

Exova Warringtonfire
Holmesfield Road
Warrington
WA1 2DS
United Kingdom

T : +44 (0) 1925 655 116
F : +44 (0) 1925 655 419
E : warrington@exova.com
W: www.exova.com



Testing. Advising. Assuring.

Title:

Classification of Fire
Resistance Performance
In Accordance With
EN 13501-2: 2007 +
A1: 2009

Notified Body No:

0833

Product Name:

Firebreak 120 Pipe
Wraps

Report No:

309853/A

Issue No:

1

Prepared for:

**Neutron Fire
Technologies Ltd.**

Shire Hall
Quay Street
Lostwithiel
Cornwall
PL22 0BS

Date:

22nd July 2011

1. Introduction

This classification report defines the classification assigned to the element 'Firebreak 120 Pipe Wraps' in accordance with the procedures given in BS EN 13501-2: 2007 + A1: 2009.

2. Details of classified product

2.1 General

The element 'Firebreak 120 Pipe Wraps' is defined as a fire resisting penetration sealing system to be used to reinstate the performance of walls and floors.

2.2 Product description

The product, 'Firebreak 120 Pipe Wraps', is fully described in the test reports provided in support of classification detailed in Clause 3.1.

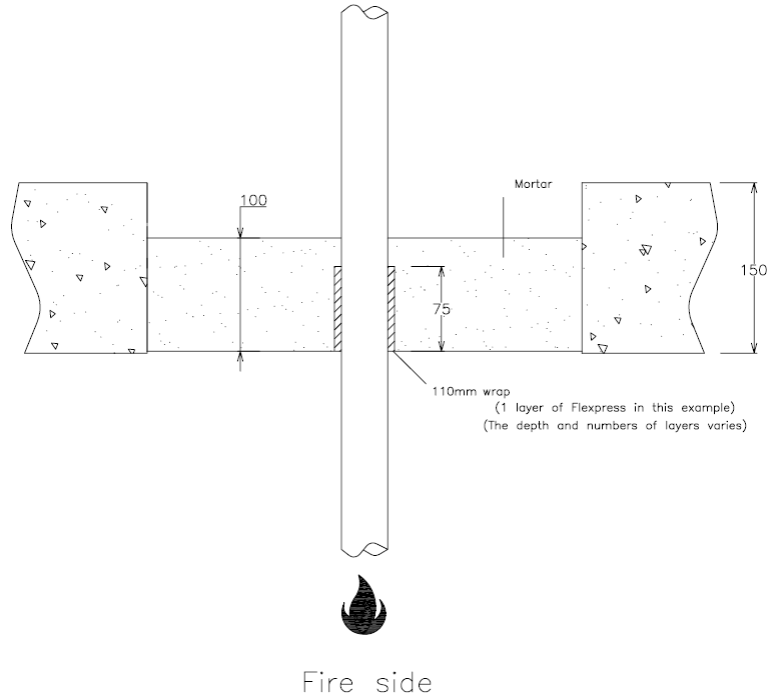
3. Test reports in support of classification

3.1 Summary of test reports

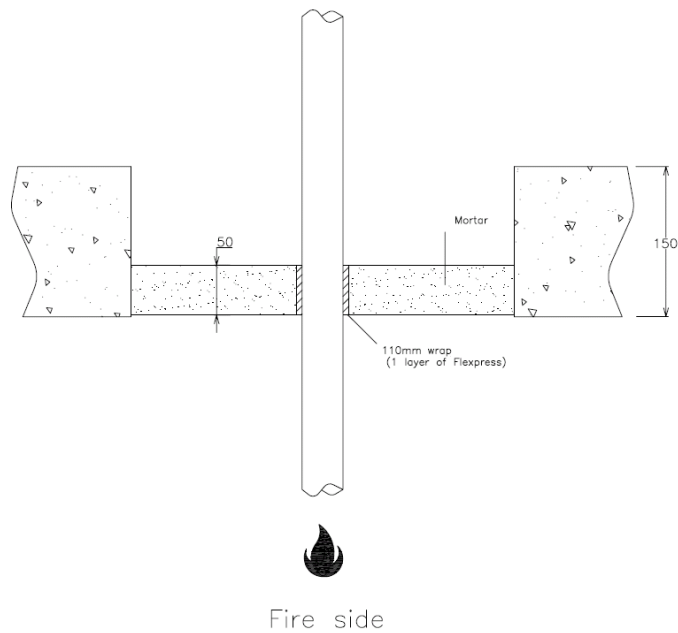
Name of laboratory	Name of sponsor	Test report no.	Test method
Chiltern Internation Fire - Notified Body No. 1314	Information held on file	Chilt/RF06163	BS EN 1366-3: 2004
		Chilt/IF07017	
SINTEF ABL as - Notified Body No. 1084		Project No. 103080.27A	NS EN 1366-3: 2004
		Project No. 103080.27B	
		Project No. 103080.17B	
BRE Testing - Notified Body No. 0832			227814

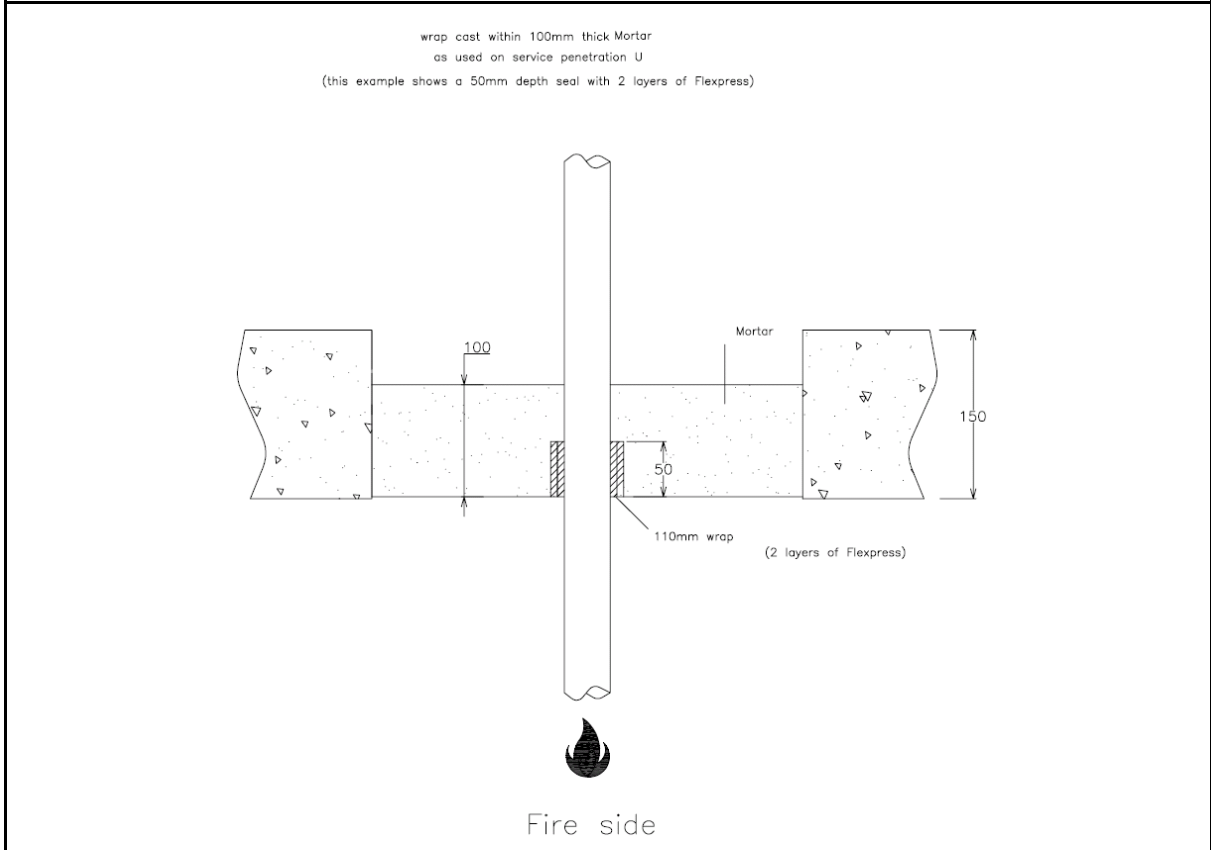
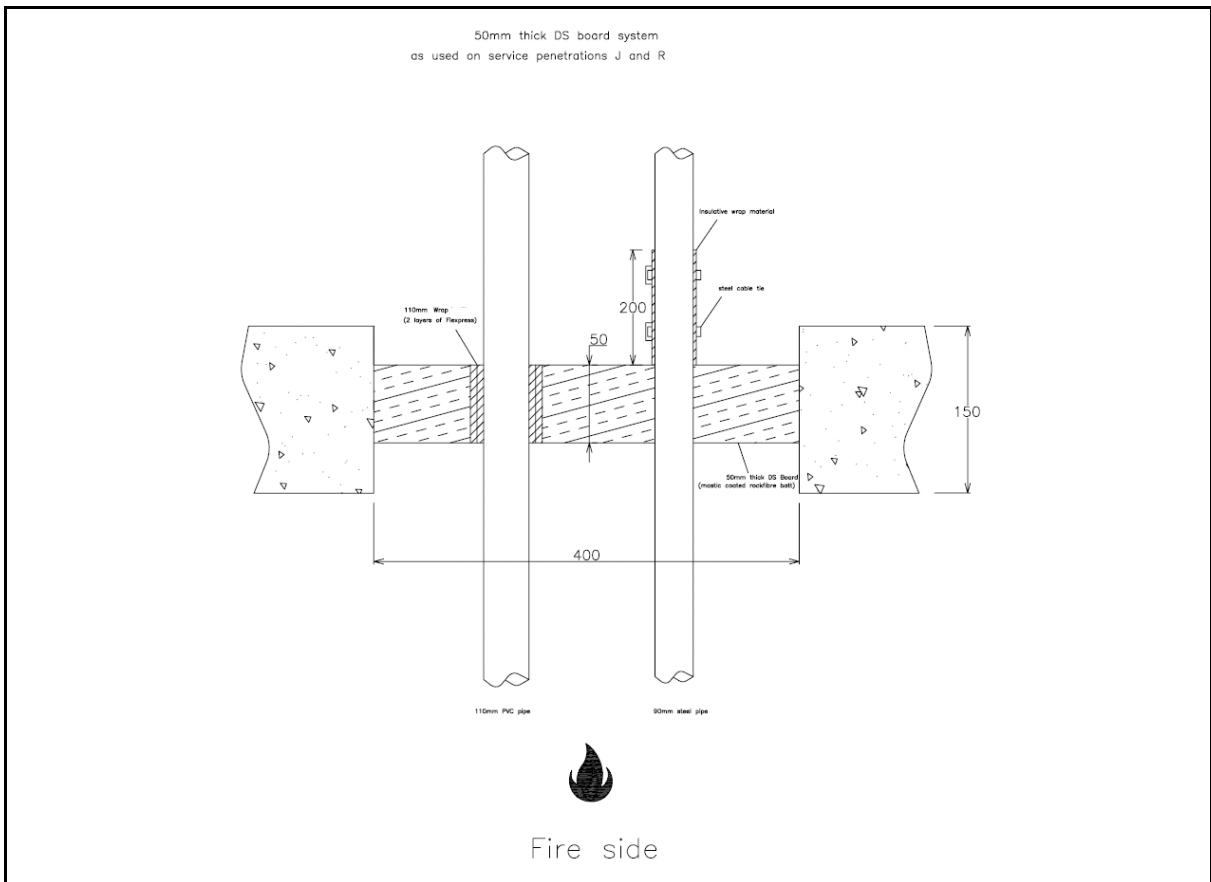
Summary of Chilt/RF06163

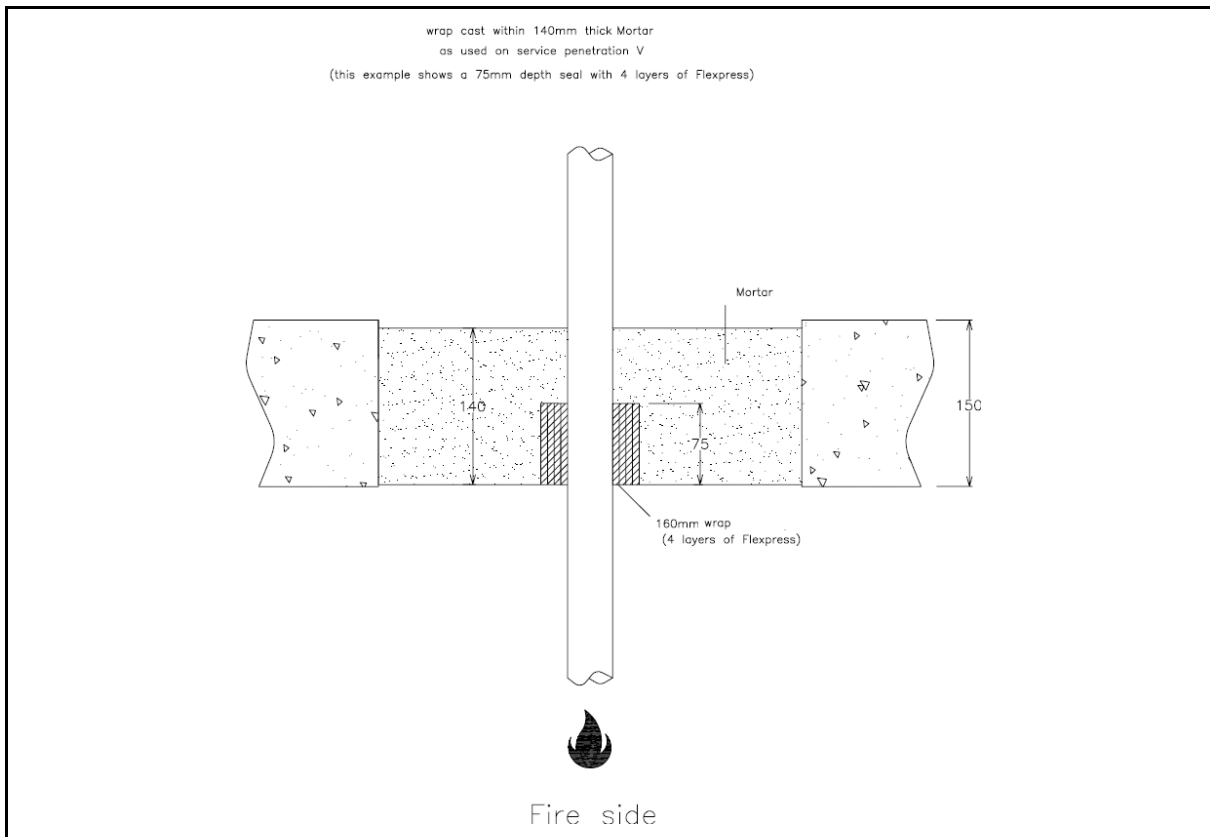
110mm wrap cast within 100mm thick Mortar
as used on service penetrations A, B, C, D, E and Q
(this example shows a 75mm depth seal with 1 layer of Flexpress
as used in service penetration E)



110mm wrap cast within 50mm thick mortar
as used on service penetration N





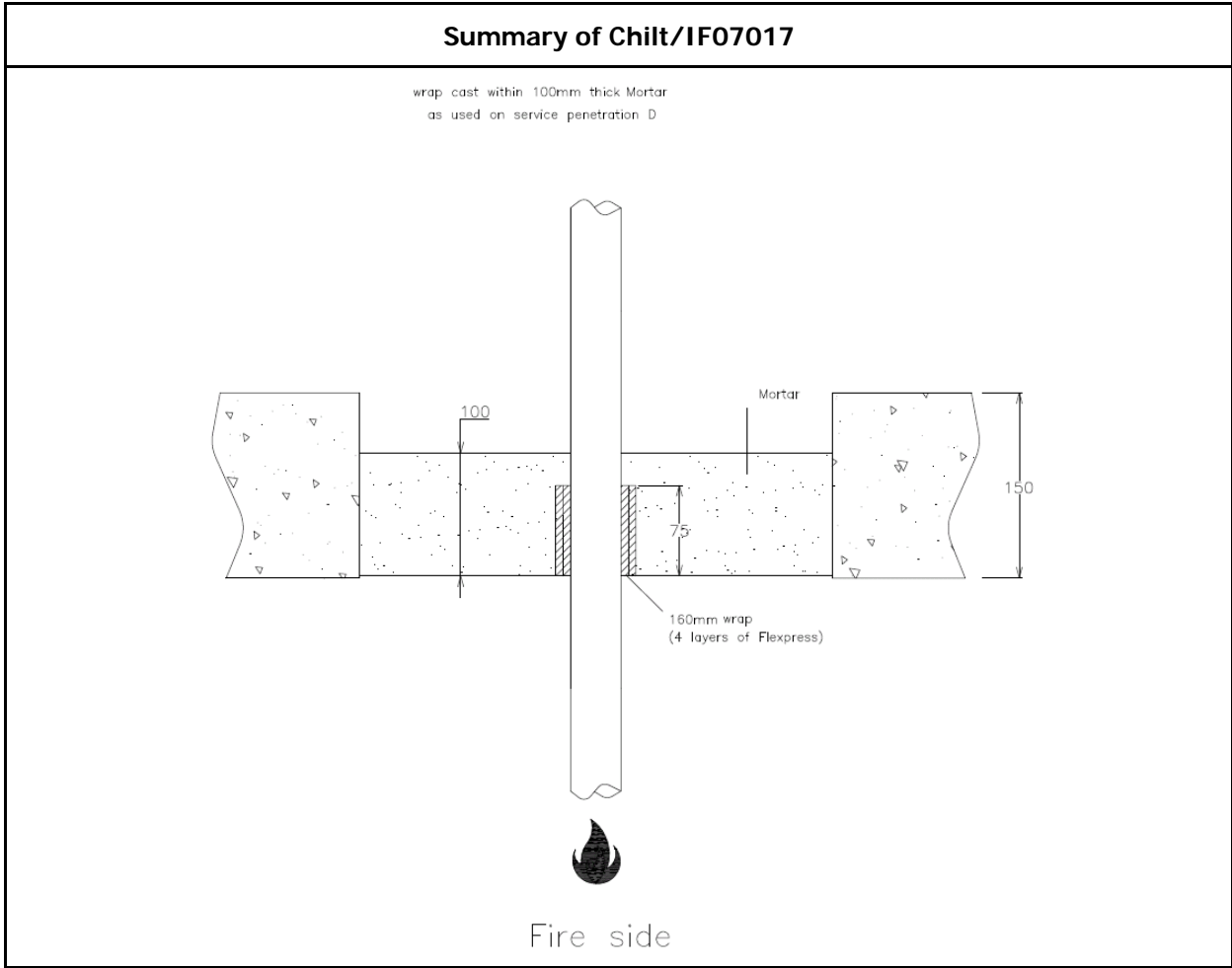


Specimen	Product	Approx. seal wall thickness	Approx. seal depth	Pipe material	Service diameter	Pipe wall thickness	Aperture size/diameter
A	125 mm pipe wrap cast within 100 mm thick FR mortar	4 mm (2 layers of Flexpress 100*)	75 mm (depth of wrap)	PE	125 mm	4.9 mm	250 x 250 (square)
B	125 mm pipe wrap cast within 100 mm thick FR mortar	6 mm (3 layers of Flexpress 100*)	75 mm (depth of wrap)	PE	125 mm	4.9 mm	250 x 250 (square)
C	160 mm pipe wrap cast within 100 mm thick FR mortar	6 mm (3 layers of Flexpress 100*)	75 mm (depth of wrap)	PVC	160 mm	4 mm	300 x 300 (square)
D	160 mm pipe wrap cast within 100 mm thick FR mortar	8 mm (4 layers of Flexpress 100*)	75 mm (depth of wrap)	PVC	160 mm	4 mm	300 x 300 (square)

E	110 mm pipe wrap cast within 100 mm thick FR mortar	2 mm (1 layers of Flexpress 100*)	75 mm (depth of wrap)	PVC	110 mm	3.4 mm	200 x 200 (square)
N	110 mm pipe wrap cast within 100 mm thick FR mortar	2 mm (1 layers of Flexpress 100*)	75 mm (depth of wrap)	PE	110 mm	3.4 mm	200 x 200 (square)
Q	250 mm pipe wrap cast within 100 mm thick FR mortar	14 mm (7 layers of Flexpress 100*)	75 mm (depth of wrap)	PE	250 mm	7.8 mm	400 x 400 (square)
R (fitted with J)	110 mm pipe wrap fitted through a 50 mm thick mastic coated rock fibre batt	4 mm (2 layers of Flexpress 100*)	50 mm (depth of wrap)	PVC	110 mm	3.4 mm	400 x 400 (square)
U	110 mm pipe wrap cast within 100 mm thick FR mortar	4 mm (2 layers of Flexpress 100*)	50 mm (depth of wrap)	Bundle of 14 mm cables (approx. 38 cables)	110 mm	-	200 x 200 (square)
V	160 mm pipe wrap cast within 140 mm thick FR mortar	8 mm (4 layers of Flexpress 100*)	75 mm (depth of wrap)	Bundle of 14 mm cables (approx. 76 cables)	160 mm	-	300 x 300 (square)

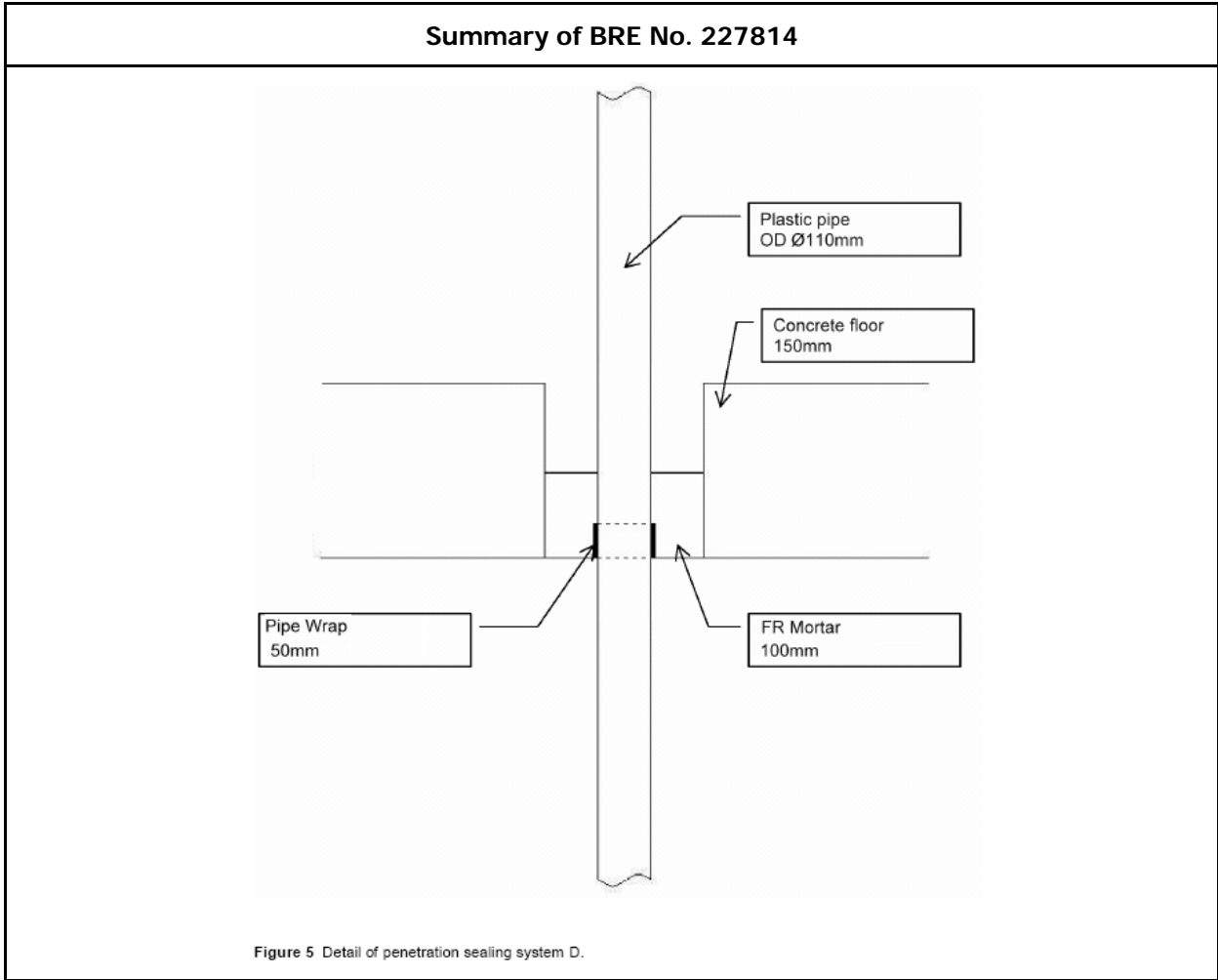
* Flexpress 100 is a 2 mm thick graphite based intumescent sheet material.

Specimen	Integrity (mins)			Insulation (mins)
	Cotton pad	Gap gauge	Sustained flames	
A	241	241	241	209
B	225	225	225	197
C	217	217	217	216
D	241	241	241	240
E	190	190	190	190
N	84	84	84	82
Q	228	228	228	228
R	91	91	91	91
U	241	241	241	241
V	241	241	241	241



Specimen	Product	Approx. seal wall thickness	Approx. seal depth	Pipe material	Service diameter	Pipe wall thickness	Aperture size/diameter
D	160 mm pipe wrap cast within 100 mm thick FR mortar and flush with the exposed face	8 mm (4 layers of Flexpress 100*)	75 mm (depth of wrap)	PE	160 mm	6.2 mm	200 x 200 (square)

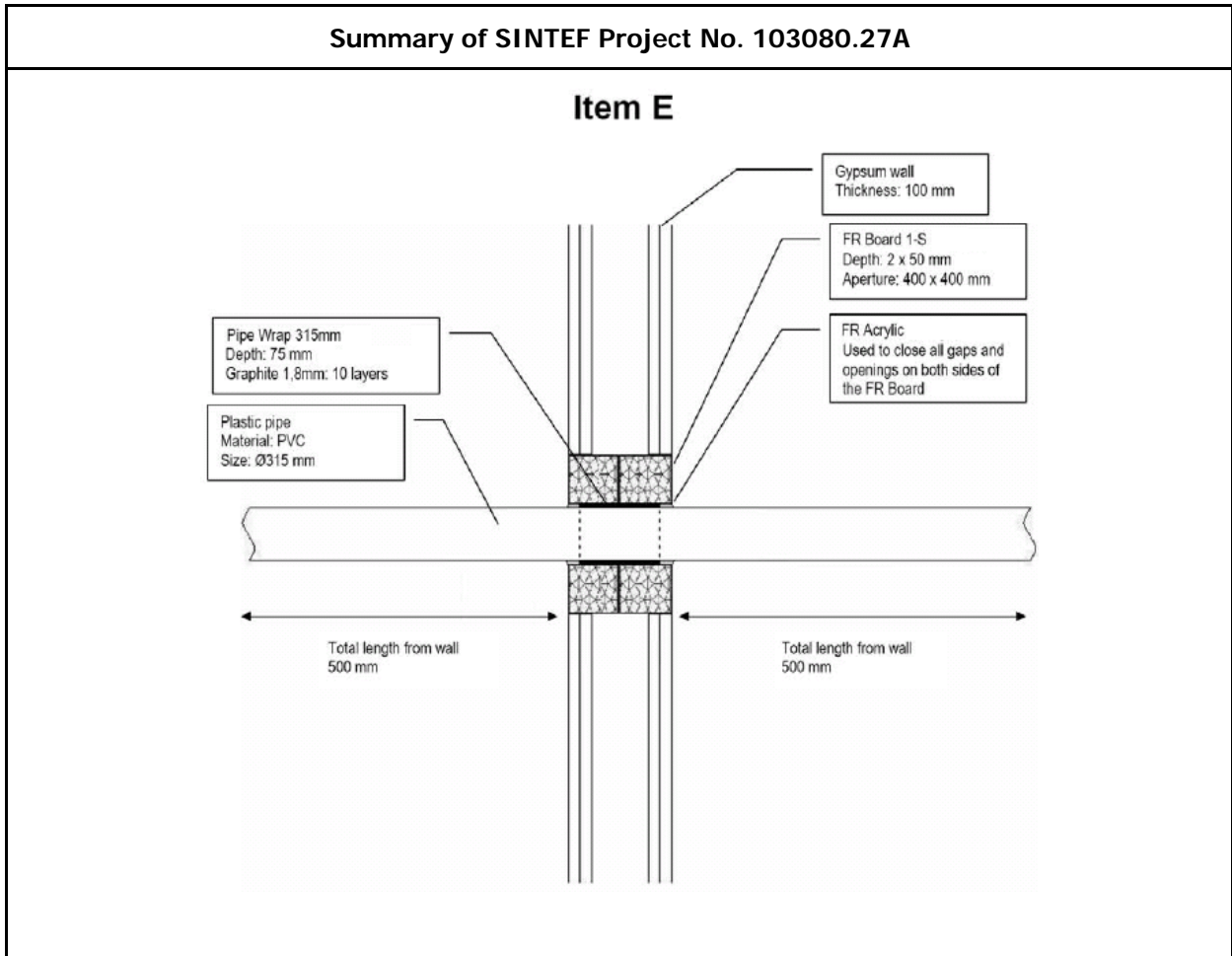
Specimen	Integrity (mins)			Insulation (mins)
	Cotton pad	Gap gauge	Sustained flames	
D	229	229	229	229



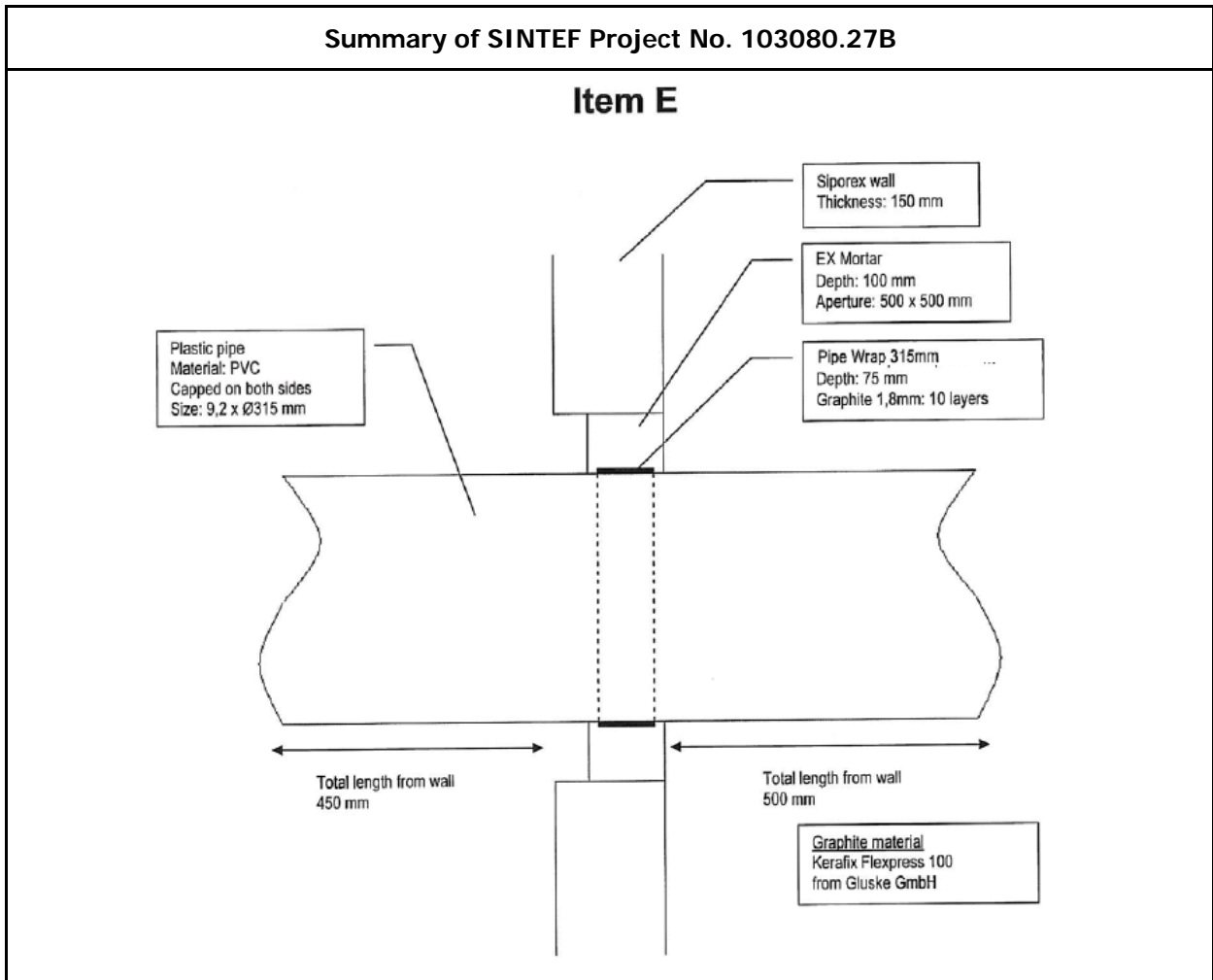
Seal D

Penetration sealing system D consisted of a 50 mm wide x 3.6 mm thick pipe wrap, and 100 mm thick FR Mortar, fitted into a 200 mm x 200 mm aperture in the concrete floor. The pipe wrap and mortar sealed the passage of a 110 mm diameter PVC pipe (3 mm wall thickness) passing through the floor. A sample wrap supplied by the sponsor was observed to contain two 1.8 mm thick layers of intumescent material, enclosed in a sealed polythene sleeve. The pipe wrap and mortar were installed level with the exposed face of the floor.

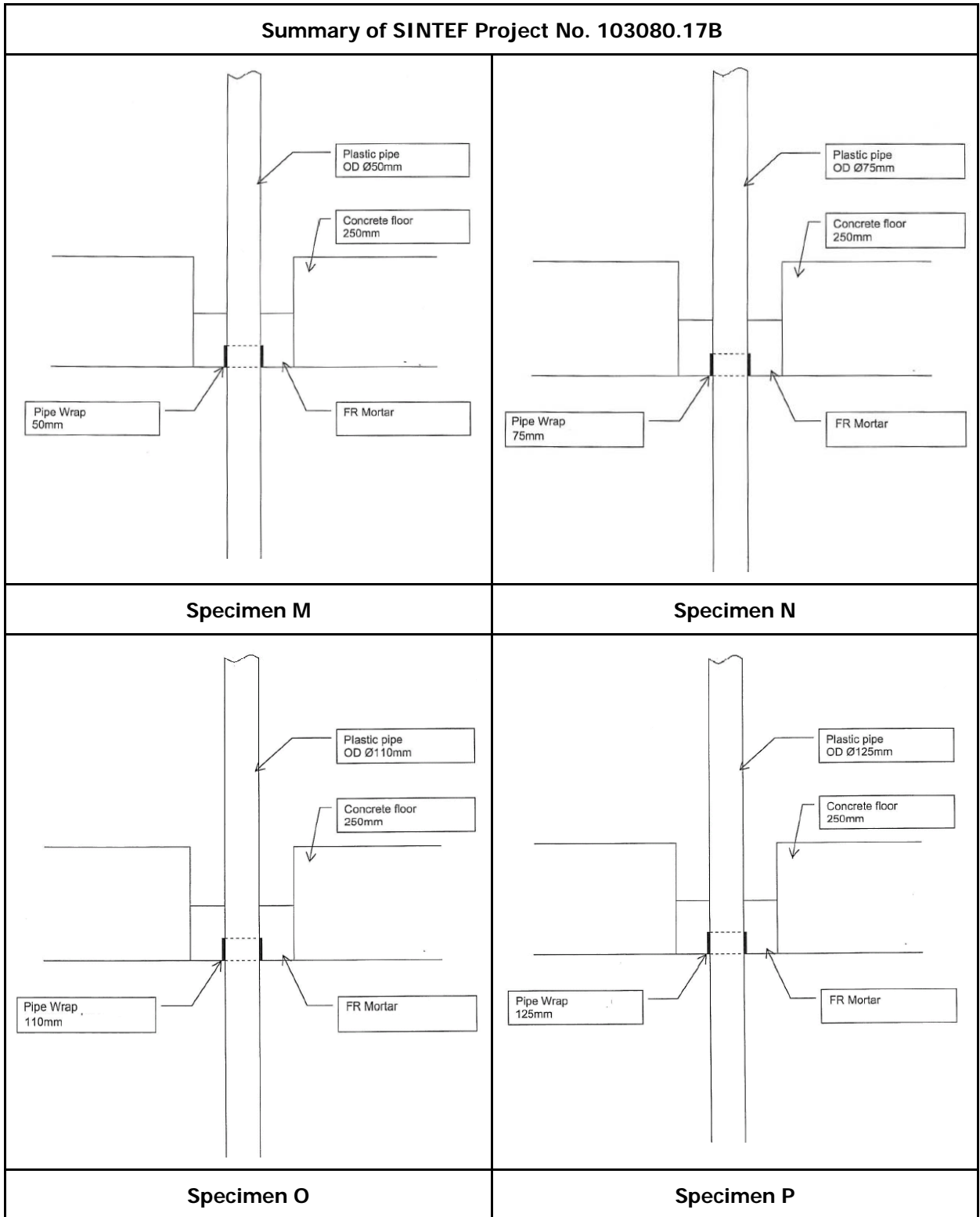
Specimen	Integrity (mins)			Insulation (mins)
	Cotton pad	Gap gauge	Sustained flames	
D	242	242	242	242

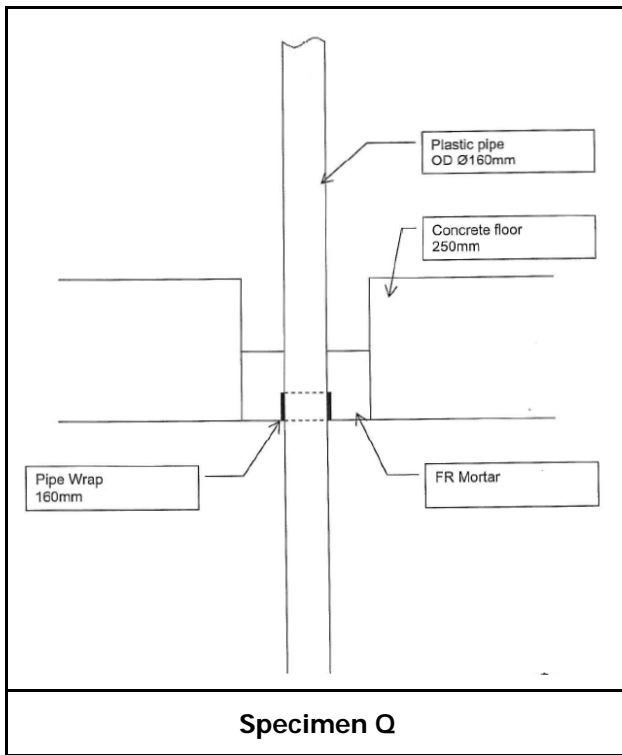


Specimen	Integrity (mins)		Insulation (mins)
	Cotton pad	Sustained flames	
E	61	45	45



Specimen	Integrity (mins)			Insulation (mins)
	Cotton pad	Sustained flames	Gap Gauge	
E	175	175	175	147





Specimen	Integrity (mins)			Insulation (mins)
	Cotton pad	Gap gauge	Sustained flames	
M	240	240	240	240
N	240	240	240	240
O	240	240	240	240
P	240	240	240	240
Q	240	240	240	240

Field Of Direct Application (latest version EN 1366-3: 2009):**Orientation**

Test results are only applicable to the orientation in which the penetration seals were tested, i.e. in a wall or floor.

Supporting construction**Rigid floor and wall constructions**

Test results obtained with rigid standard supporting constructions may be applied to concrete or masonry separating elements of a thickness and density equal to or greater than that of the supporting construction used in the test. This rule does not apply to pipe closure devices positioned within the supporting construction in case of higher thickness of the supporting construction unless the length of the seal is increased by an equal amount and the distance from the surface of the supporting construction remains the same on both sides.

Flexible wall constructions

Test results obtained with the standard flexible wall constructions according to 7.2.2.1.2 cover all flexible wall constructions of the same fire resistance classification provided,

- the construction is classified in accordance with EN 13501-2;
- the construction has an overall thickness not less than the minimum thickness of the range given in Table 3 for the standard flexible wall used in the test. This rule does not apply to pipe closure devices positioned within the supporting construction unless the length of the seal is increased by an equal amount and the distance from the surface of the supporting construction remains the same on both sides;
- in the case of penetration seals installed within the wall and where a flexible wall with insulation was used in the test an aperture framing shall be used in practice. The aperture frame and aperture lining shall be made from studs and boards of the same specification as those used in the wall in practice. The thickness of the aperture lining shall be minimum 12,5 mm. This rule does not apply in the case where the insulation was removed around the penetration seal(s) (see 7.2.2.1.2);
- the number of board layers and the overall board layer thickness is equal or greater than that tested when no aperture framing is used;
- flexible wall constructions with timber studs are constructed with at least the same number of layers as given in Table 3, no part of the penetration seal is closer than 100 mm to a stud, the cavity is closed between the penetration seal and the stud, and 100 mm of insulation of class A1 or A2 according to EN 13501-1 is provided within the cavity between the penetration seal and the stud.

An aperture framing is considered as being part of the penetration seal. Tests without an aperture framing cover applications with aperture framing but not vice versa.

The standard flexible wall construction does not cover sandwich panel constructions and flexible walls where the lining does not cover the studs on both sides. Penetrations in such constructions shall be tested on a case by case basis.

Test results obtained with flexible supporting walls may be applied to concrete or masonry elements of an overall thickness equal to or greater than that of the element used in the tests. This rule does not apply to pipe closure devices positioned within the supporting construction unless the length of the seal is increased by an equal amount and the distance from the surface of the supporting construction remains the same on both sides.

Service support construction

The standard cable ladders/trays as defined in Annex A cover metal trays with a melting point higher than the furnace temperature at the classification time, e.g. stainless steel, galvanised steel. For all other ladders/trays (e.g. plastic, aluminium) separate evidence is necessary.

Steel ladders/trays with organic coatings are covered by the standard ladders/trays if their overall classification is minimum A2 according to EN 13501-1.

The distance from the surface of the separating element to the nearest support position for services shall be as tested or less.

Seal size and distances

The test results obtained using standard wall and floor configurations for penetration systems are valid for any penetration size (in terms of linear dimensions) equal to or smaller than that tested, provided the total amount of cross sections of the services (including insulation) does not exceed 60 % of the penetration area, the working clearances are not smaller than the minimum working clearances (as defined in Annex A, B, E and F) used in the test and a blank penetration seal of the maximum seal size desired was tested in addition.

A blank penetration seal test may be omitted for mortar seals, seals made from rigid boards and mineral wool boards of a density of minimum 150 kg/m^3 and for single service penetration seals.

For floor constructions, results from tests with a penetration seal length of minimum 1 000 mm apply to any length as long as the perimeter length to seal area ratio is not smaller than that of the test specimen.

The distance between a single service and the seal edge (annular space, e.g. a1 according to Figures B.7 and E.2) shall remain within the tested range.

Field Of Direct Application- Plastic pipes:

General

Results from a multiple penetration seal may be extended to a single penetration seal of the same type but not vice versa.

Seal size

Pipe closure devices

The maximum pipe closure device size within a design group determined according to E.2.2.1 covers smaller sizes of this design group.

If the thickness of the active component of the pipe closure device is changed (length remains constant) the maximum pipe closure device sizes from the design groups comprising the smallest and the largest pipe closure device sizes cover the size range / design groups in between provided the thickness of their active components is higher than the calculated value from the straight line that connects the maximum and minimum size in a thickness - pipe diameter diagram (see Figure E.8). This interpolation is only permissible if the inner diameter of the smallest pipe closure device included in the test is greater than or equal to 40 mm. NOTE: For further details see H.4.7.2

Pipe end configuration

Test results obtained from tests with "plastic pipes" having both ends uncapped (see Table 2, test condition "U/U") are valid for all other test conditions of Table 2. Test results obtained from tests where a flue gas recovery system was used are valid for pipe end conditions U/C and C/C.

Table E.1 – Field of application rules for pipe end configuration

	Tested				
	U/U	C/U	U/C	C/C	
Covered	U/U	Y	N	N	N
	C/U	Y	Y	N	N
	U/C	Y	Y	Y	N
	C/C	Y	Y	Y	Y

Y = acceptable, N = not acceptable

Pipe and insulation material

The pipe and/or insulation material range permitted is the range covered by the test including the critical pipe approach results where applicable.

Test results on pipes made from PVC-U according to EN 1329-1, EN 1453-1 or EN 1452-1 are valid for pipes made from PVC-U according to EN 1329-1, EN 1453-1 and EN 1452-1 as well as pipes made from PVC-C according to EN 1566-1.

Test results on pipes made from PE-HD according to EN 1519-1 or EN 12666-1 are valid for pipes made from PE according to EN 12201, EN 1519-1 and EN 12666-1, for pipes made from ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1.

Pipe wall thickness

Pipe closure devices for pipes without insulation

The range between that tested is covered for a particular size of the pipe closure device. The maximum thickness tested with the maximum size within a design group (see Annex E.2.2.1) of pipe closure device sizes is valid for smaller sizes within the design group. For a design group not included in the test either a linear interpolation between the corner points tested or a step approach as illustrated in Figure E.9 may be used. Where the minimum wall thickness remains the same over several design groups, the design groups representing the maximum and minimum sizes cover the intermediate ones.

Seals other than pipe closure devices

Results of tests conducted as specified in the standard configurations may be interpolated for pipes with diameters between those tested and wall thicknesses between those tested.

Pipe orientation

If a pipe was tested perpendicular to the seal as well as oblique, the result is valid for each angle between a right-angle and the angle tested.

Separations

For multiple penetrations the separations a_1 to a_3 from a test conducted as specified in the standard configurations may be increased without limitation (see Figure E.1).

Where single pipes penetrate directly through the structural associated construction (masonry walls, flexible walls, concrete floors etc.) the annular space between the pipe and the supporting construction shall remain within the tested range. Separation a_2 may be increased.

For seals other than pipe closure devices the results of a test conducted as specified in Option 1 of the standard configurations does not cover 'clusters' of pipes, unless the distances a_3 (Figure E.1) or a_2 (Figure E.2) are > 100 mm in practice. The results of a test conducted as specified in Option 2 of the standard configurations covers pipes with linear separation.

Additional rules for pipes fitted with an insulation**Pipe closure devices**

In the case where a pipe closure device is used, the maximum pipe closure device size within a design group determined according to E.2.2.1 covers smaller sizes. If the thickness of the active component of the pipe closure device is changed (length remains constant) the maximum pipe closure device sizes from the design groups comprising the smallest and the largest pipe closure device sizes cover the size range / design groups in between provided the thickness of their active components is higher than the calculated value from the straight line that connects the maximum and minimum size in a thickness - pipe diameter diagram (see Figure E.8). In this situation pipe diameter as shown in Figure E.9 equals the sum of the actual pipe diameter and twice the thickness of the insulation.

Tests on non-insulated pipes do not cover insulated pipes.

Tests with sustained insulation cover interrupted insulation but not vice versa. Tests with sustained insulation do not cover interrupted insulation where the pipe closure device is in direct contact with the pipe.

Seals other than pipe closure devices

The thickness of the insulation may be interpolated between tested dimensions.

4. Classification and field of application

4.1 Reference of classification

This classification has been carried out in accordance with clause 7 of EN 13501-2: 2007 + A1: 2009.

4.2 Classification

The product, 'Firebreak 120 Pipe Wraps' may be classified according to the following combinations of performance parameters and classes as appropriate.

R	E	I	W		t	-	M	C	S	IncSlow	sn	ef	r
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Considering the tests submitted for classification, 'Firebreak 120 Pipe Wraps' provides the following classification for the tested seal type:

Fire resistance classification with pipe services in flexible walls (100mm or thicker)	
System comprising 2 layers of 50 mm thick FR board in a 400 x 400 mm aperture with a centrally positioned 75 x 18 mm pipe wrap at mid-depth	
Classification of the seal including services as indicated	Penetrating Service Item
	315 mm diameter and 9.2 mm wall thickness uPVC pipe
EI 45 C/C	X

Fire resistance classification with pipe services in rigid walls (150mm or thicker)	
System comprising 100 mm thick FR mortar in a 500 x 500 mm aperture with a centrally positioned 75 x 18 mm pipe wrap cast in at mid-depth	
Classification of the seal including services as indicated	Penetrating Service Item
	315 mm diameter and 9.2 mm wall thickness uPVC pipe
EI 120 C/C	X

Fire resistance classification with pipe services in rigid floors (150mm or thicker)			
System comprising 100 mm thick FR mortar in a 250 x 250 mm aperture with a centrally positioned 75 x 3.6 mm pipe wrap cast in at the soffit			
Classification of the seal including services as indicated	Penetrating Service Item		
	125 mm diameter and 4.9 mm wall thickness Polyethylene pipe		
E 240 U/C	X		
EI 180 U/C	X		
System comprising 100 mm thick FR mortar in a 250 x 250 mm aperture with a centrally positioned 75 x 7.2 mm pipe wrap cast in at the soffit			
Classification of the seal including services as indicated	Penetrating Service Item		
	125 mm diameter and 3.5 mm wall thickness uPVC pipe	160 mm diameter and 4.5 mm wall thickness uPVC pipe	160 mm diameter and 6.2 mm wall thickness PE pipe
EI 240 U/C	X	X	
E 240 U/C			
EI 180 U/C			X
System comprising 100 mm thick FR mortar in a 250 x 250 mm aperture with a centrally positioned 50 x 3.6 mm pipe wrap cast in at the soffit			
Classification of the seal including services as indicated	Penetrating Service Item		
	110 mm diameter and 3.0 mm wall thickness uPVC pipe	75 mm diameter and 3.5 mm wall thickness PP-HT pipe	50 mm diameter and 5.0 mm wall thickness PP-HT pipe
EI 240 U/C	X	X	X
System comprising 100 mm thick FR mortar in a 200 x 200 mm aperture with a centrally positioned 75 x 1.8 mm pipe wrap cast in at mid-depth			
Classification of the seal including services as indicated	Penetrating Service Item		
	110 mm diameter and 3.4 mm wall thickness uPVC pipe		
EI 180 U/C	X		
System comprising 50 mm thick FR mortar in a 200 x 200 mm aperture with a centrally positioned 75 x 5.4 mm pipe wrap cast in at mid-depth			
Classification of the seal including services as indicated	Penetrating Service Item		
	160 mm diameter and 4.0 mm wall thickness uPVC pipe		
EI 180 U/C	X		

Fire resistance classification with pipe services in rigid floors (150mm or thicker)	
System comprising 50 mm thick FR mortar in a 200 x 200 mm aperture with a centrally positioned 50 x 1.8 mm pipe wrap cast in at the soffit	
Classification of the seal including services as indicated	Penetrating Service Item
	110 mm diameter and 4.3 mm wall thickness PE pipe
EI 60 U/C	X
System comprising 100 mm thick FR mortar in a 400 x 400 mm aperture with a centrally positioned 75 x 12.6 mm pipe wrap cast in at the soffit	
Classification of the seal including services as indicated	Penetrating Service Item
	250 mm diameter and 7.8 mm wall thickness PE pipe
EI 180 U/C	X
System comprising 50 mm thick FR mineral board in a 400 x 400 mm aperture with a centrally positioned 50 x 3.6 mm pipe wrap cast in at the soffit	
Classification of the seal including services as indicated	Penetrating Service Item
	110 mm diameter and 3.4 mm wall thickness uPVC pipe
EI 90 U/C	X
System comprising 100 mm thick FR mortar in a 200 x 200 mm aperture with a centrally positioned 50 x 3.6 mm pipe wrap cast in at the soffit	
Classification of the seal including services as indicated	Penetrating Service Item
	Bundle of 38 no. 14 mm diameter copper core electrical cable
EI 240	X
System comprising 140 mm thick FR mortar in a 300 x 300 mm aperture with a centrally positioned 75 x 7.2 mm pipe wrap cast in at the soffit	
Classification of the seal including services as indicated	Penetrating Service Item
	Bundle of 76 no. 14 mm diameter copper core electrical cable
EI 240	X

4.3 Field of application

The results of the tests are directly applicable to similar constructions where one or more of the changes listed below each test summary are made and the construction continues to comply with that appropriate design code for its stiffness and stability. Other changes are not permitted.

5. Limitations

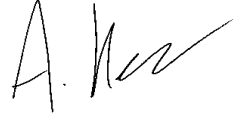
This classification document does not represent type approval or certification of the product.

SIGNED



Chris Johnson
Principal Certification Engineer

APPROVED



Andy Kearns
Technical Manager

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