

Fire resistance of various SNAP fire collars when tested in accordance with AS 1530.4-2014 and assessed in accordance with AS 4072.1-2005

Short form Assessment Report

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Report number: Short form FCO-3426 Rev. B

Date: 28/6/2022

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Commercial-in-confidence

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Report Details:

Report CSIRO Reference number: FCO-3426/CO5444

Report Status and Revision History:

VERSION	STATUS	DATE	DISTRIBUTION	ISSUE NUMBER
Initial Issue	Final	28/6/2021	CSIRO/ Client	Short form FCO-3426 Revision B

Report Authorization:

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28/6/2022	28/6/2022	28/6/2022

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1 Introduction

This short form report refers to an assessment FCO 3426 titled “Fire resistance of various SNAP fire collars when tested in accordance with AS 1530.4-2014 and assessed in accordance with AS 4072.1-2005”.

This report is prepared for meeting the evidence of suitability requirements of NCC 2019 Volume 1 Schedule 5 clauses 2b) and 2 c) or 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 and the conclusions are presented in Section 5 of this report subject to the requirements, validity and limitations of Sections 7, 8 and 9.

The field of applicability of the results of this assessment report is presented in Section 6.

2 Supporting Data

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

Table 1: Reference test data

Report Reference	Test Standard	Outline of Test Specimen
FP4640	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FP4837	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FR5670	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FRT190069.2	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a concrete beam
FSP1359	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1367	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1564	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1575	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1576	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1577	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1592	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1601	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1614	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1615	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1648	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1652	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1657	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1686	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1696	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1700	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1735	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1736	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1741	AS 1530.4 -2005	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1771	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1830	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1857	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick concrete slab.
FSP1872	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick concrete slab.
FSP1875	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick concrete slab.
FSP1882	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick Bondek slab.
FSP1883	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick Bondek slab.

Report Reference	Test Standard	Outline of Test Specimen
FSP1891	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1902	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 116 mm thick plasterboard lined wall.
FSP1904	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP1905	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick concrete slab.
FSP1986	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP2002	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick concrete slab.
FSP2008	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick concrete slab.
FSP2016	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick concrete slab.
FSP2028	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick concrete slab.
FSP2049	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick concrete slab.
FSP2050	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP2072	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP2088	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 180 mm thick concrete slab.
FSP2090	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 116 mm thick plasterboard lined wall.
FSP2111	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 180 mm thick concrete slab.
FSP2116	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a concrete slab.
FSP2153	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick concrete slab.
FSP2174	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP2177	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 120 mm thick concrete slab.
FSP2224	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
P112838-1000	EN 1366 Part 3:2009	A fire resistance testing of Suresnap fire collars protecting a 150-mm thick concrete floor slab penetrated by pipes.
P112838-1002	EN 1366 Part 3:2009	A fire resistance testing of Suresnap fire collars protecting a 150-mm thick concrete floor slab penetrated by pipes.
P112838-1003	EN 1366 Part 3:2009	A fire resistance testing of Suresnap fire collars protecting a 150-mm thick concrete floor slab penetrated by pipes.
P112838-1005	EN 1366 Part 3:2009	A fire resistance testing of Suresnap fire collars protecting a 150-mm thick concrete floor slab penetrated by pipes.
P112838-1006	EN 1366 Part 3:2009	A fire resistance testing of Suresnap fire collars protecting a 150-mm thick concrete floor slab penetrated by pipes.
P112838-1007	EN 1366 Part 3:2009	A fire resistance testing of Suresnap fire collars protecting a 150-mm thick concrete floor slab penetrated by pipes.
FSP 2050	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.
FSP 2072	AS 1530.4 -2014	A fire resistance test of pipe penetrations in a 150 mm thick concrete slab.

The referenced tests FP4640, FP4837 and FR5670 were tested at Branz, NZ and sponsored by Snap Fire Systems. The referenced test FRT 190069.2 was tested at Warringtonfire, VIC and sponsored by Snap Fire Systems.

The referenced tests FSP1359, FSP1367, FSP1564, FSP1575, FSP1576, FSP1577, FSP1592, FSP1601, FSP1614, FSP1615, FSP 1648, FSP1652, FSP1657, FSP1686, FSP1696, FSP1700, FSP1735, FSP1736, FSP1741 and FSP1771 were tested at CSIRO and sponsored by Snap Fire Systems. The referenced tests FSP1830, FSP1872, FSP1882, FSP1883, FSP1891, FSP1902, FSP1904, FSP1905, FSP1986, FSP2002, FSP2008, FSP2016, FSP2028, FSP2049, FSP2050, FSP2072, FSP2088, FSP2090, FSP2111, FSP2116, FSP2153, FSP2174, FSP2177 and FSP2224 were tested at CSIRO and sponsored by IG 6 Pty Ltd.

The referenced tests FSP1875 and FSP1857 were tested at CSIRO and sponsored by Combat Collars Pty Ltd and these reports are owned by IG 6 Pty Ltd. The reports P112838-1000, P112838-1002, P112838-1003, P112838-1005, P112838-1006, and P112838-1007 were undertaken by BRE and sponsored by Snap Fire Systems have confirmed CSIRO can use the above reports for this assessment.

3 Proposed Variations

3.1 SNAP Cast-In collars protecting plastic pipes

The proposed construction shall be Snap Cast-In collars tested in Table 1 and those listed in Tables 2-16, and subject to the following variations:

- a. For Cast-in collars as shown in Figures 1a-5
 - i. The inclusion of plastic pipes as shown in Tables 2 -16
 - ii. The inclusion of pipe fitting/coupling as same wall thickness as pipe, for pipes, as shown in Tables 2 -16
 - iii. Plastic pipes to be supported above the slab
 - iv. Stack pipes to have a straight pipe configuration below the slab
 - v. Floor Waste Cast-In Collars, the exposed side pipes can be in P – trap or 4-way gully or Gully trap configuration
 - vi. For stack HDPE pipes with a diameter of 100mm, it may be butt welded to another HDPE pipe with a nominally 3mm weld where the weld is formed by a hot plate between two pipe sections, then removed letting the pipes fuse. The butt joint may be anywhere in the collar

Table 2: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting PVC stack and floor waste pipes

PVC pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	40	2-2.3	H50S-RR/ L40-50S	Stack	Yes	Yes	Straight	120
2	50	2.3	H50S-RR/ L40-50S	Stack	Yes	Yes		120
3	40	2.5	H65S-RR	Stack	Yes	Yes		120
4	50	2.6	H65S-RR	Stack	Yes	Yes		120
5	65	2.85-3	H65S-RR	Stack	Yes	Yes		120
6	50	2-2.3	H100S-RR/ L100S	Stack	No	Yes		120
7	65	2.9	H100S-RR/ L100S	Stack	Yes	Yes		120
8	80	3	H100S-RR/ L100S	Stack	Yes	Yes		120
9	90	3-3.1	H100S-RR/ L100S	Stack	Yes	Yes		120
10	100 or 100(SC)	3.1-3.26	H100S-RR/ L100S	Stack	Yes	Yes		120
11	40	2.1	H110S	Stack	Yes	Yes		150
12	50	2 - 5	H110S	Stack	Yes	Yes		150
13	65	3	H110S	Stack	Yes	Yes		150
14	80	3.1	H110S	Stack	Yes	Yes		150

PVC pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
15	90	3.1-3.5	H110S	Stack	Yes	Yes		150
16	100 or 100(SC)	3.5	H110S	Stack	Yes	Yes		150
17	100 or 100(SC)	3.3	H150S-RR	Stack	Yes	Yes		150
18	150 or 150(SC)	4.2	H150S-RR	Stack	Yes	Yes		150
19	40	2-2.3	H50FWS-RR/ L40-50FWS	Stack & FWS	Yes	Yes	Stack Straight FWS P – trap or 4-way gully or Gully trap	150
20	50	2-2.3	H50FWS-RR/ L40-50FWS	Stack & FWS	Yes	Yes, for 150mm+ slabs		120
21	50	2.6	H65FWS-RR	Stack	Yes for 150mm+ slab	Yes		120
22	50	2.6	H65FWS-RR	FWS	Yes	Yes		150
23	65	3-3.2	H65FWS-RR	Stack	Yes for 150mm+ slab	Yes		120
24	65	3-3.2	H65FWS-RR	FWS	Yes	Yes		150
25	50	2.4	H100FWS-RR/ L100FWS	Stack & FWS	No	Yes for 150mm+ slabs		120
26	65	2.7	H100FWS-RR/ L100FWS	Stack & FWS	No	Yes for 150mm+ slabs		120
27	80	2.9	H100FWS-RR/ L100FWS	Stack & FWS	No	Yes for 150mm+ slabs		120
28	100 or 100(SC)	3.1-3.5	H100FWS-RR/ L100FWS	Stack & FWS	Yes for 150mm+ slabs	Yes for 150mm+ slabs		120
29	100(SC)	3.4	UL100FWS	Stack & FWS	No	No		120
30	100 or 100(SC)	3.2-3.3	H150FWS-RR	Stack & FWS	Yes	No		150
31	150 or 150 (SC)	4	H150FWS-RR	Stack & FWS	Yes	No		150

Table 3: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting HDPE stack and floor waste pipes

HDPE pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	40	3.7	H50S-RR/L40-50S	Stack	No	No	Straight	120
2	50	3.7-4	H50S-RR/L40-50S	Stack	No	Yes		120
3	56	4	H50S-RR/L40-50S	Stack	No	Yes		120
4	40	3.3	H65S-RR	Stack	No	Yes		150
5	50	3.7-4	H65S-RR	Stack	No	Yes		150
6	56	3.5	H65S-RR	Stack	No	Yes		150
7	63	3.7	H65S-RR	Stack	No	Yes		150
8	110	5-5.6	H100S-RR/L100S	Stack	Pipe butt weld allowed in the collar	Yes		120
9	50	3	H110S	Stack	No	No		150
10	56	3	H110S	Stack	No	No		150
11	63	3	H110S	Stack	No	No		150
12	75	3	H110S	Stack	No	No		150
13	90	3.5	H110S	Stack	No	No		150
14	110	4.3	H110S	Stack	Pipe butt weld allowed in the collar	No		150
15	110	4.2	H150S-RR	Stack	No	Yes		150
16	125	5.4	H150FWS-RR	Stack	No	Yes		150
17	125	5	H150S-RR	Stack	No	Yes		150
18	160	5.5	H150S-RR	Stack	No	No		150
19	40	3.8	H50FWS-RR/L40-50FWS	Stack & FWS	No	Yes	Stack Straight FWS P – trap or 4-way gully or Gully trap	150
20	50	3.5	H50FWS-RR/L40-50FWS	Stack & FWS	No	Yes		150
21	56	2.5	H50FWS-RR/L40-50FWS	Stack & FWS	No	Yes		150
22	56	2.5	H65FWS-RR	Stack & FWS	No	Yes		150
23	63	3.5	H65FWS-RR	Stack & FWS	No	Yes		150
24	110	4.7	H100FWS/L100FWS	Stack & FWS	Pipe butt weld allowed in the collar	Yes		150
25	110 Geberit SuperTube	As per FSP 2116 Spec. 4	H100S-RR/L100S	Stack	Pipe butt weld allowed in the collar	No	Bottom turn	150

Table 4: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting Fastflow PVC stack pipes (solid PVC version only)

Fastflow PVC pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	50	1.9	H65S-RR	Stack	No	Yes	Straight	120
2	65	2.3	H65S-RR	Stack	No	Yes		120
3	75	2.8	H100S-RR/ L100S	Stack	No	Yes		120
4	100	3.4	H100S-RR/ L100S	Stack	No	Yes		120
5	75	2.8	H110S	Stack	No	No		150
6	100	3.4	H110S	Stack	No	No		150
7	150	5.2	H150S-RR	Stack	No	Yes		150

Table 5: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting PN12 PVC stack pipes

PN12 PVC pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	15	2.9	H50FWS-RR/ L40-50FWS	Stack	No	Yes	Straight	150
2	20	2.5-2.9	H50FWS-RR/ L40-50FWS	Stack	No	Yes		150
3	25	2.5-2.9	H50FWS-RR/ L40-50FWS	Stack	No	Yes		150
4	32	2.5	H50FWS-RR/ L40-50FWS	Stack	No	Yes		150
5	40	2.1-3.1	H50FWS-RR/ L40-50FWS	Stack	No	Yes		150
6	50	3.1	H50FWS-RR/ L40-50FWS	Stack	No	Yes		150
7	40	2.5-3.1	H50S-RR /L40-50S	Stack	No	Yes		120
8	50	3.1	H50S-RR/ L40-50S	Stack	No	Yes		120
9	63	4.2	H65S-RR	Stack	No	Yes		120
10	80	5.2	H100S-RR /L100S	Stack	No	Yes		120
11	100	6.3	H100S-RR/ L100S	Stack	No	Yes		120
12	40	2.5-3.1	H110S	Stack	No	No		150
13	50	3.1	H110S	Stack	No	No		150
14	63	4.2	H110S	Stack	No	No		150
15	80	5.2	H110S	Stack	No	No		150
16	100	6.3	H110S	Stack	No	No		150

Table 6: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting Raupiano stack and floor waste pipes

Raupiano pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	40	1.8	H50S-RR/ L40-50S	Stack	Yes	Yes	Straight	150
2	50	1.8	H50S-RR/ L40-50S	Stack	Yes	Yes		
3	75	2	H65S-RR	Stack	No	Yes		
4	110	2.7	H100S- RR/ L100S	Stack	Yes	No		
5	50	2.1	H110S	Stack	Yes	No		
6	75	2.4	H110S	Stack	Yes	No		
7	110	2.9	H110S	Stack	Yes	No		
8	110	2.7-3.2	H150FWS- RR	Stack	Yes	Yes		
9	110	2.7-3.2	H150S-RR	Stack	Yes	Yes		
10	150	4.2-4.4	H150FWS- RR	Stack	No	Yes		
11	150	4.2-4.4	H150S-RR	Stack	No	Yes		
12	50	1.8	H50FWS- RR/ L40- 50FWS	Stack & FWS	No	No	Stack Straight FWS	
13	110	2.7	H100FWS- RR/ L100FWS	Stack & FWS	No	No	P – trap or 4-way gully or Gully trap	

Table 7: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting Triplus stack and floor waste pipes

Triplus pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	40	2.1-2.2	H50S-RR/ L40-50S	Stack	Only in 150mm+ slab	Yes	Straight	120
2	50	2.2-2.3	H50S-RR/ L40-50S	Stack	No	Yes		120
3	50	2.2-2.3	H65S-RR	Stack	Yes	Yes		150
4	75	2.9-3	H100S-RR/ L100S	Stack	Only in 150mm+ slab	Yes		120
5	90	3.5	H100S-RR/ L100S	Stack	Only in 150mm+ slab	Yes		120
6	110	3.8-4.2	H100S-RR/ L100S	Stack	No	Yes		120
7	50	2.3	H110S	Stack	Yes	No		150
8	75	2.6	H110S	Stack	Yes	No		150
9	90	3.1	H110S	Stack	Yes	No		150
10	110	3.7	H110S	Stack	Yes	No		150
11	160	5-5.4	H150FWS-RR	Stack	No	Yes		150
12	160	5-5.4	H150S-RR	Stack	No	Yes		150
13	110	3.4	H100FWS-RR/ L100FWS	Stack & FWS	No	No	Stack Straight	150
14	110	3.5	UL100FWS	Stack & FWS	No	No	FWS P – trap or	120
15	110	4.1	H150FWS-RR	Stack & FWS	No	No	4-way gully or Gully trap	120

Table 8: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting and PE sdr 7.4 stack pipes

PE sdr 7.4 pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	20	4	H50FWS-RR/ L40-50FWS	Stack	No	Yes	Straight	150
2	25	4-8						
3	32	4-8						
4	40	4-8						
5	50	8	H100FWS-RR/ L100FWS					
6	50	8						
7	63	8-15						
8	75	8-15						
9	90	8-15						
10	110	15						

Table 9: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting PE (SRD 11/ PN16 PE 100) stack pipes

PE (SDR11/ PN16 PE 100) pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	50	5	H50S-RR/ L40-50S	Stack	No	Yes	Straight	150
2	63	6.2	H65S-RR					
3	50	4.6	H110S					
4	63	5.8						
5	75	6.8						
6	90	8.2						
7	110	10						

Table 10: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting stack dBlue pipes

dBlue pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	40	1.8	H50S-RR/ L40-50S	Stack	No	Yes	Straight	150
2	50	2.5						
3	75	2.3	H100S-RR/ L100S					
4	110	3.4						
5	160	6	H150FWS-RR			No		

Table 11: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting George Fisher Progef Polypropylene PP-H stack pipes

PP-H pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	25	2.7	H50FWS-RR/ L40-50FWS	Stack	No	Yes	Straight	150
2	32	2.7-4.8						
3	40	4.8						
4	50	5.1						
5	63	6.2						

Table 12: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting WAVIN Astolan stack and floor waste pipes

WAVIN Astolan pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	56	4.8	H65S-RR	Stack	No	Yes	Straight	150
2	70	4.5	H100S-RR/ L100S					
3	90	4.5-5.7						
4	100	5.7						
5	56	4.8	H65FWS-RR	Stack & FWS	No	Yes	Stack Straight FWS P – trap or 4-way gully or Gully trap	

Table 13: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting GF+ Coolfit 2.0 stack pipes

GF+ Coolfit 2.0 pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (mm)
1	d65/110	As tested in FSP 1891 specimen 1	H100FWS-RR/ L100FWS	Stack	No	Yes	Straight	150

Table 14: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting PPR-80 fazer composite sdr 7.4 stack pipes

PPR-80 pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Configuration under slab	Minimum slab thickness (X) (mm)
1	20	4	H50FWS-RR/ L40-50FWS	Stack	No	Yes	Straight	150
2	25	4-8						
3	32	4-8						
4	40	4-8						
5	50	8	H100FWS-RR/ L100FWS					
6	50	8						
7	63	8-15						
8	75	8-15						
9	90	8-15						
10	110	15						

Table 15: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting Pex-a stack pipes

Pex-a pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	16	2.6	H50S-RR/ L40-50S	Stack	No	Yes	Straight	150
2	20	2.2						
3	25	4						
4	32	4.95						

Table 16: Concrete slab/Bondek or steel permanent formwork slab with SNAP collars protecting Pex-b stack pipes

Pex-b pipe number	Pipe nominal diameter (mm)	Pipe wall thickness (mm)	Collar	Config.	Pipe fitting within the collar	Section 3.3 variation allowed	Config. under the slab	Minimum slab thickness (X) (mm)
1	16	2.1	H50S-RR/ L40-50S	Stack	No	Yes	Straight	150
2	20	2.3						
3	25	4						
4	32	4.95						
5	3 x 25	2.6	H50FWS-RR/ L40-50FWS					
6	4 x 20	2.4						

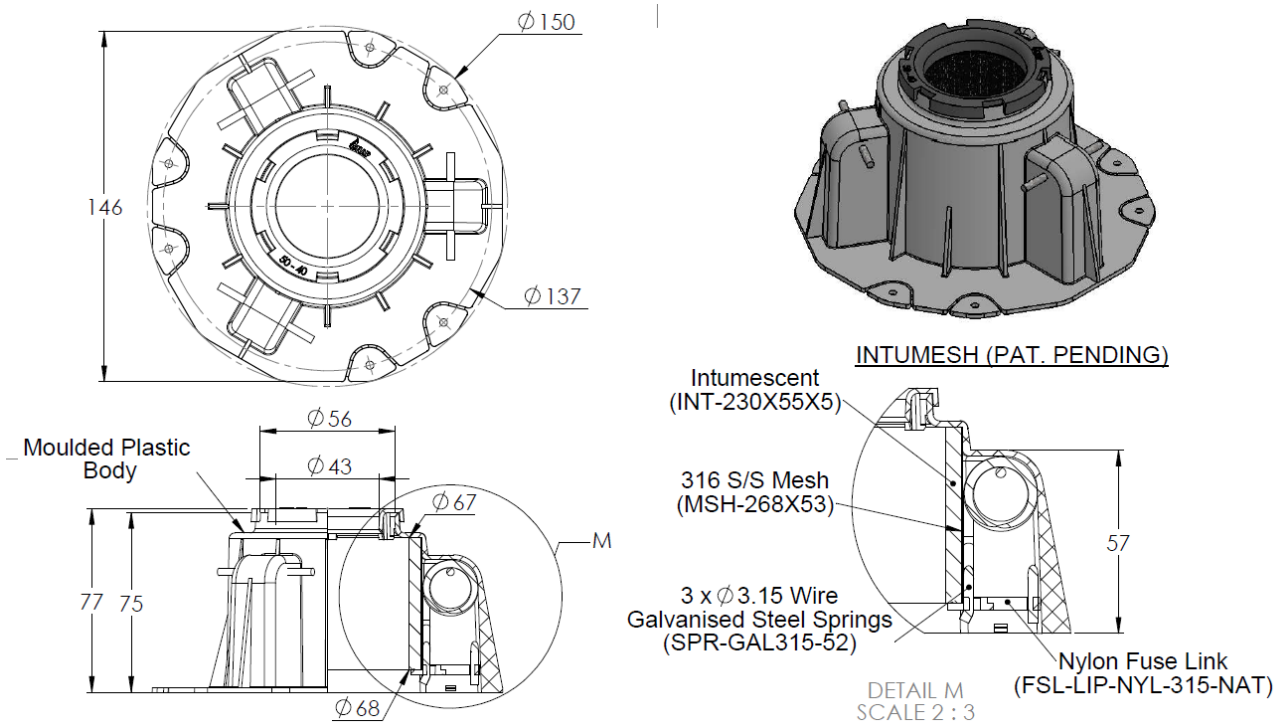


Figure 1a: SNAP L40-50S collar

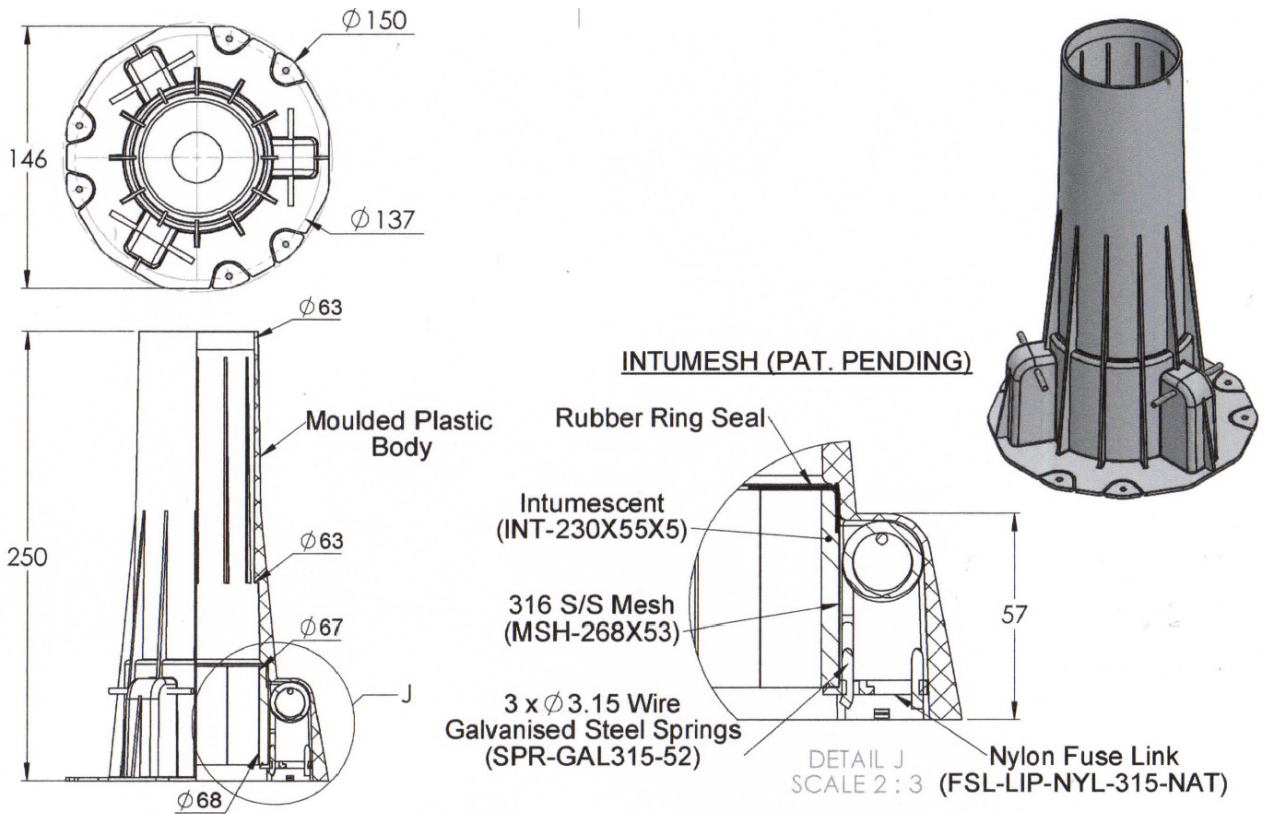


Figure 1b: SNAP H50S-RR collar

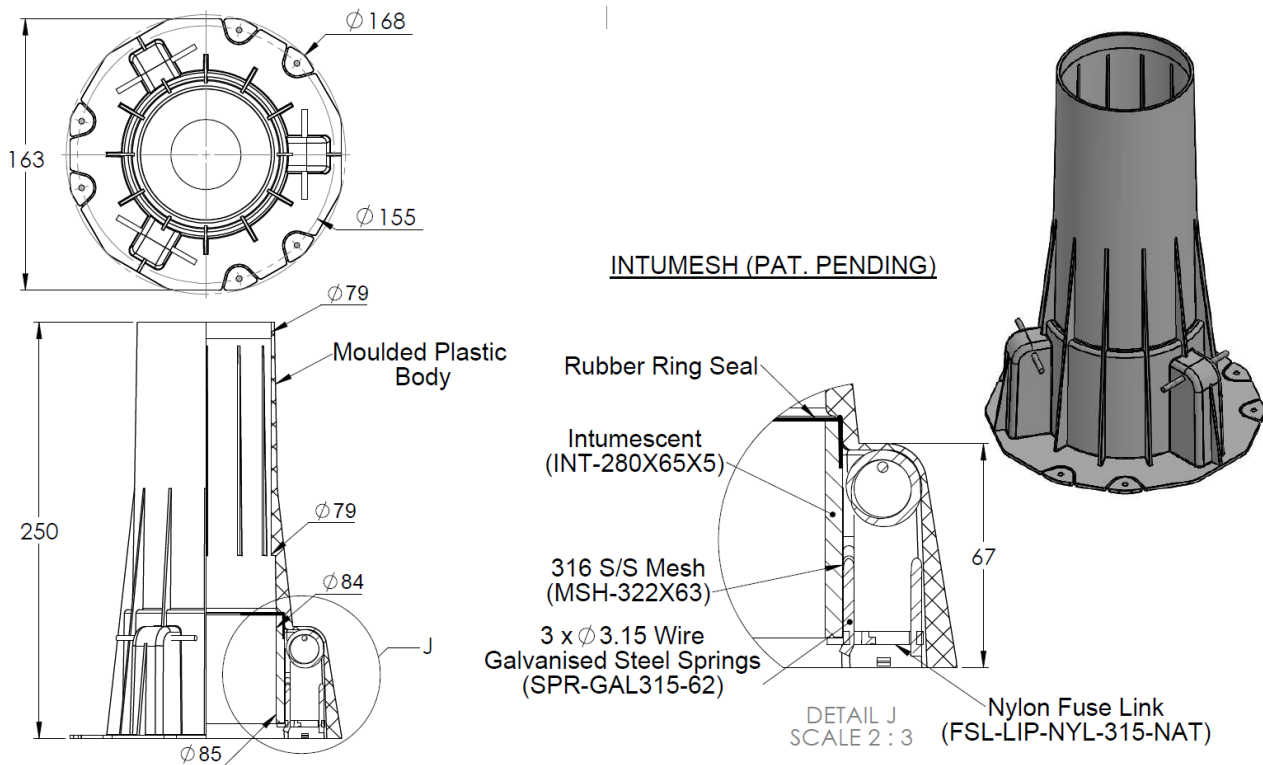


Figure 1c: SNAP H65S-RR collar

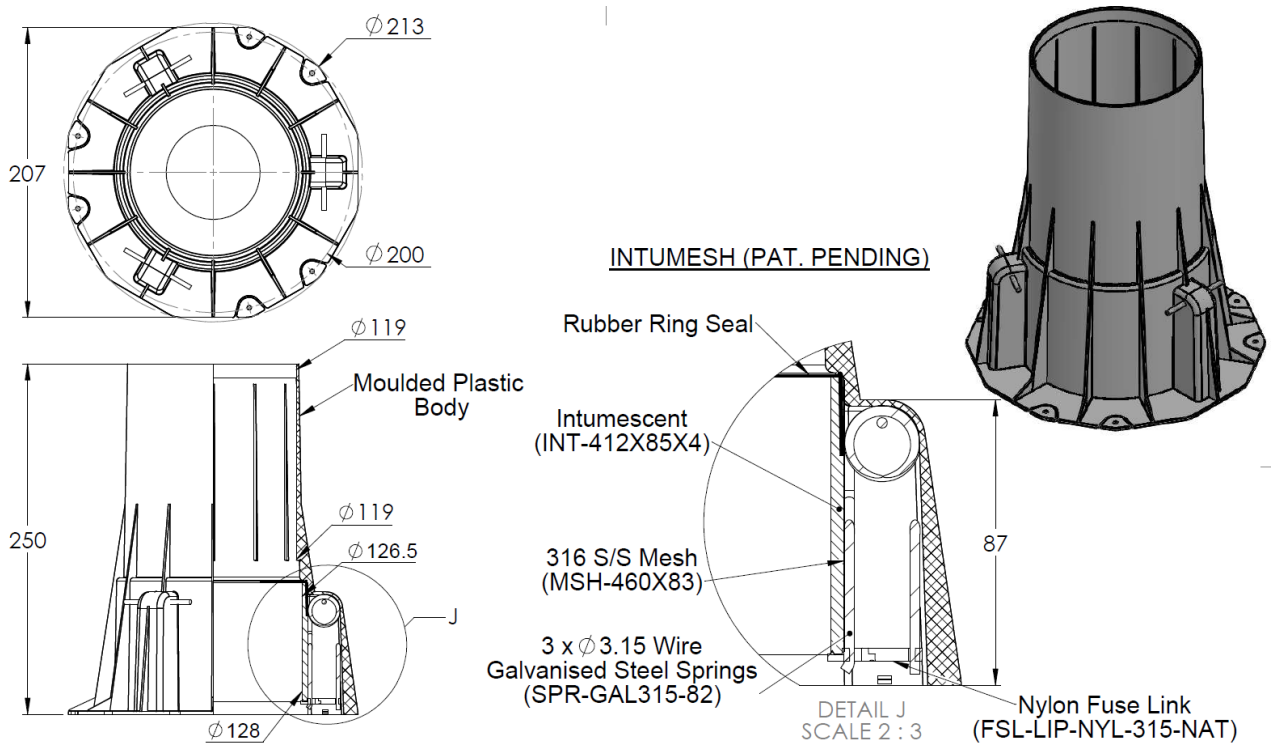


Figure 1d: SNAP H100S-RR collar

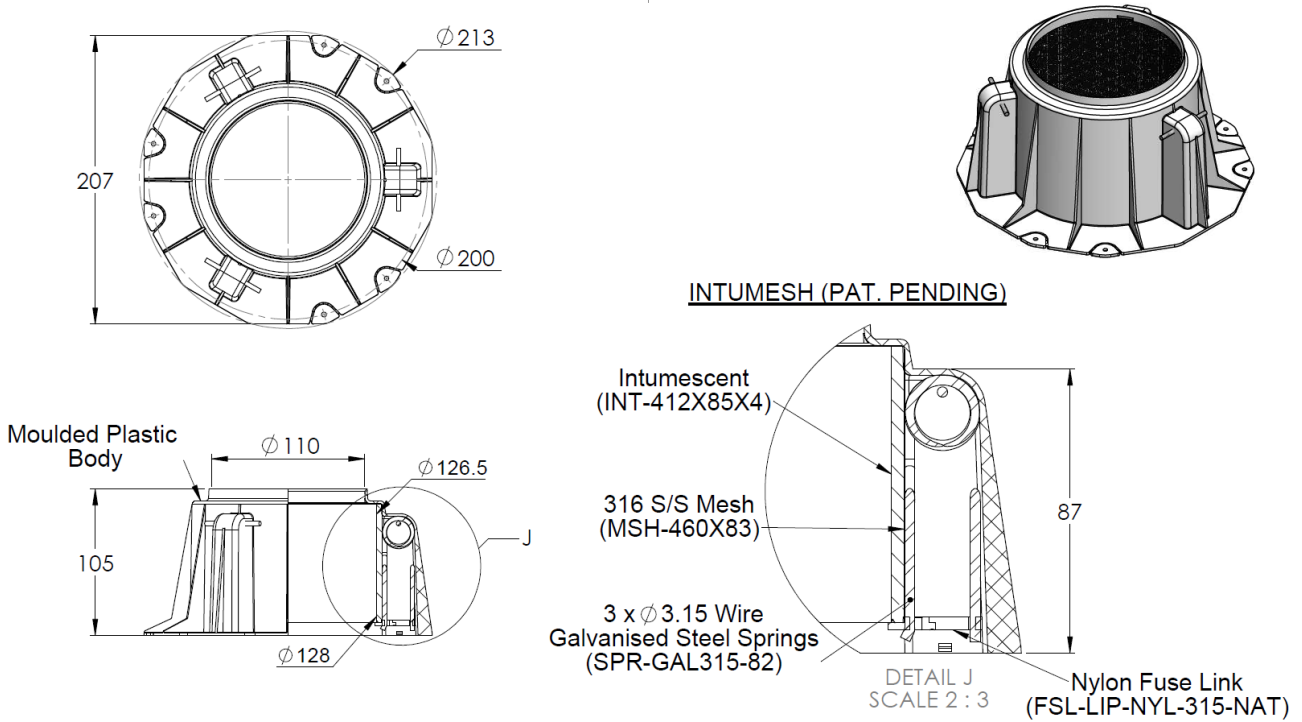


Figure 1e: SNAP L100S collar

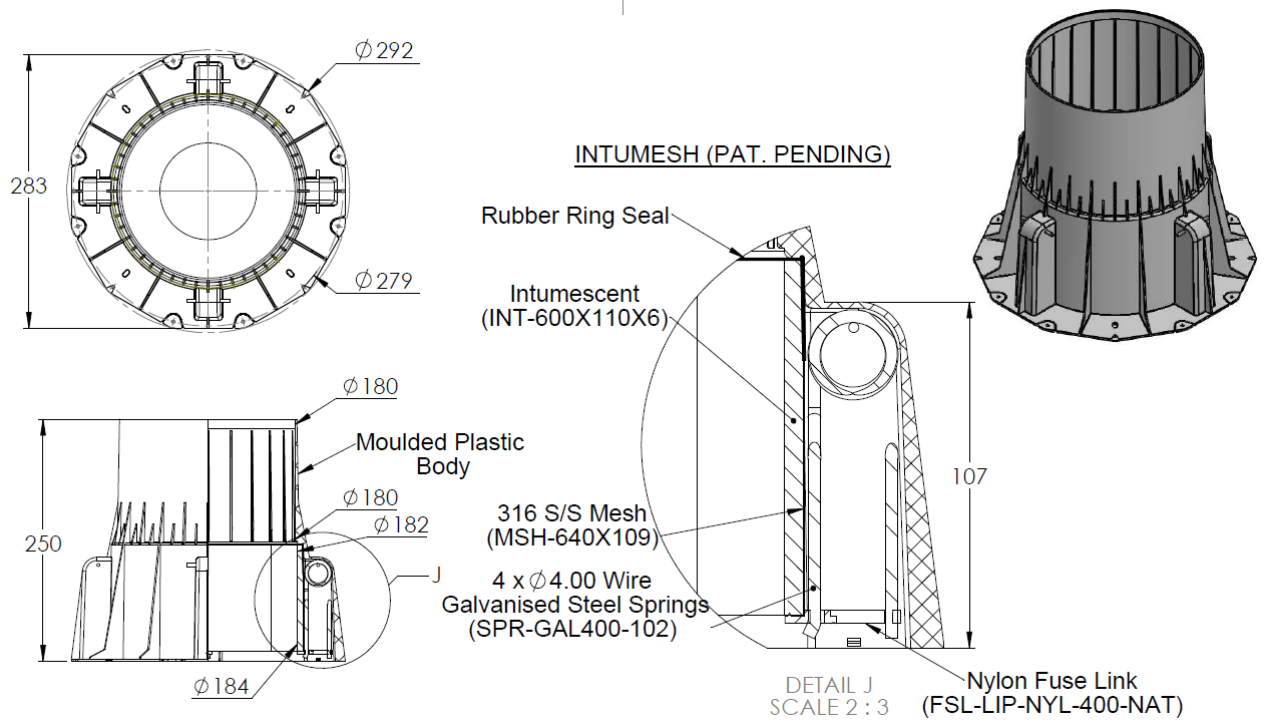


Figure 1f: SNAP 150S-RR collar

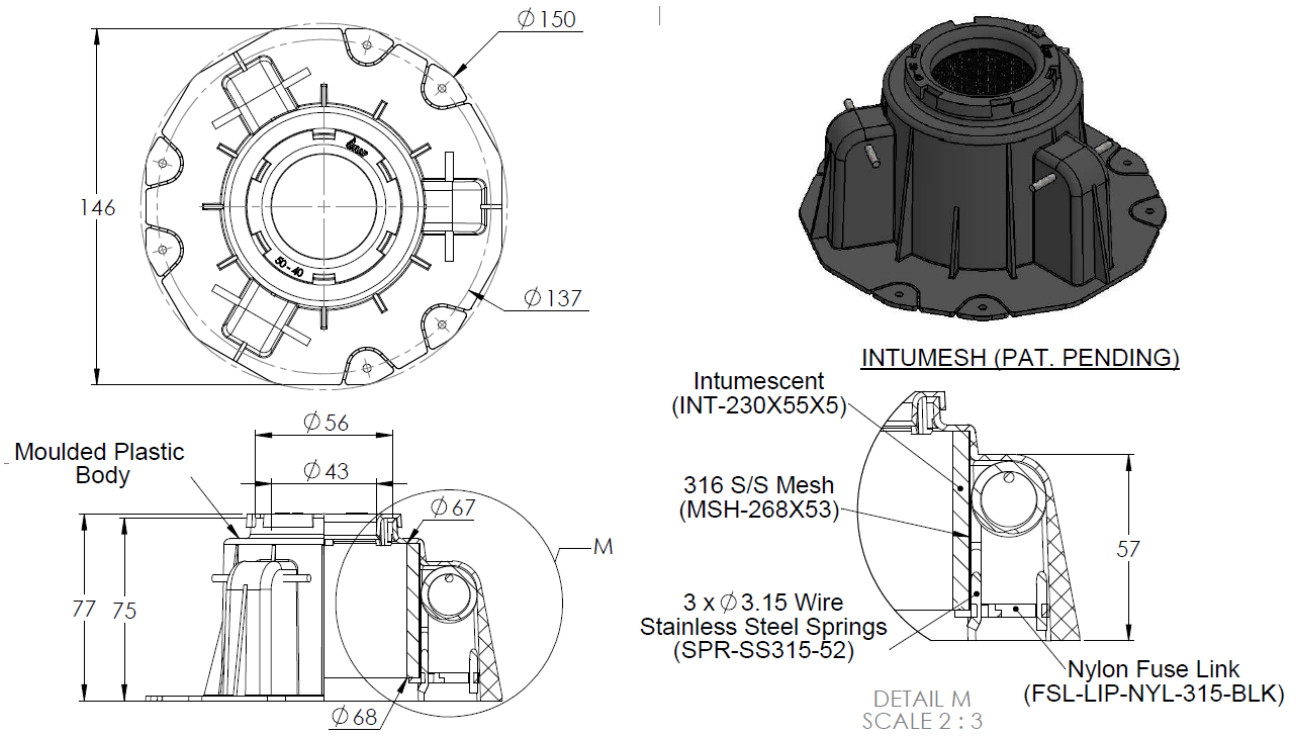


Figure 2a: SNAP L40-50FWS collar

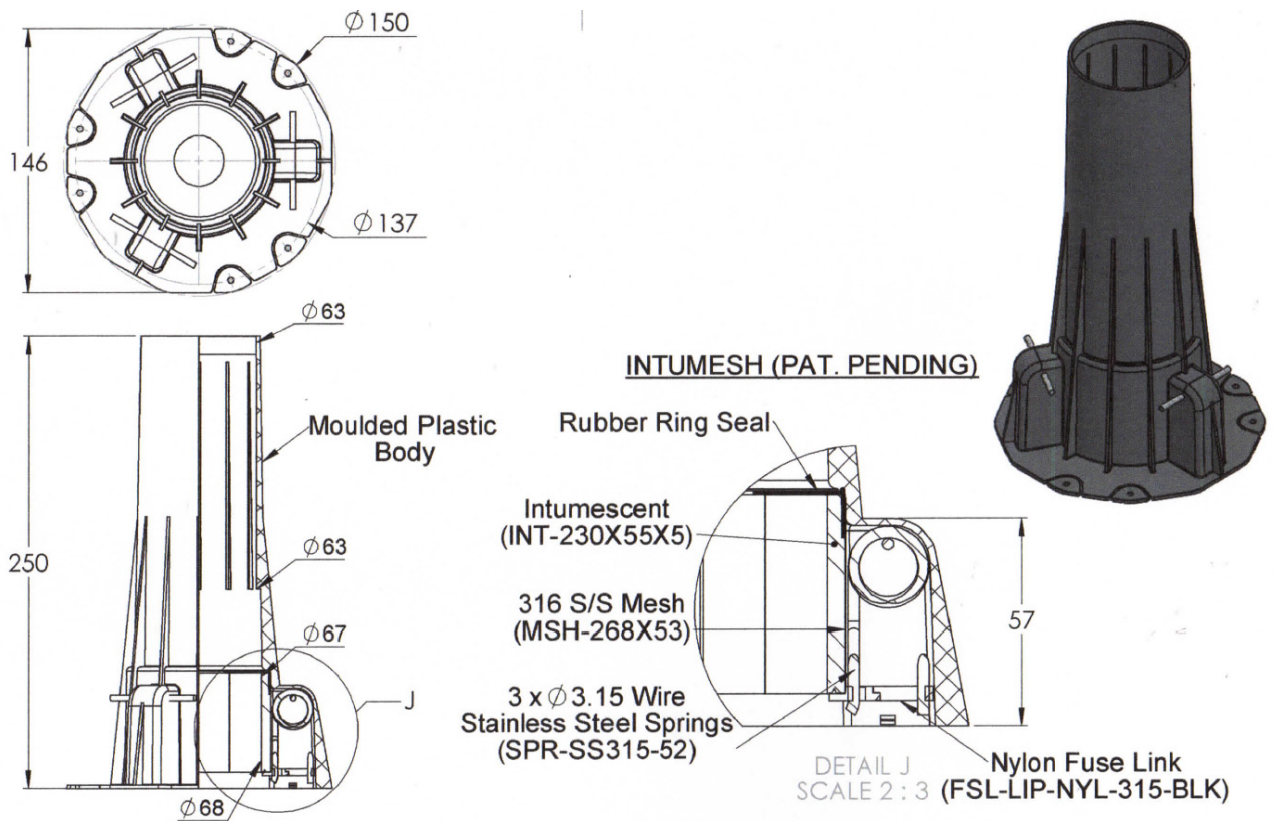
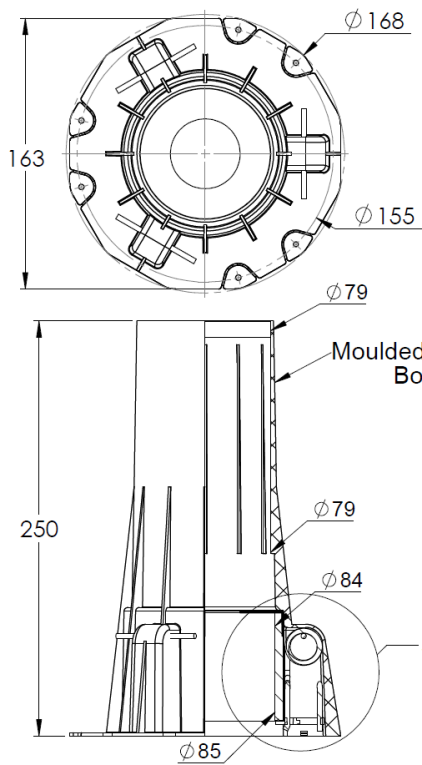


Figure 2b: SNAP H50FWS-RR collar



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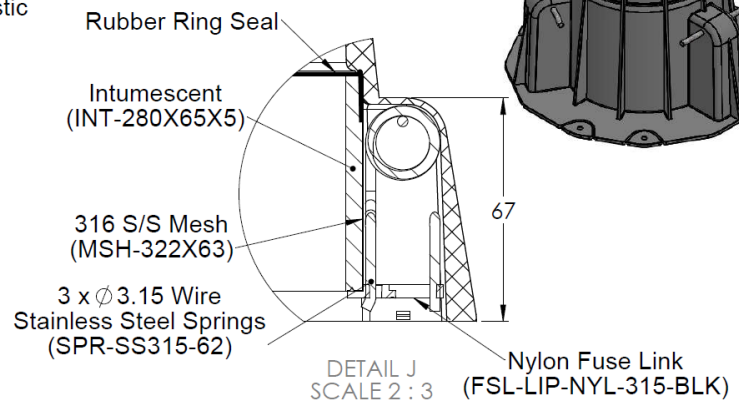
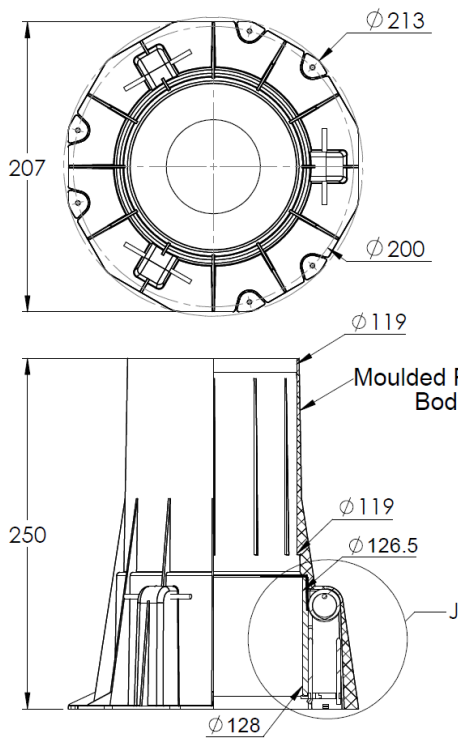


Figure 2c: SNAP H65FWS-RR collar



INTUMESH (PAT. PENDING)

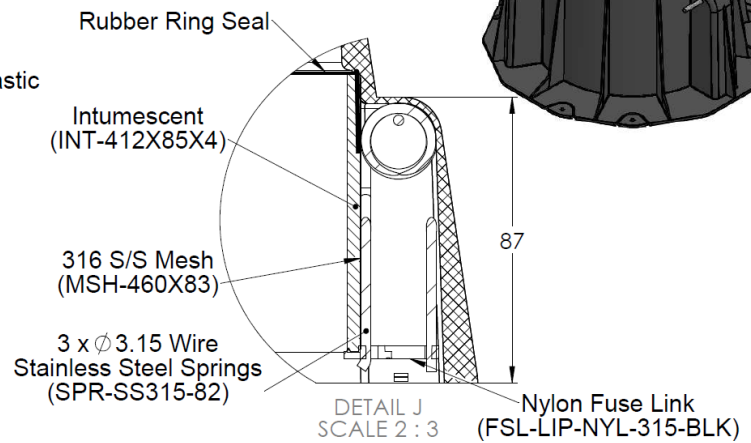


Figure 2d: SNAP H100FWS-RR collar

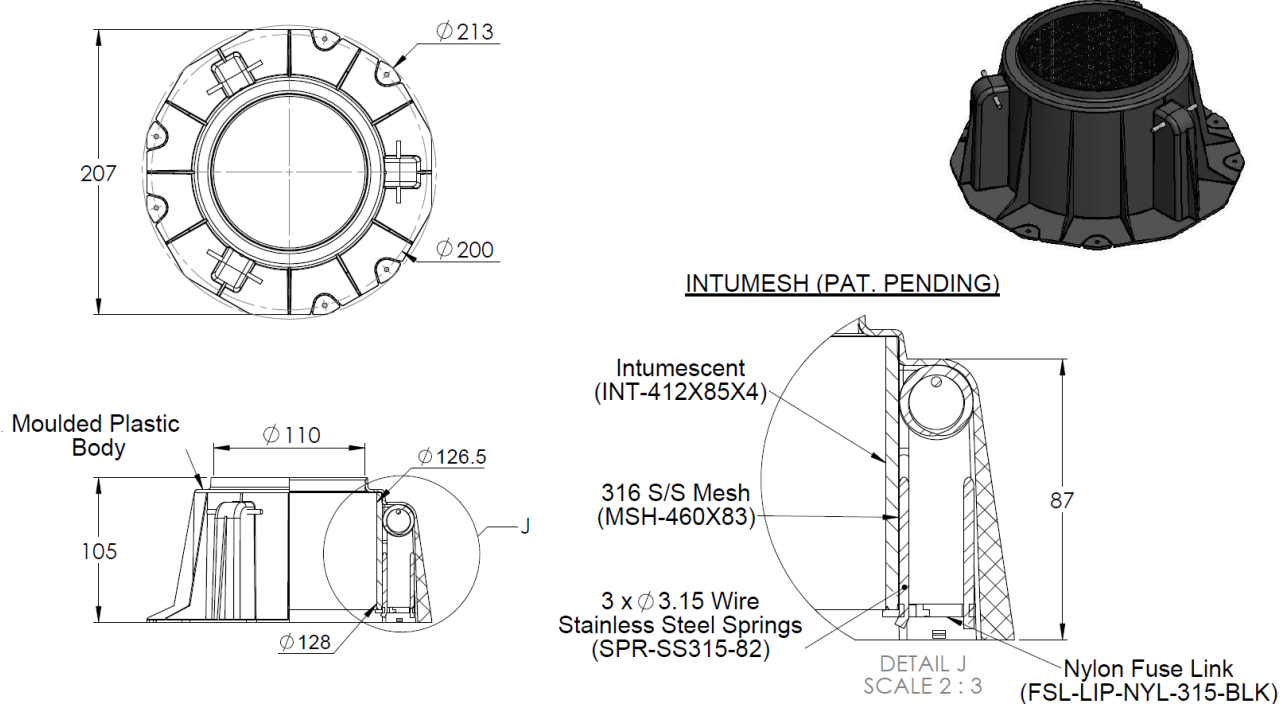


Figure 2e: SNAP L100FWS collar

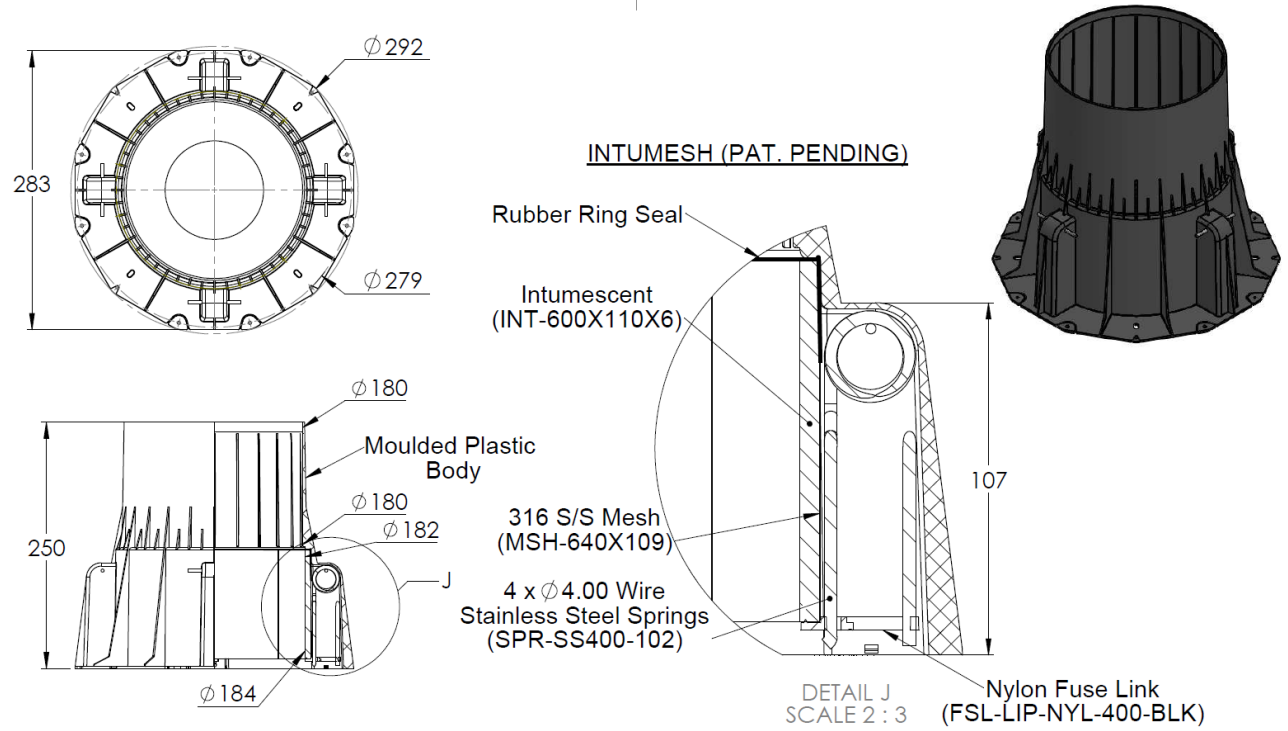


Figure 3: SNAP 150FWS-RR collar

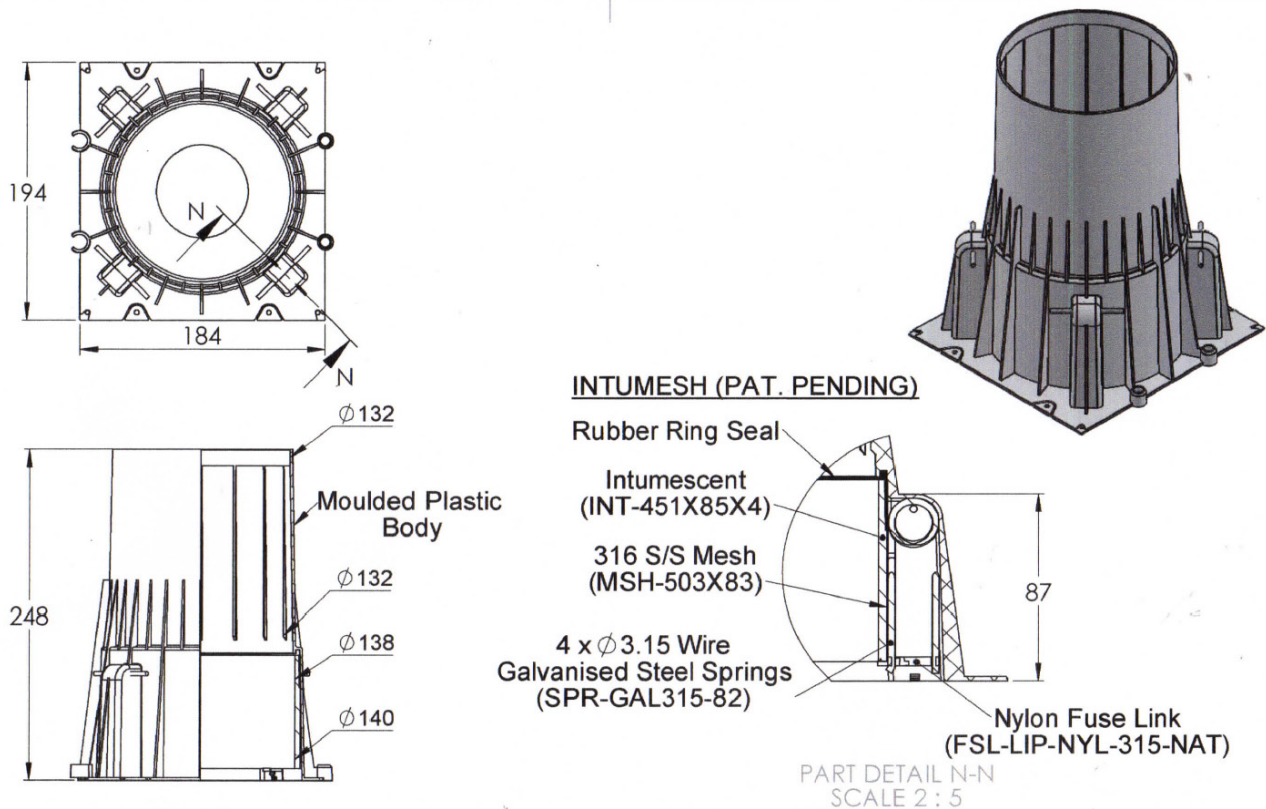


Figure 4: SNAP H110S collar

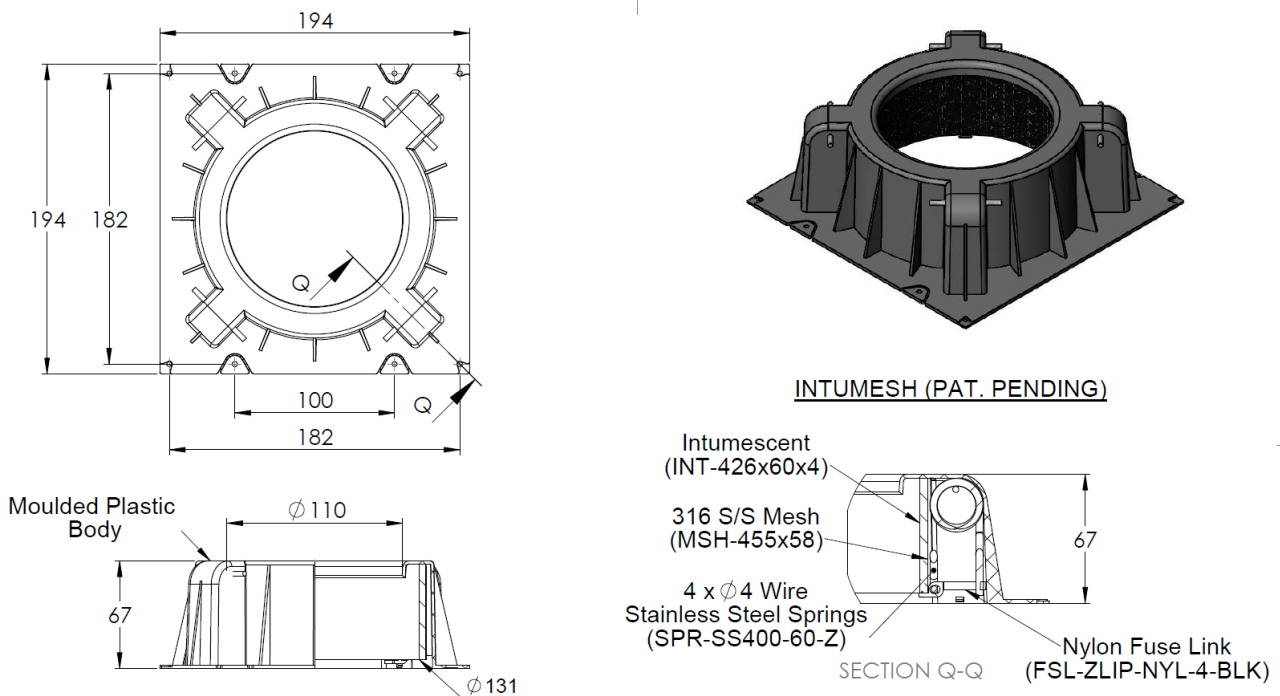


Figure 5: SNAP UL100FWS collar

3.2 Various ways of installing SNAP Cast-In collars and pipes in combination

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

- a. The inclusion of all the pipes and collars listed in Tables 2-16
- b. The inclusion of concrete slab as a separating element
 - i. Inclusion of 120mm, 150mm and 175mm thick concrete slab
 - ii. All cast-in collars to be cast-in during construction or grout backfilled between the outside of the collar and support construction
 - iii. Reduction of screed coverage to a minimum of 15mm thick as per Figure 7
 - iv. The floor grate to be either a chromed brass floor grate or an ABS floor grate
 - v. For stack pipes the pipework to be vertically supported above the slab
- c. Gap treatment between pipe and collar as shown in Table 17
 - i. Where the annular gap between the pipe and collar is less than 10mm, no sealant or backfilling is required; or fill the gap with 30mm deep grout or a 10mm or deeper Fuller Firesound with PE foam backing rod
 - ii. Where the annular gap between the pipe and collar is 10mm but less than 15mm, fill the gap with 30mm deep grout or a 10mm or deeper Fuller Firesound with PE foam backing rod
 - iii. Where the annular gap between the pipe and collar is 15mm but less than 20mm, the gap shall be grout backfill to a minimum depth of 30mm.
 - iv. When the annular gap between the pipe and collar is greater than 20mm but less than 42mm, the gap shall be grout backfill to a depth of 60mm.
- d. The inclusion of empty/blank cast-in collars sealed by either:
 - i. For all SNAP cast-in collars up to 240 minutes applications, remove intumescent material, activate the springs, cover with a metal plate and then backfill the collar with non-shrink grout as shown in Figure 9, or
 - ii. Insert a PVC end cap as detailed in FSP 2153 as shown in Figure 8
 - A. For up to 180 minute applications - for H40S-RR, H50S-RR, H65S-RR, and H100S-RR collars, their low top version and floorwaste version
 - B. For up to 120 minute applications - for the H110S collar
- e. The inclusion of variation to collar body
 - i. The Cast-in collars casing above the active area of the collar can be cut down as per Figure 12
 - ii. The Cast-in collars flange can be trimmed as per Figures 10 and 11 outside the active area of the collar
 - iii. The base flange of the Cast-In collar can be painted, though no paint is allowed on the active area of the Cast-In collar shown in Figure 10
 - iv. Small amounts of slurry are allowed on the underside of the Cast-In collar base flange but not in the active area and fuse links of the Cast-In collar are shown in Figure 10
 - v. The inclusion of a Cast-In collar where the fuse link(s) have activated or have been removed post the installation of the pipe
- f. The following variation to collar location and orientation variation
 - i. A minimum 200mm clearance is required under the collar that is free from obstructions by walls or other features as shown in Figure 15
 - ii. Installation of cast-in fire collars in a horizontal orientation on the side of a beam as shown in Figure 14
 - iii. The inclusion of cast-in pipework above cast-in collar configuration, with the gap between the pipes and the top of the collars to be sealed with either a bead of sealant or PVC tape as shown in Figure 13

- g. Inclusion of stack Geberit HDPE Supertube BottomTurn pipes with a diameter of 100mm as tested in FSP 2116 Spec. 4, it may be butt welded to the Geberit HDPE Supertube piping with a nominally 3mm weld where the weld is formed by a hot plate between two pipe sections, then removed letting the pipes fuse. The butt joint and sleeve/coupling for Supertube may be anywhere in the collar

Table 17: Gap treatment between the cast-in collar and plastic pipe

The gap between collar and pipe on the unexposed side of the slab	Gap treatment
<10mm	No sealant or grout or fill with 30mm deep grout or a 10mm or deeper Fuller Firesound with PE foam backing rod
10-14mm	Fill with 10mm or deeper Fuller Firesound sealant and PE foam backing rod or backfilled with 30mm deep grout
15-20mm	Backfilled with 30mm deep grout
20-42mm	Backfilled with 60mm deep grout

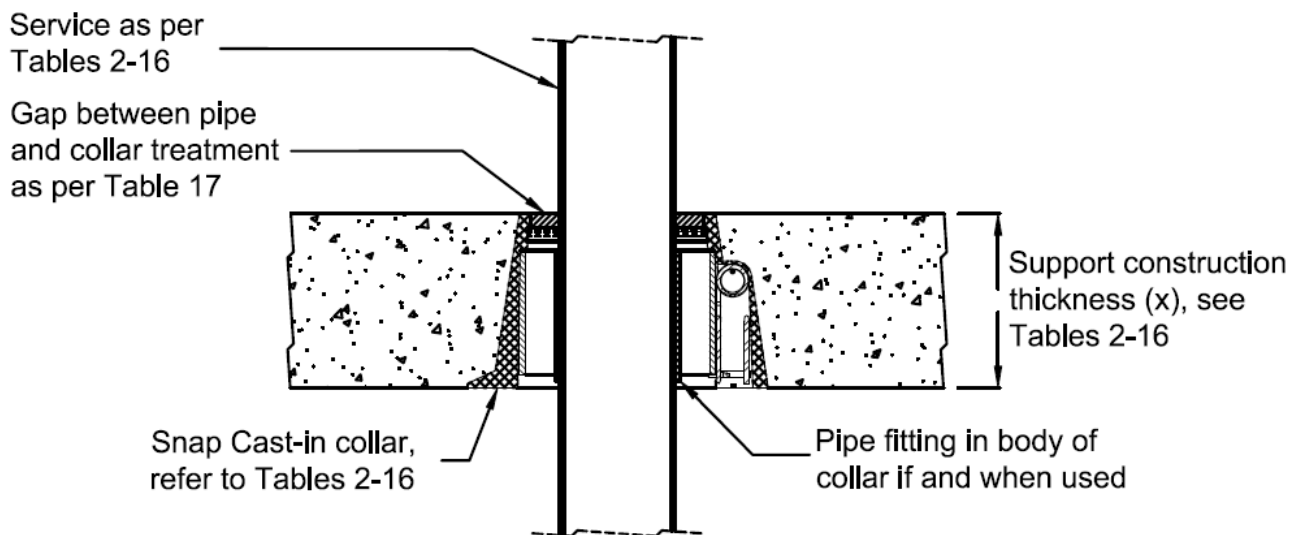


Figure 6: Example of installation of SNAP Cast-In collars with stack pipes in concrete slab/concrete with Bondek or other steel permanent formwork slab

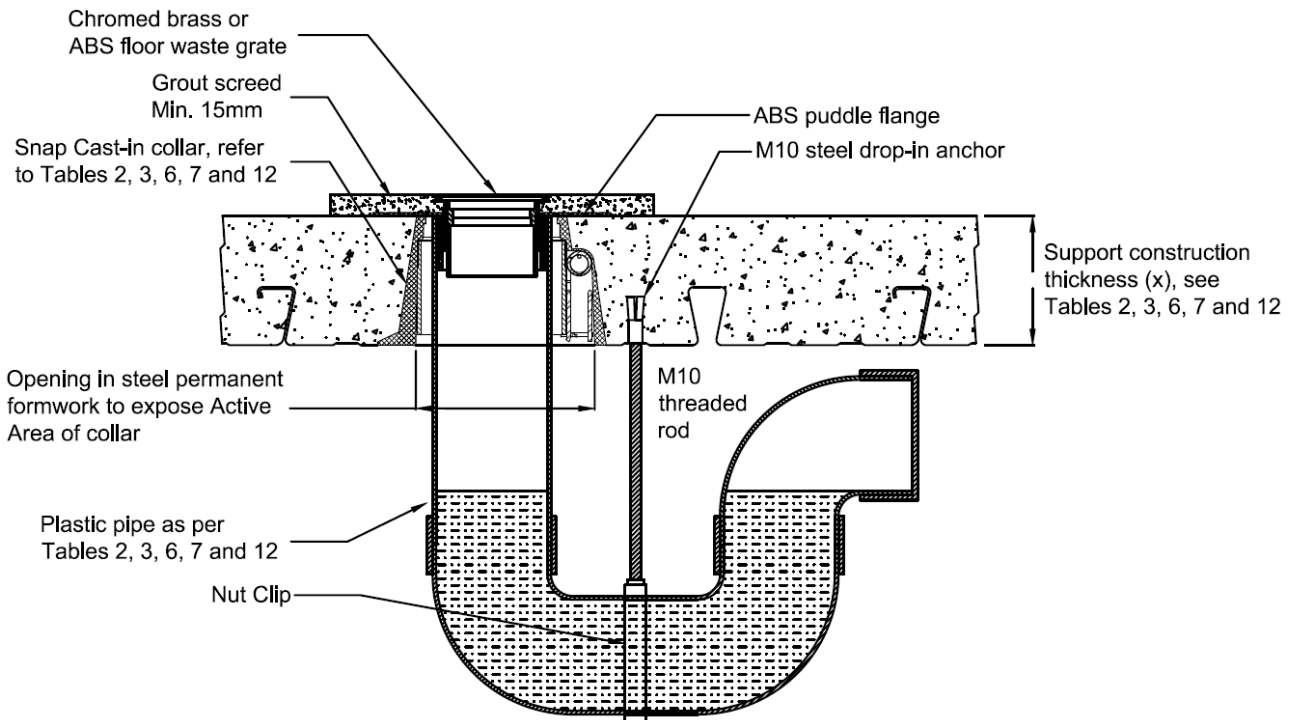


Figure 7: Example of installation of SNAP Cast-In collars with floor waste pipes in concrete slab/concrete with Bondek or other steel permanent formwork slab

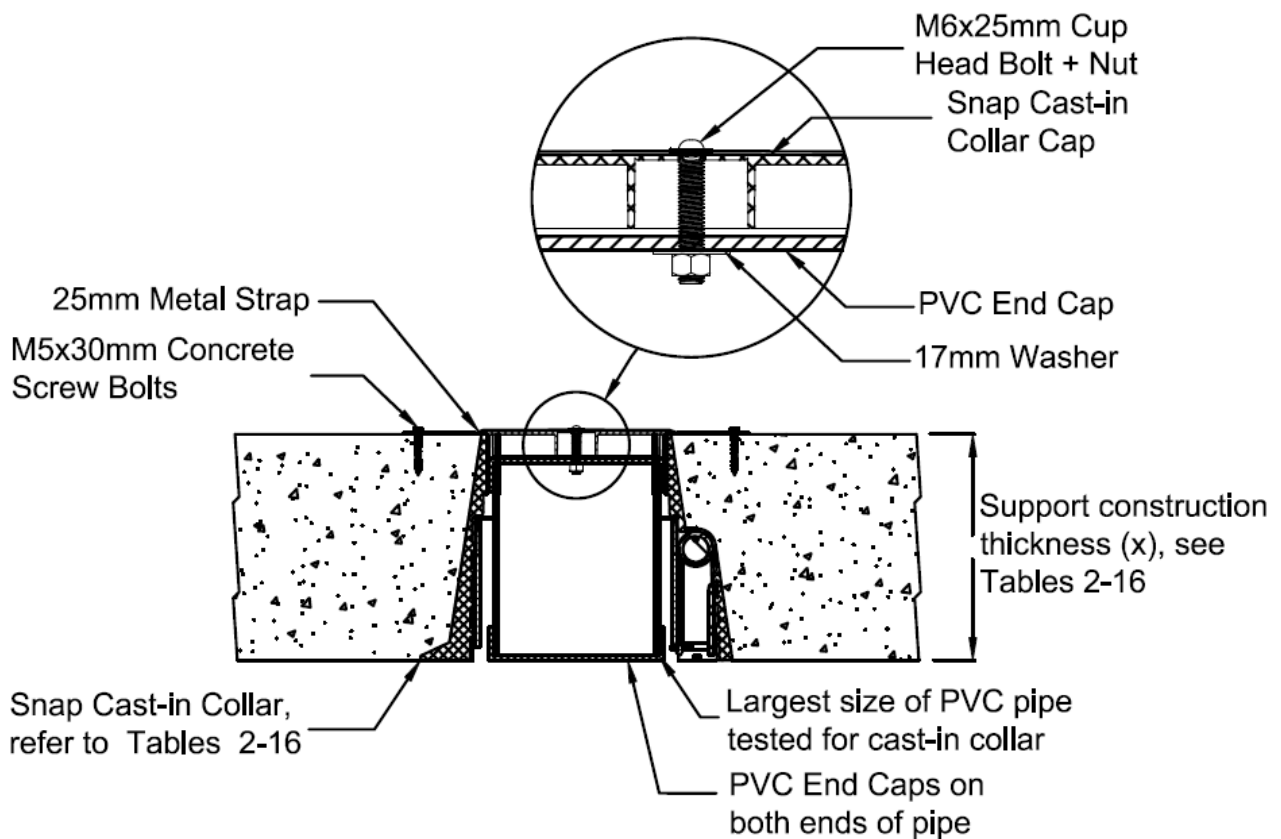


Figure 8: Sealing method of empty Cast-In collars

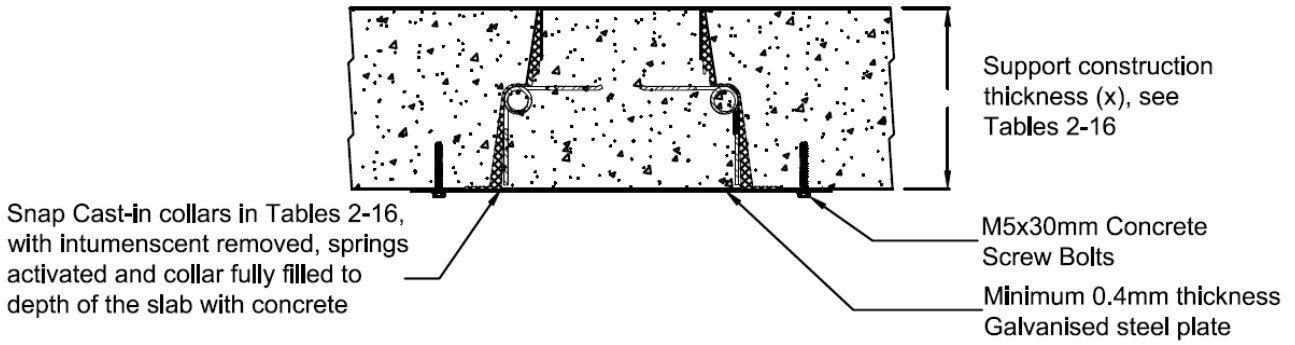


Figure 9: Sealing method of empty Cast-In collars

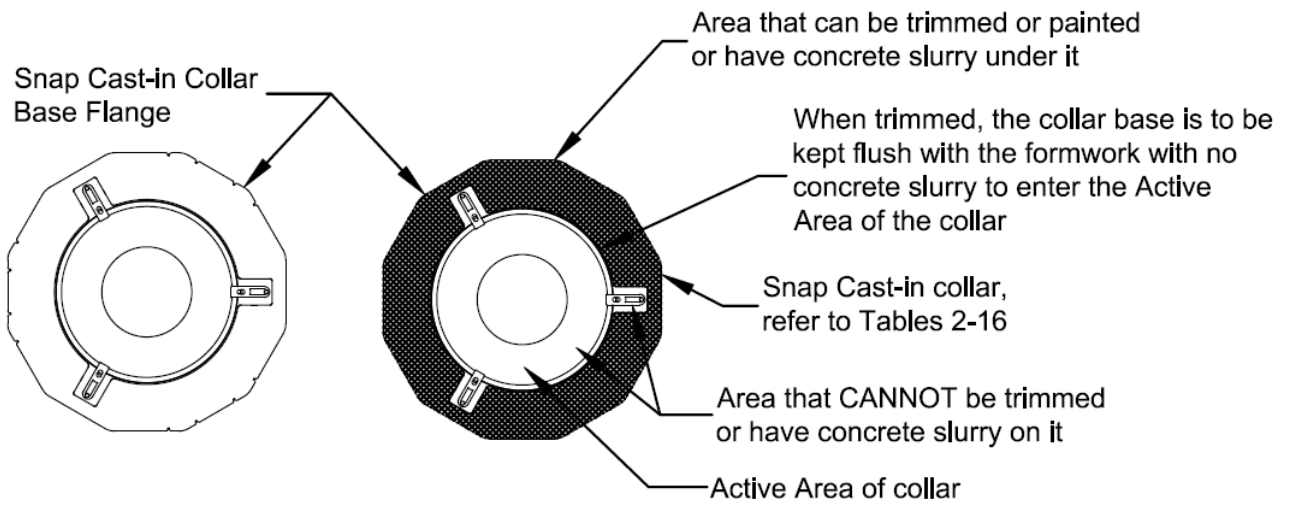


Figure 10: Definition of areas that can be trimmed or painted or have slurry under

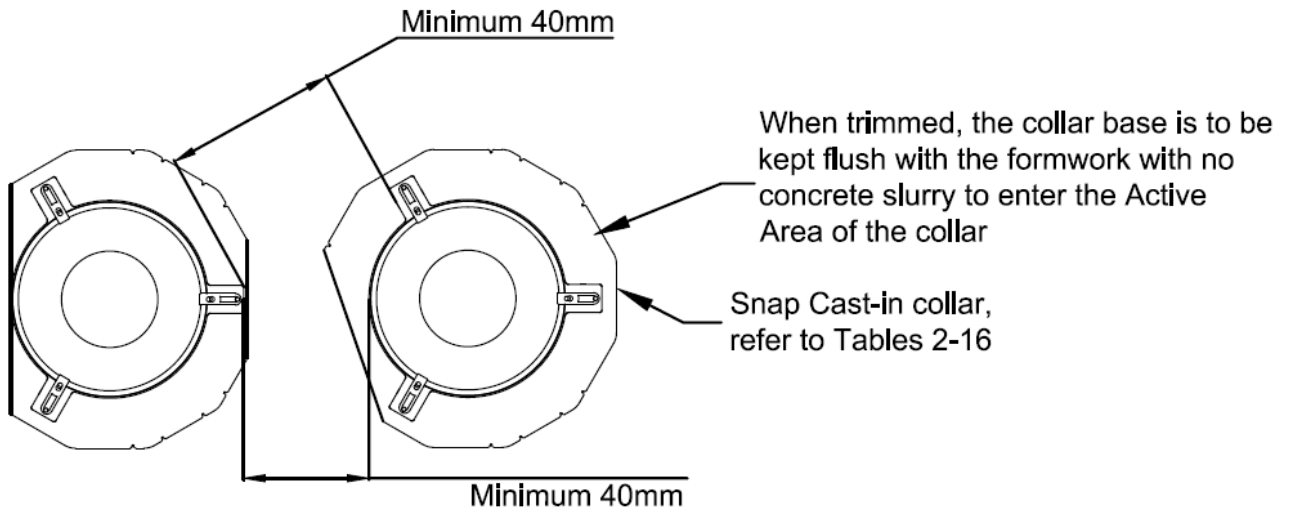
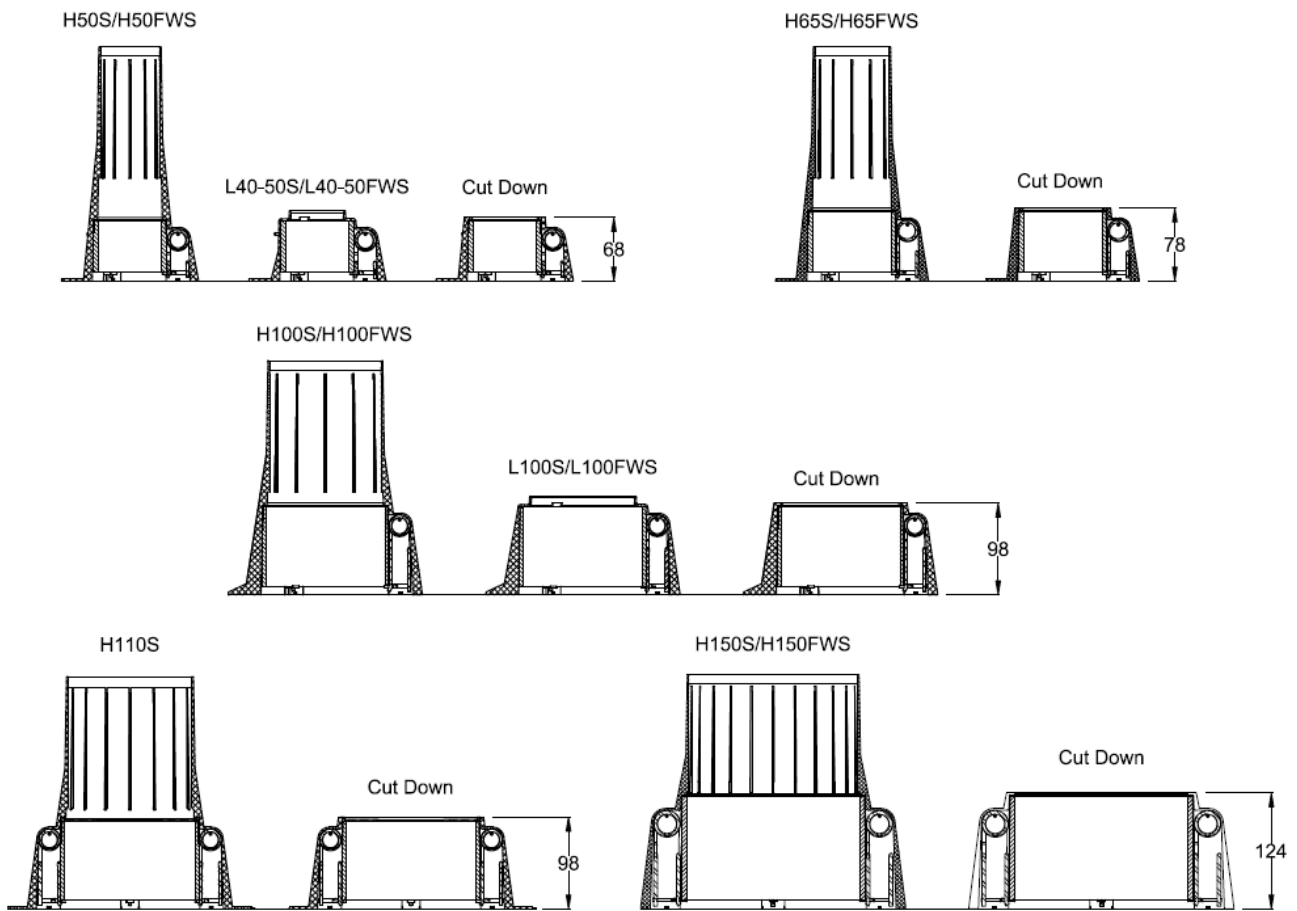


Figure 11: Examples of flange Trimming – No trimming of spring pockets permitted



When the top of the collar is cut down lower than the top of the slab depth, the gap between the top of the collar and the pipe must be sealed with a bead of sealant or PVC tape to prevent the ingress of concrete slurry into the Active Area of the collar

Figure 12: The extent of Cast In collar neck cut down

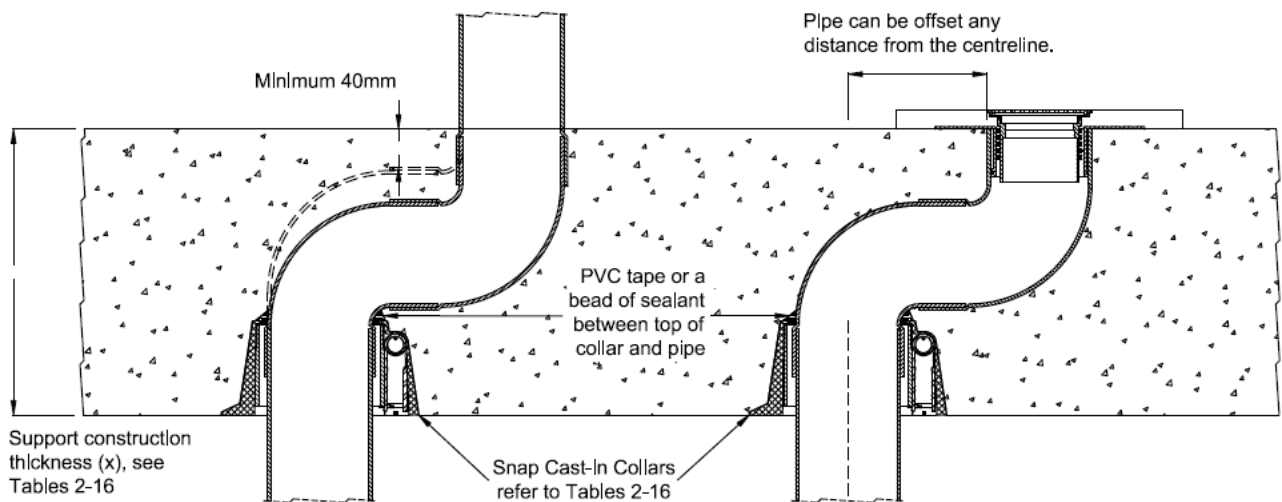


Figure 13: Examples of cast-in pipework above cast-in collar configuration

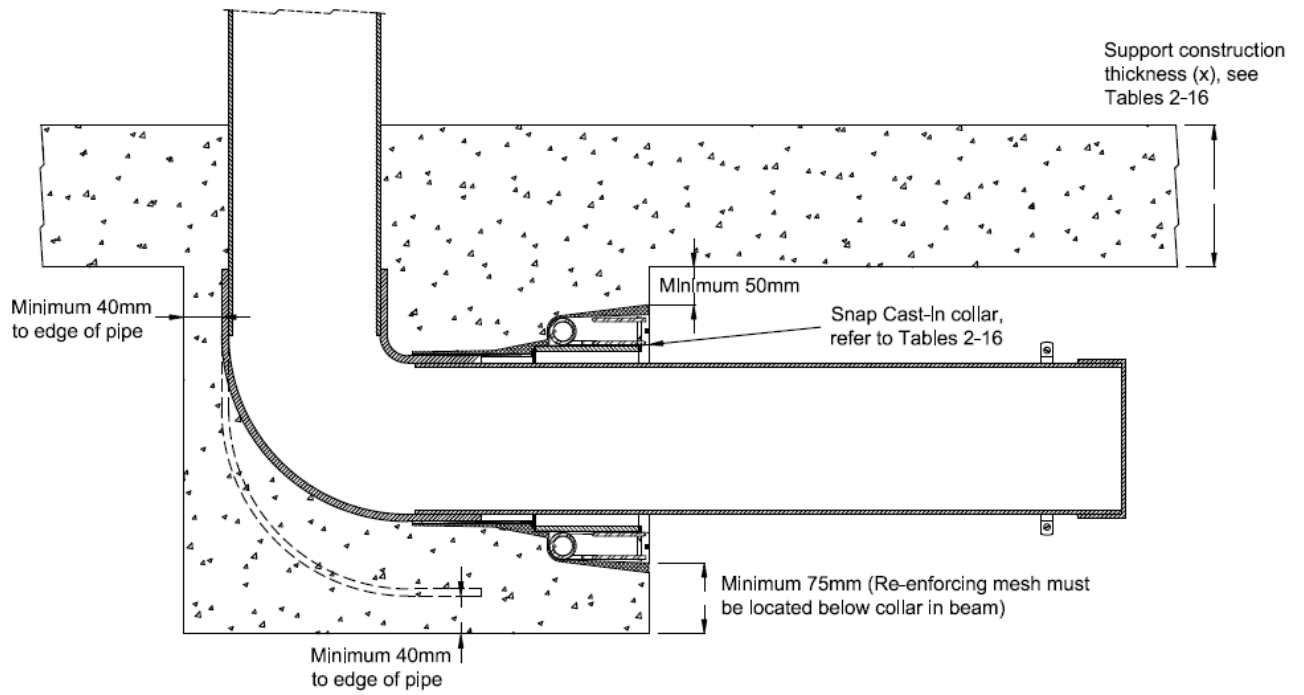


Figure 14: Examples of a horizontal orientation in the side of a beam

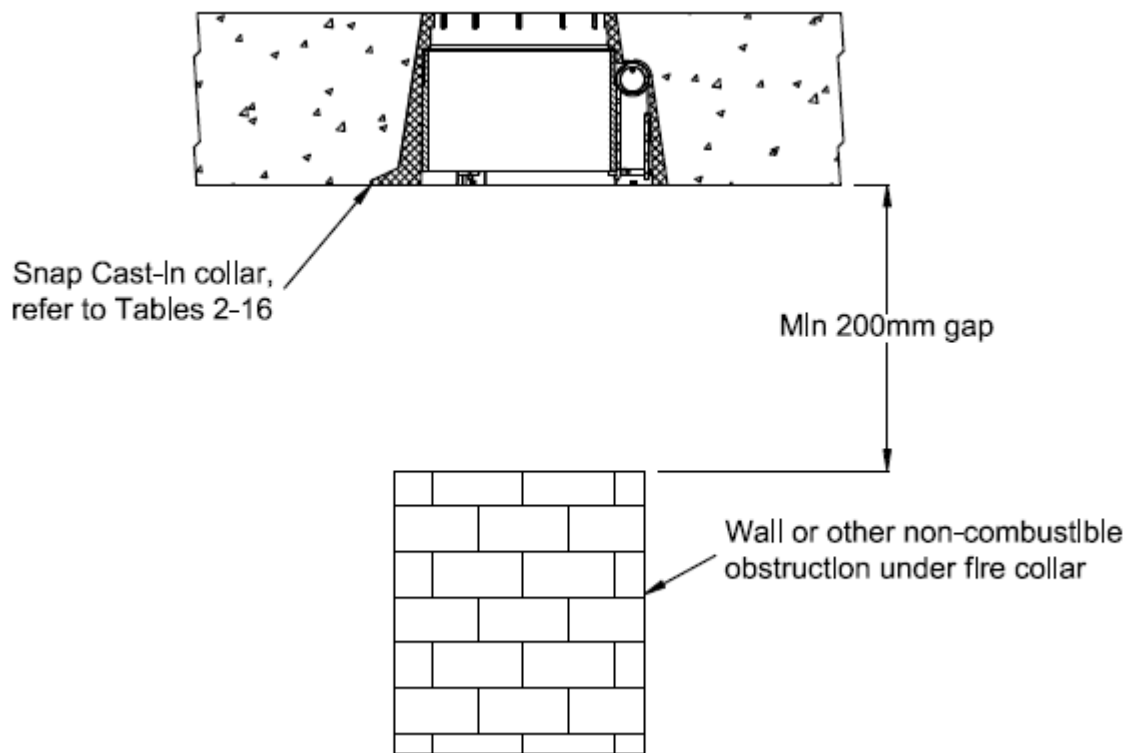


Figure 15: Examples of fire collar recessed

3.3 Various ways of installing SNAP Cast-In collars and pipes in isolation

The proposed construction in Section 3.2 of this report may include one of the following additional variations “a” to “e”:

- a. The inclusion of Bondek or other steel permanent formwork for a concrete slab as a separating element
 - i. Inclusion of 120mm, 150mm and 175mm thick Bondek or other steel permanent formwork concrete slab with a tested or assessed FRL of at least 120/120/120, 180/180/180 and 240/240/240 respectively
 - ii. Where the collar can't sit flush with the bottom of the steel formwork profile, or steel permanent formwork to be cored or modified to ensure 40mm grout backfill coverage around fire collar active area where required as per Figure 16
 - iii. The inclusion of an active area of the collar located at less than 40mm from the formwork rib as per Figure 17
 - iv. A section of Bondek or other steel permanent formwork is to be cut out to allow the collar to be cast level with the bottom of the profile such that the total concrete thickness from the bottom of the collar to the top of the slab is (X), fuse links not to be covered or set back from the bottom of concrete with steel permanent formwork, as shown in Figure 18
 - v. When metal deck plates are used for casting Cast-In collar in steel permanent formwork, fuse links and the active area of the collar must be fully exposed as shown in Figure 19
- b. The inclusion of a cluster of Cast-in fire collars for stack pipes as shown in Figure 25a
 - i. The inclusion of a cluster in groups of 2 x 10, flange to flange
 - ii. In a row up to two rows e.g., 2x1, 3x1...10x1 and 2x2, 2x3, 2x4..... 2x10 in any combination
 - iii. The collar spring pockets must be orientated away from each other
 - iv. Cast-in fire collars must have a 40mm clearance between the active area and the fuse link of any neighbouring fire collar.
 - v. Include any combination of Cast-In collars listed in Table 2-16 with stack pipes of various pipe materials.
 - vi. The clearance between the cluster collars and the edge of the slab is to be a minimum of 200mm
- c. The inclusion of a collar location variation for stack pipes
 - i. The Cast-in fire collar with stack pipe can be cast near the edge of a concrete slab but a minimum of 40mm of coverage must surround all vertical sections of the collar as shown in Figure 20.
- d. Inclusion of Cast-in collar to be either
 - i. Recessed a maximum of 35mm into a thicker slab as shown in Figure 21 or
 - ii. Surrounded by the non-fire-rated board on steel batten or soffit lining as tested in FR5670 specimen 2 or FSP2028 specimen 5, with a thickness of 35mm as shown in Figure 22 or
 - iii. Surrounded by a timber board with a thickness of 35mm and located 100mm away from the recess as shown in Figure 23
 - iv. The recess must be the same size or larger than the base flange of the fire collar.
 - v. For floor waste applications, the recess must be in a slab with a thickness of at least 150mm thick slab plus a recess in slab depth.
- e. The inclusion of the proposed PVC pipes up to 100mm wrapped with the acoustic lagging as tested in FR5670 specimen 2 or FSP2028 specimen 5, as shown in Figures 24 and 25

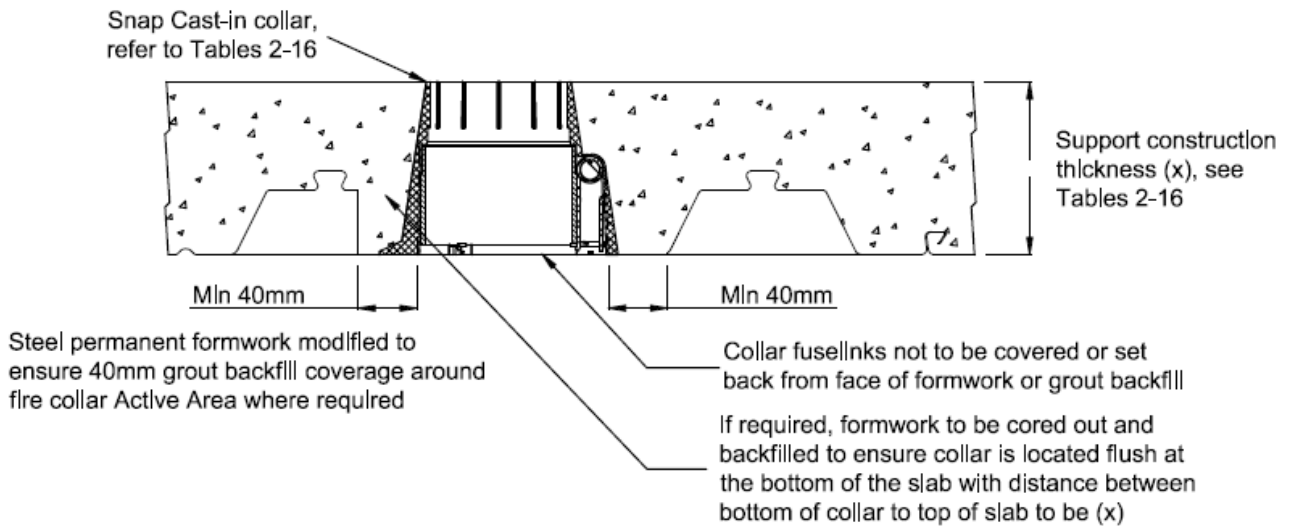


Figure 16: An example of the installation of SNAP collars in concrete with Bondek or other steel permanent formwork slab – an active area of the collar $\geq 40\text{mm}$ from the edge of the deck rib

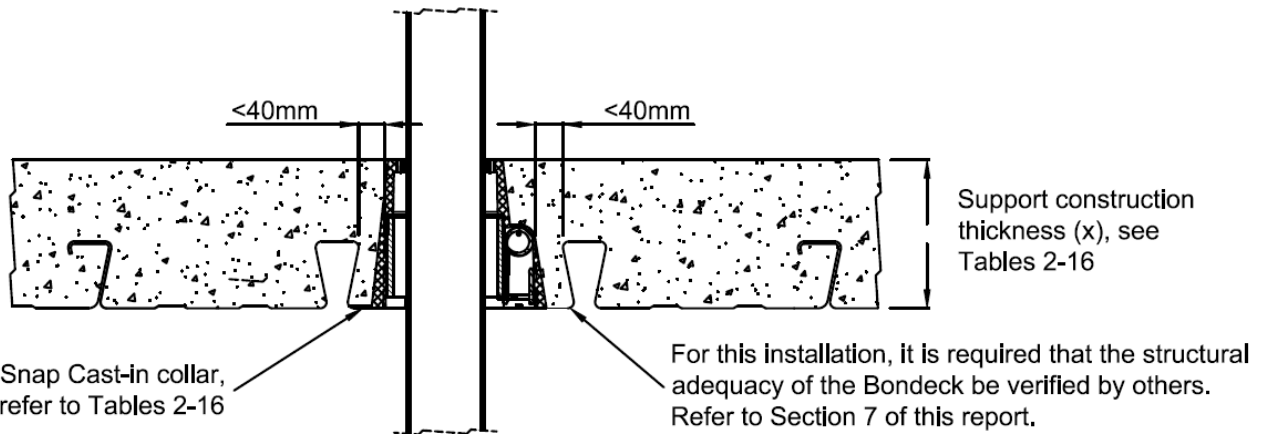


Figure 17: An example of the installation of SNAP collars in concrete with Bondek slab only – an active area of the collar $< 40\text{mm}$ from the edge of the deck rib

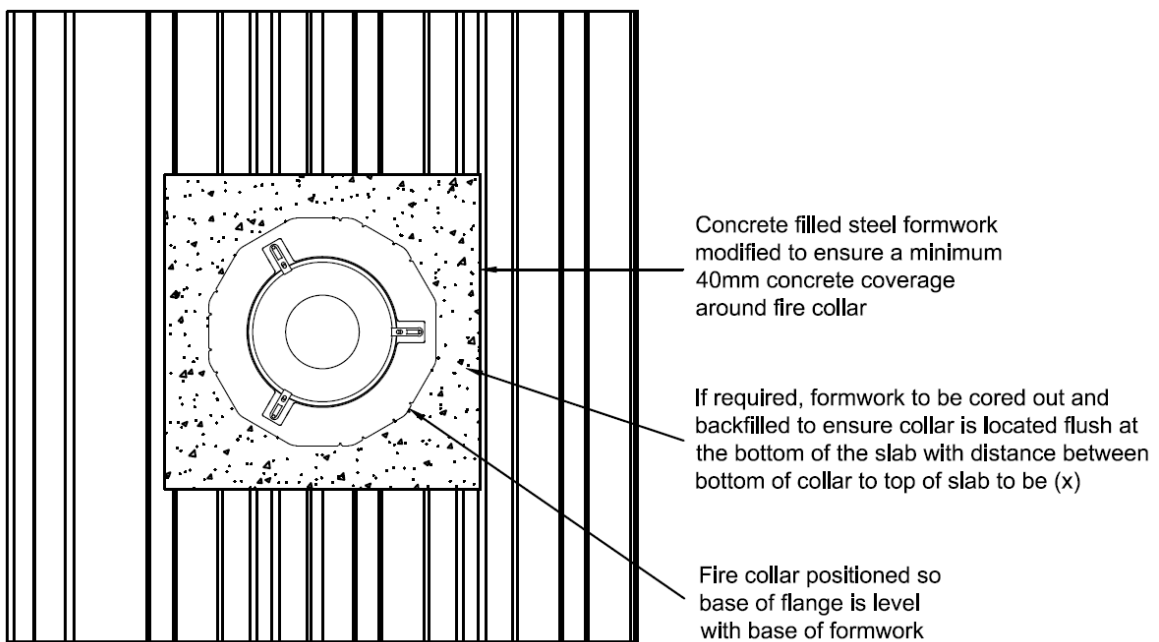


Figure 18: Base of Cast-In collar flange level with the base of Bondek or other steel permanent formwork slab

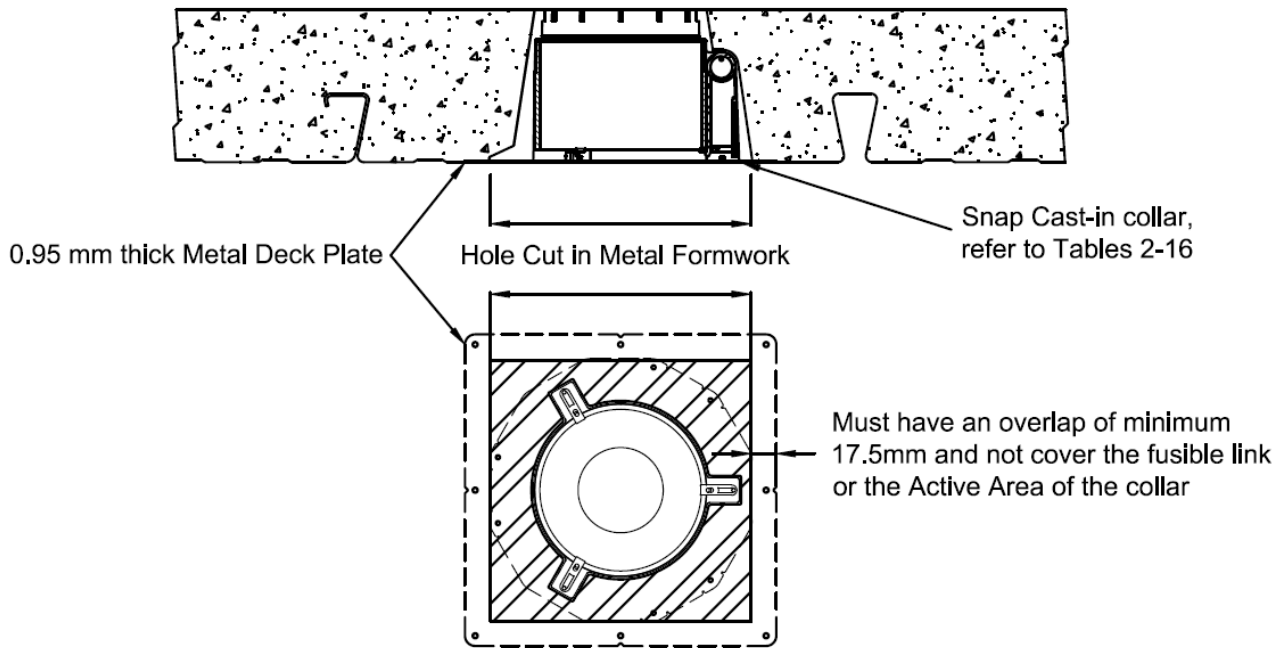


Figure 19: When Metal Deck Plates are used with Bondek or other steel permanent formwork slab

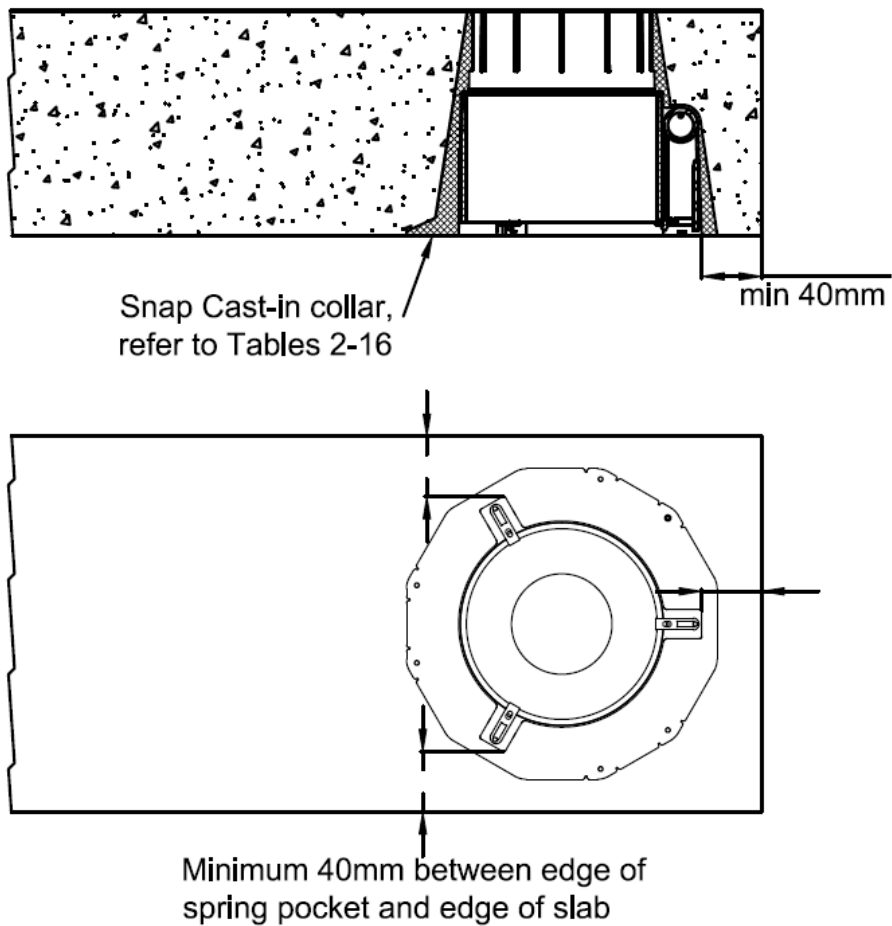


Figure 20: Cast- in collar with stack pipes when 40mm from the slab edge

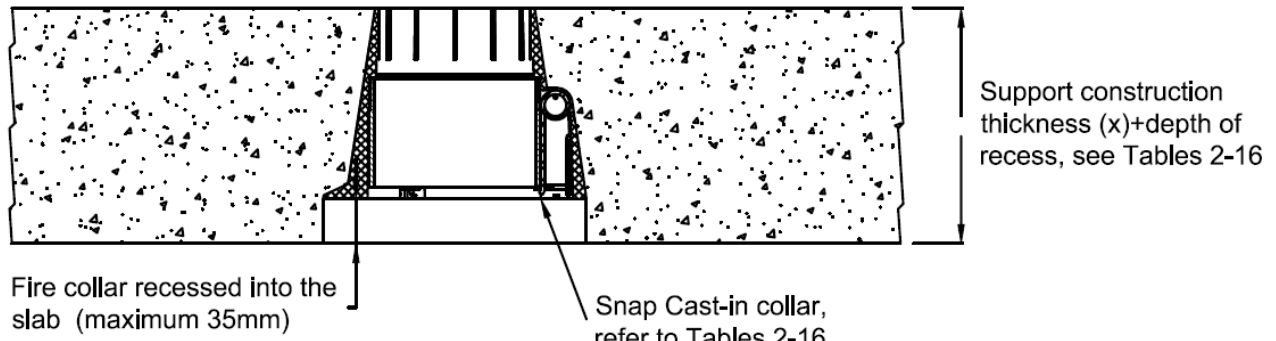


Figure 21: Examples of fire collar recessed

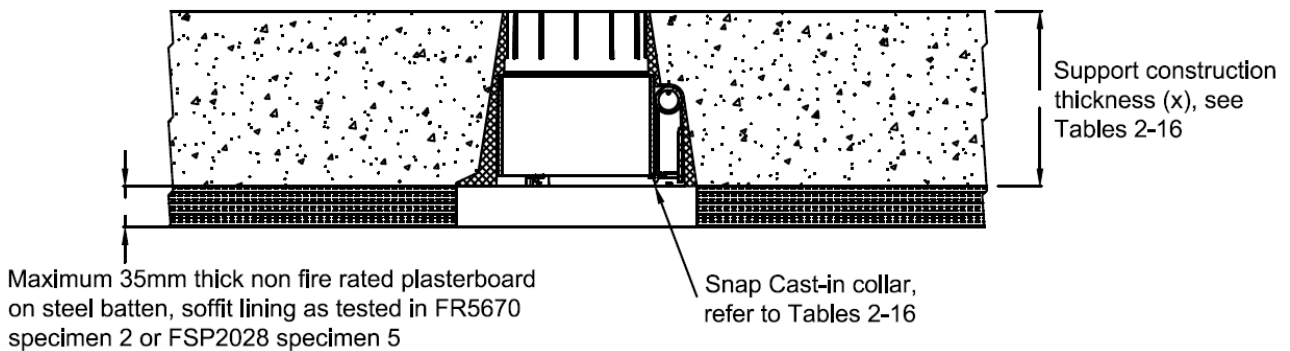


Figure 22: Examples of slab soffit lining opening for the fire collar

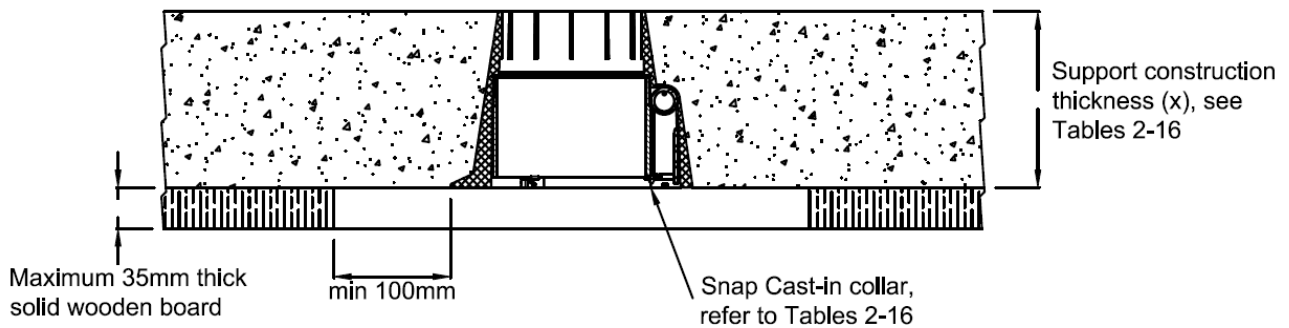


Figure 23: Examples of slab soffit lining opening for the fire collar

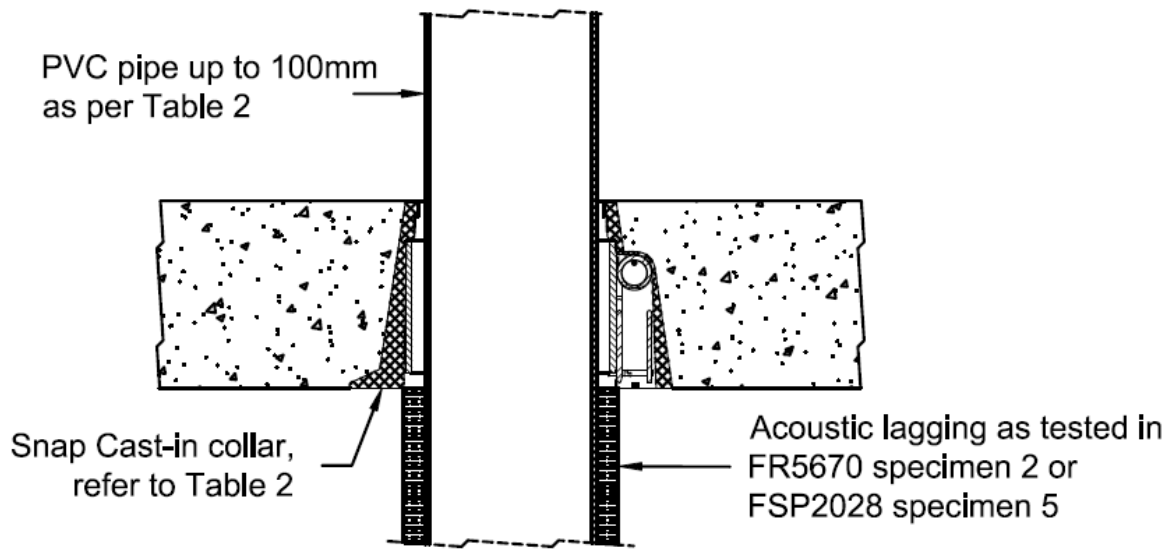


Figure 24: Example of acoustic wrap on stack PVC pipes

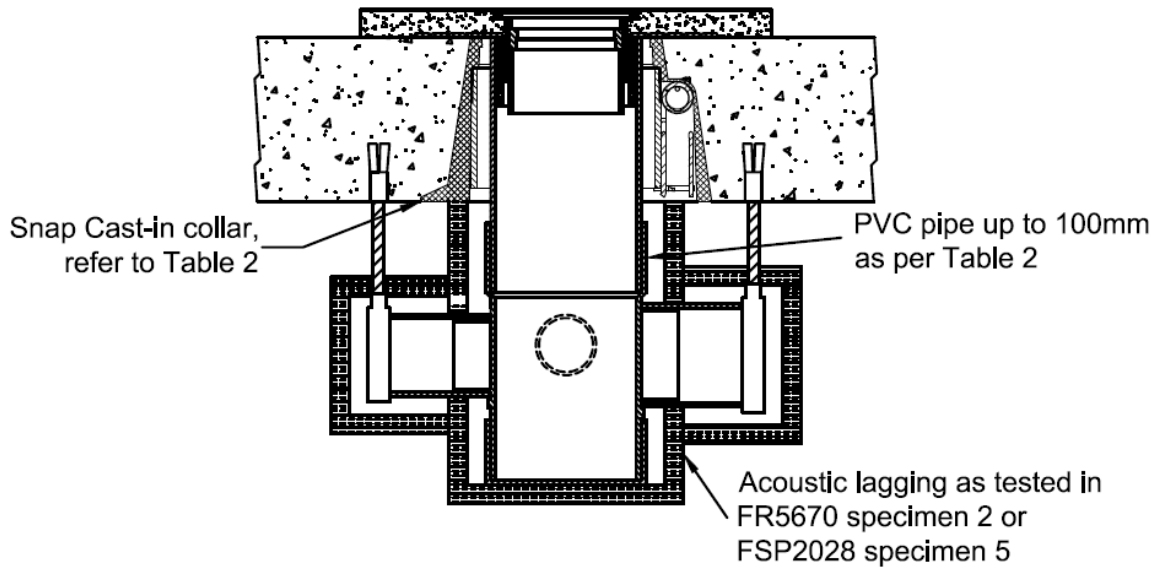


Figure 25: Example of acoustic wrap on floor waste PVC pipes

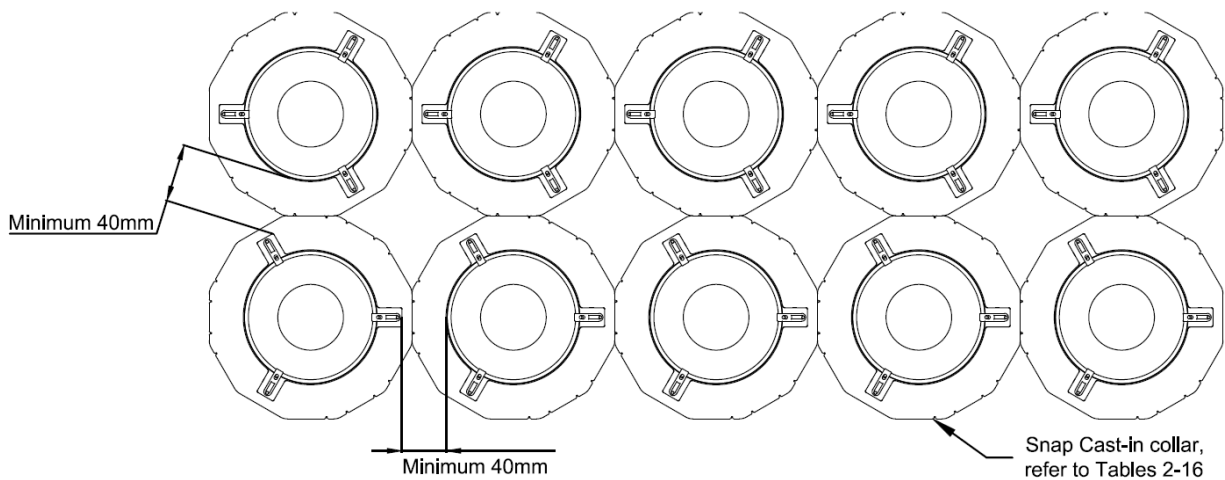


Figure 25a: Examples of collars in a cluster with stack pipes - Min. 40mm between the active area of collars

3.4 Combat Cast-In Collars protecting plastic pipes

The proposed construction shall be cast-In Combat Collars tested in Table 1 and listed in Table 5, and subject to the following variations:

- For Combat collars as shown in Figures 26-27
 - The inclusion of plastic pipes as shown in Table 18.

Table 18: Concrete slab/concrete with steel permanent formwork slab with Combat Collars with stack collars

Combat Collars pipe number	Collar	Support construction thickness (X)	Pipe material	Pipe nominal diameter (mm)	Pipe thickness (mm)	Pipe fitting within the collar
1	CC 40	Minimum 120mm concrete or concrete with steel permanent formwork slab	U-PVC	40	2	Yes
2	CC 50			50	2.3	Yes
4	CC 40		40	3.5	No	
5	CC 50		HDPE	50	3.1-3.5	No

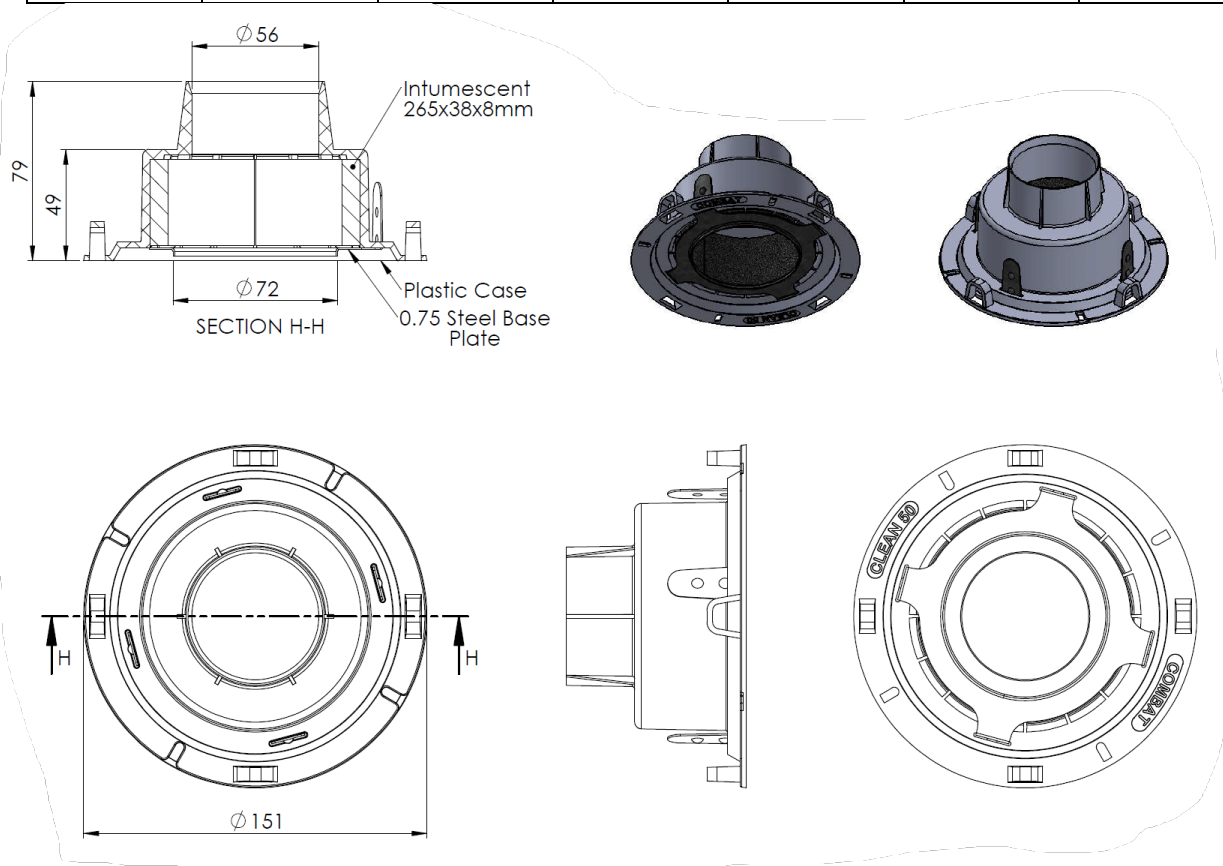


Figure 26: CC-50 collar

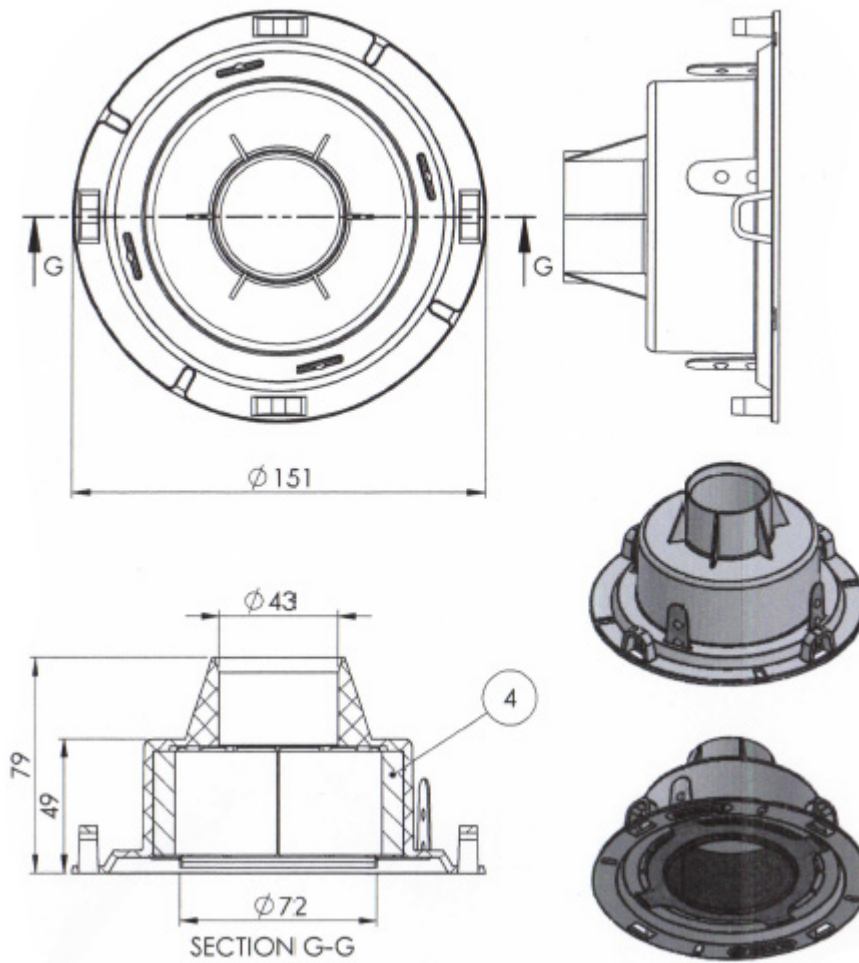


Figure 27: CC-40 collar

3.5 Various ways of installing Combat cast-In Collars and pipes

The proposed construction in Section 3.4 of this report may include the following variations in isolation or combination:

- a. The inclusion of concrete slab as a separating element
 - i. Inclusion of 120mm, 150mm and 175mm thick concrete slab
 - ii. All cast-in collars to be grout backfilled between collar and support construction
 - iii. For stack pipes, the pipework is to be vertically supported above the slab as shown in Figure 28
- b. The inclusion of Bondek or other steel permanent formwork concrete slab
 - i. Inclusion of 120mm, 150mm and 175mm thick Bondek or other steel permanent formwork concrete slab with a tested or assessed FRL of at least 120/120/120, 180/180/180 and 240/240/240 respectively
 - ii. Where the collar can't sit flush with the bottom of the steel formwork profile, or steel permanent formwork to be cored or modified, ensure 40mm grout backfill coverage around the fire collar active area where required as per Figure 29
 - iii. The inclusion of an active area of the collar located at less than 40mm from the formwork rib as per Figure 30
 - iv. A section of Bondek or other steel permanent formwork to be cut out to allow the collar to be cast level with the bottom of the profile such that the total concrete thickness from the bottom of the collar to the top of the slab is (X), fuse links not to be covered or set back from the bottom of concrete with steel permanent formwork, as shown in Figure 31
 - v. All cast-in collars to be grout backfilled between collar and support construction
- c. Variation to collar body
 - i. The Cast-in collars neck can be cut down as per Figure 34
 - ii. The Cast-in collars can be trimmed as per Figures 32 and 33
 - iii. The base flange of the Cast-In collar can be painted, though no paint is allowed on the active area of the Cast-In collar shown in Figure 32
 - iv. Small amounts of slurry allowed on the underside of the Cast-In collar base flange away from the active area and fuse links of the Cast-In collar shown in Figure 32
 - v. The inclusion of Cast-In collars with activated fuse links
- d. Collar location and orientation variation
 - i. The inclusion of cast-in pipework above cast-in collar configuration, with the gap between the pipes and the top of the collars to be sealed with either a bead of sealant or PVC tape as shown in Figure 35
- e. The inclusion of empty/blank cast-in collars sealed by:
 - i. For up to 240 minute applications, remove intumescent material and activate the springs and then backfill the collar with non-shrink grout as shown in Figure 36.

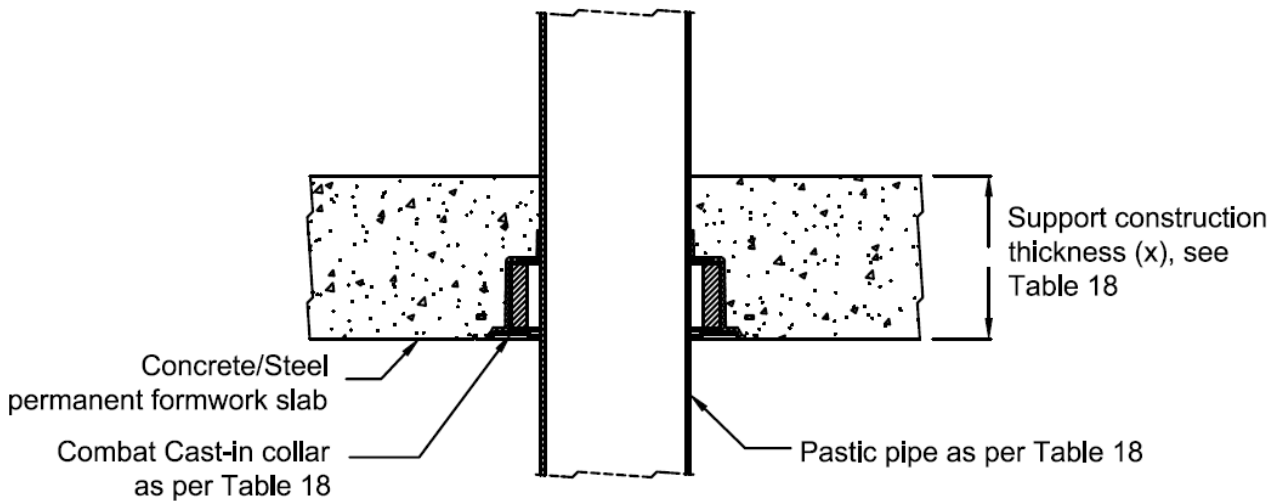


Figure 28: Installation of Combat collars with stack pipes in a concrete slab, Bondek or other steel permanent formwork slab

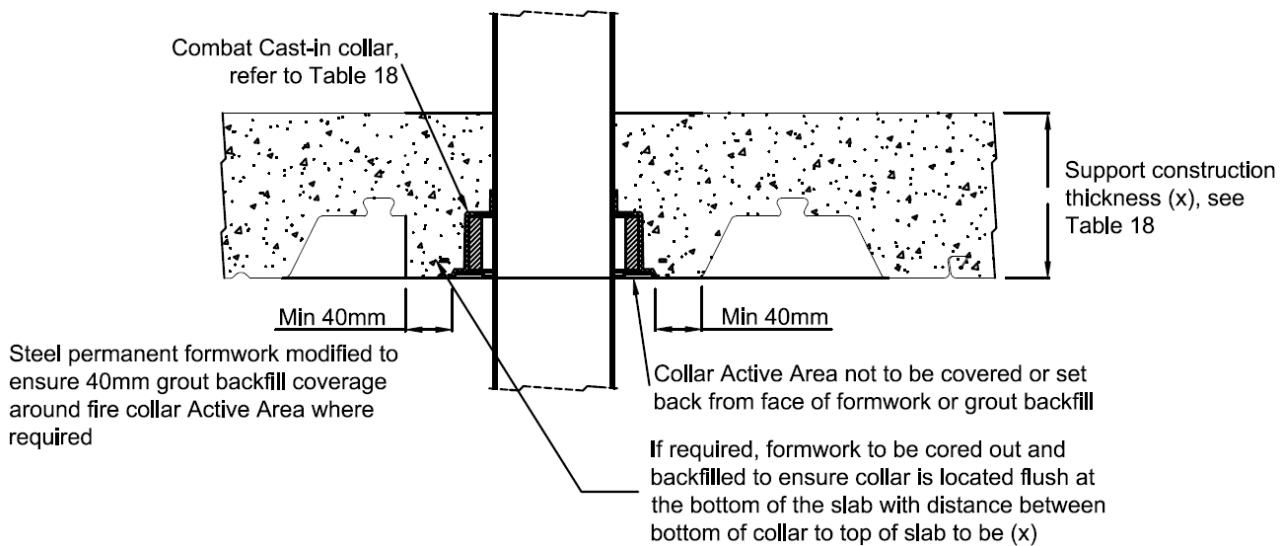


Figure 29: An example of the installation of Combat Collars in concrete with Bondek or other steel permanent formwork slab – an active area of the collar $\geq 40\text{mm}$ from the edge of the deck rib

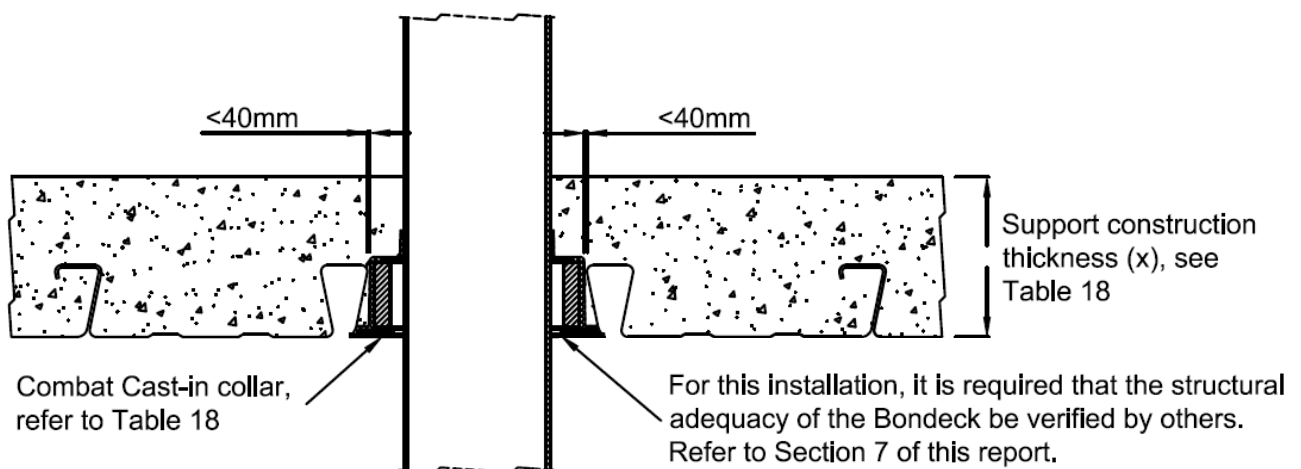


Figure 30: An example of the installation of Combat Collars in concrete with Bondek slab only – an active area of the collar $< 40\text{mm}$ from the edge of the deck rib.

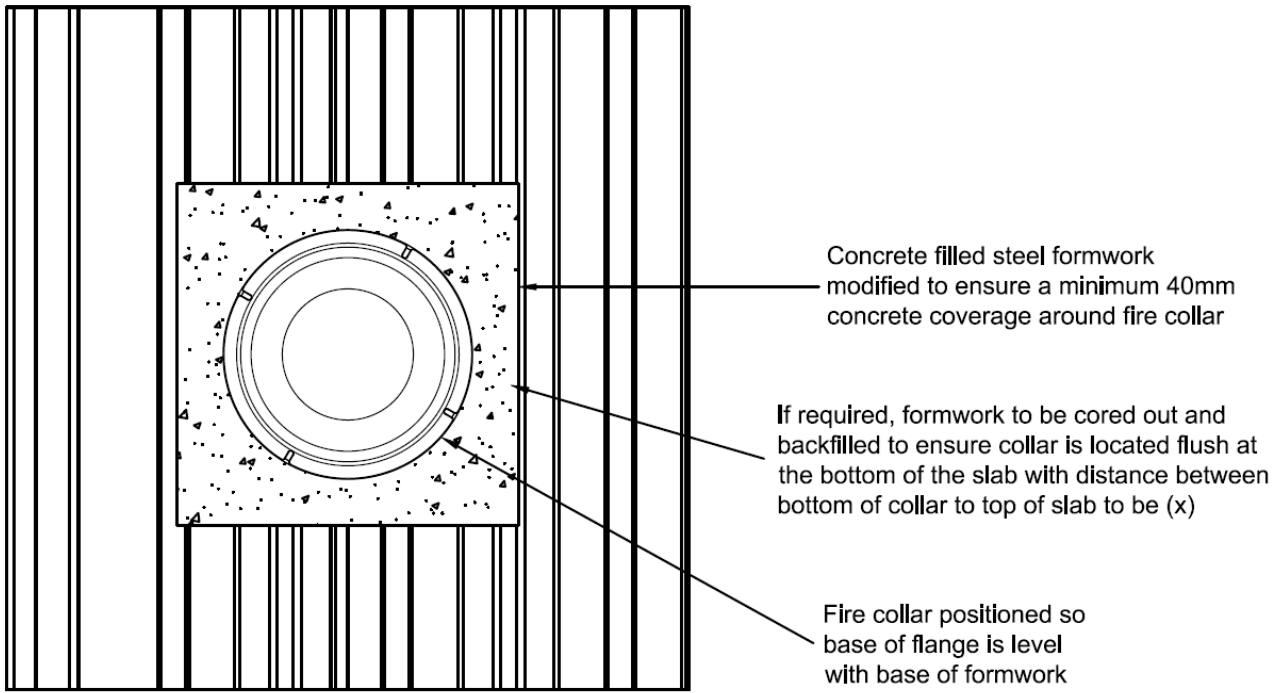


Figure 31: Base of Cast-In collar flange level with the base of Bondek or other steel permanent formwork slab

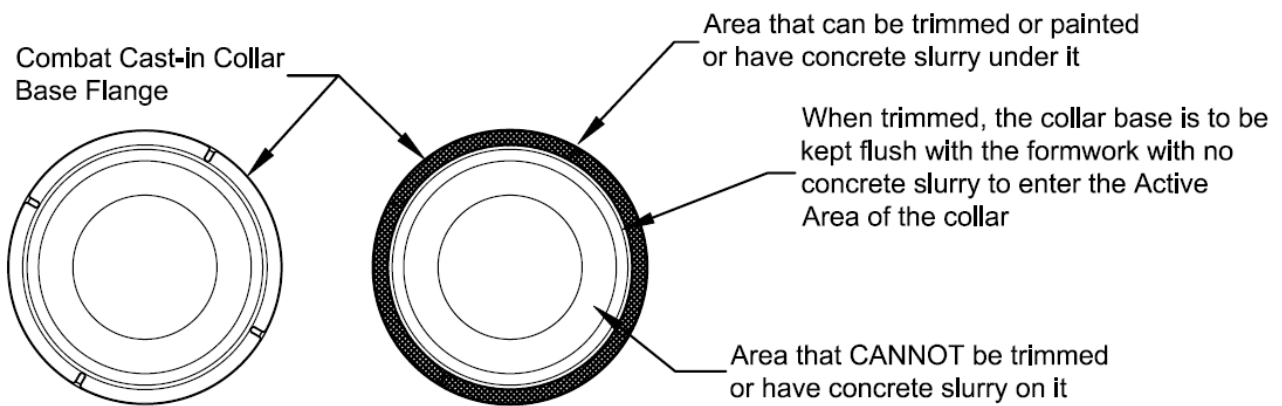


Figure 32: Definition of areas that can be trimmed or painted or have slurry under

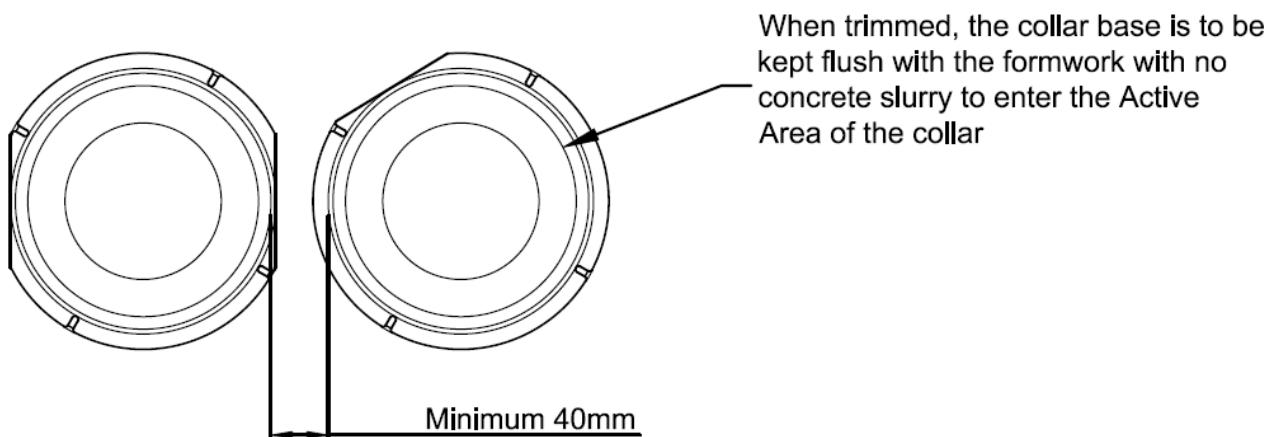


Figure 33: Examples of the extent of flange Trimming – No trimming of spring pockets permitted

CC40/CC50

Cut Down



When the top of the collar is cut down lower than the top of the slab depth, the gap between the top of the collar and the pipe must be sealed with a bead of sealant or PVC tape to prevent the ingress of concrete slurry into the Active Area of the collar

Figure 34: The extent of Combat Collar neck cut down

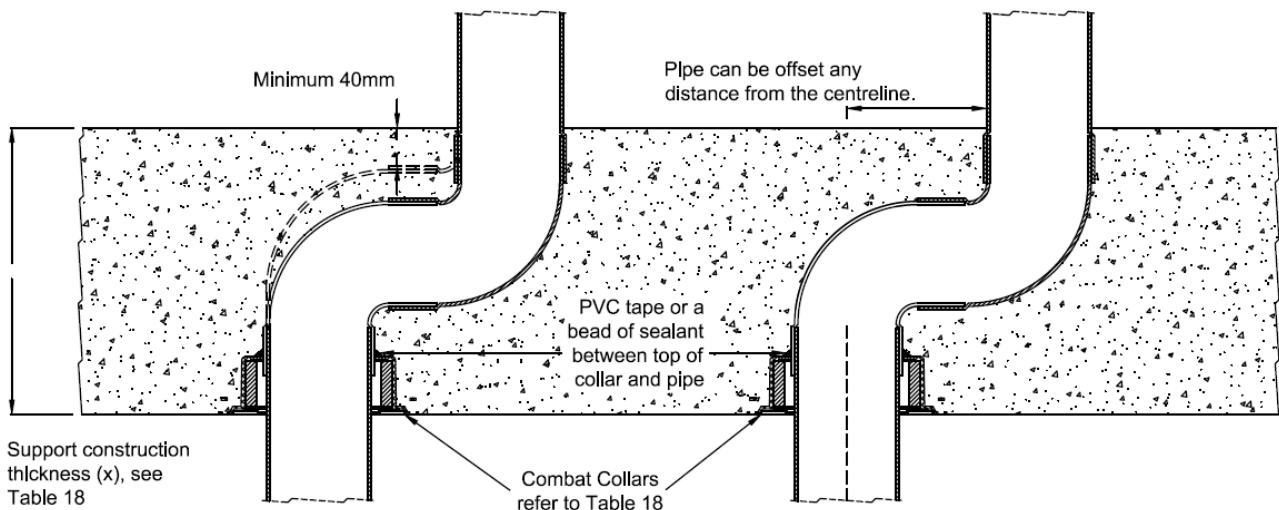


Figure 35: Examples of cast-in pipework above cast-in collar configuration

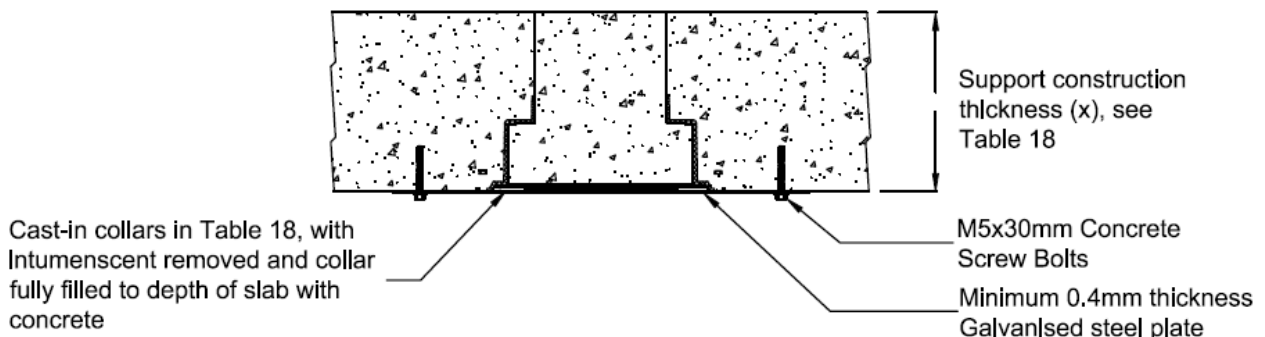


Figure 36: Sealing method of empty Cast-In collars

3.6 SNAP Retrofit collars protecting plastic pipes

The proposed construction shall be Snap Retrofit collars tested in Table 1 and listed in Table 19, and subject to the following variations:

- The inclusion of SNAP collars as shown in Figure 37
 - The inclusion of pipe as shown in Table 19

Table 19: SNAP 65-80R collar with stack PVC pressure pipes in walls and floors

SNAP 65-80R Collars pipe number	Collar	Support construction thickness (X)	Pipe material	Pipe nominal diameter (mm)	Pipe thickness (mm)	Pipe fitting within the collar
1	SNAP 65-80R collar	Min. 116mm thick plasterboard lined Or Minimum 120mm concrete or masonry wall	PVC-U, PVC-O or PVC-M pressure pipes (PN12)	65	4	No
2				80	5	No
3		Minimum 150mm Concrete slab		65	4	No
4				80	5	No

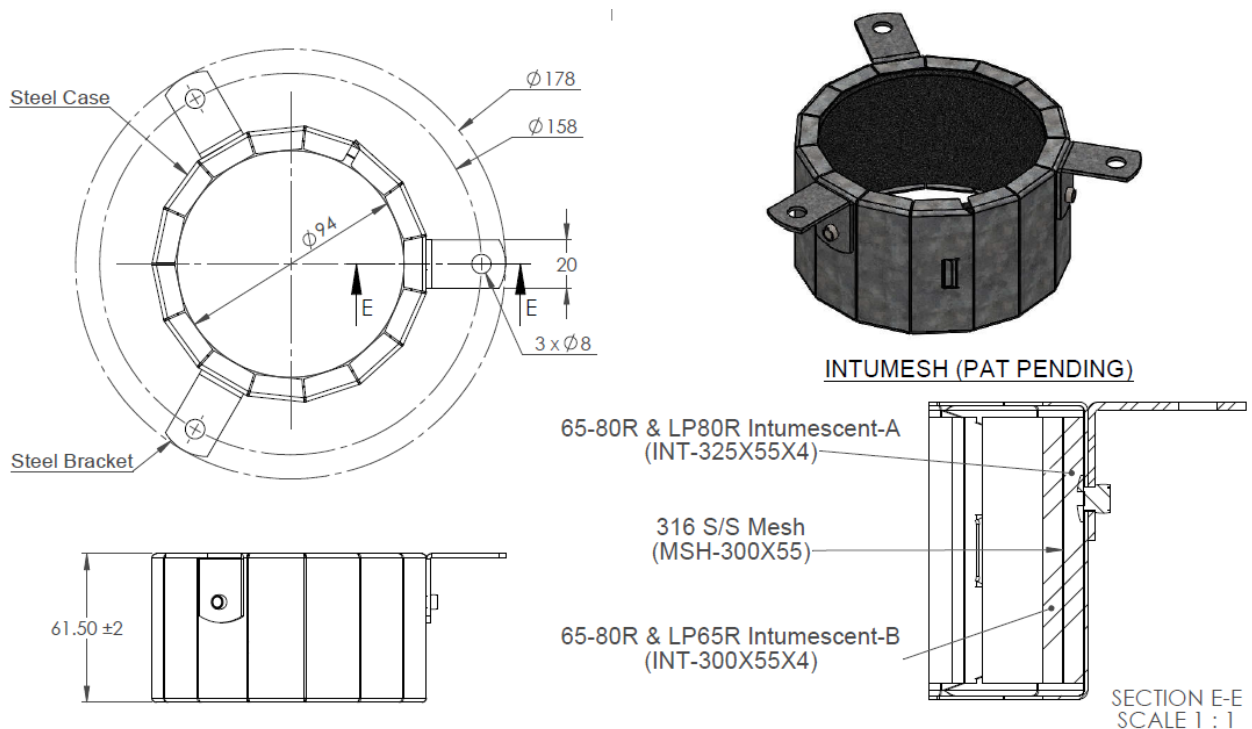






Figure 37: SNAP 65-80R collar

3.7 Various ways of installing SNAP Retrofit collars and pipes

The proposed construction in Section 3.6 of this report may include any of the following variations in isolation or combination:

- Plastic pipes are to be supported above the slab and on each side of the wall.
- The inclusion of a minimum 116mm thick plasterboard lined walls, a minimum 120mm thick concrete wall or block wall and a minimum 150mm thick concrete slab as a support construction.
- For slabs, when the annular gap between the pipe and collar is to be less than 5mm to be sealed with a bead of Fuller Firesound sealant
- Fixings for retrofit collars shall be as per Table 20.

Table 20: Collar fixings for retrofit collars

Separating Element	Fixing (minimum size)	
13mm and 16mm Plasterboard lined wall	M4 Expandable steel anchors	
Concrete or Masonry Wall or a Concrete slab	5mm x 30mm concrete screw bolts	
	5mm x 30mm steel mushroom head spikes	
	6.5 x 40mm steel sleeve anchors	
	6 x 35mm steel wedge anchors	

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 Components for the protection of openings in fire-resistant separating elements Part 1: Service penetrations and control joints. Section 10 as appropriate for service penetrations.

5 Conclusion

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

Table 22: PVC pipes, refer to Table 2 for details

PVC pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	40	H50S-RR/L40-50S	Stack	1a – 1e, 6, 8, 9, 10 – 15, 16 – 24, 25a	-/120/120	-/180/180	-/240/240
2	50	H50S-RR/L40-50S	Stack		-/120/120	-/180/180	-/240/240
3	40	H65S-RR	Stack		-/120/120	-/180/180	-/240/240
4	50	H65S-RR	Stack		-/120/120	-/180/180	-/240/240
5	65	H65S-RR	Stack		-/120/120	-/180/180	-/240/240
6	50	H100S-RR/L100S	Stack		-/120/120	-/180/180	-/240/240
7	65	H100S-RR/L100S	Stack		-/120/120	-/180/180	-/240/240
8	80	H100S-RR/L100S	Stack		-/120/120	-/180/180	-/240/240
9	90	H100S-RR/L100S	Stack		-/120/120	-/180/180	-/240/240
10	100 or 100(SC)	H100S-RR/L100S	Stack		-/120/120	-/180/180	-/240/240
11	40	H110S	Stack	4, 6, 8, 9, 10 – 15, 16 – 24, 25a	N/A	-/120/120	-/120/120
12	50	H110S	Stack		N/A	-/120/120	-/120/120
13	65	H110S	Stack		N/A	-/120/120	-/120/120
14	80	H110S	Stack		N/A	-/120/120	-/120/120
15	90	H110S	Stack		N/A	-/120/120	-/120/120
16	100 or 100(SC)	H110S	Stack		N/A	-/120/120	-/120/120
17	100 or 100(SC)	H150S-RR	Stack	1f, 6, 9, 10 – 15, 16 – 24, 25a	N/A	-/180/180	-/240/240
18	150 or 150(SC)	H150S-RR	Stack	1f, 6, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/180/180
19	40	H50FWS-RR/L40-50FWS	Stack & FWS	2a – 2e, 6, 7, 8, 9, 10 – 15, 16 – 19, 21 – 25	N/A	-/180/180	-/240/240
20	50	H50FWS-RR/L40-50FWS	Stack & FWS	2a, 2b, 6, 7, 8, 9, 10 – 15	-/120/120	-/180/180	-/240/240
				2a, 2b, 6, 7, 8, 9, 10 – 15, 16 – 19,	N/A	-/180/180	-/240/240

PVC pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
				21 – 25			
21	50	H65FWS-RR	Stack	2c	-/120/120	-/180/180	-/240/240
22	50	H65FWS-RR	FWS	6, 7, 8, 9,	NA	-/180/180	-/240/240
23	65	H65FWS-RR	Stack	10 – 15,	-/120/120	-/180/180	-/240/240
24	65	H65FWS-RR	FWS	16 – 19, 21 – 25	NA	-/180/180	-/240/240
25	50	H100FWS-RR/ L100FWS	Stack & FWS	2d, 2e, 6, 7, 8, 9, 10 – 15,	-/120/120	-/180/180	-/240/240
				2d, 2e, 6, 7, 8, 9, 10 – 15, 16 – 19, 21 – 25	NA	-/180/180	-/240/240
26	65	H100FWS-RR/ L100FWS	Stack & FWS	2d, 2e, 6, 7, 8, 9, 10 – 15,	-/120/120	-/180/180	-/240/240
				2d, 2e, 6, 7, 8, 9, 10 – 15, 16 – 19, 21 – 25	NA	-/180/180	-/240/240
27	80	H100FWS-RR/ L100FWS	Stack & FWS	2d, 2e, 6, 7, 8, 9, 10 – 15,	-/120/120	-/180/180	-/240/240
				2d, 2e, 6, 7, 8, 9, 10 – 15, 16 – 19, 21 – 25	NA	-/180/180	-/240/240
28	100 or 100(SC)	H100FWS-RR/ L100FWS	Stack & FWS	2d, 2e, 6, 7, 8, 9, 10 – 15,	-/120/120	-/180/180	-/240/240
				2d, 2e, 6, 7, 8, 9, 10 – 15, 16 – 19, 21 – 25	NA	-/180/180	-/240/240
29	100(SC)	UL100FWS	Stack & FWS	5, 6, 7, 9, 10 – 15	-/120/120	-/180/180	-/180/180
30	100 or 100(SC)	H150FWS-RR	Stack & FWS	3, 6, 7, 9,	N/A	-/180/180	-/240/240
31	150 or 150 (SC)	H150FWS-RR	Stack & FWS	10 – 15	N/A	-/180/180	-/240/240

Table 23: HDPE pipes, refer to Table 3 for details

HDPE pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	40	H50S-RR/ L40-50S	Stack	1a, 1b, 6, 8, 9, 10 – 15	-/120/120	-/180/180	-/240/240
2	50	H50S-RR/ L40-50S	Stack	1a – 1e, 6, 8, 9, 10 – 15, 16 – 23, 25a	-/120/120	-/180/180	-/240/240
3	56	H50S-RR/ L40-50S	Stack		-/120/120	-/180/180	-/240/240
4	40	H65S-RR	Stack		N/A	-/180/180	-/240/240
5	50	H65S-RR	Stack		N/A	-/180/180	-/240/240
6	56	H65S-RR	Stack		N/A	-/180/180	-/240/240
7	63	H65S-RR	Stack		N/A	-/180/180	-/240/240
8	110	H100S-RR/ L100S	Stack		-/120/120	-/180/180	-/240/240
9	50	H110S	Stack		4, 6, 8, 9, 10 – 15	N/A	-/120/120
10	56	H110S	Stack	N/A		-/120/120	-/120/120
11	63	H110S	Stack	N/A		-/120/120	-/120/120
12	75	H110S	Stack	N/A		-/120/120	-/120/120
13	90	H110S	Stack	N/A		-/120/120	-/120/120
14	110	H110S	Stack	N/A		-/120/120	-/120/120
15	110	H150S-RR	Stack	1f, 6, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/180/180
16	125	H150FWS-RR	Stack		N/A	-/180/180	-/240/240
17	125	H150S-RR	Stack		N/A	-/180/180	-/240/240
18	160	H150S-RR	Stack	1f, 6, 9, 10 – 15	N/A	-/120/120	-/120/120
19	40	H50FWS-RR/ L40-50FWS	Stack & FWS	2a – 2e, 6, 7, 8, 9, 10 – 15, 16 – 19, 21 – 23	N/A	-/180/180	-/240/240
20	50	H50FWS-RR/ L40-50FWS	Stack & FWS		N/A	-/180/180	-/240/240
21	56	H50FWS-RR/ L40-50FWS	Stack & FWS		N/A	-/180/180	-/240/240
22	56	H65FWS-RR	Stack & FWS		N/A	-/180/180	-/240/240
23	63	H65FWS-RR	Stack & FWS		N/A	-/180/180	-/240/240
24	110	H100FWS/ L100FWS	Stack & FWS		N/A	-/180/180	-/240/240
25	110 Geberit SuperTu be	H100S-RR/ L100S	Stack	1d, 1e, 6, 8, 9, 10 – 15	N/A	-/180/180	-/240/240

Table 24: FastFlow PVC pipes, refer to Table 4 for details

Fastflow PVC pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	50	H65S-RR	Stack	1c – 1e, 6, 8, 9, 10 – 15, 16 – 23, 25a	-/120/120	-/180/180	-/240/240
2	65	H65S-RR			-/120/120	-/180/180	-/240/240
3	75	H100S-RR/L100S			-/120/120	-/180/180	-/240/240
4	100	H100S-RR/L100S			-/120/120	-/180/180	-/240/240
5	75	H110S		4, 6, 8, 9, 10 – 15	N/A	-/120/120	-/120/120
6	100	H110S		N/A	-/120/120	-/120/120	
7	150	H150S-RR		1f, 6, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240

Table 25: PN12 PVC pipes, refer to Table 5 for details

PN12 PVC pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	15	H50FWS-RR/L40-50FWS	Stack	1a – 1e, 6, 8, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
2	20	H50FWS-RR/L40-50FWS			N/A	-/180/180	-/240/240
3	25	H50FWS-RR/L40-50FWS			N/A	-/180/180	-/240/240
4	32	H50FWS-RR/L40-50FWS			N/A	-/180/180	-/240/240
5	40	H50FWS-RR/L40-50FWS			N/A	-/180/180	-/240/240
6	50	H50FWS-RR/L40-50FWS			N/A	-/180/180	-/240/240
7	40	H50S-RR/L40-50S			-/120/120	-/180/180	-/240/240
8	50	H50S-RR/L40-50S			-/120/120	-/180/180	-/240/240
9	63	H65S-RR			-/120/120	-/180/180	-/240/240
10	80	H100S-RR/L100S			-/120/120	-/180/180	-/240/240
11	100	H100S-RR/L100S		-/120/120	-/180/180	-/240/240	
12	40	H110S		4, 6, 8, 9, 10 – 15	N/A	-/120/120	-/120/120
13	50	H110S			N/A	-/120/120	-/120/120
14	63	H110S			N/A	-/120/120	-/120/120
15	80	H110S			N/A	-/120/120	-/120/120
16	100	H110S			N/A	-/120/120	-/120/120

Table 26: Raupiano pipes, refer to Table 6 for details

Raupiano pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	40	H50S-RR/L40-50S	Stack	Figure 1a -1c, 6, 8, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
2	50	H50S-RR/L40-50S			N/A	-/180/180	-/240/240
3	75	H65S-RR			N/A	-/180/180	-/240/240
4	110	H100S-RR/L100S		1d, 1e, 6, 8, 9, 10 – 15	N/A	-/180/180	-/240/240
5	50	H110S		4, 6, 8, 9, 10 – 15	N/A	-/120/120	-/120/120
6	75	H110S			N/A	-/120/120	-/120/120
7	110	H110S			N/A	-/120/120	-/120/120
8	110	H150FWS-RR		1f, 3, 6, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
9	110	H150S-RR			N/A	-/180/180	-/240/240
10	150	H150FWS-RR			N/A	-/180/180	-/240/240
11	150	H150S-RR			N/A	-/180/180	-/240/240
12	50	H50FWS-RR/L40-50FWS	Stack & FWS	2a, 2b, 6, 7, 8, 9, 10 – 15	N/A	-/180/180	-/240/240
13	110	H100FWS-RR/L100FWS		2d, 2e, 6, 7, 8, 9, 10 – 15	N/A	-/180/180	-/240/240

Table 27: Triplus pipes, refer to Table 7 for details

Triplus pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	40	H50S-RR/L40-50S	Stack	1a -1e, 6, 8, 9, 10 – 15, 16 – 23, 25a	-/120/120	-/180/180	-/240/240
2	50	H50S-RR/L40-50S			-/120/120	-/180/180	-/240/240
3	50	H65S-RR			NA	-/180/180	-/240/240
4	75	H100S-RR/L100S			-/120/120	-/180/180	-/240/240
5	90	H100S-RR/L100S			-/120/120	-/180/180	-/240/240
6	110	H100S-RR/L100S			-/120/120	-/180/180	-/240/240
7	50	H110S		4, 6, 8, 9, 10 – 15	N/A	-/120/120	-/120/120
8	75	H110S			N/A	-/120/120	-/120/120
9	90	H110S			N/A	-/120/120	-/120/120
10	110	H110S			N/A	-/120/120	-/120/120
11	160	H150FWS-RR		1f, 3, 6, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/180/180
12	160	H150S-RR			N/A	-/180/180	-/180/180
13	110	H100FWS-RR/L100FWS	Stack & FWS	2d, 2e, 6, 7, 8, 9, 10 – 15	N/A	-/180/180	-/240/240
14	110	UL100FWS		5, 6, 7, 9, 10 – 15	-/120/120	-/180/180	-/240/240
15	110	H150FWS-RR		2f, 6, 7, 9, 10 – 15	-/120/120	-/180/180	-/180/180

Table 28: PE sdr 7.4 pipes, refer to Table 8 for details

PE sdr 7.4 pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	20	H50FWS-RR/L40-50FWS	Stack	2a, 2b 6, 8, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
2	25				N/A	-/180/180	-/240/240
3	32				N/A	-/180/180	-/240/240
4	40				N/A	-/180/180	-/240/240
5	50				N/A	-/180/180	-/240/240
6	50	H100FWS-RR/L100FWS		2d, 2e, 6, 8, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
7	63				N/A	-/180/180	-/240/240
8	75				N/A	-/180/180	-/240/240
9	90				N/A	-/180/180	-/240/240
10	110				N/A	-/180/180	-/240/240

Table 29: PE (SRD 11/ PN16 PE 100) pipes, refer to Table 9 for details

PE (SRD 11/ PN16 PE 100) pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	50	H50S-RR/L40-50S	Stack	1a - 1c 6, 8, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
2	63	H65S-RR		N/A	-/180/180	-/240/240	
3	50	H110S		N/A	-/120/120	-/120/120	
4	63	H110S		N/A	-/120/120	-/120/120	
5	75	H110S		N/A	-/120/120	-/120/120	
6	90	H110S		N/A	-/120/120	-/120/120	
7	110	H110S		N/A	-/120/120	-/120/120	

Table 30: dBlue pipes, refer to Table 10 for details

dBlue pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	40	H50S-RR/L40-50S	Stack	1a, 1b 6, 8, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
2	50			N/A	-/180/180	-/240/240	
3	75	H100S-RR/L100S		1d, 1e 6, 8, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
4	110			N/A	-/180/180	-/240/240	
5	160	H150FWS-RR		1f, 6, 9, 10 – 15	N/A	-/120/120	-/120/120

Table 31: George Fisher Progef Polypropylene PP-H pipes, refer to Table 11 for details

PP-H pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	25	H50FWS-RR/L40-50FW	Stack	2a, 2b 6, 8, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
2	32				N/A	-/180/180	-/240/240
3	40				N/A	-/180/180	-/240/240
4	50				N/A	-/180/180	-/240/240
5	63				N/A	-/180/180	-/240/240

Table 32: WAVIN Astolan pipes, refer to Table 12 for details

WAVIN Astolan pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	56	H65S-RR	Stack	1c 6, 8, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
2	70	H100S-RR/L100S		1d, 1e, 6, 8, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
3	90			N/A	-/180/180	-/240/240	
4	100			N/A	-/180/180	-/240/240	
5	56	H65FWS-RR	Stack & FWS	2c 6, 7, 8, 9, 10 – 15, 16 – 19, 21 – 23	N/A	-/180/180	-/240/240

Table 33: GF+ Coolfit 2.0 pipes, refer to Table 13 for details

GF+ Coolfit 2.0 pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	d65/110	H65S-RR	Stack	1d, 1e, 6, 8, 9, 10 – 15, 16 – 23	N/A	-/180/180	-/240/240

Table 34: PPR-80 fazer composite sdr 7.4 pipes, refer to Table 14 for details

PPR-80 pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	20	H50FWS-RR/ L40-50FWS	Stack	2a, 2b 6, 8, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
2	25				N/A	-/180/180	-/240/240
3	32				N/A	-/180/180	-/240/240
4	40				N/A	-/180/180	-/240/240
5	50				N/A	-/180/180	-/240/240
6	50	H100FWS-RR/ L100FWS		2d, 2e 6, 8, 9, 10 – 15, 16 – 23, 25a	N/A	-/180/180	-/240/240
7	63				N/A	-/180/180	-/240/240
8	75				N/A	-/180/180	-/240/240
9	90				N/A	-/180/180	-/240/240
10	110				N/A	-/180/180	-/240/240

Table 35: Pex-a pipes, refer to Table 15 for details

Pex-a pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					≥120mm	≥150mm	≥175mm
1	16	H50S-RR/ L40-50S	Stack	1a, 1b	N/A	-/180/180	-/240/240
2	20			6, 8, 9,	N/A	-/180/180	-/240/240
3	25			10 – 15,	N/A	-/180/180	-/180/180
4	32			16 – 23, 25a	N/A	-/180/180	-/180/180

Table 36: Pex-b pipes, refer to Table 16 for details

Pex-b pipe number	Pipe nominal diameter (mm)	Collar	Config.	Construction Details	FRL		
					Minimum slab thickness (X)		
					120mm	150mm	175mm
1	16	H50S-RR/ L40-50S	Stack	1a, 1b	N/A	-/180/180	-/240/240
2	20			6, 8, 9,	N/A	-/180/180	-/240/240
3	25			10 – 15,	N/A	-/180/180	-/180/180
4	32			16 – 23, 25a	N/A	-/180/180	-/180/180
5	3 x 25	H50FWS-RR/ L40-50FWS	Stack	2a, 2b	-/120/120	-/180/180	-/180/180
6	4 x 20			6, 8, 9, 10 – 15, 16 – 23, 25a	-/120/120	-/120/120	-/120/120

Table 37: SNAP CC collar with stack pipes through concrete slab/ Bondek or other steel permanent formwork slab – variations allowed in combination or isolation as configured in Figures 26 - 36

Combat Collars pipe number	Combat Collars	Pipe material	Pipe nominal diam. (mm)	Fitting within the body of the collar	Construction Details	FRL		
						Minimum slab thickness (X)		
						≥120mm	≥150mm	≥175mm
1	CC 40	U-PVC	40	Yes	Figures 26 -36 Table 18	-/120/120	-/180/180	-/240/240
2	CC 40	U-PVC	40	No		-/120/120	-/180/180	-/240/240
3	CC 50	U-PVC	50	Yes		-/120/120	-/180/180	-/240/240
4	CC 50	U-PVC	50	No		-/120/120	-/180/180	-/240/240

Table 38: SNAP 65-80R collar with PVC pressure pipes in walls and stack pipe through floors – variations allowed in combination or isolation

SNAP 65-80R Collars pipe number	SNAP Collars	Application	Support construction thickness (X)	Pipe material	Pipe nominal diameter (mm)	Fitting within the body of the collar	Const. Details	FRL
1	SNAP 65-80R	Collar each side of the wall	≥ 116mm thick plasterboard lined wall with a tested or assessed FRL of -/120/120 Or ≥ 120mm Concrete or block wall	PVC-U, PVC-O or PVC-M pressure pipe (PN12)	65	No	Figure 37 Tables 19-20	-/120/120
2	SNAP 65-80R	Collar each side of the wall	≥ 116mm thick plasterboard lined wall with a tested or assessed FRL of -/120/120 Or ≥ 120mm Concrete or block wall		80	No		-/120/120
3	SNAP 65-80R	Collar under side of floor	≥150mm Concrete slab		65	No		-/180/180
4	SNAP 65-80R	Collar under side of floor	≥150mm Concrete slab		80	No		-/180/180
3	SNAP 65-80R	Collar under side of floor	≥175mm Concrete slab		65	No		-/240/240
4	SNAP 65-80R	Collar under side of floor	≥175mm Concrete slab		80	No		-/240/240

6 Direct Field of Application of Results

The results of this report are applicable to floors when exposed to fire from below and for walls when exposed to fire from either side.

7 Requirements

Where concrete slabs, concrete with Bondek or other steel permanent formwork, blockwork or plasterboard walls are specified in this report, it is required that they be designed, tested or assessed as a separating element for the required FRL when including the service penetration specified in Section 5.

For concrete with Bondek or other steel permanent formwork where the collar is less than 40mm from the parts of the Bondek or other steel permanent formwork carrying the structural load in the fire load case such as Figures 17 and 30, the structural adequacy of the floor system shall be evaluated by others to either verify the ribs are load-carrying in fire or ignore the ribs as contributing to structural adequacy of the floor system.

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

8 Term of Validity

The referenced assessment report will lapse on 30th June 2027. Should you wish us to re-examine the referenced assessment 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 the referenced 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.

The referenced 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.

The referenced 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 the referenced report is reviewed on or, before, the stated expiry date.

The information contained in the referenced 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 the referenced 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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