

Fire resistance of SNAP Multiple Service Cast-In Collar (MS70C) in concrete floors when tested in accordance with AS 1530.4-2014 and assessed in accordance with AS 4072.1-2005 Amdt.1

Short Form Assessment Report

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Commercial-in-confidence

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Contents

1	Introduction	4
2	Supporting Data	4
3	Proposed Minor Variations	5
	3.1 SNAP MS70C collars protecting various services	5
	3.2 Various ways of installing SNAP MS70C collars and services with variations that can be used in any combination.....	5
4	Referenced Standards	6
5	Conclusion	6
	5.1 Performance of SNAP MS70C collars in concrete floor.....	6
	5.2 Performance of SNAP MS70C collars penetrating concrete floor with the addition of Snap Thermofab.....	14
	5.3 Performance of SNAP MS70C collars in concrete floor in concrete floor with reduced collar spacing.....	17
	5.4 Performance of SNAP MS70C collars in concrete floor with blank/empty collar	18
6	Direct Field of Application of Results	19
7	Requirements.....	19
8	Term of Validity.....	19
9	Limitations.....	19

1 Introduction

This short form report refers to an assessment FCO 3481 Revision D titled “ fire resistance of SNAP Multiple Service Cast-In Collar (MS70C) in concrete floors when tested in accordance with AS 1530.4-2014 and assessed in accordance with AS 4072.1-2005 Amdt 1.”

This report is prepared for the purpose of meeting the requirements of NCC 2019 Volume 1 Schedule 5 Clauses 2(b) and 2(c) and NCC 2022 Volume 1 Clauses S1C2 (b) and (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 in the reference report 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 is subject to the requirements, validity and limitations of Sections 7, 8 and 9.

2 Supporting Data

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

Table A: Referenced test data

Report Reference	Test Standard	Outline of Test Specimen
FSP 2203	AS 1530.4 - 2014	A fire resistance testing of six SNAP fire collars protecting a 150-mm thick concrete floor slab penetrated by various services.
FSP 2213	AS 1530.4 - 2014	A fire resistance testing of seven SNAP fire collars protecting a 150-mm thick concrete floor slab penetrated by various services.
FSP 2225	AS 1530.4 - 2014	A fire resistance testing of seven SNAP fire collars protecting a 150-mm thick concrete floor slab penetrated by various services.
FSP 2231	AS 1530.4 - 2014	A fire resistance testing of seven SNAP fire collars protecting a 150-mm thick concrete floor slab penetrated by various services.
FSP 2386	AS 1530.4 - 2014	A fire resistance testing of seven SNAP fire collars protecting a 150-mm thick concrete floor slab penetrated by various services.
FSP 2391	AS 1530.4 - 2014	A fire resistance testing of seven SNAP fire collars protecting a 150-mm thick concrete floor slab penetrated by seven services.
FSP 2153	AS 1530.4 - 2014	A fire resistance test of SNAP fire collars protecting a 120-mm thick concrete floor slab penetrated by various services.
FSP 2401	AS 1530.4 - 2014	A fire resistance test of SNAP fire collars protecting a 150-mm thick concrete floor slab penetrated by various services.

The reports FSP 2401, FSP 2203, FSP 2213, FSP 2225, FSP 2231, FSP 2386, FSP 2391 and FSP 2153 were undertaken by CSIRO North Ryde and sponsored by IG6 Pty Ltd.

3 Proposed Minor Variations

3.1 SNAP MS70C collars protecting various services

The proposed construction shall be MS70C collars tested in Table A, and subject to the following variations:

- The service/s tested with MS70C collars shall be as listed in Tables 2 - 6
- The support constructions tested shall vary from 150mm thick concrete floor slab tested to include 150mm thick and 175mm thick concrete slab.
- The collar to collar spacing in the support construction shall be either
 - At least 80mm between active area to active area as shown in Figure 6 or
 - At least 40mm between active area to active area as shown in Figure 9
- Top of collar may be flush with a 250mm thick concrete floor or below floor level when floor is greater than 250mm thick as per Figure 3
- The inclusion of Snap Thermofab as additional protection on lagged pipes as per Figure 8
- All services shall be supported at nominally 500mm from the supporting construction, with a second support at nominally 1000mm from the first support where required.

3.2 Various ways of installing SNAP MS70C collars and services with variations that can be used in any combination

The proposed construction in Section 3.1 of this report may include the following variations in isolation or combination:

- a. The inclusion of empty/blank cast-in collars sealed by either:
 - i. Installing a PVC pipe and cap assembly for MS70C collars up to 180 minutes applications as per Figure 10,
 - A. Cut the collar flush with the top of the concrete slab
 - B. Insert a section of PVC pipe capped at both ends.
 - C. Bolt the PVC plug to the collar lid with an M6 nut and bolt through the metal strapping.
 - D. Anchor the metal strapping down to the concrete with approved fixings.
 - ii. Backfilling with grout for MS70C collars up to 240 minutes applications as per Figure 11
 - A. Cut the collar flush with the top of the concrete slab
 - B. Remove intumescent material and activate the springs
 - C. Cover with a minimum 0.4mm thick metal plate and then backfill the collar with non-shrink grout
- b. The inclusion of variation to collar body as per Figure 5
 - i. The MS70C collar's flange can be trimmed outside the active area of the collar
 - ii. The base flange of the MS70C collar can be painted, though no paint is allowed on the active area of the MS70C collar or its internal components
 - iii. Small amounts of slurry are allowed on the underside of the MS70C collar flange but not in the active area and fuse links of the MS70C collar
 - iv. The inclusion of a MS70C collar where the fuse link(s) have activated or have been removed post the installation of the service.
- c. The MS70C collar may be cast-in during construction or grout backfilled with either non-shrink grout or concrete between the concrete slab and the outside of the collar as per Figure 7
- d. The inclusion of the services in Tables 2 to 6, to be installed in collars casted near the edge of a minimum 150mm thick concrete slab with a minimum of 40mm coverage surround the one side the collar as shown in Figure 4

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, Section 10 as appropriate for service penetrations.
AS 4072.1-2005 (amdt 1)	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 the reference 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.

5.1 Performance of SNAP MS70C collars in concrete floor

Table 1: Sealant details for annular gap between the service and element

Product	Detail
Snap Fire Seal FRAS	In the annular gap between collar opening and services When gap ≤ 5 mm: sealant optional When gap ≥ 6 mm: Snap Fire Seal to fill gaps to a minimum depth of 10mm depth and finished off flush with the collar opening In the annular gap between conduit and services Not required

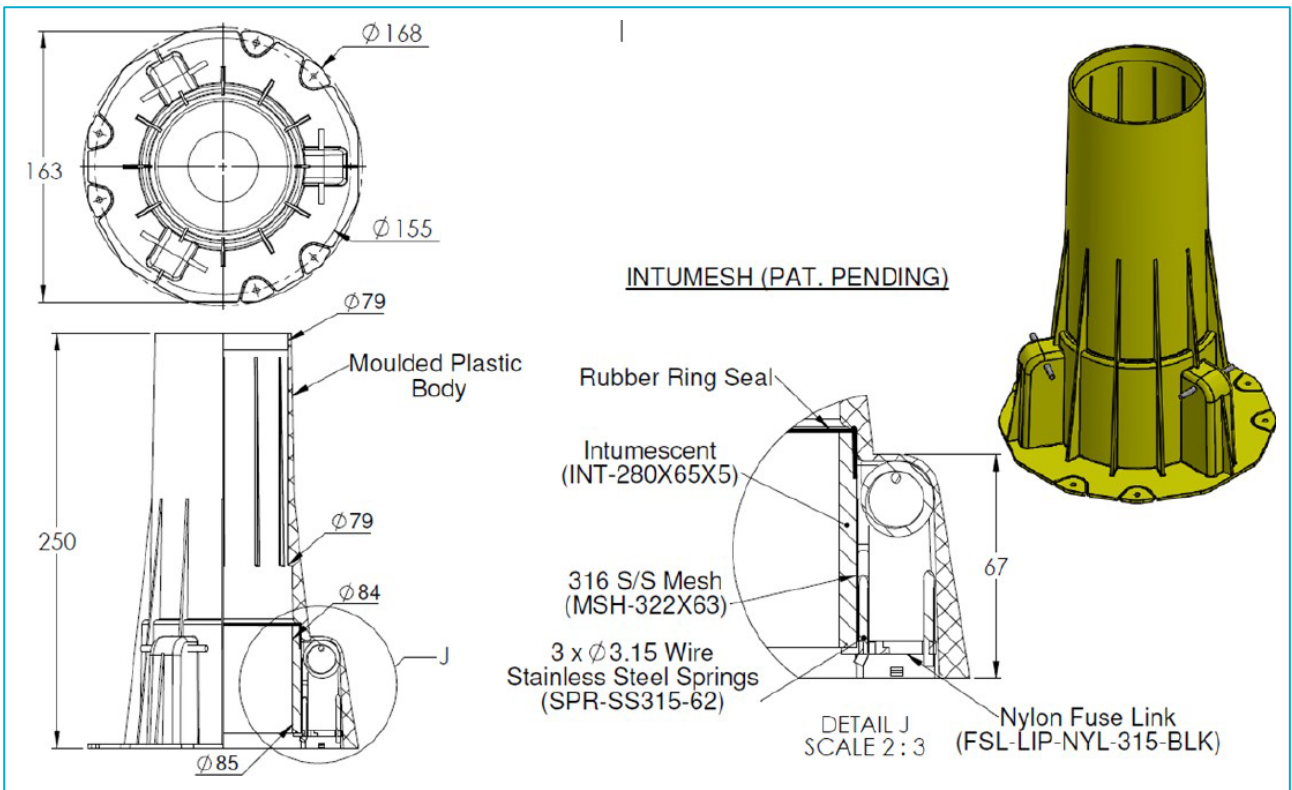


Figure 1: MS70C collar

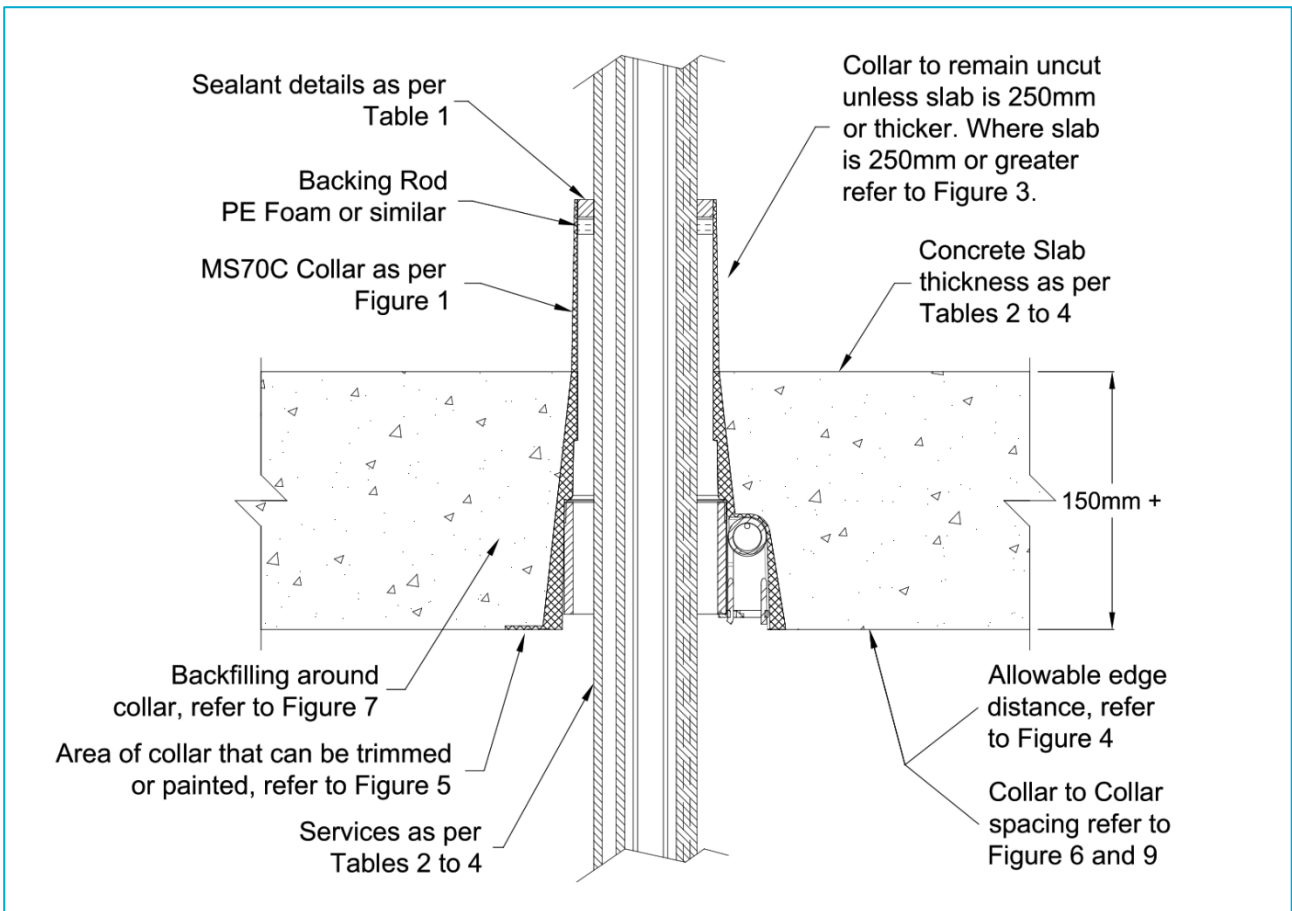


Figure 2: Standard installation of the MS70C Collar in concrete floor

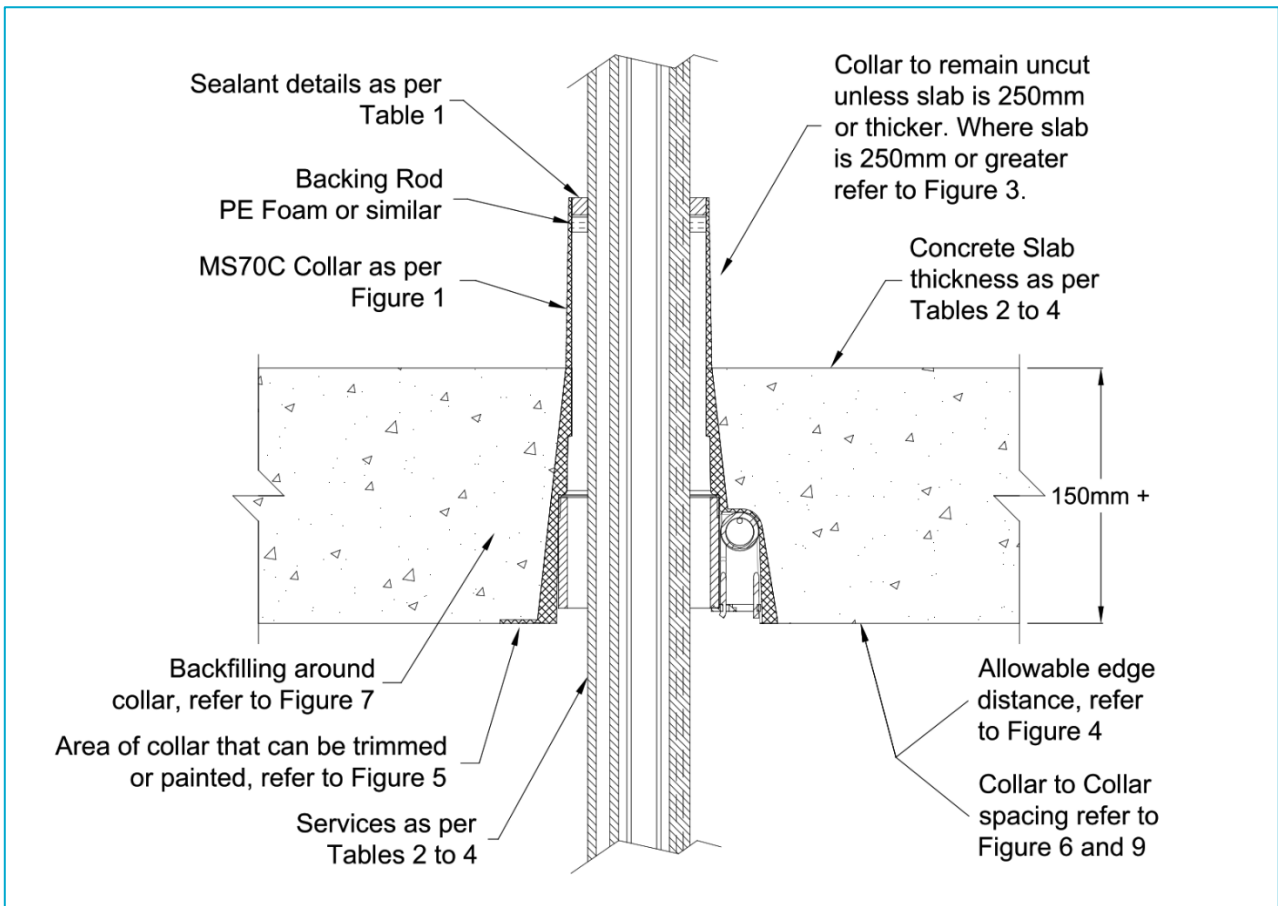


Figure 3: MS70C collar to slab interface when installed in concrete floor 250mm or greater

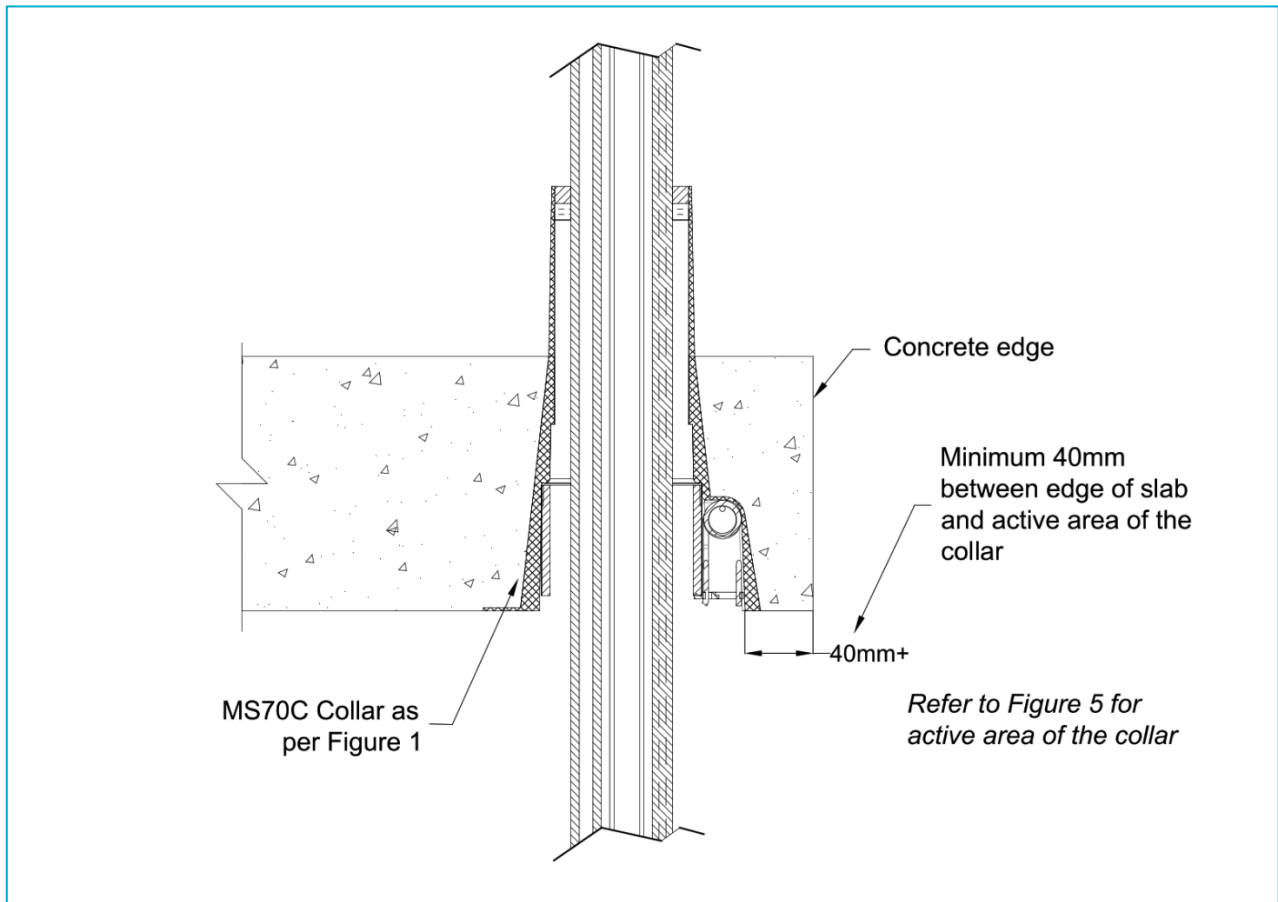


Figure 4: MS70C minimum spacing to edge of floor

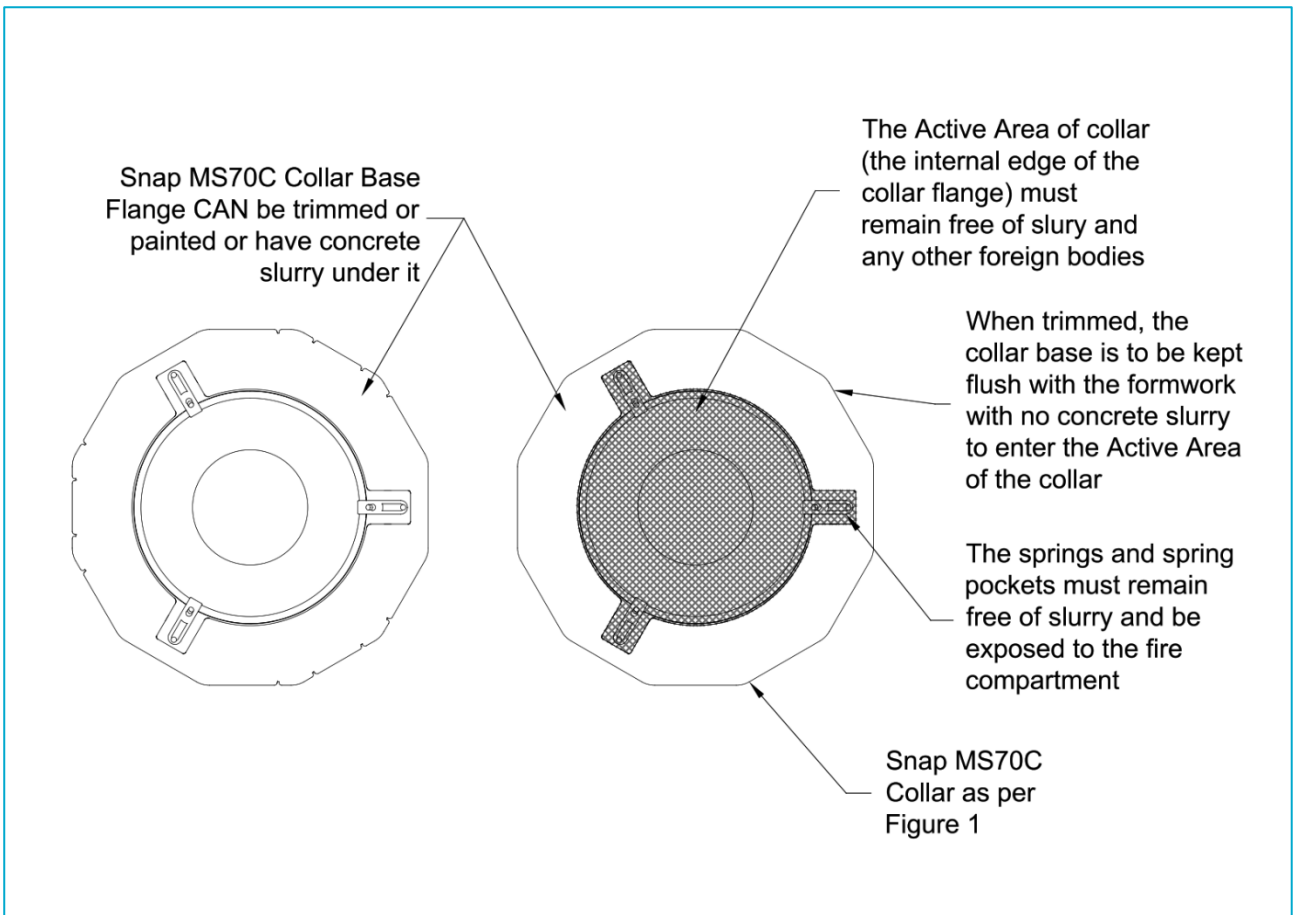


Figure 5: MS70C Active area of the collar

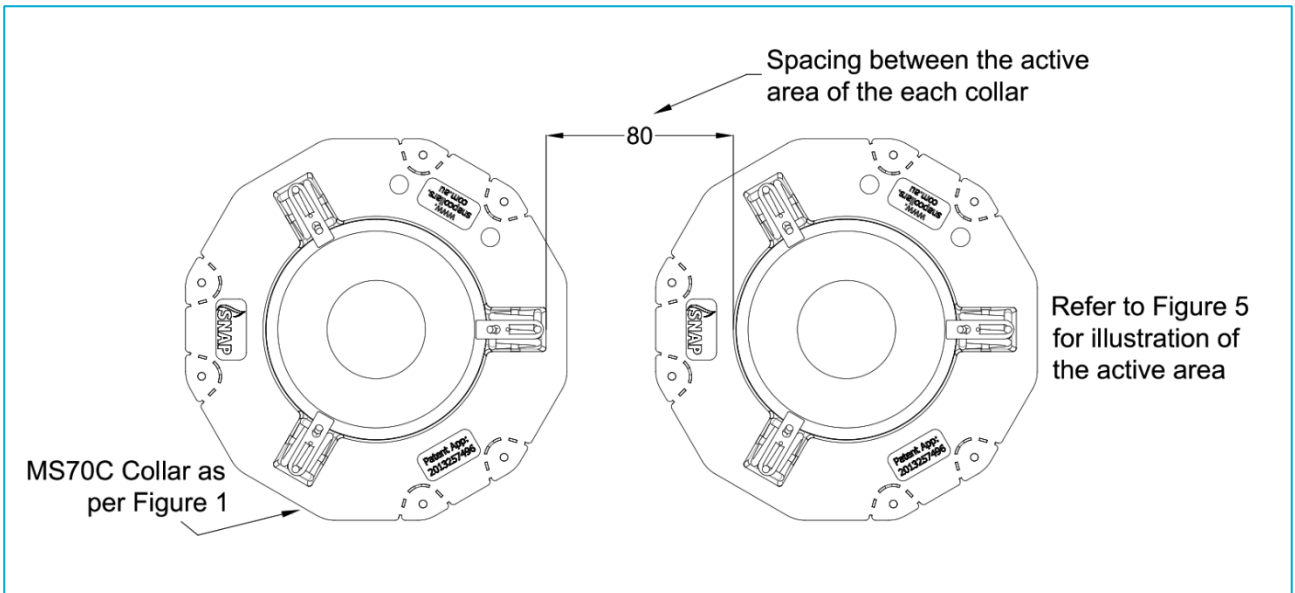


Figure 6: MS70C standard collar to collar spacing

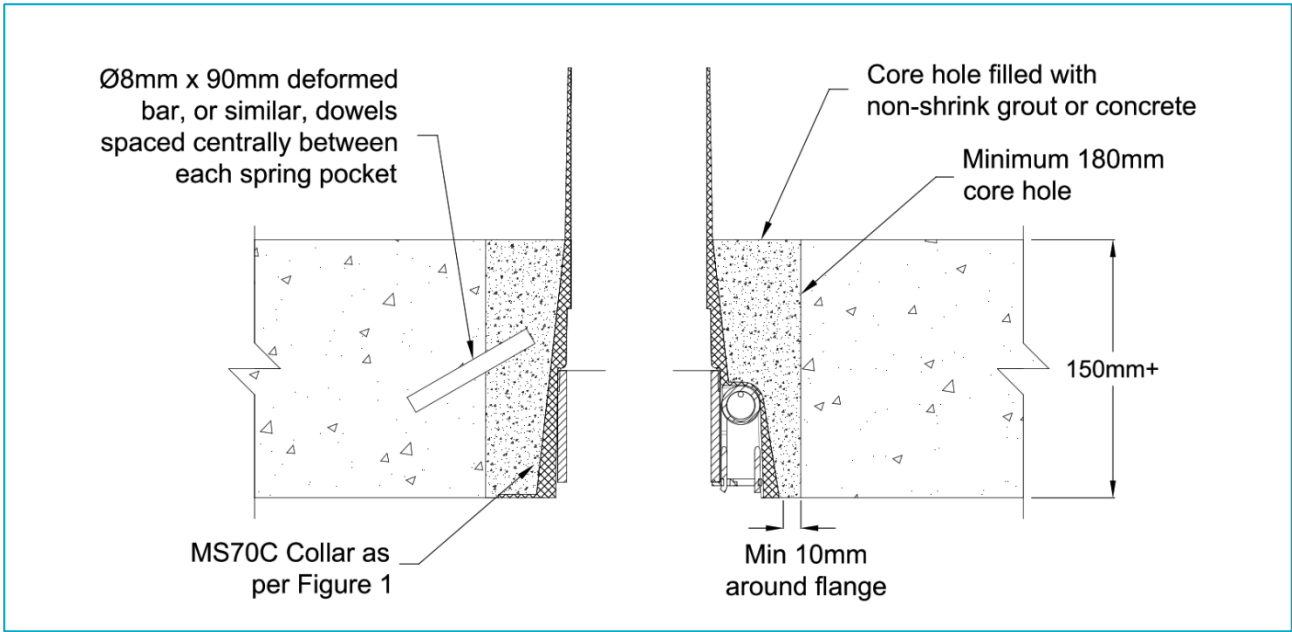


Figure 7: MS70C backfilling requirements in concrete slab core hole

Table 2: Conduit and Cable services penetrating floors (80mm collar separation as per Figure 6)

Service #	Service	Detail	Installation detail	FRL	
				Minimum 150mm slab	Minimum 175mm slab
1	One PVC Conduit 20mm – 50mm nominal diameter (1.6mm to 3mm wall thickness).	One empty rigid PVC conduit Minimum 100mm protruding above and below slab	Figure 2 to Figure 7	-/180/180	-/240/240
2	Data and Comms Cables Cat5, Cat5e	1 to 100 Cables With or without PVC conduit in the collar (Refer to line 1 for conduit details)		-/180/180	-/240/240
3	Data and Comms Cables Cat6, Cat6A, Cat7, RG6	1 to 80 Cables With or without PVC conduit in the collar (Refer to line 1 for conduit details)		-/180/180	-/240/240
4	Fibre optic cables (10.3mm diameter)	1 to Full of Optical Fibre cable With or without PVC conduit in the collar (Refer to line 1 for conduit details)		-/180/180	-/240/240
5	Fibre optic cables (5.3mm diameter)	1 to 10 of Optical Fibre cable With or without PVC conduit in the collar (Refer to line 1 for conduit details)		-/180/180	-/240/240
6	Round insulated copper Power Cables (2.5mm ² to 16mm ² 3C+E Cables)	1 to Full in collar or in conduit With PVC conduit in the collar (Refer to line 1 for conduit details)		-/180/180	-/240/180
7		1 to Full in collar or in conduit Without PVC conduit in the collar (Refer to line 1 for conduit details)		-/180/120	-/240/120
8	Flat TPS power cables (2.5mm ² 2C+E)	1 to 60 Cables With PVC conduit in the collar (Refer to line 1 for conduit details)		-/180/180	-/240/240
9		1 to 60 Cables Without PVC conduit in the collar (Refer to line 1 for conduit details)		-/180/180	-/240/180
10	Mix services	Various cable combinations from above with or without conduit in the collar (Refer to line 1 for conduit details) Only one conduit allowed in the collar		-/180/120	-/240/120

Table 3 – Fire Resistance of lagged pipes penetrating minimum 150mm thick concrete floor (80mm collar separation as per Figure 6)

Service #	Lagged services installed as per Figure 2	FRL for each lagging type in minimum 150mm concrete floor						
		PE Foam	Thermotec E-Flex ST	K-Flex ST	SuperMax	Armaflex FRV nitrile rubber	Actrol SuperPair F/R	Foilflex or Sekisui foam (Foil faced)
1	Paircoil Bundle A One set of Paircoil (a pipe up to 3/8" & a pipe up to 3/4") with or without any of the following services: <ul style="list-style-type: none"> • One of up to 25mm PVC pipe • One of up to 2.5mm² 2C+E TPS power cable • One of either CAT 5, 5e, 6, 6a or 7 cable 	-/180/90 lagging 9mm	-/180/120 lagging 9 mm	-/180/120 lagging 9 - 19mm	-/180/120 lagging 9 - 19mm	-/180/180 lagging 9 - 19mm	-/180/180 lagging 9 - 19mm	-/180/120 lagging 25mm
2	Paircoil Bundle B One or two sets of Paircoil (any two pipes up to 3/4") with or without any of the following services: <ul style="list-style-type: none"> • One of up to 2.5mm² 2C+E TPS power cable • One or two of CAT 5, 5e, 6, 6a or 7 cables 		N/A			-/180/180 lagging 9 - 19mm	N/A	
3	One of up to 3/4" copper or steel pipe (max 1.2mm wall thickness) With or without a 2.5mm ² 2C+E TPS cable	N/A	N/A	-/180/120 lagging 9 - 19mm	-/180/120 lagging 9 - 19mm	-/180/180 lagging 9 - 19mm	-/180/120 lagging 25mm	
4	One of up to 1" copper or steel pipe (max 1.2mm wall thickness) With or without a 2.5mm ² 2C+E TPS cable	N/A	N/A	-/180/120 lagging 19 - 25mm	-/180/120 lagging 19 - 25mm	-/180/120 lagging 19 - 25mm	-/180/120 lagging 25mm	
5	One of 16-32mm PN12 PVC pipe	N/A	-/180/180 lagging 19 - 25mm	-/180/180 lagging 19 - 25mm	-/180/180 lagging 19 - 25mm	-/180/180 lagging 9 - 19mm	-/180/180 lagging 25mm	

Table 4 – Fire Resistance of lagged pipes penetrating minimum 175mm thick concrete floor (80mm collar separation as per Figure 6)

Service #	Lagged services installed as per Figure 2	FRL for each lagging type in minimum 175mm concrete floor						
		PE Foam	Thermotec E-Flex ST	K-Flex ST	SuperMax	Armaflex FRV nitrile rubber	Actrol SuperPair F/R	Foilflex or Sekisui foam (Foil faced)
1	Paircoil Bundle A One set of Paircoil (a pipe up to 3/8" & a pipe up to 3/4") with or without any of the following services: <ul style="list-style-type: none"> • One of up to 25mm PVC pipe • One of up to 2.5mm² 2C+E TPS power cable • One of either CAT 5, 5e, 6, 6a or 7 cable 	-/240/90 lagging 9mm	-/240/120 lagging 9 mm	-/240/120 lagging 9 - 19mm	-/240/120 lagging 9 - 19mm	-/240/180 lagging 9 - 19mm	-/240/180 lagging 9 - 19mm	-/180/120 lagging 25mm
2	Paircoil Bundle B One or two sets of Paircoil (any two pipes up to 3/4") with or without any of the following services: <ul style="list-style-type: none"> • One of up to 2.5mm² 2C+E TPS power cable • One or two of CAT 5, 5e, 6, 6a or 7 cables 	N/A	N/A	N/A	N/A	-/240/180 lagging 9 - 19mm	N/A	
3	One of up to 3/4" copper or steel pipe (max 1.2mm wall thickness) With or without a 2.5mm ² 2C+E TPS cable	N/A	N/A	-/240/120 lagging 9 - 19mm	-/240/120 lagging 9 - 19mm	-/240/180 lagging 9 - 19mm	-/180/120 lagging 25mm	
4	One of up to 1" copper or steel pipe (max 1.2mm wall thickness) With or without a 2.5mm ² 2C+E TPS cable	N/A	N/A	-/240/120 lagging 19 - 25mm	-/240/120 lagging 19 - 25mm	-/240/120 lagging 19 - 25mm	-/180/120 lagging 25mm	
5	One of 16-32mm PN12 PVC pipe	N/A	-/240/240 lagging 19 - 25mm	-/240/240 lagging 19 - 25mm	-/240/240 lagging 19 - 25mm	-/240/240 lagging 9 - 19mm	-/180/180 lagging 25mm	

5.2 Performance of SNAP MS70C collars penetrating concrete floor with the addition of Snap Thermofab

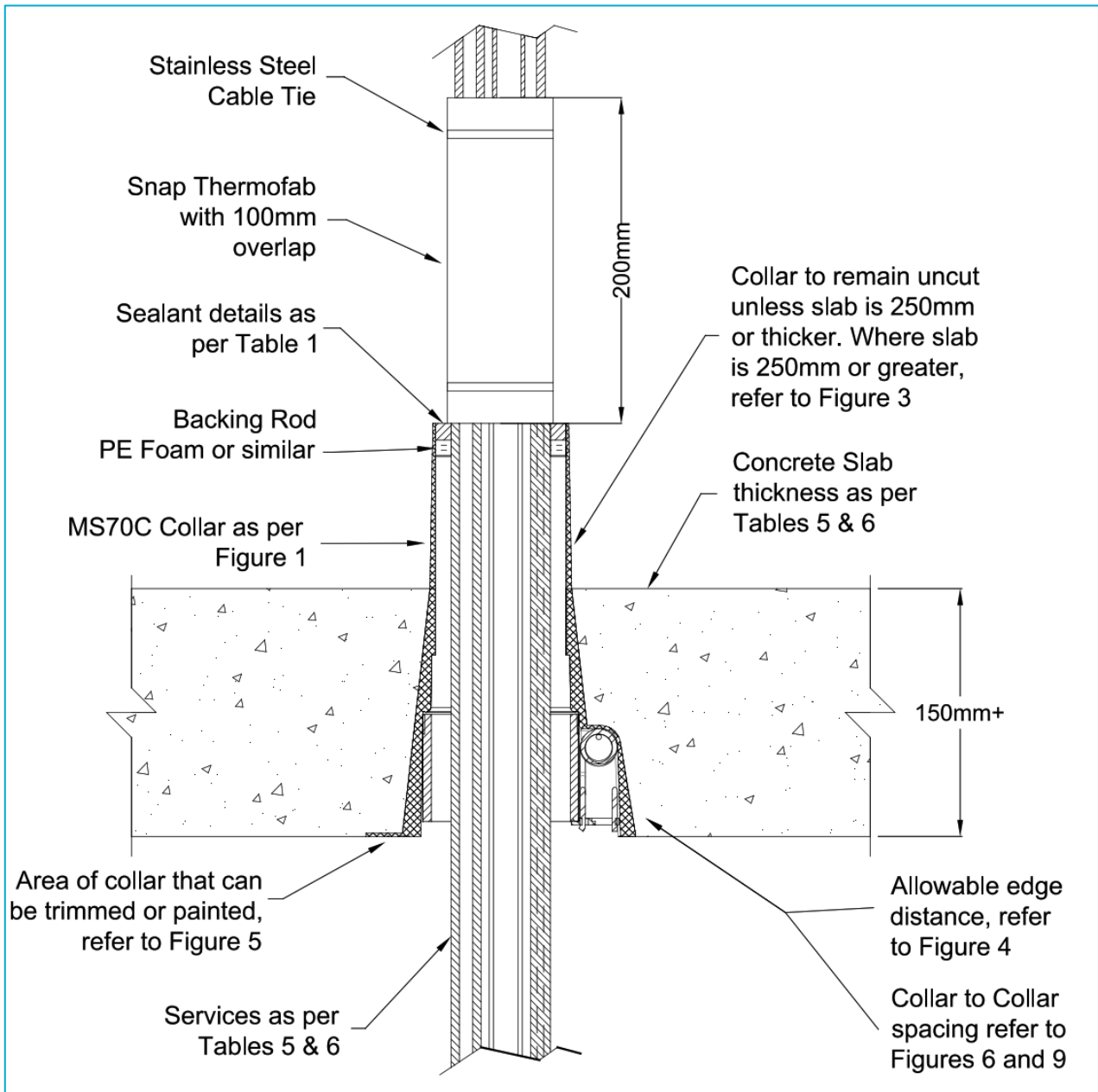


Figure 8: Standard installation of MS70C Collar in concrete floor with the addition of Snap Thermofab

Table 5 – Fire Resistance of lagged pipes wrapped with 200mm High Snap ThermoFab in minimum 150mm thick concrete floor (80mm collar separation as per Figure 6)

# Service	Lagged services installed as per Figure 8	FRL for each lagging type in minimum 150mm concrete floor						
		PE Foam	Thermotec E-Flex ST	K-Flex ST	SuperMax	Armaflex FRV nitrile rubber	Actrol SuperPair F/R	Foiflex or Sekisui foam (Foil faced)
1	Paircoil Bundle A One set of Paircoil (a pipe up to 3/8" & a pipe up to 3/4") with or without any of the following services: <ul style="list-style-type: none"> • One of up to 25mm PVC pipe • One of up to 2.5mm² 2C+E TPS power cable • One of either CAT 5, 5e, 6, 6a or 7 cable 	-/180/90 lagging 9mm	-/180/180 lagging 9 mm	-/180/180 lagging 9 - 19mm	-/180/180 lagging 9 - 19mm	-/180/180 lagging 9 - 19mm	-/180/180 lagging 9 - 19mm	-/180/120 lagging 25mm
2	Paircoil Bundle B One or two sets of Paircoil (any two pipes up to 3/4") with or without any of the following services: <ul style="list-style-type: none"> • One of up to 2.5mm² 2C+E TPS power cable • One or two of CAT 5, 5e, 6, 6a or 7 cables 	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	One of up to 3/4" copper or steel pipe (max 1.2mm wall thickness) With or without a 2.5mm ² 2C+E TPS cable	-/180/90 lagging 9mm	-/180/180 lagging 9 - 19mm	-/180/180 lagging 9 - 19mm	-/180/180 lagging 9 - 19mm	-/180/180 lagging 9 - 19mm	-/180/180 lagging 9 - 19mm	-/180/120 lagging 25mm
4	One of up to 1" copper or steel pipe (max 1.2mm wall thickness) With or without a 2.5mm ² 2C+E TPS cable	N/A	-/180/180 lagging 19 - 25mm	-/180/180 lagging 19 - 25mm	-/180/180 lagging 19 - 25mm	-/180/180 lagging 19 - 25mm	N/A	-/180/120 lagging 25mm
5	One of 16-32mm PN12 PVC pipe	N/A	-/180/180 lagging 19 - 25mm	-/180/180 lagging 19 - 25mm	-/180/180 lagging 19 - 25mm	-/180/180 lagging 19 - 25mm	-/180/180 lagging 19 - 25mm	-/180/180 lagging 25mm

Table 6– Fire Resistance of lagged pipes wrapped with 200mm High Snap ThermoFab in minimum 175mm thick concrete floor (80mm collar separation as per Figure 6)

Service #	Lagged services installed as per Figure 8	FRL for each lagging type in minimum 175mm concrete floor						
		PE Foam	Thermotec E-Flex ST	K-Flex ST	SuperMax	Armaflex FRV nitrile rubber	Actrol SuperPair F/R	Foiflex or Sekisui foam (Foil faced)
1	<p>Paircoil Bundle A</p> <p>One set of Paircoil (a pipe up to 3/8" & a pipe up to 3/4") with or without any of the following services:</p> <ul style="list-style-type: none"> • One of up to 25mm PVC pipe • One of up to 2.5mm² 2C+E TPS power cable • One of either CAT 5, 5e, 6, 6a or 7 cable 	-/240/90 lagging 9mm	-/240/180 lagging 9 mm	-/240/180 lagging 9 - 19mm	-/240/180 lagging 9 - 19mm	-/240/180 lagging 9 - 19mm	-/240/180 lagging 9 - 19mm	-/240/120 lagging 25mm
2	<p>Paircoil Bundle B</p> <p>One or two sets of Paircoil (any two pipes up to 3/4") with or without any of the following services:</p> <ul style="list-style-type: none"> • One of up to 2.5mm² 2C+E TPS power cable • One or two of CAT 5, 5e, 6, 6a or 7 cables 	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3	<p>One of up to 3/4" copper or steel pipe (max 1.2mm wall thickness) With or without a 2.5mm² 2C+E TPS cable</p>	-/240/90 lagging 9mm	-/240/180 lagging 9 - 19mm	-/240/180 lagging 9 - 19mm	-/240/180 lagging 9 - 19mm	-/240/180 lagging 9 - 19mm	-/240/180 lagging 9 - 19mm	-/240/120 lagging 25mm
4	<p>One of up to 1" copper or steel pipe (max 1.2mm wall thickness) With or without a 2.5mm² 2C+E TPS cable</p>	N/A	-/240/180 lagging 19 - 25mm	-/240/180 lagging 19 - 25mm	-/240/180 lagging 19 - 25mm	-/240/180 lagging 19 - 25mm	N/A	-/240/120 lagging 25mm
5	<p>One of 16-32mm PN12 PVC pipe</p>	N/A	-/240/240 lagging 19 - 25mm	-/240/240 lagging 19 - 25mm	-/240/240 lagging 19 - 25mm	-/240/240 lagging 19 - 25mm	-/240/240 lagging 9 - 19mm	-/180/180 lagging 25mm

5.3 Performance of SNAP MS70C collars in concrete floor in concrete floor with reduced collar spacing

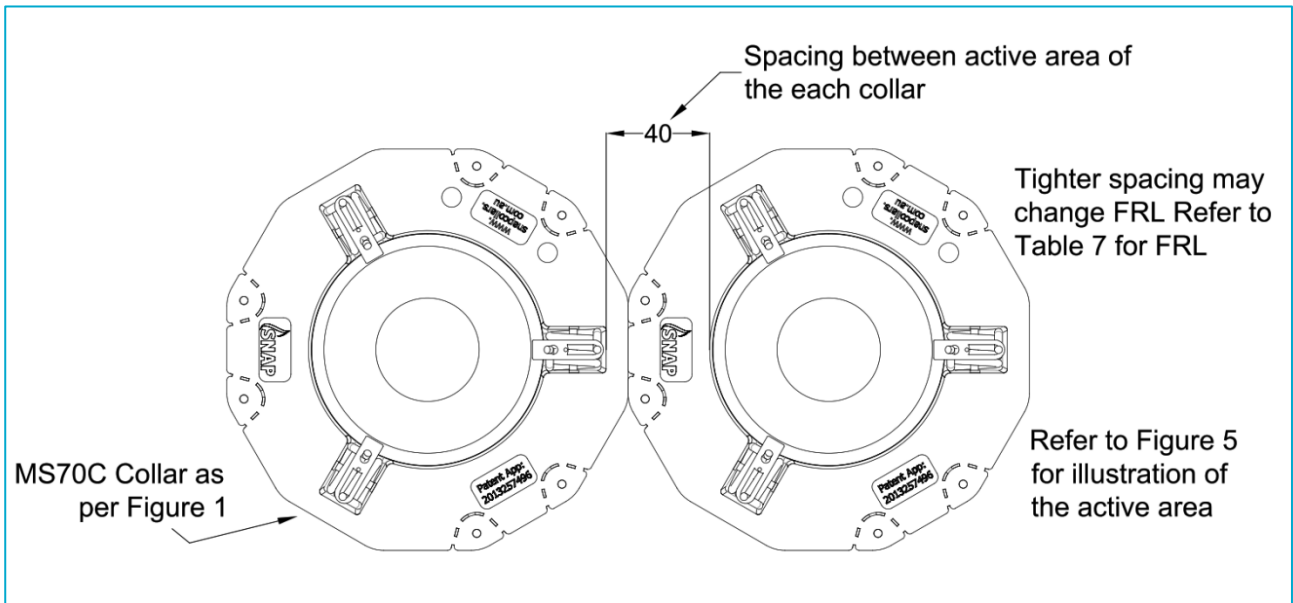


Figure 9: MS70C with 40mm collar to collar separation

Table 7 – Fire Resistance of services with MS70C collars having at least 40mm separation

Services	Additional Installation details	FRL	
		Minimum 150mm concrete floor	Minimum 175mm concrete floor
Services in Tables 2 to 6 when excluding services with PE Foam lagging	Figure 9 instead of Figure 6	-/180/120	-/240/120
Services in Tables 3 to 6 that include services with PE Foam lagging		-/180/90	-/240/90

5.4 Performance of SNAP MS70C collars in concrete floor with blank/empty collar

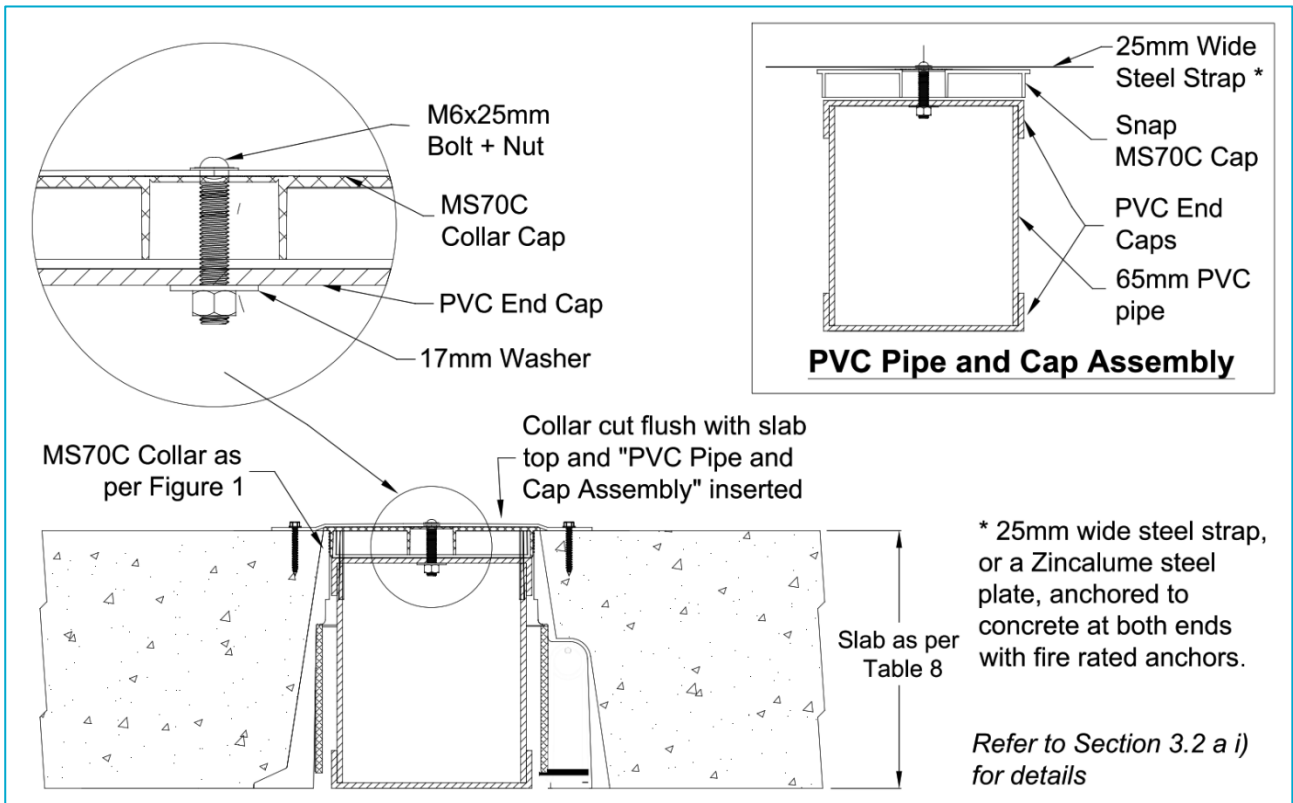


Figure 10: MS70C sealing method with PVC pipe and cap assembly

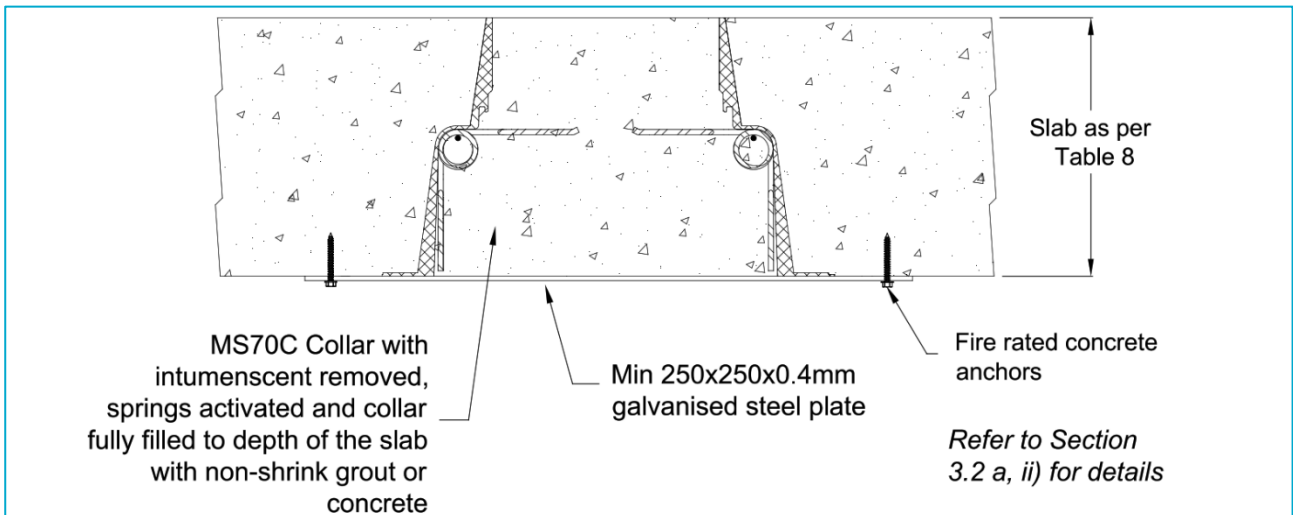


Figure 11: MS70C sealing method by backfilling

Table 8 – Fire Resistance of empty/blank cast-in collars

Collar	Installation details	FRL		
		Minimum 120mm concrete floor	Minimum 150mm concrete floor	Minimum 175mm concrete floor
MS70C	Figure 10	-/120/120	-/180/180	-/180/180
	Figure 11	-/120/120	-/180/180	-/240/240

6 Direct Field of Application of Results

The results of this report are applicable to concrete floors exposed to fire from below.

7 Requirements

It is required that the supporting construction be tested or assessed to achieve the required FRL based on the assessed design in accordance with AS 1530.4.

Any variations concerning size, constructional details, loads, stresses, and 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 31st October 2027. 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.

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