



REGULATORY INFORMATION REPORT

Fire-resistance test of various bundles of cables and pipes penetrating a 124mm Fyrchek plasterboard wall protected with BOSS Fyreboxes in accordance with AS1530.4 – 2014

EWFA Report No:

RIR 45917000.1

Report Sponsor:

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8/15-23 Kumulla Road
Caringbah, NSW 2229

Supplementary Referenced Standard

AS4072.1-2005 – Clause 3.1

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CONTENTS

1	Construction Details	4
	Test Assembly	4
	Test Specimens	4
	Assembly and Installation Methods	5
	Orientation	5
2	Schedule of Components	6
3	Test Procedure	14
	Statement of compliance	14
	Supplementary Referenced Standard	14
	Variations to test method	14
	Pre-test conditioning	14
	Sampling / Specimen Selection	14
	Ambient Temperature	14
	Test Duration	14
	Instrumentation and Equipment	14
4	Test Results	15
5	Application of Test Results	15
	Test Limitations	15
	Variations from the Tested Specimens	15
	Uncertainty of Measurement	15
APPENDIX 1	DRAWINGS OF TEST ASSEMBLY	16
APPENDIX 2	TEST OBSERVATIONS	22
APPENDIX 3	DIRECT FIELD OF APPLICATION	25
	A 3.1 General	25
	A 3.2 Separating elements	25
	A 3.3 Plastics pipes	25
	A 3.4 Metal Pipes	25

1 CONSTRUCTION DETAILS

TEST ASSEMBLY

The test assembly was comprised of a nominally 1200mm wide x 945 mm high x 124mm thick Gyprock 16mm Fyrchek plasterboard wall assembly penetrated by service bundles comprising various pipes and cables.

The wall was restrained at all four edges.

TEST SPECIMENS

The wall assembly consisted of 1200mm wide x 945 mm high 92mm thick steel frame with a layer of 16mm Gyprock Fyrchek plasterboard on both the exposed and unexposed side. The cavity of the wall system was filled with Fletcher insulation Pink Partition 24 R2.5 insulation wool. The wall system was penetrated in three locations by various pipes and cables which were protected with 2-off BOSS Fyrebox-300 and a BOSS Fyrebox-150.

The full description of the specimen is provided in Figures A1.1 to A1.20 and the 'Schedule of Components' in Section 2.

Services through plasterboard wall system

Service No.	Penetration service	Service protection
A	<ul style="list-style-type: none"> • 2x Rehau RauTitan Platinum 20x2.8 • Rehau RauTitan Gas Stabil 20x2.9 • Kembla PaircoilMAX AS1571 3/8"-5/8" R410a Class 2.9 Insulation R Value 0.6 • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² + E 2.5mm² Cu • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² Cu • Garland Data Cable LSZH CAT5E UTPL5EHF 4PR24AWG ANSI/TIA 568-C.2 • Jonsa Coax Cable CRG6UBQ 75 Ohm RG6U Quad Shield CATV/MATV/SMATV F10129 P07982 • Garland Work Series 6C Security Cable MC146-W • 32NB Medium Galvanised steel pipe • DN25 Type B copper pipe • 20mm uPVC Conduit • WW Electric Cable Vipercon 3G10 XLPE/PVC 5V90 SM1310 XVUA-OR 2C+E 10mm² Cu • Firesense cable - IPSLD - 0.75-2C-Fire Alarm System-Light Duty-AS/ACIF S008 • Grove Communication Data Cable E225668 (UL) CM 4PR 24 AWG UTP CAT6 SOLID PVC TIA/EIA-568.B.2 	BOSS FyreBox-150
B	<ul style="list-style-type: none"> • 2x Rehau RauTitan Platinum 20x2.8 • Rehau RauTitan Gas Stabil 20x2.9 • Kembla PaircoilMAX AS1571 3/8"-5/8" R410a Class 2.9 Insulation R Value 0.6 • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² + E 2.5mm² Cu • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² Cu • Garland Data Cable LSZH CAT5E UTPL5EHF 4PR24AWG ANSI/TIA 568-C.2 • Jonsa Coax Cable CRG6UBQ 75 Ohm RG6U Quad Shield CATV/MATV/SMATV F10129 P07982 • Garland Work Series 6C Security Cable MC146-W • 32NB Medium Galvanised steel pipe • DN25 Type B copper pipe • 20mm uPVC Conduit • WW Electric Cable Vipercon 3G10 XLPE/PVC 5V90 SM1310 XVUA-OR 2C+E 100mm² Cu 	BOSS FyreBox-300

Service No.	Penetration service	Service protection
	<ul style="list-style-type: none"> • Firesense Cable - IPSLD - 0.75-2C-Fire Alarm System-Light Duty-AS/ACIF S008 • Grove Communication Data Cable E225668 (UL) CM 4PR 24 AWG UTP CAT6 SOLID PVC TIA/EIA-568.B.2 	
C	<ul style="list-style-type: none"> • 2x Rehau RauTitan Platinum 20x2.8 • Rehau RauTitan Gas Stabil 20x2.9 • Kembla PaircoilMAX AS1571 3/8"-5/8" R410a Class 2.9 Insulation R Value 0.6 • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² + E 2.5mm² Cu • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² Cu • Garland Data Cable LSZH CAT5E UTPL5EHF 4PR24AWG ANSI/TIA 568-C.2 • Jonsa Coax Cable CRG6UBQ 75 Ohm RG6U Quad Shield CATV/MATV/SMATV F10129 P07982 • Garland Work Series 6C Security Cable MC146-W • 32NB Medium Galvanised steel pipe • DN25 Type B copper pipe • 20mm uPVC Conduit • WW Electric Cable Vipercon 3G10 XLPE/PVC 5V90 SM1310 XVUA-OR 2C+E 10mm² Cu • Firesense cable - IPSLD - 0.75-2C-Fire Alarm System-Light Duty-AS/ACIF S008 • Grove Communication Data CableE225668 (UL) CM 4PR 24 AWG UTP CAT6 SOLID PVC TIA/EIA-568.B.2 	BOSS FyreBox-300

ASSEMBLY AND INSTALLATION METHODS

The wall system was constructed on the 25th of October 2016 and services were installed on 26th of October 2016.

ORIENTATION

The local fire stopping was symmetrical either side of the wall.

The assembly was asymmetric due to:

- the services being supported on the unexposed side only;
- the pipes being capped on the exposed side only and;
- the plastic pipes extending 2000mm on the unexposed side but only 500mm on the exposed side

2 SCHEDULE OF COMPONENTS

Item	Description	
Wall System		
1	Product Name	Gyprock 16mm FYRCHEK Plasterboard
	Size	16mm thick
	Density	786 kg/m ³ (measured)
	Installation	<ul style="list-style-type: none"> The plasterboard was fixed to the steel frame at nominal 300mm centres. The plasterboard was fixed on both the exposed and unexposed side of the steel frame BOSS FireMastic-300 mastic was applied on the perimeter of the wall system on both sides.
2	Name	Bottom Track
	Product Name	Rondo 92mm Track
	Size	27mm flange x 92mm Web x 0.5mm thick x 1265mm long
	Installation	<ul style="list-style-type: none"> Secured to the concrete blockwork at nominal 600mm centres with 6mm masonry anchors. Fixed to the quiet studs with screws
3	Name	Top Track
	Product Name	Rondo 92mm track
	Size	27mm flange x 92mm web x 0.5mm thick
	Installation	<ul style="list-style-type: none"> 3-off lengths of top track were installed in the wall system with a 310mm gap between first and second track and 160mm between the second and the third track. Each track was secured to concrete lintel with a masonry anchor at each end.
4	Name	Nogging
	Product Name	Rondo 92mm track
	Size	27mm flange x 92mm web x 0.5mm thick 310mm long at 505mm from the concrete lintel 1200mm long at 155mm from the concrete lintel
	Installation	Fixed to the quiet stud with screws
5	Name	Stud
	Product Name	Rondo Quiet Stud 92mm
	Size	45mm flange x 92mm Web x 0.5mm thick
	Installation	<ul style="list-style-type: none"> 6-off studs were installed in the wall system and fixed to the bottom track and noggings with screws. The studs were positioned so that they were boxing the BOSS Fyreboxes on both vertical edges
6	Name	Wall Insulation
	Product Name	Fletcher insulation Pink Partition 24 R2.5
	Density	24kg/m ³
	Installation	The insulation was installed in the cavities of the wall system

Item	Description	
7	Name	Masonry Fixings
	Product Name	Dynabolt
	Size	Ø6mm x 35mm
	Installation	Fixing the top and bottom track to concrete lintel. Fixing the quiet stud to the concrete blockwork.
8	Name	Frame Fixing
	Product Name	Button head fine thread self-drill screw
	Size	8g x 16mm
	Installation	Fixing the tracks and noggings to studs.
9	Name	Board Fixing
	Product Name	Gyprock Plasterboard Screws
	Size	6g x 25mm
	Installation	Securing the plasterboard to the metal frame.
10	Name	Mastic
	Product Name	BOSS FireMastic-300
	Installation	Sealing up the gap between the wall system and the concrete blockwork and lintel.
Penetration Service		
Pipes		
11	Name	20mm PEX Pipe
	Product Name	Rehau RauTitan Platinum 20x2.8 1132310 DN/OD 20 PN 20 SDR7.4 PE-Xa 80
	Size (measured)	OD: 20.3mm Thickness: 2.9 mm
12	Name	20mm PEX/AL/PEX pipe
	Product Name	REHAU RAUTITAN gas stabil 20x2.9 T3011020 131017 for NG and LPG MOP 70
	Size (measured)	OD: 20.2mm Thickness: 2.9mm
13	Name	Paircoil 10/15mm lagged copper pipe
	Product Name	Kembla PaircoilMAX AS1571 3/8"-5/8" R410a Class 2.9 FR AS/NZS 1530.3 & BCA Class 2.9 * Insulation R – Value 0.6
	Size (measured)	Large copper pipe: Lagging: OD: 38.3mm Thickness: 9.4mm Copper pipe: OD: 15.8mm Thickness: 1.1mm Small copper pipe: Lagging: OD: 35.mm Thickness: 10.6mm Copper pipe: OD: 9.6mm Thickness: 0.9mm
14	Name	32NB Medium Galvanised Pipe

Item	Description	
	Size	OD: 42.3mm Thickness: 3.3mm
15	Name	DN25 Type B copper tube
	Size	OD: 25.4mm Thickness: 1.2mm
16	Name	20mm uPVC Conduit
	Product Name	Pipe King BEP PVC series 1 20 PVC-U PN12
	Size	OD: 26.7mm Thickness: 1.7mm
Cables		
17	Name	Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² + E 2.5mm² Cu
	Size	Overall: 12.6mm x 5.4mm Core: Ø 3.3mm
18	Name	Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² Cu
	Size	Overall: 9.0mm x 5.3mm Core: Ø 3.1mm
19	Name	Garland Data Cable LSZH CAT5E UTPL5EHF 4PR24AWG ANSI/TIA 568-C.2
	Size	Overall: Ø 4.9mm
20	Name	Jonsa Coax Cable CRG6UBQ 75 Ohm RG6U Quad Shield CATV/MATV/SMATV F10129 P07982
	Size	Overall: Ø 7.3mm
21	Name	Garland Work Series 6C Security Cable MC146-W
	Size	Overall: Ø 5.9mm
22	Name	WW Electric Cable Vipercon 3G10 XLPE/PVC 5V90 SM1310 XVUA-OR 2C+E 10mm² Cu
	Size	Overall: 15.1mm Core: Ø5.5mm Earth: Ø 3.4mm
23	Name	Firesense - IPSLD - 0.75-2C-Fire Alarm System-Light Duty-AS/ACIF S008
	Size	Overall: 4.25mm x 6.67mm Core: Ø 1.2mm
24	Name	Grove Communicaiton E225668 (UL) CM 4PR 24 AWG UTP CAT6 SOLID PVC TIA/EIA-568.B.2
	Configuration	Multicore
	Size	Overall: Ø 6.1mm
Service Protection System		
FyreBox		
25	Name	BOSS FyreBox-300
	Size	300mm wide x 270mm deep x 150mm high x 1.0mm thick

Item	Description	
	Fire Stopping Components	<ul style="list-style-type: none"> 4-off 300mm long x 85mm wide HPE Sash Inlay (BOSS FireMastic - HPE). 2 of the HPE Sash Inlay located on the top cover and the other 2 located on the bottom cover. 4-off 150mm long HPE Sachet (BOSS FireMastic-HPE). 2 of the HPE Sachet located on the left side wall and the other 2 located on the right side wall.
	Smoke Barrier	4-off 296mm wide x 109mm high x 9mm deep BOSS FR BRUSH SEAL nylon Brush smoke barrier on the openings (2 of the brush on the top cover and other 2 located on the bottom cover).
	Service Support	Service support trapeze located at the mid depth of the Fyrebox which comprised of 2-off Ø6mm x 128mm long screws and Ø10mm x 280mm long metal bar.
26	Name	BOSS FyreBox-150
	Size	150mm wide x 270mm deep x 150mm high x 1.0mm thick
	Fire Stopping Components	8-off 150mm long HPE Sachet (BOSS FireMastic-HPE). 2-off HPE Sachet were installed on each side of the Fyrebox (Top cover, bottom cover, left wall and right wall.)
	Smoke Barrier	4-off 145mm wide x 109mm high x 9mm deep BOSS FR BRUSH SEAL nylon Brush smoke barrier on the openings (2 of the brush on the top cover and other 2 located on the bottom cover).
Mastic		
27	Name	BOSS FireMastic-300
	Installation	<ul style="list-style-type: none"> Form a 25mm x 25mm fillet around the Fyrebox between the wall and the Fyrebox On the interface between the wall and the Fyrebox. (Inside the wall) On the interface between the wall and the Bulkhead Batt
Mineral Wool Insulation		
28	Name	BOSS Bulkhead Batt
	Size	400mm x 200mm x 50mm
	Material	High density mineral fibre.
	Density	160kg/m ³ (provided by client)
	Installation	Around the Service A BOSS FyreBox-300 on top of the plasterboard on both exposed and unexposed side. The Bulkhead Batt was screw fixed to wall system with 6-off 65mm screws with washers.
Cable/Pipe Lagging		
29	Name	BOSS P40 MAK-Wrap
	Size	300mm wide x 38mm thick
	Material	Aluminium foil on the outer layer and low density mineral fibre on the inner layer

Item	Description
	<p data-bbox="300 465 432 495">Installation</p> <ul data-bbox="555 277 1390 685" style="list-style-type: none"><li data-bbox="555 277 1390 331">• The wrap was wrapped around the penetration services including the Fyrex on Service C.<li data-bbox="555 338 1390 392">• The wrap extended 290mm from the wall system (service C) on both exposed and unexposed side.<li data-bbox="555 398 1390 452">• The wrap extended 290mm from the Bulkhead Batt system (service B) on both exposed and unexposed side<li data-bbox="555 459 1390 512">• The wrap extended 290mm from the Fyrex-150 (service A) on both exposed and unexposed side<li data-bbox="555 519 1390 600">• 2 metal cables ties (7.9 x 370mm 304) were used to secure the Wrap at 100mm away from the wall system and 50mm away from the other end<li data-bbox="555 607 1390 685">• Aluminium foil tape was used to cover exposed mineral fibres between the foil backing and the services at the open ends of the wrap.

Penetration Service											
Service A											
30	<table border="1"> <tr> <td style="text-align: center;">Penetrations</td> <td> <ul style="list-style-type: none"> • 2x Rehau RauTitan Platinum 20x2.8 • Rehau RauTitan Gas Stabil 20x2.9 • Kembla PaircoilMAX AS1571 3/8"-5/8" R410a Class 2.9 Insulation R Value 0.6 • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² + E 2.5mm² Cu • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² Cu • Garland Data Cable LSZH CAT5E UTPL5EHF 4PR24AWG ANSI/TIA 568-C.2 • Jonsa Coax Cable CRG6UBQ 75 Ohm RG6U Quad Shield CATV/MATV/SMATV F10129 P07982 • Garland Work Series 6C Security Cable MC146-W • 32NB Medium Galvanised steel pipe • DN25 Type B copper pipe • 20mm uPVC Conduit • WW Electric Cable Vipercon 3G10 XLPE/PVC 5V90 SM1310 XVUA-OR 2C+E 10mm² Cu • Firesense cable - IPSLD - 0.75-2C-Fire Alarm System-Light Duty-AS/ACIF S008 • Grove Communication Data Cable E225668 (UL) CM 4PR 24 AWG UTP CAT6 SOLID PVC TIA/EIA-568.B.2 </td> </tr> <tr> <td style="text-align: center;">Aperture Size</td> <td>160mm wide x 155mm high</td> </tr> <tr> <td style="text-align: center;">Service protection</td> <td> <ul style="list-style-type: none"> • BOSS FyreBox-150 • BOSS FireMastic-300 • BOSS P40 MAK-Wrap </td> </tr> <tr> <td style="text-align: center;">Installation</td> <td> <ul style="list-style-type: none"> • The cables/metal pipes bundle protruded 500mm away from the wall system on both exposed and unexposed side. • The plastic pipes protruded 2000mm away from the wall system on the unexposed side and 500mm away on the exposed side. • The BOSS FyreBox-150 was fixed to the concrete lintel with 2-off masonry anchors before the plasterboard was installed • All the cables/pipes penetrated the wall system through the BOSS FyreBox-150 • The FyreBox-150 was located centrally within the wall. • BOSS FireMastic-300 was applied: <ul style="list-style-type: none"> ○ Annular gap between the BOSS FyreBox-150 and the wall system. ○ 25mm x 25mm fillet was applied on the interface between the FyreBox-150 and the plasterboard on the side and bottom ○ A bead around the perimeter and down the centre on the interface between the FyreBox-150 top cover and concrete lintel. • The BOSS P40 MAK-Wrap was wrapped around the cables and pipes bundle once with 90 degrees overlapping. The BOSS P40 MAK-Wrap extended 290mm from the smoke barrier brushes on both sides of the wall. • 2 –off cable ties were used to secure the BOSS P40 MAK-Wrap at approximately 100mm from the wall system and 50mm from the other end. • Aluminium foil tape was used to cover exposed mineral fibres at the open end of the wrap. </td> </tr> <tr> <td style="text-align: center;">Support</td> <td>The penetration system was supported on the unexposed side at 400mm, 500mm and 1500mm away from the unexposed face of the wall.</td> </tr> </table>	Penetrations	<ul style="list-style-type: none"> • 2x Rehau RauTitan Platinum 20x2.8 • Rehau RauTitan Gas Stabil 20x2.9 • Kembla PaircoilMAX AS1571 3/8"-5/8" R410a Class 2.9 Insulation R Value 0.6 • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² + E 2.5mm² Cu • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² Cu • Garland Data Cable LSZH CAT5E UTPL5EHF 4PR24AWG ANSI/TIA 568-C.2 • Jonsa Coax Cable CRG6UBQ 75 Ohm RG6U Quad Shield CATV/MATV/SMATV F10129 P07982 • Garland Work Series 6C Security Cable MC146-W • 32NB Medium Galvanised steel pipe • DN25 Type B copper pipe • 20mm uPVC Conduit • WW Electric Cable Vipercon 3G10 XLPE/PVC 5V90 SM1310 XVUA-OR 2C+E 10mm² Cu • Firesense cable - IPSLD - 0.75-2C-Fire Alarm System-Light Duty-AS/ACIF S008 • Grove Communication Data Cable E225668 (UL) CM 4PR 24 AWG UTP CAT6 SOLID PVC TIA/EIA-568.B.2 	Aperture Size	160mm wide x 155mm high	Service protection	<ul style="list-style-type: none"> • BOSS FyreBox-150 • BOSS FireMastic-300 • BOSS P40 MAK-Wrap 	Installation	<ul style="list-style-type: none"> • The cables/metal pipes bundle protruded 500mm away from the wall system on both exposed and unexposed side. • The plastic pipes protruded 2000mm away from the wall system on the unexposed side and 500mm away on the exposed side. • The BOSS FyreBox-150 was fixed to the concrete lintel with 2-off masonry anchors before the plasterboard was installed • All the cables/pipes penetrated the wall system through the BOSS FyreBox-150 • The FyreBox-150 was located centrally within the wall. • BOSS FireMastic-300 was applied: <ul style="list-style-type: none"> ○ Annular gap between the BOSS FyreBox-150 and the wall system. ○ 25mm x 25mm fillet was applied on the interface between the FyreBox-150 and the plasterboard on the side and bottom ○ A bead around the perimeter and down the centre on the interface between the FyreBox-150 top cover and concrete lintel. • The BOSS P40 MAK-Wrap was wrapped around the cables and pipes bundle once with 90 degrees overlapping. The BOSS P40 MAK-Wrap extended 290mm from the smoke barrier brushes on both sides of the wall. • 2 –off cable ties were used to secure the BOSS P40 MAK-Wrap at approximately 100mm from the wall system and 50mm from the other end. • Aluminium foil tape was used to cover exposed mineral fibres at the open end of the wrap. 	Support	The penetration system was supported on the unexposed side at 400mm, 500mm and 1500mm away from the unexposed face of the wall.
Penetrations	<ul style="list-style-type: none"> • 2x Rehau RauTitan Platinum 20x2.8 • Rehau RauTitan Gas Stabil 20x2.9 • Kembla PaircoilMAX AS1571 3/8"-5/8" R410a Class 2.9 Insulation R Value 0.6 • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² + E 2.5mm² Cu • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² Cu • Garland Data Cable LSZH CAT5E UTPL5EHF 4PR24AWG ANSI/TIA 568-C.2 • Jonsa Coax Cable CRG6UBQ 75 Ohm RG6U Quad Shield CATV/MATV/SMATV F10129 P07982 • Garland Work Series 6C Security Cable MC146-W • 32NB Medium Galvanised steel pipe • DN25 Type B copper pipe • 20mm uPVC Conduit • WW Electric Cable Vipercon 3G10 XLPE/PVC 5V90 SM1310 XVUA-OR 2C+E 10mm² Cu • Firesense cable - IPSLD - 0.75-2C-Fire Alarm System-Light Duty-AS/ACIF S008 • Grove Communication Data Cable E225668 (UL) CM 4PR 24 AWG UTP CAT6 SOLID PVC TIA/EIA-568.B.2 										
Aperture Size	160mm wide x 155mm high										
Service protection	<ul style="list-style-type: none"> • BOSS FyreBox-150 • BOSS FireMastic-300 • BOSS P40 MAK-Wrap 										
Installation	<ul style="list-style-type: none"> • The cables/metal pipes bundle protruded 500mm away from the wall system on both exposed and unexposed side. • The plastic pipes protruded 2000mm away from the wall system on the unexposed side and 500mm away on the exposed side. • The BOSS FyreBox-150 was fixed to the concrete lintel with 2-off masonry anchors before the plasterboard was installed • All the cables/pipes penetrated the wall system through the BOSS FyreBox-150 • The FyreBox-150 was located centrally within the wall. • BOSS FireMastic-300 was applied: <ul style="list-style-type: none"> ○ Annular gap between the BOSS FyreBox-150 and the wall system. ○ 25mm x 25mm fillet was applied on the interface between the FyreBox-150 and the plasterboard on the side and bottom ○ A bead around the perimeter and down the centre on the interface between the FyreBox-150 top cover and concrete lintel. • The BOSS P40 MAK-Wrap was wrapped around the cables and pipes bundle once with 90 degrees overlapping. The BOSS P40 MAK-Wrap extended 290mm from the smoke barrier brushes on both sides of the wall. • 2 –off cable ties were used to secure the BOSS P40 MAK-Wrap at approximately 100mm from the wall system and 50mm from the other end. • Aluminium foil tape was used to cover exposed mineral fibres at the open end of the wrap. 										
Support	The penetration system was supported on the unexposed side at 400mm, 500mm and 1500mm away from the unexposed face of the wall.										

Service B		
31	Penetration	<ul style="list-style-type: none"> • 2x Rehaui RauTitan Platinum 20x2.8 • Rehaui RauTitan Gas Stabil 20x2.9 • Kembla PaircoilMAX AS1571 3/8"-5/8" R410a Class 2.9 Insulation R Value 0.6 • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² + E 2.5mm² Cu • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² Cu • Garland Data Cable LSZH CAT5E UTPL5EHF 4PR24AWG ANSI/TIA 568-C.2 • Jonsa Coax Cable CRG6UBQ 75 Ohm RG6U Quad Shield CATV/MATV/SMATV F10129 P07982 • Garland Work Series 6C Security Cable MC146-W • 32NB Medium Galvanised steel pipe • DN25 Type B copper pipe • 20mm uPVC Conduit • WW Electric Cable Vipercon 3G10 XLPE/PVC 5V90 SM1310 XVUA-OR 2C+E 100mm² Cu • Firesense Cable - IPSLD - 0.75-2C-Fire Alarm System-Light Duty-AS/ACIF S008 • Grove Communication Data Cable E225668 (UL) CM 4PR 24 AWG UTP CAT6 SOLID PVC TIA/EIA-568.B.2
	Aperture Size	310mm wide x 155mm high
	Service protection	<ul style="list-style-type: none"> • BOSS FyreBox-300 • BOSS FireMastic-300 • BOSS P40 MAK-Wrap • BOSS Bulkhead Batt
	Installation	<ul style="list-style-type: none"> • The cables/metal pipe bundle protruded 500mm away from the wall system on both exposed and unexposed side. • The plastic pipes protruded 2000mm on the unexposed side and 500mm on the exposed side. • The BOSS FyreBox-300 was fixed to the concrete lintel with 2-off masonry anchors before the plasterboard was installed • All the cables/pipes penetrated the wall system through the BOSS FyreBox-300 • The FyreBox-300 was located centrally within the wall. • BOSS FireMastic-300 was applied to the: <ul style="list-style-type: none"> ○ A bead around the perimeter and down the centre on the interface between the FyreBox-150 top cover and concrete lintel. ○ Annular gap between the BOSS FyreBox-150 and the wall system. • The BOSS P40 MAK-Wrap was wrapped around the whole penetration service twice. The BOSS P40 MAK-Wrap extended 290mm from the Bulkhead Batt on both sides of the wall. • 2 –off cable ties were used to secure the BOSS P40 MAK-Wrap at approximately 100mm from the Bulkhead Batt and 50mm from the other end. • Aluminium foil tape was used to cover exposed mineral fibres at the open end of the wrap. • 50mm wide BOSS Bulkhead Batts were secured to the wall around the outside of the BOSS FyreBox-300, on the side and along the bottom on both sides of the wall.
	Support	The penetration system was supported on the unexposed side at 400mm, 500mm and 1500mm away from the unexposed face of the wall.

Service C		
32	Penetration	<ul style="list-style-type: none"> • 2x Rehau RauTitan Platinum 20x2.8 • Rehau RauTitan Platinum Gas Stabil 20x2.9 • Kembla Paircoil MAX AS1571 3/8"-5/8" R410a Class 2.9 Insulation R Value 0.6 • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² + E 2.5mm² Cu • Prysmian L Electrical Cable 450/750V V-90 2C x 2.5mm² Cu • Garland LSZH CAT5E UTPL5EHF 4PR24AWG ANSI/TIA 568-C.2 • Jonsa Coax Cable CRG6UBQ 75 Ohm RG6U Quad Shield CATV/MATV/SMATV F10129 P07982 • Garland Work Series 6C Security Cable MC146-W • 32NB Medium Galvanised steel pipe • DN25 Type B copper pipe • 20mm uPVC Conduit • WW Electric Cable Vipercon 3G10 XLPE/PVC 5V90 SM1310 XVUA-OR 2C+E • Firesense - IPSLD - 0.75-2C-Fire Alarm System-Light Duty-AS/ACIF S008 • Grove Communication E225668 (UL) CM 4PR 24 AWG UTP CAT6 SOLID PVC TIA/EIA-568.B.2
	Aperture Size	310mm wide x 160mm high
	Service protection	<ul style="list-style-type: none"> • BOSS FyreBox-300 • BOSS FireMastic-300 • BOSS P40 MAK-Wrap
	Installation	<ul style="list-style-type: none"> • The cables/metal pipes bundle protruded 500mm away from the wall system on both exposed and unexposed side. • The plastic pipes protruded 2000mm on the unexposed side and 500mm on the exposed side. • All the cables/pipes penetrated the wall system through BOSS FyreBox-300 • The FyreBox-300 was located centrally within the wall. • Carinya 20 x 20 x 1mm Angle was cut, bent and installed around the FyreBox-300 on both sides of the wall, screwed to the wall to secure the FyreBox in position. • BOSS FireMastic -300 was applied: <ul style="list-style-type: none"> ○ Annular gap between the BOSS FyreBox-150 and the wall system. • The BOSS P40 MAK-Wrap was wrapped around the whole penetration system (including the FyreBox-300 protruding past the wall) with 90 degrees overlapping. The BOSS P40 MAK-Wrap extended 300mm from the wall on both sides of the wall. • 2 –off cable ties were used to secure the BOSS P40 MAK-Wrap at approximately 50mm from the Bulkhead Batt and 50mm from the other end. • Aluminium foil tape was used to cover exposed mineral fibres at the open end of the wrap.
Support	The penetration system was supported on the unexposed side at 400mm, 500mm and 1500mm away from the unexposed face of the wall.	

3 TEST PROCEDURE

STATEMENT OF COMPLIANCE

The test was performed in accordance with the requirements of AS 1530.4-2014 Sections 2 & 10 as appropriate for service penetrations.

SUPPLEMENTARY REFERENCED STANDARD

AS4072.1-2005 – Clause 3.1.

VARIATIONS TO TEST METHOD

None

PRE-TEST CONDITIONING

The construction of the specimen was finished on the 27th October 2016 and was tested on 4th November 2016. During this period the test specimen was subject to normal laboratory temperatures and relative humidity conditions.

SAMPLING / SPECIMEN SELECTION

The laboratory was not involved in the sampling or selection of the test specimen for the fire resistance test.

AMBIENT TEMPERATURE

The ambient temperature at the start of the test was 28°C and did not vary significantly during the test.

TEST DURATION

The test duration was 121 minutes.

INSTRUMENTATION AND EQUIPMENT

The instrumentation was provided in accordance with AS 1530.4-2014 and as detailed below:

The furnace temperature was measured by 4-off mineral insulated metal sheathed Type K thermocouples with wire diameters not greater than 1mm and overall diameter of 3mm with the measuring junction insulated from the sheath. The thermocouples protruded a minimum of 25mm from steel supporting tubes.

The non-fire side specimen temperatures were measured by Type K thermocouples with wire diameters less than 0.5mm soldered to 12mm diameter x 0.2mm thick copper discs covered by 30mm x 30mm x 2.0 mm inorganic insulating pads. The thermocouple positions are described in Table A4.1, and are shown on Figure A4.1 in Appendix 4.

A roving thermocouple was available to measure temperatures at positions that appeared hotter than the positions monitored by the fixed thermocouples.

The furnace pressure was measured at the mid-height of lowest service.

Cotton pads were available during the test to assess the performance under the criteria for integrity.

4 TEST RESULTS

The specimens listed below achieved the following performance when tested in accordance with AS 1530.4-2014, Section 2 & 10.

Service	Criteria	Result	FRL
A	Structural Adequacy	Not applicable	-/120/120
	Integrity	No Failure up to 121 minutes	
	Insulation	No Failure up to 121 minutes	
B	Structural Adequacy	Not applicable	-/120/120
	Integrity	No Failure up to 121 minutes	
	Insulation	No Failure up to 121 minutes	
C	Structural Adequacy	Not applicable	-/120/120
	Integrity	No Failure up to 121 minutes	
	Insulation	No Failure up to 121 minutes	

5 APPLICATION OF TEST RESULTS

TEST LIMITATIONS

The results of this fire test 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. The results only relate to the behaviour of the specimen of the element of the construction under the particular conditions of the test; they are not intended to be the sole criteria for assessing the potential fire performance of the element in use nor do they necessarily reflect the actual behaviour in fires.

VARIATIONS FROM THE TESTED SPECIMENS

This report details the methods of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the general procedure outlined in AS1530.4. Any significant variation with respect to size, constructional details, loads, stresses, edge or end conditions, other than those allowed under the field of direct application in the relevant test method, is not addressed by this report. It is recommended that any proposed variation to the tested configuration other than as permitted under the field of direct application specified in Appendix 3 should be referred to the test sponsor in the first instance to obtain appropriate documentary evidence of compliance from Exova Warringtonfire Aus Pty Ltd or another Registered Testing Authority.

UNCERTAINTY OF MEASUREMENT

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.

APPENDIX 1 DRAWINGS OF TEST ASSEMBLY

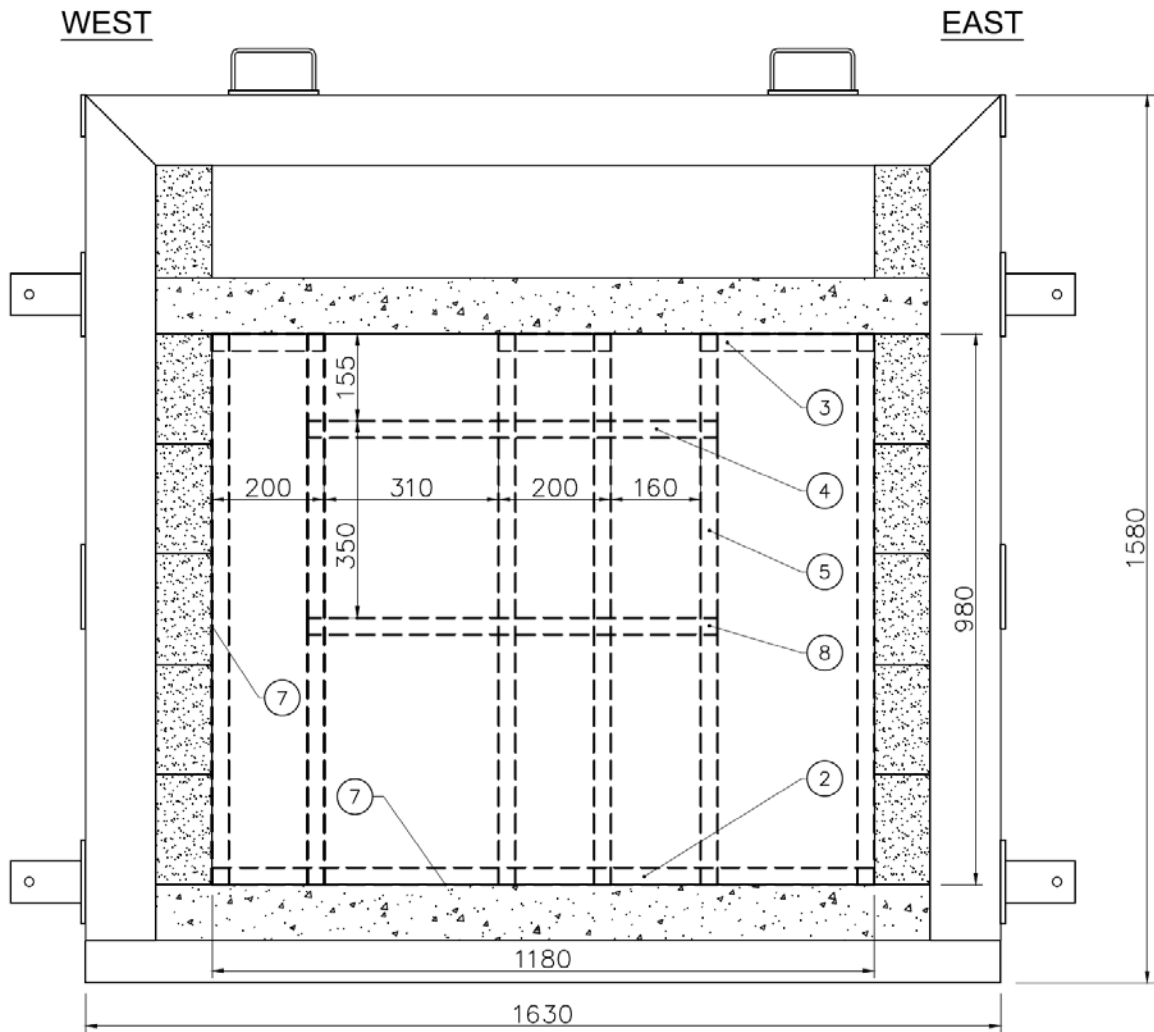


Figure A1.1: Elevation of Test Specimen – Internal frame, Unexposed side

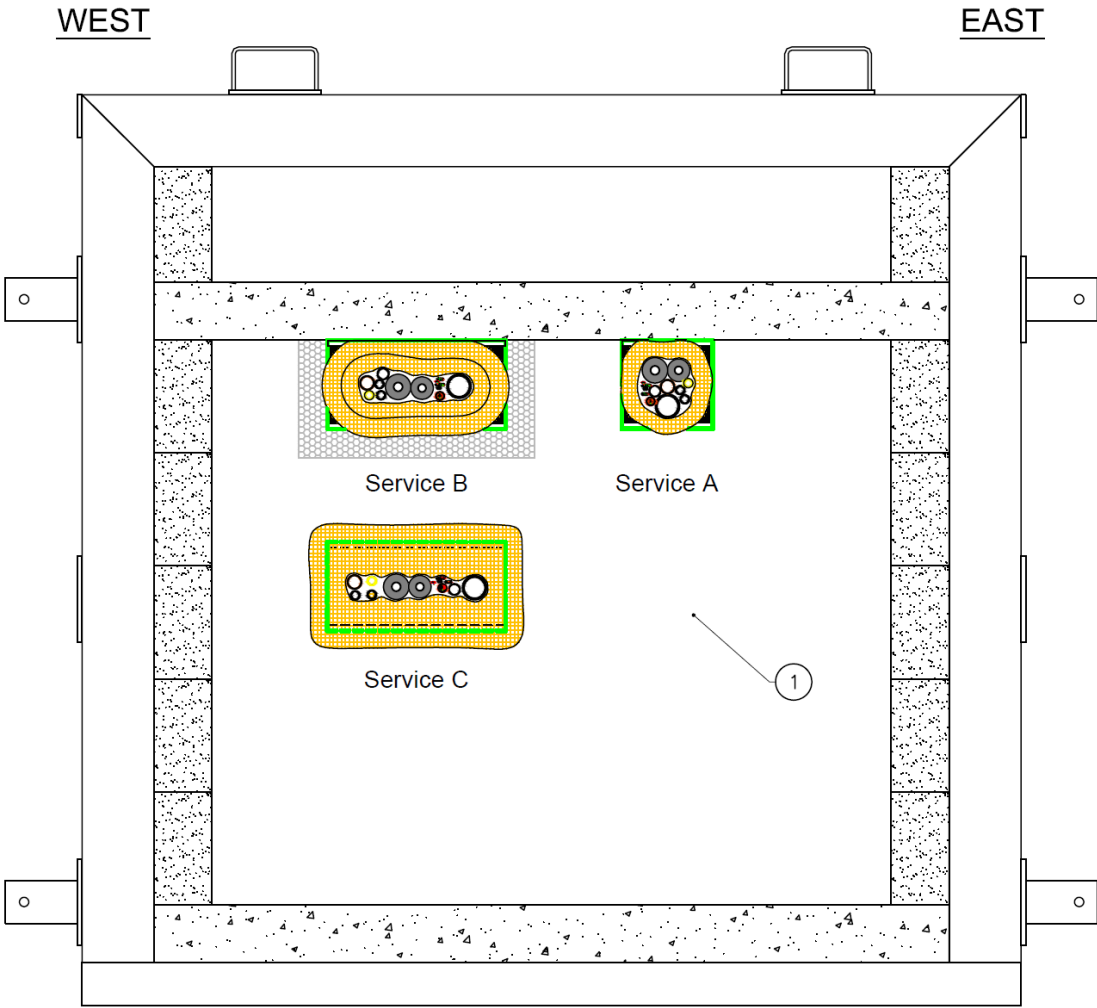


Figure A1.2: Elevation of Test Specimen, Unexposed side

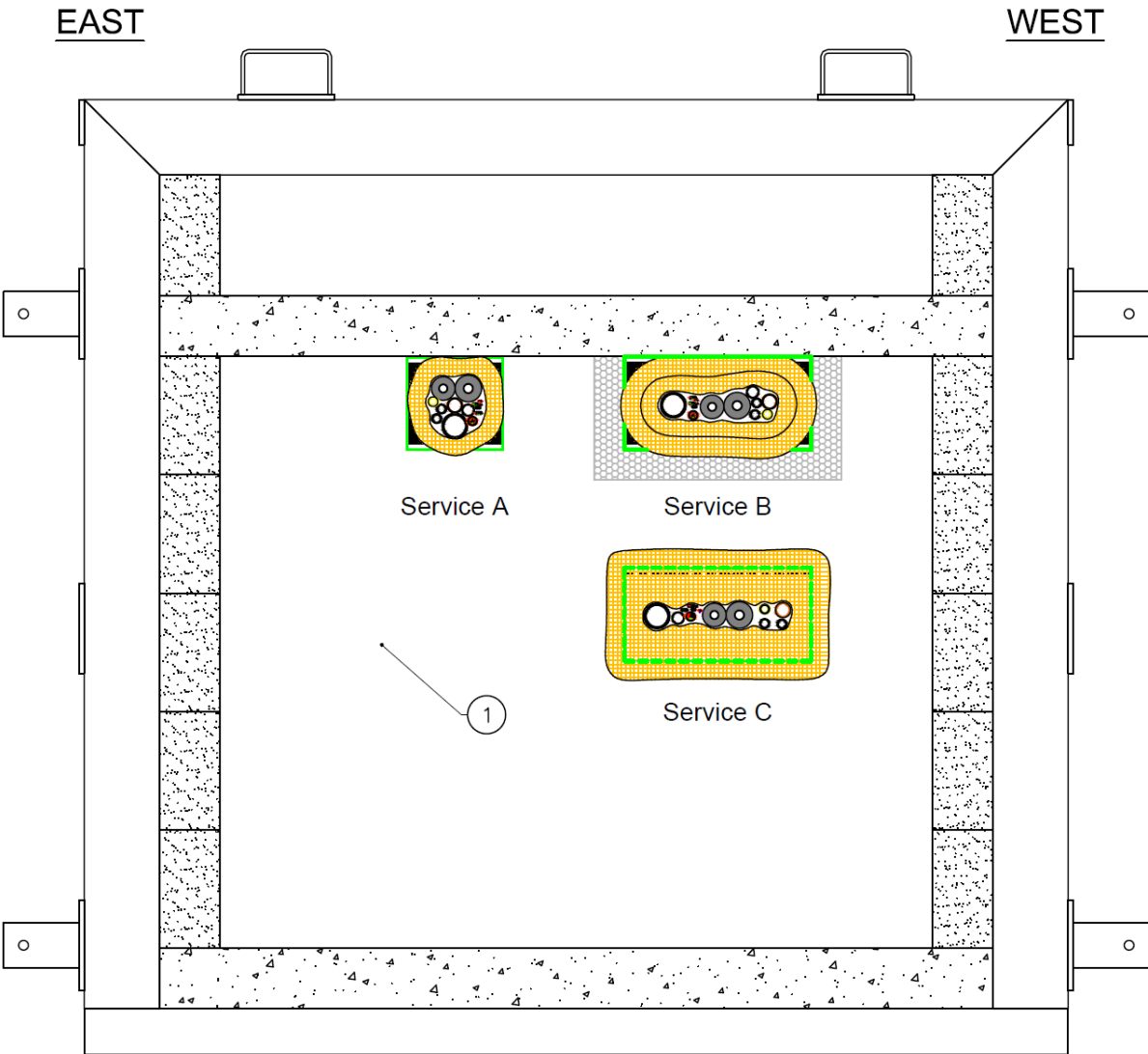


Figure A1.3: Elevation of Test Specimen, Exposed side

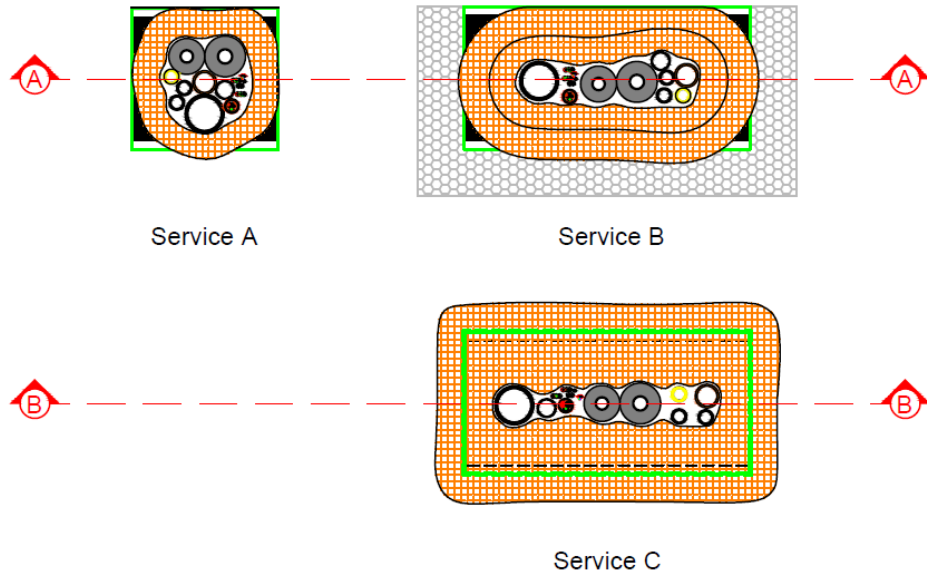


Figure A1.4: Test Specimen location , Exposed side

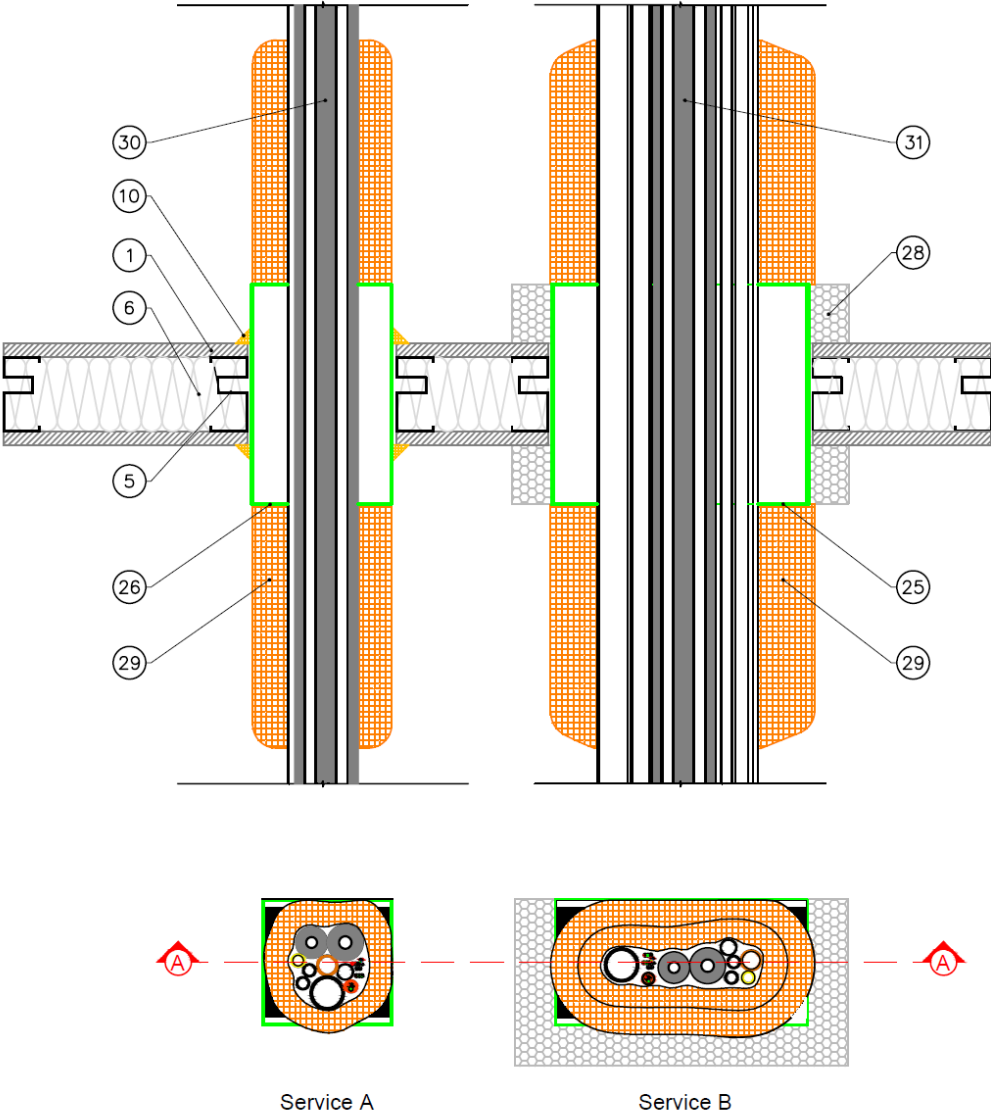


Figure A1.5: Cross-Section A-A

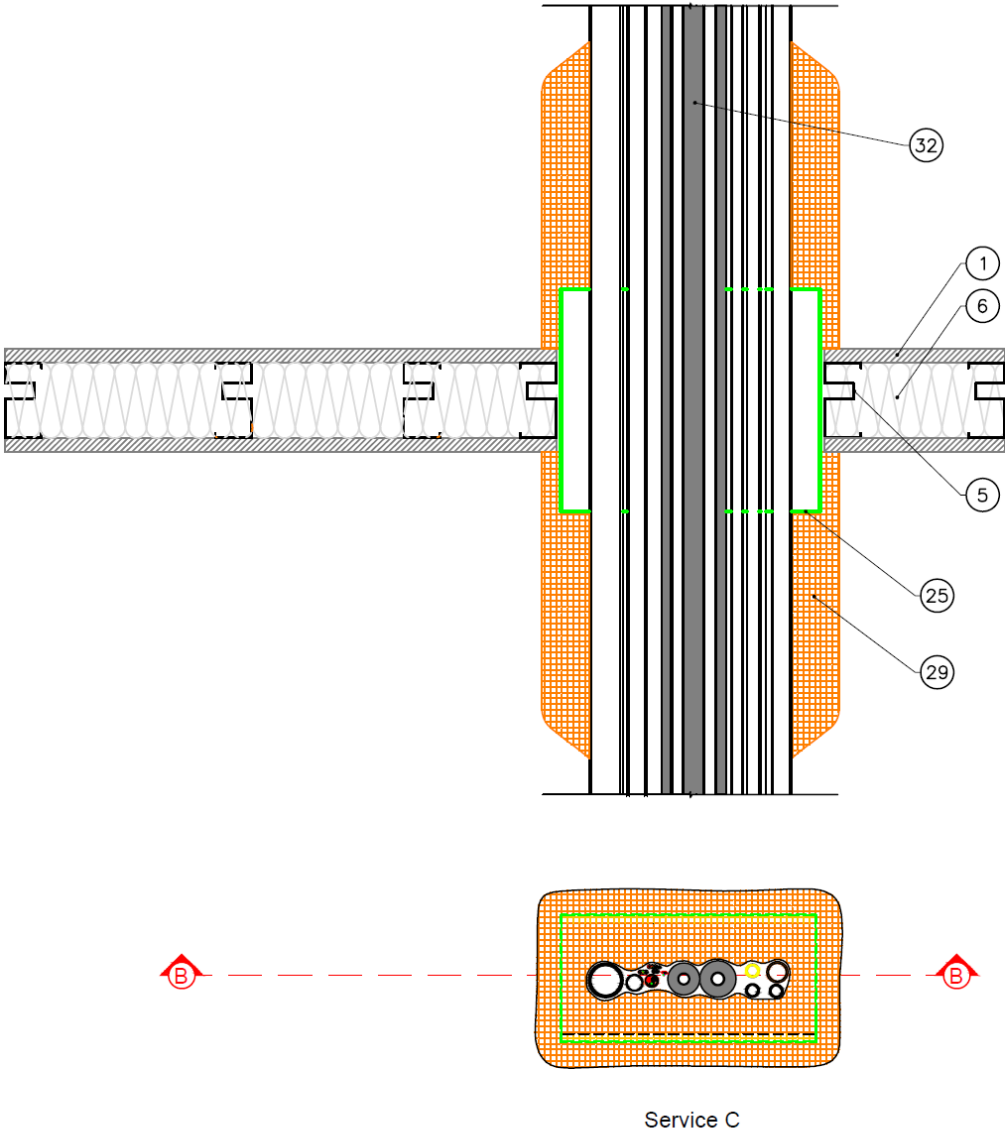


Figure A1.6: Cross-Section B-B

APPENDIX 2 TEST OBSERVATIONS

The following include observations of the significant behaviour of the specimen.

Time		Observations
min	sec	
Service A		
00	00	Fire resistance test commenced and the ambient temperature was approximately 28°C
02	00	Smoke had begun emitting from the wall box
06	30	Smoke venting from the end of the first PEX pipe
07	08	Smoke venting from the end of the second PEX pipe
10	00	Smoke venting from the ends of the PEX-AL and uPVC pipes
12	58	Minor deformation on both PEX pipes
14	32	Cessation of smoke venting from the PEX-AL pipe
15	09	Cessation of smoke venting from the uPVC pipe
27	00	Smoke still venting from the PEX pipes
30	00	The specimens had continued to maintain integrity and insulation in accordance with AS1530.4-2014
35	05	Cessation of smoke venting from the second PEX pipe
39	19	Cessation of smoke venting from the first PEX pipe
39	42	Smoke venting from the end of the second PEX pipe
55	28	Smoke venting from the end of the PEX-AL pipe
58	34	Cessation of smoke venting from the PEX-AL pipe
59	39	Smoke venting from the end of the PEX-AL pipe
60	00	The specimens had continued to maintain integrity and insulation in accordance with AS1530.4-2014
64	37	Cessation of smoke venting from the second PEX pipe
81	34	Smoke still venting from the PEX-AL pipe
90	00	The specimens had continued to maintain integrity and insulation in accordance with AS1530.4-2014
120	00	The specimens had continued to maintain integrity and insulation in accordance with AS1530.4-2014
121	00	Test stopped at the request of the sponsor
Service B		
00	00	Fire resistance test commenced and the ambient temperature was approximately 28°C
00	55	Smoke had begun emitting from the wall box
03	56	Smoke venting from the end of the uPVC pipe
06	52	Smoke venting from the end of the first PEX pipe
07	29	Smoke venting from the end of the second PEX pipe
12	38	Smoke venting from the end of the PEX-AL pipe
12	58	Minor deformation on both PEX pipes
14	32	Cessation of smoke venting from the PEX-AL pipe
15	09	Cessation of smoke venting from the uPVC pipe
27	00	Smoke still venting from the PEX pipes

Time		Observations
min	sec	
30	00	The specimens had continued to maintain integrity and insulation in accordance with AS1530.4-2014
43	55	Smoke venting from the end of the uPVC pipe
48	00	Cessation of smoke venting from the uPVC pipe
58	07	Smoke venting from the end of the PEX-AL pipe
60	00	The specimens had continued to maintain integrity and insulation in accordance with AS1530.4-2014
61	37	Cessation of smoke venting from the PEX-AL pipe
73	14	Reduction in some venting from the first PEX pipe
75	50	Cessation of smoke venting from the first PEX pipe
90	00	The specimens had continued to maintain integrity and insulation in accordance with AS1530.4-2014
109	01	Smoke venting from the end of the first PEX pipe
120	00	The specimens had continued to maintain integrity and insulation in accordance with AS1530.4-2014.
121	00	Test stopped at the request of the sponsor.
Service C		
00	00	Fire resistance test commenced and the ambient temperature was approximately 28°C.
01	16	Smoke had begun emitting from the wall box
04	20	Smoke venting from the end of the uPVC pipe
06	07	Smoke venting from the end of the PEX pipes and the PEX-AL pipe
11	14	Cessation of smoke venting from the end of the PEX-AL pipe
12	07	Smoke venting from the end of the PEX-AL pipe
12	58	Minor deformation on both PEX pipes
14	32	Cessation of smoke venting from the end of the PEX-AL pipe
15	09	Cessation of smoke venting from the end of the uPVC pipe
27	00	Smoke still venting from the PEX pipes
29	10	Smoke venting from the end of the uPVC pipe
30	00	The specimens had continued to maintain integrity and insulation in accordance with AS1530.4-2014
32	35	Slight deformation of the PEX-AL pipe near the insulation
39	42	Smoke venting from the end of the PEX-AL pipe
41	35	Cessation of smoke venting from the end of the PEX-AL pipe
44	56	Smoke venting from the end of the PEX-AL pipe
46	55	Darkening of the copper pipe and the PEX-AL pipe near the insulation
48	00	Cessation of smoke venting from the end of the uPVC pipe
60	00	The specimens had continued to maintain integrity and insulation in accordance with AS1530.4-2014
73	14	Reduction in smoke form the first PEX pipe
75	50	Cessation of smoke venting from the end of the PEX pipes
81	34	Smoke still venting from the end of the PEX-AL pipe

Time		Observations
min	sec	
90	00	The specimens had continued to maintain integrity and insulation in accordance with AS1530.4-2014
96	52	Cessation of smoke venting from the end of the PEX-AL pipe
107	05	Smoke venting from the end of the PEX-AL pipe
120	00	The specimens had continued to maintain integrity and insulation in accordance with AS1530.4-2014.
121	00	Test stopped at the request of the sponsor.

APPENDIX 3 DIRECT FIELD OF APPLICATION

A 3.1 GENERAL

AS 1530.4-2014 indicates that the results of the fire test contained in the test report are directly applicable without reference to the testing authority to similar constructions where one or more of the changes have been made:

A 3.2 SEPARATING ELEMENTS

Results obtained for sealing systems in various types of masonry and concrete construction may be applied as follows:

- a) For elements manufactured from similar types of concrete or masonry, the results of the prototype test may be applied to materials of density within $\pm 15\%$ of the tested specimen. For greater variations, the opinion of a registered testing authority shall be obtained.
- b) Test results obtained in conjunction with hollow concrete blocks may be used in a solid concrete element of the same overall thickness. The reverse does not apply.
- c) Results obtained from framed wall systems may be applied to the performance of a system in concrete, masonry or solid gypsum blocks of greater or equal thickness to that of the tested prototype. The reverse does not apply.
- d) Results obtained from framed wall systems may be applied to similar walls having studs of the same material with sizes greater than the tested prototype.
- e) Results obtained from a prototype test may be applied to framed wall systems of similar construction but having thicker facings of the same material applied to the studs.

A 3.3 PLASTICS PIPES

A 3.3.1 General

In addition to the requirements of Clause A 3.2, test results may be directly applied to masonry and concrete elements thicker than the tested prototype when installed in accordance with Figure 10.12.5.1 (AS 1530.4).

Results obtained from a particular test shall not be applied to plastics pipes of different diameters, wall thicknesses or material types.

Results obtained from tests on penetrations through vertical separating elements shall not be used to assess performance in horizontal elements, and vice versa.

As penetration seals for plastics pipes are dependent for activation upon exposure to fire conditions, they shall always be installed with the same orientation and fire exposure as was established in the fire-resistance test.

A 3.3.2 Services not perpendicular to the fire separation

Penetrations not perpendicular to the plane of the element are acceptable, provided the fire-stopping system has similar exposure and dimensions to the tested prototype.

A 3.4 METAL PIPES

A 3.4.1 A3.4.1 Sealing systems tested using standard configurations

The results may be applied to brass pipes of the same composition up to maximum outside diameter of 101.6 mm (normally 70/30 arsenical brass) and to copper and ferrous metal pipes having wall thicknesses greater than or equal to those listed in Table 10.12.3.1, provided the same penetration sealing system was used for the above penetrations in the same type of separating element and all the specimens achieved the required FRL.

NOTE: For information on standard configurations, see Appendix F.

TABLE 10.12.3.1
METAL PIPE DEEMED TO HAVE EQUIVALENT
FIRE RESISTANCE LEVELS

Nominal size	Actual OD (outside diameter)	Actual wall thickness
mm	mm	mm
32	31.75	0.91
40	38.10	0.91
50	50.80	0.91
65	63.50	0.91
80	76.20	1.22
90	88.90	1.22
100	101.60	1.22
125	127.00	1.42
150	152.40	1.63

A 3.4.2 A3.4.2 Sealing systems tested not using standard configurations

Results obtained with a penetration sealing system protecting the opening around copper or brass pipes may be applied to pipes of the same material and to ferrous metal pipes having outside diameters not greater than the tested diameter, and wall thicknesses not less than the tested thickness.

NOTE: For information on standard configurations for metal pipes, see Appendix F.

A 3.4.3 A3.4.3 Shape and size of openings for penetration seals

For mineral-fibre, cast and gun-applied mastic seals, results obtained in openings with a smooth surface texture may be applied to openings having a rough surface texture.

A 3.4.4 A3.4.4 Insulated (lagged) metal pipes

Where fire test data on the insulation system are not available, penetration sealing systems that have been subjected to the standard test with uninsulated metal pipes may be used, provided the appropriate requirements of Clause A 3.4.2 are satisfied and the following procedures are followed:

- a) If the insulation is non-combustible or is manufactured solely from mineral fibre, it shall be cut away where the service penetrates the separating element, and the opening shall be fire-stopped in accordance with the tested method.
- b) If the insulation is combustible, it shall be cut away for 1000 mm either side of the separating element (provided the pipe did not vent hot gases during the fire resistance test), and the pipe shall be fire-stopped in accordance with the tested method. A non-combustible wrap may be placed over the bare pipe. If venting occurs during the fire-resistance test at a time less than the required FRL, a fire test shall be carried out to evaluate the insulated pipe system.

A 3.4.5 A3.4.5 Alternative pipe materials

If an element is penetrated by—

- a) a pipe other than brass, copper or ferrous alloys;
- b) a pipe of cross-section other than circular; or
- c) a pipe outside the field of application specified in this Standard for the standard test configuration,

then the results obtained from a single tested system may be applied to these pipes provided the—

- i. melting point of the material is equal to or greater than the tested specimen;
- ii. surface area to mass ratio of a cross-section of the pipe is equal to or less than the tested specimen; and
- iii. thermal conductivity is equal to or less than the tested specimen diffusivity of the material.