FIRE-RESISTANCE TEST ON FIRE COLLARS PROTECTING A CONCRETE SLAB PENETRATED BY SERVICES

Report number FSP 1359 CSIRO job number SP3242 Date of issue 31 JULY 2009

Client SNAP FIRE SYSTEMS PTY LTD.

Commercial-in-confidence

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SPONSORED INVESTIGATION No. FSP 1359

FIRE-RESISTANCE TEST ON FIRE COLLARS PROTECTING A CONCRETE SLAB PENETRATED BY SERVICES

SUMMARY

IDENTIFICATION OF SPECIMEN:

The sponsor identified the specimen as Snap Cast-in Fire Collars protecting a concrete slab penetrated by six PPR pipes.

- SPONSOR: Snap Fire Systems Pty Ltd 448 Newman road Geebung QLD
- MANUFACTURER: Snap Fire Systems Pty Ltd 448 Newman road Geebung QLD
- TEST STANDARD: Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-2005, Fire-resistance tests of elements of construction.
- TEST NUMBER: FS 4071/3242
- TEST DATE: The fire-resistance test was conducted on 15 June 2009.

DESCRIPTION OF SPECIMEN:

GENERAL

The specimen comprised a 1150-mm x 1150-mm x 150-mm thick reinforced concrete slab penetrated by six Aquatherm Fusiotherm polypropylene fibre pipes protected by cast-in Snap Fire System fire collars. The fire collars were cast into the 150-mm thick slab.

For the purpose of the test, the specimens were referenced as Penetrations 1, 2, 3, 4, 5 and 6.



Penetration 1 – Cast-in SNAP (H/L) 100 FWS fire collar protecting a nominal 110-mm PPR pipe

The SNAP (H/L) 100 fire collar consisted of a 1.5-mm thick polypropylene case, 140-mm diameter and 95-mm high, excluding the top cone. The total height of the collar was 285-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 °C. A soft intumescent wrap, 4-mm thick x 85- mm wide and weighing approximately 150 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 110-mm OD PPR-80 fazer composite pipe of SDR7.4 with a wall thickness of 15-mm, fitted through the collar's sleeve. The resulting gap between the collar and the pipe was sealed with fire rated sealant. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 2 – Cast-in SNAP METAL 160 fire collar protecting a nominal 160-mm PPR pipe

The SNAP METAL 160 fire collar consisted of a 1.2-mm thick steel case, 190-mm diameter and 130-mm high. The collar incorporated four springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 °C. A soft intumescent wrap, 6-mm thick x 127-mm wide and weighing approximately 300 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside. On the unexposed face of the concrete slab, a 25-mm high x 50-mm wide concrete hob was cast around half of the pipe's circumference, to increase the total thickness of the slab to approximately 175-mm.

The penetrating service comprised a nominally 160-mm OD PPR-80 fazer composite pipe of SDR7.4 with a wall thickness of 23-mm, fitted through the collar's sleeve. The resulting gap between the collar and the pipe was sealed with fire rated sealant. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.



Penetration 3 – Cast-in SNAP (H/L) 100 FWS fire collar protecting a nominal 50-mm PPR pipe

The SNAP (H/L) 100 fire collar consisted of a 1.5-mm thick polypropylene case, 140-mm diameter and 95-mm high, excluding the top cone. The total height of the collar was 285-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 °C. A soft intumescent wrap, 4-mm thick x 85- mm wide and weighing approximately 150 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 50-mm OD PPR-80 fazer composite pipe of SDR7.4 with a wall thickness of 8-mm, fitted through the collar's sleeve. The resulting gap between the collar and the pipe was sealed with fire rated sealant. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 4 – Cast-in SNAP METAL 125 fire collar protecting a nominal 125-mm PPR pipe

The SNAP METAL 125 fire collar consisted of a 1.2-mm thick steel case, 140-mm diameter and 130-mm high. The collar incorporated four springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 °C. A soft intumescent wrap, 4-mm thick x 85-mm wide and weighing approximately 250 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside. On the unexposed face of the concrete slab, a 25-mm high x 50-mm wide concrete hob was cast around half of the pipe's circumference, to increase the total thickness of the slab to approximately 175-mm.

The penetrating service comprised a nominally 125-mm OD PPR-80 fazer composite pipe of SDR7.4 with a wall thickness of 18-mm, fitted through the collar's sleeve. The resulting gap between the collar and the pipe was sealed with fire rated sealant. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.



Penetration 5 – Cast-in SNAP (H/L) 50 FWS fire collar protecting a nominal 20-mm PPR pipe

The SNAP (H/L) 50 fire collar consisted of a 1.5-mm thick polypropylene case, 78-mm diameter and 75-mm high, excluding the top cone. The total height of the collar was 182-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 °C. A soft intumescent wrap, 4-mm thick x 57- mm wide and weighing approximately 60 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 20-mm OD PPR-80 fazer composite pipe of SDR7.4 with a wall thickness of 4-mm, fitted through the collar's sleeve. The resulting gap between the collar and the pipe was sealed with fire rated sealant. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

Penetration 6 – Cast-in SNAP (H/L) 50 FWS fire collar protecting a nominal 50-mm PPR pipe

The SNAP (H/L) 50 fire collar consisted of a 1.5-mm thick polypropylene case, 78-mm diameter and 75-mm high, excluding the top cone. The total height of the collar was 182-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 °C. A soft intumescent wrap, 4-mm thick x 57- mm wide and weighing approximately 60 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.

The penetrating service comprised a nominally 50-mm OD PPR-80 fazer composite pipe of SDR7.4 with a wall thickness of 8-mm, fitted through the collar's sleeve. The resulting gap between the collar and the pipe was sealed with fire rated sealant. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.

DIMENSIONS

The overall dimensions of the concrete slab were 1150-mm x 1150-mm, to suit the opening in the specimen containing frame.



ORIENTATION

The reinforced concrete slab was placed horizontally on top of the furnace chamber and subjected to fire exposure from the underside.

DOCUMENTATION:

The following documents were supplied by the sponsor as a complete description of the specimen and should be read in conjunction with this report:

Drawings numbered PPRATESTSLAB-1 dated May 2009 and PPRFLOORSLAB-2 dated 25 of May 2009, by Snap Fire Systems.

Confidential information about the test specimen has been submitted and is retained at CSIRO Materials Science and Engineering.

EQUIPMENT:

FURNACE

The furnace had a nominal opening of 1000-mm x 1000-mm for attachment of vertical or horizontal specimens.

The furnace was lined with refractory bricks and materials with the thermal properties as specified in AS 1530.4-2005 and was heated by combustion of a mixture of natural gas and air.

TEMPERATURE

The temperature in the furnace chamber was measured by four type K, 3-mm diameter, 310 stainless steel Mineral Insulated Metal Sheathed (MIMS) thermocouples. Each thermocouple was housed in high-nickel steel tubes opened at the exposed end.

The temperatures of the specimen were measured by glass-fibre insulated and sheathed K-type thermocouples with a wire diameter of 0.5-mm.

PRESSURE

The furnace pressure was measured by a differential low-pressure transducer with a range of \pm 50 Pa.

MEASUREMENT SYSTEM

The primary measurement system comprised of multiple-channel data loggers, scanning at one minute intervals during the test.

AMBIENT TEMPERATURE:

The temperature of the test area was 11° at the commencement of the test.



DEPARTURE FROM STANDARD:

There were no departures from the requirements of AS 1530.4-2005.

TERMINATION OF TEST:

The test was terminated at 241 minutes by agreement with the sponsor.

TEST RESULTS:

CRITICAL OBSERVATIONS

The following observations were made during the fire-resistance test:

- 3 minutes Smoke is fluing from pipe #5.
- 4 minutes Smoke is fluing from pipe #6.
- 5 minutes Pipes # 5 & # 6 ceased fluing smoke.
- 7 minutes Smoke is fluing from pipe #3 & #6.
- 8 minutes All pipes have ceased fluing smoke.
- 10 minutes Pipes #1 & #4 are fluing smoke.
- 11 minutes Smoke is being emitted from the base of pipes #2 & #4.
- 12 minutes Pipes #1 & #4 are fluing smoke again.
- 14 minutes Pipe #2 is fluing smoke.
- 21 minutes Smoke is no longer being emitted from the base of pipes #2 & #4.
- 24 minutes Pipes #1 & #4 have stopped fluing smoke.
- 30 minutes Smoke fluing from pipe #2 has decreased.
- 60 minutes No apparent change on the specimen.
- 171 minutes Smoke is being emitted from the base of the pipe #1.
- 200 minutes Bases of pipes #2 & #4 start to deform (Photograph 7).
- 215 minutes Smoke is fluing from pipe #3.
- 241 minutes Test Terminated.

FURNACE TEMPERATURE

Figure 1 shows the standard curves of temperature versus time for heating the furnace chamber and the actual curves of average and maximum temperature versus time recorded during the heating period.

SPECIMEN TEMPERATURE

Figure 2 shows the curve of maximum temperature versus time associated with Penetration 1.



Figure 3 shows the curve of maximum temperature versus time associated with Penetration 2.

Figure 4 shows the curve of maximum temperature versus time associated with Penetration 3.

Figure 5 shows the curve of maximum temperature versus time associated with Penetration 4.

Figure 6 shows the curve of maximum temperature versus time associated with Penetration 5.

Figure 7 shows the curve of maximum temperature versus time associated with Penetration 6.

PERFORMANCE

Performance observed in respect of the following AS 1530.4-2005 criteria:

Penetration 1 – Cast-in SNAP (H/L) 100 FWS fire collar protecting a nominal 110-mm PPR pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes
Penetration 2 – Cast-ir protecting a nominal 10	<u>SNAP</u> 60-mm	<u>METAL 160 fire collar</u> PPR pipe
Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	223 minutes
Penetration 3 – Cast-ir protecting a nominal 50	<u>) SNAP</u>)-mm P	(H/L) 100 FWS fire collar PR pipe
Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	222 minutes
Penetration 4 – Cast-ir protecting a nominal 12	<u>SNAP</u> 25-mm	METAL 125 fire collar PPR pipe
Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	202 minutes



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Penetration 5 – Cast-in SNAP (H/L) 50 FWS fire collar protecting a nominal 20-mm PPR pipe

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes
Penetration 6 – Cast-in protecting a nominal 50	<u>SNAP</u>)-mm P	(H/L) 50 FWS fire collar PR pipe
Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes

This report details methods of construction, the test conditions and the results obtained when specific element of construction described herein was tested following the procedure outlined in this standard. Any significant variation with respect to size, constructional details, loads, stresses, edge or end conditions, other than those allowed under the field of direct application in the relevant test method, is not covered by this report.

no failure at 241 minutes

Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result.

FIRE-RESISTANCE LEVEL (FRL):

Insulation

For the purpose of building regulations in Australia, the FRL's of the test specimens were as follows:

Penetration 1 -	-/240/240;	Penetration 4 -	-/240/180;
Penetration 2 -	-/240/180;	Penetration 5 -	-/240/240 and
Penetration 3 -	-/240/180;	Penetration 6 -	-/240/240;

For the purposes of AS 1530.4-2005 the results of these fire tests may be used to directly assess fire hazard, but it should be noted that a single test method will not provide a full assessment of fire hazard under all fire conditions.

TESTED BY:

Oddir

Chris Wojcik Testing Officer

31 July 2009

Gorry Cellin

Garry E Collins Manager, Fire Testing and Assessments



APPENDICES APPENDIX 1



Photograph 1 – Exposed face of the specimen prior to testing



Photograph 2 – Unexposed face of the specimen prior to testing





Photograph 3 – Specimen after 15 minutes of testing



Photograph 4 – Specimen after 60 minutes of testing





Photograph 5 – Specimen after 120 minutes of testing



Photograph 6 – Specimen after 180 minutes of testing





Photograph 7 – Pipe 2 after 200 minutes of testing



Photograph 8 – Specimen at the conclusion of testing





Photograph 9 – Exposed face after the conclusion of testing





Figure 1 - Furnace temperature





Figure 2 - Specimen temperature - Penetration 1





Figure 3 - Specimen temperature – Penetration 2











Figure 5 - Specimen temperature – Penetration 4











Figure 7 - Specimen temperature – Penetration 6



APPENDIX 3



Drawing numbered PPRATESTSLAB-1, dated May 2009, by Snap Fire systems





Drawing numbered PPRFLOORSLAB-2, dated 25/05/2009, by Snap Fire systems



APPENDIX 4

Certificate of Test No. 2160 "Copyright CSIRO 2009©" Copying or alteration of this report without written authorisation from CSIRO is forbidden. This is to certify that the element of construction described below was tested by the CSIRO Division of Material Science and Engineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, components and structures, Part 4-2005 on behalf of: Snap Fire Systems Pty Ltd 448 Newman road Geebung QLD A full description of the test specimen and the complete test results are detailed in the Division's sponsored investigation report numbered FSP 1359. Product name: Penetration 1 - Cast-in SNAP (H/L) 100 FWS fire collar protecting a nominal 110-mm PPR pipe The SNAP (H/L) 100 fire collar consisted of a 1.5-mm thick polypropylene case, Description: 140-mm diameter and 95-mm high, excluding the top cone. The total height of the collar was 285-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 °C. A soft intumescent wrap, 4-mm thick x 85-mm wide and weighing approximately 150 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside. The penetrating service comprised a nominally 110-mm OD PPR-80 fazer composite pipe of SDR7.4 with a wall thickness of 15-mm, fitted through the collar's sleeve. The resulting gap between the collar and the pipe was sealed with fire rated sealant. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug. Structural Adequacy not applicable Integrity no failure at 241 minutes Insulation no failure at 241 minutes and therefore for the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. The FRL is applicable for exposure to fire from the same side as tested. This certificate is provided for general information only and does not comply with the regulatory requirements for evidence of compliance. Testing Officer: Chris Wojcik Date of Test: 15 June 2009. Issued on the 31st day of July 2009 without alterations or additions. Gorry Callin Garry E Collins Manager, Fire Testing and Assessments **CSIRO** Materials Science and Engineering 14 Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA Telephone: 61 2 9490 5444 Facsimile:61 2 9490 5555 CSIRO This document is issued in accordance with NATA's accreditation requirements



This is to certify Material Science on building mate	that the element of cons and Engineering in acc rials, components and st Snap Fire Systems PI 448 Newman road Geebung QLD	with struction dess ordance wit ructures, Pa ty Ltd	out written author cribed below was h Australian Star rt 4-2005 on beh	No "Copyright CSIRO Copying or alteration of this prisation from CSIRO is for s tested by the CSIRO Div ndard 1530, Methods for fi alf of:	0. 2161 2009©" s report bidden. vision of re tests
sponsored inves	igation report numbered	FSP 1359.	inpiete test resu		13013
Product name:	Penetration 2 – Cast-in PPR pipe	SNAP MET	AL 160 fire colla	r protecting a nominal 160-	mm
Description:	The SNAP METAL 160 diameter and 130-mm l at the top of the spring temperature of 75°C. A weighing approximately collar was cast into the unexposed face of the cast around half of the to approximately 175-m	fire collar c high. The co cavity and r soft intumes y 300 grams concrete sla pipe's circur nm.	onsisted of a 1.2- illar incorporated estrained by a ny scent wrap, 6-mm lined the internal ab with its base fl b, a 25-mm high nference, to incre	mm thick steel case, 190- four springs; these were p lon fusible link with a melti 1 thick x 127-mm wide and 1 circumference of the colla ush with the underside. Or x 50-mm wide concrete ho ease the total thickness of	nm ivoted ng l r. The ı the b was the slab
	The penetrating service pipe of SDR7.4 with a resulting gap between a pipe projected vertically approximately 500-mm 1000-mm from the une unexposed end and ca	e comprised wall thicknes the collar an /, approxima into the furr xposed face pped on the	a nominally 160- is of 23-mm, fitted d the pipe was se tely 2000-mm ab nace chamber. Th of the concrete s exposed end wit	mm OD PPR-80 fazer con d through the collar's sleev ealed with fire rated sealan ove the concrete slab and he pipe was supported at r slab. The pipe was open at h a ceramic fibre plug.	iposite e. The t. The ominally the
	Structural Adequacy Integrity Insulation	-	no failure	not applicable at 241 minutes 223 minutes	
and therefore for of -/240/180. The provided for ge evidence of com	the purpose of Building FRL is applicable for en neral information only pliance.	Regulations xposure to f and does r	in Australia, ach ire from the same not comply with	ieved a fire-resistance leve e side as tested. This certi the regulatory requireme	el (FRL) ficate is ents for
Testing Officer:	Chris Wojcik		Date of Test:	15 June 2009.	
Issued on the 31	st day of July 2009 witho	ut alteration:	s or additions.		
Gorry	Collins				
Garry E Collins Manager, Fire Te	esting and Assessments				
CSIRO CS 14 Tel	IRO Materials Science Julius Avenue, Riverside ephone: 61 2 9490 5444	and Engine Corporate 4 Facsimile	eering Park, North Ryde 61 2 9490 5555	NSW 2113 AUSTRALIA	
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		Certificate of Jest No. 2162 "Copyright CSIRO 2009@"
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	This is to certify Material Science on building mate	that the element of construction described below was tested by the CSIRO Division of e and Engineering in accordance with Australian Standard 1530, Methods for fire tests erials, components and structures, Part 4-2005 on behalf of:
		Snap Fire Systems Pty Ltd 448 Newman road Geebung QLD
	A full descriptio sponsored inves	in of the test specimen and the complete test results are detailed in the Division's stigation report numbered FSP 1359.
	Product name:	Penetration 3 – Cast-in SNAP (H/L) 100 FWS fire collar protecting a nominal 50-mm PPR pipe
	Description:	The SNAP (H/L) 100 fire collar consisted of a 1.5-mm thick polypropylene case, 140-mm diameter and 95-mm high, excluding the top cone. The total height of the collar was 285-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 °C. A soft intumescent wrap, 4-mm thick x 85-mm wide and weighing approximately 150 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.
		The penetrating service comprised a nominally 50-mm OD PPR-80 fazer composite pipe of SDR7.4 with a wall thickness of 8-mm, fitted through the collar's sleeve. The resulting gap between the collar and the pipe was sealed with fire rated sealant. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.
		Structural Adequacy - not applicable Integrity - no failure at 241 minutes Insulation - 222 minutes
	and therefore fo of -/240/180. Th provided for ge evidence of com	r the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) le FRL is applicable for exposure to fire from the same side as tested. This certificate is eneral information only and does not comply with the regulatory requirements for apliance.
	Testing Officer:	Chris Wojcik Date of Test: 15 June 2009.
1	Issued on the 31	1 st day of July 2009 without alterations or additions.
	Gorige	Cellin.
	Garry E Collins Manager, Fire T	esting and Assessments
	CS IRO CS 14 Te	SIRO Materials Science and Engineering - Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA elephone: 61 2 9490 5444 Facsimile:61 2 9490 5555
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This is to certify th Material Science a on building materia A full description sponsored investig	at the element of consti- ind Engineering in acco- als, components and stru- Snap Fire Systems Pty 448 Newman road Geebung QLD of the test specimen a gation report numbered f	with ruction des rdance wit uctures, Pa Ltd	out written autho cribed below was n Australian Star rt 4-2005 on beh	No. "Copyright CSIRO 21 Copying or alteration of this risation from CSIRO is forbi- is tested by the CSIRO Divis idard 1530, Methods for fire alf of: Its are detailed in the Divi	2163 D09©" report idden. sion of e tests
Product name:	Penetration 4 – Cast-in \$ PPR pipe	SNAP MET	AL 125 fire collar	protecting a nominal 125-n	ım
Description:	The SNAP METAL 125 f diameter and 130-mm hi at the top of the spring c emperature of 75°C. A s weighing approximately collar was cast into the c unexposed face of the c cast around half of the p to approximately 175-mr	fire collar co igh. The co avity and ro oft intumes 250 grams concrete sla oncrete sla ipe's circur n.	onsisted of a 1.2- llar incorporated estrained by a ny ecent wrap, 4-mm lined the internal ib with its base fl b, a 25-mm high nference, to incre	mm thick steel case, 140-m four springs; these were piv lon fusible link with a melting t hick x 85-mm wide and circumference of the collar, ush with the underside. On i x 50-mm wide concrete hob ease the total thickness of the	m oted g . The the owas le slab
	The penetrating service bipe of SDR7.4 with a wi resulting gap between th bipe projected vertically, approximately 500-mm i 1000-mm from the unexp unexposed end and cap	comprised all thicknes le collar an approxima nto the furr posed face ped on the	a nominally 125- s of 18-mm, fitted d the pipe was se tely 2000-mm ab iace chamber. Th of the concrete s exposed end wit	mm OD PPR-80 fazer comp d through the collar's sleeve ealed with fire rated sealant. iove the concrete slab and he pipe was supported at no slab. The pipe was open at t h a ceramic fibre plug.	posite . The The minally he
5 	Structural Adequacy ntegrity nsulation	-	no failure	not applicable at 241 minutes 202 minutes	
and therefore for th of -/240/180. The f provided for gene evidence of compli	ne purpose of Building F FRL is applicable for exp eral information only a iance.	Regulations posure to fi nd does r	in Australia, ach re from the same lot comply with	ieved a fire-resistance level e side as tested. This certifi the regulatory requiremen	(FRL) cate is nts_for
Testing Officer:	Chris Wojcik		Date of Test:	15 June 2009.	
Issued on the 31 st	day of July 2009 without	t alterations	s or additions.		
Gorry C	Collin				
Garry E Collins	ting and Assessments				
CSIRO CSIR	ting und Assessments C Materials Science a Jlius Avenue, Riverside phone: 61 2 9490 5444	and Engine Corporate Facsimile:	eering Park, North Ryde 61 2 9490 5555	NSW 2113 AUSTRALIA	
This	document is issued in a	ccordance	with NATA's acc	reditation requirements	



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		Certificate of Test	
1000		No. 2164	
11111		"Copyright CSIRO 2009©" Conving or alteration of this report	
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	This is to certify Material Science on building mate	that the element of construction described below was tested by the CSIRO Division of e and Engineering in accordance with Australian Standard 1530, Methods for fire tests erials, components and structures, Part 4-2005 on behalf of:	
		Snap Fire Systems Pty Ltd 448 Newman road Geebung QLD	
	A full description sponsored investigation of the second s	on of the test specimen and the complete test results are detailed in the Division's stigation report numbered FSP 1359.	
	Product name:	Penetration 5 – Cast-in SNAP (H/L) 50 FWS fire collar protecting a nominal 20-mm PPR pipe	
	Description:	The SNAP (H/L) 50 fire collar consisted of a 1.5-mm thick polypropylene case, 78-mm diameter and 75-mm high, excluding the top cone. The total height of the collar was 182-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75 °C. A soft intumescent wrap, 4-mm thick x 57-mm wide and weighing approximately 60 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.	
		The penetrating service comprised a nominally 20-mm OD PPR-80 fazer composite pipe of SDR7.4 with a wall thickness of 4-mm, fitted through the collar's sleeve. The resulting gap between the collar and the pipe was sealed with fire rated sealant. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.	
		Structural Adequacy - not applicable	
f[[]]		Integrity - no failure at 241 minutes	
		Insulation - no failure at 241 minutes	
	and therefore for of -/240/240. The provided for ge evidence of com	r the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) IN FRL is applicable for exposure to fire from the same side as tested. This certificate is Ineral information only and does not comply with the regulatory requirements for Inpliance.	
	Testing Officer:	Chris Wojcik Date of Test: 15 June 2009.	
	Issued on the 31	1 st day of July 2009 without alterations or additions	
	Gerry	Calling	
	Garry E Collins Manager, Fire Te	esting and Assessments	
	CSIRO CS 14 Te	SIRO Materials Science and Engineering - Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA elephone: 61 2 9490 5444 Facsimile:61 2 9490 5555	
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This is to certify Material Science on building mate	that the element of construction described below was tested by the CSIRO Division of a and Engineering in accordance with Australian Standard 1530, Methods for fire tests rials, components and structures, Part 4-2005 on behalf of:
	Snap Fire Systems Pty Ltd 448 Newman road Geebung QLD
A full descriptio sponsored inves	n of the test specimen and the complete test results are detailed in the Division's tigation report numbered FSP 1359.
Product name:	Penetration 6 – Cast-in SNAP (H/L) 50 FWS fire collar protecting a nominal 50-mm PPR pipe
Description:	The SNAP (H/L) 50 fire collar consisted of a 1.5-mm thick polypropylene case, 78-mm diameter and 75-mm high, excluding the top cone. The total height of the collar was 182-mm. The collar incorporated three springs; these were pivoted at the top of the spring cavity and restrained by a nylon fusible link with a melting temperature of 75°C. A soft intumescent wrap, 4-mm thick x 57-mm wide and weighing approximately 60 grams lined the internal circumference of the collar. The collar was cast into the concrete slab with its base flush with the underside.
	The penetrating service comprised a nominally 50-mm OD PPR-80 fazer composite pipe of SDR7.4 with a wall thickness of 8-mm, fitted through the collar's sleeve. The resulting gap between the collar and the pipe was sealed with fire rated sealant. The pipe projected vertically, approximately 2000-mm above the concrete slab and approximately 500-mm into the furnace chamber. The pipe was supported at nominally 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end with a ceramic fibre plug.
	Structural Adequacy - not applicable Integrity - no failure at 241 minutes Insulation - no failure at 241 minutes
and therefore for of -/240/240. The provided for ge evidence of com	r the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) e FRL is applicable for exposure to fire from the same side as tested. This certificate is meral information only and does not comply with the regulatory requirements for pliance.
Testing Officer:	Chris Wojcik Date of Test: 15 June 2009.
Issued on the 31	st day of July 2009 without alterations or additions.
Gerry	Callan
Garry E Collins Manager, Fire To	esting and Assessments
CSIRO CS 14 Te	SIRO Materials Science and Engineering Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA lephone: 61 2 9490 5444 Facsimile:61 2 9490 5555
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