

Likely performance of CP 643-N Firestop Jackets and CP 648-S and CP 648-E Firestop Wraps in conjunction with various plastic pipe systems installed into floor systems

Assessment Report

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Client: Hilti (New Zealand) Limited

Commercial-in-confidence

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Executive summary

This report provides the re-assessment of your collar systems and wrap systems when incorporating plastic pipes and tested in accordance with AS 1530.4-1997.

Based on the test information and the performance factors detailed herein, it is the opinion of this Division that the penetration systems listed in Table 1 (Appendix B) would be capable of achieving the stated fire-resistance levels if tested in accordance with AS 1530.4-1997 and AS 4072.1-1992 when installed into a concrete slab system of nominated minimum thickness provided that the pipe is not of sandwich construction and is manufactured in accordance with the standards listed herein or equivalent.

Additionally, it is also the opinion of the Division that the penetration systems listed in Table 2 (Appendix B) would be capable of achieving the stated fire-resistance levels if tested in accordance with AS 1530.4-1997 and AS 4072.1-1992 when installed as detailed in CSIRO Sponsored Investigation report numbered FSH 1028 provided that the pipe is not of sandwich construction and is manufactured in accordance with the standards listed above or equivalent.

Likely performance of CP 643-N Firestop Jackets and CP 648-S and CP 648-E Firestop Wraps in conjunction with various plastic pipe systems installed into floor systems

1 Introduction

This report provides the re-assessment of your collar systems and wrap systems when incorporating plastic pipes and tested in accordance with AS 1530.4-1997.

2 Supporting Data

Refer Appendix A

3 Proposal

Your proposal is to establish the likely fire performance of CP 643-N Firestop Jackets and CP 648-S and CP 648-E Firestop Wraps used in conjunction with various plastic pipes installed into concrete floors.

4 Analysis

The critical factors that affect the fire performance of plastic pipe penetrations as noted in AS/NZS 4072.1-1992 are the pipe material, the pipe diameter and the pipe wall thickness. Other critical factors are the diameter of the collar, the type of intumescent and the ratio of the intumescent material to the enclosed area of the collar. The use of the same collar and the same pipe material eliminates most of the performance effecting variations and therefore only the pipe diameter and wall thickness need to be considered.

Tables 4-9 (Appendix B) lists the penetration systems tested along with the additional systems requiring assessment (indicated in yellow). Addressing the performance requirements of the system it is considered that if the same collar is used to protect penetrations incorporating plastic pipes of the same material of maximum dimensions and minimum dimensions and both achieve the same fire-resistance levels then the same fire-resistance levels can be assigned to plastic pipes of the same material whose dimension fall between those of the tested systems.

Additionally the consistency of performance can be taken into account in that if the protection achieves the same result over a relatively extensive range of pipes of the same material then interpolation between the tests may be possible. These criteria are satisfied by all of the proposed systems listed above.

Additionally, as part of the test programme, you installed five wall and five floor penetrations incorporating variously sized PVC pipes protected by your CP 648 Firestop wraps. The testing was conducted using your CP 648-E system in which a continuous wrap is wound spirally around the pipe to provide the specified number of layers. An alternative is to use a series of single discrete strips cut to length equivalent to the diameter of the pipe or the previous wrap layer. This system is designated CP 648-S Firestop wraps and would provide equivalent or marginally more intumescent material and therefore would not detrimentally affect the established fire performance if the CP 648-E was replaced with the CP 648-S system.

5 Conclusion

Based on the test information and the performance factors detailed herein, it is the opinion of this Division that the penetration systems listed in Table 1 (Appendix B) would be capable of achieving the stated fire-resistance levels if tested in accordance with AS 1530.4-1997 and AS 4072.1-1992 when installed into a concrete slab system of nominated minimum thickness provided that the pipe is not of sandwich construction and is manufactured in accordance with the standards listed herein or equivalent.

Additionally, it is also the opinion of the Division that the penetration systems listed below would be capable of achieving the stated fire-resistance levels if tested in accordance with AS 1530.4-1997 and AS 4072.1-1992 when installed as detailed in FSH 1028 provided that the pipe is not of sandwich construction and is manufactured in accordance with the standards listed above or equivalent.

6 Term of validity

This assessment report will lapse on 30 April 2021. 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.

Appendix A

Warrington Fire Research test reports numbered 128947/A and 128949/A

On 13 and 20 March 2003 Warrington Fire Research UK conducted full-scale fire-resistance tests on nineteen penetration systems incorporating your variously sized CP 643-N Firestop jackets protecting plastic pipes penetrating lightweight concrete block walls. The testing was conducted using the heating conditions specified in BS EN 1363-1:1999 in conjunction with additional guidelines taken from prEN 1366-3:2002 and the performance criteria of BS 476 Part 20:1987. A summary of the test installation is tabulated below.

Pipe Material	Pipe Diameter (mm)	Pipe Wall Thickness (mm)	Wall Thickness (mm)	Collar Reference	Specimen Designation
PE	50	3.2	150	CP 643 50/1.5" N	E
PVC	50	2.4	150	CP 643 50/1.5" N	F
PVC	40	1.9	150	CP 643 50/1.5" N	G
ABS	110	7.1	150	CP 643 110/4" N	H
PE	160	4.6	150	CP 643 160/6" N	I
PE	110	3.0	150	CP 643 110/4" N	J
PVC	110	3.7	150	CP 643 110/4" N	K
PE	110	2.7	150	CP 643 110/4" N	L
ABS	160	11.0	150	CP 643 160/6" N	M
PE	160	4.0	150	CP 643 160/6" N	Q
PVC	160	4.7	150	CP 643 160/6" N	R
PVC	160	4.7	150	CP 643 160/6" N	S
PVC	160	11.0	100	CP 643 160/6" N	A
ABS	110	7.0	100	CP 643 110/4" N	B
PVC	40	2.2	100	CP 643 50/1.5" N	C
PE	160	4.0	100	CP 643 160/6" N	H
PE	110	3.1	100	CP 643 110/4" N	I
PVC	160	4.7	100	CP 643 160/6" N	O
PVC	110	3.2	100	CP 643 110/4" N	P

The test results can thus be summarised.

Specimen	Integrity (minutes)	Insulation (minutes)	Equivalent FRL
E	245	245	-/240/240
F	245	245	-/240/240
G	245	245	-/240/240
H	245	241	-/240/240
I	245	245	-/240/240
J	245	245	-/240/240
K	245	245	-/240/240
L	245	242	-/240/240
M	123	122	-/120/120
Q	245	245	-/240/240
R	245	245	-/240/240
S	245	245	-/240/240
A	115	115	-/90/90
B	180	170	-/180/120
C	180	180	-/180/180
H	180	180	-/180/180
I	180	180	-/180/180
O	180	180	-/180/180
P	180	180	-/180/180

Warrington Fire Research test report numbered 131014/A

On 1 May 2003 Warrington Fire Research UK conducted a full-scale fire-resistance test on nineteen penetration systems incorporating your variously sized CP 643-N Firestop jackets protecting plastic pipes penetrating an aerated concrete floor slab. The testing was conducted using the heating conditions specified in BS EN 1363-1:1999 in conjunction with additional guidelines taken from pr EN 1366-3:2002 and the performance criteria of BS 476 Part 20:1987. A summary of the test installation is tabulated below.

Pipe Material	Pipe Diameter (mm)	Pipe Wall Thickness (mm)	Floor Thickness (mm)	Collar Reference	Specimen Designation
PE	110	2.7	150	CP 643 110/4" N	M
ABS	110	6.6	150	CP 643 110/4" N	N
ABS	160	10.45	150	CP 643 160/6" N	O
PVC	160	4.7	150	CP 643 160/6" N	P
PVC	110	3.2	150	CP 643 110/4" N	Q
PVC	50	2.4	150	CP 643 50/1.5" N	R
PVC	50	2.4	150	CP 643 50/1.5" N	S
PE	160	4.0	150	CP 643 160/6" N	T
PE	160	4.0	150	CP 643 160/6" N	U
PE	110	2.7	150	CP 643 110/4" N	V
PE	50	2.9	150	CP 643 50/1.5" N	W
PE	50	2.9	150	CP 643 50/1.5" N	X
ABS	160	10.45	150	CP 643 160/6" N	Y

The test results can thus be summarised.

Specimen	Integrity (minutes)	Insulation (minutes)	Equivalent FRL
M	245	245	-/240/240
N	215	213	-/180/180
O	245	245	-/240/240
P	214	190	-/180/180
Q	245	245	-/240/240
R	245	245	-/240/240
S	245	245	-/240/240
T	245	245	-/240/240
U	64	64	-/60/60
V	245	245	-/240/240
W	245	245	-/240/240
X	245	245	-/240/240

CSIRO Sponsored Investigation report numbered FSV 1025

On 18 December 2003, this Division conducted a full-scale fire-resistance test in accordance with AS 1530.4-1997 and AS 4072.1-1992 on a plasterboard-lined framed wall system incorporating eighteen pipe penetrations. The systems are summarised in the table below.

All of the pipes penetrated into the furnace by 100 mm and extended out by at least 2000 mm on the unexposed face of the wall. The pipes were supported at points 500 mm and 1500 mm from the unexposed face of the wall.

Pipe Material	Pipe Diameter (mm)	Pipe Wall Thickness (mm)	Nom Wall Width (mm)	Collar Reference	Specimen designation
PVC	40	2.0	115	CP 643 50/1.5" N	1
PVC	50	2.2	115	CP 643 63/2" N	2
PVC	65	2.7	115	CP 643 75/2.5" N	3
PVC	80	2.9	115	CP 643 90/3" N	4
PVC	100**	3.2	115	CP 643 110/4" N	5
PVC	150	4.5	115	CP 643 160/6" N	6
HDPE	50	3.0	115	CP 643 50/1.5" N	7
HDPE	56	3.0	115	CP 643 63/2" N	8
HDPE-Silent	56	3.2	115	CP 643 63/2" N	9
HDPE	75	3.0	115	CP 643 75/2.5" N	10
HDPE	90	3.5	115	CP 643 90/3" N	11
HDPE	110	4.3	115	CP 643 110/4" N	12
HDPE	160	6.2	115	CP 643 160/6" N	13
PVC	40	2.0	115	CP 648-E (1 layer)	14
PVC	65	2.7	115	CP 648-E (1 layer)	15
PVC	80	2.9	115	CP 648-E (2 layer)	16
PVC	100**	3.2	115	CP 648-E (2 layer)	17
PVC	150	4.5	115	CP 648-E (3 layer)	18

Note: ** = PVC sandwich type construction

The results from this test can be summarised as below. (NF = No failure)

Specimen	Integrity (minutes)	Insulation (minutes)	FRL
1	120 (NF)	114	-/120/90
2	120 (NF)	120 (NF)	-/120/120
3	120 (NF)	115	-/120/90
4	120 (NF)	108	-/120/90
5	120 (NF)	120 (NF)	-/120/120
6	120 (NF)	120 (NF)	-/120/120
7	120 (NF)	120 (NF)	-/120/120
8	120 (NF)	120 (NF)	-/120/120
9	120 (NF)	120 (NF)	-/120/120
10	120 (NF)	106	-/120/90
11	120 (NF)	97	-/120/90
12	120 (NF)	116	-/120/90
13	120 (NF)	120 (NF)	-/120/120
14	120 (NF)	120 (NF)	-/120/120
15	111	111	-/90/90
16	120 (NF)	120 (NF)	-/120/120
17	7	7	-/0/0
18	6	6	-/0/0

CSIRO Sponsored Investigation report numbered FSV 1028

On 10 January 2004, this Division conducted a full-scale fire-resistance test in accordance with AS 1530.4-1997 and AS 4072.1-1992 on a 150-mm thick concrete slab system incorporating twenty six pipe penetrations. The systems are summarised in the table below.

All of the pipes penetrated into the furnace by 100 mm and extended out by at least 2000 mm on the unexposed face of the slab. The pipes were supported at points 500 mm and 1500 mm from the unexposed face of the slab.

Pipe Material	Pipe Diameter (mm)	Pipe Wall Thickness (mm)	Slab Width (mm)	Collar Reference/Protection	Specimen designation
PVC	40	2.0	150	CP 643 50/1.5" N	1
PVC	50	2.2	150	CP 643 63/2" N	2
PVC	65	2.7	150	CP 643 75/2.5" N	3
PVC	80	2.9	150	CP 643 90/3" N	4
PVC	100**	3.2	150	CP 643 110/4" N	5
PVC	150	4.5	150	CP 643 160/6" N	6
HDPE	50	3.0	150	CP 643 50/1.5" N	7
HDPE	56	3.0	150	CP 643 63/2" N	8
HDPE Silent	56	3.2	150	CP 643 63/2" N	9
HDPE	75	3.0	150	CP 643 75/2.5" N	10
HDPE	90	3.5	150	CP 643 90/3" N	11
HDPE	110	4.3	150	CP 643 110/4" N	12
HDPE	160	6.2	150	CP 643 160/6" N	13
PE	110	11.0	150	CP 643 110/4" N	14
HDPE	160	6.2	150	CP 643 160/6" N	15
PP Silere	58	4.2	150	CP 643 75/2.5" N	16
PP Silere	78	4.5	150	CP 643 110/4" N	17
PVC	40	2.0	150	CP 648-E (1 layer)	18
PVC	65	2.7	150	CP 648-E (1 layer)	19
PVC	80	2.9	150	CP 648-E (2 layers)	20
PVC	100**	3.2	150	CP 648-E (2 layers)	21
PVC	150	4.5	150	CP 648-E (3 layers)	22
PVC Electrical Conduit+cables	16	-	150	CP 611 A	23
PVC Electrical Conduit+cables	50	-	150	CP 611 A	24
Electrical cables	3 x 2.5mm ²	-	150	CP 611 A	25
Electrical cables	Bundle x 2.5mm ²	-	150	CP 611 A	26

Note: ** = PVC sandwich type construction

The results from this test can be summarised as below. (NF = No failure)

Specimen	Integrity (minutes)	Insulation (minutes)	FRL
1	240 (NF)	240 (NF)	-/240/240
2	240 (NF)	240 (NF)	-/240/240
3	240 (NF)	240 (NF)	-/240/240
4	240 (NF)	240 (NF)	-/240/240
5	240 (NF)	240 (NF)	-/240/240
6	240 (NF)	240 (NF)	-/240/240
7	240 (NF)	240 (NF)	-/240/240
8	240 (NF)	240 (NF)	-/240/240
9	240 (NF)	240 (NF)	-/240/240
10	240 (NF)	240 (NF)	-/240/240
11	240 (NF)	240 (NF)	-/240/240
12	238	239	-/180/180
13	134	135	-/120/120
14	240 (NF)	240 (NF)	-/240/240
15	240 (NF)	6	-/240/0
16	240 (NF)	240 (NF)	-/240/240
17	11	12	-/0/0
18	240 (NF)	240 (NF)	-/240/240
19	240 (NF)	240 (NF)	-/240/240
20	240 (NF)	240 (NF)	-/240/240
21	162	162	-/120/120
22	93	92	-/90/90
23	240 (NF)	240 (NF)	-/240/240
24	240 (NF)	229	-/240/180
25	240 (NF)	220	-/240/180
26	240 (NF)	204	-/240/180

Appendix B

Table 1

Pipe Material	Mounting	Nominal Pipe Diameter (mm)	Nominal Pipe Wall Thickness (mm)	Minimum Floor Thickness (mm)	Collar Reference/ Protection	FRL
PVC	Surface	32	1.9	150	CP 643 50/1.5" N	-/240/240
PVC	Surface	40	2.0	150	CP 643 50/1.5" N	-/240/240
PVC	Surface	50	2.2	150	CP 643 63/2" N	-/240/240
PVC	Surface	65	2.7	150	CP 643 75/2.5" N	-/240/240
PVC	Surface	80	2.9	150	CP 643 90/3" N	-/240/240
PVC	Surface	100	3.2	150	CP 643 110/4" N	-/240/240
PVC	Surface	100**	3.2	150	CP 643 110/4" N	-/240/240
PVC	Surface	150	4.5	150	CP 643 160/6" N	-/240/240
PVC	Surface	32 + elbow flange	1.9	150	CP 643 50/1.5" N	-/240/240
PVC	Surface	40 + elbow flange	2.0	150	CP 643 50/1.5" N	-/240/240
PVC	Surface	50 + elbow flange	2.2	150	CP 643 63/2" N	-/240/240
PVC	Surface	65 + elbow flange	2.7	150	CP 643 75/2.5" N	-/240/240
PVC	Surface	80 + elbow flange	2.9	150	CP 643 90/3" N	-/240/240
PVC	Surface	100 + elbow flange	3.2	150	CP 643 110/4" N	-/240/240
PVC	Surface	100** + elbow flange	3.2	150	CP 643 110/4" N	-/240/240
PVC	Surface	150 + elbow flange	4.5	150	CP 643 160/6" N	-/240/240
PVC	Flush	32	1.9	150	CP 643 50/1.5" N	-/240/240
PVC	Flush	40	2.0	150	CP 643 50/1.5" N	-/240/240
PVC	Flush	50	2.2	150	CP 643 63/2" N	-/240/240
PVC	Flush	65	2.7	150	CP 643 75/2.5" N	-/240/240
PVC	Flush	80	2.9	150	CP 643 90/3" N	-/240/240
PVC	Flush	100	3.2	150	CP 643 110/4" N	-/240/240
PVC	Flush	100**	3.2	150	CP 643 110/4" N	-/240/240
PVC	Flush	150	4.5	150	CP 643 160/6" N	-/180/180
PVC	Flush	32	1.9	150	CP 648-E (1 layer)	-/240/240
PVC	Flush	40	2.0	150	CP 648-E (1 layer)	-/240/240
PVC	Flush	50	2.2	150	CP 648-E (1 layer)	-/240/240
PVC	Flush	65	2.7	150	CP 648-E (1 layer)	-/240/240
PVC	Flush	80	2.9	150	CP 648-E (2 layer)	-/240/240
PVC	Flush	100	3.2	150	CP 648-E (2 layer)	-/120/120
PVC	Flush	100**	3.2	150	CP 648-E (2 layer)	-/120/120
PVC	Flush	150	4.5	150	CP 648-E (3 layer)	-/90/90

Table 1 (cont'd)

Pipe Material	Mounting	Nominal Pipe Diameter (mm)	Nominal Pipe Wall Thickness (mm)	Minimum Floor Thickness (mm)	Collar Reference/ Protection	FRL
PVC	Flush	32	1.9	150	CP 648-S-50/1.5"	-/240/240
PVC	Flush	40	2.0	150	CP 648-S-50/1.5"	-/240/240
PVC	Flush	50	2.2	150	CP 648-S-63/2"	-/240/240
PVC	Flush	65	2.7	150	CP 648-S-75/2.5"	-/240/240
PVC	Flush	80	2.9	150	CP 648-S-90/3"	-/240/240
PVC	Flush	100	3.2	150	CP 648-S-110/4"	-/120/120
PVC	Flush	100**	3.2	150	CP 648-S-110/4"	-/120/120
PVC	Flush	150	4.5	150	CP 648-S-160/6"	-/90/90
HDPE	Surface	50	3.0	150	CP 643 50/1.5" N	-/240/240
HDPE	Surface	56	3.0	150	CP 643 63/2" N	-/240/240
HDPE	Surface	63	3.0	150	CP 643 63/2" N	-/240/240
HDPE	Surface	75	3.0	150	CP 643 75/2.5" N	-/240/240
HDPE	Surface	90	3.5	150	CP 643 90/3" N	-/240/240
HDPE	Surface	110	4.3	150	CP 643 110/4" N	-/180/180
HDPE	Surface	160	6.2	150	CP 643 160/6" N	-/120/120
HDPE Silent	Surface	56	3.2	150	CP 643 63/2" N	-/240/240
HDPE Silent	Surface	63	3.2	150	CP 643 63/2" N	-/240/240
PE	Surface	50	2.9	150	CP 643 50/1.5" N	-/240/240
PE	Surface	63	2.7-4.0	150	CP 643 63/2" N	-/240/240
PE	Surface	75	2.7-4.0	150	CP 643 75/2.5" N	-/240/240
PE	Surface	90	2.7-4.0	150	CP 643 90/3" N	-/240/240
PE	Surface	110	2.7	150	CP 643 110/4" N	-/240/240
PE	Surface	160	4.0	150	CP 643 160/6" N	-/240/240
PE	Flush	50	2.9	150	CP 643 50/1.5" N	-/240/240
PE	Flush	63	2.7-4.0	150	CP 643 63/2" N	-/240/240
PE	Flush	75	2.7-4.0	150	CP 643 75/2.5" N	-/240/240
PE	Flush	90	2.7-4.0	150	CP 643 90/3" N	-/240/240
PE	Flush	110	2.7	150	CP 643 110/4" N	-/240/240
PE	Flush	160	4.0	150	CP 643 160/6" N	-/60/60

Note: ** = PVC sandwich type construction

Table 2

Mounting	Penetration	Hole Diameter (mm)	Min. Floor Thickness (mm)	Protection	FRL
Flush	PVC electrical conduit 16mm to 50mm dia., filled with cables	2x Conduit dia.	150	CP 611A Intumescent mastic: Top 10mm, Bottom 30mm	-/240/180
Flush	Electrical cables ,max. 50% of penetration	32 to 100	150	CP 611A Intumescent mastic: Top 10mm, Bottom 30mm	-/240/180

Table 3 – National Standard for manufacture of pipes

Pipe	Standard
PP-R	DIN 8077/8078
PVC PN12	AS/NZS 1477
PP	DIN 8077/8078
PE	DIN 8074/8075
PP (Silere)	DIN 19560-DIN 4102
HDPE	PE80 Spec No. 005 UC No. W231
HDPE Silent	Geberit Silent
PVC	AS/NZS 1260

Table 4 - PVC – CP 643 N Firestop Jackets

Element	Mounting	Pipe Diameter (mm)	Nominal Pipe wall thickness (mm)	Min. Wall/ Slab thickness (mm)	Collar Reference	FRL
Floor	Surface	32	1.9	150	CP 643 50/1.5" N	-/240/240
Floor	Flush	32	1.9	150	CP 643 50/1.5" N	-/240/240
Floor	Surface	32+ elbow flange	1.9	150	CP 643 50/1.5" N	-/240/240
Wall (Bl)	Surface	40	1.9	150	CP 643 50/1.5" N	-/240/240
Wall (Pl)	Surface	40	2.0	115	CP 643 50/1.5" N	-/120/90
Floor	Surface	40	2.0	150	CP 643 50/1.5" N	-/240/240
Wall (Bl)	Surface	40	2.2	100	CP 643 50/1.5" N	-/180/180
Floor	Surface	40+ elbow flange	2.0	150	CP 643 50/1.5" N	-/240/240
Floor	Flush	40	2.0	150	CP 643 50/1.5" N	-/240/240
Wall (Bl)	Flush	50	2.4	150	CP 643 50/1.5" N	-/240/240
Floor	Flush	50	2.4	150	CP 643 50/1.5" N	-/240/240
Floor	Surface	50	2.4	150	CP 643 50/1.5" N	-/240/240
Wall (Pl)	Surface	50	2.2	115	CP 643 63/2" N	-/120/120
Floor	Surface	50	2.2	150	CP 643 63/2" N	-/240/240
Floor	Flush	50	2.2	150	CP 643 63/2" N	-/240/240
Floor	Surface	50+ elbow flange	2.2	150	CP 643 63/2" N	-/240/240
Wall (Pl)	Surface	65	2.7	115	CP 643 75/2.5" N	-/120/90
Floor	Surface	65	2.7	150	CP 643 75/2.5" N	-/240/240
Floor	Flush	65	2.7	150	CP 643 75/2.5" N	-/240/240
Floor	Surface	65+ elbow flange	2.7	150	CP 643 75/2.5" N	-/240/240
Wall (Pl)	Surface	80	2.9	115	CP 643 90/3" N	-/120/90
Floor	Surface	80	2.9	150	CP 643 90/3" N	-/240/240
Floor	Flush	80	2.9	150	CP 643 90/3" N	-/240/240
Floor	Surface	80+ elbow flange	2.9	150	CP 643 90/3" N	-/240/240
Wall (Pl)	Surface	100**	3.2	115	CP 643 110/4" N	-/120/120
Wall (Pl)	Surface	100	3.2	115	CP 643 110/4" N	-/120/120
Floor	Flush	100**	3.2	150	CP 643 110/4" N	-/240/240
Floor	Flush	100**	3.2	150	CP 643 110/4" N	-/240/240
Floor	Surface	100+ elbow flange	3.2	150	CP 643 110/4" N	-/240/240
Floor	Surface	100**+ elbow flange	3.2	150	CP 643 110/4" N	-/240/240
Wall (Bl)	Surface	110	3.7	150	CP 643 110/4" N	-/240/240
Wall (Bl)	Surface	110	3.2	100	CP 643 110/4" N	-/180/180
Floor	Flush	110	3.2	150	CP 643 110/4" N	-/240/240
Wall (Pl)	Surface	150	4.5	116	CP 643 160/6" N	-/120/120
Floor	Surface	150	4.5	150	CP 643 160/6" N	-/240/240
Floor	Surface	150+ elbow flange	4.5	150	CP 643 160/6" N	-/240/240
Wall (Bl)	Flush	160	4.7	150	CP 643 160/6" N	-/240/240
Wall (Bl)	Surface	160	4.7	150	CP 643 160/6" N	-/240/240
Wall (Bl)	Surface	160	11.0	100	CP 643 160/6" N	-/90/90
Wall (Bl)	Surface	160	4.7	100	CP 643 160/6" N	-/180/180
Floor	Flush	160	4.7	150	CP 643 160/6" N	-/180/180

Note: ** = PVC sandwich type construction

Bl = Blockwork, brickwork or concrete, Pl = Plasterboard,

Table 5 - PVC – CP 648-E and CP 648-S Firestop wraps

Element	Pipe Diameter (mm)	Pipe Wall Thickness (mm)	Wall/Slab Thickness (mm)	Protection	FRL
Wall (PI)	40	2.0	115	CP 648-E (1 layer)	-/120/120
Wall (PI)	65	2.7	115	CP 648-E (1 layer)	-/90/90
Wall (PI)	80	2.9	115	CP 648-E (2 layer)	-/120/120
Wall (PI)	100**	3.2	115	CP 648-E (2 layers)	-/0/0
Wall (PI)	150	4.5	115	CP 648-E (3 layers)	-/0/0
Floor	32	1.9	150	CP 648-E (1 layer)	-/240/240
Floor	32	1.9	150	CP 648-S-50/1.5"	-/240/240
Floor	40	2.0	150	CP 648-E (1 layer)	-/240/240
Floor	40	2.0	150	CP 648-S-50/1.5"	-/240/240
Floor	50	2.2	150	CP 648-E (1 layer)	-/240/240
Floor	50	2.2	150	CP 648-S-63/2"	-/240/240
Floor	65	2.7	150	CP 648-E (1 layer)	-/240/240
Floor	65	2.7	150	CP 648-S-75/2.5"	-/240/240
Floor	80	2.9	150	CP 648-E (2 layers)	-/240/240
Floor	80	2.9	150	CP 648-S-90/3"	-/240/240
Floor	100**	3.2	150	CP 648-E (2 layers)	-/120/120
Floor	100	3.2	150	CP 648-E (2 layers)	-/120/120
Floor	100	3.2	150	CP 648-S-110/4"	-/120/120
Floor	100**	3.2	150	CP 648-S-110/4"	-/120/120
Floor	150	4.5	150	CP 648-E (3 layers)	-/90/90
Floor	150	4.5	150	CP 648-S-160/6"	-/90/90

Note: ** = PVC sandwich type construction

PI = Plasterboard

Table 6 - HDPE – CP 643 N Firestop Jackets

Element	Mounting	Pipe Diameter (mm)	Pipe Wall thickness (mm)	Wall/slab thickness (mm)	Collar Reference	FRL
Wall (PI)	Surface	50	3.0	115	CP 643 50/1.5" N	-/120/120
Floor	Surface	50	3.0	150	CP 643 50/1.5" N	-/240/240
Wall (PI)	Surface	56	3.0	115	CP 643 63/2" N	-/120/120
Floor	Surface	56*	3.0	150	CP 643 63/2" N	-/240/240
Wall (PI)	Surface	56*	3.2	115	CP 643 63/2" N	-/120/120
Floor	Surface	56	3.2	150	CP 643 63/2" N	-/240/240
Floor	Surface	63	3.0	150	CP 643 63/2" N	-/240/240
Floor	Surface	63*	3.2	150	CP 643 63/2" N	-/240/240
Wall (PI)	Surface	75	3.0	115	CP 643 75/2.5" N	-/120/90
Floor	Surface	75	3.0	150	CP 643 75/2.5" N	-/240/240
Wall (PI)	Surface	90	3.5	115	CP 643 90/3" N	-/120/90
Floor	Surface	90	3.5	150	CP 643 90/3" N	-/240/240
Wall (PI)	Surface	110	4.3	115	CP 643 110/4" N	-/120/90
Floor	Surface	110	4.3	150	CP 643 110/4" N	-/180/180
Wall (PI)	Surface	160	6.2	115	CP 643 160/6" N	-/120/120
Floor	Surface	160	6.2	150	CP 643 160/6" N	-/120/120

Note - * HDPE – Silent pipe, PI = Plasterboard

Table 7 - PE – CP 643 N Firestop jackets

Element	Mounting	Pipe Diameter (mm)	Pipe wall thickness (mm)	Wall/slab thickness (mm)	Collar Reference	FRL
Wall (Bl)	Flush	50	2.9	150	CP 643 50/1.5" N	-/240/240
Floor	Surface	50	2.9	150	CP 643 50/1.5" N	-/240/240
Floor	Flush	50	2.9	150	CP 643 50/1.5" N	-/240/240
Floor	Surface	63	2.7-4.0	150	CP 643 63/2" N	-/240/240
Floor	Flush	63	2.7-4.0	150	CP 643 63/2" N	-/240/240
Floor	Surface	75	2.7-4.0	150	CP 643 75/2.5" N	-/240/240
Floor	Flush	75	2.7-4.0	150	CP 643 75/2.5" N	-/240/240
Floor	Surface	90	2.7-4.0	150	CP 643 90/3" N	-/240/240
Floor	Flush	90	2.7-4.0	150	CP 643 90/3" N	-/240/240
Wall (Bl)	Surface	110	3.0	150	CP 643 110/4" N	-/240/240
Wall (Bl)	Surface	110	3.1	100	CP 643 110/4" N	-/180/180
Floor	Flush	110	2.7	150	CP 643 110/4" N	-/240/240
Floor	Surface	110	2.7	150	CP 643 110/4" N	-/240/240
Wall (Bl)	Flush	110	2.7	150	CP 643 110/4" N	-/240/240
Wall (Bl)	Flush	160	4.0	150	CP 643 160/6" N	-/240/240
Wall (Bl)	Surface	160	4.0	100	CP 643 160/6" N	-/180/180
Wall (Bl)	Surface	160	4.6	150	CP 643 160/6" N	-/240/240
Floor	Surface	160	4.0	150	CP 643 160/6" N	-/240/240
Floor	Flush	160	4.0	150	CP 643 160/6" N	-/60/60

Bl = Blockwork

Table 8 - ABS – CP 643 N Firestop Jackets

Element	Mounting	Pipe Diameter (mm)	Pipe wall thickness (mm)	Wall/Slab thickness (mm)	Collar Reference	FRL
Wall (Bl)	Surface	110	7.1	150	CP 643 110/4" N	-/240/240
Wall (Bl)	Surface	160	11.0	150	CP 643 160/6" N	-/120/120
Wall (Bl)	Surface	110	7.0	100	CP 643 110/4" N	-/180/120
Floor	Surface	110	6.6	150	CP 643 110/4" N	-/180/180
Floor	Surface	160	10.45	150	CP 643 160/6" N	-/240/240
Floor	Surface	160	10.45	100	CP 643 160/6" N	-/240/240

Table 9 - Electrical Cables – CP 611A Intumescent firestop mastic

Element	Mounting	Penetration	Hole Diameter (mm)	Slab thickness (mm)	Protection	FRL
Floor	Flush	PVC electrical conduit 16mm diameter filled with cables	32	min. 150	CP 611A Intumescent Mastic	-/240/240
Floor	Flush	PVC electrical conduit 16mm to 50mm diameter., filled with cables	2x Conduit diameter	min.150	CP 611A Intumescent Mastic	-/240/180
Floor	Flush	PVC electrical conduit 50mm diameter. filled with cables	100	min 150	CP 611A Intumescent Mastic	-/240/180
Floor	Flush	Electrical cables max. 50% of penetration	32	min 150	CP 611A Intumescent Mastic	-/240/180
Floor	Flush	Electrical cables max. 50% of penetration	32 to 100	min 150	CP 611A Intumescent Mastic	-/240/180
Floor	Flush	Electrical cables max. 50% of penetration	100	min 150	CP 611A Intumescent Mastic	-/240/180

References

The following informative documents are referred to in this Report:

- | | |
|-----------------------|---|
| AS 1530.4-1997 | Methods for fire tests on building materials, components and structures Part 4: Fire-resistance tests of elements of building construction. |
| AS4072.1-1992 | Components for the protection of openings in fire-resistant separating elements. Part 1: Service penetrations and control joints. |
| BS476-20 | Fire tests on building materials and structures – Part 20: Method for determination of the fire resistance of elements of construction (general principles) |
| BS EN 1363-1 | Fire resistance tests – Part 1: General requirements |
| 128947/A and 128949/A | Warrington Fire Research reports for tests conducted on 13 and 20 March 2003. |
| 131014/A | Warrington Fire Research report for test conducted on 1 May 2003. |
| FSV 1025 | CSIRO Sponsored Investigation report on test conducted on 18 December 2003. |
| FSV 1028 | CSIRO Sponsored Investigation report on test conducted on 10 January 2004. |

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