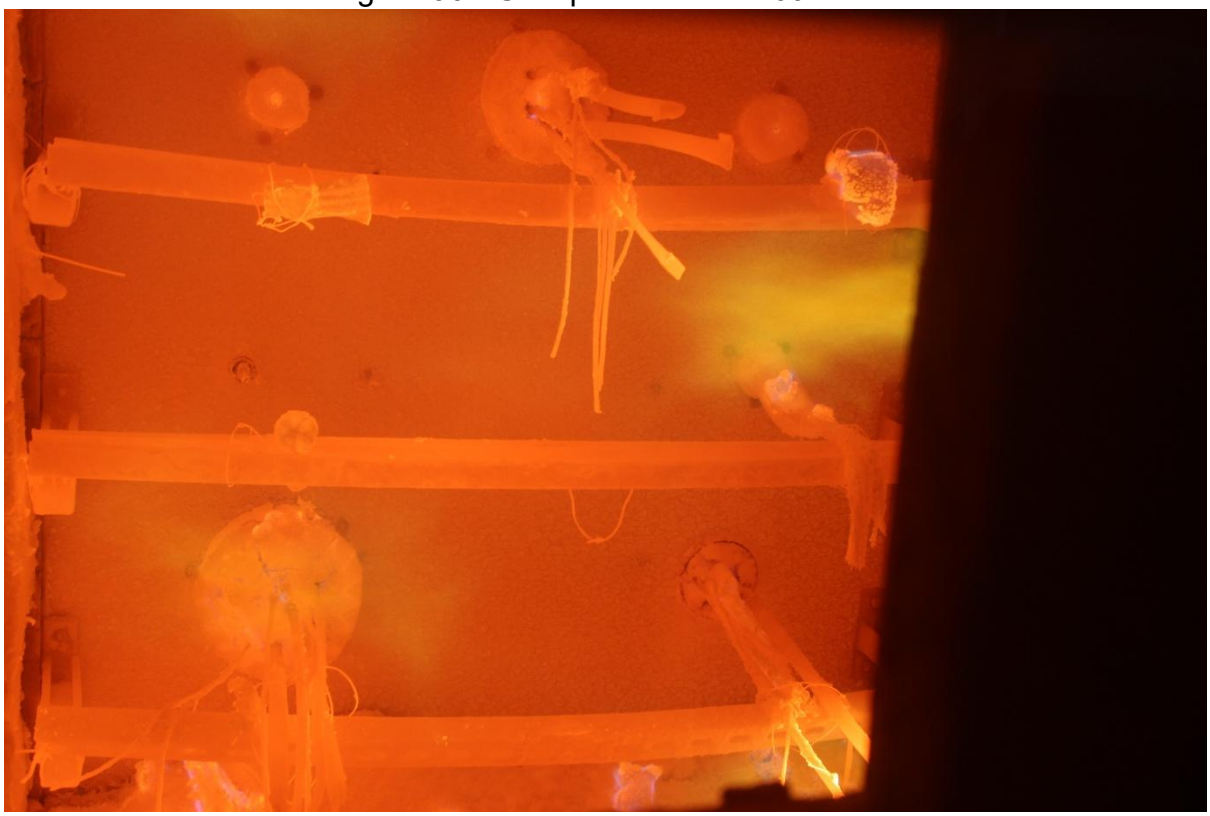


Figure 31 - Exposed face at 60 minutes

Figure 32 - Unexposed face at 90 minutes

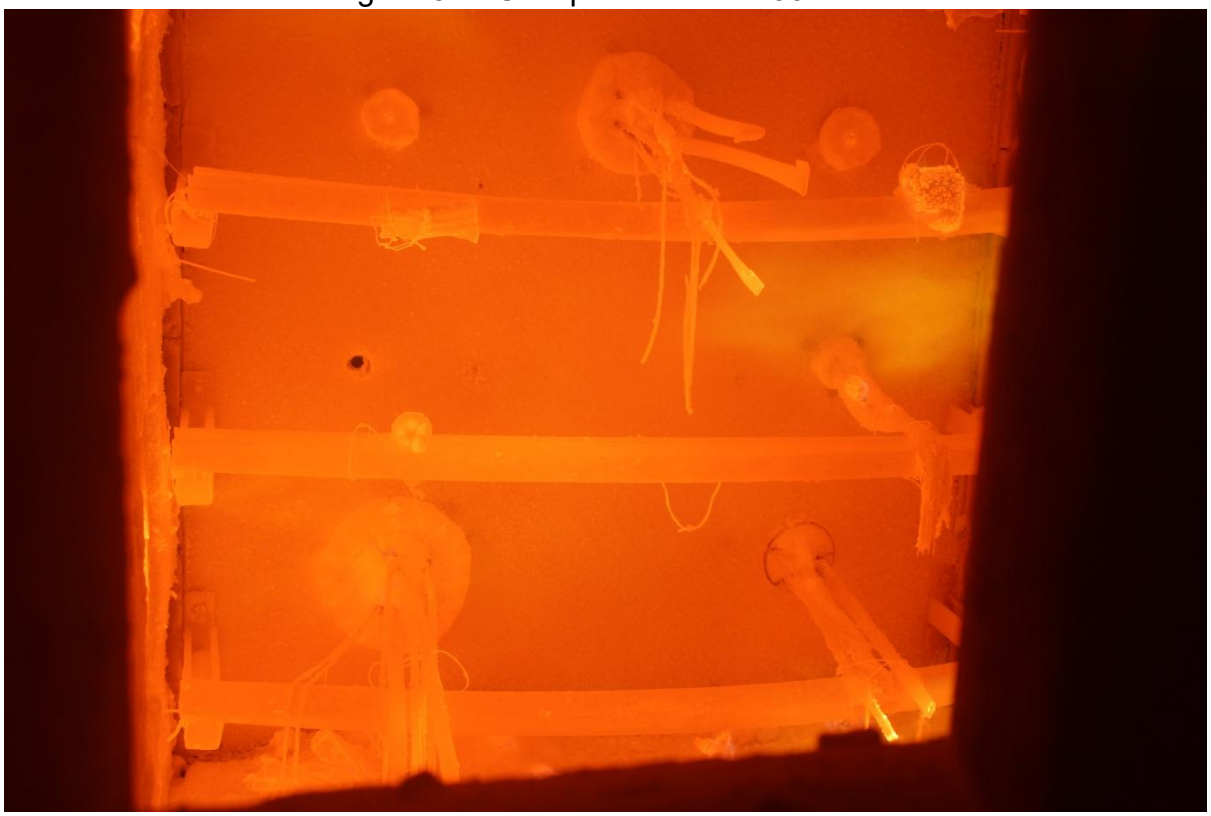


Figure 33 - Exposed face at 90 minutes

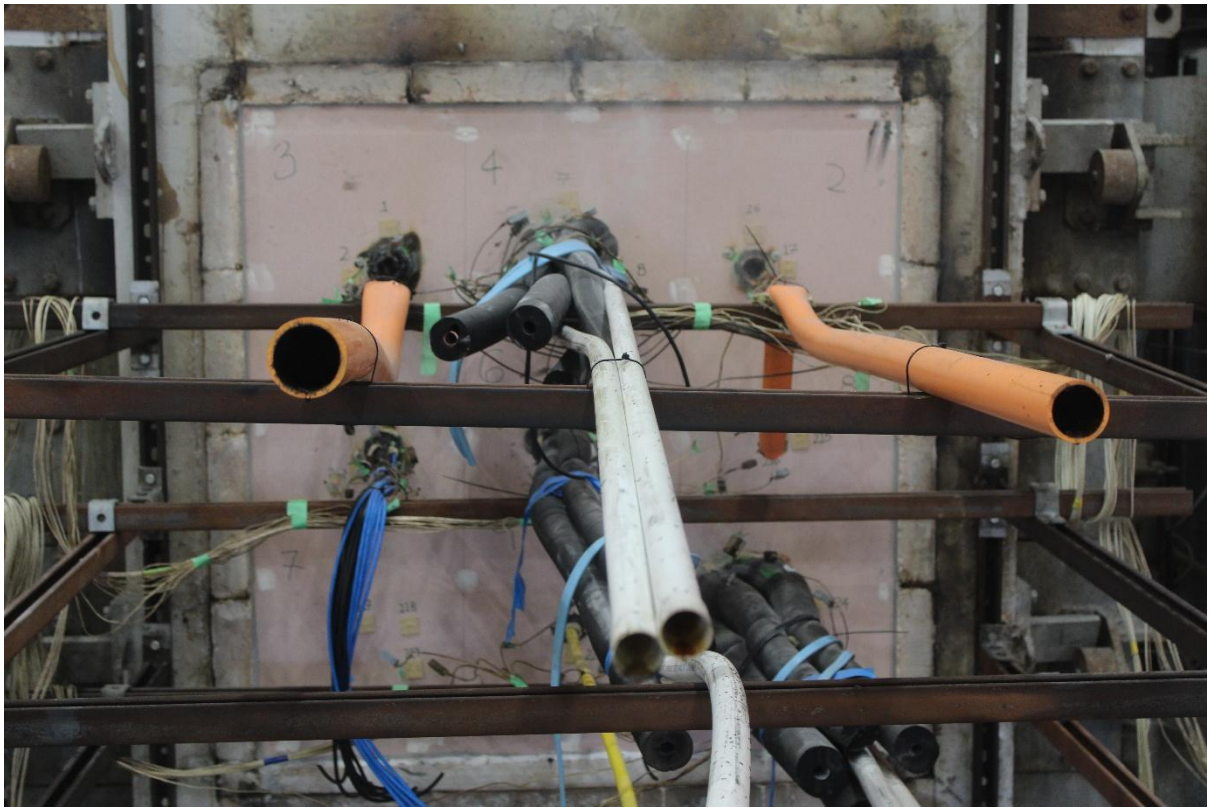


Figure 34 - Unexposed face at 120 minutes

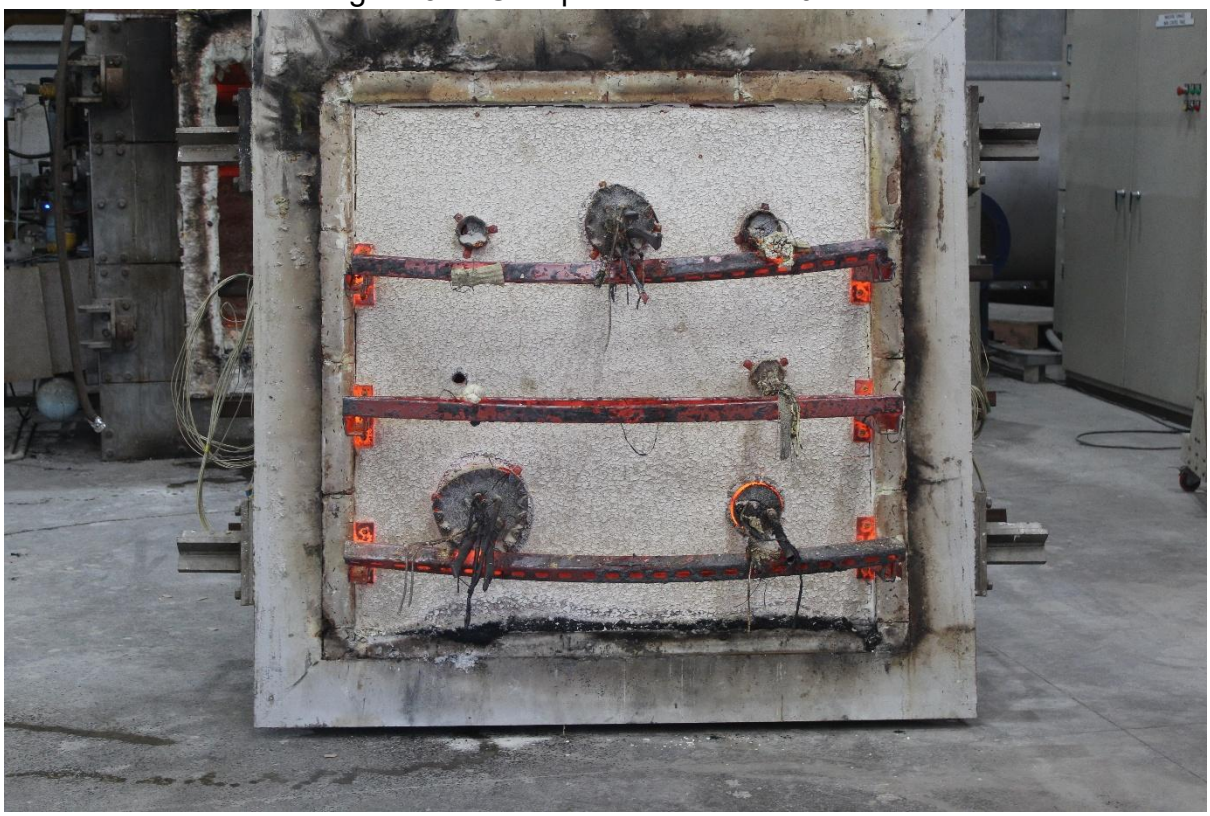


Figure 35 - Exposed face after the test

8. Appendix

8.1 Client supplied drawings

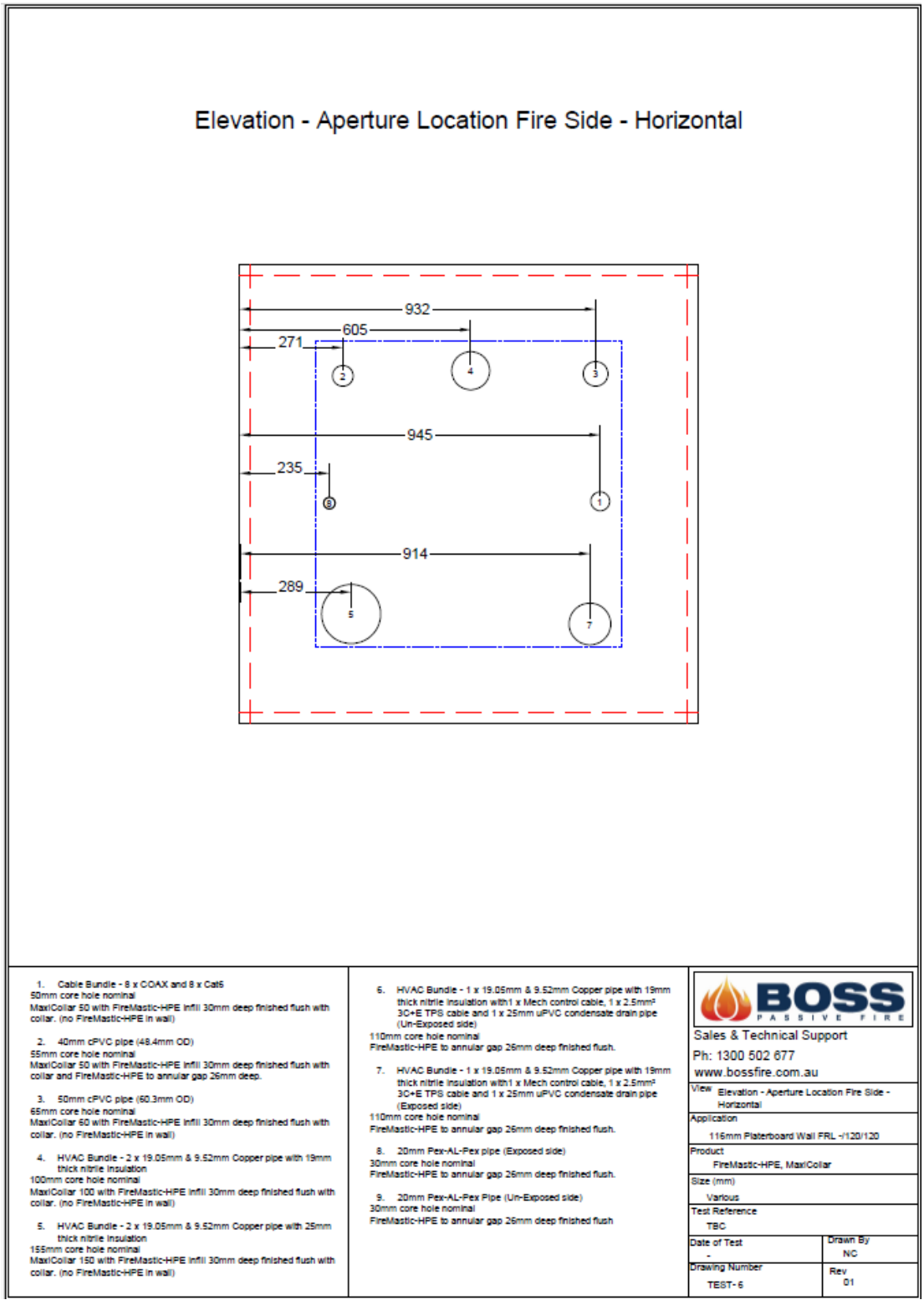
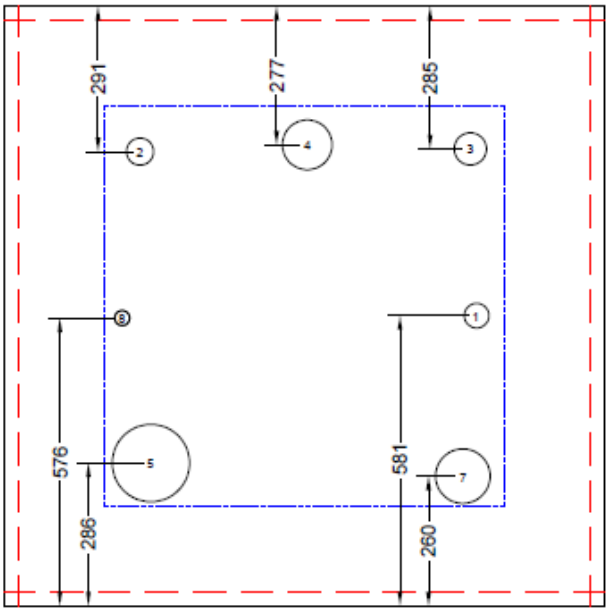


Figure 36 - Test 6 – Aperture Location – Fire Side – Horizontal.pdf

Elevation - Aperture Location Fire Side - Vertical



1. Cable Bundle - 8 x COAX and 8 x Cat6
50mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

2. 40mm cPVC pipe (48.4mm OD)
55mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar and FireMastic-HPE to annular gap 26mm deep.

3. 50mm cPVC pipe (60.3mm OD)
65mm core hole nominal
MaxiCollar 60 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

4. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation
100mm core hole nominal
MaxiCollar 100 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

5. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 25mm thick nitrile insulation
155mm core hole nominal
MaxiCollar 150 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

6. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with1 x Mech control cable, 1 x 2.5mm² 3C+E TPS cable and 1 x 25mm uPVC condensate drain pipe (Un-Exposed side)
110mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

7. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with1 x Mech control cable, 1 x 2.5mm² 3C+E TPS cable and 1 x 25mm uPVC condensate drain pipe (Exposed side)
110mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

8. 20mm Pex-AL-Pex pipe (Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

9. 20mm Pex-AL-Pex Pipe (Un-Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush

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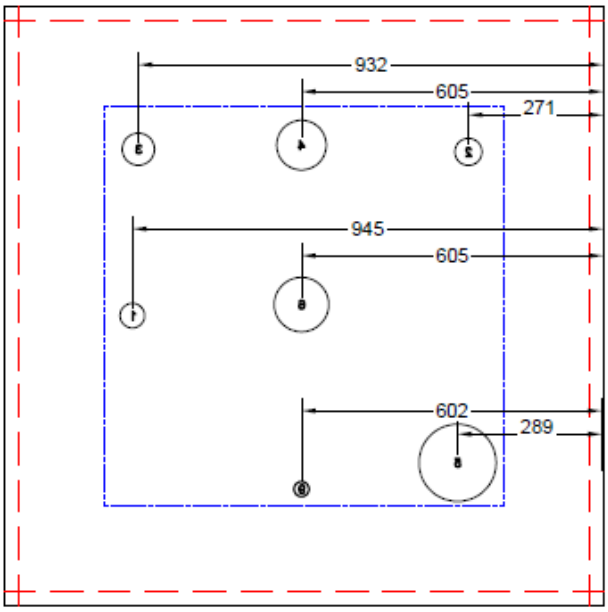
View	Elevation - Aperture Location Fire Side - Vertical
Application	116mm Plasterboard Wall FRL -/120/120
Product	FireMastic-HPE, MaxiCollar
Size (mm)	Various
Test Reference	TBC
Date of Test	-
Drawn By	NC
Drawing Number	TEST-6
Rev	01

Figure 37 - Test 6 – Aperture Location – Fire Side – Vertical.pdf

Elevation - Aperture Location Non Fire Side - Horizontal



1. Cable Bundle - 8 x COAX and 8 x Cat6
50mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

2. 40mm cPVC pipe (48.4mm OD)
55mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar and FireMastic-HPE to annular gap 26mm deep.

3. 50mm cPVC pipe (60.3mm OD)
65mm core hole nominal
MaxiCollar 60 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

4. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation
100mm core hole nominal
MaxiCollar 100 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

5. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 25mm thick nitrile insulation
155mm core hole nominal
MaxiCollar 150 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

6. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with1 x Mech control cable, 1 x 2.5mm² 3C+E TPS cable and 1 x 25mm uPVC condensate drain pipe (Un-Exposed side)
110mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

7. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with1 x Mech control cable, 1 x 2.5mm² 3C+E TPS cable and 1 x 25mm uPVC condensate drain pipe (Exposed side)
110mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

8. 20mm Pex-AL-Pex pipe (Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

9. 20mm Pex-AL-Pex Pipe (Un-Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush

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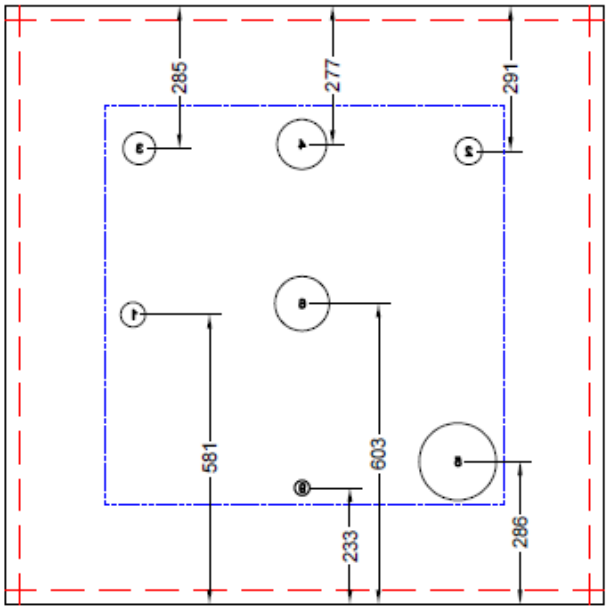
View	Elevation - Aperture Location Fire Side - Horizontal
Application	116mm Plasterboard Wall FRL -/120/120
Product	FireMastic-HPE, MaxiCollar
Size (mm)	Various
Test Reference	TBC
Date of Test: -	Drawn By: NC
Drawing Number: TEST- 6	Rev: 01

Figure 38 - Test 6 – Aperture Location – Non Fire Side – Horizontal.pdf

Elevation - Aperture Location Non Fire Side - Vertical



1. Cable Bundle - 8 x COAX and 8 x Cat6
50mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

2. 40mm cPVC pipe (48.4mm OD)
55mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar and FireMastic-HPE to annular gap 26mm deep.

3. 50mm cPVC pipe (60.3mm OD)
65mm core hole nominal
MaxiCollar 60 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

4. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation
100mm core hole nominal
MaxiCollar 100 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

5. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 25mm thick nitrile insulation
155mm core hole nominal
MaxiCollar 150 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

6. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with1 x Mech control cable, 1 x 2.5mm² 3C+E TPS cable and 1 x 25mm uPVC condensate drain pipe (Un-Exposed side)
110mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

7. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with1 x Mech control cable, 1 x 2.5mm² 3C+E TPS cable and 1 x 25mm uPVC condensate drain pipe (Exposed side)
110mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

8. 20mm Pex-AL-Pex pipe (Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

9. 20mm Pex-AL-Pex Pipe (Un-Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush

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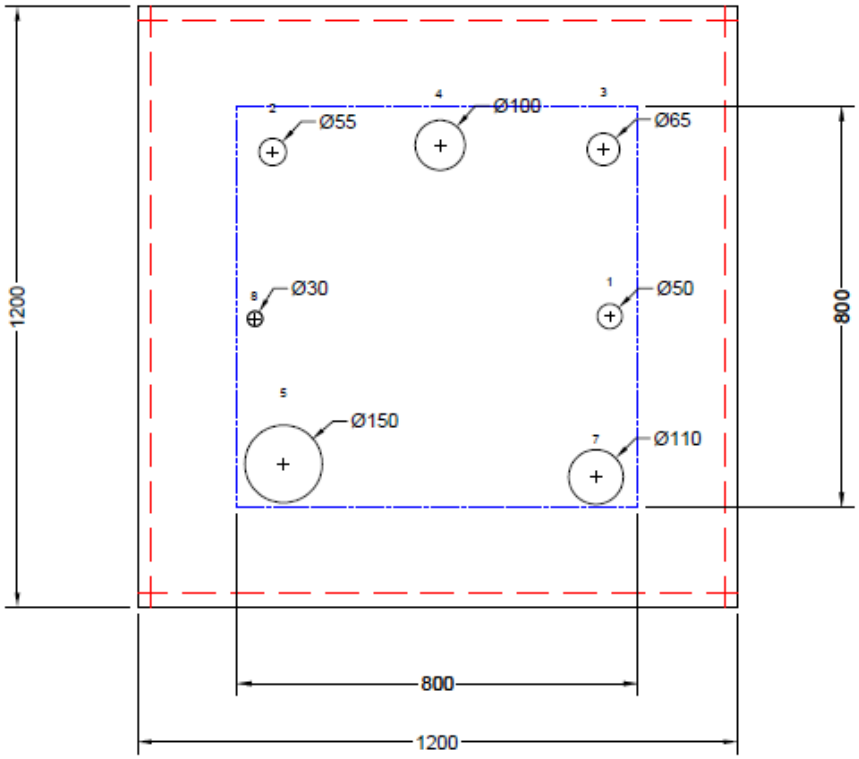
View	Elevation - Aperture Location Fire Side - Vertical
Application	116mm Plasterboard Wall FRL -/120/120
Product	FireMastic-HPE, MaxiCollar
Size (mm)	Various
Test Reference	TBC
Date of Test: -	Drawn By: NC
Drawing Number: TEST- 6	Rev: 01

Figure 39 - Test 6 – Aperture Location – Non Fire Side – Vertical.pdf

Elevation - Aperture Size Fire Side



1. Cable Bundle - 8 x COAX and 8 x Cat6
50mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

2. 40mm cPVC pipe (48.4mm OD)
55mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar and FireMastic-HPE to annular gap 26mm deep.

3. 50mm cPVC pipe (60.3mm OD)
65mm core hole nominal
MaxiCollar 60 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

4. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation
100mm core hole nominal
MaxiCollar 100 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

5. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 25mm thick nitrile insulation
155mm core hole nominal
MaxiCollar 150 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

6. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with1 x Mech control cable, 1 x 2.5mm² 3C+E TPS cable and 1 x 25mm uPVC condensate drain pipe (Un-Exposed side)
110mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

7. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with1 x Mech control cable, 1 x 2.5mm² 3C+E TPS cable and 1 x 25mm uPVC condensate drain pipe (Exposed side)
110mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

8. 20mm Pex-AL-Pex pipe (Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

9. 20mm Pex-AL-Pex Pipe (Un-Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush

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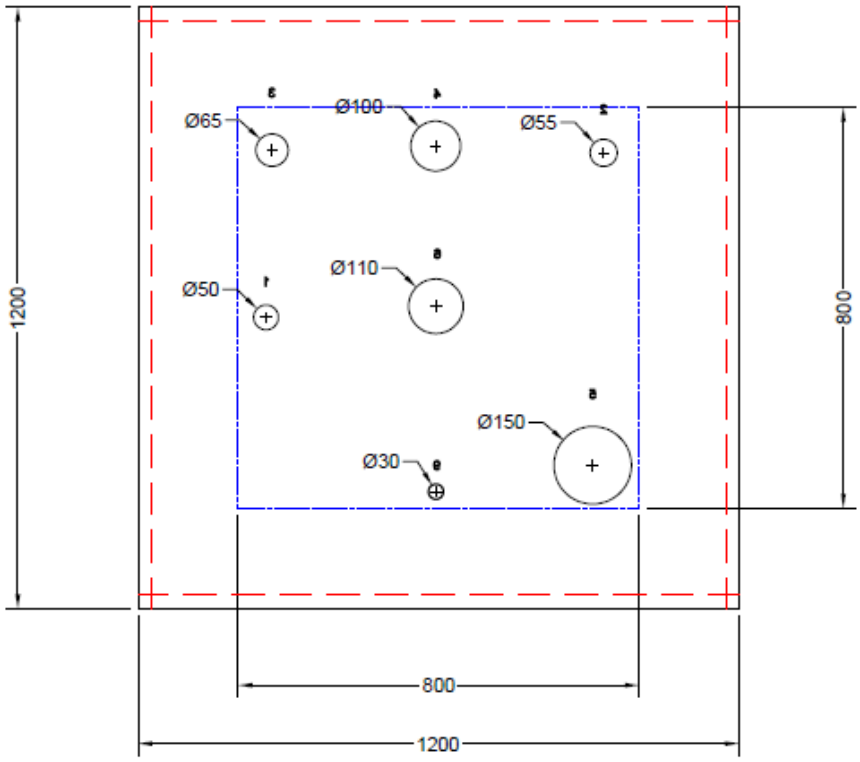
View	Elevation - Aperture Size Fire Side
Application	116mm Plasterboard Wall FRL -/120/120
Product	FireMastic-HPE, MaxiCollar
Size (mm)	Various
Test Reference	TBC
Date of Test	-
Drawn By	NC
Drawing Number	TEST-6
Rev	01

Figure 40 - Test 6 – Aperture Size – Fire Side.pdf

Elevation - Aperture Size Non Fire Side



1. Cable Bundle - 8 x COAX and 8 x Cat6
50mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

2. 40mm cPVC pipe (48.4mm OD)
55mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar and FireMastic-HPE to annular gap 26mm deep.

3. 50mm cPVC pipe (60.3mm OD)
65mm core hole nominal
MaxiCollar 60 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

4. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation
100mm core hole nominal
MaxiCollar 100 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

5. HVAC Bundle - 2 x 19.05mm & 9.52mm Copper pipe with 25mm thick nitrile insulation
155mm core hole nominal
MaxiCollar 150 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)

6. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with1 x Mech control cable, 1 x 2.5mm² 3C+E TPS cable and 1 x 25mm uPVC condensate drain pipe (Un-Exposed side)
110mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

7. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with1 x Mech control cable, 1 x 2.5mm² 3C+E TPS cable and 1 x 25mm uPVC condensate drain pipe (Exposed side)
110mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

8. 20mm Pex-AL-Pex pipe (Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.

9. 20mm Pex-AL-Pex Pipe (Un-Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush

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View	Elevation - Aperture Size Fire Side
Application	116mm Plasterboard Wall FRL -/120/120
Product	FireMastic-HPE, MaxiCollar
Size (mm)	Various
Test Reference	TBC
Date of Test	-
Drawn By	NC
Drawing Number	TEST-6
Rev	01

Figure 41 - Test 6 – Aperture Size – Non Fire Side.pdf

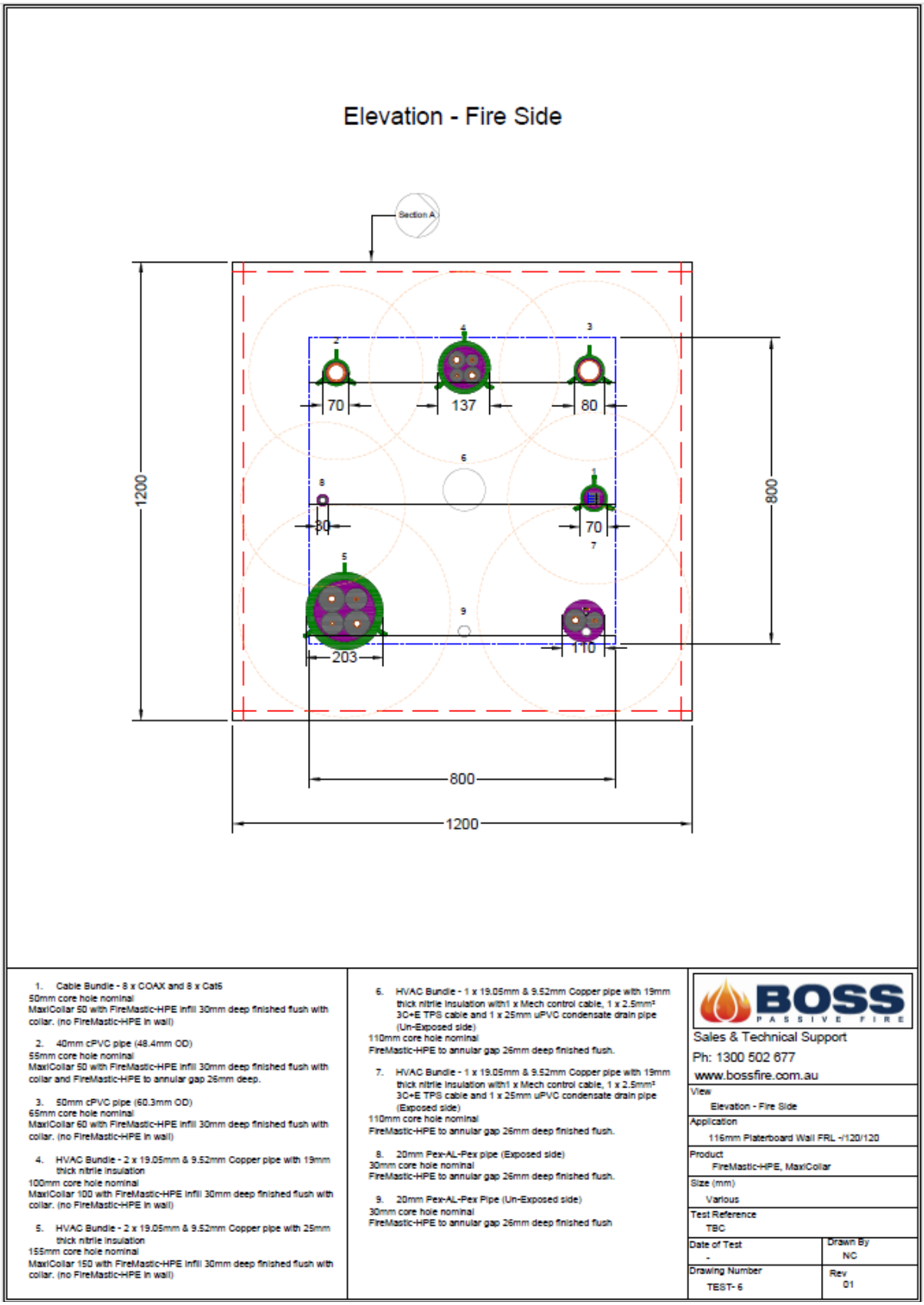

Figure 42 - Test 6 – Elevation – Fire Side.pdf

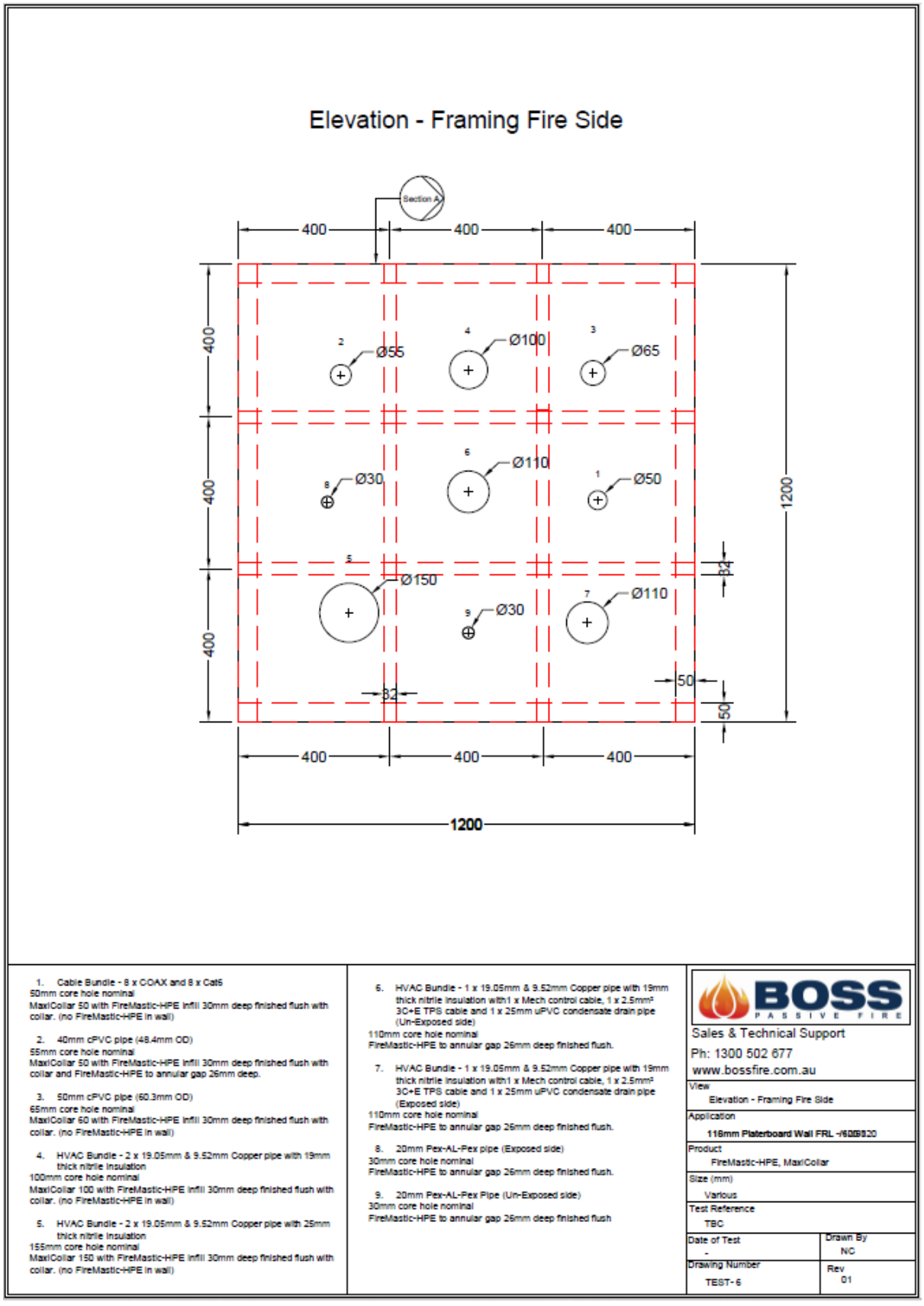

Figure 43 - Test 6 – Elevation – Framing – Fire Side.pdf

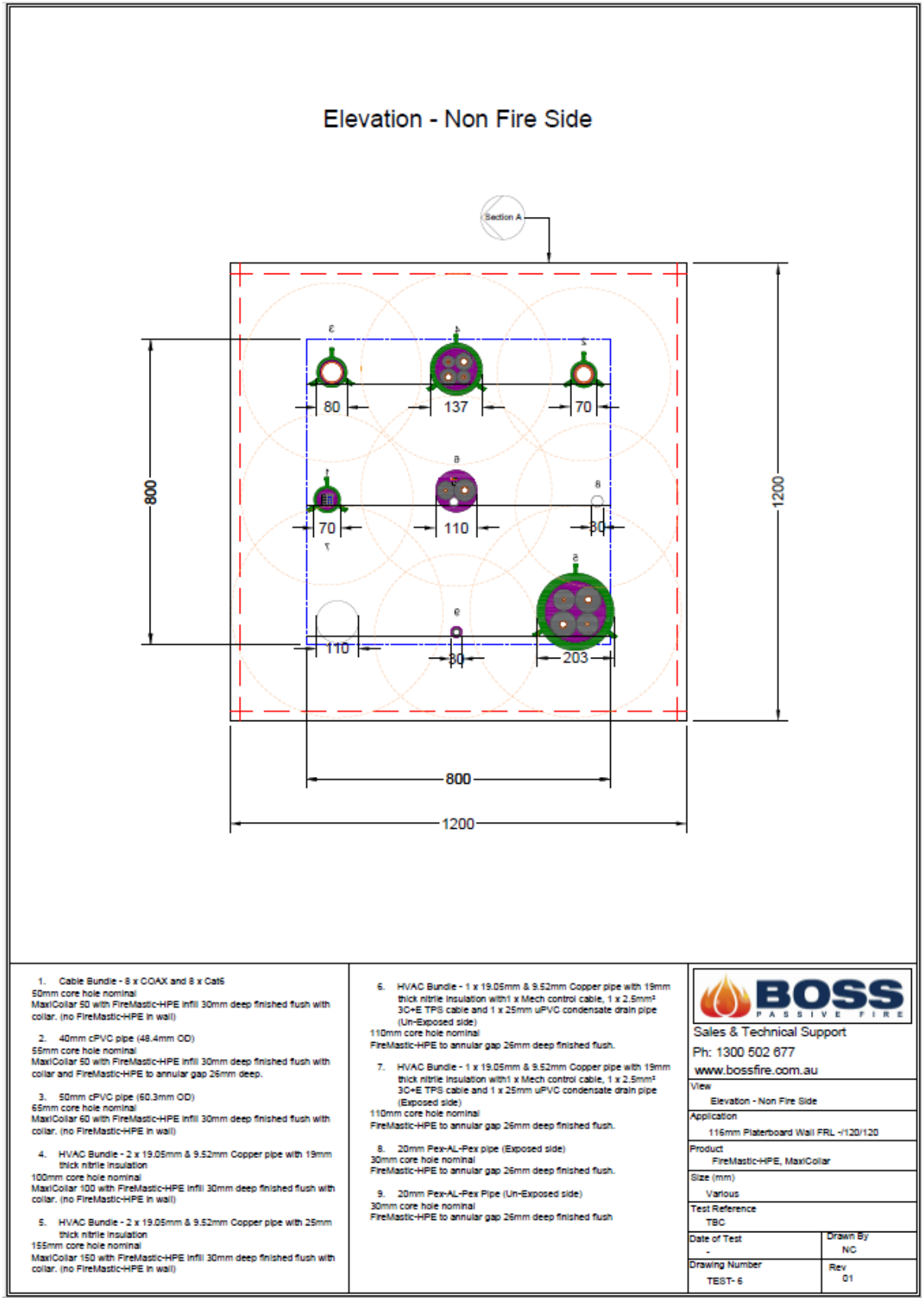

Figure 44 - Test 6 – Elevation – Non Fire Side.pdf

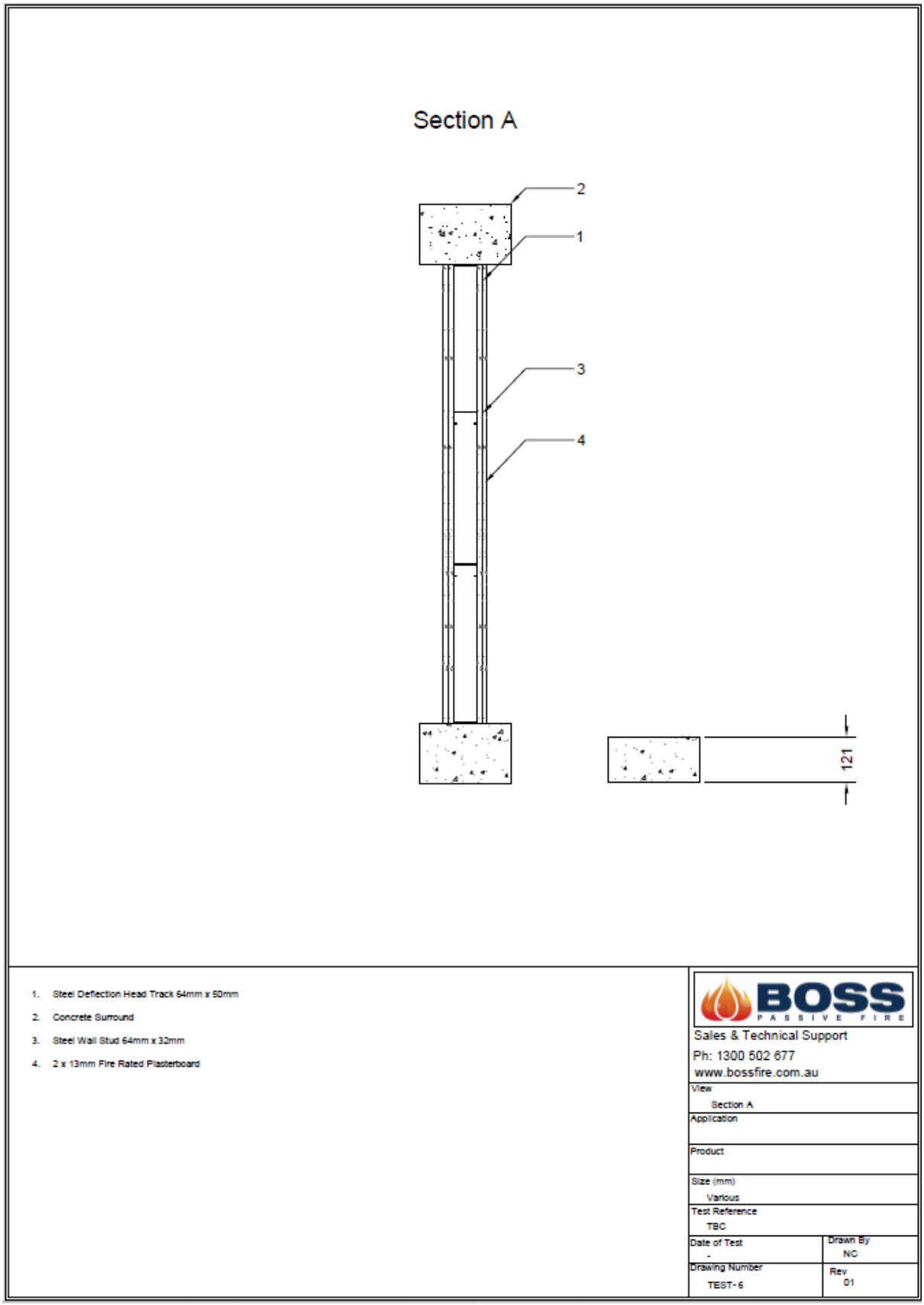

Figure 45 - Test 6 – Section A.pdf

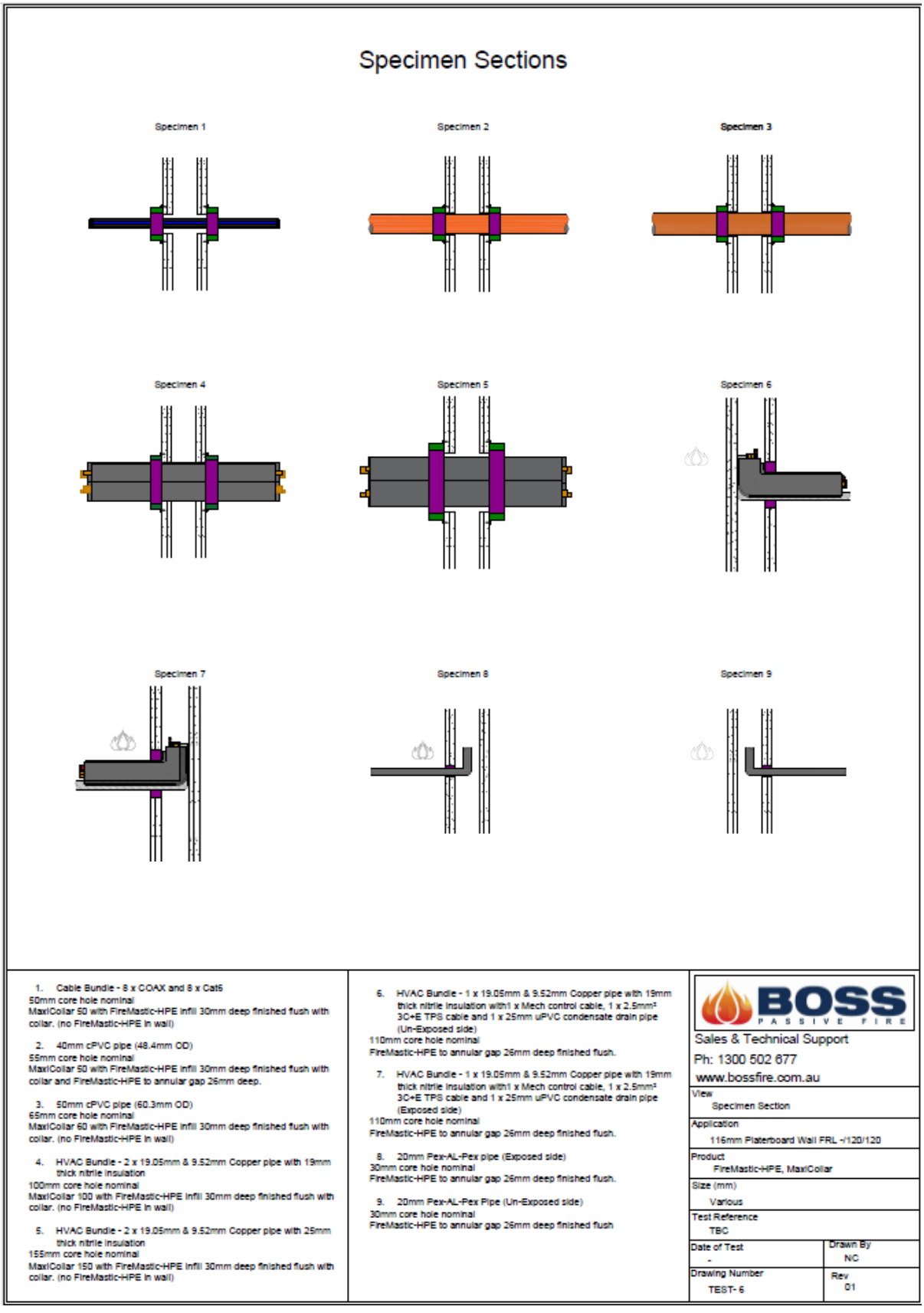

Figure 46 - Test 6 – Specimen Sections.pdf