

FIRE ASSESSMENT REPORT

FC12925-01-11

FIRE RESISTANCE OF BOSS FYREBOX™ PENETRATION SYSTEMS

CLIENT
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ASSESSMENT OBJECTIVE

To assess the fire resistance of the BOSS FyreBox™ and penetrations in accordance with AS 1530.4:2014 and AS 4072.1-2005 as appropriate.

The assessment is to consider the following:

1. Range of penetration services with or without insulation wrap and wrapping services separately.
2. Allow a variation in BOSS FyreBox™ size and shape.
3. Installation in the following elements with established FRL/FRR:
   a. Steel or timber framed plasterboard lined walls, or
   b. Blank infill panel of BOSS Batts, or
   c. other walls such as AFS, Barrierline, Dincel, Hebel, IntRwall, Korok, Pronto Panel, Shaftliner/Shaftwall, Speedpanel, Supapanel, Partiwall/Party Wall, INEX wall systems, AlphaPanel systems, concrete walls, solid or hollow masonry/block walls, AAC walls, or
   d. Concrete floors at least 70 mm thick with P40-Mak Wrap above the slab, or Thermal Defence Wrap above the slab, or
   e. Concrete floors at least 110 mm thick, or
   f. Fire rated ceiling and ceiling/floors.
   g. Cross Laminated Timber (CLT).

CONCLUSION

It is considered that the penetrations listed in Appendix 1, included in the BOSS FyreBox specimens tested in the fire resistance tests listed in Table 7 mounted in steel or timber framed plasterboard lined walls, blank infill panel of BOSS Batts, AAC, normal weight concrete, solid or hollow masonry walls or other walls such as AFS, Barrierline, Dincel, Hebel, IntRwall, Korok, Pronto Panel, Shaftliner/Shaftwall, Speedpanel, Supapanel, Partiwall/Party Wall, INEX wall systems, AlphaPanel systems, CLT, or concrete floors at least 70 mm thick and fire rated ceiling or ceiling/floors as tested in FRT 180474, would achieve an FRL, in accordance with AS 1530.4:2014, with reference to AS 4072.1-2005, or the lesser of that stated in Appendix 1 or the FRL of the wall, ceiling or floor/ceiling. The table identifies the applicability of systems to walls or floors as appropriate. All wrapped floor systems include P40-MAK Wrap or Thermal Defence Wrap. Unwrapped boxes in floors are to have mastic sealed brushes on the unexposed side.

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LIMITATION

This report is subject to the accuracy and completeness of the information supplied. BRANZ reserves the right to amend or withdraw this assessment if information becomes available which indicates the stated fire performance may not be achieved. This assessment report may only be quoted or reproduced in full.

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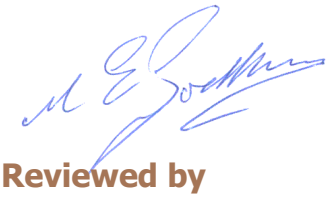

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DOCUMENT REVISION STATUS

ISSUE NO.	DATE ISSUED	REVIEW DATE	DESCRIPTION
1	7 July 2020		Initial Issue
2	17 July 2020		Clarification of specification for power cables.
3	23 December 2020		Changes to blank BOSS Fire Transit Boxes systems. Specification of minimum wall thickness and fill of the BOSS Transit Boxes.
4	22 April 2021		Modifications to Figure titles and inclusion of INEX wall systems.
5	16 July 2021		Additional details for drawings. Revision of drawings. Clarification of plastic pipes FRL Changes to the list of penetration systems
6	19 July 2021	19 July 2031	Correction of typo. Add reference to AS 4072.1-2005 Include 10-year review date.
7	22 March 2022	22 March 2032	Clarification of plastic pipes in floors, percentage fill of BOSS Fire Transit Boxes, elastomeric lagging. Addition of empty 150 mm x 150 mm BOSS Fire Transit Boxes and AlphaPanel systems.
8	8 March 2024	8 March 2034	Change of name of BOSS Transit box to BOSS FyreBox. Addition of 240-minute systems, mastic on face of BOSS Fyrebox™, use in CLT and BOSS Thermal Defence Wrap, and the use circular FyreBoxes Removal of a minimum fill ratio. (Project FC16616-01)
9	28 March 2024	28 March 2024	Correction of typographical error. (Project FC16616-01)
10	2 April 2024	2 April 2024	Correction of typographical error. (Project FC16616-01)
11	6 November 2024	6 November 2034	Inclusion of insulated steel pipes. (Project FC28205-01)

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1. INTRODUCTION

This report gives BRANZ's assessment of the fire resistance of the BOSS FyreBox™ and penetrations in accordance with AS 1530.4:2014 and AS 4072.1-2005 as appropriate.

The assessment is to consider the following:

1. Range of penetration services with or without wrap.
2. Allow a variation in BOSS FyreBox™ size and shape.
3. Installation in the following elements with established FRL/FRR:
4. Steel or timber framed plasterboard lined walls, or
5. Blank infill panel of BOSS Batts, or
6. other walls such as AFS, Barrierline, Dincel, Hebel, IntRwall, Korok, Pronto Panel, Shaftliner/Shaftwall, Speedpanel, Supapanel, Partiwall/Party Wall, INEX wall systems, AlphaPanel systems, concrete walls, solid or hollow masonry/block walls, AAC, or
7. Concrete floors at least 70 mm thick with P40-Mak Wrap above the slab, or Thermal Defence Wrap above the slab, or
8. Concrete floors at least 110 mm thick, or
9. Fire rated ceiling and ceiling/floors.
10. Cross Laminated Timber (CLT).

Figure 1 to Figure 32 show construction details for the BOSS FyreBox™ systems in various applications. Where there is a conflict between the text and figures, the text shall take precedence.

2. BACKGROUND

2.1 Exova Warringtonfire fire resistance test EWFA No. 45917000

In Exova Warringtonfire fire resistance test EWFA No. 45917000 the specimen was a 1,200 mm high x 945 mm wide x 124 mm thick CSR Gyprock wall comprising one layer of 16 mm Fyrchek each side of 92 mm deep Rondo Quiet Studs penetrated by service bundles comprising various pipes and cables. The cavity of the wall system was filled with Pink Partition 24 R2.5 insulation wool. The wall system was penetrated in three locations by various pipes and cables which were protected with two BOSS FyreBox-300 and a BOSS FyreBox-150. The various pipes and cables and their protection systems were tested in accordance with AS 1530.4:2014 for a duration of 121 minutes. All penetrations achieved an FRL of -/120/120.

2.1.1 Specimen A, BOSS FyreBox-150

The BOSS FyreBox -150 consisted of a rectangular steel box 150 mm wide x 270 mm deep x 150 mm high x 1.0 mm thick and enclosed eight 150 mm long HPE Sachet (BOSS FireMastic-HPE). Two HPE Sachets were installed on each of the top and bottom cover and two each on the left and right wall. Four 145 mm wide x 109 mm high x 9 mm deep BOSS FR BRUSH SEAL nylon brush smoke barrier were provided at the openings (two of the brush on the top cover and the other two located on the bottom cover). A 25 mm x 25 mm fillet of FireMastic-300 was provided around the BOSS FyreBox at the interface between the wall and the FyreBox and in the gap between the BOSS FyreBox and the wall aperture. Beyond the fillet the BOSS FyreBox was exposed without any cladding. The pipe and cable penetrations beyond the BOSS

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FyreBox were wrapped with a 300 mm wide x 38 mm thick lagging of BOSS P40-MAK Wrap which consisted of an aluminium foil on the outer layer and low density mineral fibre on the inner layer.

2.1.2 Specimen B, BOSS FyreBox-300

The BOSS FyreBox -300 consisted of a rectangular steel box 300 mm wide x 270 mm deep x 150 mm high x 1.0 mm thick and enclosed four 300 mm long x 85 mm wide HPE Sachet (BOSS FireMastic-HPE), two on the top cover and the other two on the bottom cover. Four 150 mm long HPE Sachet were installed two on each side of the BOSS FyreBox (left and right wall). Four 296 mm wide x 109 mm high x 9 mm deep BOSS FR BRUSH SEAL nylon brush smoke barrier were provided at the openings (two of the brushes on the top cover and the other two located on the bottom cover). A service support trapeze comprising two 6 mm diameter x 128 mm long screws and a 10 mm diameter x 280 mm long metal bar was provided at the mid depth of the BOSS FyreBox. The BOSS FyreBox was fixed to the concrete lintel with two masonry anchors before the plasterboard was installed. FireMastic-300 was provided around the perimeter and down the centre on the interface between the BOSS FyreBox-300 top cover and concrete lintel and in the gap between the BOSS FyreBox and the wall aperture.

Mineral wool insulation consisting of 400 mm x 200 mm x 50 mm thick BOSS Bulkhead Batt (high density mineral fibre, stated density 160 kg/m^3) was placed on the plasterboard wall lining around the BOSS FyreBox on the side and along the bottom on both exposed and unexposed faces of the wall. The batts were screw fixed to the wall system. BOSS P40-MAK Wrap was wrapped around the whole penetration service twice. The BOSS P40-MAK Wrap extended 290 mm from the Bulkhead Batt on both sides of the wall and was secured with cable ties. Aluminium tape was used to cover exposed mineral fibres at the open end of the wrap.

2.1.3 Specimen C, BOSS FyreBox-300

The BOSS FyreBox-300 consisted of a rectangular steel box 300 mm wide x 270 mm deep x 150 mm high x 1.0 mm thick and enclosed four 300 mm long x 85 mm wide HPE Sachet (BOSS FireMastic-HPE), two on the top cover and the other two on the bottom cover. Four 150 mm long HPE Sachet HPE Sachet were installed two on each side of the BOSS FyreBox (left and right wall). Four 296 mm wide x 109 mm high x 9 mm deep BOSS FR BRUSH SEAL nylon brush smoke barrier were provided at the openings (two of the brushes on the top cover and the other two located on the bottom cover). Carinya 20 mm x 20 mm x 1 mm angle was cut and bent and installed around the BOSS FyreBox-300 on both sides of the wall, screwed to the wall to secure the BOSS FyreBox in position. FireMastic-300 was applied in the gap between the BOSS FyreBox and the wall aperture.

BOSS P40-MAK Wrap was wrapped around the whole penetration system, including the BOSS FyreBox protruding past the wall, with a ninety degree overlap. The BOSS P40-MAK Wrap extended 300 mm from the wall on both sides of the wall and was secured with cable ties. Aluminium tape was used to cover exposed mineral fibres at the open end of the wrap.

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The BOSS FyreBox specimens tested in fire resistance test EWFA No. 45917000 contained the following penetrating services:

- Two 20 mm PEX pipes
- 20 mm PEX/AL/PEX pipe
- Paircoil 10/15 mm insulated copper pipe
- Prysmian L electrical cable 2Core + E 2.5 mm^2 Cu.
- Prysmian L electrical cable 2Core 2.5 mm^2 Cu.
- Garland data cable LSZH CAT5E
- Jonsa coax cable CRG6UBQ 75 ohm
- Garland Work Series 6C security cable
- 32 mm NB medium galvanised pipe
- DN25 Type B copper pipe
- 20 mm uPVC conduit
- WW electric cable 2Core + E 10 mm^2 Cu
- Firesense cable IPSLD 0.75-2C Fire Alarm System-Light-Duty
- Grove communications data cable E225668 CAT6

The three penetration systems achieved an FRL of -/120/120.

2.2 CSIRO fire resistance test FSP 2091

In CSIRO fire resistance test FSP 2091 the specimens tested comprised two BOSS FyreBoxes, nominally 300 mm wide x 150 mm high x 270 mm deep without wrap, containing a number of services penetrating through and installed in a steel framed plasterboard lined wall comprising a single layer of 13 mm thick fire rated plasterboard each face of the frame for a nominal thickness of 118 mm. One box was soffit mounted and the other was mounted mid wall of the 1,000 mm x 1,000 mm wall. The 10 mm annular gap between the FyreBox and the surrounding plasterboard was filled with BOSS FireMastic-300 to a depth of 13 mm. A 15 mm x 15 mm fillet of BOSS FireMastic-300 was applied to the surrounding sides of the FyreBox on both faces of the plasterboard wall. Each FyreBox included a number of pipe and cable penetrations including:

- 16 mm^2 2C & E power cable with 18.1 mm OD
- 16mm x PEX pipe with 12.5mm thick pipe lagging
- 20mm PEX and PEX-AL pipes
- 25mm x PEX-AL pipe
- 40mm Steel Sprinkler Pipe
- RG6 MATV and CAT5 data cables
- 2.5mm twin FR cable
- 20mm NBN conduit with NBN cables inside
- Pair of 32mm OD copper pipes with 25mm thick lagging
- 38mm dia. copper pipe with 25mm thick lagging

The specimens were tested in accordance with AS 1530.4:2014 for a duration of 91 minutes and achieved Integrity and Insulation of 91 minutes without failure.

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2.3 Warringtonfire fire resistance test No. FRT 180137

In Warringtonfire fire resistance test FRT 180137 the specimen was an 1,830 mm long x 1,590 mm wide x 70 mm to 130 mm thick composite floor system penetrated by service penetrations. In particular Specimen E was a BOSS FyreBox 150 mm square x 270 mm deep enclosing a nominal 32 mm diameter copper pipe, a 32 mm diameter galvanized pipe, an air conditioning pair coil, a 25 mm uPVC pipe, a bundle of nine 3-core x 2.5 mm^2 power cables, a bundle of 15 CAT6 data cables and a bundle of 15 Fire Sense cables. On the unexposed side only, the services were wrapped in 300 mm long x 40 mm thick BOSS P40-MAK wrap. BOSS FireMastic-300 was used to seal between the BOSS FyreBox and the floor slab.

The various pipes and cables and their protection systems were tested in accordance with AS 1530.4:2014 for a duration of 121 minutes. The BOSS FyreBox and service penetrations described above achieved an overall fire resistance of 121 minutes Integrity and 85 minutes Insulation.

2.4 Warringtonfire fire resistance test No. FRT 180473

In Warringtonfire fire resistance test No. FRT 180473 the specimen was a 1,600 mm high x 1,600 mm wide x 75 mm thick Hebel Power Panel wall penetrated in a number of locations by various pipes and cables. In particular Specimen B was a BOSS FyreBox consisting of a rectangular steel box 300 mm wide x 131 mm deep x 80 mm high and enclosing four intumescent bags installed on each of the top and bottom cover and sides. The BOSS FyreBox was inserted into the aperture and secured to the separating element with 20 mm x 20 mm angles on the exposed side. A 25 mm x 25 mm fillet of FireMastic-300 was provided around the BOSS FyreBox at the interface between the wall and the BOSS FyreBox and in the annular gap between the BOSS FyreBox and the wall aperture. Beyond the fillet the BOSS FyreBox was exposed without any wrap.

Included in the various penetrations through the BOSS FyreBox was a 50NB (60.3 mm outside diameter) galvanised steel sprinkler pipe, a nominal 32 mm diameter copper pipe lagged with 19 mm thick Armaflex FRV lagging, a power cable with 70 mm^2 aluminium conductor and a power cable with a 185 mm^2 aluminium conductor. The pipes were closed on the fire exposed ends. The penetrating services were not wrapped.

The various pipes and cables and their protection systems were tested in accordance with AS 1530.4:2014 for a duration of 121 minutes. The BOSS FyreBox and service penetrations described above achieved a fire resistance as listed in the following Table 1.

Table 1: Results for fire resistance test FRT 180473

Penetration	Fire resistance	FRL
BOSS FyreBox	-/121/56	-/120/30
50NB (60.3 mm outside dia.) galvanised pipe	-/121/121	-/120/120
32 mm dia. lagged copper pipe	-/121/121	-/120/120
Cable 70 mm^2 aluminium conductor	-/121/33	-/120/30
Cable 185 mm^2 aluminium conductor	-/121/33	-/120/30

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2.5 Warringtonfire fire resistance test report No. 180474, Revision R3.0

In Warringtonfire fire resistance test No. FRT 180474 the specimen was a 235 mm thick ceiling system penetrated by a variety of ten penetration systems. In particular Specimen F consisted of a range of cables and pipes passing through a BOSS FyreBox BFB 150 sealed into the ceiling with BOSS FireMastic-300. The ceiling consisted of 190 timber framing with two layers of 13 mm fire rated plasterboard screw fixed directly to the timber framing on the underside (exposed face) and 19 mm thick particle board flooring to the upper side (unexposed face). The Boss FyreBox was installed in a 170 mm x 170 mm aperture in the floor/ceiling and BOSS FireMastic was applied between the box and the plasterboard on both sides. On the exposed side the mastic was finished with a 15 mm x 25 mm fillet and finished flush with the surface on the unexposed side. On the unexposed side BOSS P40-MAK was wrapped around the BOSS FyreBox and penetration services and extended to nominal 300 mm. The specimen included the following penetrations services:

- 10 x TPS – 2.5 mm^2 2C & E power cables
- 10 x Cat 6 cables
- 1 x Kembla Pair coil FR - 9/15 mm
- 2 x Ardent Pair coils - 13/19 mm
- 1 x DN 25 copper pipe 25.4 mm OD with 9.4 mm thick K-FLEX insulation
- 1 x 25 mm uPVC electrical conduit

The specimen was tested in accordance with AS 1530.4:2014 for a duration of 91 minutes and achieved Integrity of 91 minutes without failure and Insulation of 75 minutes, i.e. an FRL of -/90/60. The power cables failed the insulation criteria after 75 minutes while none of the other penetrations failed insulation for the 91 minutes duration of the test.

2.6 Warringtonfire fire resistance test No. FRT190309

In Warringtonfire fire resistance test No. FRT 190309 a 118 mm thick fire resistant plasterboard wall was penetrated by three BOSS FyreBoxes enclosing various pipes and cables. The specimens were tested in accordance with AS 1530.4:2014 for a duration of 121 minutes. Specimen C contained a range of pipes and achieved a fire resistance as listed in the following Table 2.

Table 2: Fire resistance of Specimen C pipes from test FRT190309

Penetration	Fire resistance	FRL
BOSS FyreBox™ BFB-300 320 mm x 170 mm	-/121/79	-/120/60
50 mm dia. cPVC pipe	-/121/121	-/120/120
50 mm dia. uPVC pipe	-/121/121	-/120/120
32 mm PE-RT Kelox pipe with 13 mm lagging	-/121/23	-/120/0
25 mm dia. PE-RT Kelox pipe	-/121/5	-/120/0
16 mm dia. PE-RT Kelox pipe	-/121/ns	-/120/0

ns = not stated

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2.7 Exova Warringtonfire fire resistance test No. WF 385573/C

In Exova Warringtonfire fire resistance test No. WF 385573/C a wall comprising two layers of 12.5 mm fire rated gypsum plasterboard each side of 50 mm deep steel studs with mineral wool insulation in the cavity, penetrated by a 100 mm deep Pass-It Transit System (equivalent to BOSS FyreBox™) enclosing various cables, was tested in accordance with BS EN 1366-3:2009. The transit and cables achieved Integrity of 132 minutes without failure and Insulation of 85 minutes. This specimen contained a PVC insulated and sheathed four core 185 mm^2 copper cable. The wall thickness was 100 mm.

2.8 Warringtonfire Fire Assessment Report FAS190042

In Warringtonfire Fire Assessment Report FAS190042 it was considered that BOSS FirePillows in a masonry or concrete wall or floor protected without penetrations would achieve an FRL of up to -/180/180 in accordance with AS 1530.4:2014.

2.9 BRANZ Fire Assessment Report FAR 3921

In BRANZ fire assessment report it was considered that 50 mm thick and 100 mm thick BOSS Batts would achieve an FRL of at least -/60/60 and -/120/120 respectively.

2.10 CSIRO fire resistance test FSP 2191

In CSIRO fire resistance test FSP 2191 the specimen tested included one BOSS FyreBox™, nominally 150 mm wide x 150 mm high x 270 mm in a deep without wrap and no penetrations in a steel framed wall comprising 64 mm studs with two layers of fire rated plasterboard either side of the wall. The specimen achieved an FRL of -/120/120 in accordance with AS 1530.4:2014.

2.11 Warringtonfire Regulatory Information Report FAS210067

In Warringtonfire Regulatory Information Report FAS210067 it was considered that various AlphaPanel systems would achieve an FRL of up to 90/90/90 and -/120/120 in accordance with AS 1530.4:2014, depending on the system configuration.

2.12 Warringtonfire fire resistance test No. FRT220049 R1.2

In Warringtonfire fire resistance test No FRT220049 R1.2 a 150 mm thick concrete floor slab was penetrated by two BOSS FyreBoxes enclosing various pipes and cables. The specimens were tested in accordance with AS 1530.4:2014 for a duration of 241 minutes. Specimens C, BOSS FyreBox™ -BFB-150, and H BOSS FyreBox™ -BFB-450 contained a range of pipes and cables and achieved a fire resistance as listed in Table 3 and Table 4. No wrap was used in specimen C. The BOSS FyreBox™ and services on Specimen H were wrapped with 6.5 mm thick BOSS Thermal Defence Wrap for a distance of 300 mm from the unexposed face of the slab.

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Table 3: Fire resistance of Specimen C services from test FRT220049 R1.2 (No wrap)

Penetration	Fire resistance	FRL
BOSS FyreBox™ - BFB-150 150 mm x 150 mm	-/241/177*	-/240/120
16 mm² 2C+E cable	-/241/ns	-/240/-
2.5 mm² 2C+E TPS cable	-/241/177	-/240/120
2.5 mm² 3C+E TPS cable	-/241/ns	-/240/-
20 mm Pex-A pipe	-/241/241	-/240/240
20 mm Pex/Al/Pex pipe	-/241/223	-/240/180
3/8" x ¾" Pair coil w/ 19 mm insulation	-/241/241	-/240/240
DN 20 mm conduit	-/241/241	-/240/240
DN 25 mm conduit	-/241/241	-/240/240
Cable bundle	-/241/241	-/240/240
CAT 6 cable		
RG6 Coax cable		
Fire alarm cable		
Fig 8 cable		
Mastic on face of Fyrebox™	-/241/241	-/240/240

ns = not stated

Note: * BOSS FyreBox™ Insulation failure by virtue of TPS cable failure.

Table 4: Fire resistance of Specimen H services from test FRT220049 R1.2 (300 mm Thermal Defence Wrap)

Penetration	Fire resistance	FRL
BOSS FyreBoxTM -BFB-450 452 mm x 100 mm	-/241/227	-/240/180
20 mm Pex/Al/Pex pipe	-/241/241	-/240/240
32 mm Pex/Al/Pex pipe	-/241/241	-/240/240
DN 50 mm PPR pipe	-/241/241	-/240/240
DN 60 mm cPVC pipe	-/241/241	-/240/240
DN 25 mm uPVC pipe	-/241/241	-/240/240
32 mm Pex-Xa pipe	-/241/241	-/240/240
20 mm Pex-Xa pipe	-/241/241	-/240/240
DN 50 mm uPVC pipe	-/241/241	-/240/240

BOSS FyreBox™ Insulation failure by virtue of floor slab failure.
Additional BOSS Fyrebox™ Insulation failure on mounting angle on side at 235 minutes.

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2.13 Warringtonfire fire resistance test No. FRT210330 R1.1

In Warringtonfire fire resistance test No FRT210330 R1.1 a 130 mm thick, XLam, CL3/130 cross laminated timber wall, was penetrated by a BOSS FyreBox™ 300 enclosing various pipes and cables. The specimens were tested in accordance with AS 1530.4:2014 for a duration of 100 minutes. Specimens B contained a range of pipes and cables and achieved a fire resistance as listed in Table 5. The BOSS FyreBox™ and services were wrapped in 6.5 mm thick BOSS Thermal Defence Wrap for 300 mm from both the exposed and unexposed face.

Table 5: Fire resistance of Specimen B services from test FRT210330 R1.1

Penetration	Fire resistance	FRL
BOSS FyreBoxTM - BFB-300 300 mm x 150 mm	-/100/94	-/90/90
1 x 48.4 mm steel sprinkler pipe	-/100/100	-/90/90
2 x 22 mm stainless steel pipes (item 15) with 20 mm Thermobreak 9705 lagging	-/100/100	-/90/90
2 x 25 mm Kelox plus pipes	-/100/100	-/90/90
1 x 25 mm condensation drainpipe	-/100/100	-/90/90
1 x 16 mm2 3C+E cable	-/100/100	-/90/90
1 x 50 mm2 2C+E cable	-/100/100	-/90/90
1 x fire alarm cables	-/100/100	-/90/90
1 x Cat 6 cables	-/100/100	-/90/90
1 x 2.5 mm2 2C+E TPS cable	-/100/100	-/90/90
1 x 2.5 mm2 3C+E TPS cable	-/100/100	-/90/90
1 x RG6 Coax cables	-/100/100	-/90/90
1 x Fig 8 cable	-/100/100	-/90/90
1 x Security cable	-/100/100	-/90/90

2.14 Warringtonfire fire resistance test No. FRT210267 R1.1

In Warringtonfire fire resistance test No FRT210267 R1.1 a specimen of BOSS Fyrebox™-450, specimen B, was tested in accordance with AS 1530.4:2014 in a steel framed plasterboard wall comprising 92 mm steel studs with three layers of 16 mm thick fire rated plasterboard. The BOSS FyreBox™ included various services and achieved an FRL as given in Table 6.

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Table 6: Fire resistance of Specimen B services from test FRT210267 R1.1

Penetration	Fire resistance	FRL
BOSS FyreBox™ - BFB-450 450 mm x 150 mm	-/242/227	-/240/180
BOSS FyreBox™ - BFB-600 600 mm x 150 mm	-/242/242	-/240/240
1 x 3/8 + 5/8 FR 13 mm pair coil	-/242/242	-/240/240
1 x 20 mm PEXa pipe	-/242/242	-/240/240
1 x 16 mm² 2C+E power cable	-/242/242	-/240/240
5 x 2.5 mm² 2C+E TPS cables	-/242/242	-/240/240
1 x DN50 medium duty galvanised steel sprinkler pipe	-/242/242	-/240/240
1 x ELV extra low voltage alarm cable (2 core round)	-/242/242	-/240/240
1 x 032 mm PVC conduit	-/242/242	-/240/240
1 x 032 mm HDPE pipe	-/242/242	-/240/240
1 x 025 mm PEX/AL/PE-X pipe	-/242/242	-/240/240
5 x CAT6 cables	-/242/242	-/240/240
1 x DN32 type B copper pipe with 32 mm SupaCell pipe lagging	-/242/242	-/240/240

2.15 Holmes fire resistance test 146660 FTR1.1

In Holmes fire resistance test No 146660 FTR1.1 a specimen of BOSS Fyrebox™-450SL, specimen B, was tested in accordance with AS 1530.4:2014. The test was in a steel framed plasterboard wall comprising 92 mm steel studs with two layers of 16 mm thick fire rated plasterboard. The BOSS FyreBox™ included no services and achieved an FRL of -/180/180. Additionally, no smoke was observed from the empty FyreBox.

One of the BFB-150 circulars had an initial temperature spike on the chassis however this was attributed to a prototype brush design. The empty FyreBox maintained integrity and insulation beyond this point.

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2.16 Summary of tests

Table 7 gives a summary of the background test reports on the BOSS FyreBox™.

Table 7: Summary of test data

Test Report No.	Element	Element thickness (mm)	Box size	FRL fillet (min)	Overall FRL	Fillet size	Rows of sachets
FRT 180474	Floor/ceiling	235	BFB-150	No TC	-/90/60	Flush	2
WF 385573c	PB wall	100	300x100	120	-/120/85	Flush	1
EWFA 45917000.1	PB wall	124	BFB-150 A	120	-/120/120	25x25	2
EWFA 45917000.1	PB wall	175	BFB-300 B	No TC	-/120/120	Flush	2
EWFA 45917000.1	PB wall + batt	124	BFB-300 C	No TC	-/120/120	Flush	2
FRT 180473.1	Hebel wall	75	300x80 B	56	-/120/30	25x25	1
FRT 190309.2	PB wall	118	BFB-300 C	120	-/120/0	25x25	2
FRT 180137.2	Concrete floor	70 -130	BFB-150	No TC	-/120/60	20x20	2
FSP 2091	PB wall	118	BFB-300 1	90	-/90/90	15x15	1
FSP 2091	PB wall	118	BFB-300 2	90	-/90/90	15x15	1
FSP 2191	PB wall	116	150 x 150	120	-/120/120	20x20	2
FRT220049 R1.2	Concrete slab	150	BFB-150	No TC	-/240/120	15x15	2
FRT220049 R1.2	Concrete slab	150	BFB-450	N/A	-/240/240	N/A	2
FRT210330 R1.1	CLT wall	130	BFB-300	N/A	-/90/90	N/A	2
FRT 210267	PB wall	188	BFB-450 B	N/A	-/240/180	N/A	2
FRT 210267	PB wall	188	BFB-600	N/A	-/180/30	N/A	2
146660 FTR1.1	PB wall	144	BFB450S, 150 Circular	N/A	-/180/180	NA	2

3. DISCUSSION

3.1 Wall thickness

Where the BOSS FyreBox™ is installed in a wall, the wall must have a minimum thickness of 100 mm. In WF 385573C the wall thickness was 100 mm as shown in Table 7. This is the minimum thickness of wall to achieve an Insulation of 120 minutes and therefore applies to all installations.

If the wall is less than 100 mm thick it may be increased by locally applied lining such as fire rated plasterboard, Boss Batts, P40-MAK Wrap or FireMastic-300 or a fillet of FireMastic-300 in order to maintain a minimum thickness of 100mm at the interface of the BOSS FyreBox™ penetrating the construction element.

The BOSS FireMastic-300 may be substituted with fire rated sealants which have been approved in accordance with AS 1530.4:2014 for use against a steel element, provided that the FRL achieved by the sealant does not reduce the intended FRL of the element. The sealants approved for substitution are listed below with their test references:

- Knauf Bindex Fire Sealant – rebranded to Siniat Bindex (Test Ref 28139-06 and EWFA2752800)

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- CSR Fire Seal (test ref provided to Branz directly)
- Hilti CP606 (Test ref FRT180461bm FRT180049 and FSV0857)
- HB Fuller Firesound (Test Ref 48763900.1 and FSV1731)
- Sika Flex-400 fire sealant (Test Ref EWFA54503700.1, FSP1839 and FC11177-001.2)
- Boss FireSilicone EMA.

3.2 BOSS FyreBox™ with penetrations

In Exova Warringtonfire fire resistance test EWFA No. 45917000 the three BOSS FyreBoxes were tested with a number of penetrations as listed in Section 2.1 above and achieved Integrity and Insulation of 121 minutes without failure.

The two sizes of BOSS FyreBox™ tested had dimensions of 150 mm wide x 150 mm high and 300 mm wide x 150 mm high and both were 270 mm deep. These contained two pairs of 85 mm wide HPE Sash Inlay (BOSS FireMastic HPE) around the internal perimeter of each box together with two pairs of 109 mm high x 9 mm deep BOSS FR BRUSH SEAL nylon brush smoke barrier across the full width of the top and bottom of the box. As the integrity of the system is primarily dependent on the expansion of the intumescent seal around the perimeter of the boxes it is considered that the height of the boxes can be reduced without prejudice to the fire resistance as the intumescent seal will still fill any cavities around the penetrations.

Also, provided the HPE Sash Inlay is continuous around the full internal perimeter of the box it is considered that the width of the box can be increased up to a proposed maximum of 900 mm wide. For widths greater than 450 mm it is proposed that additional fixings at 200 mm centres or a 20 mm x 20 mm flanged bracket be provided around the perimeter of the box to hold the box in place on one side of the wall, floor or ceiling. If using a bracket fixing method for under soffit applications, the flanged bracket shall be required on three sides only. It is considered that this will not prejudice the Integrity of the boxes for at least 120 minutes.

3.3 Integrity and Insulation

In test EWFA No. 45917000 all the penetrations were wrapped with BOSS P40-MAK Wrap for a distance of at least 290 mm from the wall. Therefore, the temperatures were measured on the wrap or on the penetrations beyond the wrap and did not fail insulation for at least 120 minutes. In test FRT 180473 Specimen B was not lagged and the BOSS FyreBox™ passing through a 75 mm thick Hebel wall failed insulation on the seal fillet at 56 minutes. It is therefore considered that the BOSS FyreBox™ without an insulating wrap would achieve Insulation of at least 30 minutes. The thermal conduction through the metal BOSS FyreBox™, and hence Insulation, would be dependent on the length of the box within the thickness of the wall and would not be expected to be significantly affected by the width and height of the box.

In test EWFA No. 45917000 there was no reported indication of integrity failure of any of the penetrations at the unexposed end of the unlagged BOSS FyreBox™ of specimen A. It is therefore considered that the penetrations tested are unlikely to fail integrity if they were not enclosed in the wrap.

In test Warringtonfire FRT190309 there was no reported indication of integrity failure of any of the penetrations of specimen C. It is therefore considered that the penetrations tested are unlikely to fail integrity. The unlagged pipes achieved the Insulation as stated in Table 2. The unlagged BOSS FyreBox™ failed the insulation criteria at 79 minutes and thus would achieve an Insulation of at least 60 minutes. This is an increase over that achieved in test FRT180473

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and is considered to be due to the greater length of the BOSS FyreBox™ from the fire exposure due to the thicker wall.

In Exova Warringtonfire fire resistance test No. WF 385573/C the specimen contained an unlagged PVC insulated and sheathed four core 185 mm^2 copper cable which did not fail Integrity for the 132 minutes duration of the test and achieved Insulation of 85 minutes. It is generally accepted that any electrical cables with similar sheath and conductor size equal or less than the tested cable will achieve at least the same fire resistance. It is therefore considered that any of the PVC or XLPE insulated and sheathed electrical cables in Appendix D1 of AS 1530.4:2014 of size 185 mm^2 core or less would achieve Integrity of at least 120 minutes and Insulation of at least 60 minutes. Because of the substantially smaller conductor size, communication cables as in Appendix D2 would also achieve Integrity of 120 minutes and Insulation of at least 90 minutes without lagging.

In test EWFA No. 45917000 the temperatures recorded on the insulated 10/15 mm pair coil copper pipes beyond the BOSS P40-MAK Wrap lagging were less than the temperatures recorded on the electrical cables beyond the lagging. Based on the Insulation of electrical cables as discussed above it is considered that the insulated pair coil refrigeration copper pipes would also achieve at least 90 minutes Insulation without additional lagging. The recorded temperatures on the pair coils were also substantially less than the insulation failure criteria and hence it is considered that the larger 13/19 mm pair coil could also achieve Insulation of at least 90 minutes without lagging and 120 minutes with lagging.

Unlagged copper or steel pipes would not be expected to achieve any significant Insulation due to the heat conducting properties of the pipes. In test FRT 180473 the 50NB (60.3 mm outside diameter) galvanized steel pipe without lagging and the lagged 32 mm copper pipe achieved Integrity and Insulation of at least 120 minutes. Also, in this test the cables with aluminium cores with 70 mm and 185 mm^2 conductors achieved Integrity of 121 minutes and Insulation of 33 minutes. It is therefore considered that any of the PVC insulated and sheathed electrical cables with aluminium conductors of size 185 mm^2 core or less would also achieve Integrity of 120 minutes and Insulation of at least 30 minutes without lagging.

In test FRT 190309.2 the lagged 50 mm copper pipe achieved 120 minutes Integrity. The temperature on the copper pipe exceeded the Insulation criteria after 2 minutes, which is considered to be caused by furnace gasses, therefore can be ignored. In comparing its performance with the lagged 32 mm copper pipe tested in FRT 180473, which achieved 120 minutes Integrity and Insulation, it is considered that the lagged 50 copper pipe, because of its greater diameter, would achieve 120 minutes Integrity and 60 minutes Insulation with the additional protection with 300 mm length of wrap. Where the 50 mm copper pipe is unlagged it is considered that the wrap would provide sufficient protection for the pipe to achieve 120 minutes Insulation to obtain an FRL of -/120/120. With no wrapping or lagging the FRL would be -/120/-. It is also considered that the copper pipes can be wrapped separately to the other services passing through the FyreBox with P40-Mak Wrap.

Considering the Insulation performance of the thermally insulated pair-coils discussed above it is considered that if the 25 mm copper pipe is insulated with at least 13 mm thick non-combustible insulation approved to AS 1530.3 it would also achieve Insulation of at least 60 minutes without wrap.

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3.4 Insulated steel pipes

In tests EWFA 45917000, FSP 2091, FRT180137, FRT180473, FSP 2191, FRT220049, and FRT210267 various insulated copper pipes achieved up to FRL -/240/240 in a variety of wall, floor and ceiling substrates. Insulated stainless steel pipes were also tested in a cross laminated timber wall in test FRT210330.

Copper pipes have a higher thermal conductivity. than steel, stainless steel or ferrous metal pipes and this means that the temperature rise on the unexposed face of a copper pipe will be higher than a ferrous metal pipe of the same diameter. Steel, stainless steel or ferrous metal pipes would therefore be expected to give a lower Insulation than the equivalent copper pipe.

Therefore, it is considered that substituting steel, stainless steel or ferrous metal pipes for copper pipes with the same insulation types and thicknesses as tested would not be detrimental to the system and would perform to at least the same FRL's as the tested insulated copper pipes.

3.5 Range of Penetrations

Specimens A, B and C in fire resistance test EWFA No. 45917000 and Specimen B in fire resistance test report FRT 180473 demonstrated that a large number and range of penetrations contained within the BOSS FyreBox™ individually achieved Integrity and Insulation of up to 120 minutes. Additional tests referenced in Table 7 also give data on various penetrations. It is therefore considered that any combination of these penetrations, and any number of these penetrations in the BOSS FyreBox™ without causing damage to the internal intumescent strips or brush seals, will achieve at least 120 minutes Integrity and 120 minutes Insulation with the BOSS P40-MAK Wrap or Thermal Defence, where applicable, as tested and for electrical cables and insulated pair coil copper pipes will achieve at least 240 minutes Insulation.

It is also considered that any services can be wrapped separately to the other services passing through the FyreBox with P40-Mak Wrap or Thermal Defence Wrap.

Provided there is no damage to the internal intumescent strips or brush seals, the penetrations may be in any combination, and in any number in BOSS FyreBoxes up to 900 mm wide or 150mm diameter.

3.6 Alternative walls

In the fire resistance tests described in Section 2 above the BOSS FyreBox™ specimens with penetrations were mounted in a steel framed plasterboard lined wall. It is generally accepted that if mounted in a concrete or masonry wall of the same or greater fire resistance the BOSS FyreBox™ would be expected to achieve at least the same fire resistance. It is therefore considered that the BOSS FyreBox™ as tested in fire resistance test EWFA No. 45917000 and FRT210267 R1.1 would achieve at least the same fire resistance if mounted in AAC, Speedpanel, solid or hollow masonry or concrete walls or other walls of at least -/240/240 FRL.

It is also considered that if the BOSS FyreBox™ is installed in a wall of at least FRL of -/60/60, -/90/90, -/120/120, -/180/180 and -/240/240 the BOSS FyreBox™ and penetrations will achieve a fire resistance of at least -/60/60 or -/90/90, -/120/120, -/180/180 and -/240/240 respectively. The FRL given in the table in Appendix 1 is the maximum and will be subject to the FRL of the

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wall, floor or ceiling/floor in which the BOSS FyreBox™ is installed. The FRL will be the lesser of the building element or the FRL as given above.

It is also considered that if the BOSS FyreBox™ is installed in a wall of at least FRL of -/60/60 or -/90/90 the BOSS FyreBox™ and penetrations will achieve a fire resistance of at least -/60/60 or -/90/90 respectively. It is also considered that other forms of wall such as AFS, Barrierline, Dincel, Hebel, IntRwall, Korok, Pronto Panel, Shaftliner/Shaftwall, Speedpanel, Supapanel, Partiwall/Party Wall, INEX wall systems and AlphaPanel systems, and CLT will be acceptable provided they have the equivalent FRL to match the required BOSS FyreBox™ and penetrations rating. The BOSS FyreBox™ may also be used for penetrations through a blank infill panel consisting of vertically mounted BOSS Batts where a single layer of 50 mm thick BOSS Batt provides an FRL of -/60/60 and two layers of 50 mm BOSS Batt provides an FRL of -/120/120.

3.7 Penetrations through concrete floor slabs

Warringtonfire fire resistance test FRT 180137 demonstrated that the BOSS FyreBox™ with a range of penetrating services mounted through a 70 mm thick concrete floor slab could achieve Integrity of at least 120 minutes with Insulation depending on the relevant services. It is therefore considered that the BOSS FyreBox™ can also be used to protect services penetrating concrete floors composite floors and trapezoidal floors, of at least 70 mm thick for Integrity up to 120 minutes and at least 110 mm thick for Insulation up to 120 minutes. In FRT180137 Insulation failure was recorded at 85 minutes on the floor slab separating element. No Insulation failure was recorded on the BOSS FyreBox™ or services at 120 minutes. Therefore, this applies to any concrete floor greater than 70 mm thick limited to the FRL of the service or the floor slab, whichever is the lesser.

In Warringtonfire test FRT 220049 R1.1 two BOSS FyreBoxes were tested in a 150mm thick concrete floor , a BFB-450 was tested with a variety of combustible plastic pipes, the combustible plastic pipes were wrapped on the unexposed side with Boss Thermal Defence Wrap , all of which achieved a FRL -/240/240 except for FyreBox that achieved a FRL -/240/180 the failure was recorded on the supporting element , no insulation failure was recorded on the FyreBox or the services for 240 minutes.

The second BOSS FyreBox™ tested was the BFB-150 with a range of services including plastic pipes, PEX pipes, various cables and paircoil. The FyreBox was sealed with FireMastic 300 over the brushes on the unexposed side and the services were not wrapped.

The FRL achieved for the BOSS FyreBox™ and the services was -/240/120 with insulation failure recorded on the TPS cable at 177 minutes.

Therefore, it is considered that the BOSS FyreBox™ can achieve FRLs up to -/120/120 in concrete floors without a wrap and the BOSS FyreBox™ can achieve FRL -/180/180 in concrete floors with minimum thickness of 150 mm and FRL up to -/240/240 in concrete floors with a minimum thickness of 180 mm with the addition of P40-Mak Wrap or Thermal Defence Wrap as appropriate to the service.

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The penetration services may include power cables, data and communication cables, copper and steel pipes as discussed in this report. For plastic pipes this assessment is limited to the type and maximum sizes of the services tested in Warringtonfire fire resistance tests FRT220049 R1.2 and FRT180137. This applies to pipes of smaller diameter than tested.

Provided there is no damage to the internal intumescent strips or brush seals, the penetrations may be in any combination, and in any number in BOSS FyreBoxes up to 900 mm wide or 150 mm diameter.

3.8 Penetrations through ceiling or floor/ceiling system

Warringtonfire fire resistance test FRT 180474 demonstrated that the BOSS FyreBox™ with a range of penetrating services mounted through a 235 mm thick timber framed ceiling/floor could achieve Integrity of at least 90 minutes with Insulation depending on the relevant services. The performance of the BOSS FyreBox™ and the penetrations in this test was substantially similar to that of the BOSS FyreBox™ and penetrations in the other fire resistance tests in walls and concrete floors as described in Section 2 above and was only limited by the FRL of the nominally 90 minute floor/ceiling system. It is therefore considered that the fire resistance of the BOSS FyreBox™ would not be prejudiced by installation in a floor or floor/ceiling system up to the FRL of that floor/ceiling with any service which had previously been tested in a floor/ceiling or wall as the test data from the wall was consistent with that obtained on the floor/ceiling system.

The penetration services may include power cables, data and communication cables, copper and steel pipes as discussed in this report. For plastic pipes this assessment is limited to the type and maximum sizes of the services tested in Warringtonfire fire resistance test FRT 180474 and FRT220049-R1.1.

Provided there is no damage to the internal intumescent strips or brush seals, the penetrations may be in any combination, and in any number in BOSS FyreBoxes up to 900 mm wide or 150 mm diameter. This applies to pipes of smaller diameter than tested.

3.9 AlphaPanel Systems

In Warringtonfire Regulatory Information Report FAS210067 various AlphaPanel wall systems were considered to achieve an FRL as given in Table 8. These systems include single and double solid AlphaPanel walls and steel framed walls with plasterboard linings on one side.

Figure 33 and Figure 34 show the BOSS FyreBox™ installed in such walls. Where the wall thickness is less than 100 mm additional material has been added to increase the thickness to 100 mm as discussed in paragraph 3.1 above.

The FRL of the BOSS FyreBox™ is the lesser of that specified in this report, or as given in Table 8 provided the wall thickness is at least 100 mm of fire rated material.

For some AlphaPanel systems, as shown in Figure 33 and Figure 34, the wall thickness must be increased to 100 mm as discussed in 3.1 above.

Table 8: AlphaPanel wall systems

Wall system	FRL
35 mm AlphaPanel + 16 mm fire-rated plasterboard	-/90/90

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35 mm AlphaPanel + 16 mm fire-rated plasterboard	60/60/60
35 mm AlphaPanel + 2 x 13 mm fire-rated plasterboards	90/90/90
35 mm AlphaPanel + 35 mm AlphaPanel	90/90/90
35 mm AlphaPanel + 35 mm AlphaPanel	-/120/120
50 mm AlphaPanel with 50 mm fire rated material	-/120/90

3.10 Concrete floor slab 240 minute systems FRT220049 R1.2

3.10.1 Integrity

In Warringtonfire fire resistance test No FRT220049 R1.2 it was demonstrated that a BOSS FyreBox™ 150 and 450 with various services can achieve Integrity of 240 minutes in accordance with AS 1530.4:2014 as given in Table 3 and Table 4.

3.10.2 Insulation

In the BOSS FyreBox™ 150, specimen C, insulation varied with the 16 mm² and 2.5 mm² cables either having no Insulation recorded, or at most 120 minutes for the 2.5 mm² 2C+E TPS cable. Therefore for the services, except for the electrical cables and 20 mm Pex/Al/Pex pipe, an Insulation of 240 minutes can be given. For the electrical cable, the only data was for the 2.5 mm² 2C+E TPS cable which achieved Insulation of 120 minutes. For the 16 mm² 2C+E cable data from other tests, as discussed in this report and included in Appendix 1, where an Insulation of 120 minutes, with wrap, and 90 minutes without wrap has been assigned to 16 mm² cables. Therefore, as 16 mm² is the largest cable, the 90 minutes Insulation can be applied to the 2.5 mm² 3C+E TPS cable.

The 20 mm Pex/Al/Pex pipe maintains its Insulation of 180 minutes.

For the BOSS FyreBox™ - BFB-150 itself, Insulation failure occurred at 235 minutes. The floor slab was 150 mm thick which, in accordance with AS 3600:2018 and subject to design parameters, has an FRL of 180/180/180, the thickness being the determined for Insulation. Therefore for a 150 mm thick concrete slab the performance of the BOSS FyreBox™ - BFB-150 was commensurate with the nominal FRL of the concrete slab. In AS 3600:2018 the specified thickness of a slab achieving 240 minutes Insulation is 175 mm. This is 25 mm thicker than the slab tested in FRT220049 R1.1 and therefore would expect to increase the Insulation of the BOSS FyreBox™ - BFB-150 from 235 minutes to 240 minutes. Table 9 gives the assessed FRL of the BOSS FyreBox™ - BFB-150 and the various services.

Table 9: BOSS FyreBox™ - BFB-150 in 150 mm concrete slab (no wrap)

Penetration	FRL 150 mm floor slab	FRL 175 mm floor slab
BOSS FyreBoxTM - BFB-150 150 mm x 150 mm	-/240/180	-/240/240
16 mm² 2C+E cable	-/240/90	-/240/90

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2.5 mm² 2C+E TPS cable	-/240/120	-/240/120
2.5 mm² 3C+E TPS cable	-/240/90	-/240/90
20 mm Pex-A pipe	-/240/240	-/240/240
20 mm Pex/Al/Pex pipe	-/240/180	-/240/180
3/8" x ¾" Pair coil w/ 19 mm insulation	-/240/240	-/240/240
DN 20 mm conduit	-/240/240	-/240/240
DN 25 mm conduit	-/240/240	-/240/240
Cable bundle	-/240/240	-/240/240
CAT 6 cable		
RG6 Coax cable		
Fire alarm cable		
Fig 8 cable		
Mastic on face of BOSS FyreboxTM	-/240/240	-/240/240

In the BOSS FyreBox™ 450, specimen H, all services achieved insulation of 240 minutes.

For the BOSS FyreBox™ - BFB-450 itself, Insulation failure occurred at 227 minutes on the slab and additionally at 235 minutes. The floor slab was 150 mm thick which, in accordance with AS 3600:2018 and subject to design parameters, has an FRL of 180/180/180, the thickness being the determined for Insulation. Therefore for a 150 mm thick concrete slab the performance of the BOSS FyreBox™ - BFB-150 was commensurate with the nominal FRL of the concrete slab. In AS 3600:2018 the specified thickness of a slab achieving 240 minutes Insulation is 175 mm. This is 25 mm thicker than the slab tested in FRT220049 R1.2 which results in an increase in Insulation of 60 minutes. Therefore it is considered that the Insulation of the BOSS FyreBox™ - BFB-450 would increase by at last 13 minutes from 227 minutes to 240 minutes. Table 10 gives the assessed FRL of the BOSS FyreBox™ - BFB-450 and the various services.

Table 10: BOSS FyreBox™ - BFB-450 in 150 mm concrete slab (with wrap)

Penetration	FRL 150 mm floor slab	FRL 175 mm floor slab
BOSS FyreBoxTM -BFB-450 452 mm x 100 mm	-/240/180	-/240/240
20 mm Pex/Al/Pex pipe	-/240/240	-/240/240
32 mm Pex/Al/Pex pipe	-/240/240	-/240/240
DN 50 mm PPR pipe	-/240/240	-/240/240
DN 60 mm cPVC pipe	-/240/240	-/240/240
DN 25 mm uPVC pipe	-/240/240	-/240/240
32 mm Pex-Xa pipe	-/240/240	-/240/240
20 mm Pex-Xa pipe	-/240/240	-/240/240
DN 50 mm uPVC	-/240/240	-/240/240

3.11 Mastic on face of BOSS FyreBox™

In Warringtonfire fire resistance test No FRT220049 R1.1 BOSS FyreBox™ - BFB-150 had mastic covering the unexposed face. No Integrity or Insulation failure was attributed to the presence of the mastic therefore it is considered that the presence of the mastic is not detrimental to the FRL of a BOSS FyreBox™.

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Further to that the mastic was installed on one face of a BFB-600 in test FRT210267 and can be applied to all sizes of the BOSS FyreBox™ for up to at least -/240/240 applications in fire rated walls, solid and hollow concrete floor slabs, ceiling and floor/ceiling.

The addition of mastic seal to the brushes of the BOSS FyreBox™ creates an airtight smoke seal to the face of the BOSS FyreBox™.

3.12 BOSS FyreBox™ in CLT

In Warringtonfire fire resistance test No FRT210330 R1.1 it was demonstrated that various services in a BOSS FyreBox™ - BFB-300 with BOSS Thermal Defence Wrap extending 300 mm either side, penetrating a 130 mm XLam CLT wall, could achieve an FRL of -90/90 as shown in Table 5.

It is proposed that the same BOSS FyreBox™ penetration system be used in any cross laminated timber wall.

Provided that the same BOSS FyreBox™ system is used and that the alternative cross laminated timber wall is at least 130 mm thick and has achieved an FRL of at least -/90/90, then it is considered that the use of any cross laminated timber wall system would not be detrimental to the FRL of the BOSS FyreBox™ and services as tested in Warringtonfire fire resistance test No FRT210330 R1.1.

Provided there is no damage to the internal intumescent strips or brush seals, the penetrations may be in any combination, and in any number in BOSS FyreBoxes up to 900 mm wide or 150mm diameter.

3.13 P40-Mak Wrap and Thermal Defence Wrap

In various reports referenced in this assessment P40-Mak Wrap was used for insulation around the BOSS FyreBox™ and services as listed in Appendix 1. Where the P40-Mak Wrap was used the BOSS FyreBox™ and services achieved an FRL of up to -/240/240. Appendix 1 gives the details of the minimum length of P40-Mak Wrap or Thermal Defence Wrap required for the services and achieved FRL.

P40-Mak Wrap for 2 hours requires 300mm and for 4 hours requires 540mm.

It is also considered that penetrating services can be wrapped separately to the other services passing through the FyreBox with P40-Mak Wrap or Thermal Defence Wrap to increase the insulation rating of individual services.

Where the FyreBox is installed in the soffit orientation or directly against a fire rated wall/s, the wrap may be installed using a 2 or 3 sided method.

3.14 FRL options without a wrap within CLT walls.

In Warringtonfire fire resistance test No FRT210330 R1.1, the BOSS FyreBox™ - BFB-300 and services were wrapped in Thermal Defence Wrap. It is proposed to remove the wrap and remove the Insulation value.

Various test referenced in this report have established the FRL of various systems without the use of a wrap as given in Appendix 1. In Warringtonfire fire resistance test No FRT220049 R1.2 the systems with no wrap were found to achieve Integrity of at least 240 minutes.

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Therefore, removing the wrap on the BOSS FyreBox™ and services tested in Warringtonfire fire resistance test No FRT210330 R1.1 is not considered to be detrimental to the Integrity and Insulation of the system for at least 90 minutes or the FRL of the CLT, whichever is smaller. Table 11 gives the assessed FRLs where no wrap is used.

Table 11: FRL options without a wrap within CLT walls

Penetration	FRL
BOSS FyreBox™ - BFB-300 300 mm x 150 mm	-/90/90
1 x 48.4 mm steel sprinkler pipe	-/90/90
2 x 22 mm stainless steel pipes (item 15) with 20 mm Thermobreak 9705 lagging	-/90/90
2 x 25 mm Kelox plus pipes	-/90/-
1 x 25 mm condensation drainpipe	-/90/90
1 x 16 mm2 3C+E cable	-/90/90
1 x 50 mm2 2C+E cable	-/90/90
1 x fire alarm cables	-/90/90
1 x Cat 6 cables	-/90/90
1 x 2.5 mm2 2C+E TPS cable	-/90/90
1 x 2.5 mm2 3C+E TPS cable	-/90/90
1 x RG6 Coax cables	-/90/90
1 x Fig 8 cable	-/90/90
1 x Security cable	-/90/90

3.15 240 minute framed plasterboard systems

In Warringtonfire fire resistance test No FRT210267 R1.1 demonstrated that a specimen of BOSS FyreBox™-450, specimen B, with various services could achieve an FRL as given in Table 6.

Specimen B achieved a FRL -/240/180 with insulation failure at 227 minutes (TC 022) on the angle bracket fixed to the wall that was exposed outside the P40-Mak Wrap. It is proposed that the angle bracket be protected, on one side of the wall, with a 100 mm strip of 13 mm fire rated plasterboard fixed over the face of the angle or BOSS batts, an additional 100 mm collar of P40-Mak Wrap or fillet of FireMastic 300, or other sealant referenced in section 3.1,

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underneath the wrap covering the angle. All these proposals are considered to be suitable means of achieving an Insulation of 240 minutes. The temperature rise at 240 minutes on TC 022 was 218°C which is 38°C higher than the failure criterion of 180°C temperature rise.

It is considered that a layer of 13 mm fire rated plasterboard or BOSS batts would be sufficient to limit the temperature rise on the unexposed angle to 180°C thereby resulting in Insulation of 240 minutes. A fillet of FireMastic 300, or other sealant referenced in section 3.1, would achieve the same result provided it covers the whole angle. An additional 100 mm collar of P40-Mak Wrap would also be sufficient as it would cover the angle, and the only thermocouples would be on the face of the plasterboard wall. In Warringtonfire fire resistance test No FRT210267 R1.1 the temperatures measured by thermocouples on the face of the wall had not reached the 180°C failure criterion, therefore using a 100 mm collar of P40-Mak Wrap is considered to be sufficient to achieve Insulation of 240 minutes.

For soffit mount installations where the angle bracket is not required for BOSS FyreBoxes sizes up to 1,200mm wide the BOSS FyreBox™ with a wrap will achieve FRL -/240/240.

Table 12 gives the assessed FRL of the FyreBox™ system tested in Warringtonfire fire resistance test No FRT210267 R1.1 with modifications to the installation of the BOSS FyreBox™.

Table 12: BOSS FyreBox™ in 240min walls with a minimum thickness of 188mm

Penetration	FRL
BOSS FyreBox™ - BFB-450 450 mm x 100 mm	-/240/240
1 x 3/8 + 5/8 FR 13 mm pair coil	-/240/240
1 x 20 mm PEXa pipe	-/240/240
1 x 16 mm² 2C+E power cable	-/240/240
5 x 2.5 mm² 2C+E TPS cables	-/240/240
1 x DN50 medium duty galvanised steel sprinkler pipe	-/240/240
1 x ELV extra low voltage alarm cable (2 core round)	-/240/240
1 x 032 mm PVC conduit	-/240/240
1 x 032 mm HDPE pipe	-/240/240
1 x 025 mm PEX/AL/PE-X pipe	-/240/240
5 x CAT6 cables	-/240/240
1 x DN32 type B copper pipe with 32 mm SupaCell pipe lagging	-/240/240

3.16 Other framed and monolithic systems

Warringtonfire fire resistance test No FRT210267 R1.1 was carried out on a 188 mm thick plasterboard wall with a declared FRL of at least -/240/240. AS 1530.4:2014 clause 10.12, “Permissible Variations to the Tested Specimen” states that tests carried out in a framed wall system may be applied to concrete or masonry of greater or equal thickness and to framed systems having studs of the same material with sizes greater than the tested prototype. Therefore the results of Warringtonfire fire resistance test No FRT210267 R1.1 can be applied to those alternative wall systems provided the wall thickness is at least 188 mm and has achieved an FRL of at least -/240/-. The test was carried out on a steel stud wall system. As the wall must have achieved an FRL of at least -/240/-, it is considered that timber framing may

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also be used. This applies to the wall systems discussed in Section 3.6 above provided that can achieve an FRL of at least -/240/-.

4. ADDITIONAL ITEMS

4.1.1 BOSS FyreBox™ size

The intumescent at the side walls in any BOSS FyreBox™ is the same for any width of box.

To correctly function the intumescent must close from top and bottom along its width. Fixings to the element are as discussed in this document and the box includes a dual or single BOSS Intumescent Sash Inlay around the full internal perimeter together with two pairs of minimum 9 mm deep BOSS FR BRUSH SEAL nylon brush smoke barrier at the top and bottom of the box for full height and full width, the height of the BOSS FyreBox™ may be reduced in height and/or increased in width up to a maximum of 900 mm or diameter of 150 mm. Table 7 gives the number of rows of BOSS Intumescent Sash Inlay given in each test report referenced in Section 2 above. The results show that the FRL was not affected by the number of rows of BOSS Intumescent Sash Inlay.

4.1.2 Angle brackets

For widths up to 300 mm, alternative fixing method; steel angle brackets, minimum 20 x 20 mm, may be fixed to the external sides of the box, attaching to the soffit, aperture or noggin above or below the box.

For all BOSS FyreBox™ sizes, intumescent lined brackets, as tested in Holmes 146660 FTR1.1 may be used to provide a fixing to the wall without the use of sealant. In test FRT210267, a BOSS FyreBox™ was installed to the plasterboard wall via a method of clamping brackets fixed to the BOSS FyreBox™ only and not to the face of the wall. It is permissible to use friction fit angle brackets to mount BOSS FyreBoxes within the fire rated substrate.

In test FRT220049, both BOSS FyreBoxes were mounted to the top side of the slab mounted with angles brackets on the two longest faces. It is permissible to fix the box with angle brackets on only 2 sides of the BOSS FyreBox™. For BOSS FyreBoxes up to 150 mm a single fixing on each side is permitted. On BOSS FyreBoxes over 150 mm, the maximum spacing of fixings is 400 mm centres with a minimum of 2 fixings on any one side.

4.1.3 Bracket Fix

In WF 190309, specimen B, was a BOSS FyreBox™ which was mounted to the soffit using two 40 mm x 40 mm x 0.8 mm angle brackets fitted outside the box. Fixings to the soffit were at nominally 340 mm centres. Therefore, for BOSS FyreBoxes up to 300 mm wide, external angles to the side of the box are considered suitable fixings.

4.1.4 BOSS FyreBox™ greater than 450 mm wide

For boxes with widths greater than 450 mm, additional fixings at 200 mm between centres are required for soffit or noggin mount, or a minimum 20 x 20 mm flanged bracket to be used around the perimeter to hold the BOSS FyreBox™ in place on one side of the wall, floor or ceiling. If using a bracket fixing method for under-soffit applications, the flanged bracket shall be required on three sides only.

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The 20 x 20 mm flanged bracket used around the perimeter of the box, as described above, can also be used as an alternative fixing method for BOSS FyreBoxes smaller than 450mm wide.

4.1.5 BOSS FyreBox™ depth

The depth of the BOSS FyreBox™ through the wall may be reduced to 100 mm or to the thickness of the wall, whichever is the greater. The box must not be recessed behind the wall lining. The BOSS FyreBox™ may be flush with the wall surface. The FyreBox need not be central to the wall element provided the face is not recessed into the wall face.

4.1.6 Installation in BOSS Batts

The BOSS FyreBox™ may be installed into a fire rated element of a single 50 mm BOSS Batt, with an additional build-up of 50 mm BOSS Batt, extending 100 mm around the BOSS FyreBox™, for 60 minutes, or a double layer of 50 mm BOSS Batt for 90 and 120 minutes as detailed below. The additional layer(s) must be fixed with BOSS Pigtail screws or steel fixings with minimum 20 mm diameter washers. If the BOSS FyreBox™ is mounted to the underside of a soffit then the addition of a 50 mm BOSS Batt is only required to three sides.

60 min applications or less:

A BOSS FyreBox™ may be installed into a construction element made up of a single 50 mm BOSS Batt for 60 minutes, provided that an additional Batt of 50 mm thick is applied locally to the point of penetration, so as to create a 100 mm perimeter around the box.

If the box is mounted to the underside of a soffit, then the addition of a 50 mm BOSS Batt is only required on 3 sides.

For 90 min and 120 min applications:

A BOSS FyreBox™ may be installed into a double layer of 50 mm thick BOSS Batt, thereby giving a 100 mm construction element, for applications requiring 90 min and 120 min ratings.

In all cases where 50mm BOSS Batts are installed together to form a double layer, the two layers must be fixed with BOSS Pigtail screws or steel fixings with minimum 20mm diameter washers.

4.1.7 Framed walls

On steel or timber framed plasterboard lined walls, the fire resistance of the BOSS FyreBox™ and penetrations is conditional upon the established framing requirements of the plasterboard wall system, including the position of studs and noggins within the wall system. Notwithstanding that, the BOSS FyreBox™ must be located no more than 35 mm from the nearest stud and a no more than 120 mm from the nearest noggin. For mid-wall mounting applications, the BOSS FyreBox™ may be affixed to a noggin from below, or alternatively be positioned on top of a noggin.

4.1.8 Floor Mounting

For floor mounted applications, the BOSS FyreBox™ may be retrofitted to existing apertures or cast-in to the floor slab at the time of concrete pour.

4.1.9 Fillet sealant

The maximum perimeter gap between the BOSS FyreBox™ and the wall lining is up to 20 mm. The gap is to be filled with BOSS FireMastic-300 sealant or any of the fire rated sealants listed below and approved in accordance with AS1530.4:2014 for use against a steel element, to the full depth of the plasterboard lining. Sealants which are applicable are:

- Siniat Bindex Fire Sealant
- CSR Fire Seal
- Hilti CP606
- HB Fuller Firesound
- Sika Flex-400 fire sealant.

In CSIRO fire resistance test FSP 2091 a 15 mm x 15 mm sealant was applied around the BOSS FyreBox™. Temperatures measure on the fillet did not exceed the Insulation failure criteria for 120 minutes, therefore a 15 mm x 15 mm fillet is considered to be the minimum fillet size in order to maintain the FRL of the BOSS FyreBox™. This only applies to walls less than 100 mm thick.

It is permissible for cured intumescent wrap or intumescent lined brackets to be used instead of sealant for fixing to a substrate as per Holmes fire resistance test 146660 FTR1.1.

On walls equal to or greater than 100 mm, a fillet is not required given the wall thickness is sufficient to maintain insulation.

In Warringtonfire fire resistance test FRT220049, a wrapped FyreBox was installed without a surface fillet of fire rated sealant, and therefore it is applicable to all wrapped BOSS FyreBoxes installed without a fillet.

4.1.10 Plastic pipes

Section 2 of this report details various fire tests where plastic pipes were tested.

The maximum size of uPVC pipe tested was 55.8mm OD, achieving -/120/120 without a wrap or FRL up to -/240/240 with a wrap.

The maximum size of CPVC pipe tested was 60.3mm OD achieving -/120/120 without a thermal wrap or FRL up to -/240/240 with a wrap.

In CSIRO FSP 2091, 20 mm and 25 mm PEX and PEX-AL were tested, achieving -/90/90 without a thermal wrap. The maximum temperature rise reached in this test were 97°C and 79°C respectively.

In Exova Warringtonfire fire resistance test EWFA No. 45917000 two 20 mm PEX pipes and one 20 mm PEX/AL/PEX pipes achieved an FRL of -/120/120 with thermal wrap.

In Warringtonfire fire resistance test FRT 210267 R1.1 a 32 mm PEX/AL/PE-X pipes achieved FRL of -/240/240 with a wrap.

4.1.11 Trapeze

In some cases a trapeze may be included in the box. The trapeze can be used where it is necessary to separate services such as hot and cold pipes, or power and communication cables. It has no function in maintaining the FRL of the box. Therefore the internal trapeze bar can be removed without detriment to the FRL of the BOSS FyreBox™.

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4.1.12 240 FRL in flexible and rigid walls

As detailed in Appendix 1, for increased FRLs up to -/240/240 the P40-Mak Wrap should extend 540 mm from both sides of the wall that has a minimum wall thickness of 188 mm or thickened locally to achieve the minimum wall thickness using fire rated plasterboard, Boss Batts, MgO, calcium silicate board, or other board systems with an established FRL or FireMastic 300 or other approved sealants mentioned in this report.

4.1.13 FRL in concrete floors

For increased FRLs up to -/180/180 and -/240/240 the BOSS FyreBox™ and the services should be wrapped with P40-Mak Wrap or Thermal Defence Wrap on the unexposed side of the concrete floor as given in Appendix 1.

4.1.14 Mastic sealing of brushes

Where mastic is applied to the brushes of a FyreBox to provide an airtight smoke seal, the sealant only needs to be installed on one side of the box in a wall orientation or from above in the floor orientation.

The BOSS FyreBox™ may be sealed with Boss FireMastic-300 or FireSilicone-EMA or a fire sealant with an established FRL.

5. CONCLUSION

It is considered that the penetrations listed in Appendix 1, included in the BOSS FyreBox™ specimens tested in the fire resistance tests listed in Table 7 mounted in steel or timber framed plasterboard lined walls, blank infill panel of BOSS Batts, AAC, normal weight concrete, solid or hollow masonry walls or other walls such as AFS, Barrierline, Dincel, Hebel, IntRwall, Korok, Pronto Panel, Shaftliner/Shaftwall, Speedpanel, Supapanel, Partiwall/Party Wall, INEX wall systems, AlphaPanel systems, CLT, or concrete floors at least 70 mm thick and fire rated ceiling or ceiling/floors as tested in FRT 180474, would achieve an FRL, in accordance with AS 1530.4:2014, with reference to AS 4072.1-2005, or the lesser of that stated in Appendix 1 or the FRL of the wall, ceiling or floor/ceiling. The table identifies the applicability of systems to walls or floors as appropriate. All wrapped floor systems include P40-MAK Wrap or Thermal Defence Wrap. Unwrapped boxes in floors are to have mastic sealed brushes on the unexposed side.

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APPENDIX 1: LIST OF BOSS FYREBOX™ SYSTEMS

FRL of BOSS FyreBox™ for wall penetrations up to FRL -/240/240

Penetration	FRL With P40-MAK	FRL No Wrap	FRL With Thermal Defence Wrap 550 mm
Empty FyreBox			
BOSS FyreBox™	-/120/120	-/120/120	-/120/120
BOSS FyreBox™ 150 mm x 150 mm maximum (or <22,500 mm² opening size) in minimum 130 mm thick CLT walls.	-/90/90	N/A	-/120/120
BOSS FyreBox™ in minimum 188 mm thick walls.	-/240/240	-/240/240	-/240/240
BOSS FyreBox™ in minimum 156 mm thick walls.		-/180/180	
Metal Pipes in flexible and rigid walls with a minimum thickness of 100 mm	**FRL With P40-MAK**	**FRL No Wrap**	**FRL With Thermal Defence Wrap, 300 mm**
Paircoil up to 13/19 mm with min 19mm insulated copper pipes	-/120/120	-/120/120	-/120/120
Paircoil up to 13/19 mm with 9 mm and 13mm insulation	-/120/120	-/120/90	-/120/90
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 25 mm OD with minimum 19 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/120/120	-/120/60	
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 32 mm OD with minimum 19 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/120/120	-/120/120	
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 50.8 mm OD with minimum 25 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/120/120	-/120/60	
Copper Pipe up to 50.8 mm OD uninsulated	-/120/120	-/120/-	
Steel Sprinkler Pipe, steel and stainless steel pipes up to 60.3 mm OD	-/120/120	-/120/120	-/120/120

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Metal Pipes in flexible and rigid walls with a minimum thickness of 188 mm	**FRL With P40-MAK**	**FRL No Wrap**	**FRL With Thermal Defence Wrap, 550 mm**
Paircoil up to 13/19 mm insulated copper pipes	-/240/240	-/240/240	-/240/240
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 25 mm OD with minimum 19 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/240/240	-/240/60	
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 32 mm OD with minimum 19 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/240/240	-/240/120	
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 50.8 mm OD with minimum 25 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/240/240	-/240/60	
Copper Pipe up to 50.8 mm OD uninsulated	-/240/240	-/240/60	
Steel Sprinkler Pipe, steel and stainless steel pipes up to 60.3 mm OD	-/240/240	-/240/120	-/240/120
Plastic Pipes in rigid and flexible walls with a minimum thickness of 100 mm	**FRL With P40-MAK**	**FRL No Wrap**	**FRL With Thermal Defence Wrap, 300 mm**
PEX & PEX-AL-PEX Pipes up to 25 mm OD with or without lagging	-/120/120	-/120/90	-/120/90
PEX & PEX-AL-PEX Pipes up to 32 mm OD with or without lagging	-/120/120	-/120/-	-/120/90
uPVC Pipe & Conduit up to 56 mm OD	-/120/120	-/120/120	-/120/120
cPVC Pipe up to 60.3 mm OD	-/120/120	-/120/120	-/120/120
PE-RT Pipe or PE-RT Kelox pipe up to 32 mm OD with or without lagging	-/120/120	-/120/-	-/120/90
HDPE pipe up to 32mm	-/120/120	-/120/-	-/120/90
PP and PP-R pipes up to 50mm	-/120/120	-/120/-	-/120/90
Plastic Pipes in rigid and flexible walls with a minimum thickness of 188 mm	**FRL With P40-MAK**	**FRL No Wrap**	**FRL With Thermal Defence Wrap, 550 mm**
PEX & PEX-AL-PEX Pipes up to 25 mm OD with or without lagging	-/240/240	-/240/90	-/240/90
PEX & PEX-AL-PEX Pipes up to 32 mm OD with or without lagging	-/240/240	-/240/-	-/240/90
uPVC Pipe & Conduit up to 56 mm OD	-/240/240	-/240/120	-/240/120
cPVC Pipe up to 60.3 mm OD	-/240/240	-/240/120	-/240/120
PE-RT Pipe or PE-RT Kelox pipe up to 32 mm OD with or without lagging	-/240/240	N/A	-/240/90
HDPE pipe up to 32mm	-/240/240	-/240/-	-/240/90
PP and PP-R pipes up to 50mm	-/240/240	-/240/-	-/240/90

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Electric cables in rigid and flexible walls with a minimum thickness of 100 mm	**FRL With P40-MAK**	**FRL No Wrap**	**FRL With Thermal Defence Wrap, 300 mm**
Appendix D1 Power Cables (except 630 mm²)	-/120/120	-/120/60	-/120/90
Multi Core Power Cables: Individual conductor size up to 16 mm². Total Maximum cross sectional area not greater than 48 mm² per cable.	-/120/120	-/120/90	-/120/90
Appendix D2 Data / Comms Cables also including: CAT5, CAT5E, CAT6, CAT7, COAX, MATV, SMATV, CATV, Fig 8, Fire Alarm, EWIS, LAN, Security, NBN, Fibre Optic & Speaker cables.	-/120/120	-/120/90	-/120/90
Cables with Aluminium core 185 mm² or less	-/120/120	-/120/30	-/120/90
Electric cables in rigid and flexible walls with a minimum thickness of 188 mm	**FRL With P40-MAK**	**FRL No Wrap**	**FRL With Thermal Defence Wrap, 300 mm**
Appendix D1 Power Cables (except 630 mm²)	-/240/240	-/240/60	-/240/90
Multi Core Power Cables: Individual conductor size up to 16 mm². Total Maximum cross sectional area not greater than 48 mm² per cable.	-/240/240	-/240/90	-/240/90
Appendix D2 Data / Comms Cables also including: CAT5, CAT5E, CAT6, CAT7, COAX, MATV, SMATV, CATV, Fig 8, Fire Alarm, EWIS, LAN, Security, NBN, Fibre Optic & Speaker cables.	-/240/240	-/240/90	-/240/90
Cables with Aluminium core 185 mm² or less	-/240/240	-/240/30	-/240/90

FRL of BOSS FyreBox™ penetrations for Floor slabs and floor/ceiling and ceiling up to FRL -/240/240

Penetration	**FRL With P40-MAK**	**FRL No Wrap**	**FRL With Thermal Defence Wrap**
BOSS FyreBox™ in concrete floor slabs minimum 70 mm thick filled with BOSS Batt, FR Foam Block or BOSS FirePillows-240. or brush seals on the unexposed side sealed with FireMastic 300 Wrap above slab only.	-/120/120	N/A	-/120/120
BOSS FyreBox™ in concrete floor slabs minimum 110 mm thick filled with BOSS Batt, FR Foam Block or BOSS FirePillows-240 or brush seals on the unexposed side sealed with FireMastic 300. Wrap above slab only.	-/120/120	-/120/120	-/120/120
BOSS FyreBox™ in concrete floor slabs minimum thickness 150mm thick filled with Boss Batt, FR Foam Block, BOSS FirePillows-240 or brush seals on the unexposed side sealed with FireMastic 300	-/180/180	-/180/180	-/180/180
BOSS FyreBox™ in concrete floor slabs minimum thickness 180mm thick filled with Boss Batt, FR Foam Block, BOSS FirePillows-240 or brush seal on the unexposed side sealed with FireMastic 300	-/240/240	-/240/120	-/240/240
BOSS FyreBox™ without services in ceiling or ceiling floor systems filled with BOSS Batt, FR Foam Block or BOSS FirePillows-240 or sealing the brush seal on the unexposed side with FireMastic 300.	-/120/120	-/120/120	-/120/120

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Metal Pipes in floors with a minimum thickness of 70 mm thick and fire rated ceiling and ceiling floor systems with an established FRL/FRR	**FRL With P40-MAK**	**FRL No Wrap**	**Thermal Defence Wrap, 300 mm**
Paircoil up to 13/19 mm with min 19 mm insulated copper pipes	-/120/120	-/120/120	-/120/120
Paircoil up to 13/19 mm with 9 mm and 13 mm insulation	-/120/120	-/120/90	-/120/90
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 25 mm OD with minimum 13 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/120/120	-/120/60	
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 32 mm OD with minimum 19 mm thick continuous Armaflex FRV, K-Flex lagging or Thermobreak lagging Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/120/120	-/120/120	
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 50.8 mm OD with minimum 25 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/120/120	-/120/60	
Copper Pipe up to 50.8 mm OD uninsulated	-/120/120	-/120/-	
Steel Sprinkler Pipe, steel and stainless steel pipes up to 60.3 mm OD	-/120/120	-/120/-	-/120/120
Metal pipes in floor slabs with a minimum thickness of 150 mm	**FRL With P40-MAK**	**FRL No Wrap**	**Thermal Defence Wrap 300 mm**
Paircoil up to 13/19 mm insulated copper pipes	-/180/180	-/180/180	-/180/180
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 25 mm OD with minimum 13 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/180/180	-/180/60	
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 32 mm OD with minimum 19 mm thick continuous Armaflex FRV, K-Flex lagging or Thermobreak lagging Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/180/180	-/180/120	
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 50.8 mm OD with minimum 25 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/180/180	-/180/60	
Copper Pipe up to 50.8 mm OD uninsulated.	-/180/180	-/180/-	
Steel Sprinkler Pipe, steel and stainless steel up to 60.3 mm OD.	-/180/180	-/180/120	-/180/180

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Metal pipes in floor slabs with a minimum thickness of 180mm	P40-Mak Wrap length 540mm	No wrap	Thermal Defence Wrap, 300 mm
Paircoil up to 13/19 mm insulated copper pipes.	-/240/240	-/240/240	-/240/240
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 25 mm OD with minimum 13 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/240/240	-/240/60	
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 32 mm OD with minimum 19 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/240/240	-/240/120	
Copper Pipe, steel, stainless steel and ferrous metal pipes up to 50.8 mm OD with minimum 25 mm thick non-combustible lagging to AS1530.1 or Armaflex FRV, K-Flex lagging or Thermobreak lagging or similar elastomeric foam rubber such as nitrile, Neoprene, or cross-linked polyolefin with density from 25 kg/m³ to 75 kg/m³ and complying with AS 1530.3, SFI=0 and SDI≤5.	-/240/240	-/240/60	
Copper Pipe up to 50.8 mm OD uninsulated.	-/240/240	-/240/-	
Steel Sprinkler Pipe, steel and stainless steel up to 60.3 mm OD.	-/240/240	-/240/120	-/240/240

Plastic Pipes in floor slabs with a minimum thickness of 70mm	P40-Mak Wrap length 300mm	No wrap	Thermal Defence Wrap, 300 mm
PEX & PEX-AL-PEX Pipes up to 25 mm OD with or without lagging	-/120/120	-/120/90	-/120/120
PEX & PEX-AL-PEX Pipes up to 32 mm OD with or without lagging	-/120/120	-/120/-	-/120/120
uPVC Pipe & Conduit up to 55.8 mm OD	-/120/120	-/120/120	-/120/120
cPVC Pipe up to 60.3 mm OD	-/120/120	-/120/120	-/120/120
PE-RT Pipe or PE-RT Kelox pipe up to 32 mm OD with or without lagging	-/120/120	-/120/-	-/120/120
HDPE pipe up to 32mm	-/120/120	-/120/-	-/120/120
PP and PP-R pipes up to 50mm	-/120/120	-/120/-	-/120/120
Plastic Pipes concrete floor slab with a minimum thickness of 150 mm	**P40-Mak Wrap length 300mm**	**No wrap**	**Thermal Defence Wrap, 300 mm**
uPVC Pipe & Conduit up to 56 mm OD	-/180/180	-/180/120	-/180/180
uPVC Pipe & Conduit up to 25 mm OD	-/180/180	-/180/180	-/180/180
PEX & PEX-AL-PEX pipes up to 32mm OD with or without lagging	-/180/180	-/180/180	-/180/180
PP and PP-R pipes up to 50mm	-/180/180	-/180/-	-/180/180
cPVC up to 60.3mm OD	-/180/180	-/180/120	-/180/180
HDPE pipe up to 32mm	-/180/180	-/180/-	-/180/180
Plastic Pipes in concrete floor slab with a minimum thickness of 180 mm	**P40-Mak Wrap length 540mm**	**No wrap**	**Thermal Defence Wrap 550mm**
uPVC Pipe & Conduit up to 56 mm OD	-/240/240	-/240/120	-/240/240
uPVC Pipe & Conduit up to 25mm OD	-/240/240	-/240/240	-/240/240

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PEX & PEX-AL-PEX pipes up to 20mm OD with or without lagging	-/240/240	-/240/240	-/240/240
PEX & PEX-AL-PEX pipes up to 32mm OD with or without lagging	-/240/240	-/240/-	-/240/240
PP and PP-R pipes up to 50mm	-/240/240	-/240/-	-/240/240
cPVC up to 60.3 mm OD	-/240/240	-/240/120	-/240/240
HDPE pipe up to 32mm	-/240/240	-/240/-	-/240/240

Plastic Pipes floor/ceiling and FR ceiling	**P40-Mak Wrap length 300mm**	**No wrap**	**Thermal Defence Wrap 300mm**
uPVC Pipe & Conduit up to 25mm OD	-/120/120	-/120/120	-/120/120
uPVC Pipe & Conduit up to 56 mm OD	-/120/120	-/120/-	-/120/120
PEX & PEX-AL-PEX pipes up to 20mm OD with or without lagging	-/120/120	-/120/120	-/120/120
PEX & PEX-AL-PEX pipes up to 32mm OD with or without lagging	-/120/120	-/120/-	-/120/120
PP and PP-R pipes up to 50mm	-/120/120	-/120/-	-/120/120
cPVC up to 60.3 mm OD	-/120/120	-/120/-	-/120/120
HDPE pipe up to 32mm	-/120/120	-/120/-	-/120/120

Electrical Cables in floor slabs with a minimum thickness of 70 mm and fire rated ceilings and ceiling floors systems with an established FRL/FRR	**P40-Mak Wrap length 300mm**	**No wrap**	**Thermal Defence Wrap length 300mm**
Appendix D1 Power Cables (exempt 630 mm²)	-/120/120	-/120/60	-/120/120
Multi Core Power Cables: Individual conductor size up to 16 mm². Total Maximum cross-sectional area not greater than 48 mm² per cable.	-/120/120	-/120/90	-/120/120
Appendix D2 Data / Comms Cables also including: CAT5, CAT5E, CAT6, CAT7, COAX, MATV, SMATV, CATV, Fig 8, Fire Alarm, EWIS, LAN, Security, NBN, Fibre Optic & Speaker cables.	-/120/120	-/120/90	-/120/120
Cables with Aluminium core 185 mm² or less	-/240/240	-/120/30	-/120/120
Electrical Cables in floor slabs with a minimum thickness of 150 mm	**P40-Mak Wrap length 300mm**	**No wrap**	**Thermal Defence Wrap length 300mm**
Appendix D1 Power Cables (exempt 630 mm²)	-/180/180	-/180/60	-/180/180
Multi Core Power Cables: Individual conductor size up to 16 mm². Total Maximum cross-sectional area not greater than 48 mm² per cable.	-/180/180	-/180/90	-/180/180
Appendix D2 Data / Comms Cables also including: CAT5, CAT5E, CAT6, CAT7, COAX, MATV, SMATV, CATV, Fig 8, Fire Alarm, EWIS, LAN, Security, NBN, Fibre Optic & Speaker cables.	-/180/180	-/180/90	-/180/180
Cables with Aluminium core 185 mm² or less	-/180/180	-/180/30	-/180/180
Electrical Cables in floor slabs with a minimum thickness of 180 mm	**P40-Mak Wrap length 540mm**	**No wrap**	**Thermal Defence Wrap length 550mm**
Appendix D1 Power Cables (exempt 630 mm²)	-/240/240	-/240/60	-/240/240
Multi Core Power Cables: Individual conductor size up to 16 mm². Total Maximum cross-sectional area not greater than 48 mm² per cable.	-/240/240	-/240/90	-/240/240
Appendix D2 Data / Comms Cables also including: CAT5, CAT5E, CAT6, CAT7, COAX, MATV, SMATV, CATV, Fig 8, Fire Alarm, EWIS, LAN, Security, NBN, Fibre Optic & Speaker cables.	-/240/240	-/240/90	-/240/240

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Cables with Aluminium core 185 mm² or less	-/240/240	-/240/30	-/240/240

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It is considered that:

1. The FRL given above is the maximum and will be subject to the FRL of the wall, floor or ceiling/floor in which the BOSS FyreBox™ is installed. The FRL will be the lesser of the building element or the FRL as given above.
2. The wall thickness must be at least 100 mm for FRLs up to -/120/120 and at least 188 mm for FRLs up to -/240/240 or the BOSS FyreBox™ sealed with at least 15 mm x 15 mm fillet of BOSS FireMastic-300. Where the wall thickness is less than 100 mm it may be increased by locally applied lining such as fire rated plasterboard, Boss Batts, P40-Mak Wrap or fillet of FireMastic-300 or any fire rated sealant approved in accordance with AS 1530.4:2014 for use against a metal element.
3. The P40-MAK Wrap is 300 mm wide and can be joined and overlapped by 50 mm for FRLs up to 240 minutes extending on both sides of the wall with a minimum coverage of 550 mm or a continuous wrap to the same length.
4. The BOSS FyreBox™ may be reduced in height from and/or increased in width up to a maximum of 1,200 mm provided that the box includes a dual or single BOSS Intumescent Sash Inlay around the full internal perimeter together with two pairs of 9 mm deep BOSS FR BRUSH SEAL nylon brush smoke barrier at the top and bottom of the box for the full height and full width. For widths greater than 600 mm additional fixings at 200 mm centres, or a minimum 20 mm x 20 mm flanged bracket, is used around the perimeter to hold the BOSS FyreBox™ in place on one side of the wall, floor or ceiling. If using a bracket fixing method for under soffit applications, the flanged bracket shell be required on three sides only.
5. Where the BOSS FyreBox™ is to be installed in a wall, the box manufacturer may supply a box with a reduced depth of minimum 100mm, as 100 mm is the minimum box depth that had been tested and considered in this report. When a thermal wrap is required, as specified in this report, the wrap over the penetrations must be maintained at a minimum of 270mm.
6. The BOSS FyreBox™ can be installed into a fire rated element of a single 50 mm BOSS Batt for 60 minutes (with an additional pattress of 50 mm BOSS Batt extending 100 mm around the BOSS FyreBox™), or a double layer of 50 mm BOSS Batts for 90 minutes or 120 minutes. The BOSS Batts can be used to increase the element thickness to be equal to or greater than the minimum thickness requirement.
7. On steel or timber framed lined walls, the fire resistance of the BOSS FyreBox™ and penetrations is conditional upon established framing requirements of the plasterboard wall system, including the position of studs and noggins within the wall system. Notwithstanding that, the BOSS FyreBox™ must be located no more than 35mm from the nearest stud and no more than 120mm from the nearest noggin. For mid-wall mounting applications, the BOSS FyreBox™ may be affixed to a noggin from below, or alternatively be positioned to the top of a noggin.

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8. The maximum perimeter gap between the BOSS FyreBox™ and the wall lining is up to 20 mm. The gap is to be filled with BOSS FireMastic-300 sealant or any of the fire rated sealants listed below and approved in accordance with AS1530.4:2014 for use against a metal element, to the full depth of the plasterboard lining. Sealants which are applicable are:

    - Siniat Bindex sealant.
    - CSR Fire Seal
    - Hilti CP606
    - HB Fuller Firesound
    - Sika Flex-400 fire sealant

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Appendix 2: Notes to Figure 1 to Figure 39

Figure 1: BOSS FyreBox™ - Soffit Mount in Flexible Wall

This shows the BOSS FyreBox installed in a lightweight plasterboard wall under a slab. This installation is consistent with the method described in the text of this document.

Figure 2: BOSS FyreBox™ - Mid Mount in Flexible Wall

This shows the BOSS FyreBox installed in a lightweight plasterboard wall and shaftwall. This installation is consistent with the method described in the text of this document.

Figure 3: BOSS FyreBox™ – Mid, Soffit & Ceiling Mount in Other Wall Systems

This shows the BOSS FyreBox installed in a solid permanent formwork wall and floor slab. This includes systems such as Speedpanel, Korok or SupaPanel. AFS, ProntoPanel and Dincel. This installation is consistent with the method described in the text of this document.

Figure 4: BOSS FyreBox™ – Mid, Soffit & Ceiling Mount in Other Wall Systems

Similar to Figure 3-A with oversize sealant fillet on wall angles.

Figure 5: BOSS FyreBox™ – Mid & Soffit Mount in Concrete Systems

This shows the BOSS FyreBox installed in ACC and Hebel systems. This installation is consistent with the method described in the text of this document.

Figure 6: BOSS FyreBox™ – Mid & Soffit Mount in Concrete/Masonry Systems

This shows the BOSS FyreBox installed in a block wall and floor slab. This also applies to solid & hollow masonry, concrete walls including concrete walls with Permanent Polymer Formwork. This installation is consistent with the method described in the text of this document.

Figure 6: BOSS FyreBox™ – Thicker Wall Systems Above 270 mm

This shows the BOSS FyreBox installed in lightweight lined wall and concrete/masonry greater than 270 mm thick. This installation is consistent with the method described in the text of this document.

Figure 8: BOSS FyreBox™ – Mid Mount Other Built-up Wall Systems (Plasterboard)

This shows the installation method for BOSS FyreBox in various wall systems with localised built-up wall thickness using FR Plasterboard. This installation is consistent with the method described in the text of this document.

Figure 9: BOSS FyreBox™ – Soffit Mount Other Built-up Wall Systems (Plasterboard)

These are similar details to Figure 7 with the BOSS FyreBox installed under the floor slab. This installation is consistent with the method described in the text of this document.

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Figure 10: BOSS FyreBox™ – Mid Mount Other Built-up Wall Systems (Boss Batt)

This shows the installation method for BOSS FyreBox in various wall systems with localised built-up wall thickness using 50 mm BOSS Batt. This installation is consistent with the method described in the text of this document.

Figure 11: BOSS FyreBox™ – Soffit Mount Other Built-up Wall Systems (Boss Batt)

This shows the installation method for BOSS FyreBox in various wall systems with localised built-up wall thickness using 50 mm BOSS Batt. This installation is consistent with the method described in the text of this document.

Figure 12: BOSS FyreBox™ – Soffit Mount in Other Wall Systems with P40-MAK Wrap Option (1)

This shows the installation method for BOSS FyreBox in various wall systems with P40-MAK Wrap. This installation is consistent with the method described in the text of this document.

Figure 13: BOSS FyreBox™ – Soffit Mount in Other Wall Systems with P40-MAK Wrap Option (2)

This shows the installation method for BOSS FyreBox in various wall systems with P40-MAK Wrap. Where P40-MAK Wrap is required for Insulation, its width is 300mm with sufficient additional material to increase the wall depth to 100 mm. This installation is consistent with the method described in the text of this document.

Figure 14: BOSS FyreBox™ – Soffit and Mid wall Mount with Sealant (1)

This shows the installation method for BOSS FyreBox in various wall systems with additional fillet mastic sealant. This installation is consistent with the method described in the text of this document.

Figure 15: BOSS FyreBox™ – Soffit and Mid wall Mount with Sealant (2)

This shows the installation method for BOSS FyreBox in various wall systems with additional fillet mastic sealant and reduced box depth. This installation is consistent with the method described in the text of this document.

Figure 16: BOSS FyreBox™ – Installation in BOSS Batt Infill Panel. - Soffit Mount & Mid Wall Mount – Rigid Walls. – 60min FRL

Refer to clause 4.1.6 above for details.

Figure 16: BOSS FyreBox™ – Installation in BOSS Batt Infill Panel. - Soffit Mount & Mid Wall Mount – Rigid Walls – 60, 90 & 120min FRL

Refer to clause 4.1.6 above for details.

Figure 17: BOSS FyreBox™ – Installation in BOSS Batt Infill Panel. - Soffit Mount & Mid Wall Mount –Flexible Walls – 60, 90 & 120min FRL

Refer to clause 4.1.6 above for details.

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Figure 18: BOSS FyreBox™ – Boss Batt systems, flush mounted with reduced box depth

This shows the BOSS Fyrebox mounted in BOSS Batt systems. Flush mounted with reduced box depth.

Figure 19: BOSS FyreBox™ – Multiple

This shows the installation method for multiple BOSS FyreBoxes. The separation of individual boxes is to be in accordance with AS 4072.1.

Figure 20: BOSS FyreBox™ –Vertical installation

This figure shows the BOSS FyreBox installed vertically. This is not considered to be detrimental to the FRL of the BOSS FyreBox or any penetrations discussed in this report.

Figure 21: BOSS FyreBox™ – Mount in Party System

This shows the installation method for BOSS FyreBox in a party wall system. This installation is consistent with the method described in the text of this document.

Figure 22: BOSS FyreBox™ – Installation in concrete floor slab with services

This shows the installation method for BOSS FyreBox in a concrete floor slab with cable and pipe penetrations. This installation is consistent with the method described in the text of this document. The MAK Wrap P40 extends to cover the box.

Figure 23: BOSS FyreBox™ – Floor Installation

This shows the installation method for BOSS FyreBox on a concrete floor slab. This installation is consistent with the method described in the text of this document.

Figure 24: BOSS FyreBox™ – Floor Installation with Large Opening

This shows the installation method for BOSS FyreBox on a concrete floor slab in a large opening. The framework supports the BOSS FyreBox and spaces around the box filled with BOSS Batt of thickness appropriate to the required FRL.

Figure 25: BOSS FyreBox™ – Multiple in floor slab

This shows the installation method for multiple BOSS FyreBoxes on a concrete floor slab in a large opening. The framework supports the BOSS FyreBox and spaces around the box filled with BOSS Batt of thickness appropriate to the required FRL. The spacing must comply with AS 4072.2.

Figure 26: BOSS FyreBox™ – Concrete Slab Cast-in

The BOSS FyreBox is cast in-situ with concrete poured after placement of the box so that it is completely surrounded and in contact with concrete. This will maintain the FRL of the system.

Figure 27: BOSS FyreBox™ – Floor/Ceiling Systems

This shows the general installation method for BOSS FyreBox with services in a framed floor system. This installation is consistent with the method described in the text of this document.

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Figure 28: BOSS FyreBox™ – Technical Drawing

This shows details of the construction of the BOSS FyreBox.

Figure 29: BOSS FyreBox™ – Standard configuration for cables

This shows the standard configuration of cables. Actual installation may vary. This installation is consistent with the method described in the text of this document.

Figure 30: BOSS FyreBox™ – Low fill of services

This shows a common configuration of mixed services with low fill of services. Service percentage fill is discussed in 4.1.8 above.

Figure 31: BOSS FyreBox™ – Installation detail - plastic pipes

This shows a typical configuration within the BOSS FyreBox with plastic pipes. Use of the trapeze is optional.

Figure 32: BOSS FyreBox™ – Installation detail -copper pipes

This shows a typical configuration within the BOSS FyreBox with lagged copper pipes and Paircoil. Use of the trapeze is optional.

Figure 33: BOSS FyreBox™ – Alpha Panel installation (Under slab)

Figure 34: BOSS FyreBox™ – Alpha Panel installation (Within wall)

Figure 33 and Figure 34 show typical installation in an Alpha Panel wall in various configuration of solid wall and framed wall. Where the construction has a thickness of less than 100 mm, additional material has been added to increase the wall thickness to at least 100 mm.

Figure 35: BOSS FyreBox™ – Mid wall and soffit mount with no Wrap

This shows mid floor and soffit mount in framed and solid walls without wrap.

Figure 36: BOSS FyreBox™ – Floor slab 1

Figure 37: BOSS FyreBox™ – Floor slab 2

Figures 36 and 37 show various mounting options in a concrete floor slab.

Figure 38: BOSS FyreBox™ – Mid floor and soffit mount with Wrap

This shows mid floor and soffit mount in framed and solid walls with wrap.

Figure 39: BOSS FyreBox™ – Mid wall mount in CLT

This shows the BOSS Fyrebox mounted in a CLT wall.

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Figure 1: BOSS FyreBox™ - Soffit Mount in Flexible Wall

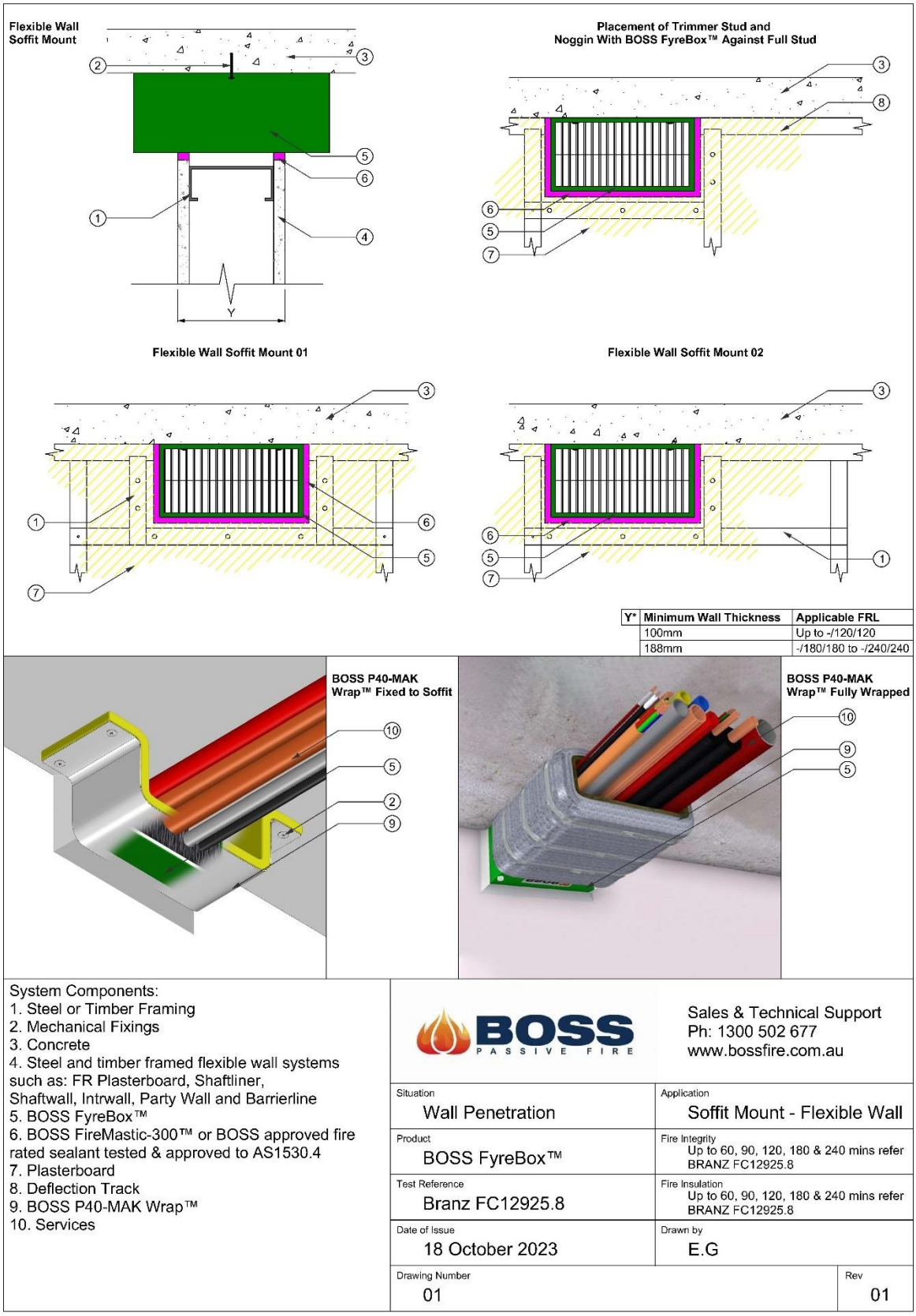
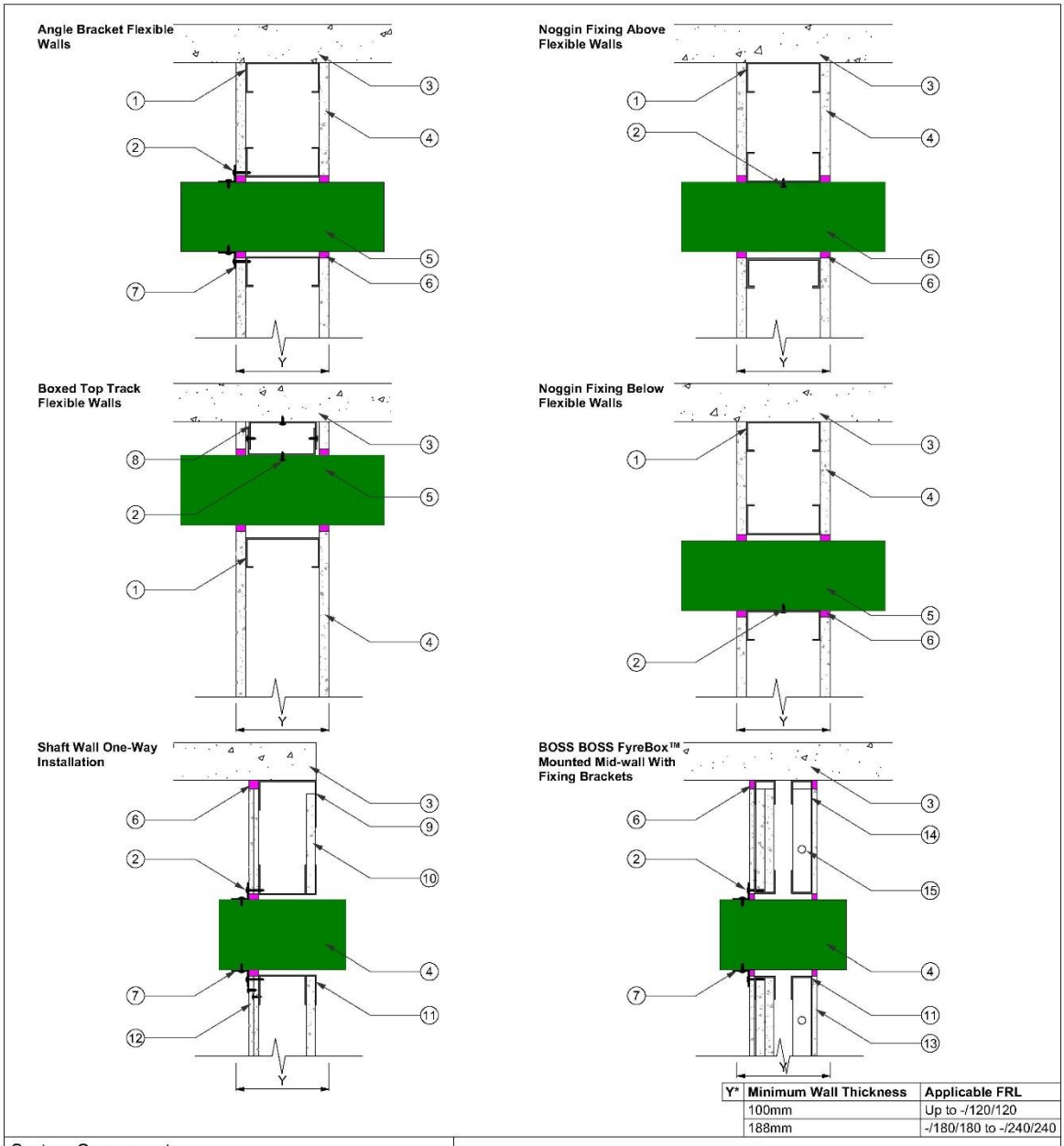


Figure 2: BOSS FyreBox™ - Mid Mount in Flexible Wall



System Components:
1. Steel or Timber Framing
2. Mechanical Fixings
3. Concrete
4. Steel and timber framed flexible wall systems such as: FR Plasterboard, Shaftliner, Shaftwall, IntRwall, Party Wall & Barrierline
5. BOSS FyreBox™
6. BOSS FireMastic-300™
7. Minimum 20m x 20mm Steel Angle
8. Boxed Track
9. J-Track
10. Shaftliner Sheet
11. Noggin
12. Riser Shaft Wall System
13. Fire Rated Plasterboard
14. Deflection Head Track
15. Metal Stud

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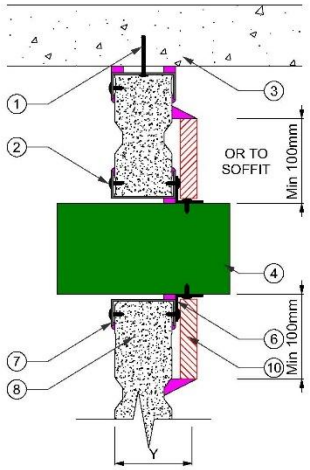
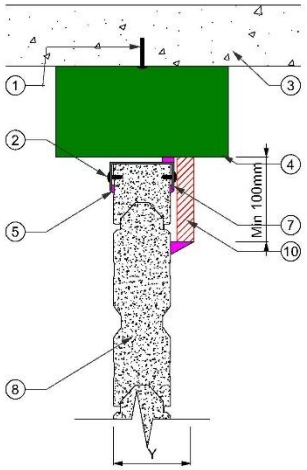
Situation: Wall Penetration	Application: Mid Mount - Flexible Wall
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 02	Rev: 01

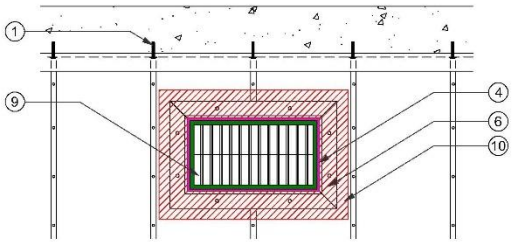
Figure 3: BOSS FyreBox™ – Mid, Soffit & Ceiling Mount in Other Wall Systems

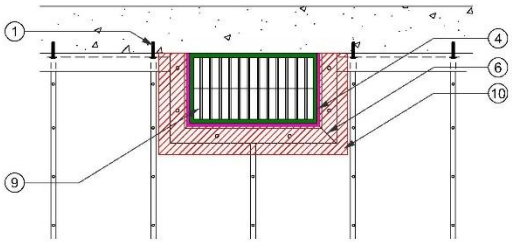
SpeedPanel, Korok, SupaPanel or Metal Clad Aerated Concrete - Mid Mount



SpeedPanel, Korok, SupaPanel or Metal Clad Aerated Concrete - Soffit Mount







Y*	Minimum Wall Thickness	Applicable FRL
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Masonry Fixings
2. SDS Screw for SpeedPanel, Korok, SupaPanel or Metal Clad Aerated Concrete
3. Concrete
4. BOSS FyreBox™
5. BOSS FireMastic-300™
6. Minimum 20m x 20mm Steel Angle
7. C-Track
8. Minimum width of 50mm with a FRL -/60/60 up to -/120/120 SpeedPanel, Korok, SupaPanel or Metal Clad Aerated Concrete - Vertical or horizontal wall orientations & 78mm ceilings.
9. Brush Seals
10. Wall Build up Required:
-FR Plasterboard -Oversize Sealant Fillet
-BOSS Batt™ -BOSS P40-MAK Wrap™

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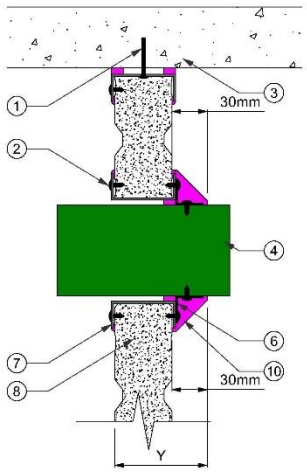
www.bossfire.com.au

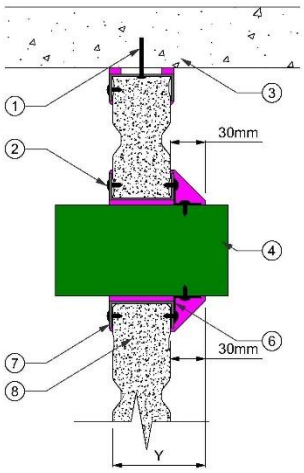
Situation: Mid, Soffit and Ceiling Mount	Application: Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 03	Rev: 01

Figure 4: BOSS FyreBox™ – Mid, Soffit & Ceiling Mount in Other Wall Systems

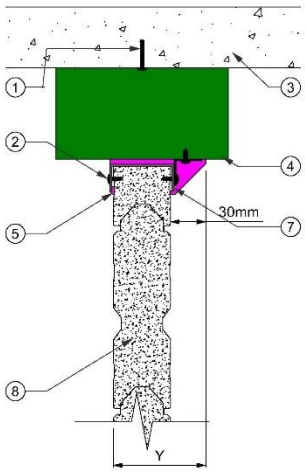
SpeedPanel, Korok, SupaPanel or Metal Clad Aerated Concrete - Mid Mount



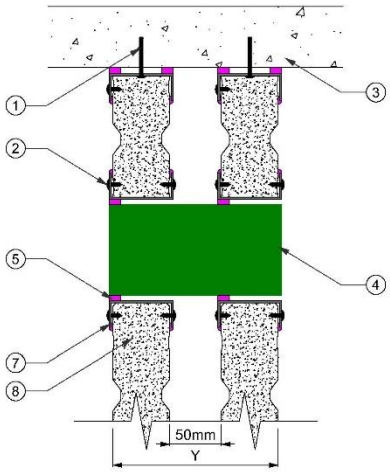
SpeedPanel, Korok, SupaPanel or Metal Clad Aerated Concrete - Mid Mount



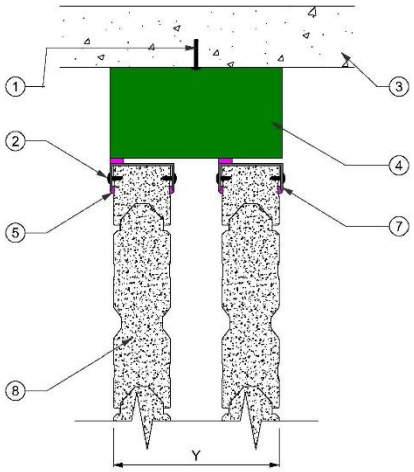
SpeedPanel, Korok, SupaPanel or Metal Clad Aerated Concrete - Soffit Mount



SpeedPanel, Korok, SupaPanel or Metal Clad Aerated Concrete - Mid Mount



SpeedPanel, Korok, SupaPanel or Metal Clad Aerated Concrete - Soffit Mount



Y*	Minimum Wall Thickness	Applicable FRL
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Masonry Fixings
2. SDS Screw for SpeedPanel, Korok, SupaPanel or Metal Clad Aerated Concrete
3. Concrete
4. BOSS FyreBox™
5. BOSS FireMastic-300™
6. Minimum 20m x 20mm Steel Angle
7. C-Track
8. Minimum width of 50mm with a FRL -/60/60 up to -/120/120 SpeedPanel, Korok, SupaPanel or Metal Clad Aerated Concrete - Vertical or horizontal wall orientations & 78mm ceilings.
9. Brush Seals
10. Wall Build up Required:
-FR Plasterboard -Oversize Sealant Fillet
-BOSS Batt™ -BOSS P40-MAK Wrap™

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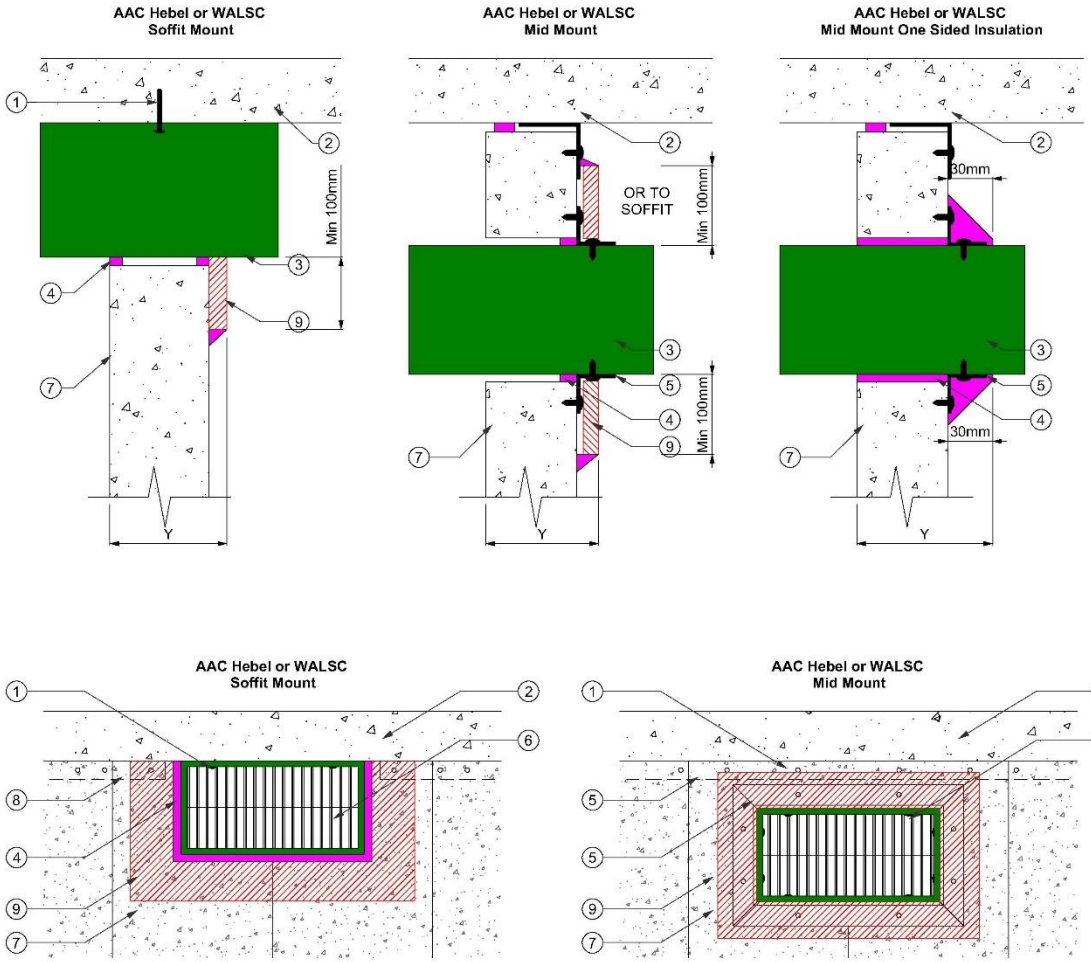
Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: Mid, Soffit and Ceiling Mount	Application: Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 04	Rev: 01

Figure 5: BOSS FyreBox™ – Mid & Soffit Mount in Concrete Systems



Y*	Minimum Wall Thickness	Applicable FRL
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Masonry Fixings
2. Concrete
3. BOSS FyreBox™
4. BOSS FireMastic-300™
5. Minimum 20m x 20mm Steel Angle
6. Brush Seals
7. AAC, Hebel or WALSC
8. Top Angle Removed at BOSS Fire® Transit Box Location
9. Wall Build up Required:
   -FR Plasterboard -Oversize Sealant Fillet
   -BOSS Batt™ -BOSS P40-MAK Wrap™

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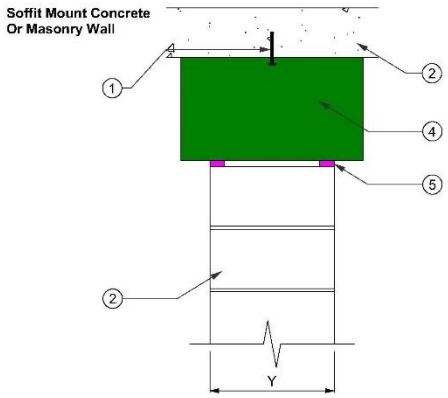
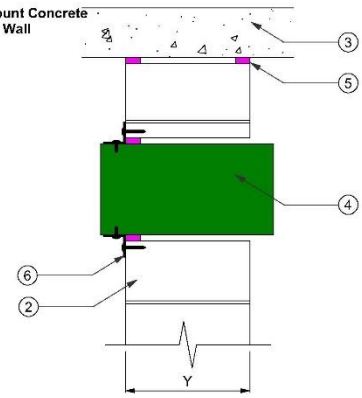
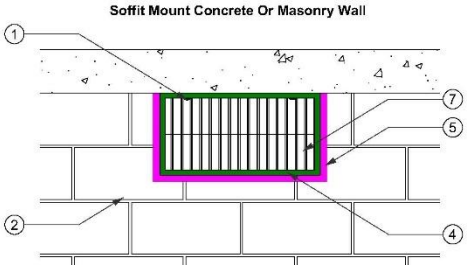
Ph: 1300 502 677
www.bossfire.com.au

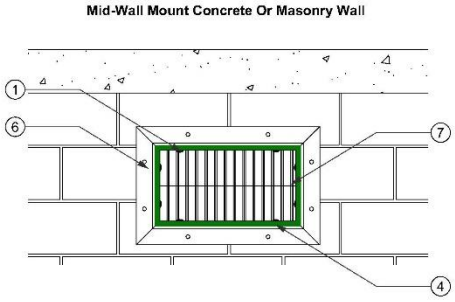
Situation: Mid Mount and Soffit Mount	Application: Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90 or 120 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90 or 120 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 05	Rev: 01

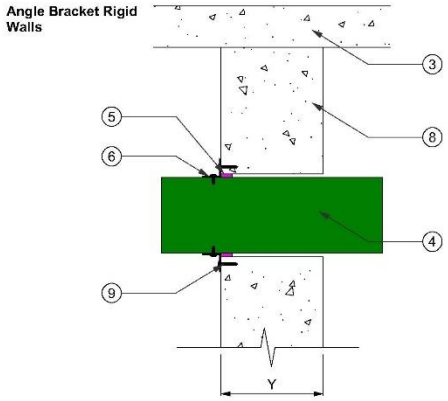
Figure 6: BOSS FyreBox™ – Mid & Soffit Mount in Concrete/Masonry Systems

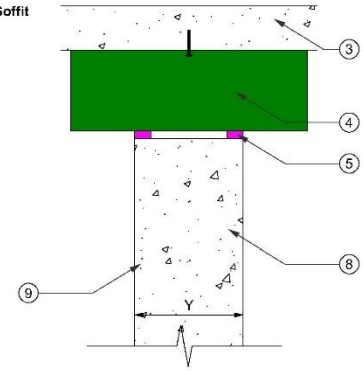












Y*	Minimum Wall Thickness	Applicable FRL
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Masonry Fixings
2. Concrete, Masonry, Solid or Hollow Block Wall
3. Concrete
4. BOSS FyreBox™
5. BOSS FireMastic-300™
6. Minimum 20m x 20mm Steel Angle
7. Brush Seals
8. Dincel and AFS
9. Mechanical Fixing

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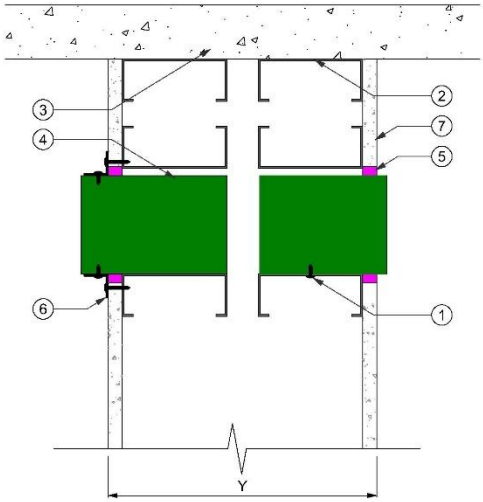
Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

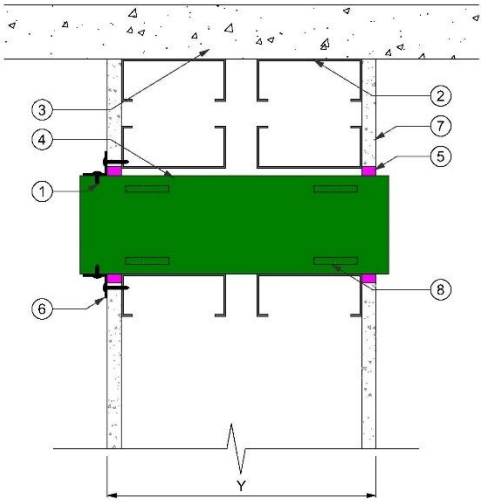
Situation: Mid Mount and Soffit Mount	Application: Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 06	Rev: 01

Figure 7: BOSS FyreBox™ – Thicker Wall Systems Above 270 mm

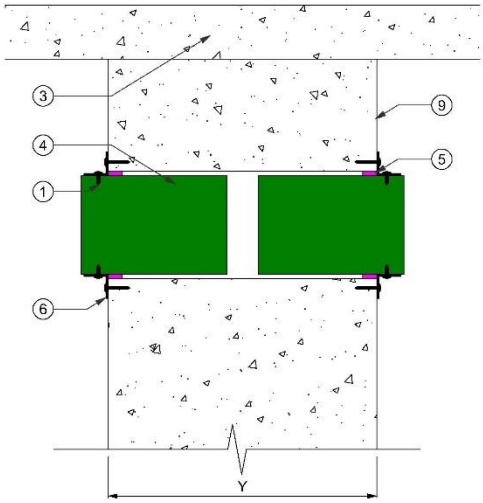
Flexible Walls Larger Than 270mm Thick



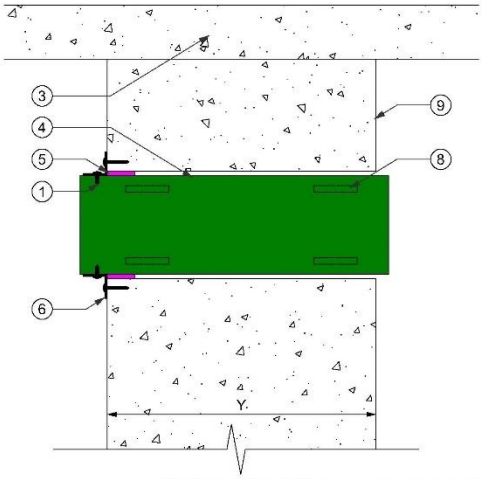
Flexible Walls Larger Than 270mm Thick



Rigid Walls Larger Than 270mm Thick



Rigid Walls Larger Than 270mm Thick



Y*	Minimum Wall Thickness	Applicable FRL
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Mechanical Fixing
2. Steel or Timber Framing
3. Concrete
4. BOSS FyreBox™
5. BOSS FireMastic-300™
6. Minimum 20m x 20mm Steel Angle
7. Steel and timber framed flexible wall systems
8. 4x Intumescent Sachets around perimeter of Transit Box at each open end. Total 8 Sachets per Transit Box
9. Concrete, Masonry, Dincel and AFS & CLT

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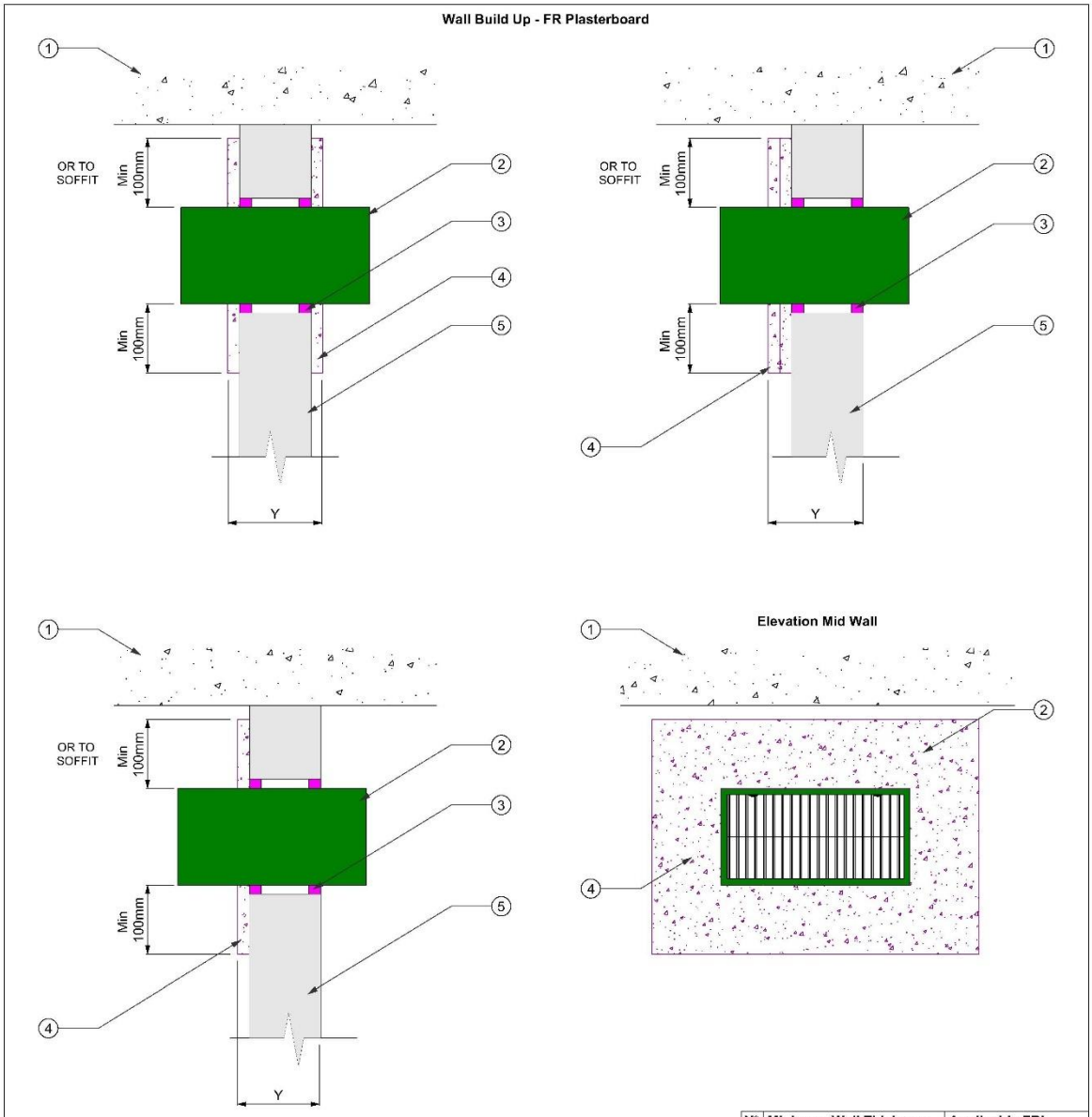
Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: Thicker Wall Systems above 270mm	Application: Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 07	Rev: 01

Figure 8: BOSS FyreBox™ – Mid Mount Built-Up Wall Systems (Plasterboard)



Y*	Minimum Wall Thickness	Applicable FRL
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Ceiling
2. BOSS FyreBox™
3. BOSS FireMastic-300™
4. FR Plasterboard
5. Wall Types:
   - -Steel or Timber Framed FR Plasterboard
   - -Concrete
   - -Solid or Hollow Masonry
   - -ACC / Hebel / WALSC
   - -Speedpanel / Korok / Supapanel
   - -Pronto Panel
   - -Shaftliner / Shaftwall
   - -IntRwall
   - -Barrierline
   - -BOSS Batt™

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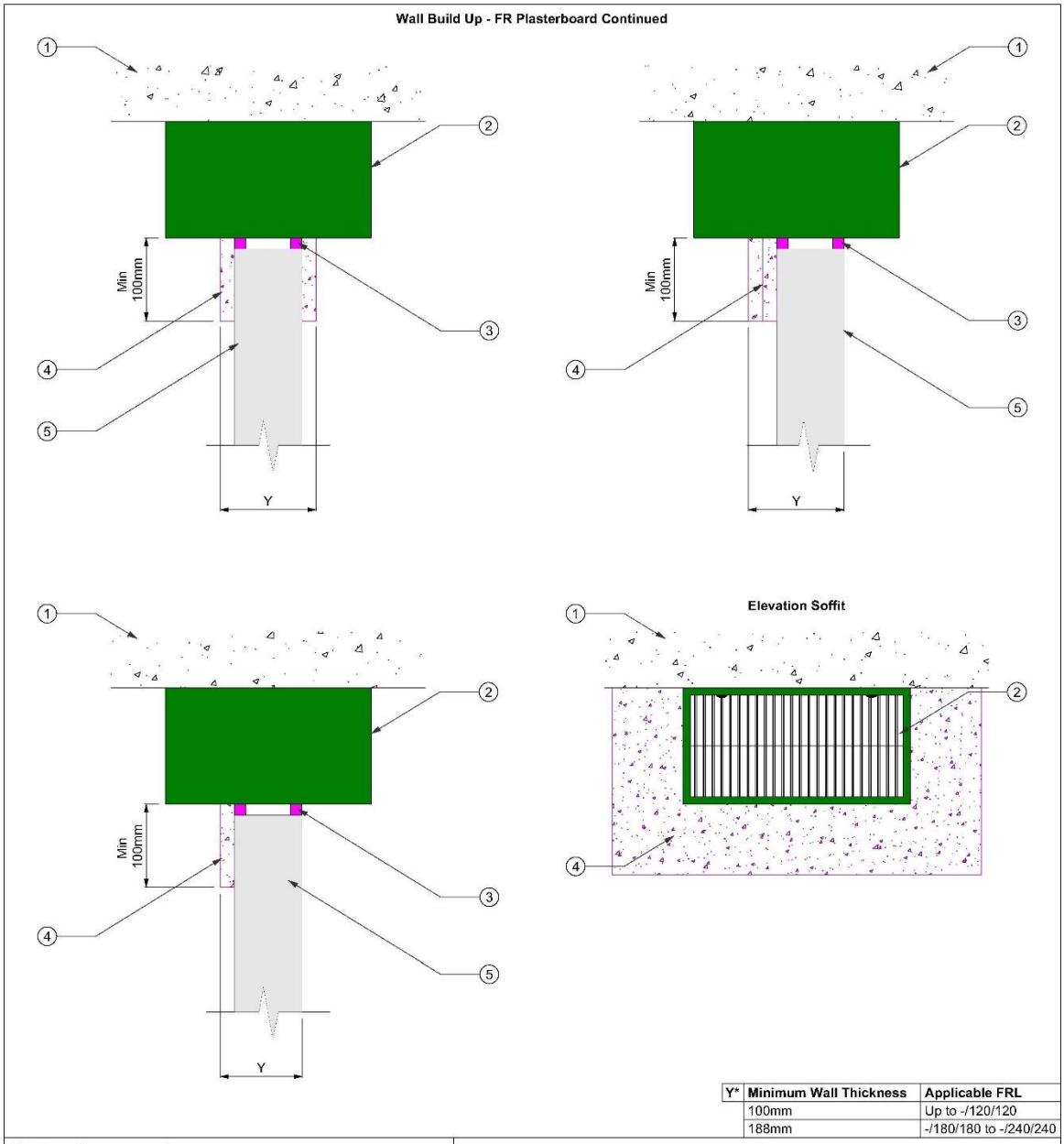
Ph: 1300 502 677
www.bossfire.com.au

Situation: FR Plasterboard - Build Up	Application: Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 08	Rev: 01

Figure 9: BOSS FyreBox™ – Soffit Mount Built-Up Wall Systems (Plasterboard)



Y*	Minimum Wall Thickness	Applicable FRL
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Ceiling
2. BOSS FyreBox™
3. BOSS FireMastic-300™
4. FR Plasterboard
5. Wall Types:
   - -Steel or Timber Framed FR Plasterboard
   - -Concrete
   - -Solid or Hollow Masonry
   - -ACC / Hebel / WALSC
   - -Speedpanel / Korok / Supapanel
   - -Pronto Panel
   - -Shaftliner / Shaftwall
   - -IntRwall
   - -Barrierline
   - -BOSS Batt™

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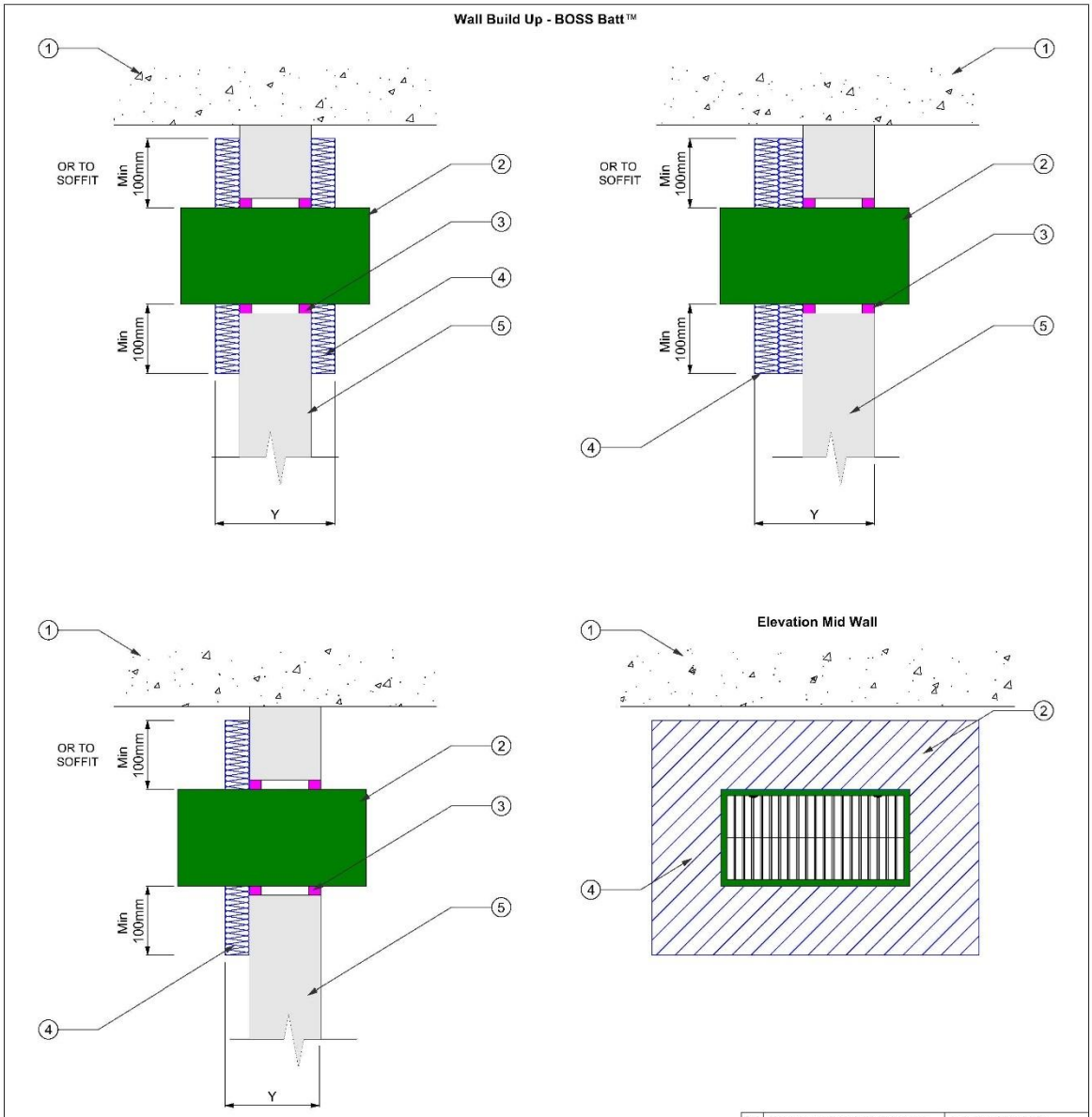
Ph: 1300 502 677
www.bossfire.com.au

Situation: FR Plasterboard - Build Up	Application: Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 09	Rev: 01

Figure 10: BOSS FyreBox™ – Mid Mount in Built-Up Wall Systems (Boss batt)



Y*	Minimum Wall Thickness	Applicable FRL
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Ceiling
2. BOSS FyreBox™
3. BOSS FireMastic-300™
4. BOSS Batt™
5. Wall Types:
   - -Steel or Timber Framed FR Plasterboard
   - -Concrete
   - -Solid or Hollow Masonry
   - -ACC / Hebel / WALSC
   - -Speedpanel / Korok / Supapanel
   - -Pronto Panel
   - -Shaftliner / Shaftwall
   - -IntRwall
   - -Barrierline
   - -BOSS Batt™

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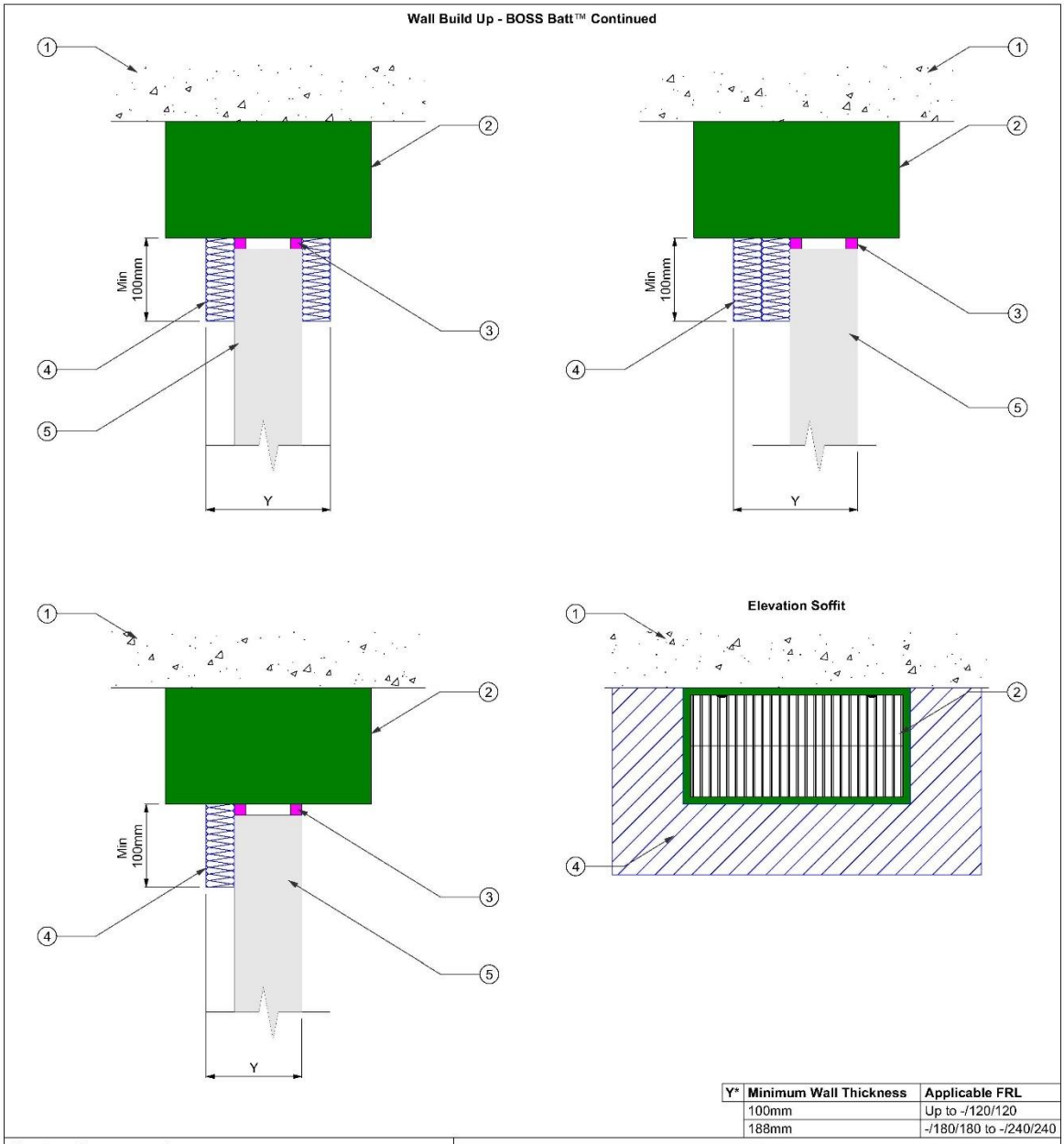
Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: BOSS Batt™ - Build Up	Application: Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 10	Rev: 01

Figure 11: BOSS FyreBox™ – Soffit Mount in Built-Up Wall Systems (Boss batt)



Y*	Minimum Wall Thickness	Applicable FRL
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Ceiling
2. BOSS FyreBox™
3. BOSS FireMastic-300™
4. BOSS Batt™
5. Wall Types:
   - -Steel or Timber Framed FR Plasterboard
   - -Concrete
   - -Solid or Hollow Masonry
   - -ACC / Hebel / WALSC
   - -Speedpanel / Korok / Supapanel
   - -Pronto Panel
   - -Shaftliner / Shaftwall
   - -IntRwall
   - -Barrierline
   - -BOSS Batt™

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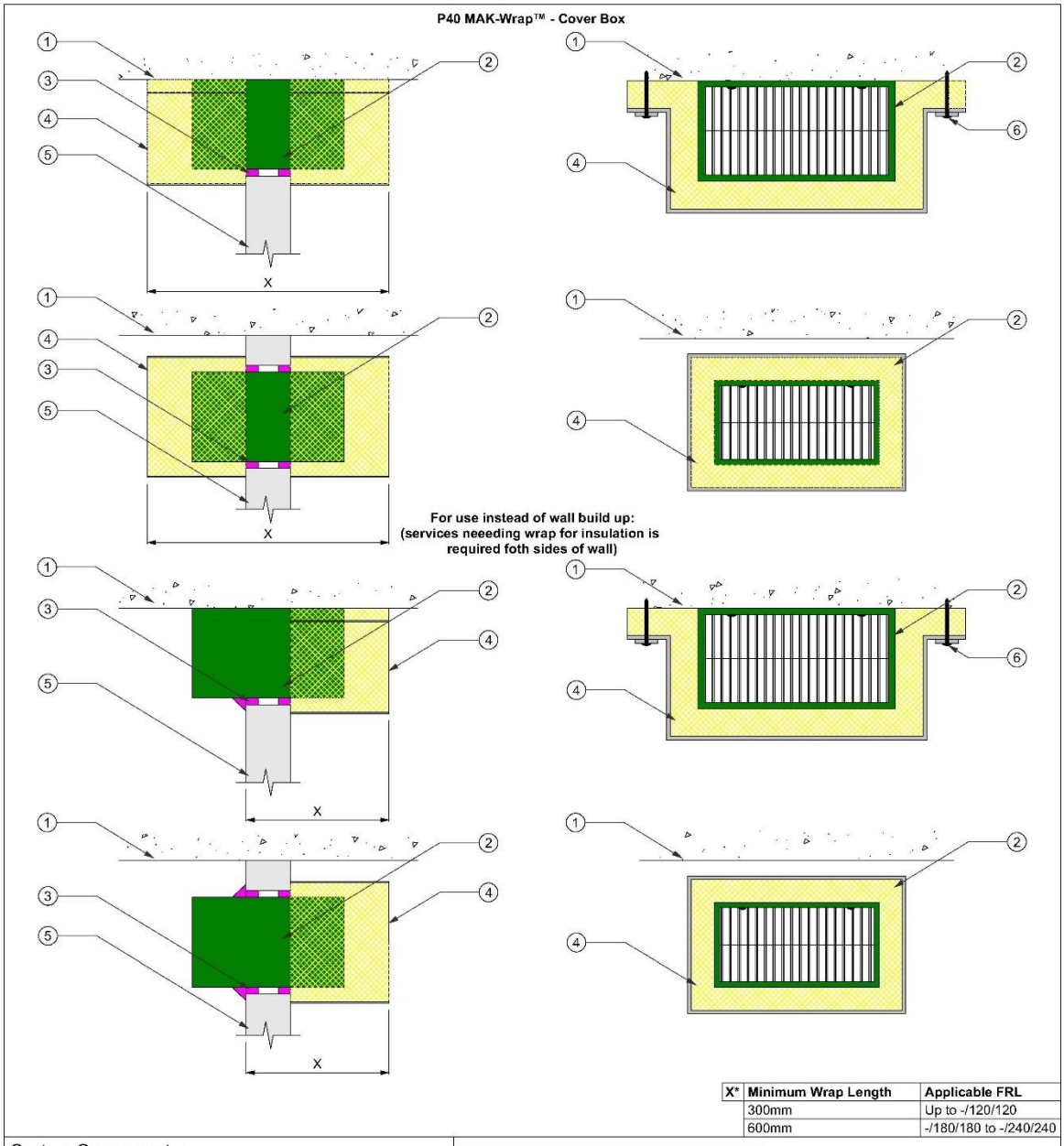
Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: BOSS Batt™ - Build Up	Application: Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 11	Rev: 01

Figure 12: BOSS FyreBox™ – Soffit and Mid Mount with P40-MAK Wrap (1)



X*	Minimum Wrap Length	Applicable FRL
	300mm	Up to -/120/120
	600mm	-/180/180 to -/240/240

System Components:
1. Ceiling
2. BOSS FyreBox™
3. BOSS FireMastic-300™
4. P40 MAK-Wrap™
5. Wall Types:
   - -Steel or Timber Framed FR Plasterboard
   - -Concrete
   - -Solid or Hollow Masonry
   - -ACC / Hebel / WALSC
   - -Speedpanel / Korok / Supapanel
   - -Pronto Panel
   - -Shaftliner / Shaftwall
   - -IntRwall
   - -Barrierline
   - -BOSS Batt™
6. Mechanical Fixing with Flat Bar or Large Washers

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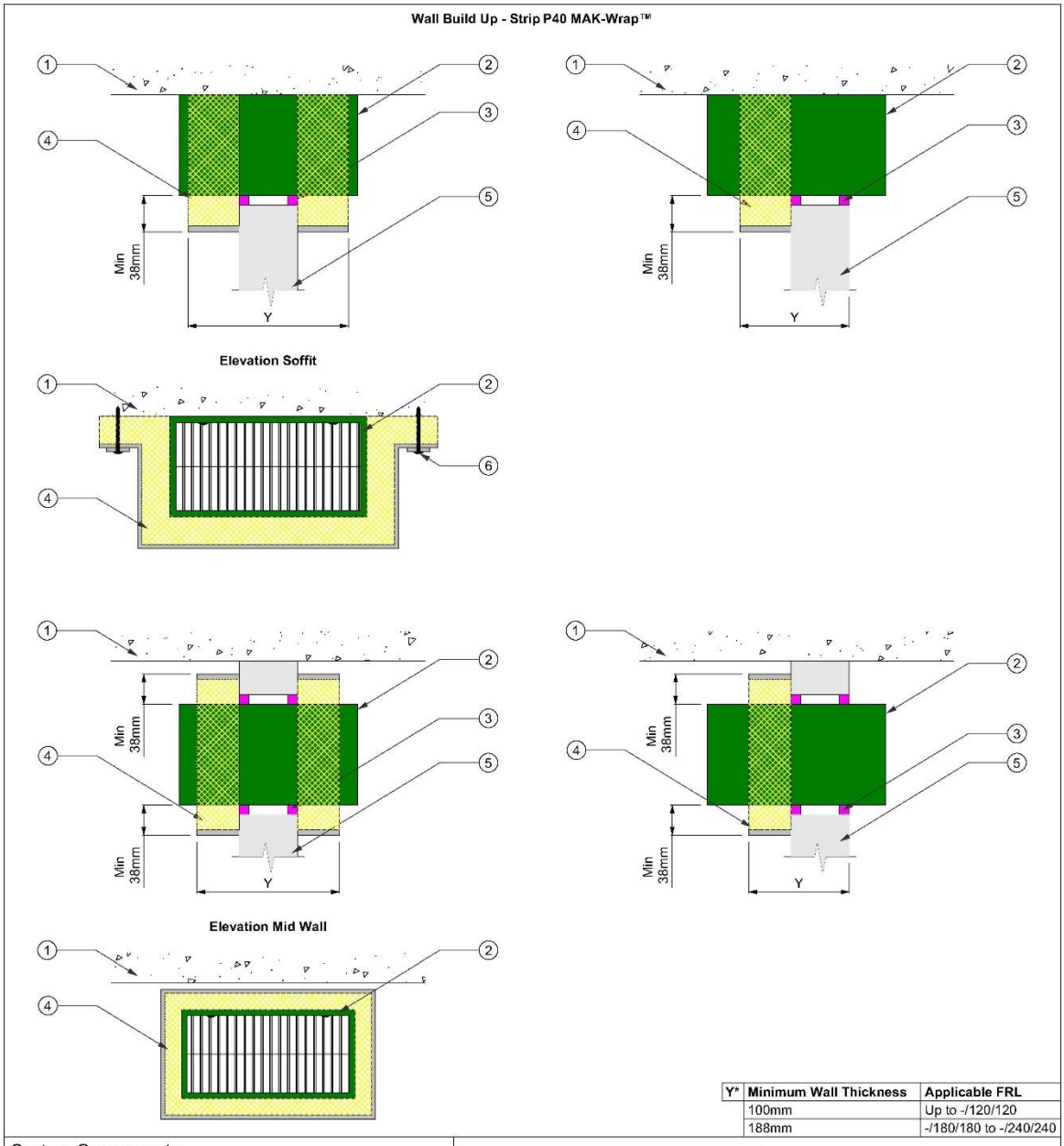
Ph: 1300 502 677
www.bossfire.com.au

Situation	Application
P40 MAK-Wrap™ - Cover Box	Other Wall Systems
Product	**Fire Integrity**
BOSS FyreBox™	Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference	**Fire Insulation**
Branz FC12925.8	Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue	**Drawn by**
18 October 2023	E.G
Drawing Number	**Rev**
12	01

Figure 13: BOSS FyreBox™ – Soffit and Mid Mount with P40-MAK Wrap (2)



Y*	Minimum Wall Thickness	Applicable FRL
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Ceiling
2. BOSS FyreBox™
3. BOSS FireMastic-300™
4. BOSS P40 MAK-Wrap™
5. Wall Types:
   - -Steel or Timber Framed FR Plasterboard
   - -Concrete
   - -Solid or Hollow Masonry
   - -ACC / Hebel / WALSC
   - -Speedpanel / Korok / Supapanel
   - -Pronto Panel
   - -Shaftliner / Shaftwall
   - -IntRwall
   - -Barrierline
   - -BOSS Batt™
6. Mechanical Fixing with Flat Bar or Large Washers

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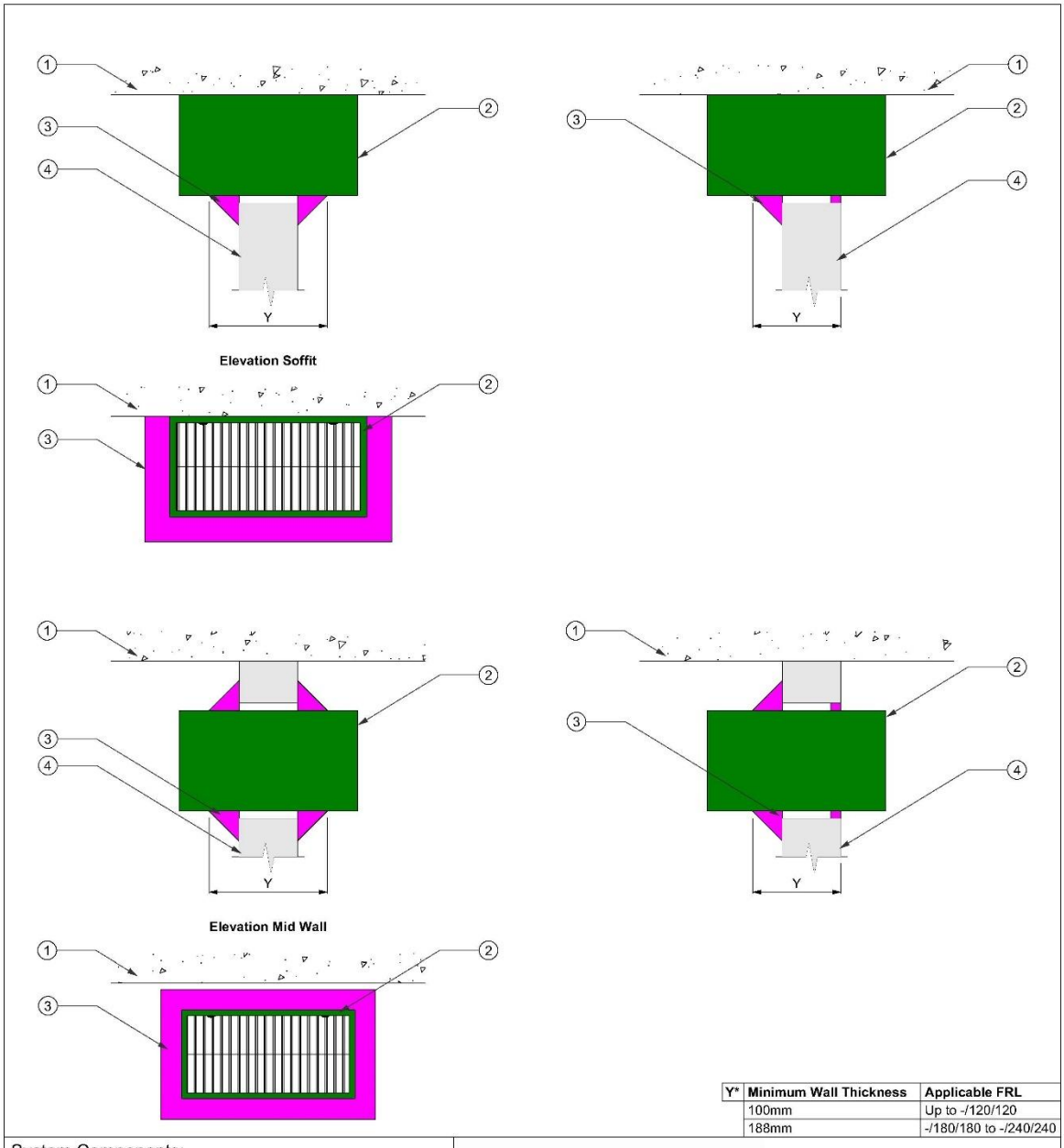
Ph: 1300 502 677
www.bossfire.com.au

Situation	Application
P40 MAK-Wrap™ Shield	Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 13	Rev: 01

Figure 14: BOSS FyreBox™ – Soffit and Mid wall Mount with Sealant (1)



Y*	Minimum Wall Thickness	Applicable FRL
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Ceiling
2. BOSS FyreBox™
3. BOSS FireMastic-300™
4. Wall Types:
   - -Steel or Timber Framed FR Plasterboard
   - -Concrete
   - -Solid or Hollow Masonry
   - -ACC / Hebel / WALSC
   - -Speedpanel / Korok / Supapanel
   - -Pronto Panel
   - -Shaftliner / Shaftwall
   - -IntRwall
   - -Barrierline
   - -BOSS Batt™

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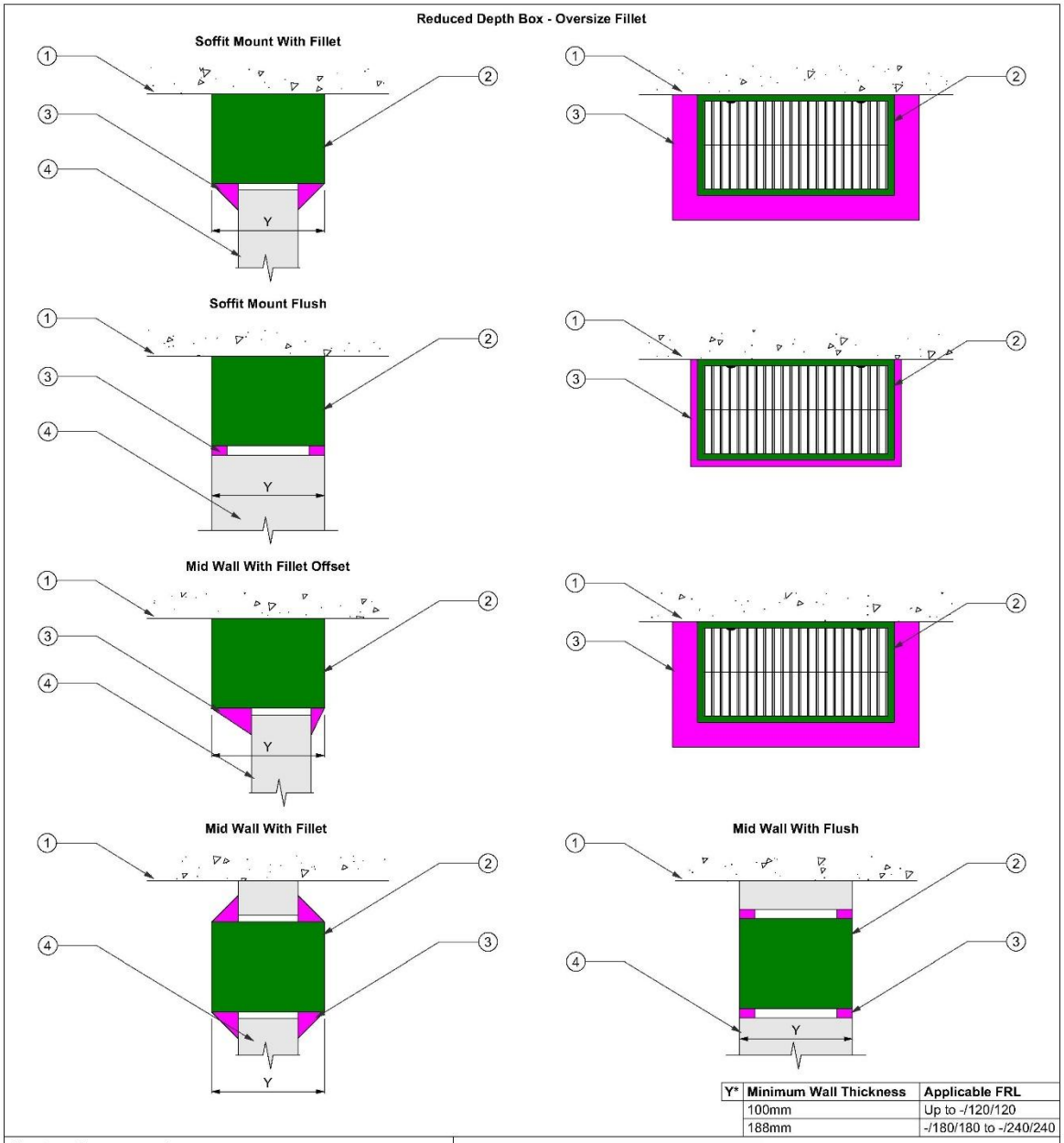
Ph: 1300 502 677
www.bossfire.com.au

Situation: Oversize FireMastic-300™ Fillet	Application: Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 14	Rev: 01

Figure 15: BOSS FyreBox™ – Soffit and Mid wall Mount with Sealant (2)



Y*	Minimum Wall Thickness	Applicable FRL
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Ceiling
2. BOSS FyreBox™
3. BOSS FireMastic-300™
4. Wall Types:
   - -Steel or Timber Framed FR Plasterboard
   - -Concrete
   - -Solid or Hollow Masonry
   - -ACC / Hebel / WALSC
   - -Speedpanel / Korok / Supapanel
   - -Pronto Panel
   - -Shaftliner / Shaftwall
   - -IntRwall
   - -Barrierline
   - -BOSS Batt™

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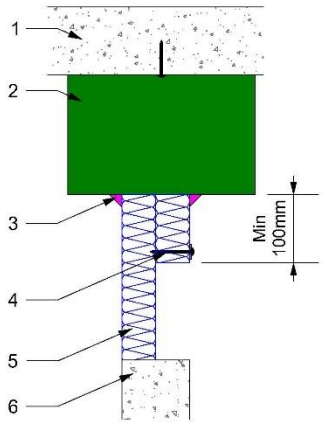
Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

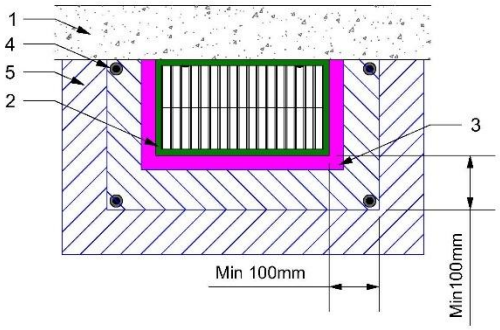
Situation: Flush Mount Installs (Reduced Box Depth)	Application: Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 15	Rev: 01

Figure 16: BOSS FyreBox™ – Installation in BOSS Batt Infill Panel. - Soffit Mount & Mid Wall Mount – Rigid Walls. – 60min FRL

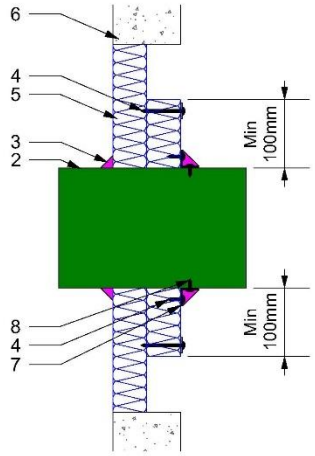
Soffit Mount Section



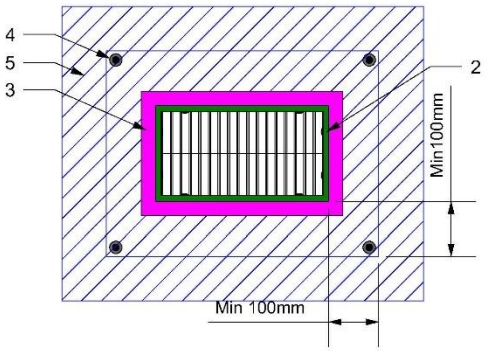
Soffit Mount Elevation



Soffit Mount Section



Mid Wall Mount Elevation



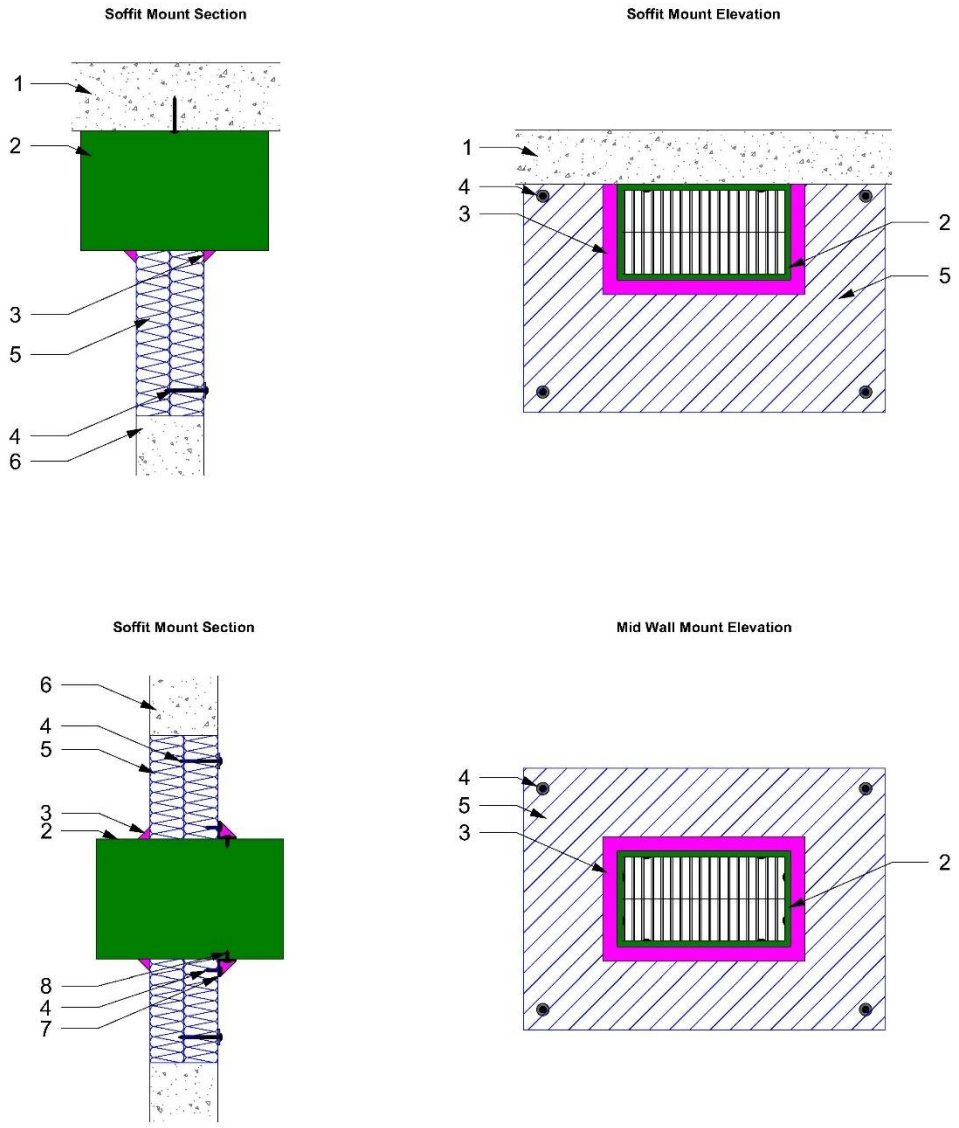
System Components:
1. Concrete Slab
2. BOSS FyreBox™
3. BOSS FireMastic-300™
4. Pig Tail Screws (with large washer when to Batt)
5. BOSS Batt™
6. All rigid walls with an FRL as specified in BRANZ FC12925-001 including Concrete, Masonry,Speedpanel, Korok, Supapanel, ACC, Hebel, WALSC, AFS & Dincel.
7. Minimum 20mm x 20mm Steel Angle
8. Self Drilling Metal Screw

BOSS PASSIVE FIRE

Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: Flush Mount Installs (Reduced Box Depth)	Application: BOSS Batt™
Product: BOSS FyreBox™	Fire Integrity: 60 mins ref BRANZ FC12925.8
Test Reference: BOSS FC12925.8	Fire Insulation: 60 mins ref BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 16	Rev: 01

Figure 17: BOSS FyreBox™ – Installation in BOSS Batt Infill Panel. - Soffit Mount & Mid Wall Mount – Rigid Walls – 60, 90 & 120min FRL



System Components:
1. Concrete Slab
2. BOSS FyreBox™
3. BOSS FireMastic-300™
4. Pig Tail Screws (with large washer when to Batt)
5. BOSS Batt™
6. All rigid walls with an FRL as specified in BRANZ FC12925-001 including Concrete, Masonry, Speedpanel, Korok, Supapanel, ACC, Hebel, WALSC, AFS & Dincel.
7. Minimum 20mm x 20mm Steel Angle
8. Self Drilling Metal Screw

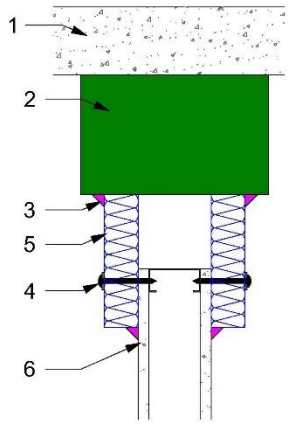
BOSS PASSIVE FIRE

Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

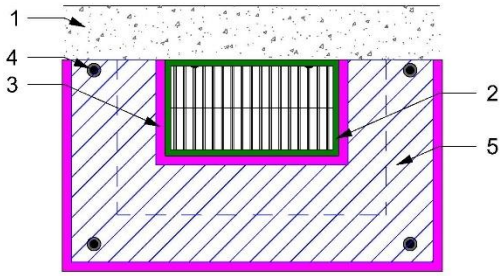
Situation: Flush Mount Installs (Reduced Box Depth)	Application: BOSS Batt™
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90 or 120 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90 or 120 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 17	Rev: 01

Figure 18: BOSS FyreBox™ – Installation in BOSS Batt Infill Panel. - Soffit Mount & Mid Wall Mount –Flexible Walls – 60, 90 & 120min FRL

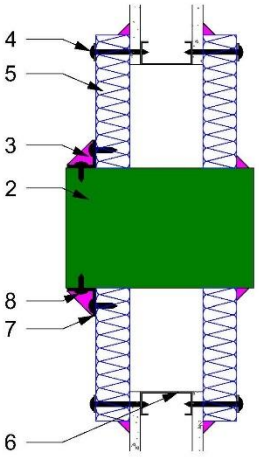
Soffit Mount Section



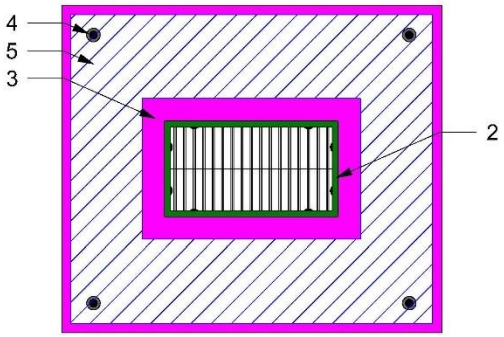
Soffit Mount Elevation



Soffit Mount Section



Mid Wall Mount Elevation



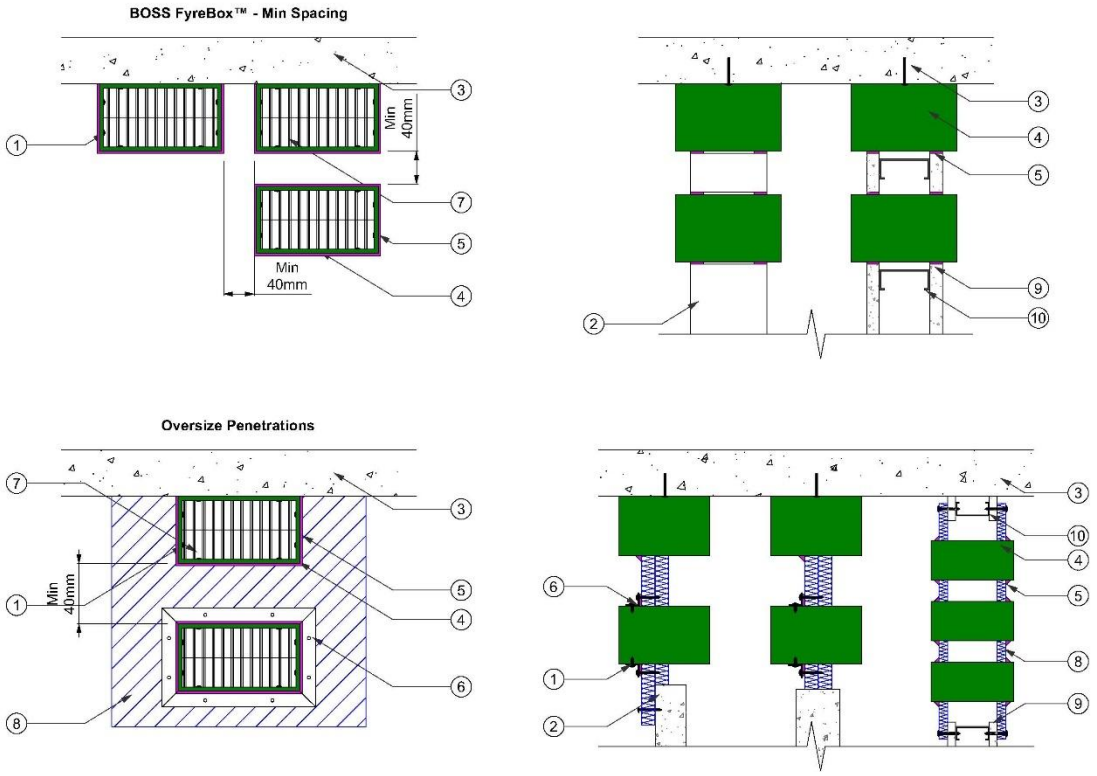
System Components:
1. Concrete Slab
2. BOSS FyreBox™
3. BOSS FireMastic-300™
4. Pig Tail Screws (with large washer when to Batt)
5. BOSS Batt™
6. All flexible walls with an FRL as specified in BRANZ FC12925-001 including Fire Rated Plasterboard, Shaftliner, Shaftwall, Partiwall, Party Wall, Barrierline & Intrwall.
7. Minimum 20mm x 20mm Steel Angle
8. Self Drilling Metal Screw

BOSS PASSIVE FIRE

Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: Flush Mount Installs (Reduced Box Depth)	Application: BOSS Batt™
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90 or 120 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90 or 120 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 18	Rev: 01

Figure 19: BOSS FyreBox™ – Multiple Units



System Components:
1. Mechanical Fixings
2. All Rigid walls with an FRL as specified in Branz FC 12925 including Concrete, Masonry, Speedpanel, Korok, Supapanel, AAC, Hebel, WALSC, AFS & Dincel.
3. Concrete
4. BOSS FyreBox™
5. BOSS FireMastic-300™
6. Minimum 20m x 20mm Steel Angle
7. Brush Seals
8. BOSS Batt™ single for -/60/60 double for -/120/120
9. All flexible walls with an FRL as specified in Branz FC 12925 including FR Plasterboard, Shaftwall / Shaftliner, Barrierline, IntRwall and Partywall systems.
10. Steel Framing

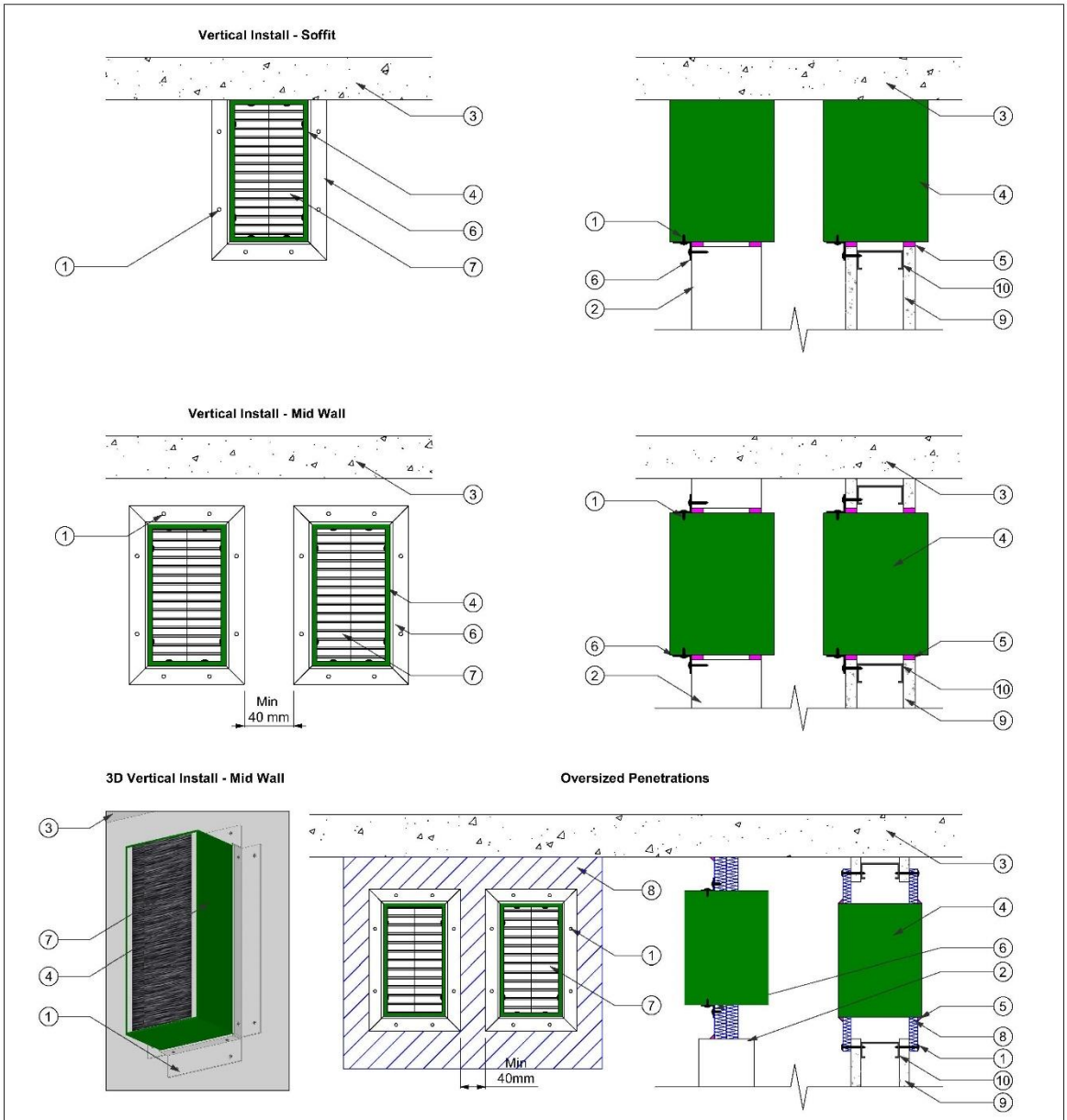
* In accordance with clause 4.9.3 of AS4072.1-2005 Seperate services can be fitted in a modular form in the approved construction element with minium 40mm seperation

BOSS PASSIVE FIRE

Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: Mid Mount and Soffit Mount	Application: Wall & Batt Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 or 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90 120, 180 or 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 19	Rev: 01

Figure 20: BOSS FyreBox™ – Vertical Installation



System Components:
1. Mechanical Fixings
2. All Rigid walls with an FRL as specified in Branz FC 12925 including Concrete, Masonry, Speedpanel, Korok, Supapanel, AAC, Hebel, WALSC, AFS & Dincel.
3. Concrete
4. BOSS FyreBox™
5. BOSS FireMastic-300™
6. Minimum 20m x 20mm Steel Angle
7. Brush Seals
8. BOSS Batt™ single for -/60/60 double for -/120/120
9. All flexible walls with an FRL as specified in Branz FC 12925 including FR Plasterboard, Shaftwall / Shaftliner, Barrierline, IntRwall and Partywall systems.
10. Steel Framing

* In accordance with clause 4.9.3 of AS4072.1-2005 Seperate services can be fitted in a modular form in the approved construction element with minium 40mm seperation

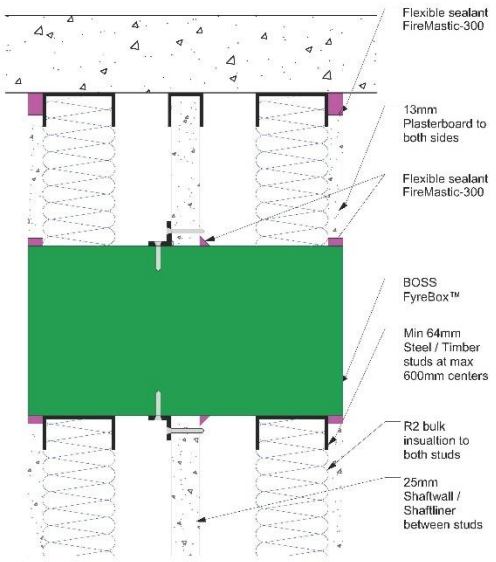
BOSS PASSIVE FIRE

Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

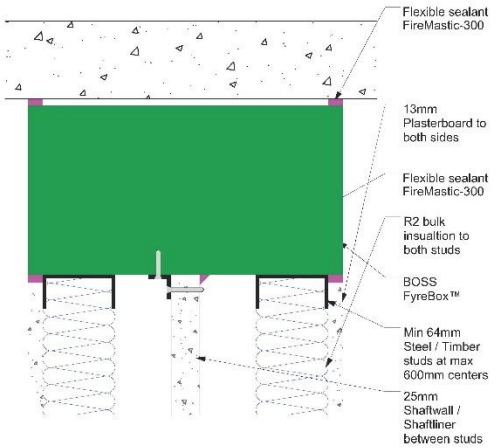
Situation: Vertical Orientation Mid Mount and Soffit Mount	Application: Wall & Batt Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 20	Rev: 01

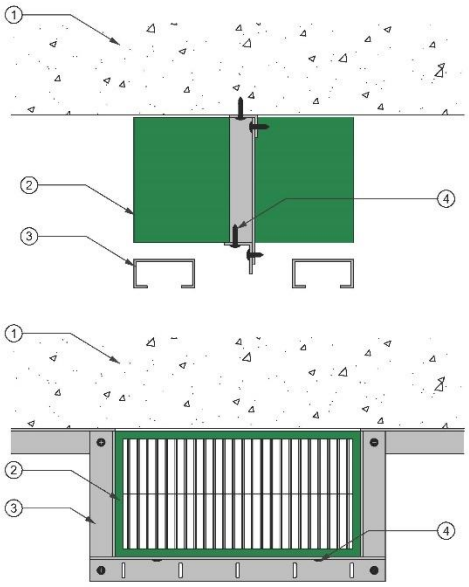
Figure 21: BOSS FyreBox™ – Party Wall systems

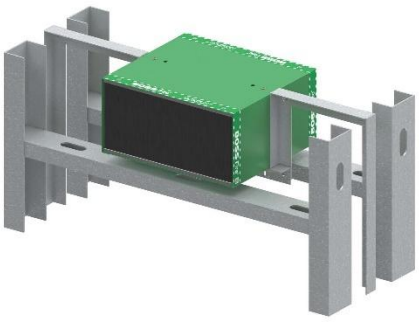
Residential Party Walls - Mid Mount



Residential Party Walls - Soffit Mount







System Components:
1. Concrete
2. BOSS FyreBox™
3. Steel Framing
4. Mechanical Fixing

Services Summary:

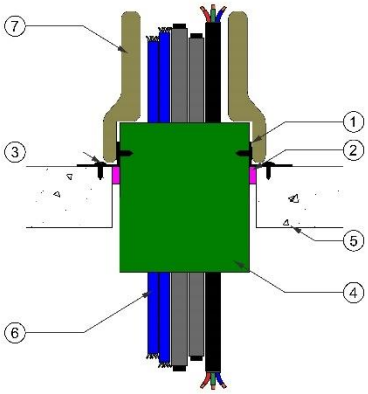
1. To ensure support to plasterboard linings, additional studs may be required.
2. If the BOSS FyreBox™ is installed adjacent to a full length vertical stud then an additional trimmer stud and noggin may be required.
3. If the BOSS FyreBox™ is installed centrally between full length vertical studs, then 2 additional trimmer studs may be required.
4. Mid-wall applications can be fixed to the wall or plasterboard facing via a surface mounted angle flange bracket, minimum 20x20mm.
5. BOSS FireMastic-300TM to be used for perimeter seal and smoke seal around Boss Fire Transit Box.
6. For Shaft Wall applications with access from one side only face fit Angle Bracket to shaft lining and fasten to both BOSS FyreBox™and wall face. For Angle Brackets mounted on both wall faces, fasten to wall face only.
7. Consult test approval and Tech Data Sheet for more information.

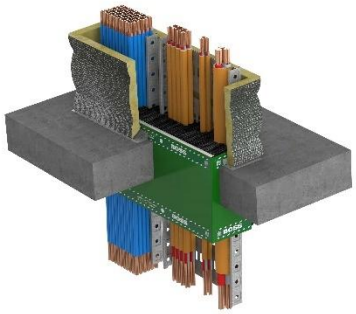
BOSS PASSIVE FIRE

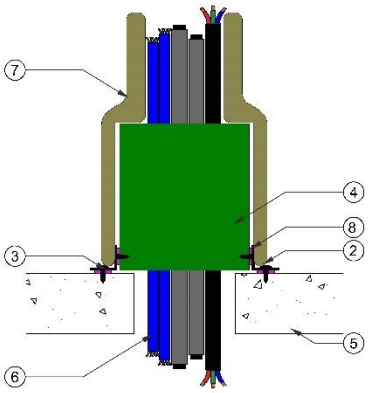
Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

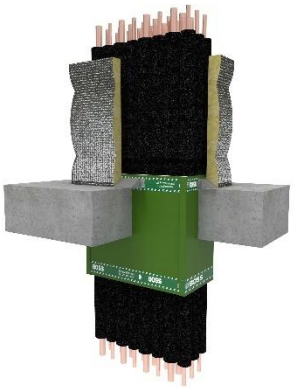
Situation: Boss Fire Transit Box in Party Wall Systems	Application: Mid wall or soffit wall mount
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90 & 120 mins refer BRANZ FC12925.8
Test Refrence: Branz FC12925.8	Fire Insulation: Up to 60, 90, & 120 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn By: E.G
Drawing Number: 21	Rev: 01

Figure 22: BOSS FyreBox™ – Installation in concrete floor slab









System Components:
1. Min 20mm x 40mm with 40mm side against the concrete
2. BOSS FireMastic-300™
3. Mechanical Fixing
4. BOSS FyreBox™
5. Concrete
6. Services
7. BOSS P40-MAK Wrap™
8. Min 20mm x 20mm Angle

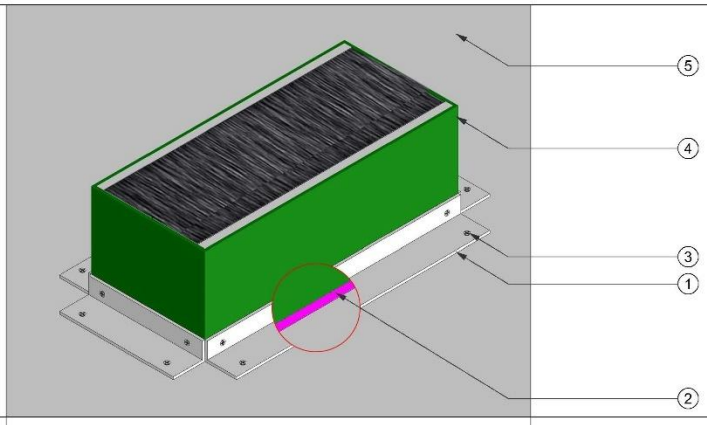
BOSS PASSIVE FIRE

Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

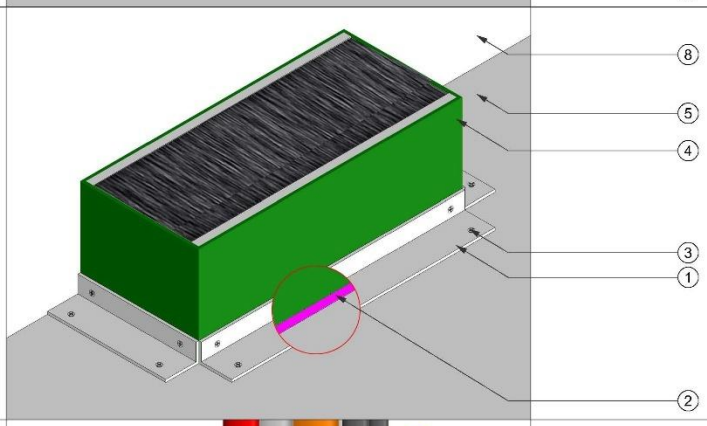
Situation: Floor Slab Penetration	Application: Concrete Floor Slab
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 22	Rev: 01

Figure 23: BOSS FyreBox™ – Floor installation

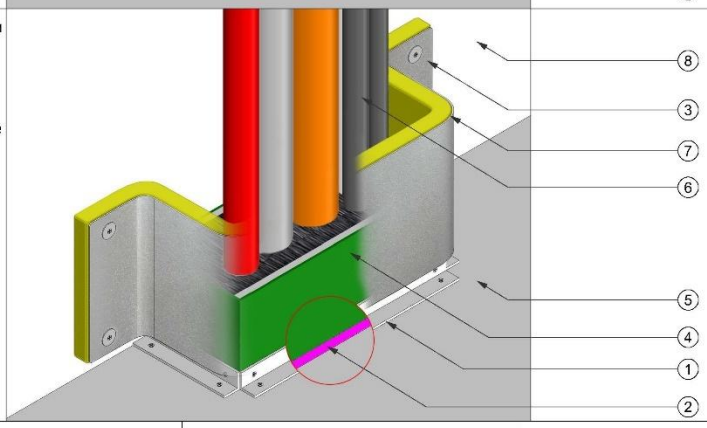
Where BOSS FyreBox™ penetrates or sits atop or underside a floor slab 20mm x 20mm equal angle must be fitted to all four side of box. Where box penetrates slab a 20 x 40mm angle will be required.



Where BOSS FyreBox™ penetrates or sits atop or underside a floor slab and is hard against a wall. 20mm x 20mm equal angle fixed to floor slab on 3 available faces. Where box penetrates slab a 20 x 40mm angle will be required.



Where BOSS P40-MAK Wrap™ cannot wrap around all four sides of the services due to services being against a wall or soffit P40-MAK Wrap™ Can be fixed to wall or soffit using suitable fixings and washers for substrate.



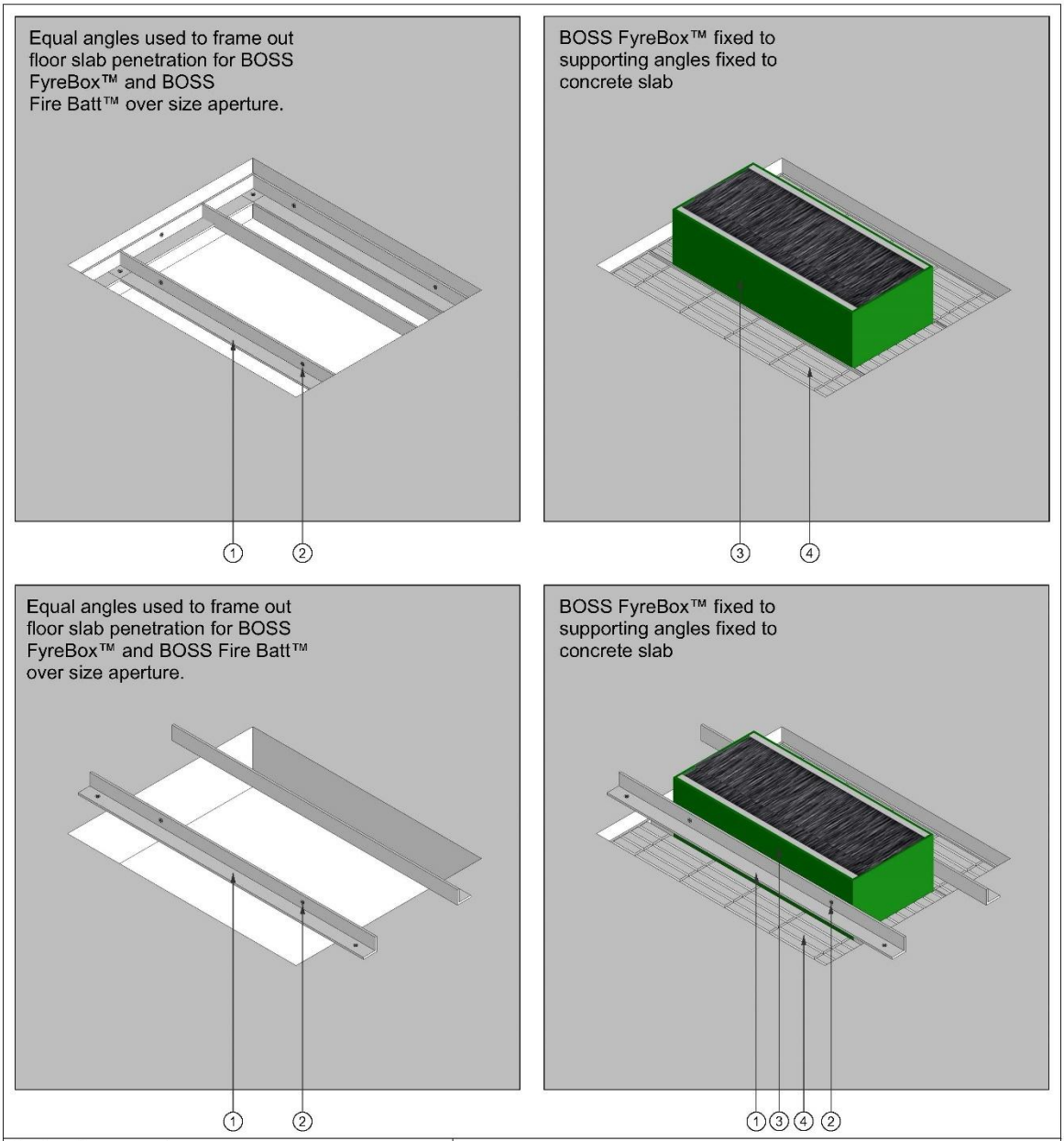
System Components:
1. 20mm x 40mm Angle when box penetrates concrete. Min 20mm x 20mm Anlge when box fixed, to top or underside of floor.
2. BOSS FireMastic-300™
3. Mechanical Fixing
4. BOSS FyreBox™
5. Concrete
6. Services
7. BOSS P40-MAK Wrap™
8. Wall

BOSS PASSIVE FIRE

Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: Floor slab Penetration -Mid Floor -Up against Wall	Application: Concrete Floor Slab
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 23	Rev: 01

Figure 24: BOSS FyreBox™ – Floor Installation with Large Opening



System Components:
1. Minimum 20mm x 20mm Steel Angle
2. Mechanical Fixing
3. BOSS FyreBox™
4. BOSS Fire Batt™

*BOSS Fire Batt™ Infill:
Single Layer 50mm = FRL -/60/60
Double Layer 100mm = FRL -/120/120

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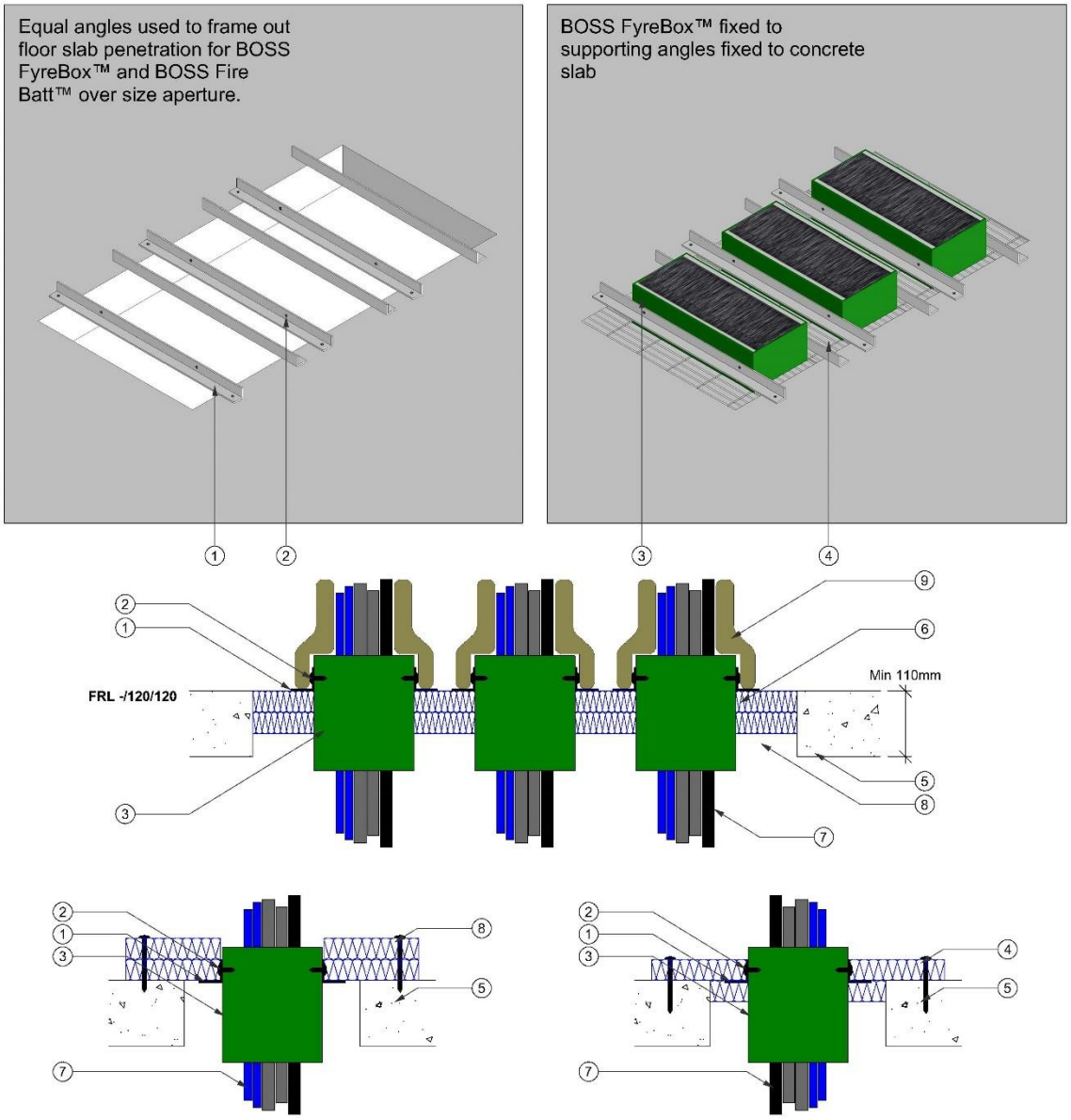
Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: Oversize Floor Penetration	Application: Concrete Floor Slab
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 24	Rev: 01

Figure 25: BOSS FyreBox™ – Multiple in Floor Slab



System Components:
1. Minimum 20mm x 20mm Steel Angle
2. Mechanical Fixing
3. BOSS FyreBox™
4. 50mm BOSS Fire Batt™
5. Concrete
6. BOSS FireMastic-300™
7. Services
8. Double 50mm BOSS Batt™
9. BOSS P40-MAK Wrap™

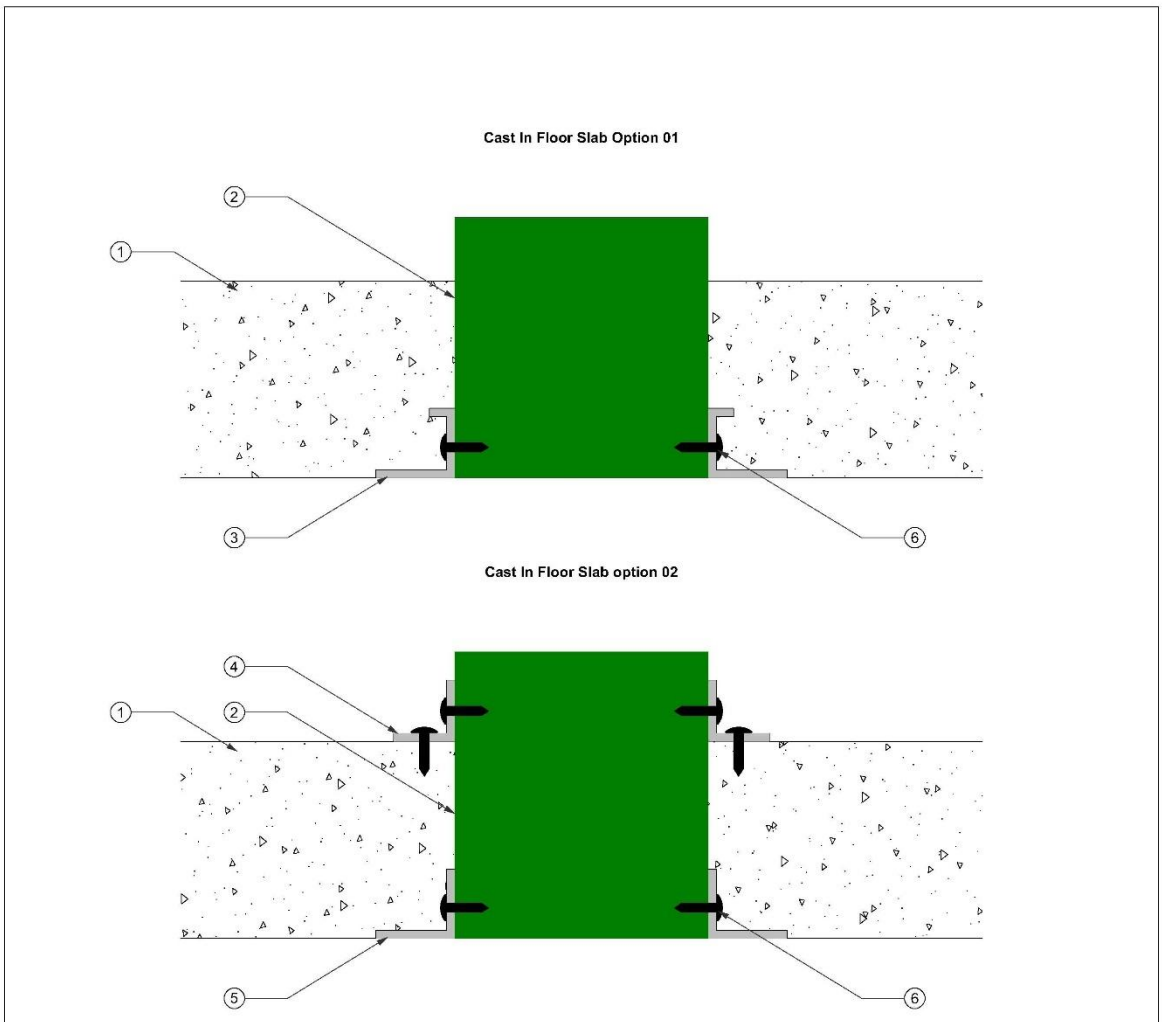
*In accordance with clause 4.9.3 of AS4072.1-2005 seperating services can be fitted in a modular form in the approved construction element with minimum 40mm seperation.
*BOSS Fire Batt™ Infill:
Single Layer 50mm = FRL -/60/60
Double Layer 100mm = FRL -/120/120

BOSS PASSIVE FIRE

Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: Oversize Floor Penetration	Application: Concrete Floor Slab
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 25	Rev: 01

Figure 26: BOSS FyreBox™ – Concrete Slab Cast-In Installation



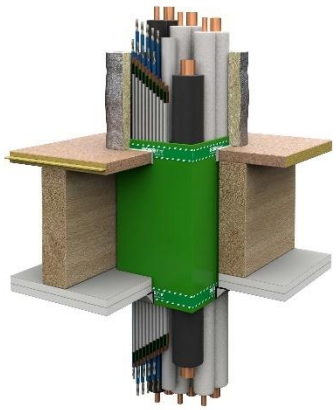
System Components:
1. Concrete Slab
2. BOSS FyreBox™
3. Pre-attached J-Track to box perimeter
4. Retrofit Min 20mm x 20mm Angle to box perimeter
5. Pre-attached angle to box perimeter
6. Mechanical Fixing

BOSS PASSIVE FIRE

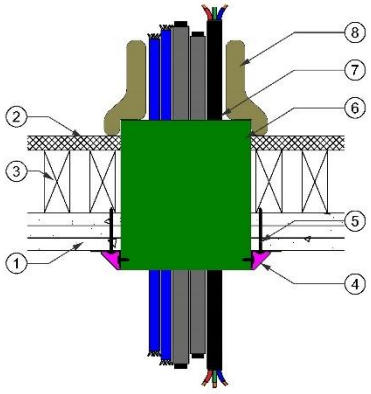
Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: Cast In Floor Slab	Application: Other Wall Systems
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 26	Rev: 01

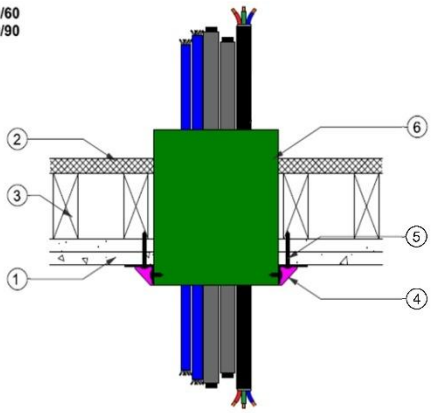
Figure 27: BOSS FyreBox™ – Floor/Ceiling Systems



FRL -/120/120



FRL -/60/60
FRL -/90/90



System Components:
1. 13mm FR Plasterboard
2. 19mm Chipboard Flooring
3. Wooden Floor Joist
4. BOSS FireMastic-300™
5. Mechanical Fixing
6. BOSS FyreBox™
7. Services
8. BOSS P40-MAK Wrap™

BOSS PASSIVE FIRE

Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: Floor + Ceiling Penetration	Application: Floor + Ceiling
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90 & 120mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90 & 120 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 27	Rev: 01

Figure 28: BOSS FyreBox™ – Technical Drawing

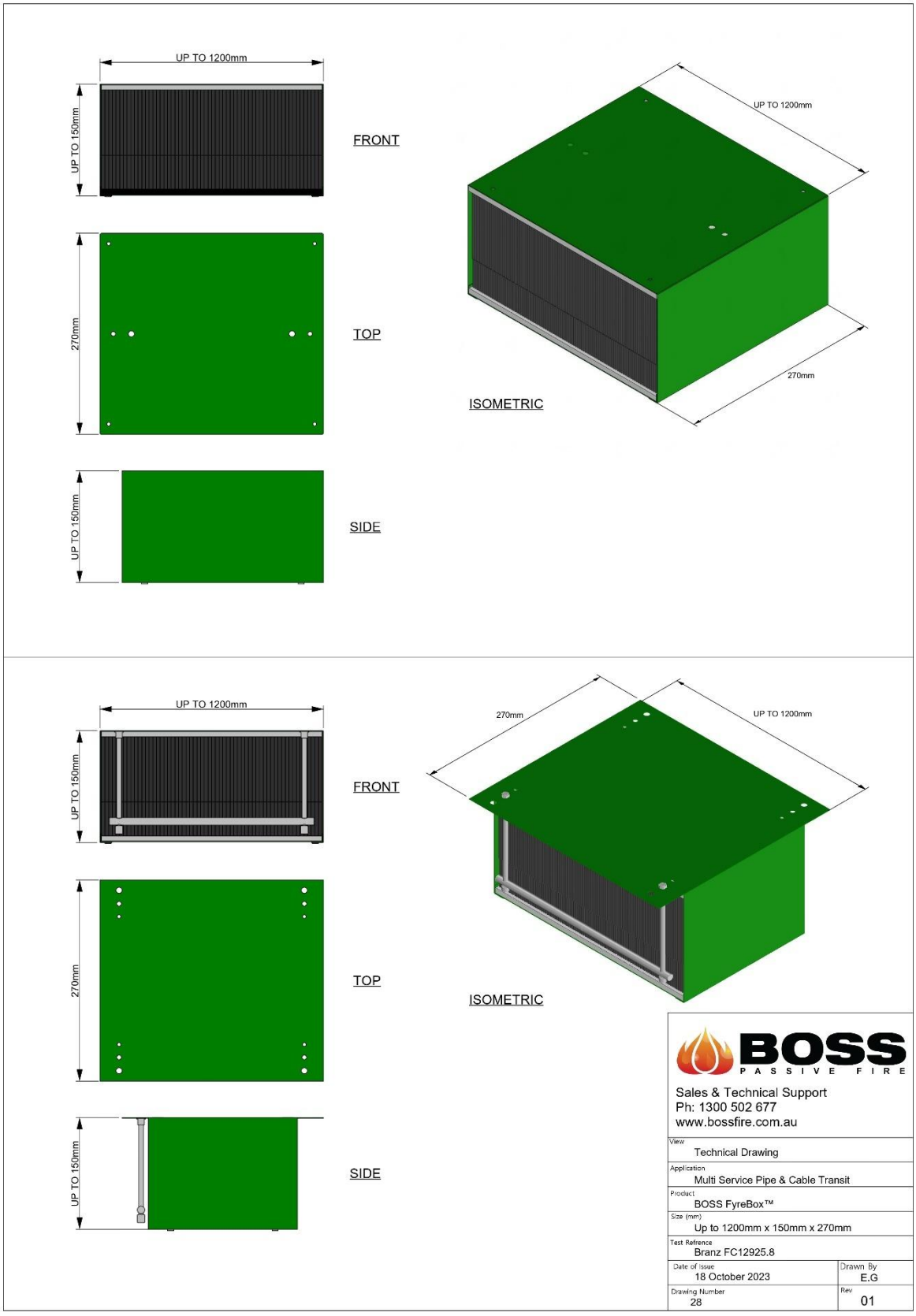
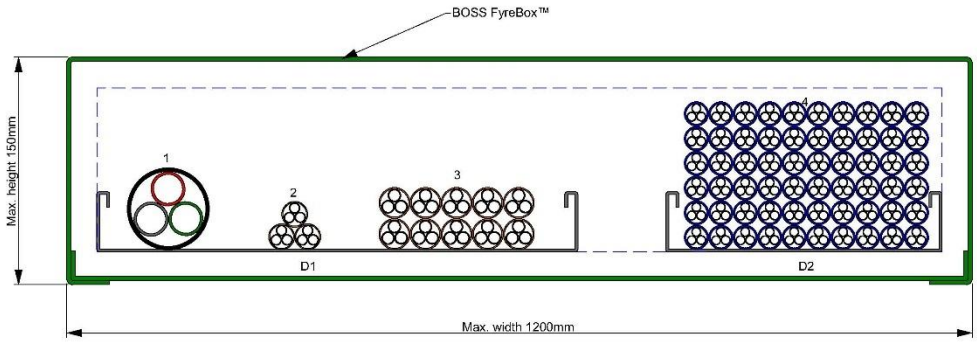


Figure 29: BOSS FyreBox™ – Standard Configuration for Cables



System Components:
1. Power Cables: Full range of power cables as per AS1530.4 Appendix D1 (excluding 630mm²) can be bundled into the BOSS FyreBox™.
2. Data Cables: Full range of data communication cables as per AS1530.4 Appendix D2 can be bundled into the BOSS FyreBox™.

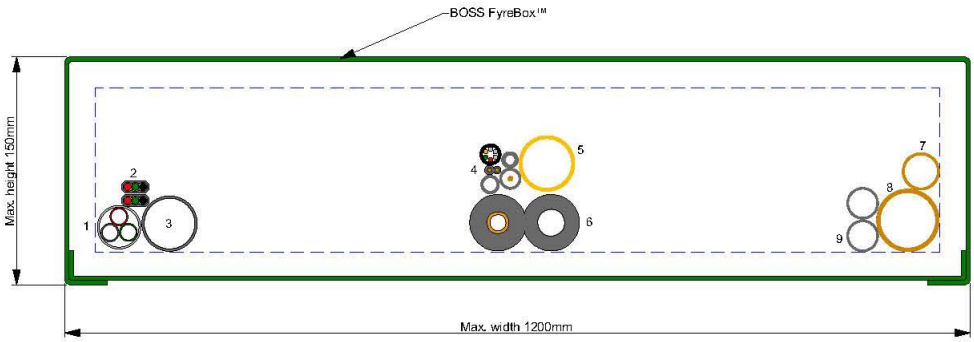
Note:
AS30000 and associated wiring rules require separation between power and data cables. Always maintain minimum separation of at least 50mm between services and check with your local Authority of relevant Standard for more information.

BOSS PASSIVE FIRE

Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: Standard configuration of cables	Application: Fire Wall & Riser Penetrations
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 29	Rev: 01

Figure 30: BOSS FyreBox™ – Low Fill Services



System Components:
1. 10mm² 2C & E Mains
2. 2.5mm² 2C 7 E TPS (2x)
3. 32mm uPVC Conduit
4. Comms cable - Coax, 6C security, 2C Firesense Alarm, Cat 5e & Cat 6 Cables
5. 32mm PEX-AL Gas Pipe
6. 13/19mm Pair Coil
7. 25mm Copper Water Pipe
8. 42mm Steel Sprinkler Pipe
9. 32mm PEX Water Pipe (2x)

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Ph: 1300 502 677
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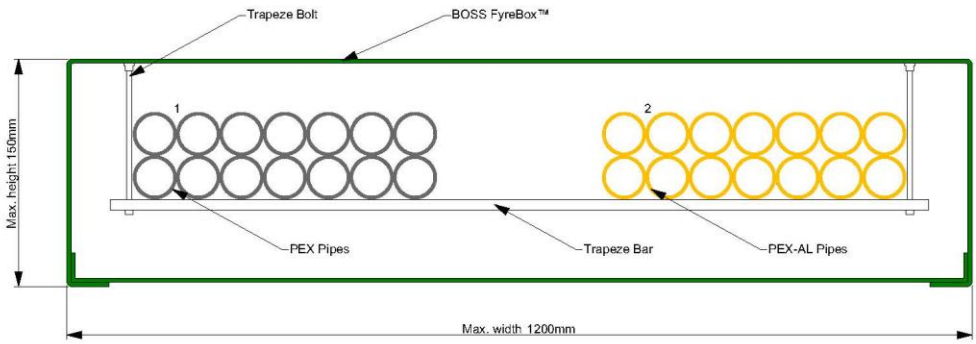
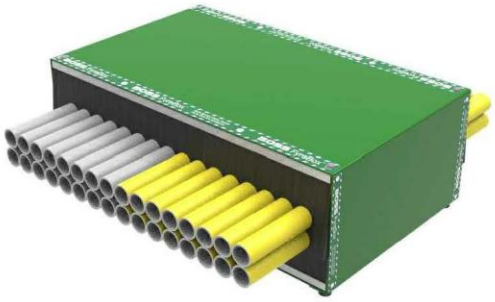
Situation: Service Spearation in Fire Walls	Application: Typical Apartment Arrangement
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 30	Rev: 01

Figure 31: BOSS FyreBox™ – Installation detail - plastic pipes





System Components:
1. PEX pipes up to 32mm diameter
2. PEX-AL pipes up to 32mm diameter
3. PVC pipes up to 32mm diameter

Note:
AS3500 plumbing standard may require minimum speration between services.

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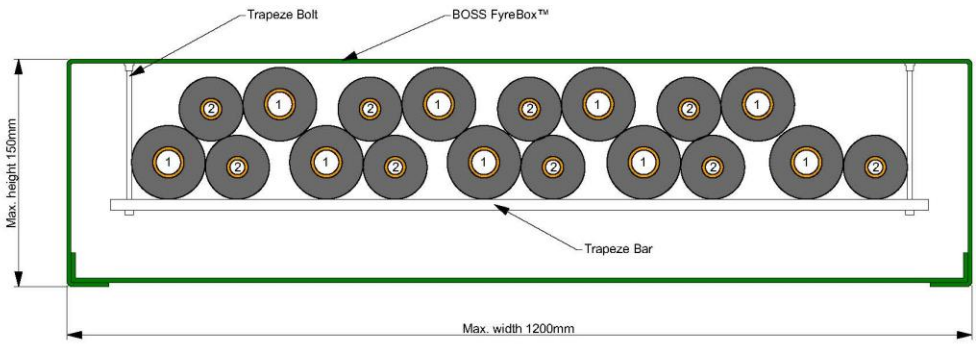
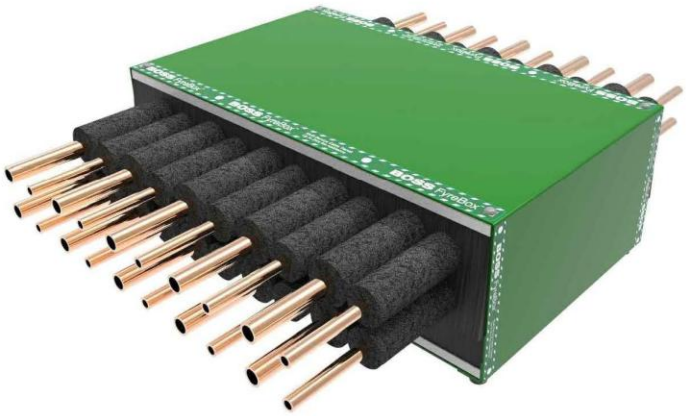
Situation: Bundled Plumbing Services	Application: Fire Wall & Riser Penetrations
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 31	Rev: 01

Figure 32: BOSS FyreBox™ – Installation detail - copper pipes





System Components:
- Paircoil up to 13/19mm insulated copper pipes

- Copper Pipe up to 25mm OD with minimum 13mm thick non-combustible lagging AS1530.1 or Armaflex FRV, K-Flex lagging, thermobreak lagging or similar elastomeric foam rubber such as nitrile, neoprene or cross linked polyolefin with density from 25kg/m3 to 75kg/m3 and complying with AS1530.3, SFI=0 and SDI< or = to 5.

- Copper Pipe up to 32mm OD with minimum 19mm thick non-combustible lagging AS1530.1 or Armaflex FRV, K-Flex lagging, Thermobreak lagging or similar elastomeric foam rubber such as nitrile, neoprene or cross linked polyolefin with density from 25kg/m3 to 75kg/m3 and complying with AS1530.3, SFI=0 and SDI< or = to 5.

- Copper Pipe up to 50.8mm OD with with minimum 25mm thick non-combustible lagging AS1530.1 or Armaflex FRV, K-Flex lagging, Thermobreak lagging or similar elastomeric foam rubber such as nitrile, neoprene or cross linked polyolefin with density from 25kg/m3 to 75kg/m3 and complying with AS1530.3, SFI=0 and SDI< or = to 5.
- Copper Pipe up to 50.8mm OD uninsulated

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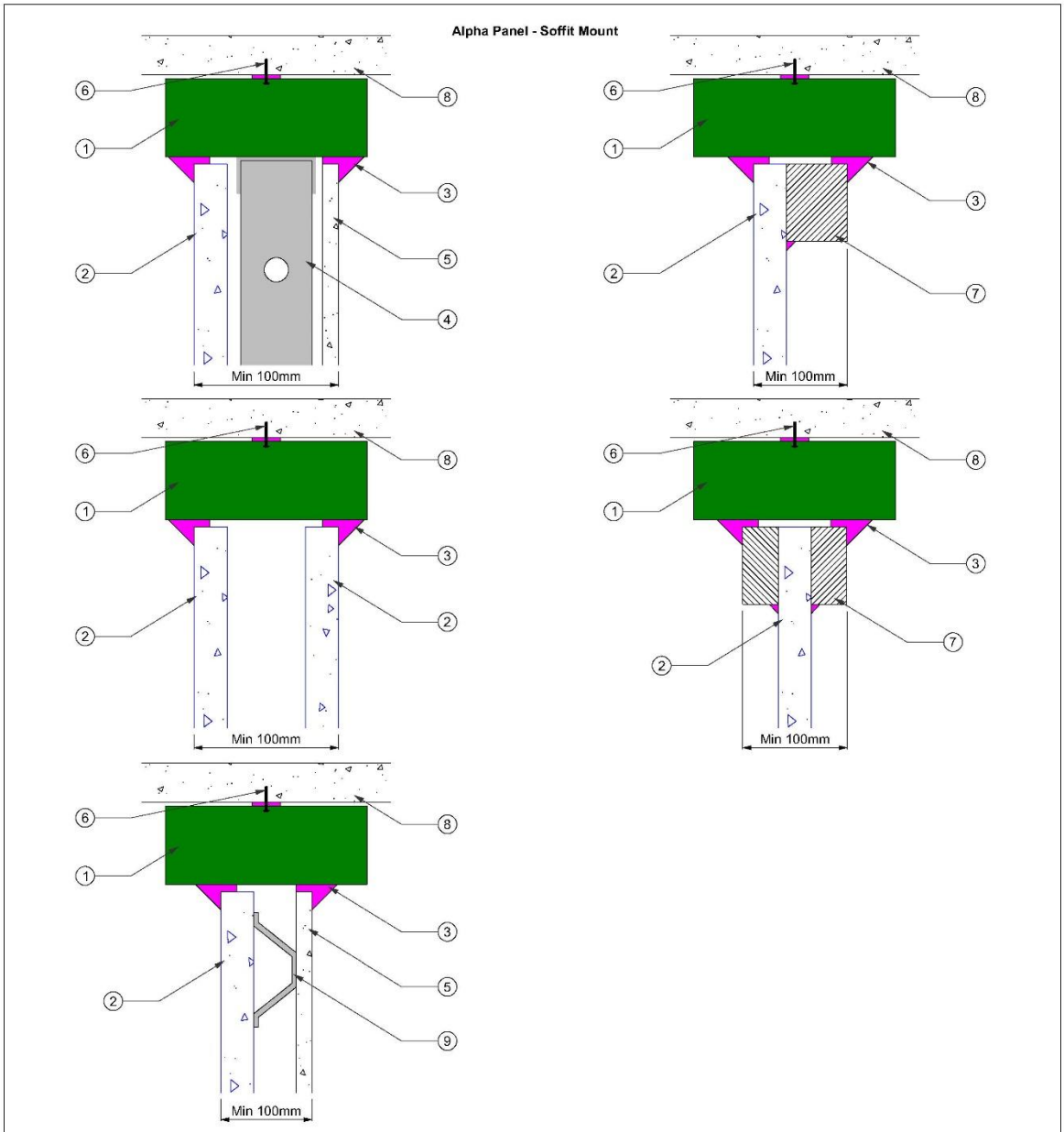
Situation: Bundled HVAC&R	Application: Fire Wall & Riser Penetrations
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 32	Rev: 01

Figure 33: BOSS FyreBox™ – Alpha Panel installation (Under slab)



System Components:
1. BOSS FyreBox™
2. Alpha Panel
3. BOSS FireMastic-300™ or other Approved Sealant
4. Steel Stud
5. Fire Rated Plasterboard
6. Mechanical Fixing
7. Localised Build up to Min 100mm:
   -Fire Rated Plasterboard
   -BOSS Batt
   -Calcium Silicate Board
   -Increased Fillet of FireMastic-300™ or other approved sealant
   -Cover exposed BOSS FyreBox™ with P40-MAK Wrap™
8. Concrete Slab
9. Baton/Furring Channel

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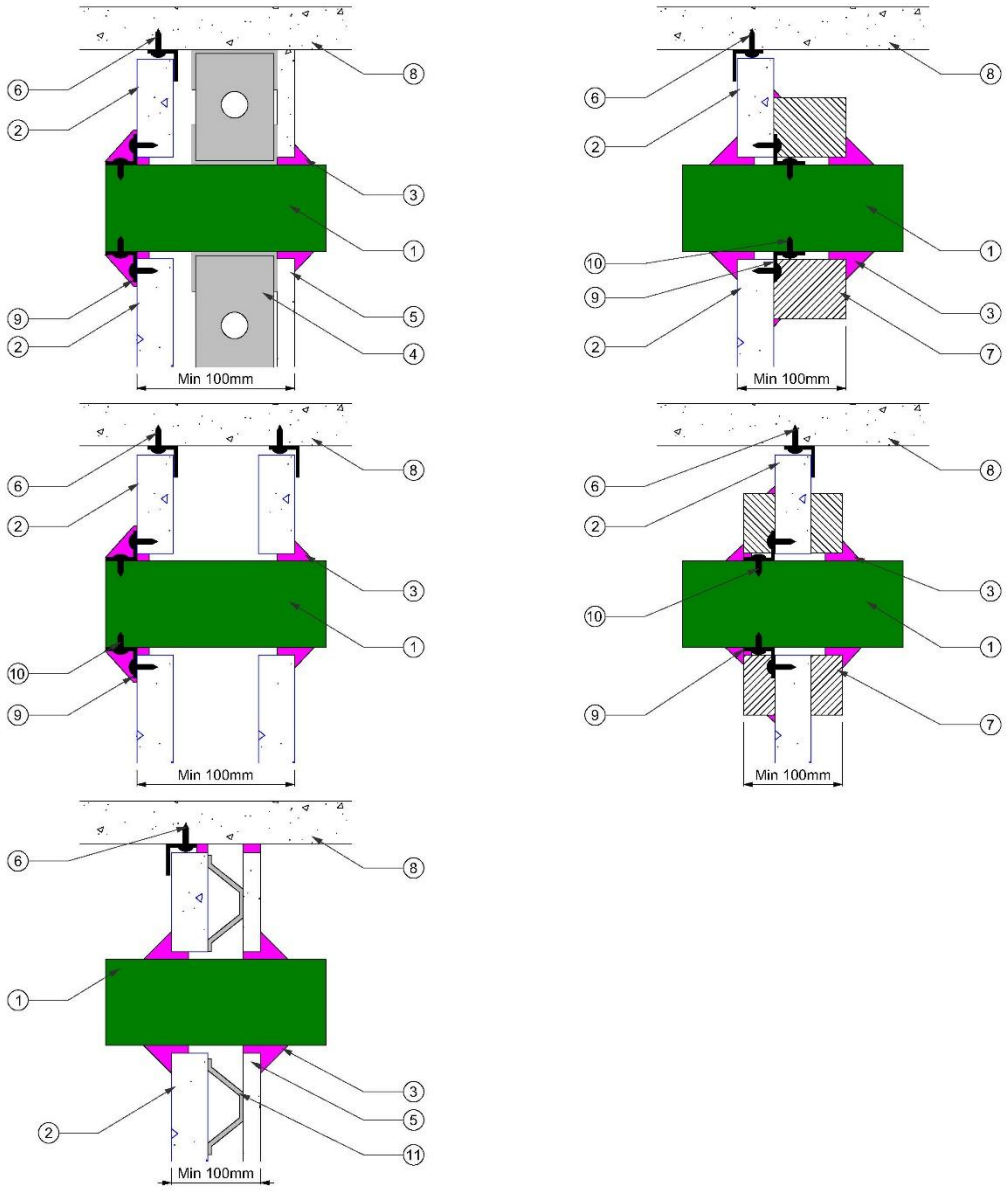
Sales & Technical Support
Ph: 1300 502 677
www.bossfire.com.au

Situation: AlphaPanel Wall	Application: Soffit Mount
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90 or 120 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90 or 120 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 33	Rev: 01

Figure 34: BOSS FyreBox™ – Alpha Panel mid wall installation



System Components:
1. BOSS FyreBox™
2. Alpha Panel
3. BOSS FireMastic-300™ or other Approved Sealant
4. Steel Stud
5. Fire Rated Plasterboard
6. Mechanical Fixing
7. Localised Build up to Min 100mm:
   -Fire Rated Plasterboard
   -BOSS Batt
   -Calcium Silicate Board
   -Increased Fillet of FireMastic-300™ or other approved sealant
   -Cover exposed BOSS FyreBox™ with P40-MAK Wrap™
8. Concrete Slab
9. Steel Angle - Min 20mm x 20mm x 1mm
10. Screw
11. Baton/Furring Channel

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Situation: AlphaPanel Wall	Application: Mid Wall Mount
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90 or 120 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90 or 120 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
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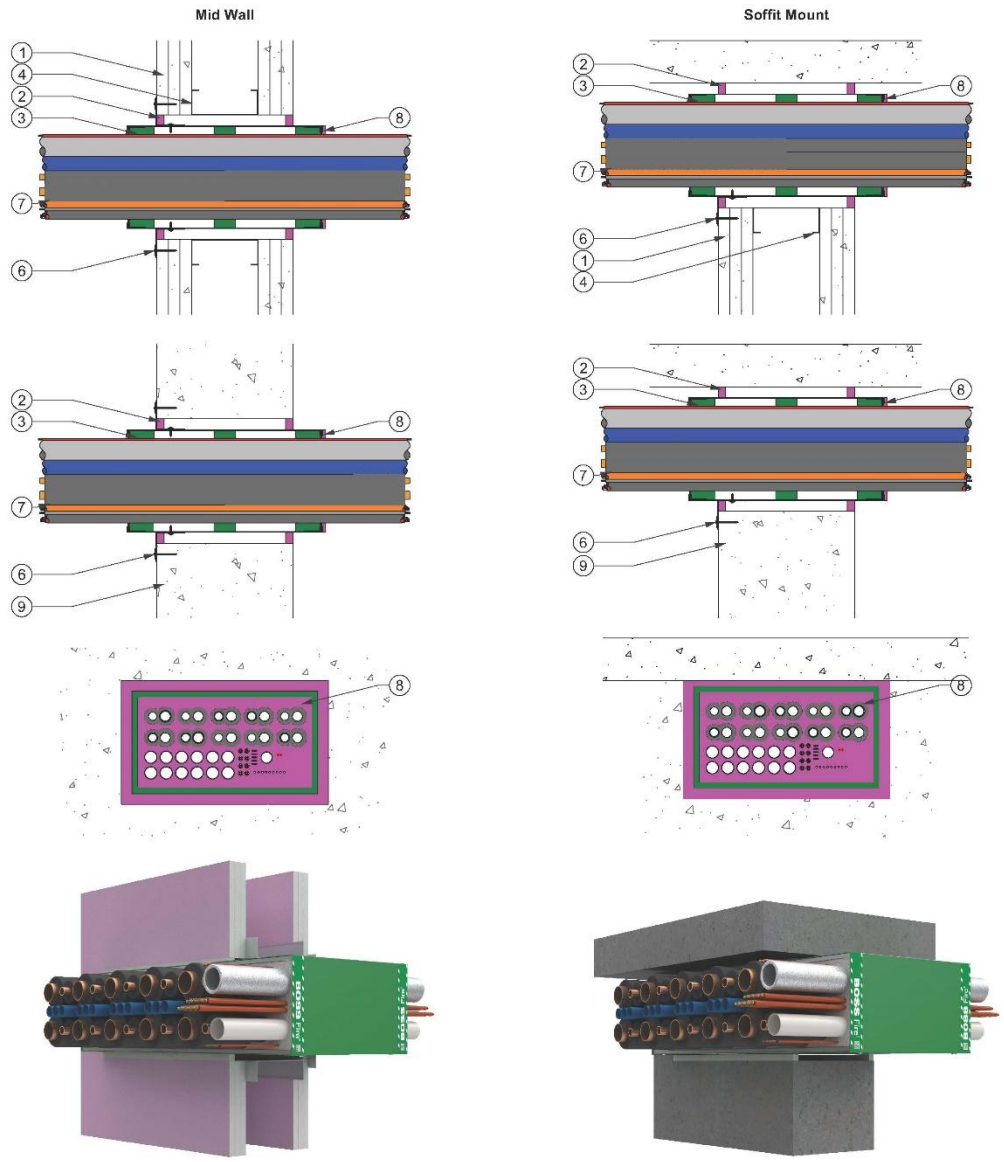
Figure 35: BOSS FyreBox™ – Mid wall and soffit mount with no Wrap



System Components:
1. Fire Rated Plasterboard
2. BOSS FireMastic-300™ or other Approved Sealant
3. BOSS FyreBox™ BFB-600
4. Metal Stud
6. Mechanical Fixings
7. Same mixed or approved services in accordance with FC12925.8
8. BOSS FireMastic-300™ sealed to brushes, one side of wall only.
9. Concrete

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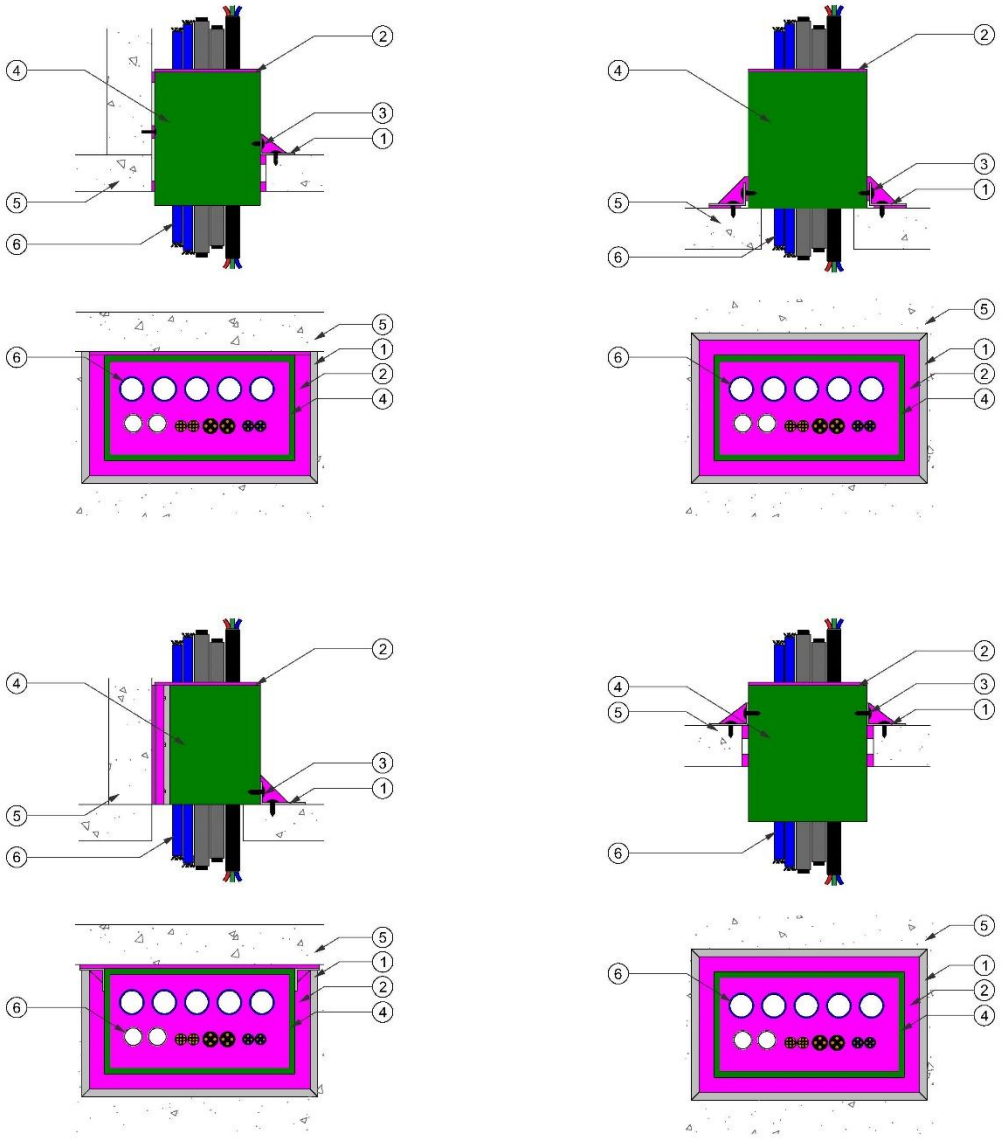
Situation: Fire, Smoke & Air Pressuization	Application: Mid Wall & Soffit Mount
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 35	Rev: 01

Figure 36: BOSS FyreBox™ – Floor slab 1



System Components:
1. Min 20mm x 40mm with 40mm side against the concrete
2. BOSS FireMastic-300™
3. Mechanical Fixing
4. BOSS FyreBox™
5. Concrete
6. Services

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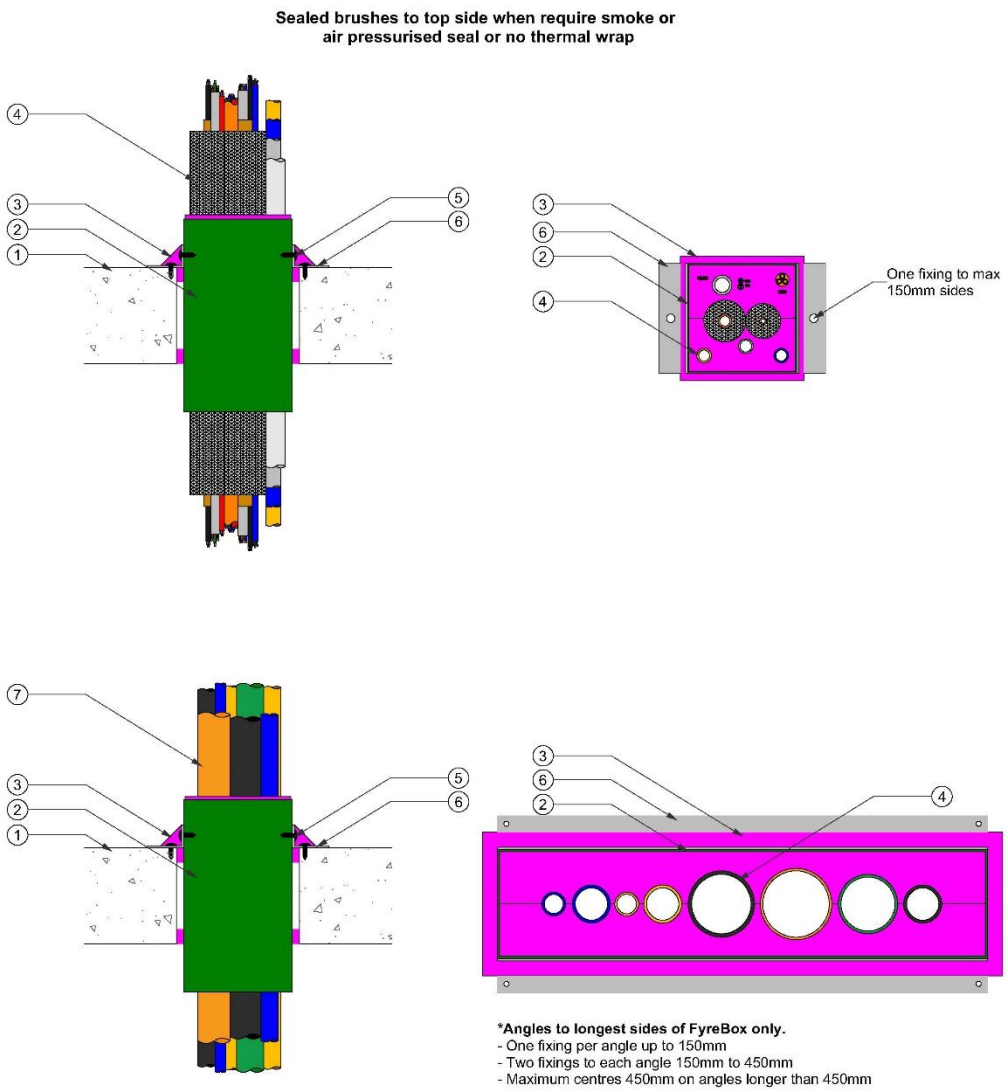
Situation: Fire, Smoke & Air Pressuization	Application: Floor Slab
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 36	Rev: 01

Figure 37: BOSS FyreBox™ – Floor slab 2



System Components:
1. Concrete
2. BOSS FyreBox™ - BFB-150
3. FireMastic-300™
4. Same mixed or approved services in accordance with FC12925.8
5. Mechanical Fixing
6. BOSS FyreBox - BFB-450 ™
7. Same mixed or approved services in accordance with FC12925.8
9. Metal Angle

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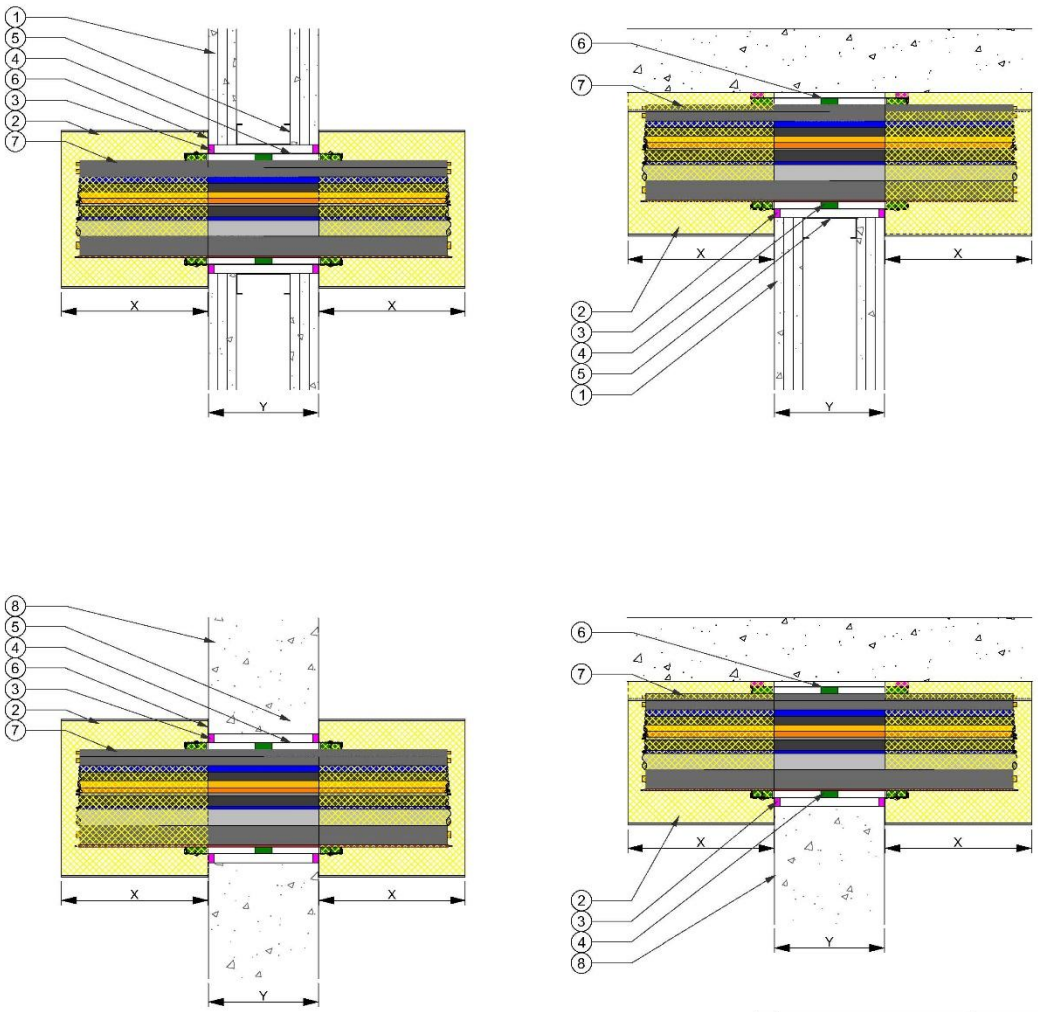
Situation: Fire, Smoke & Air Pressuization	Application: Floor Slab
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 37	Rev: 01

Figure 38: BOSS FyreBox™ – Mid floor and soffit mount with Wrap



X*	Minimum Wrap Length	Applicable FRL
	300mm	Up to -/120/120
	600mm	-/180/180 to -/240/240
Y*	**Minimum Wall Thickness**	**Applicable FRL**
	100mm	Up to -/120/120
	188mm	-/180/180 to -/240/240

System Components:
1. Flexible Wall Types, Fire Rated Plaserboard, Shaftliner, InRwall, Party Wall & Barrier Line
2. P40-MAK Wrap
3. FireMastic-300™
4. BOSS FyrebBox™
5. Metal Stud
6. Mechanical Fixings
7. Same or mixed approved services in accordance with FC12625.8
8. Rigid Wall Types, Concrete, Solid & Hollow Masonry, Spedpanel, Supapanel, Korok, AFS, AAC, Hebel, Dincel, AlphaPanel

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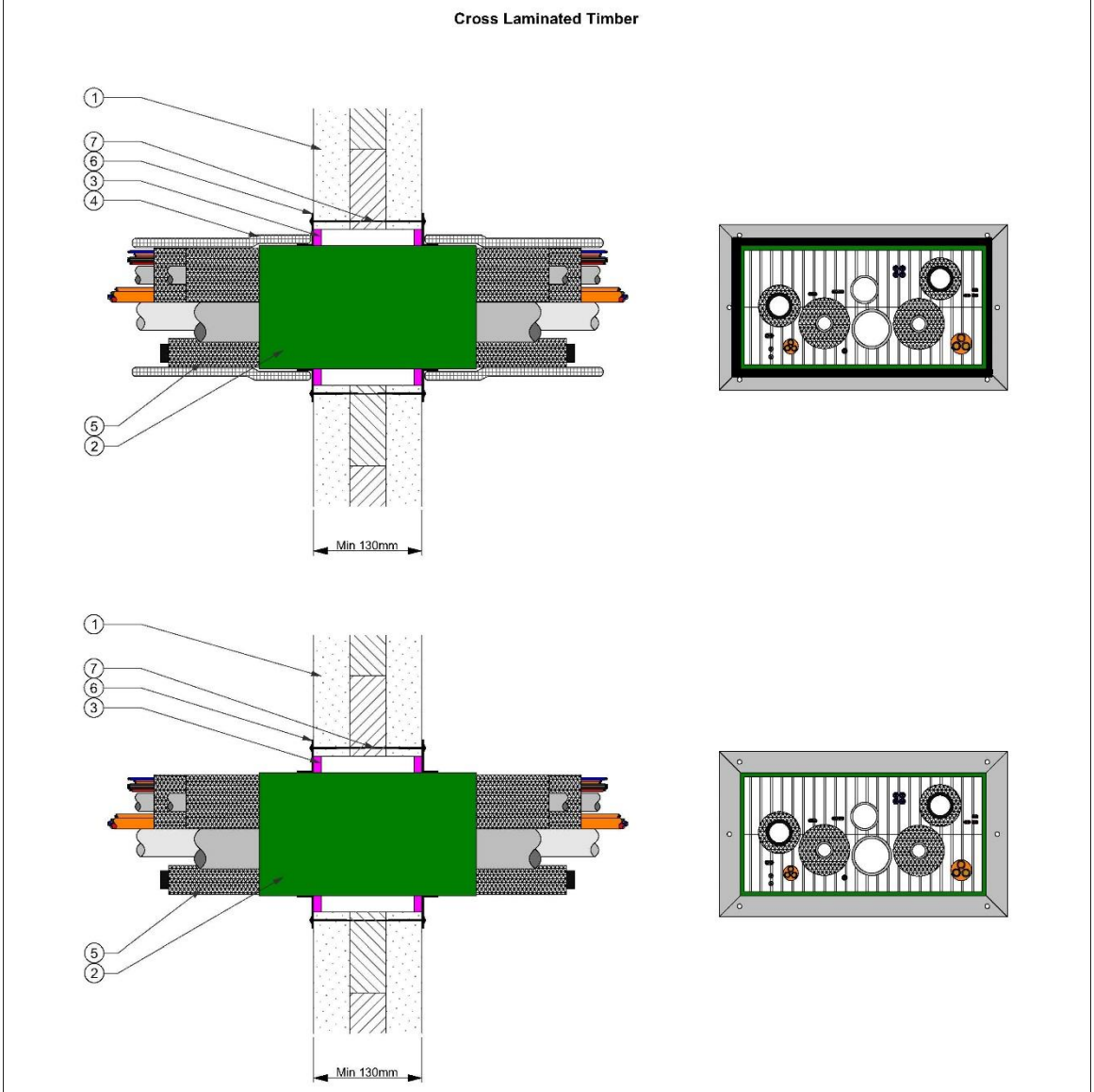
Situation: Fire Rated Walls	Application: Mid Wall & Soffit Mount
Product: BOSS FyreBox™	Fire Integrity: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60, 90, 120, 180 & 240 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 38	Rev: 01

Figure 39: BOSS FyreBox™ – Mid wall mount in CLT



System Components:
1. XLAM CLT
2. BOSS FyreBox™
3. FireMastic-300™
4. Thermal Defence Wrap
5. Same mixed or approved services in accordance with FC12925.8
6. Metal angle
7. Mechanical Fixings - 14g x 100mm long

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Situation: Cross Laminated Timber	Application: Mid Wall Mount
Product: BOSS FyreBox™	Fire Integrity: Up to 60 or 90 mins refer BRANZ FC12925.8
Test Reference: Branz FC12925.8	Fire Insulation: Up to 60 or 90 mins refer BRANZ FC12925.8
Date of Issue: 18 October 2023	Drawn by: E.G
Drawing Number: 39	Rev: 01

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