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

Report number FSP 1592 (Revision B) CSIRO job number SP3648 Date of issue 25 February 2021

This report supersedes FSV 1592 issued 18 July 2013 due to removal of "Letter of Opinion" document referenced in Appendix 6. The sponsor has confirmed there has been no change to the design and material specifications of the product/system referenced in this report.

Client SNAP FIRE SYSTEMS PTY LTD.

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SPONSORED INVESTIGATION No. FSP 1592

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 four floor waste systems and one stack pipe.

- SPONSOR: Snap Fire Systems Pty Ltd Unit 2-160 Redland Bay Road CAPALABA QLD
- MANUFACTURER: Snap Fire Systems Pty Ltd Unit 2-160 Redland Bay Road CAPALABA 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.

REFERENCE STANDARD:

Australian Standard 4072, Components for the protection of openings in fire-resistant separating elements, Part 1 - 2005, Service penetrations and control joints.

TEST NUMBER: FS 4358/3648

TEST DATE: The fire-resistance test was conducted on 29 May 2013.

DESCRIPTION OF SPECIMEN:

GENERAL

The specimen comprised a 1150-mm x 1150-mm x 150-mm thick reinforced concrete slab penetrated by four floor waste systems and one stack pipe protected by cast-in Snap Fire System fire collars.

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



Penetration 1 – H 150 S cast-in fire collar protecting a 160-mm Rehau Raupiano pipe (slab incorporating a 35-mm thick concrete step)

The SNAP Cast-in H 160 S fire collar comprised a 2-mm thick polypropylene casing with a 179-mm inner diameter and a 267-mm diameter base flange. The 150-mm high collar casing incorporated a 588-mm x 110-mm x 6-mm thick intumescent material. The closing mechanism comprised four stainless steel springs, a nylon fuse link and a 640-mm x 109-mm stainless steel mesh as shown in drawing numbered H 150 S-T dated 11 June 2013, by SNAP Fire Systems.

The penetrating service comprised a 160-mm OD Rehau Raupiano pipe, with a wall thickness of 4.2-mm fitted through the collar's sleeve. The pipe projected vertically, 2000-mm above the concrete slab and 500-mm into the furnace chamber. The pipe was supported at 500-mm and 1000-mm from the unexposed face of the concrete slab. The pipe was open at the unexposed end and capped on the exposed end using a Kaowool plug.

On the unexposed face, the narrow gap between the pipe and the slab was filled with 3M Fire Barrier Sealant IC 15WB+ sealant to a 10-mm depth.

The concrete slab comprised a 35-mm thick step around half the pipe, as shown in drawing titled "Penetration #1 160 RAUPIANO PLUS/Stack" dated 1 June 2013, by Snap Fire Systems Pty Ltd.

<u>Penetration 2 – LP 80R retrofitted fire collar protecting a 82-mm diameter</u> <u>Polyvinyl Chloride (PVC) pipe incorporating a floor waste</u>

The SNAP Cast-in LP 80R fire collar fixed to the concrete slab with three 6.5/M5-35mm Dynabolts. The collar comprised a 0.95-mm thick Steel casing with a 92-mm inner diameter and a 114-mm outer diameter. The 62-mm high collar casing incorporated a 325-mm x 55-mm x 4-mm thick intumescent material. The closing mechanism comprised three stainless steel springs, a nylon fuse link and a 325-mm x 55-mm stainless steel mesh, as shown in drawing numbered LP 80 R-T-20LB, dated 10 June 2013, by SNAP Fire Systems.

The penetrating service comprised a 82-mm OD PVC pipe, with a wall thickness of 3.2-mm fitted through the LP 80R Snap fire collar. The floor waste system was capped on the unexposed face with chromed brass floor waste grate, a 35-mm thick cement screed was laid on top of the concrete slab and finished flush with the floor grate. On the exposed side of the slab a 82-mm OD PVC gully trap was connected to the penetrating pipe, supported by a Saddle Clamp fixed to the concrete slab with 6.5/M5-35mm Dynabolts.

The floor waste gully was charged with water to the level shown in drawing titled "Penetration #2 80 PVC FW", dated 1 June 2013, by Snap Fire Systems Pty Ltd.



Penetration 3 – H 150 S cast-in fire collar protecting a 110-mm Polyvinyl Chloride (PVC) pipe Sandwich Construction (SC) incorporating a floor waste

The SNAP Cast-in H 150 S fire collar comprised a 2-mm thick HDPE casing with a 179-mm inner diameter and a 267-mm diameter base flange. The 110-mm high collar casing incorporated a 588-mm x 110-mm x 6-mm thick intumescent material. The closing mechanism comprised four stainless steel springs, a nylon fuse link and a 640-mm x 109-mm stainless steel mesh, as shown in drawing numbered H 150 S-T, dated 11 June 2013, by SNAP Fire Systems.

The penetrating service comprised a 110-mm OD PVC SC pipe, with a wall thickness of 3.2-mm fitted through the H 150 S Snap fire collar. The floor waste system was capped on the unexposed face with chromed brass floor waste grate, a 35-mm thick cement screed was laid on top of the concrete slab and finished flush with the floor grate. On the exposed side of the slab a 110-mm OD PVC gully trap was connected to the penetrating pipe, supported by M10 HKD clamp, fixed to the concrete slab, and M10 nut clip. On the exposed face, the floor waste gully was sealed using a PVC end cap.

The floor waste gully was charged with water to the level shown in drawing titled "Penetration #3 100 PVCsc FW" dated 1 June 2013, by Snap Fire Systems Pty Ltd.

Penetration 4 – L 100 FWS cast-in fire collar protecting a 110-mm diameter High Density Polyethylene (HDPE) pipe incorporating a floor waste

The SNAP Cast-in L 100 FWS fire collar comprised a 1.6-mm thick HDPE casing with a 110-mm inner diameter and a 182-mm diameter base flange. The 115-mm high collar casing incorporated a 412-mm x 85-mm x 4-mm thick intumescent material. The closing mechanism comprised three stainless steel springs, a nylon fuse link and a 460-mm x 85-mm stainless steel mesh, as shown in drawing numbered L 100 FWS-T, dated 9 June 2013, by SNAP Fire Systems.

The penetrating service comprised a 110-mm OD HDPE pipe, with a wall thickness of 4.7-mm fitted through the L 100 FWS Snap fire collar. The floor waste system was capped on the unexposed face with chromed brass floor waste grate, a 35-mm thick cement screed was laid on top of the concrete slab and finished flush with the floor grate. On the exposed side of the slab a 110-mm OD HDPE gully trap was connected to the penetrating pipe, supported by a Saddle Clamp fixed to the concrete slab with 6.5/M5-35mm Dynabolts. On the exposed face, the floor waste gully was sealed using a HDPE end cap.

The floor waste gully was charged with water to the level shown in drawing titled "Penetration #4 110 HDPE FW" dated 1 June 2013, by Snap Fire Systems Pty Ltd.



Penetration 5 – H 50 FWS cast-in fire collar protecting a 56-mm diameter High Density Polyethylene (HDPE) pipe incorporating a floor waste

The SNAP Cast-in H 50 FWS fire collar comprised a 1.6-mm thick HDPE casing with a 71-mm inner diameter and a 108-mm diameter base flange. The 76-mm high collar casing incorporated a 240-mm x 58-mm x 4-mm thick intumescent material. The closing mechanism comprised three stainless steel springs, a nylon fuse link and a 280-mm x 58-mm stainless steel mesh, as shown in drawing numbered H 50 FWS-T dated 20 April 2013, by SNAP Fire Systems.

The penetrating service comprised a 56-mm OD HDPE pipe, with a wall thickness of 3.5-mm fitted through the H 50 FWS Snap fire collar. The floor waste system was capped on the unexposed face with chromed brass floor waste grate, a 35-mm thick cement screed was laid on top of the concrete slab and finished flush with the floor grate. On the exposed side of the slab a 56-mm OD HDPE gully trap was connected to the penetrating pipe, supported by a Saddle Clamp fixed to the concrete slab with 6.5/M5-35mm Dynabolts. On the exposed face, the floor waste gully was sealed using a HDPE end cap.

The floor waste gully was charged with water to the level shown in drawing titled "Penetration #5 56 HDPE FW", dated 1 June 2013, by Snap Fire Systems Pty Ltd.

DIMENSIONS

The overall dimension of the concrete slab was 1150-mm wide x 1150-mm long, 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.

CONDITIONING

The concrete slab was left to cure for a period of sixty three days.

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:

Drawing titled "Penetration #1 160 RAUPIANO PLUS/ Stack" dated 1 June 2013, by Snap Fire Systems Pty Ltd.

Drawing titled "Penetration #2 80 PVC FW" dated 1 June 2013, by Snap Fire Systems Pty Ltd.

Drawing titled "Penetration #3 100 PVCsc FW" dated 1 June 2013, by Snap Fire Systems Pty Ltd.

Drawing titled "Penetration #4 110 HDPE FW" dated 1 June 2013, by Snap Fire Systems Pty Ltd.



Drawing titled "Penetration #5 56 HDPE FW" dated 1 June 2013, by Snap Fire Systems Pty Ltd.

Drawing numbered H 50 FWS - T, dated 20 April 2013, by Snap Fire Systems Pty Ltd.

Drawing numbered L 100 FWS - T, dated 9 June 2013, by Snap Fire Systems Pty Ltd.

Drawing numbered LP 80 R - T - 20LB, dated 10 June 2013, by Snap Fire Systems Pty Ltd.

Drawing numbered H 150 S - T, dated 11 June 2013, by Snap Fire Systems Pty Ltd.

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.

Location of the thermocouples on the unexposed face of the specimen is shown in photograph #2 and described in the table in Appendix 1.

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 17°C 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:

- 2 minutes Light smoke is being emitted from the base of the pipe of Penetration #1.
- 3 minutes Smoke emitted from Penetrations #3 and #4.
- 4 minutes Smoke is starting to flue from the end of pipe penetration #1.
- 5 minutes Smoke is emitted from penetrations #4 and #5.
- 10 minutes Smoke is no longer emitted from penetrations #1, #4 and #5.
- 13 minutes Smoke is no longer emitted from penetration #3.
- 60 minutes Moisture patches are forming on the unexposed face of the concrete slab.
- 107 minutes Smoke is being emitted from penetrations #2 & #4.
- 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.



PERFORMANCE

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

Penetration 1 – H 150 S cast-in fire collar protecting a
160-mm High Rehau Raupiano pipe slab incorporating a
35-mm thick concrete step)

Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes
Penetration 2 – LP 801 82-mm diameter Polyv incorporating a floor w	inyl Chlo	<u>ted fire collar protecting a</u> pride (PVC) pipe
Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes
Penetration 3 – H 150 110-mm Polyvinyl Chlo Construction (SC) inco	oride (P\	n fire collar protecting a /C) pipe Sandwich g a floor waste
Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes
Penetration 4 – L 100 110-mm High Density incorporating a floor w	polyethy	<u>st-in fire collar protecting a</u> <u>/lene (HDPE) pipe</u>
Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	no failure at 241 minutes
Penetration 5 – H 50 F 56-mm High Density P incorporating a floor w	olyethyl	<u>t-in fire collar protecting a</u> ene (HDPE) pipe
Structural adequacy	-	not applicable
Integrity	-	no failure at 241 minutes
Insulation	-	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.

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):

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

Penetration 1	-	-/240/240	Penetration 4 -	-/240/240
Penetration 2	-	-/240/240	Penetration 5 -	-/240/240
Penetration 3	-	-/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.

FIELD OF DIRECT APPLICATION OF TEST RESULTS:

The results of the fire test contained in this test report are directly applicable, without reference to the testing authority, to similar constructions where one or more changes listed in Clause 10.11 of AS1530.4-2005, have been made provided no individual component is removed or reduced.

TESTED BY:

a B. Rody

Mario Lara Testing Officer

Brett Roddy Manager, Fire Testing and Assessments



APPENDICES

APPENDIX 1

Measurement Location					
Group location	T/C Position	T/C designation			
Specimen					
	On slab - 25-mm from pipe	S1			
	On 185-mm thick slab - 25-mm from pipe	\$2			
Penetration 1	On pipe - 25-mm from slab	S3			
	On pipe - 25-mm from 185-mm thick slab	S4			
	On slab - 25-mm from grate	S5			
Penetration 2	On slab - 25-mm from grate	S6			
	On floor grate	S7			
	On slab - 25-mm from grate	S8			
Penetration 3	On slab - 25-mm from grate	S9			
	On floor grate	S10			
	On slab - 25-mm from grate	S11			
Penetration 4	On slab - 25-mm from grate	S12			
	On floor grate	S13			
	On slab - 25-mm from grate	S14			
	On slab - 25-mm from grate	S15			
Penetration 5	On floor grate	S16			
	On pipe - 25-mm from slab	S17			
	On pipe - 25-mm from slab	S18			

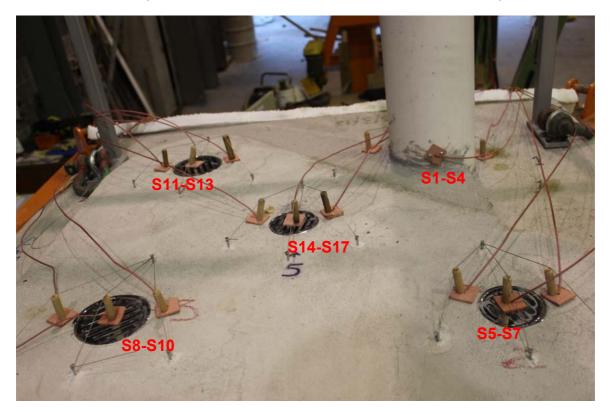
Table 1 – Specimen thermocouple positioning



APPENDIX 2

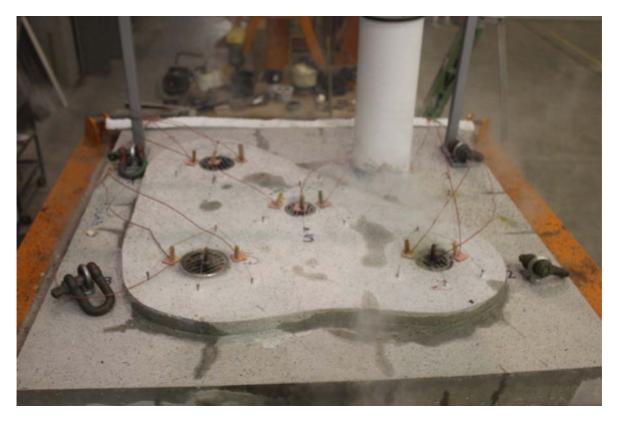


Photograph 1 – Exposed face of the specimen prior to testing



Photograph 2 – Unexposed face of the specimen prior to testing





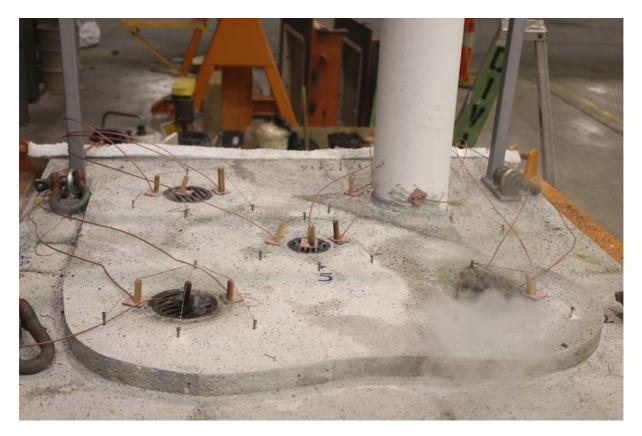
Photograph 3 – Specimens after 60 minutes of testing



Photograph 4 – Specimens after 120 minutes of testing



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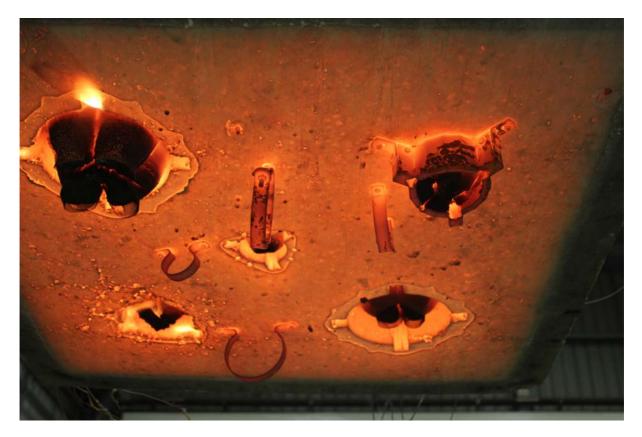


Photograph 5 – Specimens after 180 minutes of testing



Photograph 6 – Specimens after 240 minutes of testing





Photograph 7 – Exposed face of the specimens at the conclusion of testing



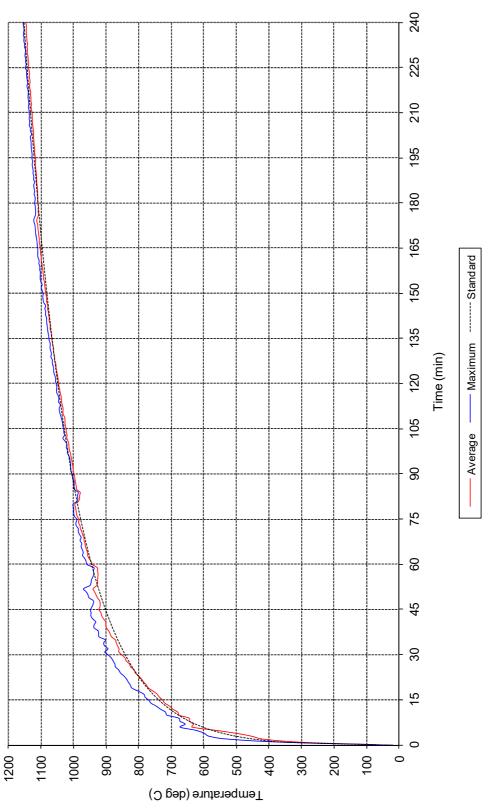


Figure 1 - Furnace temperature



APPENDIX 3

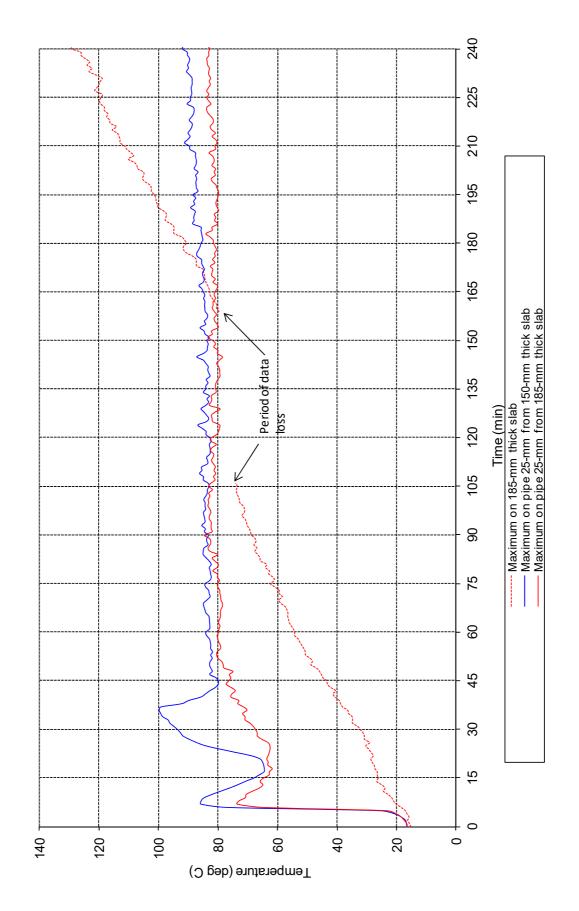


Figure 2 - Specimen temperature – Associated with Penetration 1



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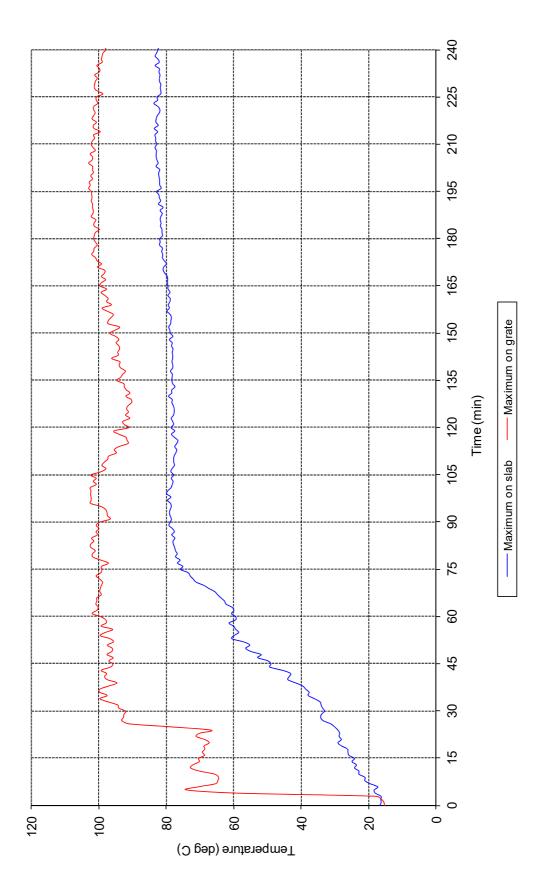


Figure 3 - Specimen temperature – Associated with Penetration 2



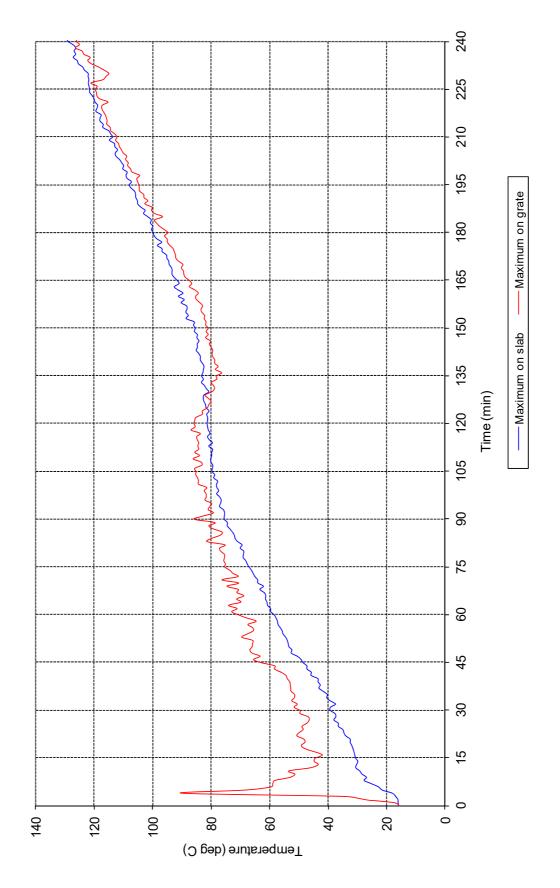


Figure 4 - Specimen temperature – Associated with Penetration 3



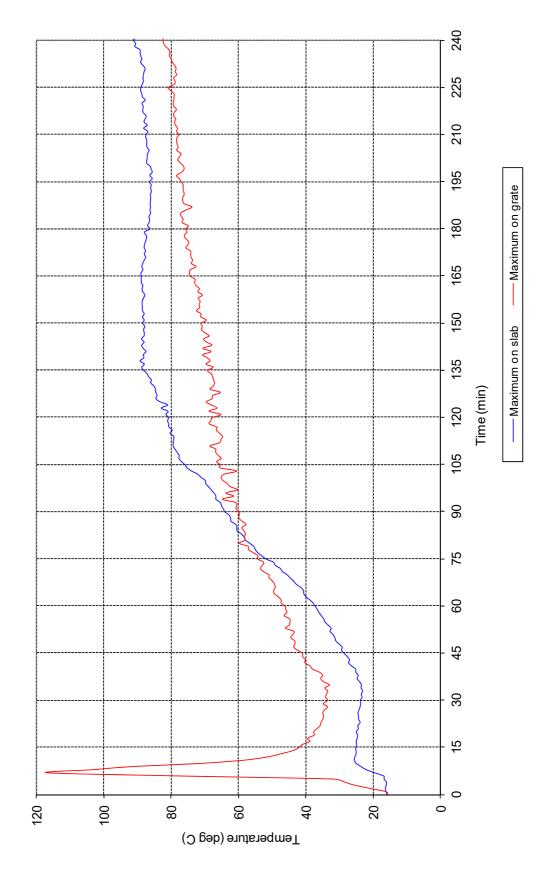


Figure 5 - Specimen temperature – Associated with Penetration 4



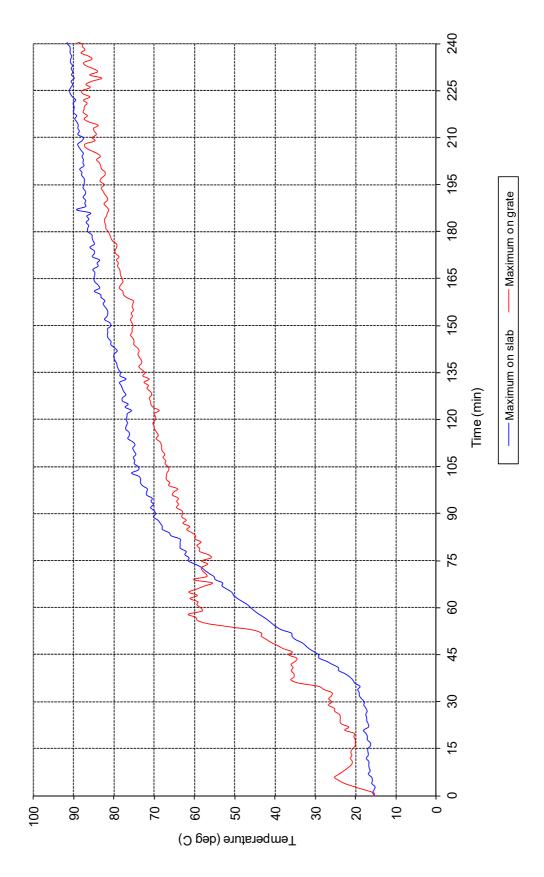
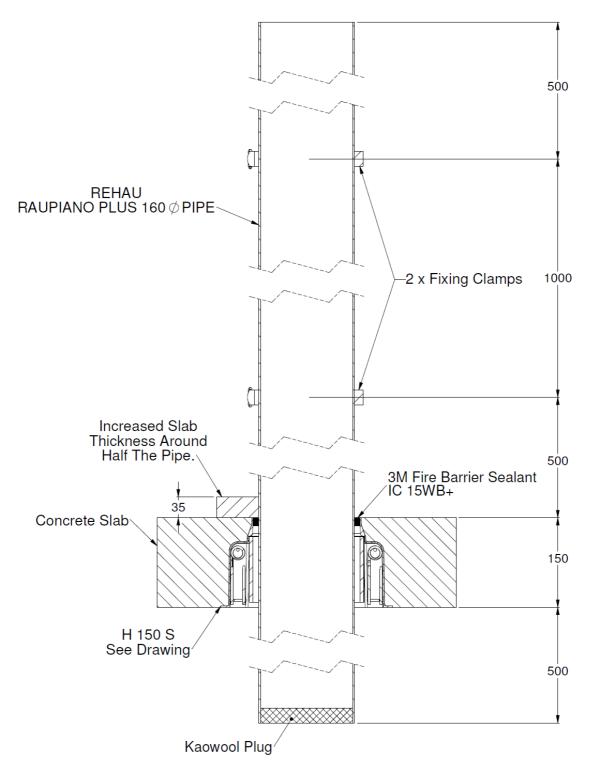


Figure 6 - Specimen temperature – Associated with Penetration 5



APPENDIX 4

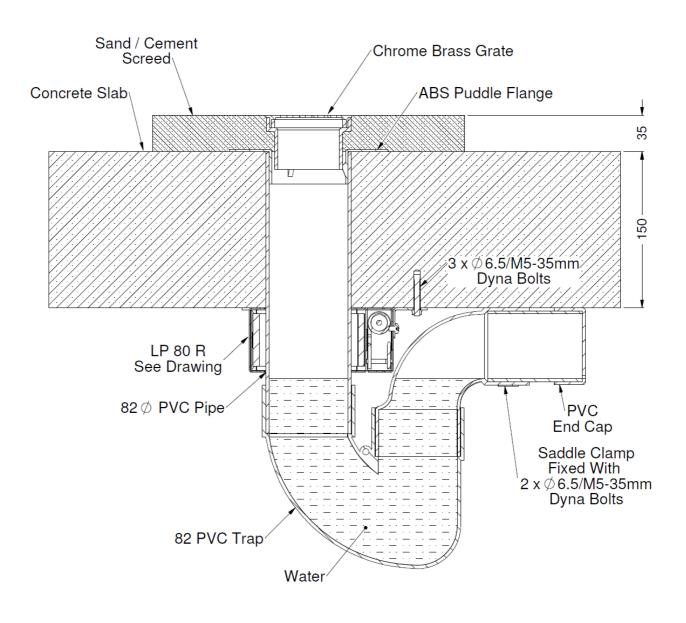
Penetration #1 160 RAUPIANO PLUS/Stack - Date 01/06/2013



Drawing titled "Penetration #1 160 RAUPIANO PLUS/Stack", dated 1 June 2013

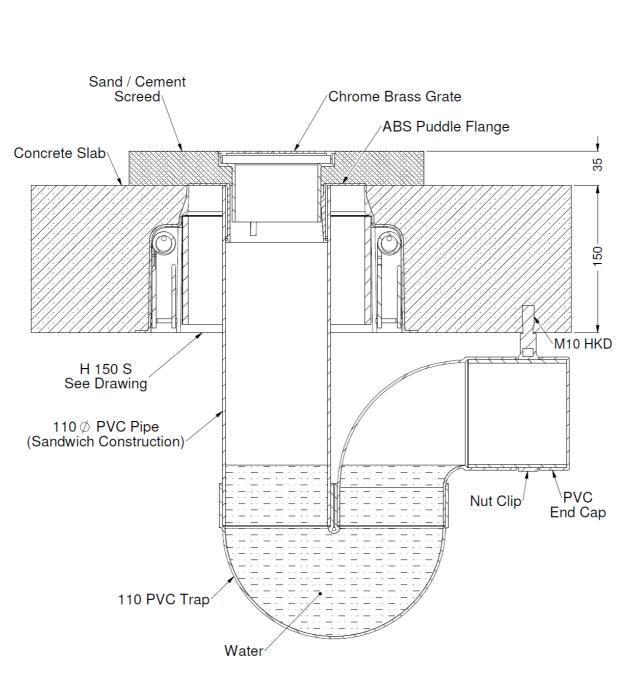


Penetration #2 80 PVC FW - Date 01-06-2013



Drawing titled "Penetration #2 80 PVC FW", dated 1 June 2013



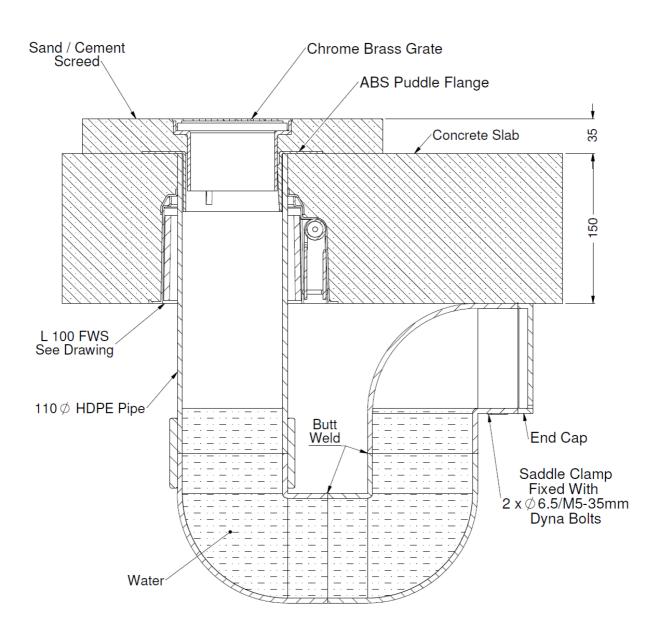


Penetration #3 100 PVCsc FW - Date 01-06-2013

Drawing titled "Penetration #3 100 PVCsc FW", dated 1 June 2013

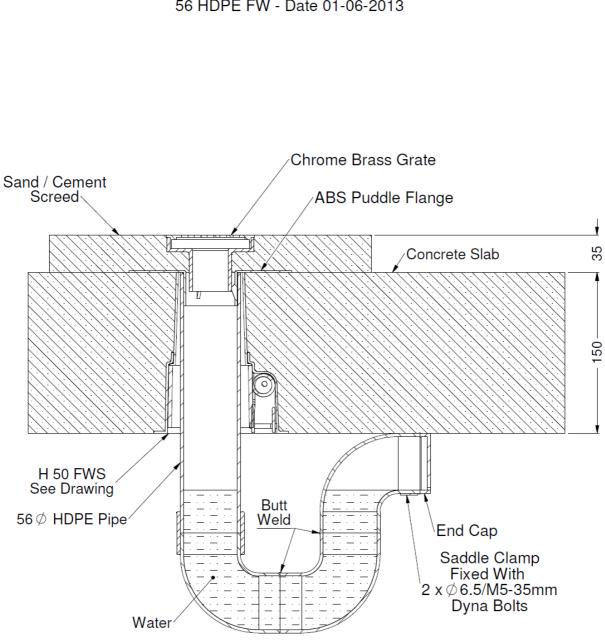


Penetration #4 110 HDPE FW - Date 01-06-2013



Drawing titled "Penetration #4 100 HDPE FW", dated 1 June 2013

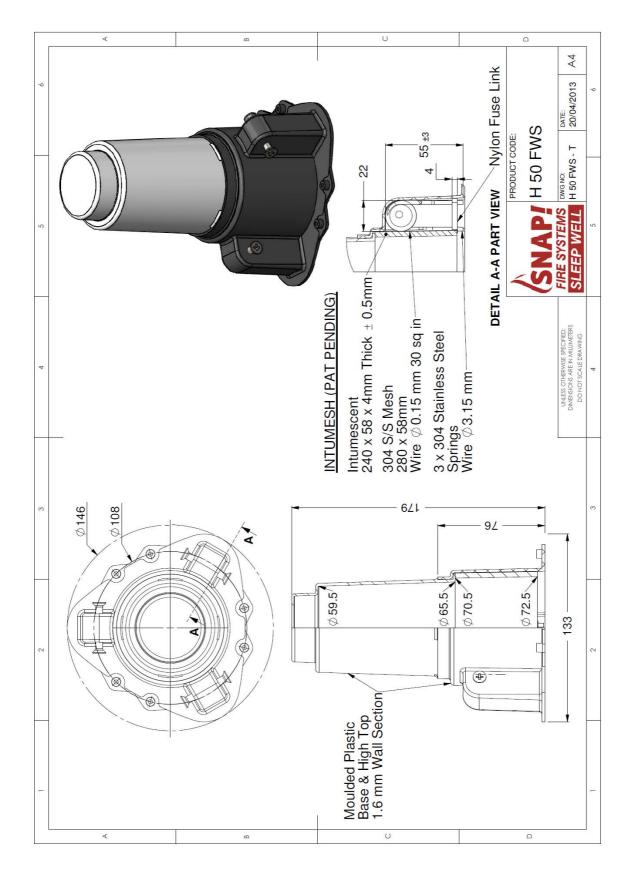




Penetration #5 56 HDPE FW - Date 01-06-2013

Drawing titled "Penetration #5 56 HDPE FW", dated 1 June 2013

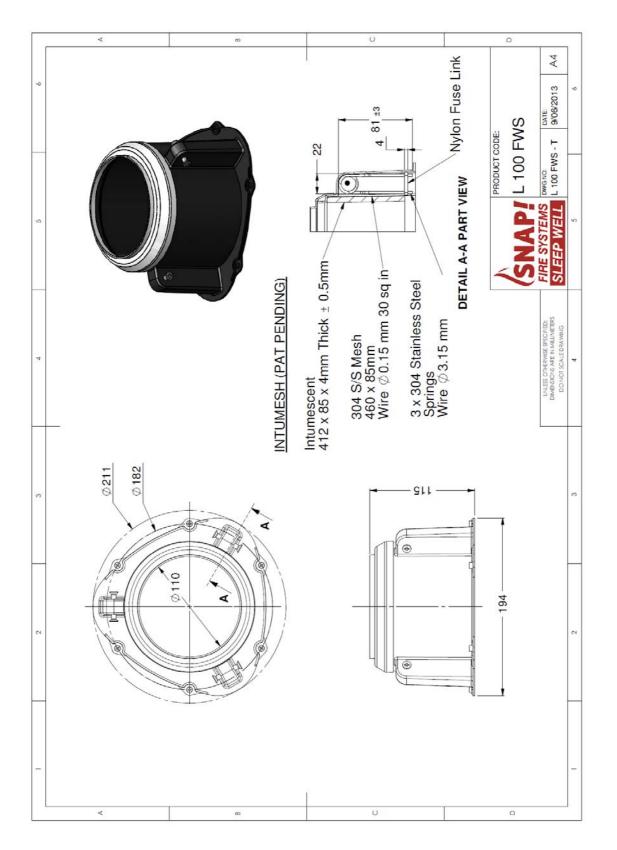




Drawing numbered H 50 FWS - T, dated 20/04/2013, by Snap Fire Systems

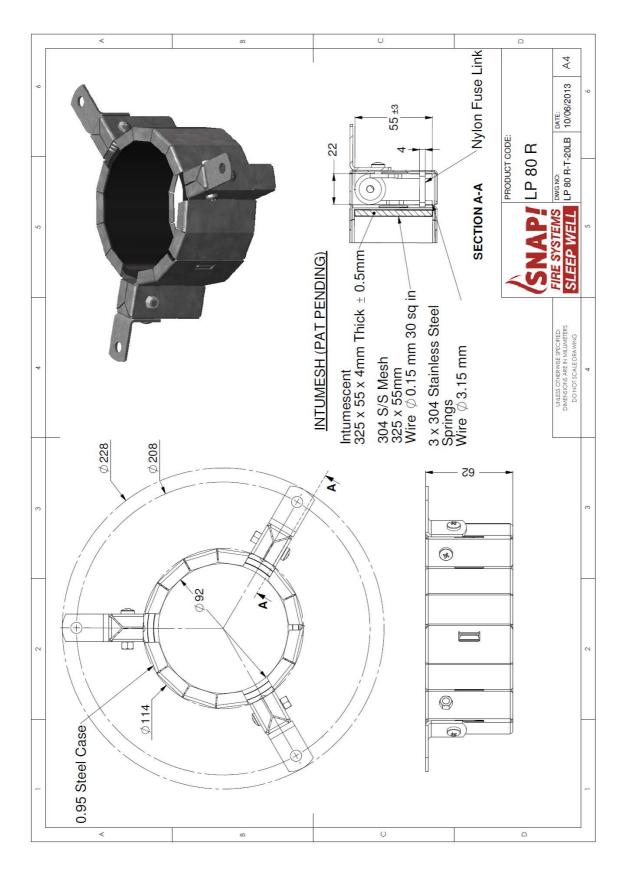


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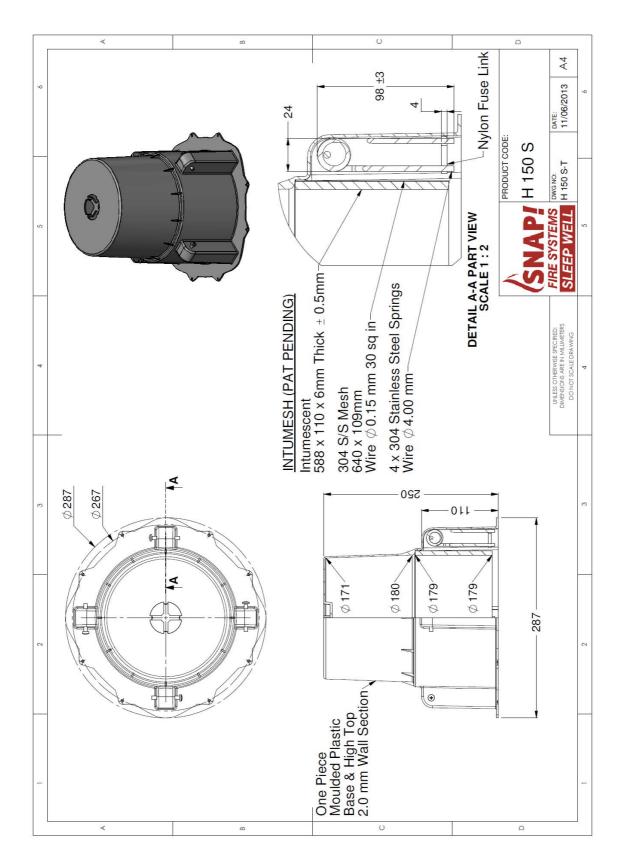
Drawing numbered L 100 FWS - T, dated 9/06/2013, by Snap Fire Systems





Drawing numbered LP 80 R - T - 20LB, dated 10/06/2013, by Snap Fire Systems





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APPENDIX 5

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Science and Eng		th Australian Standar	was tested by the CSIRO Division of Materials 1530, Methods for fire tests on building materials	
	Snap Fire Systems Pty I Unit 2-160 Redland Bay CAPALABA QLD			
	of the test specimen and t ort numbered FSP 1592.	he complete test rest	Its are detailed in the Division's sponsored	
Product Name:	Penetration 1 – H 150 S incorporating a 35-mm t		tecting a 160-mm Rehau Raupiano pipe (slab	
Description:	179-mm inner diameter incorporated a 588-mm comprised four stainless	and a 267-mm diame x 110-mm x 6-mm th s steel springs, a nylo	ed a 2-mm thick polypropylene casing with a ter base flange. The 150-mm high collar casing ck intumescent material. The closing mechanis n fuse link and a 640-mm x 109-mm stainless s S-T dated 11 June 2013, by SNAP Fire System	m teel
	thickness of 4.2-mm fitte mm above the concrete supported at 500-mm ar	ed through the collar's slab and 500-mm inte nd 1000-mm from the	OD Rehau Raupiano pipe, with a wall sleeve. The pipe projected vertically, 2000- the furnace chamber. The pipe was unexposed face of the concrete slab. The ped on the exposed end using a Kaowool	
	On the unexposed face, Fire Barrier Sealant IC 1		een the pipe and the slab was filled with 3M I-mm depth.	
			tep around half the pipe, as shown in drawing t " dated 1 June 2013, by Snap Fire Systems Pt	
The element of c	onstruction described abo	ve satisfied the follow	ing criteria for fire-resistance for the period state	ed.
	Structural Adequacy Integrity	-	not applicable	
	Insulation	-	no failure at 241 minutes no failure at 241 minutes	
	the purpose of Building Re cable for exposure to the fi		a, achieved a fire-resistance level (FRL) of -/240 ction as tested.)/240.
This certificate is evidence of com		mation only and does	not comply with the regulatory requirements fo	ſ
Testing Officer: Issued on the 12	Mario Lara th day of July 2013 without	Date of Test: alterations or additio	29 May 2013 is.	
B. Row	-y-			
Brett Roddy	esting and Assessments			
	14 Julius Avenue,	Riverside Corporate	c ience and Engineering Park, North Ryde NSW 2113 AUSTRALIA 144 Facsimile:61 2 9490 5555	
NATA	Accre	editation No. 165 - 0	ith NATA's accreditation requirements. orporate Site No. 3625 se with ISO/IEC 17025]

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			ficate of	No. 2 Copyright CSIRO 201 Copying or alteration of this re	3 ©"
				without written authorisation from CSIRO is forbid	
	Science and Eng		ith Australian Standar	w was tested by the CSIRO Division of Materials d 1530, Methods for fire tests on building material	s,
		Snap Fire Systems Pty Unit 2-160 Redland Bay CAPALABA QLD			
		of the test specimen and ort numbered FSP 1592.	the complete test res	ults are detailed in the Division's sponsored	
	Product Name:	Penetration 2 – LP 80F (PVC) pipe incorporatir		protecting a 82-mm diameter Polyvinyl Chloride	
	Description:	Dynabolts. The collar c 114-mm outer diameter thick intumescent mate	omprised a 0.95-mm r. The 62-mm high co rial. The closing mec 25-mm x 55-mm stain	the concrete slab with three 6.5/M5-35mm thick Steel casing with a 92-mm inner diameter an lar casing incorporated a 325-mm x 55-mm x 4-m nanism comprised three stainless steel springs, a less steel mesh, as shown in drawing numbered IAP Fire Systems.	
		3.2-mm fitted through t the unexposed face wi was laid on top of the o side of the slab a 82-m	the LP 80R Snap fire th chromed brass floc concrete slab and finis im OD PVC gully trap	OD PVC pipe, with a wall thickness of collar. The floor waste system was capped on r waste grate, a 35-mm thick cement screed shed flush with the floor grate. On the exposed was connected to the penetrating pipe, nncrete slab with 6.5/M5-35mm Dynabolts.	
				r to the level shown in drawing titled 2013, by Snap Fire Systems Pty Ltd.	
	The element of c	onstruction described abo	ove satisfied the follow	ving criteria for fire-resistance for the period stated	ļ
		Structural Adequacy	-	not applicable	
		Integrity Insulation	-	no failure at 241 minutes no failure at 241 minutes	
		the purpose of Building F cable for exposure to the		a, achieved a fire-resistance level (FRL) of -/240/2	240.
	This certificate is evidence of com		rmation only and doe	s not comply with the regulatory requirements for	
	Testing Officer: Issued on the 12 ^t	Mario Lara th day of July 2013 withou	Date of Test: t alterations or addition	29 May 2013 ns.	
	B. Road				
	Brett Roddy Manager, Fire Te	esting and Assessments			
			, Riverside Corporat	cience and Engineering e Park, North Ryde NSW 2113 AUSTRALIA	
÷	CSIRO	Tele	phone: 61 2 9490 5	444 Facsimile:61 2 9490 5555	
	NATA	Accr	editation No. 165 -	vith NATA's accreditation requirements. Corporate Site No. 3625 ce with ISO/IEC 17025	



		Certificate of Test
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	Science and Engi	hat the element of construction described below was tested by the CSIRO Division of Materials ineering in accordance with Australian Standard 1530, Methods for fire tests on building materials, structures, Part 4-2005 on behalf of:
		Snap Fire Systems Pty Ltd Unit 2-160 Redland Bay Road CAPALABA QLD
		of the test specimen and the complete test results are detailed in the Division's sponsored ort numbered FSP 1592.
	Product Name:	Penetration 3 – H 150 S cast-in fire collar protecting a 110-mm Polyvinyl Chloride (PVC) pipe Sandwich Construction (SC) incorporating a floor waste
	Description:	The SNAP Cast-in H 150 S fire collar comprised a 2-mm thick HDPE casing with a 179-mm inner diameter and a 267-mm diameter base flange. The 110-mm high collar casing incorporated a 588-mm x 110-mm x 6-mm thick intumescent material. The closing mechanism comprised four stainless steel springs, a nylon fuse link and a 640-mm x 109-mm stainless steel mesh, as shown in drawing numbered H 150 S-T, dated 11 June 2013, by SNAP Fire Systems.
		The penetrating service comprised a 110-mm OD PVC SC pipe, with a wall thickness of 3.2-mm fitted through the H 150 S Snap fire collar. The floor waste system was capped on the unexposed face with chromed brass floor waste grate, a 35-mm thick cement screed was laid on top of the concrete slab and finished flush with the floor grate. On the exposed side of the slab a 110-mm OD PVC gully trap was connected to the penetrating pipe, supported by M10 HKD clamps fixed to the concrete slab. On the exposed face, the floor waste gully was sealed using a PVC end cap.
		The floor waste gully was charged with water to the level shown in drawing titled "Penetration #3 100 PVCsc FW" dated 1 June 2013, by Snap Fire Systems Pty Ltd.
	The element of co	onstruction described above satisfied the following criteria for fire-resistance for the period stated.
		Structural Adequacy - not applicable
		Integrity - no failure at 241 minutes Insulation - no failure at 241 minutes
		the purpose of Building Regulations in Australia, achieved a fire-resistance level (FRL) of -/240/240. able for exposure to the fire from the same direction as tested.
	This certificate is evidence of comp	provided for general information only and does not comply with the regulatory requirements for pliance.
	Testing Officer: Issued on the 12 th	Mario Lara Date of Test: 29 May 2013 ^h day of July 2013 without alterations or additions.
	B. Roa	-J
	Brett Roddy	sting and Assessments
		CSIRO Materials Science and Engineering
÷	CSIRO	14 Julius Avenue, Riverside Corporate Park, North Ryde NSW 2113 AUSTRALIA Telephone: 61 2 9490 5444 Facsimile:61 2 9490 5555
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		Certij	licate of	1. Jest No. 2502	
			w	"Copyright CSIRO 2013 ©" Copying or alteration of this report ithout written authorisation from CSIRO is forbidden.	
	Science and Engi		h Australian Standard	was tested by the CSIRO Division of Materials 1530, Methods for fire tests on building materials,	
		Snap Fire Systems Pty L Unit 2-160 Redland Bay CAPALABA QLD			
		of the test specimen and tl ort numbered FSP 1592.	he complete test resul	ts are detailed in the Division's sponsored	
	Product Name:	Penetration 4 – L 100 FV Polyethylene (HDPE) pip		rotecting a 110-mm diameter High Density r waste	
	Description:	inner diameter and a 182 a 412-mm x 85-mm x 4-r stainless steel springs, a	2-mm diameter base f mm thick intumescent nylon fuse link and a	prised a 1.6-mm thick HDPE casing with a 110-mm lange. The 115-mm high collar casing incorporated material. The closing mechanism comprised three 460-mm x 85-mm stainless steel mesh, as shown une 2013, by SNAP Fire Systems.	
		4.7-mm fitted through th on the unexposed face was screed was laid on top of exposed side of the slat pipe, supported by a Sa	e L 100 FWS Snap fir with chromed brass flo of the concrete slab ar o a 110-mm OD HDPE ddle Clamp fixed to th	OD HDPE pipe, with a wall thickness of e collar. The floor waste system was capped oor waste grate, a 35-mm thick cement id finished flush with the floor grate. On the gully trap was connected to the penetrating e concrete slab with 6.5/M5-35mm ste gully was sealed using a HDPE end cap.	
				to the level shown in drawing titled 2013, by Snap Fire Systems Pty Ltd.	
	The element of co	onstruction described abov	ve satisfied the following	ng criteria for fire-resistance for the period stated.	
		Structural Adequacy Integrity	-	not applicable no failure at 241 minutes	
		Insulation	22 	no failure at 241 minutes	
		the purpose of Building Re able for exposure to the fi		, achieved a fire-resistance level (FRL) of -/240/240. ction as tested.	
	This certificate is evidence of comp		nation only and does i	not comply with the regulatory requirements for	
	Testing Officer: Issued on the 12 th	Mario Lara ^h day of July 2013 without	Date of Test: alterations or addition	29 May 2013 s.	
	B. Rove	-J			
	Brett Roddy Manager, Eiro To	sting and Assessments			
	Manager, The Te	sting and Assessments			
		14 Julius Avenue,	Riverside Corporate	ience and Engineering Park, North Ryde NSW 2113 AUSTRALIA 44 Facsimile:61 2 9490 5555	
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Science and Engi		h Australian Standard	was tested by the CSIRO Division of Materials 1530, Methods for fire tests on building materials,	è.		
	Snap Fire Systems Pty L Unit 2-160 Redland Bay CAPALABA QLD					
	of the test specimen and th ort numbered FSP 1592.	ne complete test resul	ts are detailed in the Division's sponsored			
Product Name:	Penetration 5 – H 50 FW Polyethylene (HDPE) pir		otecting a 56-mm diameter High Density r waste			
Description:	cription: The SNAP Cast-in H 50 FWS fire collar comprised a 1.6-mm thick HDPE casing with a 71-mm inner diameter and a 108-mm diameter base flange. The 76-mm high collar casing incorporated a 240-mm x 58-mm x 4-mm thick intumescent material. The closing mechanism comprised three stainless steel springs, a nylon fuse link and a 280-mm x 58-mm stainless steel mesh, as shown in drawing numbered H 50 FWS-T dated 20 April 2013, by SNAP Fire Systems.					
	3.5-mm fitted through th on the unexposed face was screed was laid on top of exposed side of the slab pipe, supported by a Sac	e H 50 FWS Snap fire with chromed brass flo f the concrete slab an a 56-mm OD HDPE ddle Clamp fixed to th	DD HDPE pipe, with a wall thickness of collar. The floor waste system was capped or waste grate, a 35-mm thick cement d finished flush with the floor grate. On the gully trap was connected to the penetrating e concrete slab with 6.5/M5-35mm te gully was sealed using a HDPE end cap.			
			to the level shown in drawing titled 2013, by Snap Fire Systems Pty Ltd.			
The element of co	onstruction described abov	e satisfied the following	ng criteria for fire-resistance for the period stated.			
	Structural Adequacy Integrity	ie. 1-	not applicable no failure at 241 minutes			
	Insulation	1997 - 19	no failure at 241 minutes			
	the purpose of Building Re able for exposure to the fir		achieved a fire-resistance level (FRL) of -/240/24 tion as tested.	0.		
This certificate is evidence of comp		nation only and does r	not comply with the regulatory requirements for			
Testing Officer: Issued on the 12 th	Mario Lara ^h day of July 2013 without	Date of Test: alterations or addition	29 May 2013 s.			
B. Rove	-J					
Brett Roddy Manager, Fire Te	sting and Assessments					
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