Fire resistance of SNAP fire collars protecting various pipe system penetrations in plasterboard walls when tested in accordance with AS 1530.4-2014 and assessed in accordance with AS 4072.1-2005

Assessment Report

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Copyright and disclaimer

Important disclaimer

Contents

1 Introduction

This report is an assessment of fire resistance of SNAP fire collars protecting various pipe system penetrations in plasterboard lined walls when tested in accordance with AS 1530.4-2014 and assessed in accordance with AS 4072.1-2005.

This report is prepared for meeting the evidence of suitability requirements of NCC Vol 1 2019 Schedule 5 Clause 2(c) as appropriate for FRL.

This report reviews and confirms the extent to which the reference fire resistance tests listed in section 2 meet the requirements of the standard fire test standards listed in section 4 of the report. The proposed variations to the tested construction presented in section 3 are subject to an analysis in Appendix B and the conclusions are presented in Section 5 of this report.

The field of applicability of the results of this assessment report is presented in Section 6 and subject to the requirements, validity and limitations of Section 7, 8 and 9.

2 Supporting Data

This assessment report refers to various test reports to support the analysis and conclusions of this report. They are listed below;

Table 1: Referenced Report

Report Reference	Test Standard	Outline of Test Specimen
FSP 1341	AS 1530.4-2005	Pilot-scale CSR plasterboard lined wall including various pipe penetrations protected with various Snap fire collars
FSP 1360	AS 1530.4-2005	Pilot-scale CSR plasterboard lined wall including various pipe penetrations protected with various Snap fire collars
FSP 1366	AS 1530.4-2005	Pilot-scale CSR plasterboard lined wall including various pipe penetrations protected with various Snap fire collars
FSP 1716	AS 1530.4-2005	Pilot-scale Boral plasterboard lined wall including various pipe penetrations protected with various Snap fire collars
FSP 1723	AS 1530.4-2005	Pilot-scale Boral plasterboard lined wall including various pipe penetrations protected with various Snap fire collars

The reports FSP 1341, FSP 1360, FSP 1366, FSP 1716 and FSP 1723 were undertaken by CSIRO and sponsored by Snap Fire Systems who has provided permission for CSIRO to refer to these reports on behalf of IG6 Pty Ltd.

3 Proposed Variations

The proposed construction includes the pipes and Snap collars tested in Table 1, and subject to the following variations:

- The plasterboard wall system shall be varied any brand of fire grade plasterboard of the same thickness tested in FSP 1341, FSP 1360, FSP 1366, FSP 1716 and FSP 1723

4 Referenced Standards

AS 1530.4-2014	Methods for fire tests on building materials, components and structures Part 4: Fire resistance tests of elements of building construction.
AS 4072.1-2005	Components for the protection of openings in fire-resistant separating elements Part 1: Service penetrations and control joints

5 Conclusion

On the basis of the analysis presented in this report, it is the opinion of this Accredited Testing Laboratory that the tested prototypes described in Section 2 when varied as described in Section 3 will achieve the Fire Resistance stated below when submitted to a standard fire test in accordance with the test methods referenced in Section 4 and subject to the requirements of section 7, the validity of section 8 and limitation of section 9.

Table 2 – FRL of various pipe and collars

Test report	Specimen	Supporting partitions	FRL
FSP 1341	1	Minimum 128mm thick plasterboard wall tested or assessed for a minimum FRL of -/180/180 or 180/180/180	-/180/180
	2		-/180/120
	3		-/180/180
	4		-/180/120
	5		-/180/180
	6		-/180/180
FSP 1360	1		-/180/180
	2		-/180/180
	3		-/180/180
	4		-/180/180
	5		-/180/180
	6		-/180/180
FSP 1366	1		-/180/180
	2		-/180/180
	3		-/180/180
	4		-/180/180
	5		-/180/180
	6		-/180/180
FSP 1716	1		-/120/120
	2		-/180/180
	3		-/180/180
	4		-/180/180
	5		-/120/120
FSP 1723	1	Minimum 96mm thick plasterboard wall tested or assessed for a minimum FRL of -/90/90 or 90/90/90	-/90/90
	2		-/90/60
	3		-/90/90
	4		-/90/60
	5		-/90/60
	6		-/90/60
	7		-/90/60
	8		-/90/60
	9		-/90/60

6 Direct Field of Application of Results

The results of this report are applicable to pipes in plasterboard walls exposed to fire from either side.

7 Requirements

It is required the partitions that these penetrations are installed within are supported by testing or assessments for the required FRL in accordance with AS 1530.4 as a wall.

Any variations with respect to size, constructional details, loads, stresses, edge or end conditions that are other than those identified in this report, may invalidate the conclusions drawn in this report.

8 Term of Validity

This assessment report will lapse on 30th April 2025. Should you wish us to re-examine this report with a view to the possible extension of its term of validity, would you please apply to us three to four months before the date of expiry. This Division reserves the right at any time to amend or withdraw this assessment in the light of new knowledge.

9 Limitations

The conclusions of this assessment report may be used to directly assess the fire resistance performance under such conditions, but it should be recognised that a single test method will not provide a full assessment of the fire hazard under all fire conditions.

Because of the nature of fire resistance testing, and the consequent difficulty in quantifying the uncertainty of measurement, it is not possible to provide a stated degree of accuracy. The inherent variability in test procedures, materials and methods of construction, and installation may lead to variations in performance between elements of similar construction.

This assessment report does not provide an endorsement by CSIRO of the actual products supplied to industry. The referenced assessment can therefore only relate to the actual prototype test specimens, testing conditions and methodology described in the supporting data, and does not imply any performance abilities of construction of subsequent manufacture.

This assessment is based on information and experience available at the time of preparation. The published procedures for the conduct of tests and the assessment of test results are the subject of constant review and improvement and it is recommended that this report is reviewed on or, before, the stated expiry date.

The information contained in this assessment report shall not be used for the assessment of variations other than those stated in the conclusions above. The assessment is valid provided no modifications are made to the systems detailed in this report. All details of construction should be consistent with the requirements stated in the relevant test reports and all referenced documents.

Appendix A Supporting Test Data

A.1. CSIRO report numbered FSP 1341

On 20 November 2008, this Division conducted a fire test on SNAP retrofitted collars protecting a plasterboard wall penetrated by six PPR pipes in accordance with AS 1530.4-2005.

The wall system was constructed in accordance with the CSR wall system with an established fire resistance level (FRL) of -/120/120. Construction comprised 64-mm x 0.75-mm steel studs and noggins installed at nominally 600-mm centres, lined on each side with two layers of 16-mm thick CSR Gyprock Fyrchek plasterboard sheets. The plasterboard sheeting was screw fixed to the steel studs using plasterboard screws at nominally 200-mm centres. The wall was penetrated by six gas pipes of various constructions protected by retro-fitted SNAP Fire System fire collars.

Penetrations 1, 2 and 6 were protected with SNAP 32Gas fire collars.

Penetration 1 – Retrofit SNAP32GAS fire collar protecting a nominal 16-mm REHAU PEX-AL-PE gas pipe

The SNAP32GAS, fire collar consisted of a galvanised steel case 54-mm diameter x 63-mm high, with a single spring pocket and a 90-mm diameter base plate screw fixed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 57-mm wide x 130-mm long. Between the wraps was a layer 0.15-mm thick x 57-mm wide of stainless steel mesh. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter threaded rods fixed through the wall and the holes in the base plates of the two collars and fastened with nuts.

The penetrating service comprised a nominally 16-mm REHAU PEX-AL-PE gas pipe penetrating the plasterboard wall through a cut-out hole closest in size to the size of the pipe. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

The system as tested did not fail insulation nor integrity for the 181-minute duration of the test.

Penetration 2 – Retrofit SNAP32GAS fire collar protecting a nominal 32-mm IPLEX PE-AL-PE gas pipe

The SNAP32GAS, fire collar consisted of a galvanised steel case 54-mm diameter x 63-mm high, with a single spring pocket and a 90-mm diameter base plate screwed to the case. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 57-mm wide x 130-mm long. Between the wraps was a layer 0.15-mm thick x 57-mm wide of stainless steel mesh. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameters threaded rods fixed through the wall and the holes in the base plates of the two collars and fastened with nuts.

The penetrating service comprised a nominally 32-mm IPLEX PE-AL-PE gas pipe penetrating the plasterboard wall through a cut-out hole closest to the size of the pipe. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard wall. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

The system as tested failed insulation at 172 minutes due to the maximum temperature rise of 180 deg K being exceeded on the pipe. The integrity criterion was maintained for the 181-minute duration of the test.

Penetration 6 – Retrofit SNAP32GAS fire collar protecting a nominal 16-mm IPLEX PE-AL-PE gas pipe

The SNAP32GAS fire collar consisted of a galvanised steel case 54-mm diameter x 63-mm high, with a single spring pocket. The single spring is pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 degrees Celsius. Two soft intumescent wraps lined the internal circumference of the collar. The wraps were 4-mm thick x 57-mm wide x 130-mm long. Between the wraps was a layer 0.15-mm thick x 57-mm wide of Stainless steel mesh. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter threaded rods fixed through the wall and the holes in the base plate (collar on the unexposed face) and brackets (collar on the exposed face) of the two collars and fastened with nuts.

The penetrating service comprised a nominally 16-mm IPLEX PE-AL-PE gas pipe penetrating the plasterboard wall through a cut-out hole closest to the size of the pipe. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Results

Specimen	Integrity	Insulation
Penetration 1	181 NF	181 NF
Penetration 2	181 NF	172
Penetration 3	181 NF	181 NF
Penetration 4	181 NF	177
Penetration 5	181 NF	181 NF
Penetration 6	181 NF	181 NF

A.2. CSIRO report numbered FSP 1360

On 18 June 2009, this Division conducted a fire test on SNAP Retrofitted Fire Collars protecting a plasterboard wall penetrated by six PPR pipes in accordance with AS 1530.4-2005.

The wall system, with an established fire-resistance level (FRL) of -/120/120 comprised 64-mm x 0.75-mm steel studs and noggins installed at nominally 600-mm centres, lined on each side with two layers of 16-mm thick CSR Gyprock Fyrchek plasterboard sheets. The plasterboard sheeting was screw fixed to the steel studs using plasterboard screws at nominally 200-mm centres. The wall was penetrated by six Aquatherm Fusiotherm polypropylene fibre pipes protected by retro-fitted SNAP Fire System fire collars.

Penetration 1 – Retrofit SNAP63R fire collar protecting a nominal 63-mm PPR pipe

The SNAP63R fire collar consisted of a 0.7-mm thick steel case, 47-mm high with a 69-mm diameter opening. Two layers of soft intumescent wraps, 4-mm thick x 43-mm wide and weighing approximately 50 grams each, lined the internal circumference of the collar. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter bolts fixed through the wall and the holes in the brackets of the two collars and fastened with nuts. The collar detail is showed in drawing numbered SNAP63R, dated 8 May 2009, by Snap Fire Systems.

The penetrating service comprised a nominally 63-mm OD PPR-80 fazer composite pipe of SDR7.4 with a wall thickness of 10-mm, penetrating the plasterboard wall through a close-fitting cut-out hole. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 2 – Retrofit SNAP32R fire collar protecting a nominal 20-mm PPR pipe

The SNAP32R fire collar consisted of a 0.7-mm thick steel case, 32-mm high with a 35-mm diameter opening. Two layers of soft intumescent wraps, 4-mm thick x 26-mm wide and weighing approximately 23 grams each, lined the internal circumference of the collar. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter bolts fixed through the wall and the holes in the brackets of the two collars and fastened with nuts. The collar detail is showed in drawing numbered SNAP32R, dated 8 May 2009, by Snap Fire Systems.

The penetrating service comprised a nominally 20-mm PPR-80 Fazer composite pipe of SDR7.4 with a wall thickness of 4-mm, penetrating the plasterboard wall through a close-fitting cut-out hole. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 3 – Retrofit SNAP63R fire collar protecting a nominal 20-mm PPR pipe

The SNAP63R fire collar consisted of a 0.7-mm thick steel case, 47-mm high with a 69-mm diameter opening. Two layers of soft intumescent wraps, 4-mm thick x 43-mm wide and weighing approximately 50 grams each, lined the internal circumference of the collar. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter bolts fixed through the wall and the holes in the brackets of the two collars and fastened with nuts. The collar detail is showed in drawing numbered SNAP63R, dated 8 May 2009, by Snap Fire Systems.

The penetrating service comprised a nominally 20-mm PPR-80 Fazer composite pipe of SDR7.4 with a wall thickness of 4-mm, penetrating the plasterboard wall through a close-fitting cut-out hole. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 4 – Retrofit SNAP50R fire collar protecting a nominal 20-mm PPR pipe

The SNAP50R fire collar consisted of a 0.7-mm thick steel case, 47-mm high with 58-mm diameter opening. Two layers of soft intumescent wraps, 4-mm thick x 43-mm wide and weighed approx 45 grams each lined the internal circumference of the collar. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter bolts fixed through the wall and the holes in the brackets of the two collars and fastened with nuts. The collar detail is showed in drawing numbered SNAP50R, dated 8 May 2009, by Snap Fire Systems.

The penetrating service comprised a nominally 20-mm PPR-80 Fazer composite pipe of SDR7.4 with a wall thickness of 4-mm, penetrating the plasterboard wall through a close-fitting cut-out hole. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 5 – Retrofit SNAP32R fire collar protecting a nominal 32-mm PPR pipe

The SNAP32R fire collar consisted of a 0.7-mm thick steel case, 32-mm high with a 35-mm diameter opening. Two layers of soft intumescent wraps, 4-mm thick x 26-mm wide and weighing approximately 23 grams each, lined the internal circumference of the collar. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter bolts fixed through the wall and the holes in the brackets of the two collars and fastened with nuts. The collar detail is showed in drawing numbered SNAP32R, dated 8 May 2009, by Snap Fire Systems.

The penetrating service comprised a nominally 32-mm PPR-80 Fazer composite pipe of SDR7.4 with a wall thickness of 5-mm, penetrating the plasterboard wall through a close-fitting cut-out hole. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 6 – Retrofit SNAP50R fire collar protecting a nominal 50-mm PPR pipe

The SNAP50R fire collar consisted of a 0.7-mm thick steel case, 47-mm high with 58-mm diameter opening. Two layers of soft intumescent wraps, 4-mm thick x 43-mm wide and weighed approx 45 grams each lined the internal circumference of the collar. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter bolts fixed through the wall and the holes in the brackets of the two collars and fastened with nuts. The collar detail is showed in drawing numbered SNAP50R, dated 8 May 2009, by Snap Fire Systems.

The penetrating service comprised a nominally 50-mm PPR-80 Fazer composite pipe of SDR7.4 with a wall thickness of 8-mm, penetrating the plasterboard wall through a close-fitting cut-out hole. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Results

Specimen	Integrity	Insulation
Penetration 1	181 NF	181 NF
Penetration 2	181 NF	181 NF
Penetration 3	181 NF	181 NF
Penetration 4	181 NF	181 NF
Penetration 5	181 NF	181 NF
Penetration 6	181 NF	181 NF

A.3. CSIRO report numbered FSP 1366

On 11 August 2009, this Division conducted a fire test on SNAP Retrofitted Fire Collars protecting a plasterboard wall penetrated by six PE pipes in accordance with AS 1530.4-2005.

The wall system, with an established fire-resistance level (FRL) of -/120/120 comprised 64-mm x 0.75-mm steel studs and noggins installed at nominally 600-mm centres, lined on each side with two layers of 16-mm thick CSR Gyprock Fyrchek plasterboard sheets. The plasterboard sheeting was screw fixed to the steel studs using plasterboard screws at nominally 200-mm centres. The wall was penetrated by six Aquatherm Fusiotherm polypropylene fibre pipes protected by retro-fitted SNAP Fire System fire collars.

Penetration 1 – Retrofit SNAP63R fire collar protecting a nominal 63-mm PE pipe

The SNAP63R fire collar consisted of a 0.7-mm thick steel case, 47-mm high with a 69-mm diameter opening. Two layers of soft intumescent wrap, 4-mm thick x 43-mm wide and weighing approximately 50 grams each, lined the internal circumference of the collar. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter bolts fixed through the wall and the holes in the brackets of the two collars and fastened with nuts. The collar detail is shown in drawing numbered SNAP63R, dated 8 May 2009, by Snap Fire Systems.

The penetrating service comprised a nominally 63-mm OD PE pipe of SDR7.4 with a wall thickness of 10-mm, penetrating the plasterboard wall through a close-fitting cut-out hole. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 2 – Retrofit SNAP32R fire collar protecting a nominal 20-mm PE pipe

The SNAP32R fire collar consisted of a 0.7-mm thick steel case, 32-mm high with a 35-mm diameter opening. Two layers of soft intumescent wrap, 4-mm thick x 26-mm wide and weighing approximately 23 grams each, lined the internal circumference of the collar. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter bolts fixed through the wall and the holes in the brackets of the two collars and fastened with nuts. The collar detail is shown in drawing numbered SNAP32R, dated 8 May 2009, by Snap Fire Systems.

The penetrating service comprised a nominally 20-mm OD PE pipe of SDR7.4 with a wall thickness of 4-mm, penetrating the plasterboard wall through a close-fitting cut-out hole. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately

500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 3 – Retrofit SNAP63R fire collar protecting a nominal 20-mm PE pipe

The SNAP63R fire collar consisted of a 0.7-mm thick steel case, 47-mm high with a 69-mm diameter opening. Two layers of soft intumescent wrap, 4-mm thick x 43-mm wide and weighing approximately 69 grams each, lined the internal circumference of the collar. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter bolts fixed through the wall and the holes in the brackets of the two collars and fastened with nuts. The collar detail is shown in drawing numbered SNAP63R, dated 8 May 2009, by Snap Fire Systems.

The penetrating service comprised a nominally 20-mm OD PE pipe of SDR7.4 with a wall thickness of 4-mm, penetrating the plasterboard wall through a close-fitting cut-out hole. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 4 – Retrofit SNAP50R fire collar protecting a nominal 20-mm PE pipe

The SNAP50R fire collar consisted of a 0.7-mm thick steel case, 47-mm high with 58-mm diameter opening. Two layers of soft intumescent wrap, 4-mm thick x 43-mm wide and weighed approx 45 grams each lined the internal circumference of the collar. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter bolts fixed through the wall and the holes in the brackets of the two collars and fastened with nuts. The collar detail is shown in drawing numbered SNAP50R, dated 8 May 2009, by Snap Fire Systems.

The penetrating service comprised a nominally 20-mm OD PE pipe of SDR7.4 with a wall thickness of 4-mm, penetrating the plasterboard wall through a close-fitting cut-out hole. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 5 – Retrofit SNAP32R fire collar protecting a nominal 32-mm PE pipe

The SNAP32R fire collar consisted of a 0.7-mm thick steel case, 32-mm high with a 35-mm diameter opening. Two layers of soft intumescent wrap, 4-mm thick x 26-mm wide and weighing approximately

23 grams each, lined the internal circumference of the collar. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter bolts fixed through the wall and the holes in the brackets of the two collars and fastened with nuts. The collar detail is shown in drawing numbered SNAP32R, dated 8 May 2009, by Snap Fire Systems.

The penetrating service comprised a nominally 32-mm OD PE pipe of SDR7.4 with a wall thickness of 5-mm, penetrating the plasterboard wall through a close-fitting cut-out hole. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 6 – Retrofit SNAP50R fire collar protecting a nominal 50-mm PE pipe

The SNAP50R fire collar consisted of a 0.7-mm thick steel case, 47-mm high with 58-mm diameter opening. Two layers of soft intumescent wrap, 4-mm thick x 43-mm wide and weighed approx 45 grams each lined the internal circumference of the collar. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three 6-mm diameter bolts fixed through the wall and the holes in the brackets of the two collars and fastened with nuts. The collar detail is shown in drawing numbered SNAP50R, dated 8 May 2009, by Snap Fire Systems.

The penetrating service comprised a nominally 50-mm OD PE pipe of SDR7.4 with a wall thickness of 8-mm, penetrating the plasterboard wall through a close-fitting cut-out hole. The pipe projected horizontally, approximately 2000-mm above the plasterboard and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the plasterboard. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Results

Specimen	Integrity	Insulation
Penetration 1	181 NF	181 NF
Penetration 2	181 NF	181 NF
Penetration 3	181 NF	181 NF
Penetration 4	181 NF	181 NF
Penetration 5	181 NF	181 NF
Penetration 6	181 NF	181 NF

A.4. CSIRO report numbered FSP 1716

On 7 September 2015, this Division conducted a pilot-scale fire-resistance test on Snap Cast-in Fire Collars protecting a plasterboard wall penetrated by one (1) HDPE pipe, one (1) PVC pipe, two (2) Raupiano Pipes and one (1) Pex-a Pipes in accordance with AS 1530.4-2005.

The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/120/120. Construction comprised 64-mm x 0.35-mm steel studs and noggins installed at nominally 600-mm centres, lined on each side with two layers of 16-mm thick Firestop sheets. The plasterboard sheeting was screw fixed to the steel studs using plasterboard screws at nominally 200-mm centres. The plasterboard wall thickness was 128-mm from exposed face to unexposed face. The wall was penetrated by five (5) stack pipes protected by retro-fitted Snap Fire Systems fire collars.

Penetration # 1 – HP150 R retrofitted fire collar protecting a 160-mm High-Density Polyethylene (HDPE) pipe

The SNAP retrofitted HP150 R collar comprised a 0.95-mm steel casing with a 175 mm inner diameter and a 326-mm diameter base flange. The 117-mm high collar casing incorporated a strip of 570 mm x 112 mm x 8-mm thick Intumesh intumescent material. The closing mechanism comprised four 304 stainless steel springs, with nylon fuse links, and a 596 mm x 112-mm stainless steel mesh as shown in drawing numbered HP 150 R -T dated 3 November 2014, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 160-mm nominal diameter HDPE pipe, with a wall thickness of 6.7-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 165 mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-E Penetration # 1 – 160-mm HDPE Pipe – HP150R Retrofit Collar", dated 2 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Penetration # 2 – 32R retrofitted fire collar protecting a 32-mm Pex-a Pipe

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40 mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 12 February 2015, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors.

The penetrating service comprised a 32-mm nominal diameter Pex-a Pipe, with a wall thickness of 4.9-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 35 mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-E Penetration # 2 – 32-mm Pex-A Pipe – 32R Retrofit Collar", dated 2 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Penetration # 3 – 110R retrofitted fire collar protecting a 110 mm diameter Raupiano pipe

The SNAP 110R retrofitted fire collar comprised a 0.75-mm steel casing with a 127-mm inner diameter and a 214-mm diameter base flange. The 62-mm high collar casing incorporated three layers of 403-mm x 58-mm wide x 2.5-mm thick Intumesh intumescent material. Between the intumescent layers, 58-mm wide stainless steel mesh was installed as shown in drawing numbered 110R-T, dated 4 November 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using two hollow wall anchors.

The penetrating service comprised a 110-mm nominal diameter Raupiano Pipe, with a wall thickness of 3.2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 113 mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-E Penetration # 3 – 110-mm Raupiano Pipe – 110R Retrofit Collar", dated 2 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Penetration # 4 – 50R retrofitted fire collar protecting a 40-mm diameter Raupiano pipe

The SNAP Retrofit 50R fire collar comprised a 0.75-mm steel casing with a 62 mm inner diameter and a 149-mm diameter base flange. The 47-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 43-mm wide x 200-mm long, and 4-mm thick x 43-mm wide x 220-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 210 mm long x 42-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 50R-T dated 4 November 2013, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors.

The penetrating service comprised a 40-mm nominal diameter Raupiano Pipe, with a wall thickness of 2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 43 mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-E Penetration # 4 – 40-mm Raupiano Pipe – 50R Retrofit Collar", dated 2 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Penetration # 5 – HP150 R retrofitted fire collar protecting a 160-mm Polyvinyl Chloride (PVC) pipe

The SNAP retrofitted HP150 R collar comprised a 0.95-mm steel casing with a 175 mm inner diameter and a 326-mm diameter base flange. The 117-mm high collar casing incorporated a strip of 570 mm x 112 mm x 8-mm thick Intumesh intumescent material. The closing mechanism comprised four stainless steel springs, with nylon fuse links, and a 596 mm x 112-mm 304 stainless steel mesh as shown in drawing numbered HP 150 R -T dated 3 November 2014, by Snap Fire Systems Pty Ltd.

The penetrating service comprised a 160-mm nominal diameter PVC-SC Pipe, with a wall thickness of 4.05-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 165 mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-E Penetration # 5 – 160-mm PVC-SC Pipe – HP150R Retrofit Collar", dated 2 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Results

Specimen	Integrity	Insulation
Penetration 1	166	163
Penetration 2	181 NF	181 NF
Penetration 3	181 NF	181 NF
Penetration 4	181 NF	181 NF
Penetration 5	138	123

A.5. CSIRO report numbered FSP 1723

On 2 September 2015, this Division conducted a pilot-scale fire-resistance test on Snap Cast-in Fire Collars protecting a plasterboard wall penetrated by four (4) PEX-a, four (4) PEX-b and one (1) PVC pipe in accordance with AS 1530.4-2005.

The wall system was constructed in accordance with Boral Firestop system with an established fire resistance level (FRL) of -/60/60. Construction comprised 64-mm x 0.55-mm steel studs and noggins installed at nominally 600-mm centres, lined on each side with one layer of 16-mm thick Boral Firestop sheets. The plasterboard sheeting was screw fixed to the steel studs using plasterboard screws at nominally 200-mm centres. The plasterboard wall thickness was 96-mm from exposed face to unexposed face. The wall was penetrated by nine (9) stack pipes protected by a retro-fitted Snap Fire Systems fire collar. For the purpose of the test, the specimens were referenced as Penetrations # 1, 2, 3, 4, 5, 6, 7, 8 and 9.

Penetration # 1 – 32R retrofitted fire collar protecting a 16-mm PEX-a Pipe

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent wraps lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 2 July 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors.

The penetrating service comprised a 16-mm nominal diameter PEX-a Pipe, with a wall thickness of 2.7-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 19-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 1 – 16-mm PEX-A Pipe – 32R Retrofit Collar", dated 21 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Penetration # 2 – 32R retrofitted fire collar protecting a 16-mm PEX-b Pipe

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 2 July 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors.

The penetrating service comprised a 16-mm nominal diameter PEX-b Pipe, with a wall thickness of 2.3-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 19-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 2 – 16-mm PEX-b Pipe – 32R Retrofit Collar", dated 21 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Penetration # 3 – 32R retrofitted fire collar protecting a 20-mm PEX-a Pipe

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 2 July 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors.

The penetrating service comprised a 20-mm nominal diameter PEX-a Pipe, with a wall thickness of 3.5-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 23-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 3 – 20-mm PEX-a Pipe – 32R Retrofit Collar", dated 21 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Penetration # 4 – 32R retrofitted fire collar protecting a 20-mm PEX-b Pipe

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 2 July 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors.

The penetrating service comprised a 20-mm nominal diameter PEX-b Pipe, with a wall thickness of 2.35-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 23-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 4 – 20-mm PEX-b Pipe – 32R Retrofit Collar", dated 21 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Penetration # 5 – 32R retrofitted fire collar protecting a 25-mm PEX-a Pipe

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 2 July 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors.

The penetrating service comprised a 25-mm nominal diameter PEX-a Pipe, with a wall thickness of 4.3-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 28-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 5 – 25-mm PEX-a Pipe – 32R Retrofit Collar", dated 21 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected

horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Penetration # 6 – 32R retrofitted fire collar protecting a 25-mm PEX-b Pipe

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 2 July 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors.

The penetrating service comprised a 25-mm nominal diameter PEX-b Pipe, with a wall thickness of 2.8-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 28-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 6 – 25-mm PEX-b Pipe – 32R Retrofit Collar", dated 21 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Penetration # 7 – 32R retrofitted fire collar protecting a 32-mm PEX-a Pipe

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 2 July 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors.

The penetrating service comprised a 32-mm nominal diameter PEX-a Pipe, with a wall thickness of 5.2-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 35-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 7 – 32-mm PEX-a Pipe – 32R Retrofit Collar", dated 21 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Penetration # 8 – 32R retrofitted fire collar protecting a 32-mm PEX-b Pipe

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 2 July 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors.

The penetrating service comprised a 32-mm nominal diameter PEX-b Pipe, with a wall thickness of 3.3-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 35-mm diameter cut-out hole as shown in drawing titled "Test Wall W-15-H Penetration # 8 – 32-mm PEX-b Pipe – 32R Retrofit Collar", dated 21 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Penetration # 9 – 32R retrofitted fire collar protecting a 21.6-mm Polyvinyl Chloride (P-PVC) Pipe + Lagging

The SNAP Retrofit 32R fire collar comprised a 0.75-mm steel casing with a 40-mm inner diameter and a 106-mm diameter base flange. The 32-mm high collar casing incorporated a closing mechanism that was comprised of two soft Intumesh intumescent strips lined within the internal circumference of the collar. The inner and outer strips were 4-mm thick x 26-mm wide x 135-mm long, and 4-mm thick x 26-mm wide x 154-mm long, respectively. Between the strips was a layer of 304 stainless steel mesh 135 mm long x 25-mm wide with wire mesh diameter of 0.15-mm, as shown in drawing numbered 32R-T dated 2 July 2014, by Snap Fire Systems Pty Ltd. One collar was fixed to each side of the plasterboard wall in a back-to-back configuration using three hollow wall anchors.

The penetrating service comprised a 15-mm nominal diameter P-PVC Pipe, with a wall thickness of 2.1-mm, fitted through the collar's sleeve and penetrating the plasterboard wall through a 24-mm diameter cut-out hole. The pipe was wrapped with Thermotec 25-mm thick 4-Zero lagging as shown in drawing titled "Test Wall W-15-H Penetration # 9 – 15-mm P-PVC Pipe – 32R Retrofit Collar", dated 21 October 2015, by Snap Fire Systems Pty Ltd. The pipe projected horizontally, approximately 2000-mm away from the unexposed face of the plasterboard wall and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 500-mm from the unexposed face of the plasterboard wall by two support clamp brackets spaced apart at nominally 1000-mm. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre (Kaowool) plug.

Results

Specimen	Integrity	Insulation
Penetration 1	121 NF	93
Penetration 2	121 NF	87
Penetration 3	121 NF	92
Penetration 4	121 NF	84
Penetration 5	121 NF	76
Penetration 6	121 NF	76
Penetration 7	121 NF	78
Penetration 8	121 NF	69
Penetration 9	121 NF	73

A.6. The relevance of referenced test data to AS 1530.4-2014

General

The fire resistance tests FSP 1341, FSP 1360, FSP 1366, FSP 1716 and FSP 1723 were conducted in accordance with AS 1530.4-2005. This standard differs from AS 1530.4 2014 and the significance of these differences relevant to section 10 and is discussed below.

Specimen mounting

The differences in Section 3 and Section 10 of AS 1530.4-2005 and AS 1530.4-2014 for specimen size and mounting relate to grammar and are not technically significant in the case of the referenced tests.

Specimen thermocouple arrangements

The specimen thermocouple arrangements for the referenced tests are not different between AS 1530.4-2005 and AS 1530.4-2014

Criteria for failure

The criteria for the referenced tests are not different for tests in accordance with Section 10 of AS 1530.4-2005 and AS 1530.4-2014.

Conclusion

Based on the above it is confirmed the referenced test data in Section 2 of this report in accordance with AS 1530.4-2005 can be used to assess performance in accordance with AS 1530.4-2014.

Appendix B Analysis of Variations

B.1 Variation to plasterboard wall construction

The proposed construction includes the pipes protected with the Snap fire collars as tested and detailed in the test reports listed in Table 1 and subject to the following variations:

- The plasterboard wall system shall be varied any brand of fire grade plasterboard of the same thickness tested in FSP 1341, FSP 1360, FSP 1366, FSP 1716 and FSP 1723

With reference to the construction of the tests listed in Table 2, it is confirmed the construction of the walls tested all included 64mm studs lined on each side with either 1 or 2 layers of 16mm fire grade plasterboard. The plasterboard was manufactured by Boral or CSR.

When tested, the specimens listed in the reports in Table 2 achieved an integrity performance of 120 to 181 minutes without failure. In addition, the specimens penetrated 2 layers of 16mm fire grade plasterboard lined walls achieved an insulation performance of at least 121 minutes with some margin over failure, while those that penetrated 1 layer of 16mm fire grade plasterboard lined wall achieved an insulation performance of at least 60 minutes with some margin over failure.

With reference to AS 4072.1—2005 Clause 4.3.1.2 for Framed walls:

> *Results obtained with a steel or timber stud-framed wall using a proprietary board may be used to assess the performance of alternative proprietary brands provided that a registered testing authority is satisfied that the products behave in a similar manner.*

It is confirmed this accredited testing laboratory is satisfied the fire grade plasterboard will behave in a similar manner with respect to the referenced tests.

Based on the above, it is expected that the proposed variation will not detrimentally affect the performance of the tested prototypes in the referenced tests for up to 180 minutes for minimum 128mm thick plasterboard wall tested or assessed for a minimum FRL of -/180/180 or 180/180/180 and for up to 90 minutes for minimum 96mm thick plasterboard wall tested or assessed for a minimum FRL of -/90/90 or 90/90/90, when tested in accordance with AS 1530.4 – 2014 and assessed in accordance with AS 4072.1—2005 Clause 4.3.1.2.

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