

TEST REPORT

PF25015

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:	PF25015

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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



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	HVAC Bundle – 1 x 19.05mm & 9.52mm Copper Pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm ² 3C+E TPS cable and 1 x 20mm uPVC condensate drain pipe	132NF	132NF	-/120/120
2	HVAC Bundle – 1 x 32mm & 25mm Copper Pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm ² 2C+E TPS cable and 1 x 25mm uPVC condensate drain pipe	132NF	132NF	-/120/120
3	HVAC Bundle – 2 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with 2 x Mech control cable, 2 x 2.5mm ² 2C+E TPS cable and 2 x 20mm uPVC condensate drain pipe	132NF	132NF	-/120/120
4	40mm cPVC Pipe	59	59	-/45/45
5	20mm Pex Pipe (exposed side)	132NF	132NF	-/120/120
6	20mm Pex Pipe (unexposed side)	132NF	132NF	-/120/120
7	Cable Bundle – 12 x 2.5mm ² TPS 2C+E cables	132NF	132NF	-/120/120
8	Cable Bundle – 20 x CAT6 cables	132NF	132NF	-/120/120
9	70mm ² Aluminium Cable	132NF	132NF	-/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°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 5 – Aperture Location – Fire Side – Horizontal.pdf
- Test 5 – Aperture Location – Fire Side – Vertical.pdf
- Test 5 – Aperture Location – Non Fire Side – Horizontal.pdf
- Test 5 – Aperture Location – Non Fire Side – Vertical.pdf
- Test 5 – Aperture Size – Fire Side.pdf
- Test 5 – Aperture Size – Non Fire Side.pdf
- Test 5 – Elevation – Fire Side.pdf
- Test 5 – Elevation – Framing – Fire Side.pdf
- Test 5 – Elevation – Non Fire Side.pdf
- Test 5 – Section A.pdf
- Test 5 – 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:

15/04/2025

Installation completion date:

26/03/2025

Termination of The Test:

The test was discontinued at 132 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 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: 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	Ardent 19.05mm Copper Coil
	Dimensions	Diameter (OD): 19.4mm
		Diameter (ID): 13.8mm
		Wall Thickness (T): 1.3mm
	Specimen #	1, 3
2.2	Item	Ardent 9.52mm Copper Coil
	Dimensions	Diameter (OD): 9.4mm
		Diameter (ID): 7.9mm
		Wall Thickness (T): 1.15mm
	Specimen #	1, 3
2.3	Item	K Flex Black Nitrile Fire Retardant Insulation 20x19
	Dimensions	Diameter (OD): 58.0mm
		Diameter (ID): 20.0mm
		Insulation Thickness (T): 19.0mm
	Specimen #	1, 3
2.4	Item	K Flex Black Nitrile Fire Retardant Insulation 10x19
	Dimensions	Diameter (OD): 48.0mm
		Diameter (ID): 10.0mm

		Insulation Thickness (T): 19.0mm
	Specimen #	1, 3
2.5	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
	Specimen #	1, 2, 3
2.6	Item	Nexans 2.5mm ² 3C+E Flat TPS Blue Sheath
	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 #	1
2.7	Item	Marley Pressure Pipe S1 PVC-U DN20 PN15
	Dimensions	Diameter (OD): 26.2mm
		Diameter (ID): 22.9mm
		Wall Thickness (T): 1.65mm

	Specimen #	1, 3
2.8	Item	Kembla NZS3501 2 32x1.22 B 32mm Copper Pipe
	Dimensions	Diameter (OD): 34.2mm
		Diameter (ID): 31.1mm
		Wall Thickness (T): 1.65mm
	Specimen #	2
2.9	Item	Kembla NZS3501 2 25x1.02 B 25mm Copper Pipe
	Dimensions	Diameter (OD): 27.5mm
		Diameter (ID): 24.5mm
		Wall Thickness (T): 1.5mm
	Specimen #	2
2.10	Item	K Flex Black Nitrile Fire Retardant Insulation 32x19
	Dimensions	Diameter (OD): 70.0mm
		Diameter (ID): 32.0mm
		Insulation Thickness (T): 19.0mm
	Specimen #	2
2.11	Item	K Flex Black Nitrile Fire Retardant Insulation 25x19
	Dimensions	Diameter (OD): 63.0mm
		Diameter (ID): 25.0mm
		Insulation Thickness (T): 19.0mm
	Specimen #	2
2.12	Item	Prysmian Electrical Cable 450/750V 2C + E 2.5mm ²
	Cable	Width x Depth: 12mm x 5.5mm
		Sheath Material: 3V-90 PVC
		Sheath Thickness: 0.92mm
	Core	Number of Cores: 2 (circular shaped)
		Overall Diameter: 3.3mm
		Conductor Diameter: 0.64mm
		Conductor Material: Copper
		Insulation Material: V-90 PVC
		Insulation Thickness: 0.6mm

	Earth	Overall Diameter: 3.2mm
		Wire Diameter: 0.64mm
	Specimen #	2, 3, 7
2.13	Item	Marley Pressure Pipe S1 PVC-U DN25 PN15
	Dimensions	Diameter (OD): 33.6mm
		Diameter (ID): 28.3mm
		Wall Thickness (T): 2.65mm
	Specimen #	2
2.14	Item	Spears FlameGuard SDR-13.5 cPVC 40mm Pipe
	Dimensions	Diameter (OD): 48.2mm
		Diameter (ID): 40.6mm
		Wall Thickness (T): 3.8mm
	Specimen #	4
2.15	Item	Auspex DN20 PN20 SDR9 PE-Xb Pipe
	Dimensions	Diameter (OD): 20.4mm
		Diameter (ID): 14.3mm
		Wall Thickness (T): 3.05mm
	Specimen #	5, 6
2.16	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 #	8
2.17	Item	ICS 2024 x-90 70mm ² Aluminium Electric Cable
	Cable	Overall Diameter: 15.0mm
		Sheath Material: HF-110-Rubber

		Sheath Thickness: 1.3mm
	Core	Number of Cores: 1
		Overall Diameter: 12.5mm
		Conductor Diameter: 2.5mm
		Conductor Material: Aluminium
		Insulation Material: XLPE
		Insulation Thickness: 1.4mm
	Specimen #	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
4.2	Item	BOSS Collar Shell 125 (no intumescent included)
	Collar	Height: 40mm Maximum Opening: 156mm Steel Thickness: 0.70BMT
	Fixing Points	3
4.3	Item	BOSS Collar Shell 50 (no intumescent included)
	Collar	Height: 30mm Maximum Opening: 70mm Steel Thickness: 0.70BMT
	Fixing Points	3

Fixings

	Item	Ramset RD16 16mm Steel Disc
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5.1	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:

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.

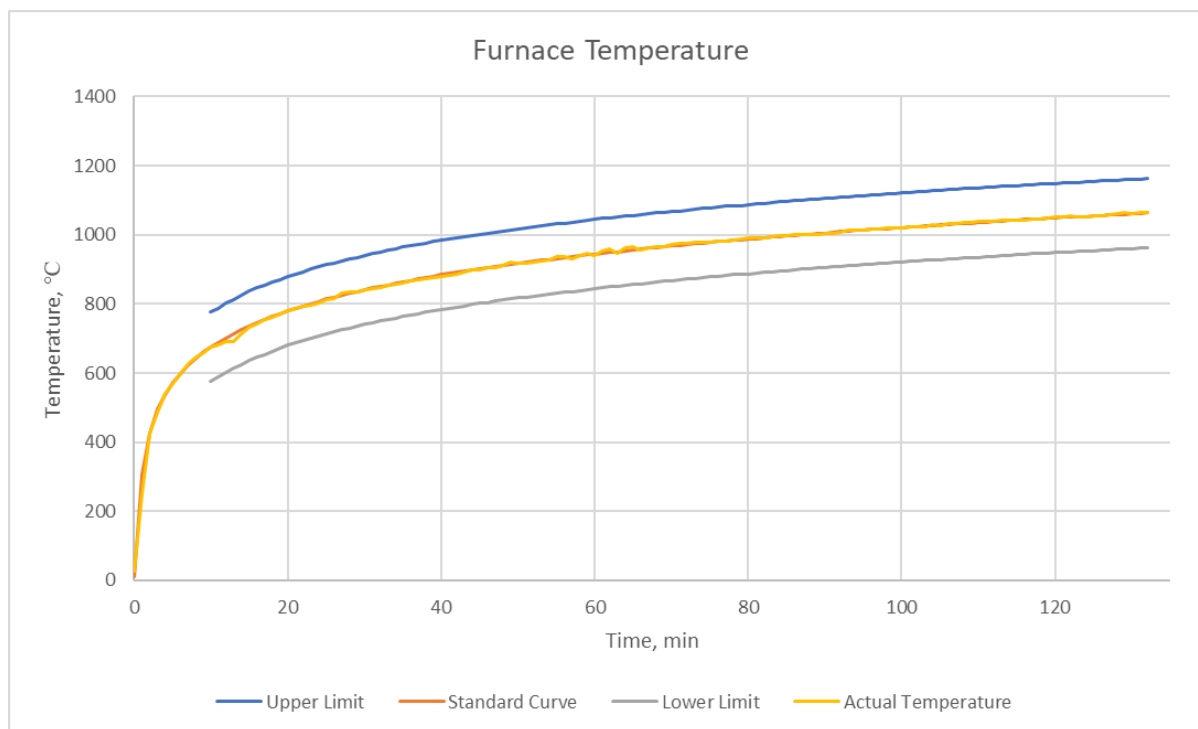


Figure 1 - Furnace Temperature during the test

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.

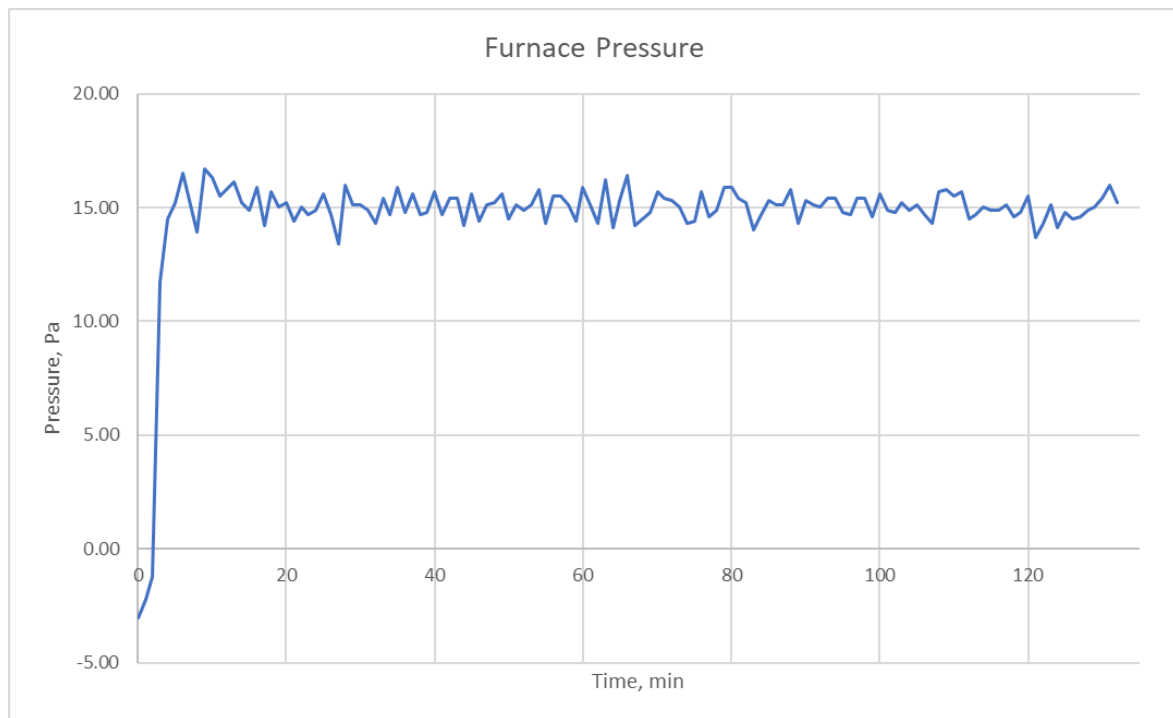


Figure 2 - Furnace Pressure during the test

5.3 Thermocouple locations

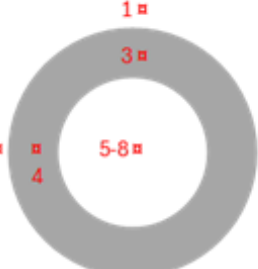
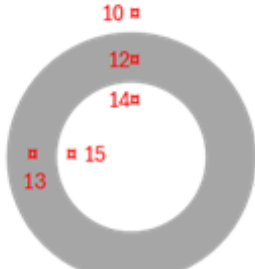
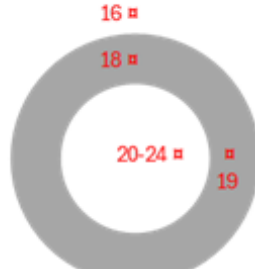
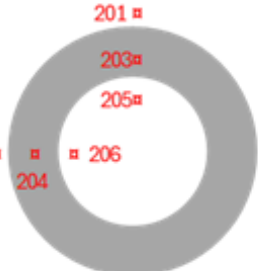
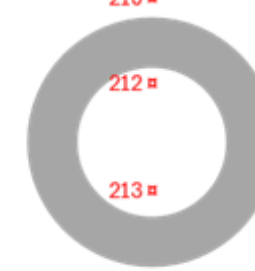
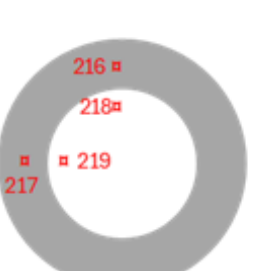
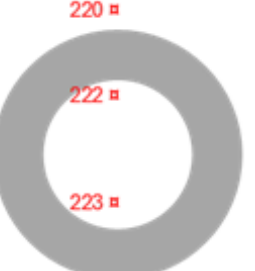
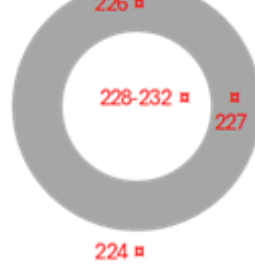
Service: OTHER	Service: CPVC - 40	Service: OTHER
# of Thermocouples: 9	# of Thermocouples: 6	# of Thermocouples: 9
Start: TC1 Finish: TC9	Start: TC10 Finish: TC15	Start: TC16 Finish: TC24
SP2 - HVAC BUNDLE  TC5 - PAIR COIL TC6 - CONDENSATE TC7 - CONTROL CABLE TC8 - PAIR COIL TC9 - TPS CABLE (no thermocouple as cable in centre of bundle)	SP4 	SP3 - HVAC BUNDLE  TC20 - CONDENSATE TC21 - PAIR COIL TC22 - CONTROL CABLE TC23 - PAIR COIL TC24 - TPS CABLE
Service: TPS CABLE	Service: PEX PIPE - 20	Service: ALUMINIUM CABLE - 70
# of Thermocouples: 6	# of Thermocouples: 3	# of Thermocouples: 4
Start: TC201 Finish: TC206	Start: TC207 Finish: TC209	Start: TC210 Finish: TC213
SP7 - CABLE BUNDLE 	SP5 - EXPOSED ONLY 	SP9 
Service: DATA CABLE	Service: PEX PIPE - 20	Service: OTHER
# of Thermocouples: 6	# of Thermocouples: 4	# of Thermocouples: 9
Start: TC214 Finish: TC219	Start: TC220 Finish: TC223	Start: TC224 Finish: TC232
SP8 - CABLE BUNDLE 	SP6 - UNEXPOSED ONLY 	SP1 - HVAC BUNDLE  TC228 - TPS CABLE TC229 - CONTROL CABLE TC230 - PAIR COIL TC231 - CONDENSATE TC232 - PAIR COIL

Figure 3 - Thermocouple locations

6. Test Results

6.1 Observations during the test

Time min	Test face	SP#	OBSERVATIONS/REMARKS
1	U	3	Smoke coming through from between the services
2	U	1	Smoke coming through from between the services
2	U	7, 8	Smoke coming through from between the cables
5	E	ALL	All PVC/Pex pipes dislodged from the separating element
5	U	1	Smoke coming through from between the services
8	U	4	Pipe beginning to bow slightly
8	U	4	Large hole developed close to the sealant
9	U	4	Pipe dislodged from the separating element, cotton pad test - pass
10	U	4	Cotton pad test - pass
12	U	4	Cotton pad test - pass
13	U	4	Cotton pad test - pass
14	U	1, 2	Nitrile rubber insulation beginning to expand
17	U	3	Nitrile rubber insulation beginning to expand
17	U	4	Cotton pad test - pass
20	U	2	Intumescent from the sealant beginning to expand
22	U	4	Intumescent mostly sealed the hole in the aperture
22	U	3	Condensate pipe in HVAC bundle distorted
25	U	3	Second condensate pipe in HVAC bundle distorted close to collar shell
32	U	2	Rips in nitrile rubber insulation expanding
38	U	2	Nitrile rubber insulation and intumescent from sealant continue to expand
38	U	3	Nitrile rubber insulation continues to expand
41	U	9	Cracks developing in sealant
45	U	3	Intumescent in sealant beginning to expand

48	U	2	Split developed in nitrile rubber insulation, smoke coming through
53	U	2	Another split developed in the nitrile rubber insulation close to the collar shell, excessive smoke coming through, discolouration of condensate pipe & nitrile rubber insulation close to the splits
59	U	4	Cotton pad test - fail
82	U	2	Discolouration visible on the collar shell
84	U	1	Cracks developing in the sealant
98	U	9	Intumescent from sealant beginning to expand
98	U	7	Intumescent from sealant beginning to expand, cables melting close to the separating element
113	U	6	Pipe beginning to bow slightly
125	U	3	Discolouration of nitrile rubber insulation above the condensate pipe
133			TEST DISCONTINUED

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

6.2 Specimen 1

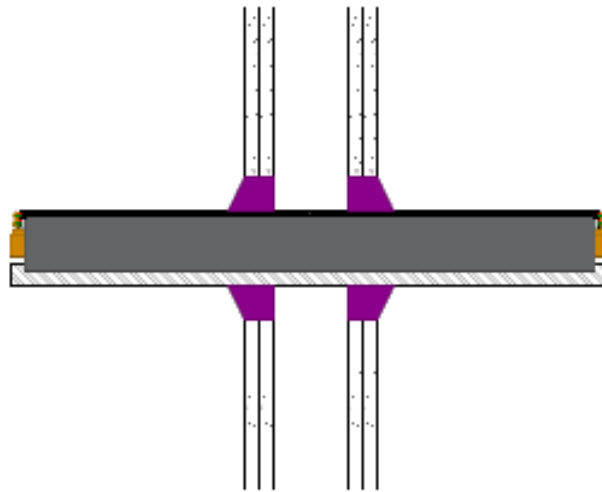


Figure 4 - Specimen 1

Service penetration details	
Service	HVAC Bundle – 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation + 1 x Mech control cable + 1 x 2.5mm ² 3C+E TPS cable + 1 x 20mm uPVC condensate pipe
Service Support	Exposed Side: 280mm Unexposed Side: 480mm and 1575mm
Aperture Size	127.1mm
Annular Space	Min: 8.2mm, Max: 15.6mm

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, 26mm (nominal) deep and finished flush with the separating element. 2. 15mm x 15mm FireMastic-HPE fillet applied around services.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 132 minutes
Insulation	No failure at 132 minutes

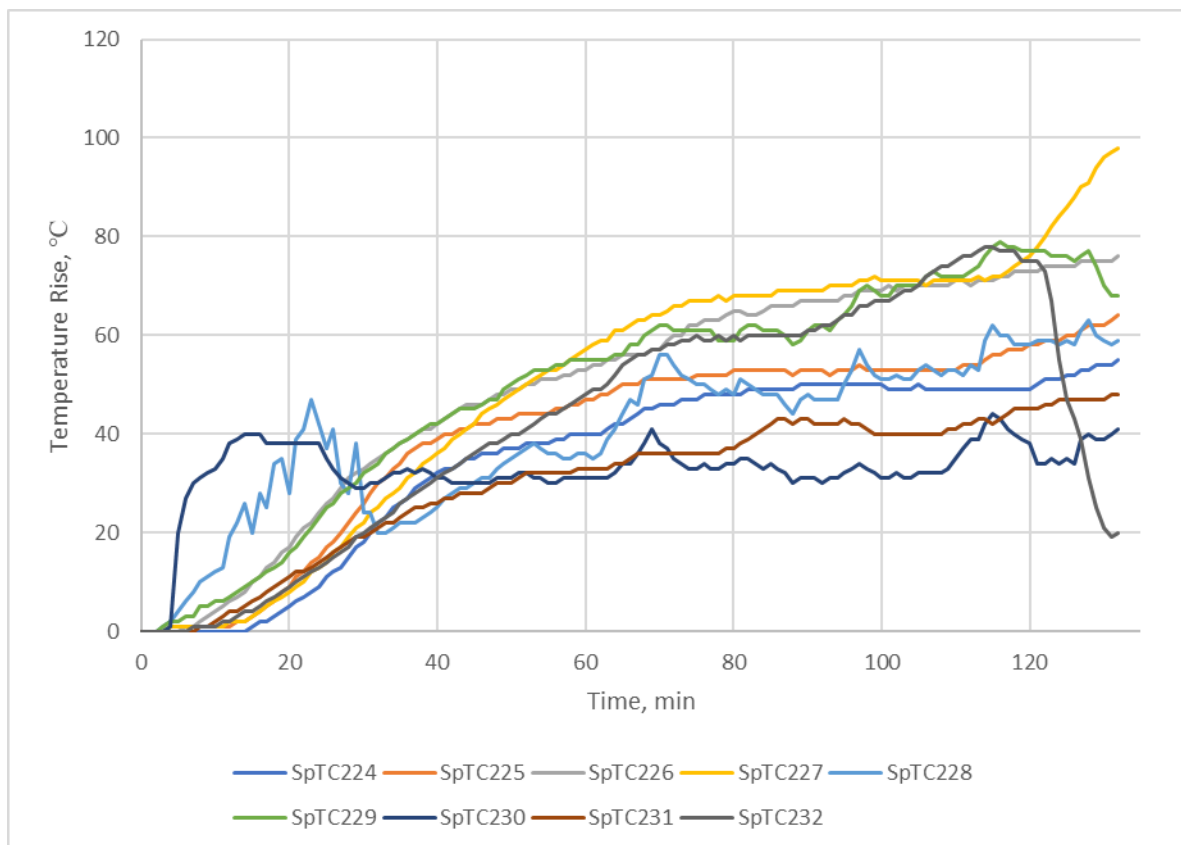


Figure 5 - Specimen 1 thermocouple temperature rise readings

6.3 Specimen 2

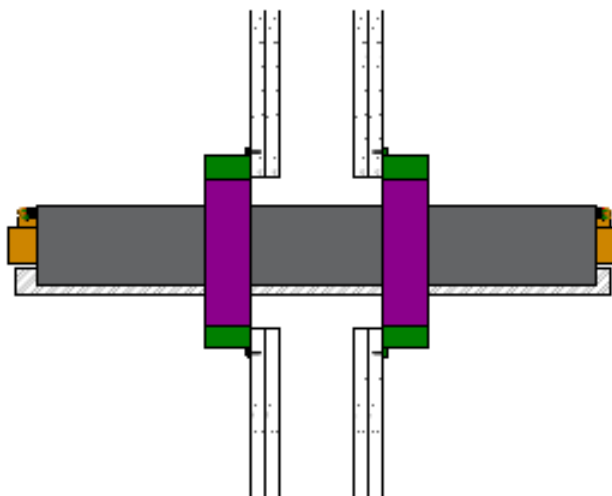


Figure 6 - Specimen 2

Service penetration details	
Service	HVAC Bundle – 1 x 32mm & 25mm Copper pipe with 19mm thick nitrile insulation + 1 x Mech control cable + 1 x 2.5mm ² 2C+E TPS cable + 1 x 25mm uPVC condensate pipe
Service Support	Exposed Side: 280mm Unexposed Side: 480mm and 1575mm
Aperture Size	137.5mm
Annular Space	Min: 2.3mm, Max: 10.6mm

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 services and secured to the separating element in the fixing points with screws and washers. 2. FireMastic-HPE applied in the collar around services, finished flush with the top of the collar.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 132 minutes
Insulation	No failure at 132 minutes

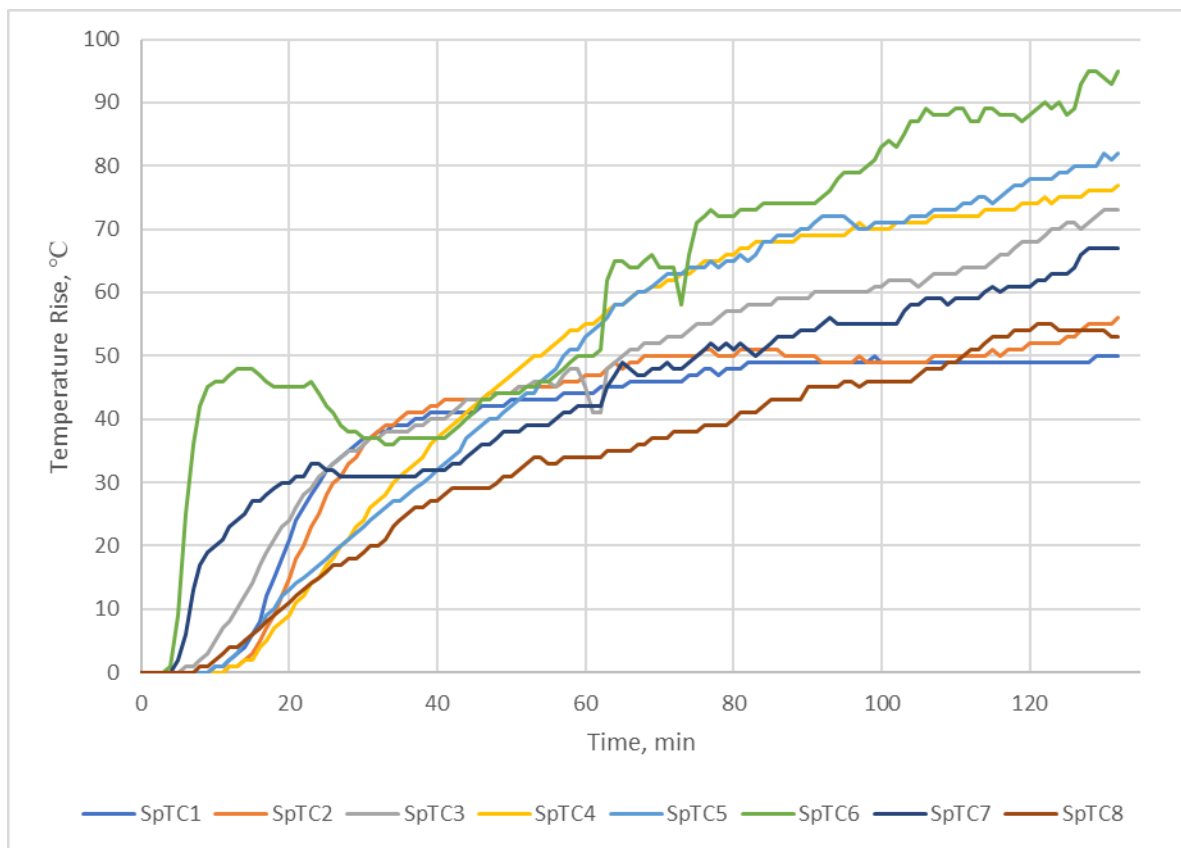


Figure 7 - Specimen 2 thermocouple temperature rise readings

6.4 Specimen 3

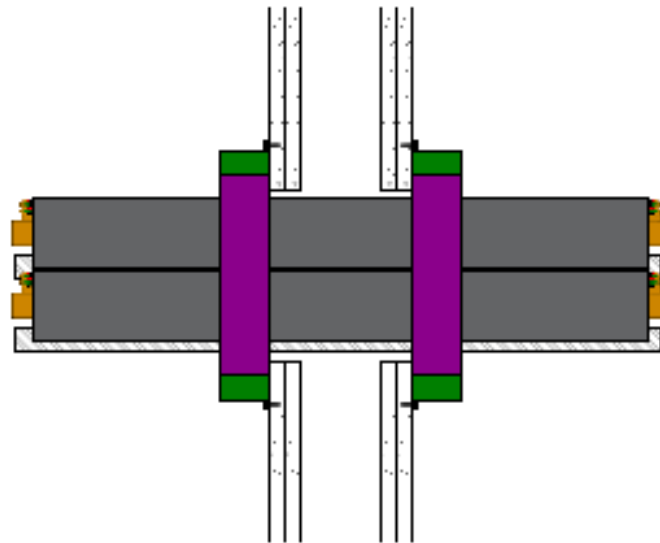


Figure 8 - Specimen 3

Service penetration details	
Service	HVAC Bundle – 2 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation + 2 x Mech control cable + 2 x 2.5mm ² 2C+E TPS cable + 2 x 20mm uPVC condensate pipe
Service Support	Exposed Side: 280mm Unexposed Side: 480mm and 1575mm
Aperture Size	140.6mm
Annular Space	Min: 5.1mm, Max: 12.9mm

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 services, finished flush with the top of the collar.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 132 minutes
Insulation	No failure at 132 minutes

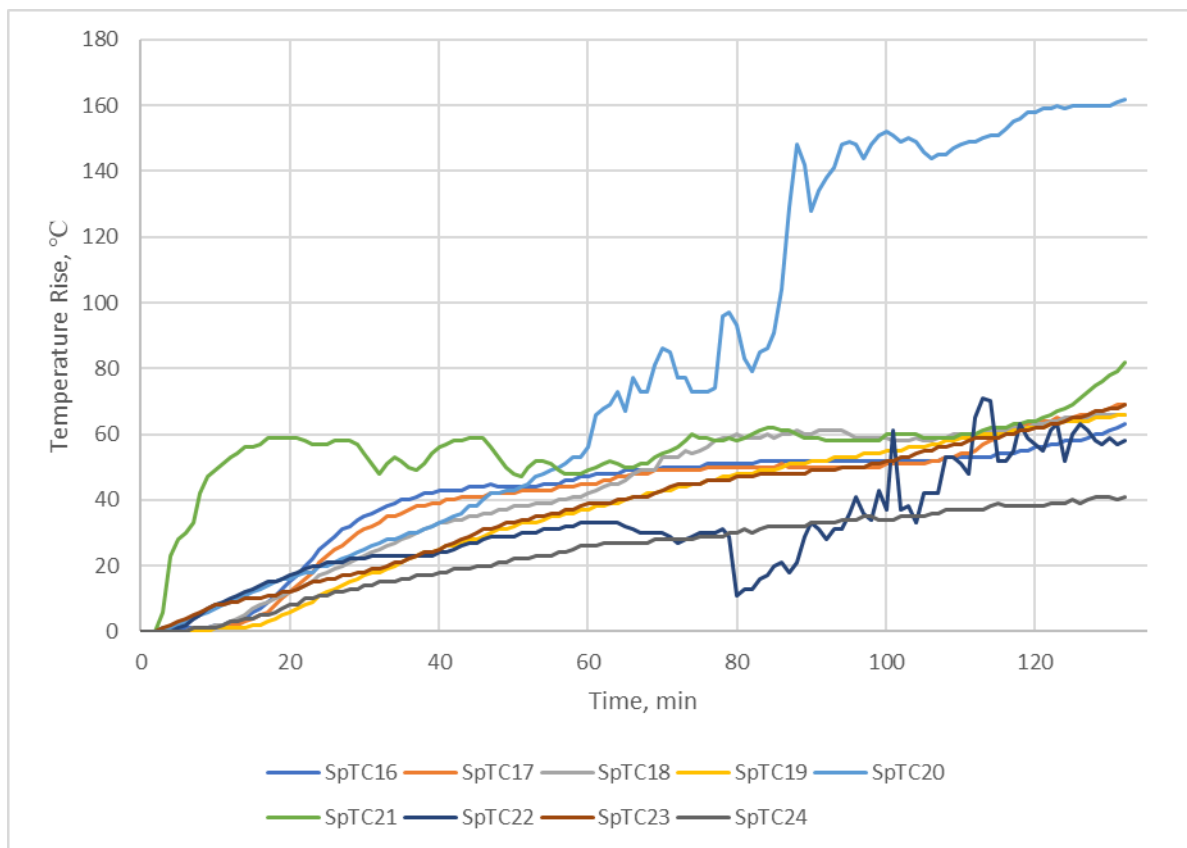


Figure 9 - Specimen 3 thermocouple temperature rise readings

6.5 Specimen 4

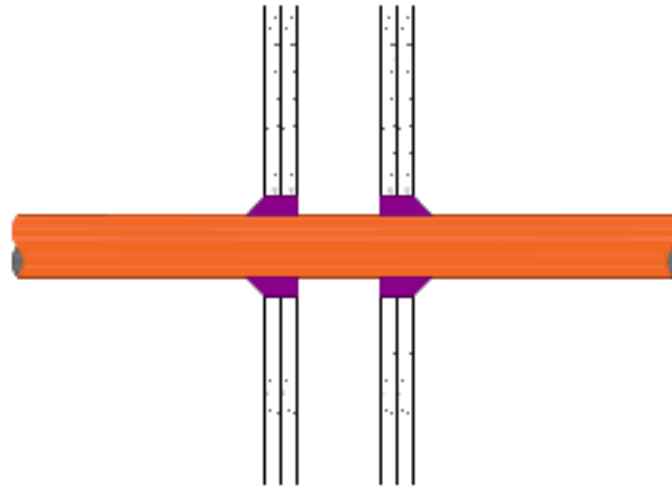


Figure 10 - Specimen 4

Service penetration details	
Service	40mm cPVC Pipe
Service Support	Exposed Side: 280mm Unexposed Side: 480mm and 1575mm
Aperture Size	79.8mm
Annular Space	Min: 13.7mm, Max: 17.9mm

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, 26mm (nominal) deep and finished flush with the separating element. 2. 15mm x 15mm FireMastic-HPE fillet applied around services.

Test results

Structural adequacy	Not applicable
Integrity	59 minutes
Insulation	59 minutes

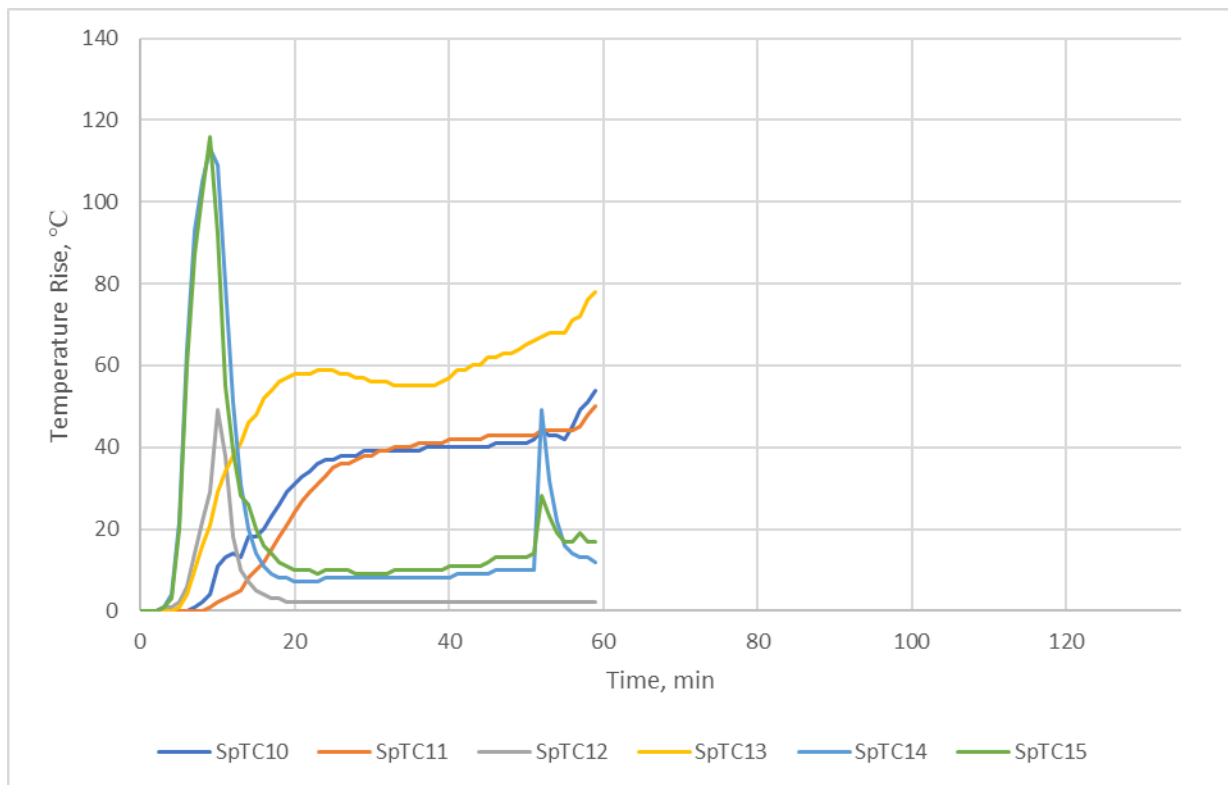


Figure 11 - Specimen 4 thermocouple temperature rise readings

6.6 Specimen 5

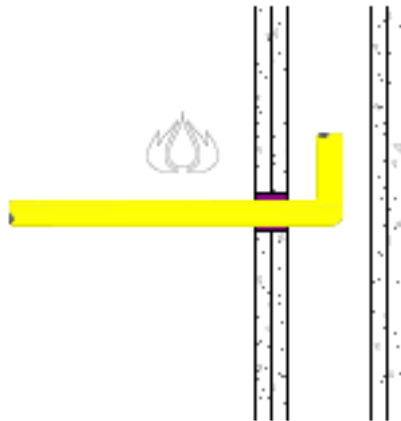


Figure 12 - Specimen 5

Service penetration details	
Service	20mm Pex Pipe (Exposed Side)
Service Support	Exposed Side: 280mm
Aperture Size	28.9mm
Annular Space	Min: 3.4mm, Max: 5.1mm

Local Fire-stopping system	
Application	Asymmetrical – applied to exposed face 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 132 minutes
Insulation	No failure at 132 minutes

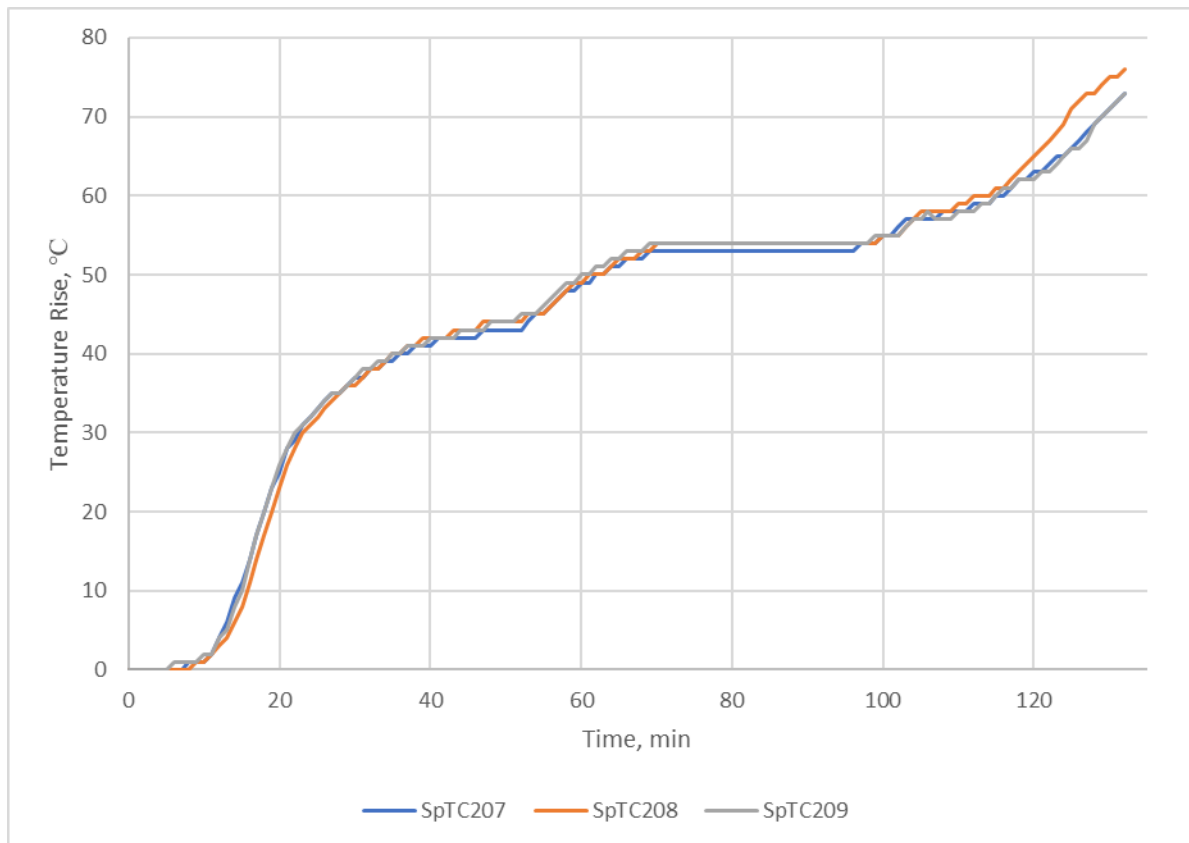


Figure 13 - Specimen 5 thermocouple temperature rise readings

6.7 Specimen 6

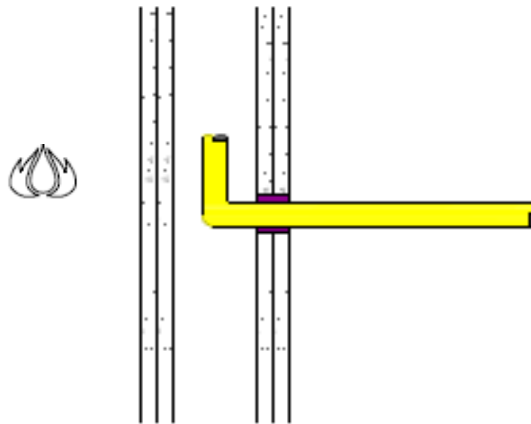


Figure 14 - Specimen 6

Service penetration details	
Service	20mm Pex Pipe (Unexposed Side)
Service Support	Unexposed Side: 480mm and 1575mm
Aperture Size	28.9mm
Annular Space	Min: 3.5mm, Max: 5.0mm

Local Fire-stopping system	
Application	Asymmetrical – applied to unexposed face 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 132 minutes
Insulation	No failure at 132 minutes

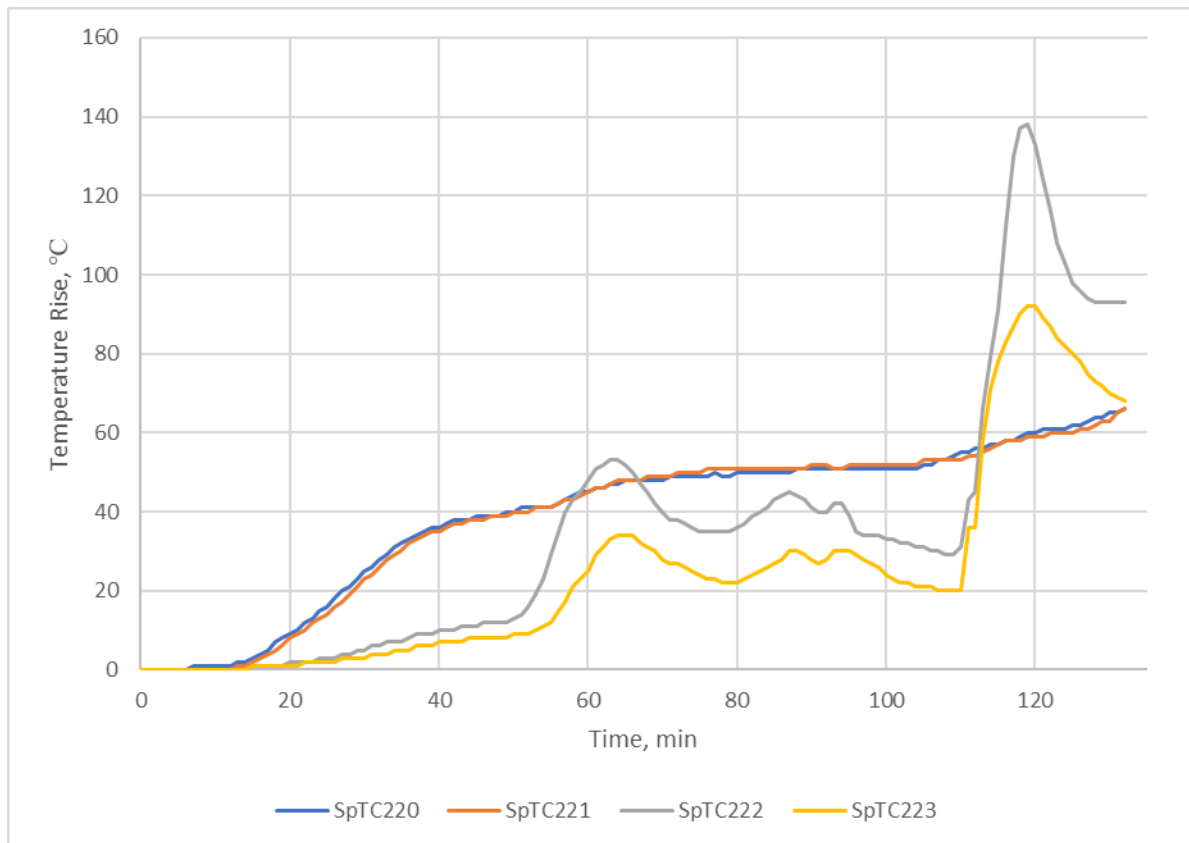


Figure 15 - Specimen 6 thermocouple temperature rise readings

6.8 Specimen 7

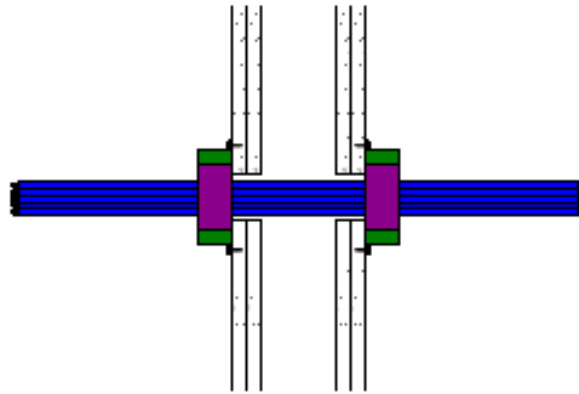


Figure 16 - Specimen 7

Service penetration details	
Service	Cable Bundle – 12 x 2.5mm ² TPS 2C+E
Service Support	Exposed Side: 280mm Unexposed Side: 480mm
Aperture Size	40.1mm
Annular Space	Min: 4.1mm, Max: 6.3mm

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 132 minutes
Insulation	No failure at 132 minutes

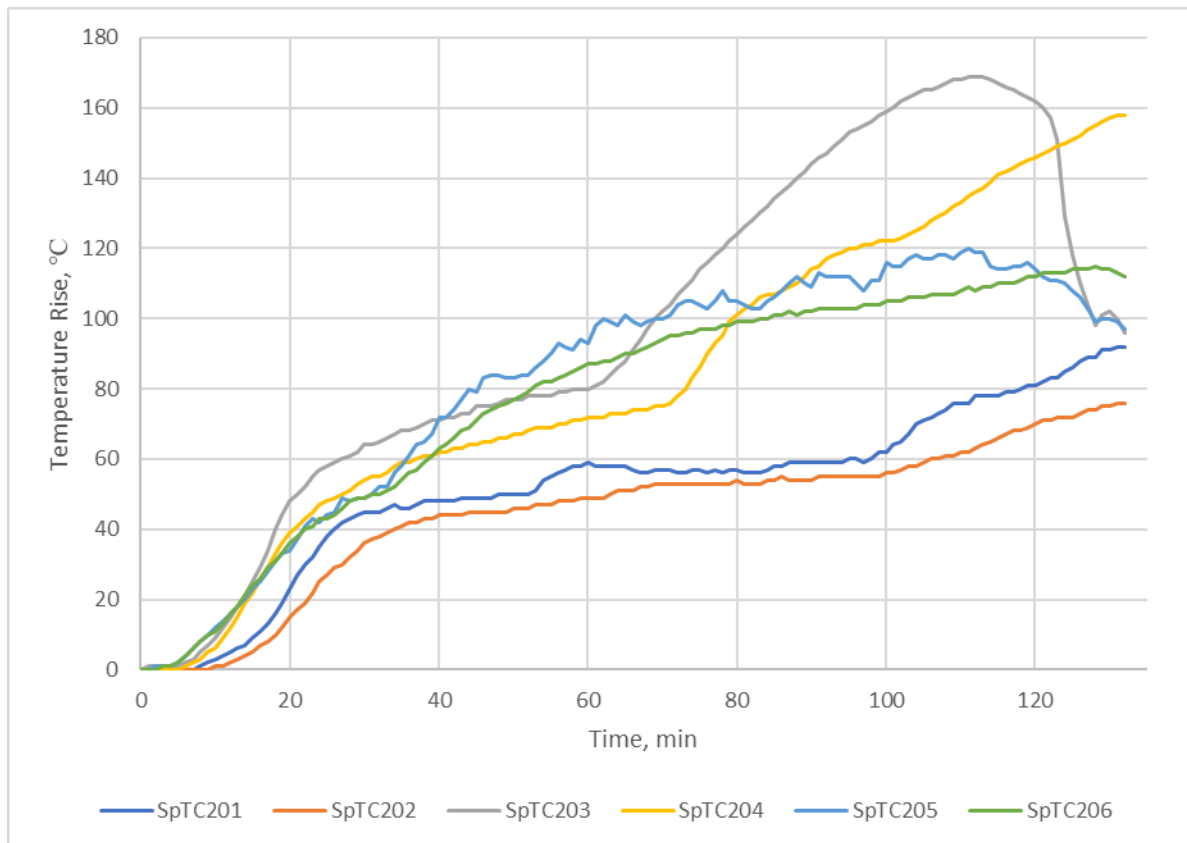


Figure 17 - Specimen 7 thermocouple temperature rise readings

6.9 Specimen 8

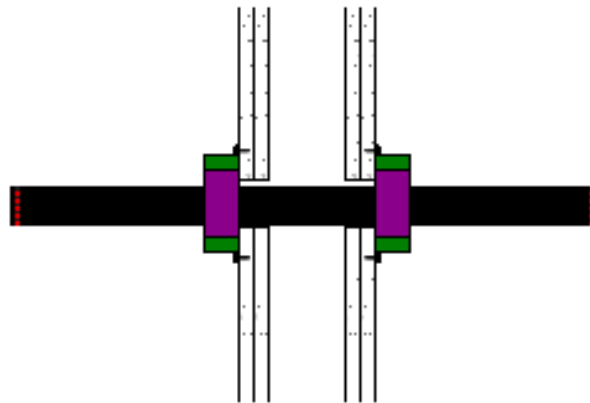


Figure 18 - Specimen 8

Service penetration details	
Service	Cable Bundle – 20 x CAT6
Service Support	Exposed Side: 280mm Unexposed Side: 480mm
Aperture Size	39.9mm
Annular Space	Min: 3.6mm, Max: 8.9mm

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 132 minutes
Insulation	No failure at 132 minutes

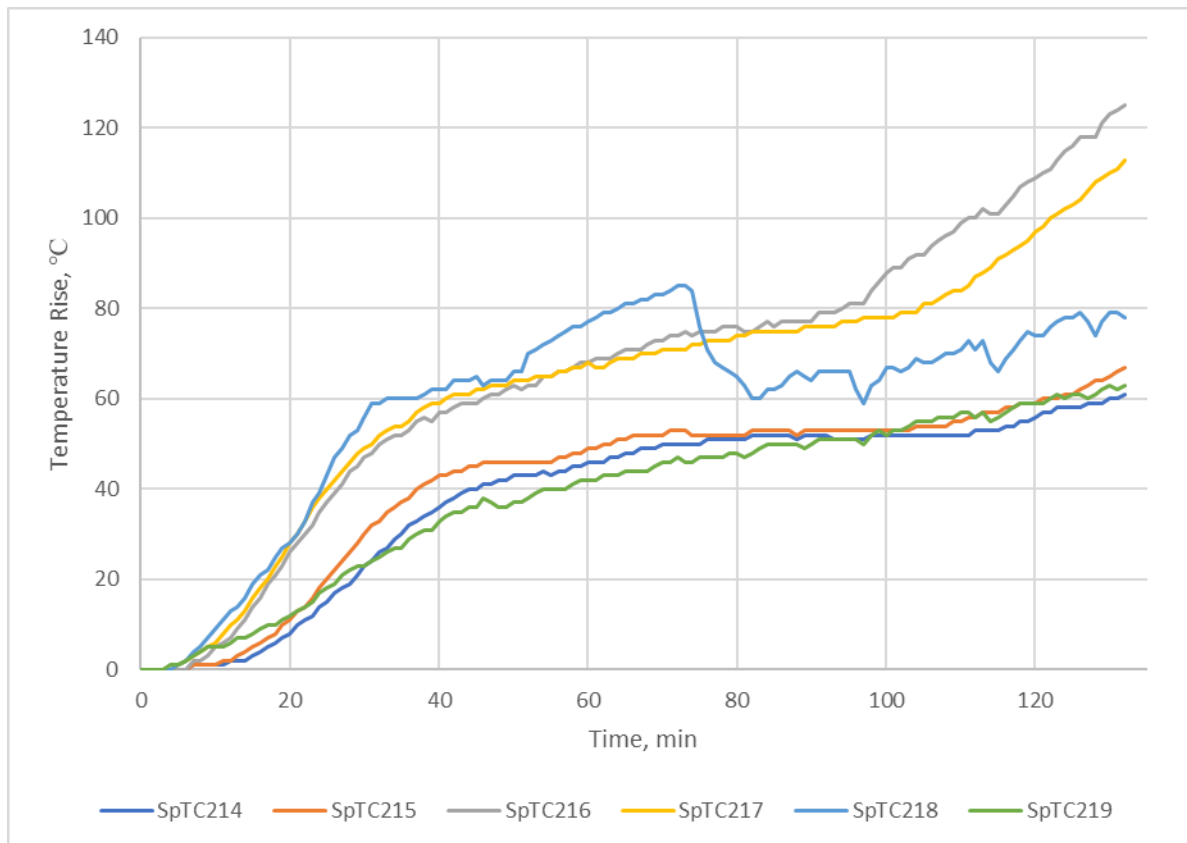


Figure 19 - Specimen 8 thermocouple temperature rise readings

6.10 Specimen 9

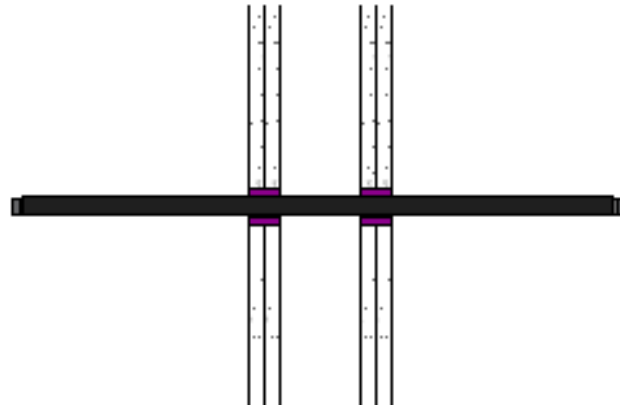


Figure 20 - Specimen 9

Service penetration details	
Service	70mm ² Aluminium Cable
Service Support	Exposed Side: 280mm Unexposed Side: 480mm
Aperture Size	29.6mm
Annular Space	Min: 5.2mm, Max: 9.4mm

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, 26mm (nominal) deep and finished flush with the separating element.

Test results

Structural adequacy	Not applicable
Integrity	No failure at 132 minutes
Insulation	No failure at 132 minutes

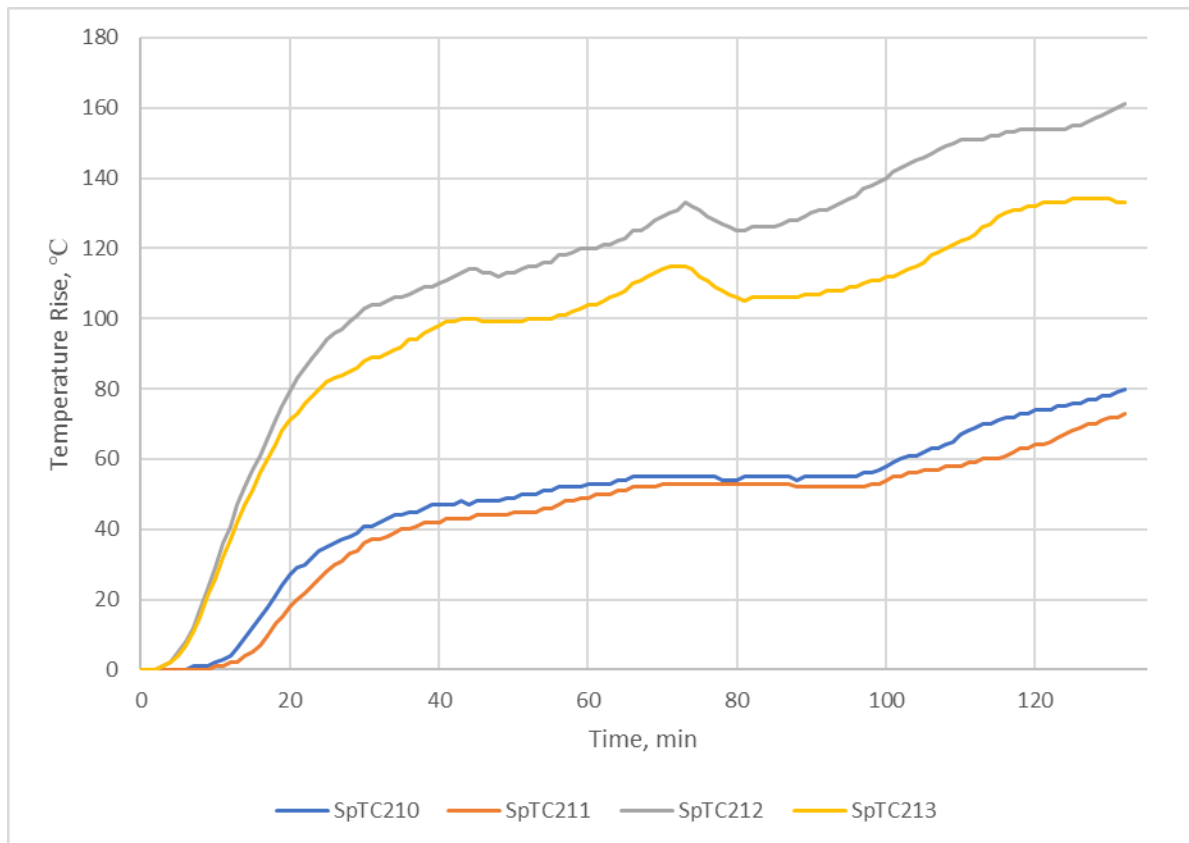


Figure 21 - Specimen 9 thermocouple temperature rise readings

7. Photos

7.1 Photos before the test

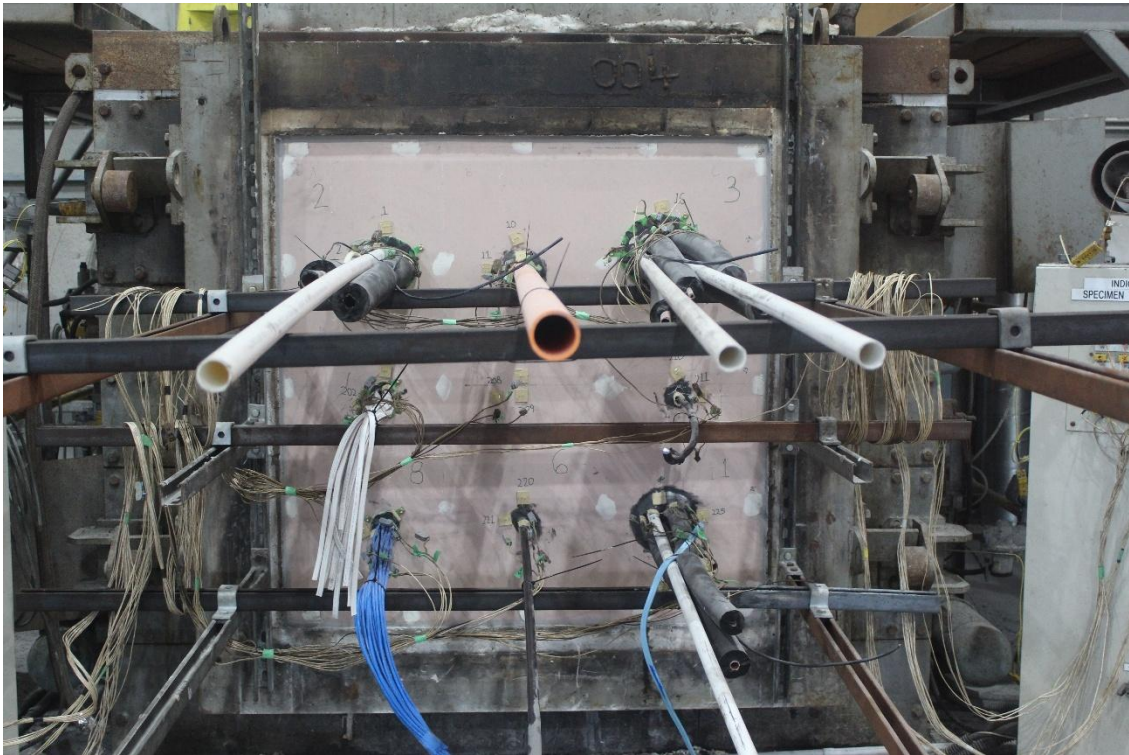


Figure 22 - Unexposed face prior to test commencement



Figure 23 - Exposed face prior to test commencement

7.2 During and after the test

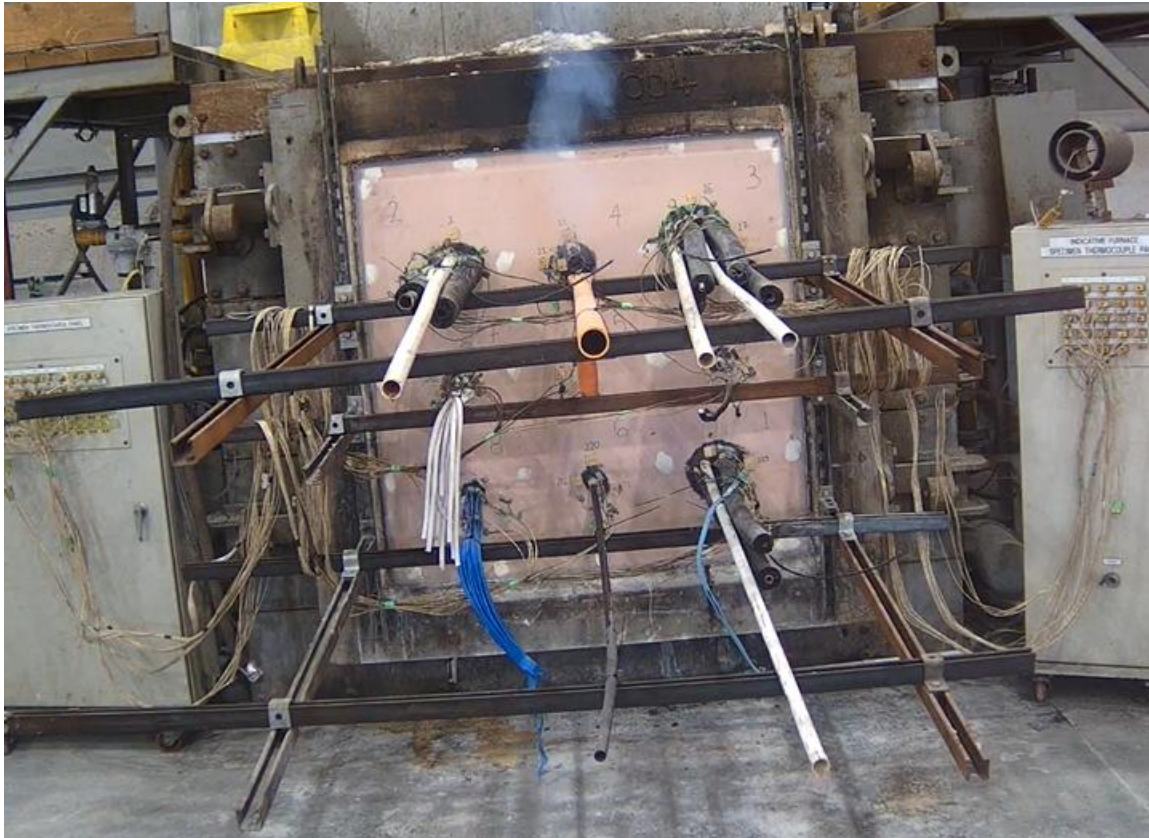


Figure 24 - Unexposed face at 15 minutes



Figure 25 - Exposed face at 15 minutes



Figure 26 - Unexposed face at 30 minutes



Figure 27 - Exposed face at 30 minutes

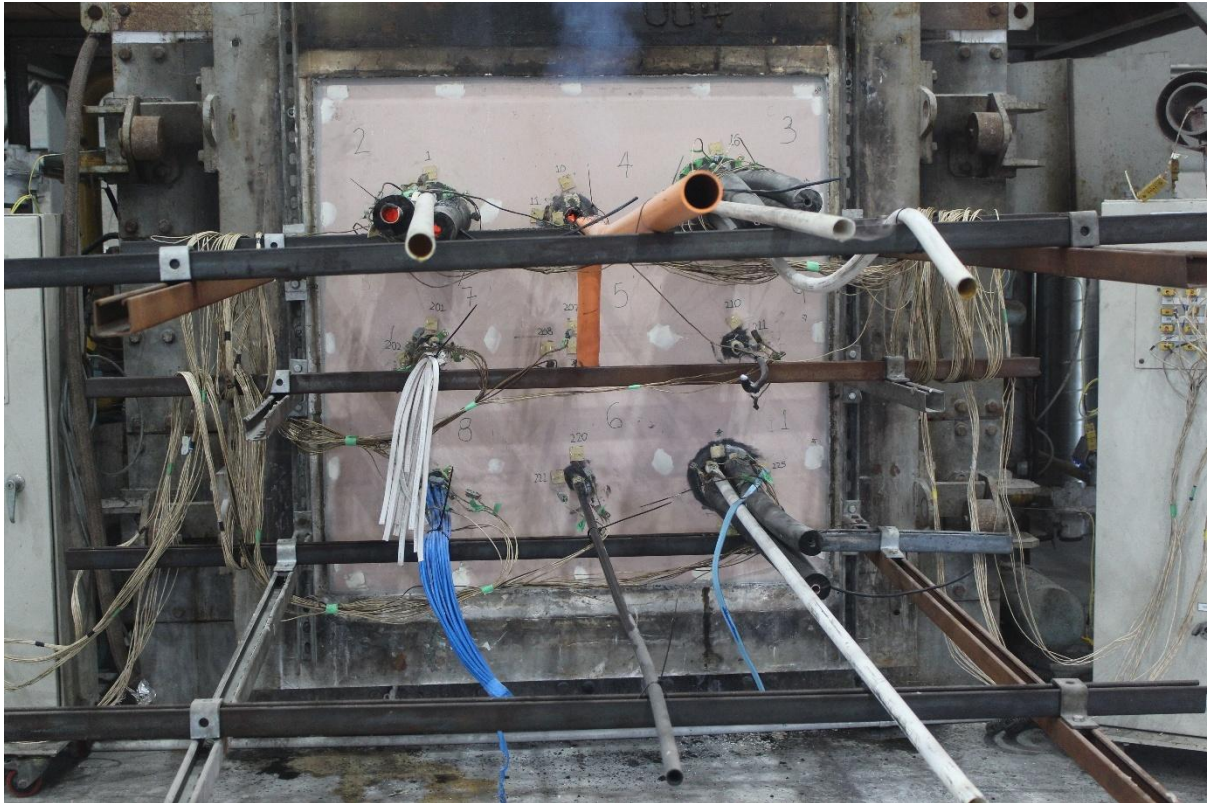


Figure 28 - Unexposed face at 45 minutes

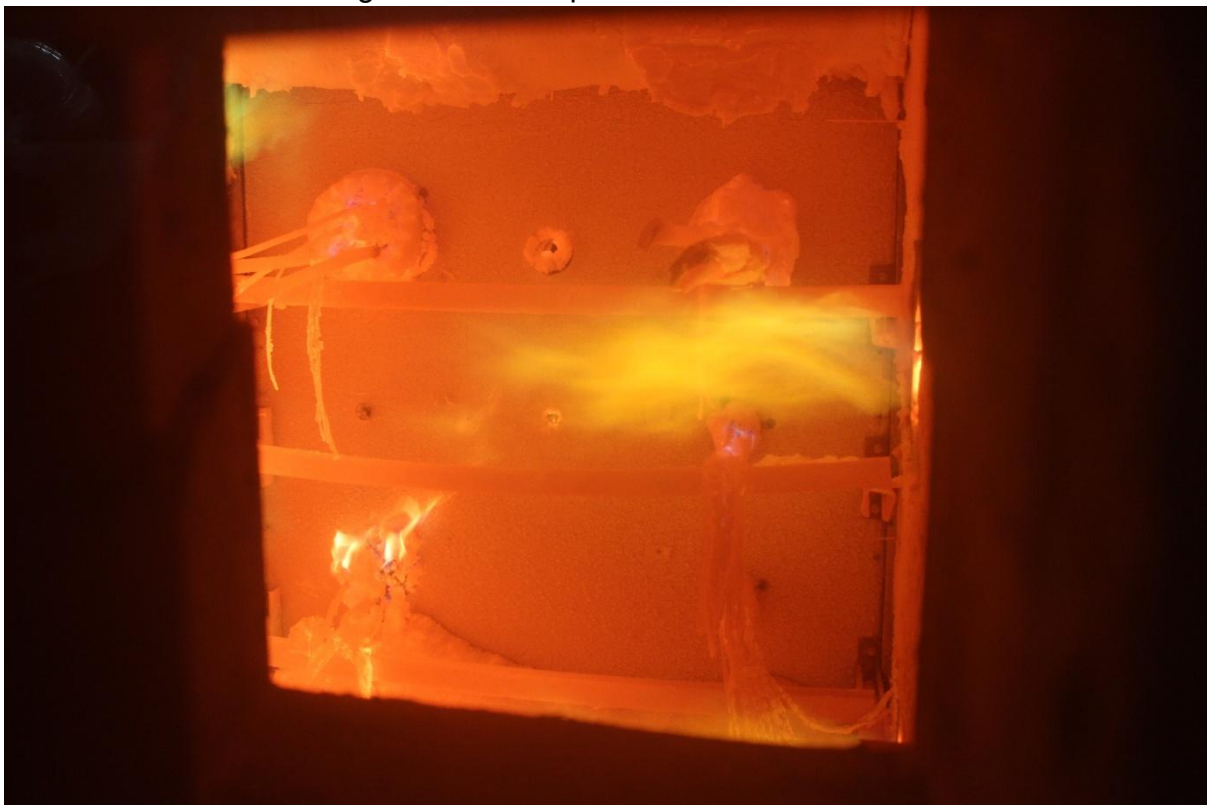


Figure 29 - Exposed face at 45 minutes

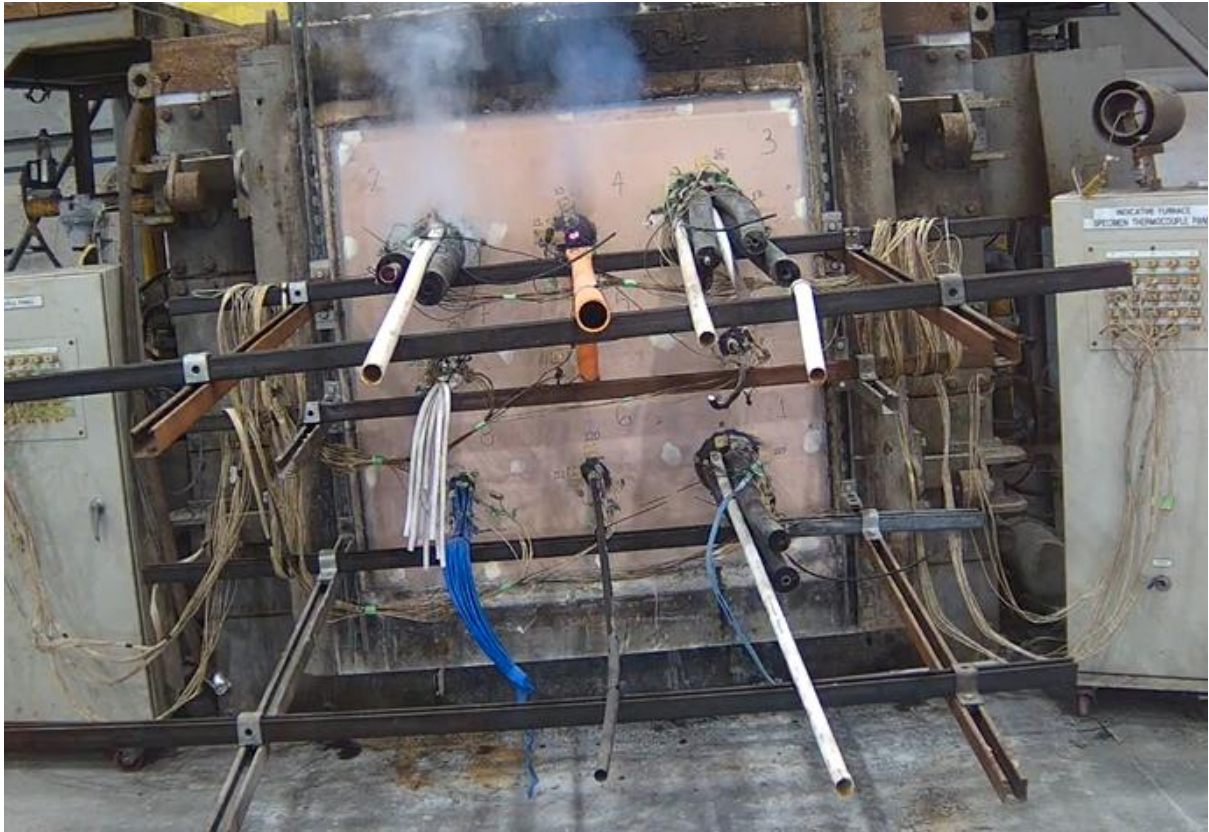


Figure 30 - Unexposed face at 60 minutes

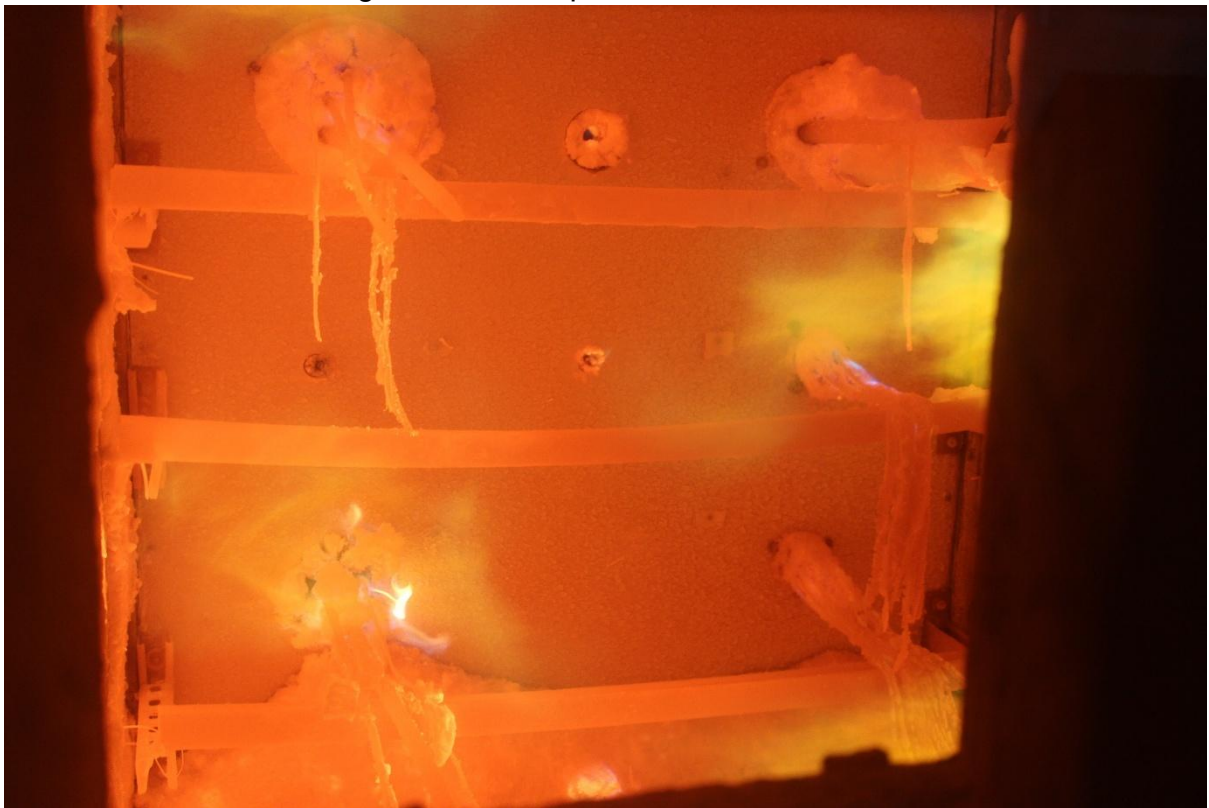


Figure 31 - Exposed face at 60 minutes

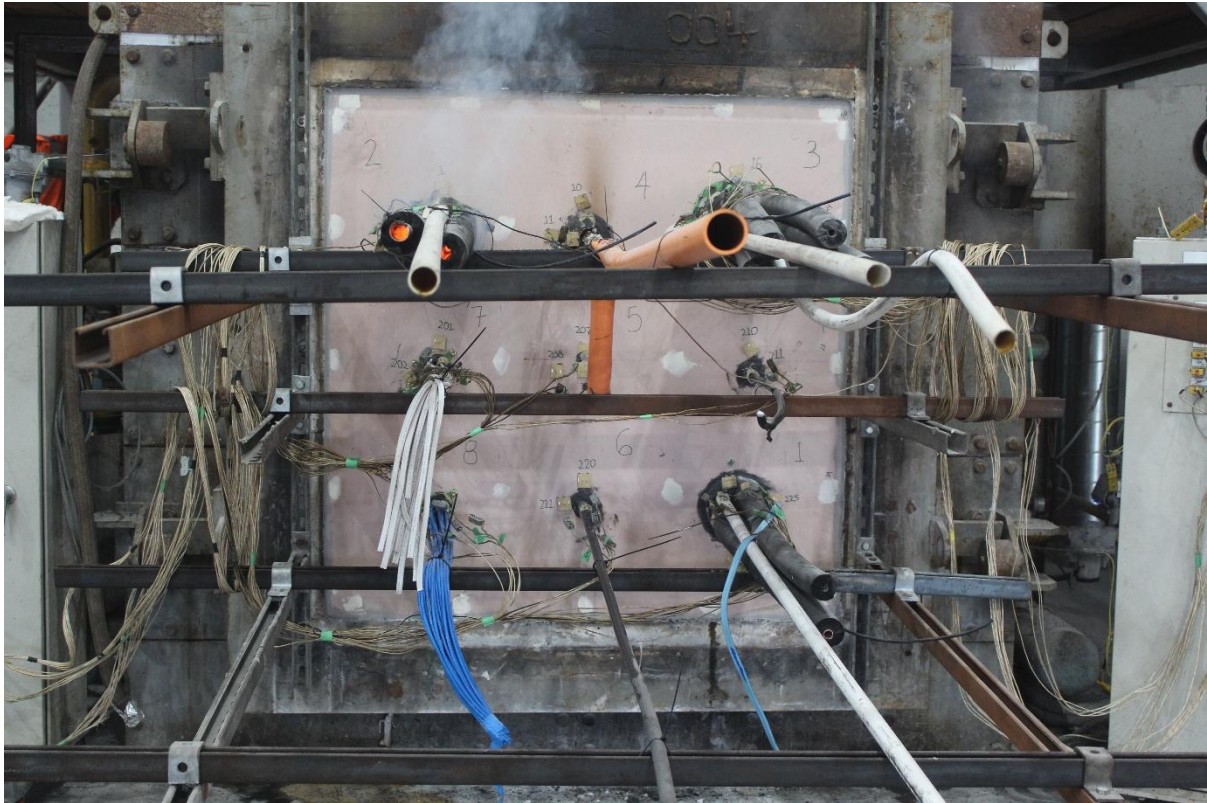


Figure 32 - Unexposed face at 90 minutes

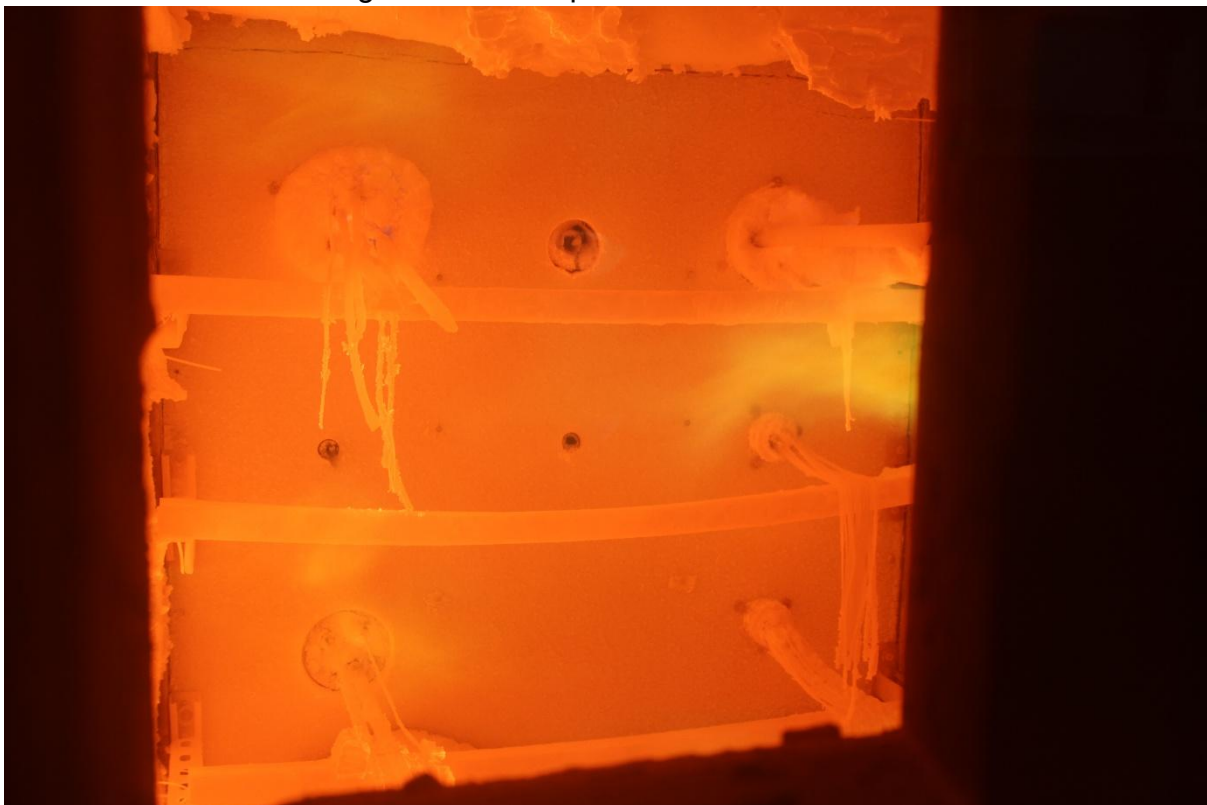


Figure 33 - Exposed face at 90 minutes

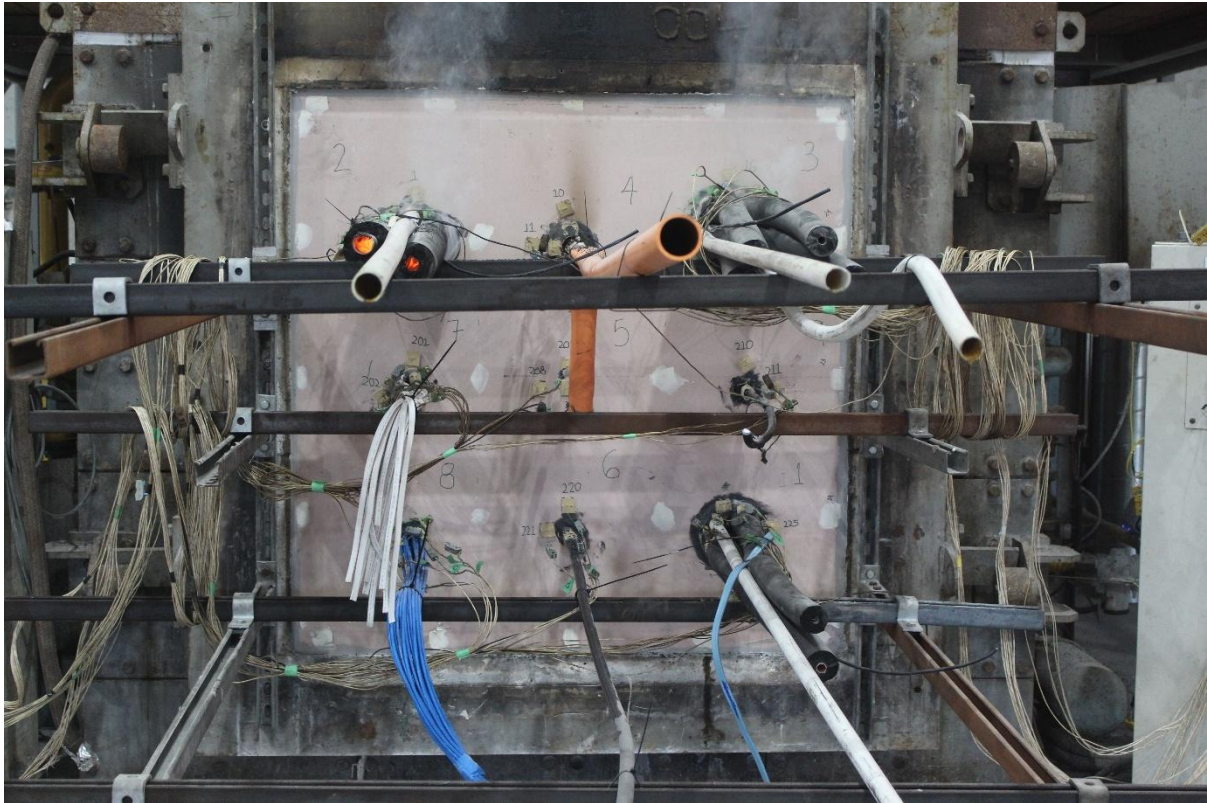


Figure 34 - Unexposed face at 120 minutes

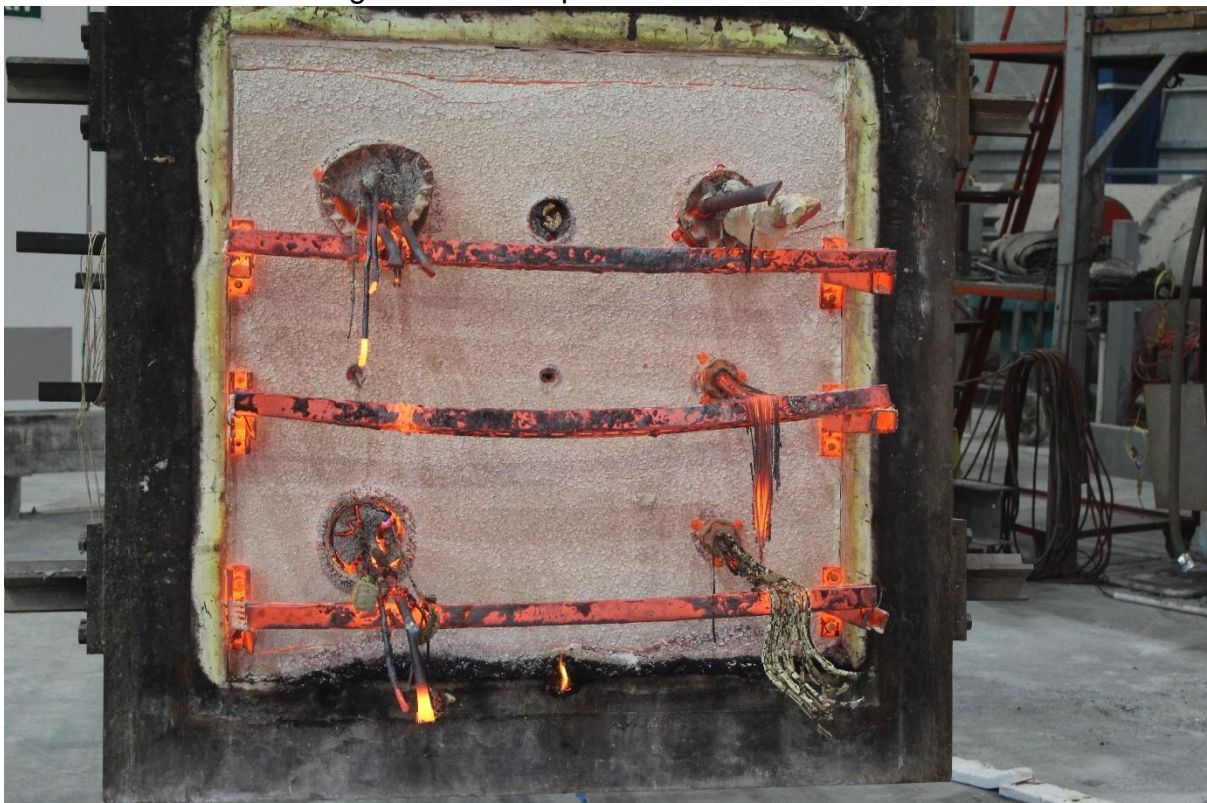


Figure 35 - Exposed face after the test

8. Appendix

8.1 Client supplied drawings

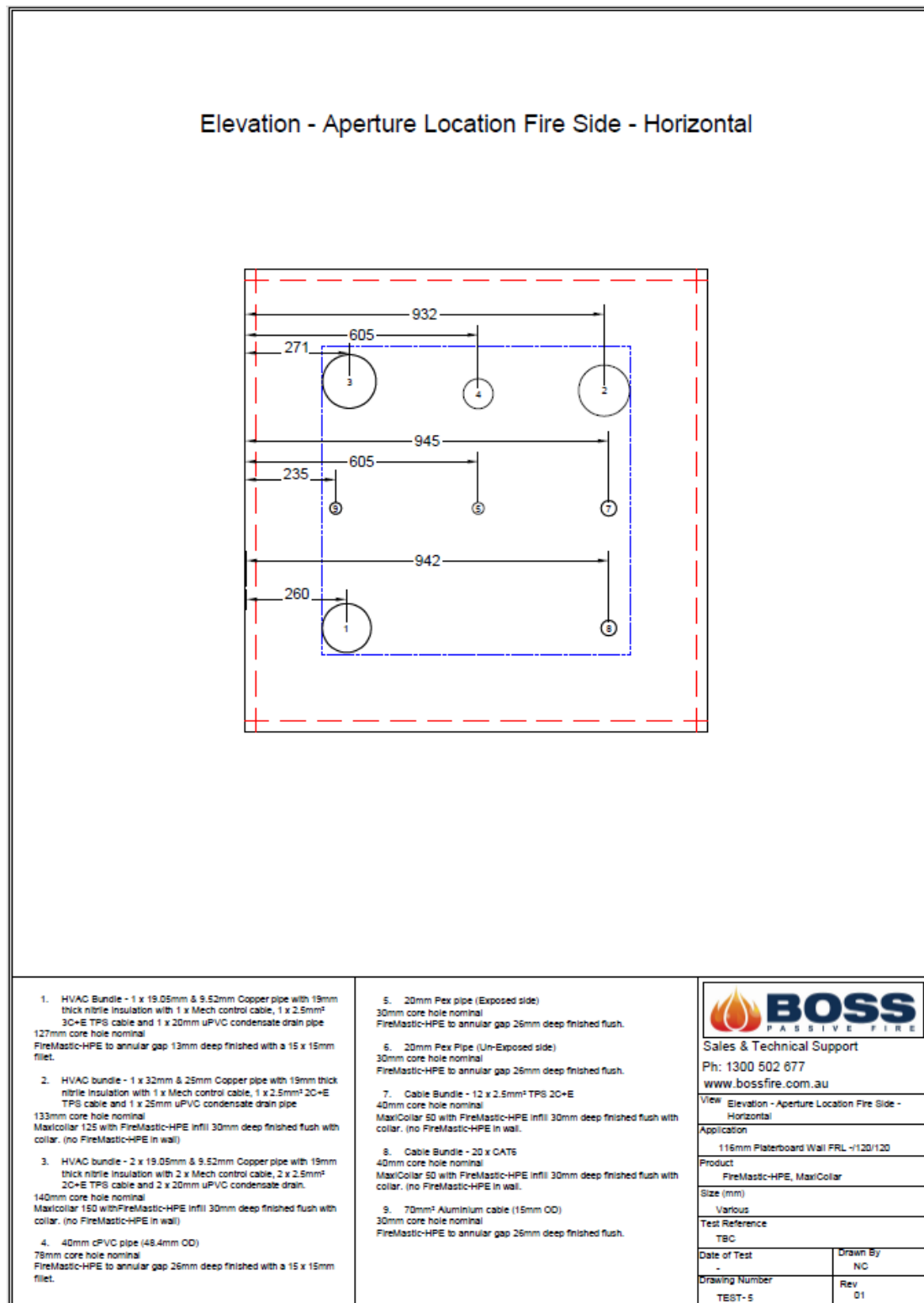
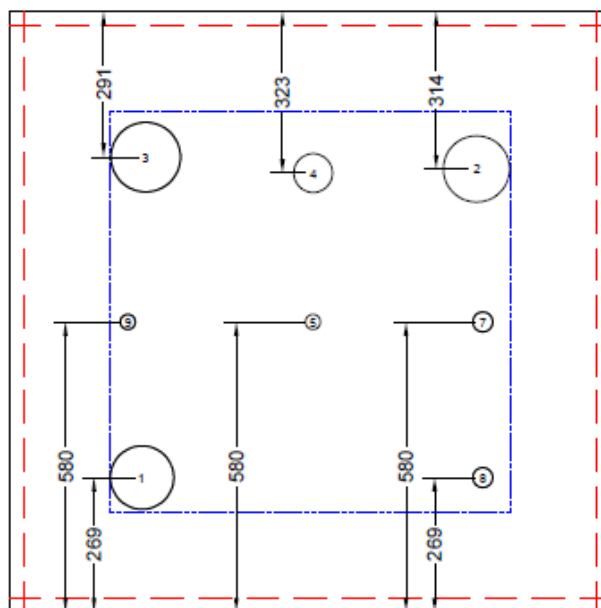


Figure 36 - Test 5 – Aperture Location – Fire Side – Horizontal.pdf

Elevation - Aperture Location Fire Side - Vertical



1. 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 TFS cable and 1 x 20mm uPVC condensate drain pipe 127mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm fillet.
2. HVAC bundle - 1 x 32mm & 25mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TFS cable and 1 x 25mm uPVC condensate drain pipe 133mm core hole nominal
MaxiCollar 125 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)
3. 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 2C+E TFS cable and 2 x 20mm uPVC condensate drain. 140mm core hole nominal
MaxiCollar 150 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)
4. 40mm cPVC pipe (48.4mm OD)
78mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished with a 15 x 15mm fillet.

5. 20mm Pex pipe (Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.
6. 20mm Pex Pipe (Un-Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.
7. Cable Bundle - 12 x 2.5mm² TFS 2C+E
40mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall).
8. Cable Bundle - 20 x CAT5
40mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall).
9. 70mm² Aluminium cable (15mm OD)
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 115mm Plasterboard Wall FRL -120/120

Product FireMastic-HPE, MaxiCollar

Size (mm)

Various

Test Reference

TBC

Date of Test

-

Drawing Number

TEST-5

Drawn By

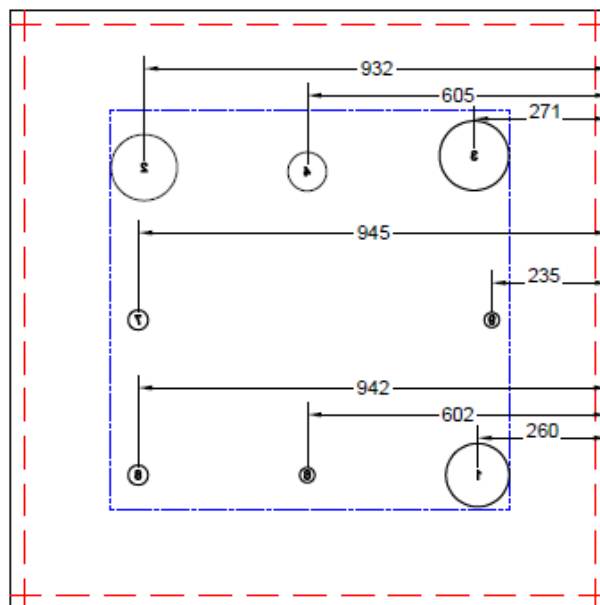
NC

Rev

01

Figure 37 - Test 5 – Aperture Location – Fire Side – Vertical.pdf

Elevation - Aperture Location Non Fire Side - Horizontal



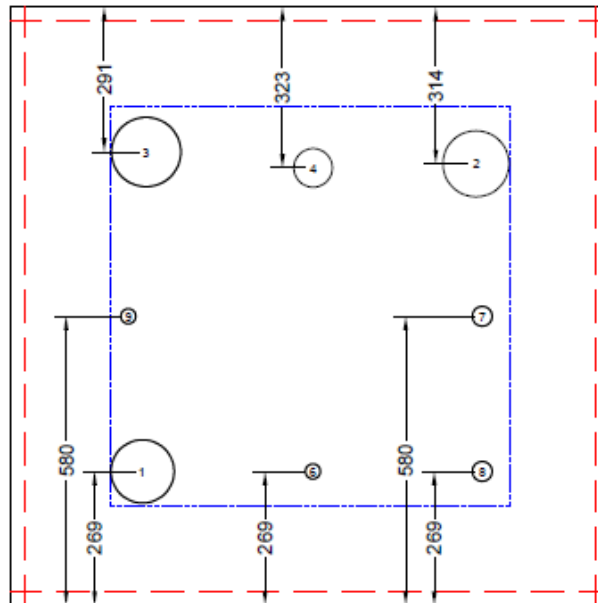
1. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 3C+E TPG cable and 1 x 20mm uPVC condensate drain pipe
127mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm fillet.
2. HVAC bundle - 1 x 32mm & 25mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPG cable and 1 x 25mm uPVC condensate drain pipe
133mm core hole nominal
MaxiCollar 125 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)
3. 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 2C+E TPG cable and 2 x 20mm uPVC condensate drain.
140mm core hole nominal
MaxiCollar 150 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)
4. 40mm dPVC pipe (48.4mm OD)
78mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished with a 15 x 15mm fillet.

5. 20mm Pex pipe (Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.
6. 20mm Pex Pipe (Un-Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.
7. Cable Bundle - 12 x 2.5mm² TPG 2C+E
40mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall).
8. Cable Bundle - 20 x CAT5
40mm core hole nominal
MaxiCollar 50 with FireMastic-HPE infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall).
9. 70mm² Aluminium cable (15mm OD)
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	115mm Plasterboard Wall FRL ~120/120
Product	FireMastic-HPE, MaxiCollar
Size (mm)	Various
Test Reference	TBC
Date of Test	Drawn By
Drawing Number	NC
TEST-5	Rev 01

Figure 38 - Test 5 – Aperture Location – Non Fire Side – Horizontal.pdf

Elevation - Aperture Location Non Fire Side - Vertical



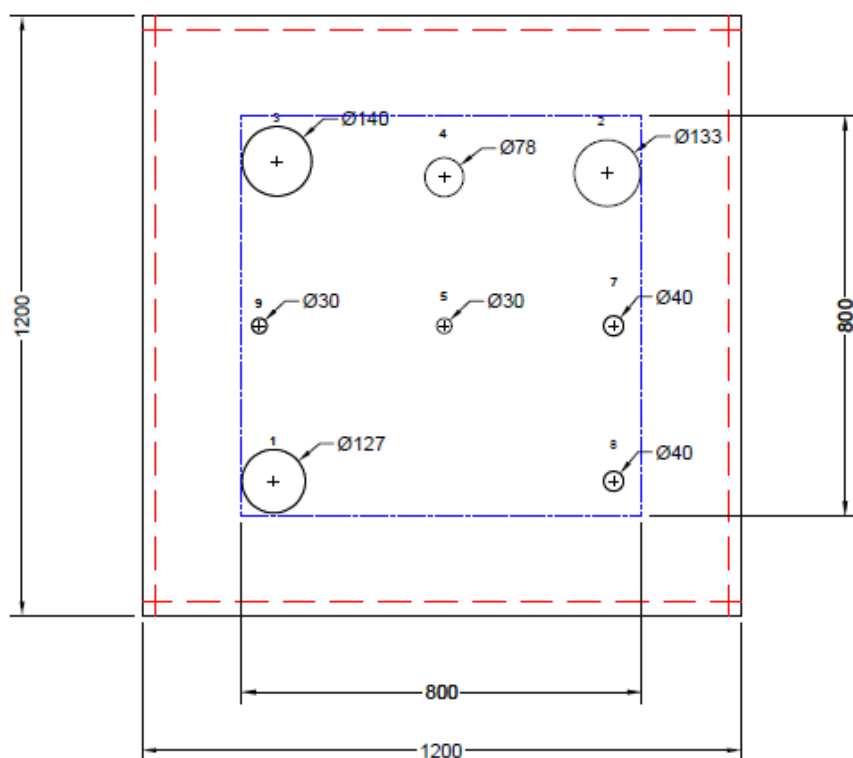
1. HVAC Bundle - 1 x 19.05mm & 9.52mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 3C+E TPG cable and 1 x 20mm uPVC condensate drain pipe 127mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm fillet.
2. HVAC bundle - 1 x 32mm & 25mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 3C+E TPG cable and 1 x 25mm uPVC condensate drain pipe 133mm core hole nominal
MaxiCollar 125 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)
3. 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 TPG cable and 2 x 20mm uPVC condensate drain. 140mm core hole nominal
MaxiCollar 150 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)
4. 40mm dPVC pipe (48.4mm OD)
78mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished with a 15 x 15mm fillet.

5. 20mm Pex pipe (Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.
6. 20mm Pex Pipe (Un-Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.
7. Cable Bundle - 12 x 2.5mm² TPG 3C+E
40mm core hole nominal
MaxiCollar 50 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall).
8. Cable Bundle - 20 x CAT5
40mm core hole nominal
MaxiCollar 50 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall).
9. 70mm² Aluminium cable (15mm OD)
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 115mm Plasterboard Wall FRL ~120/120	
Product FireMastic-HPE, MaxiCollar	
Size (mm) Various	
Test Reference TBC	
Date of Test -	Drawn By NC
Drawing Number TEST-5	Rev 01

Figure 39 - Test 5 – Aperture Location – Non Fire Side – Vertical.pdf

Elevation - Aperture Size Fire Side



1. 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 TPE cable and 1 x 20mm uPVC condensate drain pipe 127mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm fillet.
2. HVAC bundle - 1 x 32mm & 25mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPE cable and 1 x 25mm uPVC condensate drain pipe 133mm core hole nominal
MaxiCollar 125 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)
3. 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 2C+E TPE cable and 2 x 20mm uPVC condensate drain. 140mm core hole nominal
MaxiCollar 150 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)
4. 40mm cPVC pipe (48.4mm OD)
78mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished with a 15 x 15mm fillet.

5. 20mm Pex pipe (Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.
6. 20mm Pex Pipe (Un-Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.
7. Cable Bundle - 12 x 2.5mm² TPE 2C+E
40mm core hole nominal
MaxiCollar 50 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall).
8. Cable Bundle - 20 x CAT5
40mm core hole nominal
MaxiCollar 50 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall).
9. 70mm² Aluminium cable (15mm OD)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.



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View
Elevation - Aperture Size Fire Side

Application
115mm Plasterboard Wall FRL ~120/120

Product
FireMastic-HPE, MaxiCollar

Size (mm)

Various

Test Reference

TBC

Date of Test

-

Drawn By

NC

Drawing Number

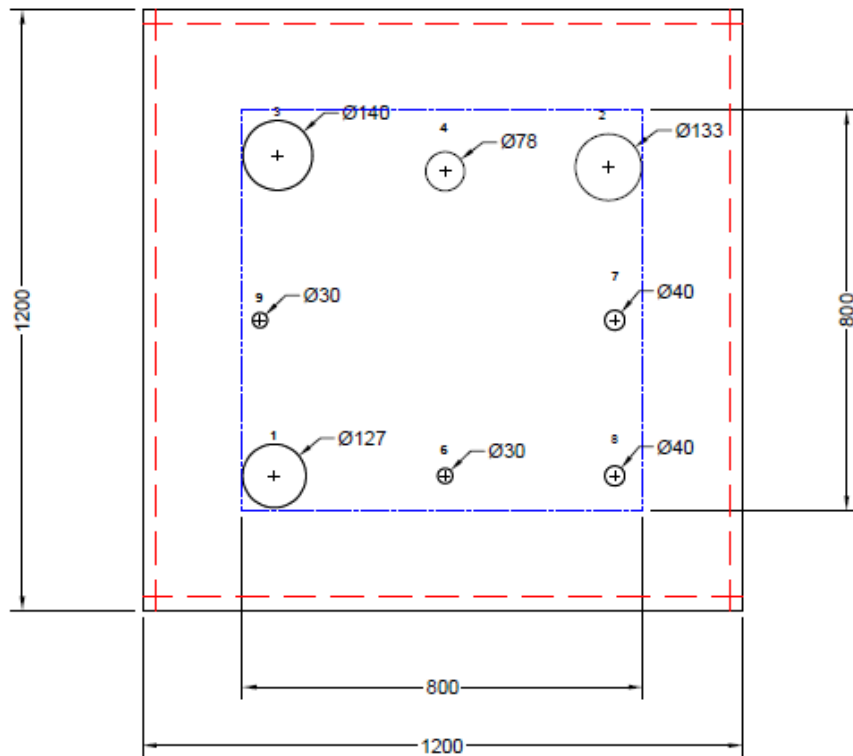
TEST-5

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01

Figure 40 - Test 5 – Aperture Size – Fire Side.pdf

Elevation - Aperture Size Non Fire Side



1. 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 20mm uPVC condensate drain pipe 127mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm fillet.
2. HVAC bundle - 1 x 32mm & 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 25mm uPVC condensate drain pipe 133mm core hole nominal
MaxiCollar 125 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)
3. 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 2C+E TPS cable and 2 x 20mm uPVC condensate drain. 140mm core hole nominal
MaxiCollar 150 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)
4. 40mm cPVC pipe (48.4mm OD)
78mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished with a 15 x 15mm fillet.

5. 20mm Pex pipe (Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.
6. 20mm Pex Pipe (Un-Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.
7. Cable Bundle - 12 x 2.5mm² TPS 2C+E
40mm core hole nominal
MaxiCollar 50 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall).
8. Cable Bundle - 20 x CAT5
40mm core hole nominal
MaxiCollar 50 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall).
9. 70mm² Aluminium cable (15mm OD)
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-5

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Figure 41 - Test 5 – Aperture Size – Non Fire Side.pdf

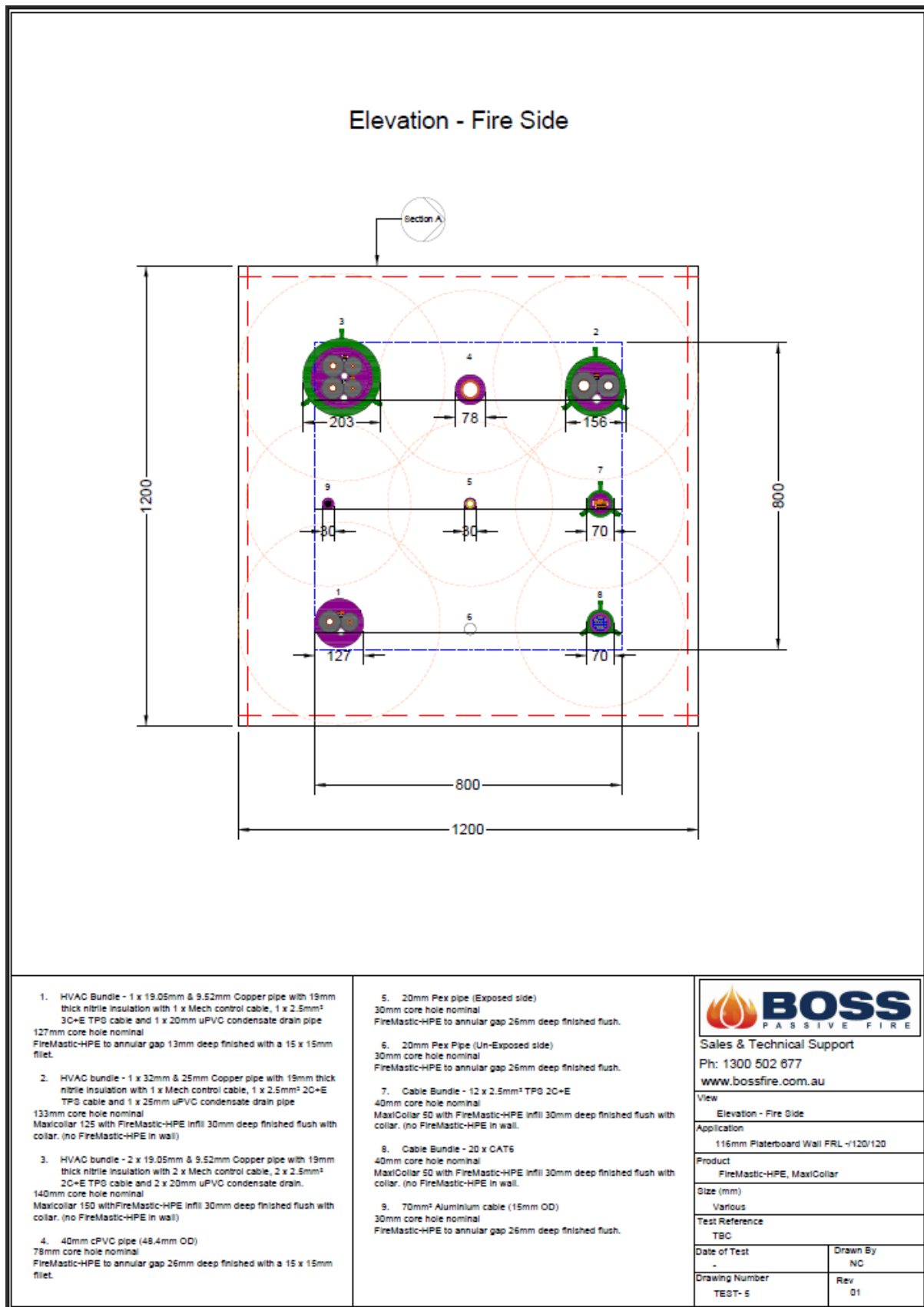


Figure 42 - Test 5 – Elevation – Fire Side.pdf

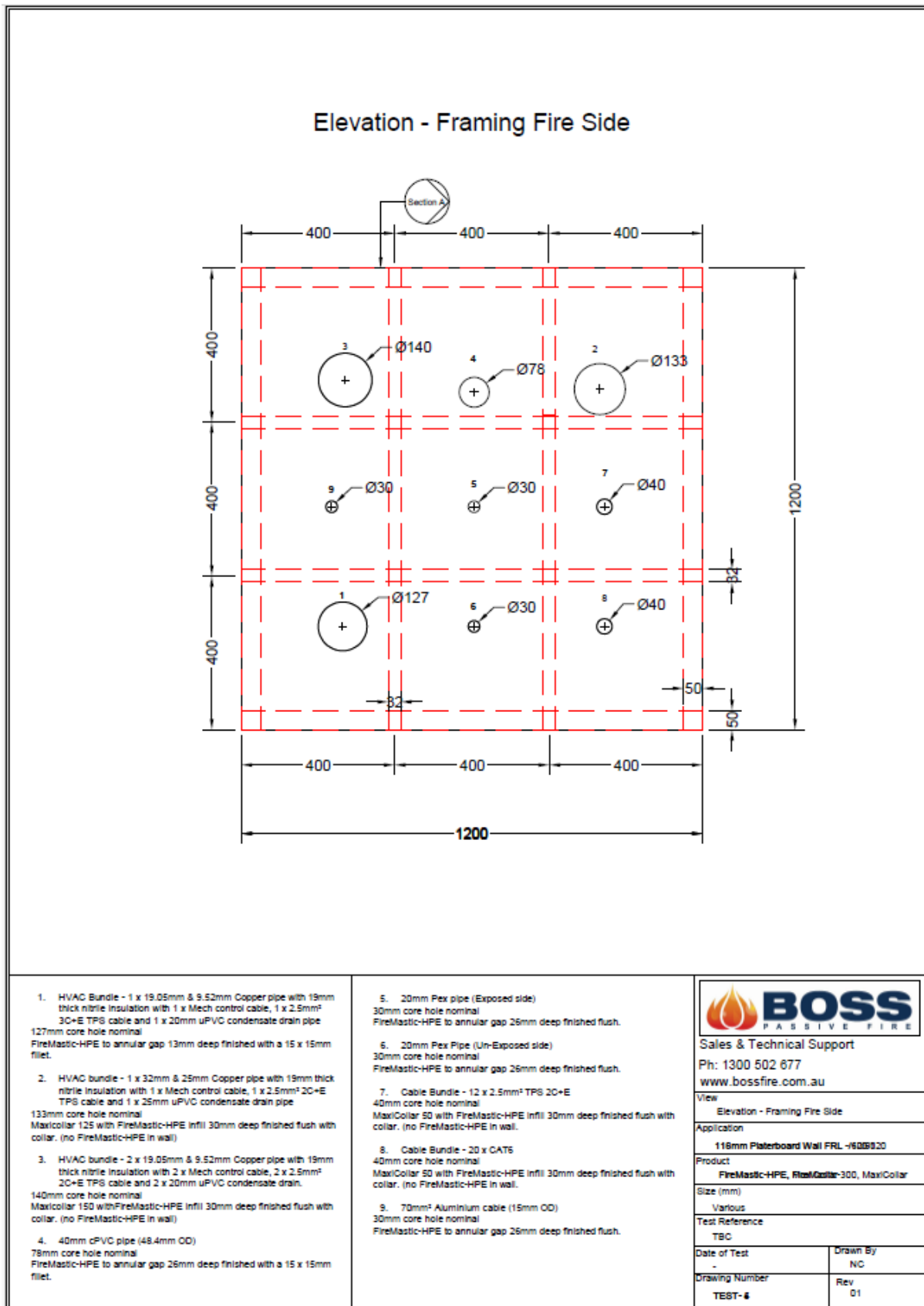


Figure 43 - Test 5 – Elevation – Framing – Fire Side.pdf

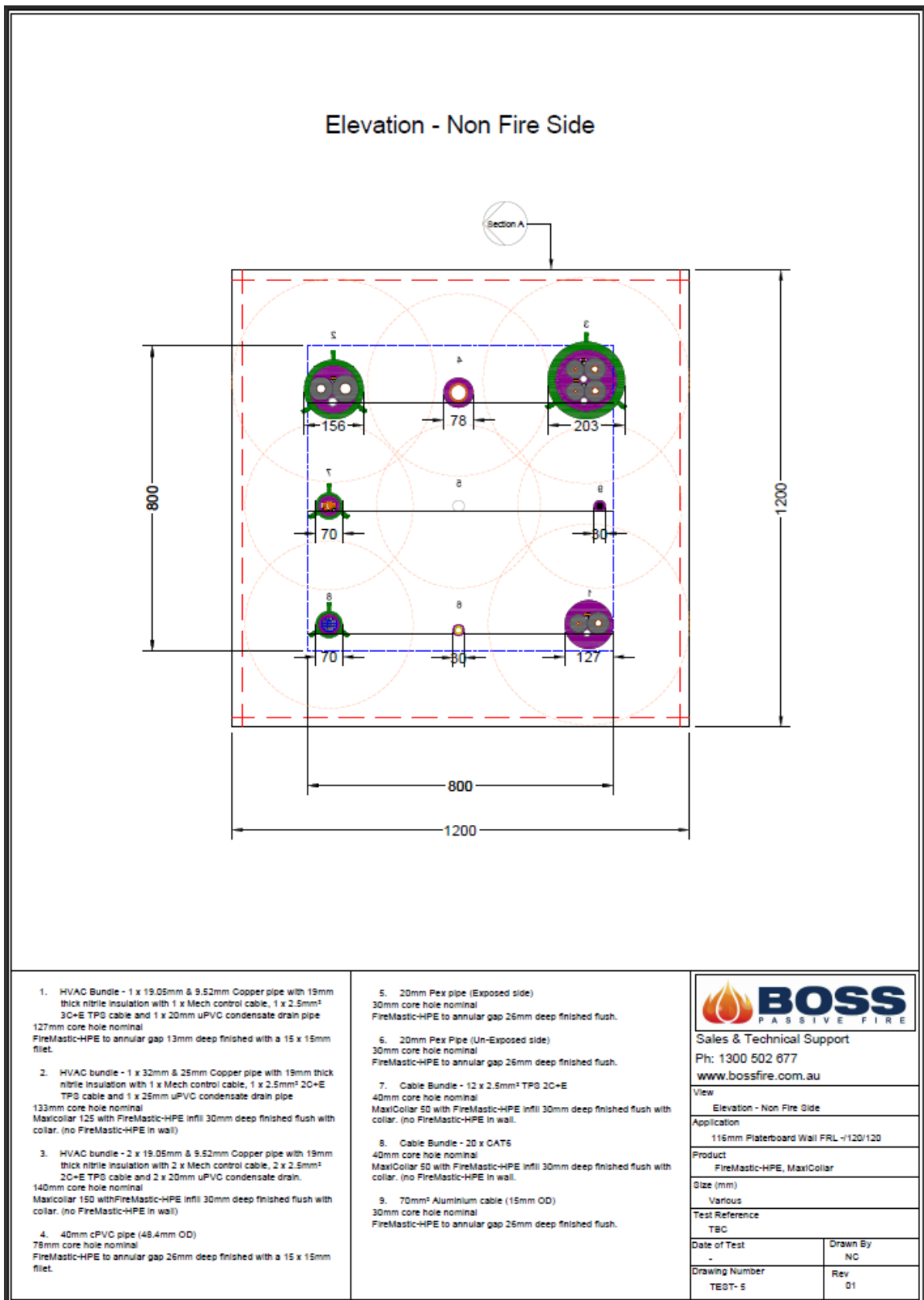


Figure 44 - Test 5 – Elevation – Non Fire Side.pdf

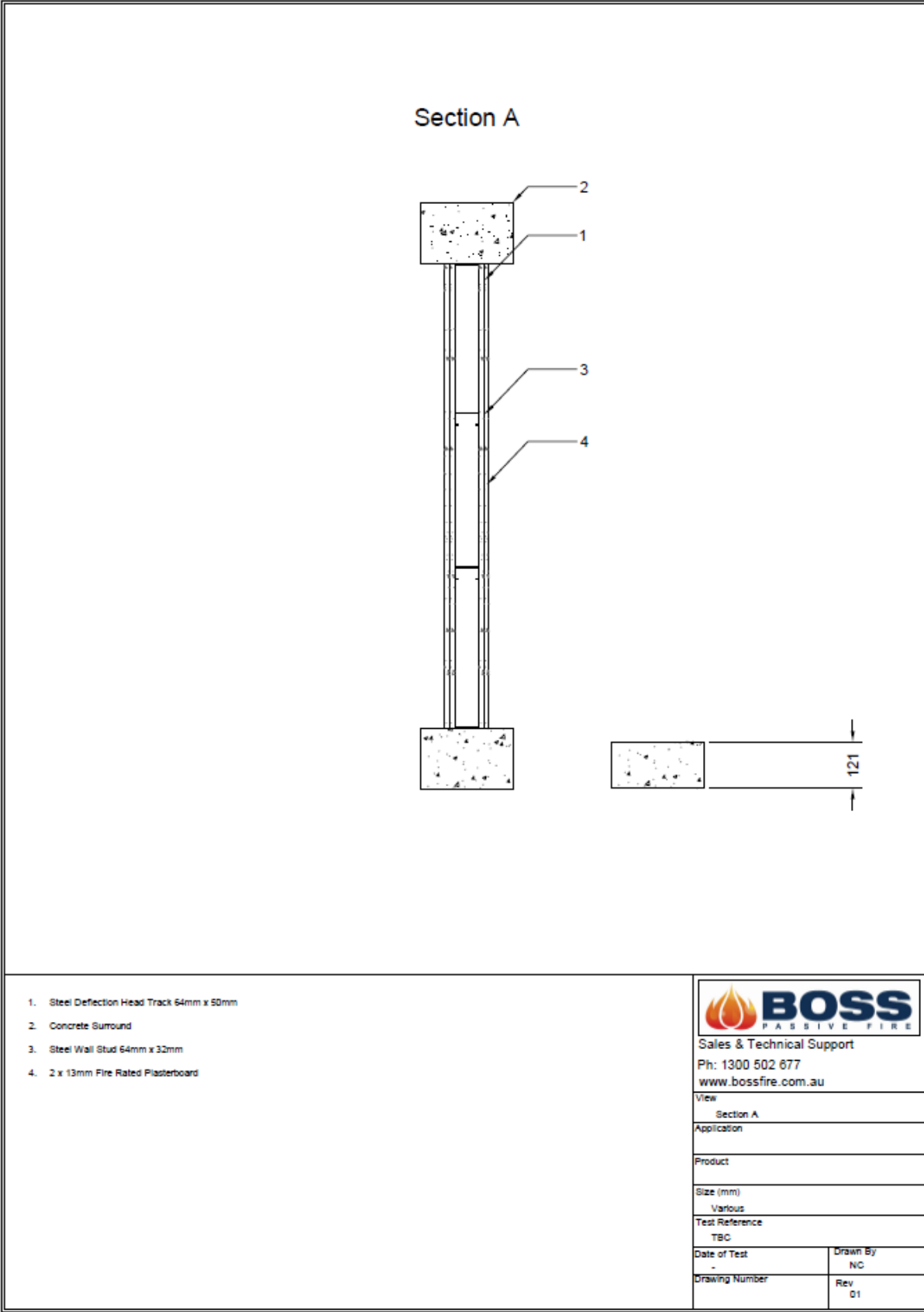
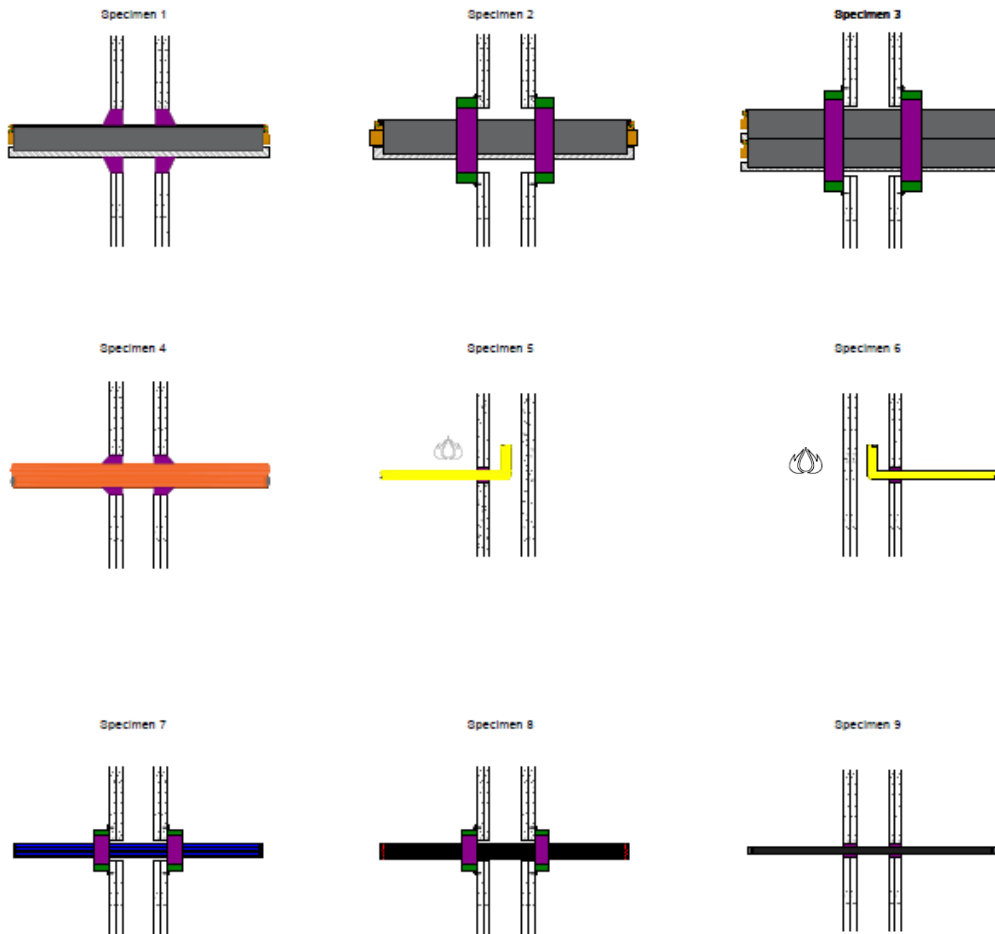


Figure 45 - Test 5 – Section A.pdf

Specimen Sections



1. 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 TPG cable and 1 x 20mm uPVC condensate drain pipe 127mm core hole nominal
FireMastic-HPE to annular gap 13mm deep finished with a 15 x 15mm fillet.
2. HVAC bundle - 1 x 32mm & 25mm Copper pipe with 19mm thick nitrile insulation with 1 x Mech control cable, 1 x 2.5mm² 2C+E TPG cable and 1 x 25mm uPVC condensate drain pipe 133mm core hole nominal
MaxiCollar 125 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)
3. 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 2C+E TPG cable and 2 x 20mm uPVC condensate drain. 140mm core hole nominal
MaxiCollar 150 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall)
4. 40mm cPVC pipe (48.4mm OD)
78mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished with a 15 x 15mm fillet.

5. 20mm Pex pipe (Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.
6. 20mm Pex Pipe (Un-Exposed side)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.
7. Cable Bundle - 12 x 2.5mm² TPG 2C+E
40mm core hole nominal
MaxiCollar 50 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall).
8. Cable Bundle - 20 x CAT6
40mm core hole nominal
MaxiCollar 50 with FireMastic-HPE Infill 30mm deep finished flush with collar. (no FireMastic-HPE in wall).
9. 70mm² Aluminum cable (15mm OD)
30mm core hole nominal
FireMastic-HPE to annular gap 26mm deep finished flush.



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View	Specimen Section
Application	115mm Plasterboard Wall FRL ~120/120
Product	FireMastic-HPE, MaxiCollar
Size (mm)	Various
Test Reference	TBC
Date of Test	-
Drawn By	NC
Drawing Number	TEST- 5
Rev	01

Figure 46 - Test 5 – Specimen Sections.pdf