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Nº 9/LE 895

Title:
Classification report for the determination of the fire resistance of a set of penetration seals according to EN 13501-2:2016 Fire classification of construction products and building elements. Part 2: Classification using data from fire resistance tests, excluding ventilation services.

Tested material:
12 penetration seals based on collars reference "MG2-A U" for plastic pipes, everything supplied by RF Technologies.
Test done in vertical configuration.

File number: 16/13124-2159 Part 2

Solicitor:
RF Technologies, S.A
Lange Ambachtstraat 40
B-9860 Oosterzele
Belgium

Report Date:
28 November 2016

Tested on:
21 November 2016

LGAI Technological Center S.A. Inscrita en el registro Mercantil de Barcelona, Tomo 35.803, Folio1, Hoja Nº B-266.627 Inscripción 1ª C.I.F. : A-63207492

1.- INTRODUCTION

This Fire Resistance classification report defines the classification for a set of penetration seals for plastic pipes supplied by RF Technologies.

2.- DETAILS OF CLASSIFIED ELEMENT

2.1.- Type of function

Tested elements are defined as penetration seals for plastic pipes. Its function is to withstand the integrity and thermal insulation criteria given in clause 5 of EN 13501-2:2016.

2.2.- Description

The complete description of the tested elements can be consulted in the test report (see clause 3 of this classification report).

Supporting construction made of a flexible wall of dimensions 3000 x 3000 mm made out of two gypsum boards type F "Prégyflam" of Siniat of 12.5 mm in thickness and 10.5 kg/m^2 + 50 mm of rockwool "Rockfit 431 Adapt" of 40 kg/m^3 + two gypsum boards type F "Prégyflam" of Siniat of 12.5 mm in thickness.

As can be seen in the test report indicated in the clause 3 of this classification report; two design groups have been established:

- Design group 1 (DG1): 12 x 60 mm (thickness x length of the active component).
- Design group 2 (DG2): 18 x 80 mm (thickness x length of the active component).

3.- TEST REPORT

This classification report is based on the following test report:
File nº: 16/13124-2159 Part 1
Issued with date: 28 of November of 2016
Test carried out on: 21 of November of 2016

4.- TEST RESULTS

4.1.- Test standard:

EN 1366-3: 2009 "Fire resistance tests for service installations. Part 3: Penetration seals" (equivalent to UNE EN 1366-3: 2011)

4.2.- Exposure conditions

Time/temperature curve	$T = 345 \log_{10}(8t + 1) + 20$ (acc. EN 1363-1:2012)
Number of exposed sides	1 (U/U)
Applied load	No load applied

Support conditions	Standard supporting construction in accordance with EN 1366-3:2009. See more details in the test report indicated in clause 3 of this classification report.

4.3.- Result table.

Pipe dimensions are outside diameter x thickness

System	Integrity	Thermal insulation
System 1 (MG2-A U Ø75 DG1 collar + PEHD pipe 75 x 2.3 mm)	It was maintained the entire test, 133 minutes	It was maintained the entire test, 133 minutes
System 2 (MG2-A U Ø110 DG2 collar + PVC-U pipe 110 x 5.3 mm)	It was maintained the entire test, 133 minutes	It was maintained the entire test, 133 minutes
System 3 (MG2-A U Ø110 DG2 collar + PEHD pipe 110 x 6.6 mm)	It was maintained the entire test, 133 minutes	It was maintained the entire test, 133 minutes
System 4 (MG2-A U Ø160 DG2 collar + PEHD pipe 160 x 4.0 mm)	It was maintained the entire test, 133 minutes	It was maintained the entire test, 133 minutes
System 5 (MG2-A U Ø110 DG1 collar + PEHD pipe 110 x 2.7 mm)	It was maintained the entire test, 133 minutes	It was maintained the entire test, 133 minutes
System 6 (MG2-A U Ø75 DG1 collar + PP pipe 75 x 3.0 mm)	It was maintained the entire test, 133 minutes	It was maintained the entire test, 133 minutes
System 7 (MG2-A U Ø110 DG1 collar + PVC-U pipe 110 x 5.3 mm)	It was maintained the entire test, 133 minutes	It was maintained the entire test, 133 minutes
System 8 (MG2-A U Ø110 DG1 collar + PVC-U pipe 110 x 2.2 mm)	It was maintained the entire test, 133 minutes	It was maintained the entire test, 133 minutes
System 9 (MG2-A U Ø160 DG2 collar + PEHD pipe 160 x 9.5 mm)	It was maintained the entire test, 133 minutes	It was maintained the entire test, 133 minutes

System 10 (MG2-A U Ø110 DG1 collar + PEHD pipe 110 x 6.6 mm)	It was maintained the entire test, 133 minutes	It was maintained the entire test, 133 minutes
System 11 (MG2-A U Ø160 DG2 collar + PP pipe 160 x 4.9 mm)	It was maintained the entire test, 133 minutes	It was maintained the entire test, 133 minutes
System 12 (MG2-A U Ø110 DG1 collar + PP pipe 110 x 3.4 mm)	It was maintained the entire test, 133 minutes	It was maintained the entire test, 133 minutes

5.- CLASSIFICATION

According to clause 7.5 of EN 13501-2:2016 standard, classification of the tested elements is:

System	Classification
System 1 (MG2-A U Ø75 DG1 collar + PEHD pipe 75 x 2.3 mm)	**EI 120-U/U**
System 2 (MG2-A U Ø110 DG2 collar + PVC-U pipe 110 x 5.3 mm)	**EI 120-U/U**
System 3 (MG2-A U Ø110 DG2 collar + PEHD pipe 110 x 6.6 mm)	**EI 120-U/U**
System 4 (MG2-A U Ø160 DG2 collar + PEHD pipe 160 x 4.0 mm)	**EI 120-U/U**
System 5 (MG2-A U Ø110 DG1 collar + PEHD pipe 110 x 2.7 mm)	**EI 120-U/U**
System 6 (MG2-A U Ø75 DG1 collar + PP pipe 75 x 3.0 mm)	**EI 120-U/U**
System 7 (MG2-A U Ø110 DG1 collar + PVC-U pipe 110 x 5.3 mm)	**EI 120-U/U**
System 8 (MG2-A U Ø110 DG1 collar + PVC-U pipe 110 x 2.2 mm)	**EI 120-U/U**
System 9 (MG2-A U Ø160 DG2 collar + PEHD pipe 160 x 9.5 mm)	**EI 120-U/U**
System 10 (MG2-A U Ø110 DG1 collar + PEHD pipe 110 x 6.6 mm)	**EI 120-U/U**
System 11 (MG2-A U Ø160 DG2 collar + PP pipe 160 x 4.9 mm)	**EI 120-U/U**
System 12 (MG2-A U Ø110 DG1 collar + PP pipe 110 x 3.4 mm)	**EI 120-U/U**

6.- FIELD OF DIRECT APPLICATION (according to EN 1366-3:2009).

6.1 Summary of tested samples.

File number	Test nº order	Collar Diameter (mm)	Thickness x length active component (mm)	Pipe Material	Pipe thickness (mm)	Support frame	Classification
16/13124-2029	1	160	18 x 80	PVC-U	7,7	Wall	EI 120-U/U
	5	75	12 x 60	PVC-U	1,8	Wall	EI 120-U/U
	6	160	18 x 80	PVC-U	3,2	Wall	EI 120-U/U
	10	75	12 x 60	PEHD	4,5	Wall	EI 120-U/U
	14	110	18 x 80	PVC-U	2,2	Wall	EI 120-U/U
	15	75	12 x 60	PVC-U	3,6	Wall	EI 120-U/U
	17	40	12 x 60	PP	1,8	Wall	EI 120-U/U
	18	32	12 x 60	PP	1,8	Wall	EI 120-U/U
	19	110	18 x 80	PEHD	2,7	Wall	EI 120-U/U
	20	110	18 x 80	PP	3,4	Wall	EI 120-U/U
16/13124-2035	1	160	18 x 80	PVC-U	7,7	Floor	EI 120-U/U
	2	110	18 x 80	PVC-U	2,2	Floor	EI 120-U/U
	3	110	18 x 80	PEHD	2,7	Floor	EI 120-U/U
	4	110	18 x 80	PP	3,4	Floor	EI 120-U/U
	5	110	12 x 60	PVC-U	2,2	Floor	EI 120-U/U
	6	160	18 x 80	PEHD	9,5	Floor	EI 120-U/U
	7	75	12 x 60	PEHD	2,3	Floor	EI 120-U/U
	8	75	12 x 60	PVC-U	1,8	Floor	EI 120-U/U
	9	75	12 x 60	PP	3	Floor	EI 120-U/U
	10	110	12 x 60	PEHD	2,7	Floor	EI 120-U/U
	11	160	18 x 80	PEHD	4	Floor	EI 120-U/U
	12	75	12 x 60	PEHD	4,5	Floor	EI 120-U/U
	13	75	12 x 60	PVC-U	3,6	Floor	EI 120-U/U
	14	32	12 x 60	PP	1,8	Floor	EI 120-U/U
	15	110	12 x 60	PP	3,4	Floor	EI 120-U/U
	16	160	18 x 80	PVC-U	3,2	Floor	EI 120-U/U
	17	110	12 x 60	PVC-U	5,3	Floor	EI 120-U/U
	18	110	12 x 60	PEHD	6,6	Floor	EI 120-U/U
	19	40	12 x 60	PP	1,8	Floor	EI 120-U/U

16/13124-2159	1	75	12 x 60	PEHD	2,3	Wall	EI 120-U/U
	2	110	18 x 80	PVC-U	5,3	Wall	EI 120-U/U
	3	110	18 x 80	PEHD	6,6	Wall	EI 120-U/U
	4	160	18 x 80	PEHD	4	Wall	EI 120-U/U
	5	110	12 x 60	PEHD	2,7	Wall	EI 120-U/U
	6	75	12 x 60	PP	3	Wall	EI 120-U/U
	7	110	12 x 60	PVC-U	5,3	Wall	EI 120-U/U
	8	110	12 x 60	PVC-U	2,2	Wall	EI 120-U/U
	9	160	18 x 80	PEHD	9,5	Wall	EI 120-U/U
	10	110	12 x 60	PEHD	6,6	Wall	EI 120-U/U
	11	160	18 x 80	PP	4,9	Wall	EI 120-U/U
	12	110	12 x 60	PP	3,4	Wall	EI 120-U/U

6.2. General (clause 13 of EN 1366-3-2009).

6.2.1 Orientation.

Test results are applicable to penetration seals assembled in a horizontal division (floor) and vertical division (wall).

6.2.2 Supporting construction.

Floor test: Results are applicable on seals with a support frame made of aerated concrete with density and thickness equal or higher than the ones used in test (tested supporting construction: density 650 ± 200 kg/m^3 and 150 mm in thickness).

Wall test: Results cover all flexible wall construction of the same fire resistance classification (tested supporting construction: flexible wall of dimensions 3000 x 3000 mm made out of two gypsum boards type F "Prégyflam" of Siniat of 12.5 mm in thickness and 10.5 kg/m^2 + 50 mm of rockwool "Rockfit 431 Adapt" of 40 kg/m^3 + two gypsum boards type F "Prégyflam" of Siniat of 12.5 mm in thickness

Test results covers also concrete or masonry elements of an overall thickness equal to or greater than that of the element used in the tests.

6.2.3 Service support construction.

Metal trays with melting point higher than the furnace temperature at the classification time (e.g: stainless steel, galvanised steel) are covered.

6.2.4 Seal size and distances:

- The test result obtained are valid for any seal (in terms of linear dimensions) equal to or smaller than the tested taking provided that:
  - o total amount of cross sections of the services (including insulation) does not exceed 60% of the penetration area.

- Working clearances are not smaller than the minimum working clearances (defined in the annexes A, B, E and F of EN 1366-3:2009 and according to figure 1 of each test report).
- Distance between a single service and the seal edge shall remain within the tested range.

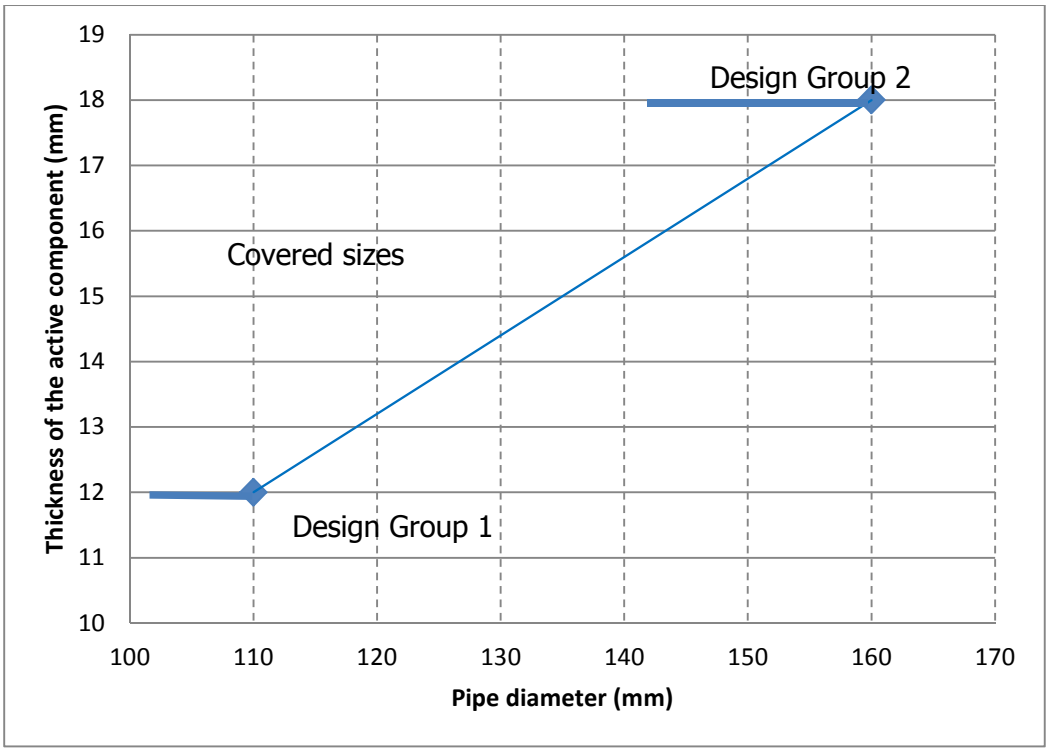
6.3. Plastic pipes (clause E.2.7 of EN 1366-3:2009)

6.3.1 General.

Obtained results from a multiple penetration seal can be extended to a single penetration seal of the same type, but not vice versa.

6.3.2 Seal size.

- Two design groups were tested.
  - Design group 1 (DG1):
    - Material of the active component: intumescent strip reference "EX 147"
    - Length of the active component: 60 mm
    - Thickness of the active component: 12 mm
  - Design group 2 (DG2):
    - Material of the active component: intumescent strip reference "EX 147"
    - Length of the active component: 80 mm
    - Thickness of the active component: 18 mm



6.3.3 Pipe end configuration.

- Tested configuration: U/U
- Covered configurations: U/U, C/U, U/C and C/C

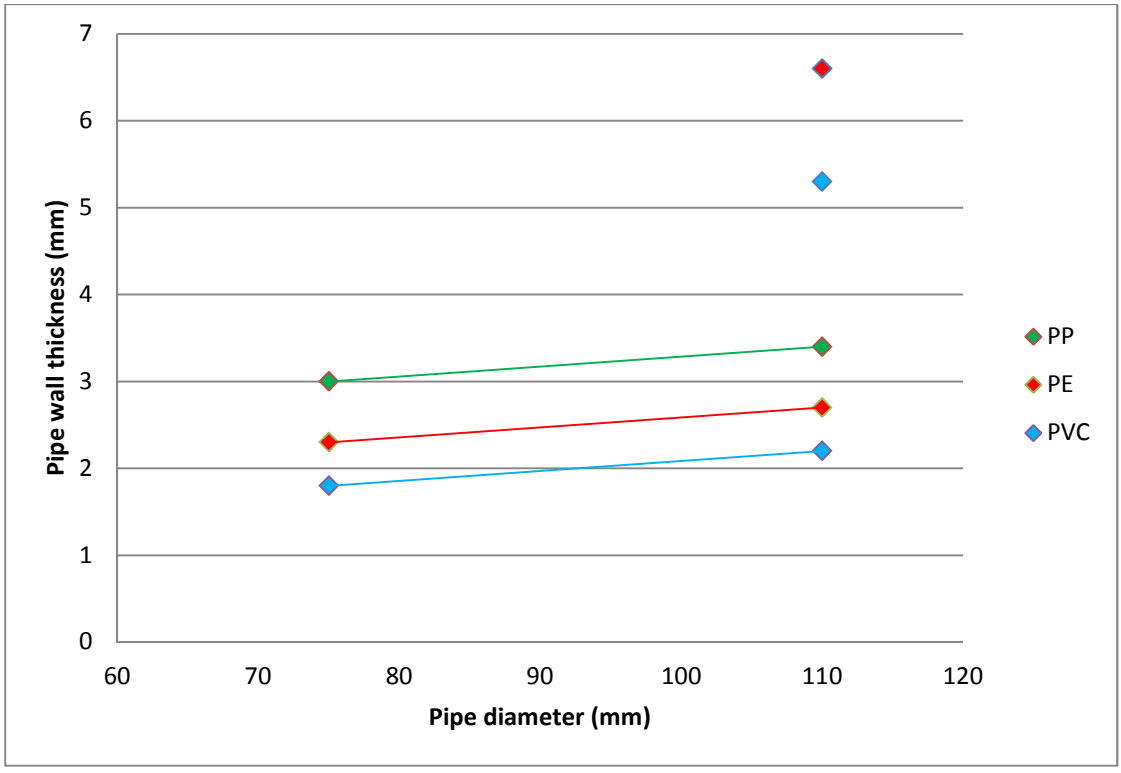
6.3.4 Pipe material:

Results are valid for

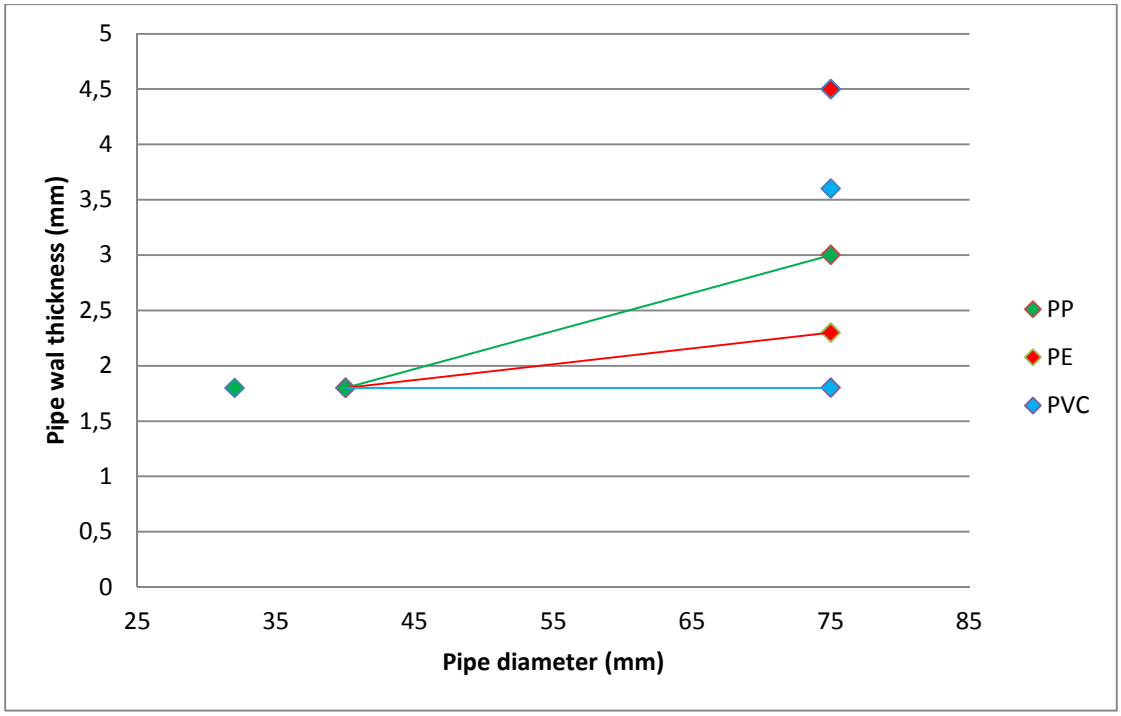
- Pipes made from PVC-U according EN 1329-1, EN 1453-1 and EN 1452-1 as well as pipes made from PVC-C according 1566-1.
- Pipes made from PE according to EN 12201-2, EN 1519-1 and EN 12666-1, for pipes made from ABS according to EN 1455-1 and pipes made from SAN+PVC according to EN 1565-1
- Pipes made from PP according to EN 1451-1.

6.3.5 Pipe wall thickness

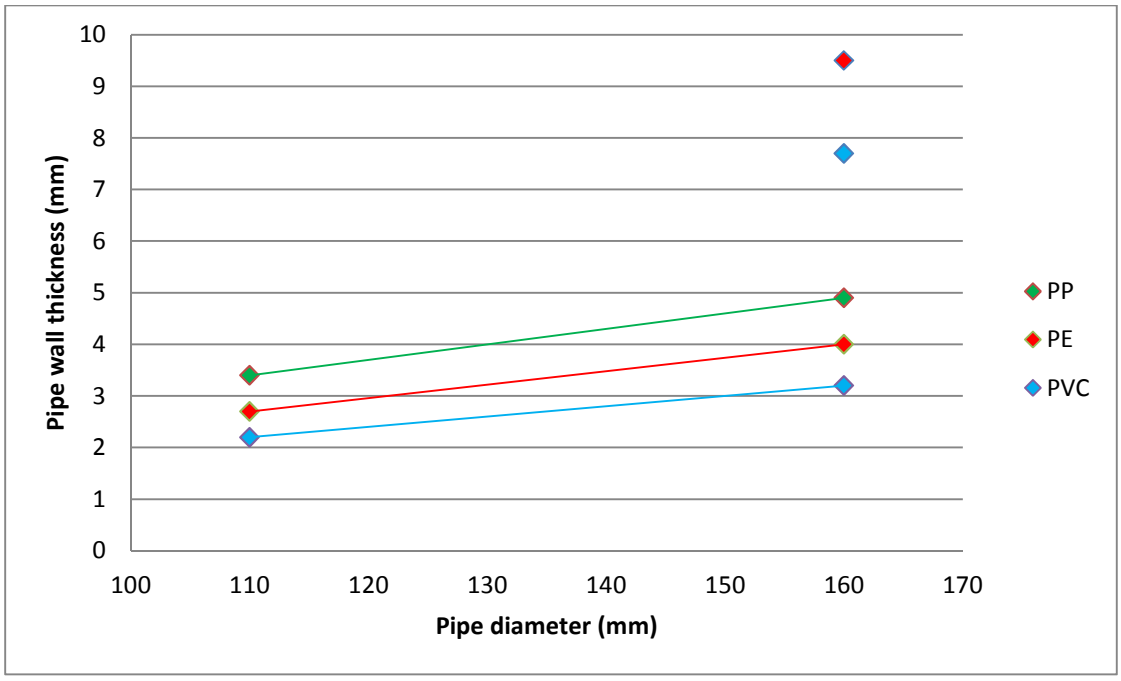
- Design group 1 (A)



- Design group 1 (B)



- Design group 2



6.3.6. Pipe orientation
Test results are valid for all pipes assembled perpendicular to the seal (90º)

6.3.7 Separations.
The annular space (a1 acc. to EN 1366-3:2009 and values indicated in figure 2 of test report) between the pipe and the supporting construction shall remain within tested range. Separation a2 (acc. to EN 1366-3:2009 and values indicated in figure 2 of test report) may be increased.
The annular space between pipe and construction element (floor and wall) is external diameter of the pipe + 5 mm.
The distance between pipes is not less than 200 mm.

The validity period is the one indicated in the product certification system.
This document is not neither a type approval nor a product certification.

Digitally signed by
Jordi Mirabent Junyent

Fire Laboratory Responsible
LGAI Technological Center, S.A.

Digitally Signed By
Albert Ger

Fire Resistance Responsible
LGAI Technological Center, S.A.

The results refer exclusively to the sample, product or material surrendered to the Laboratory, just as it is informed in the section of received material and tested under the conditions indicated in the norms mentioned in this document.

ANNEX A. SUMMARY OF COVERED SAMPLES (according to available dimensions supplied by the test solicitor

6.4.1 Wall

Results cover all flexible wall construction of the same or higher fire resistance classification (tested supporting construction: flexible wall of dimensions 3000 x 3000 mm made out of two gypsum boards type F "Prégyflam" of Siniat of 12.5 mm in thickness and 10.5 kg/m^2 + 50 mm of rockwool "Rockfit 431 Adapt" of 40 kg/m^3 + two gypsum boards type F "Prégyflam" of Siniat of 12.5 mm in thickness

Test results covers also concrete or masonry elements of an overall thickness equal to or greater than that of the element used in the tests.

MG2-A U collars fixed by threaded rods, washers and bolts (M6).

Pipe material	Diameter (mm)	Pipe Wall thickness range (mm)	Thickness x length of active component (mm)	Classification
PE	160	4,0 - 9,5	18x80	EI 120-U/U
	140	3,5 - 9,5		
	125	3,1 - 9,5		
	110	2,7 - 6,6	12x60	
	100	2,6 - 6,6		
	90	2,5 - 6,6		
	80	2,4 - 6,6		
	75	2,3 - 6,6		
	63	2,1 - 4,5		
	56	2,0 - 4,5		
	50	1,9 - 4,5		
	40	1,8 - 4,5		
	32	1,8 - 4,5		
PVC	160	3,2 - 7,7	18x80	
	140	2,8 - 7,7		
	125	2,5 - 7,7		
	110	2,2 - 5,3	12x60	
	100	2,1 - 5,3		
	90	2,0 - 5,3		
	80	1,9 - 5,3		
	75	1,8 - 5,3		
	63	1,8 - 3,6		
	56	1,8 - 3,6		
	50	1,8 - 3,6		
	40	1,8 - 3,6		
	32	1,8 - 3,6		
PP	160	4,9 - 9,5	18x80	
	140	4,3 - 9,5		
	125	3,9 - 9,5		
	110	3,4 - 6,6	12x60	
	100	3,3 - 6,6		
	90	3,2 - 6,6		
	80	3,1 - 6,6		
	75	3,0 - 6,6		
	63	2,6 - 4,5		
	56	2,3 - 4,5		
	50	2,1 - 4,5		
	40	1,8 - 4,5		
	32	1,8 - 4,5		

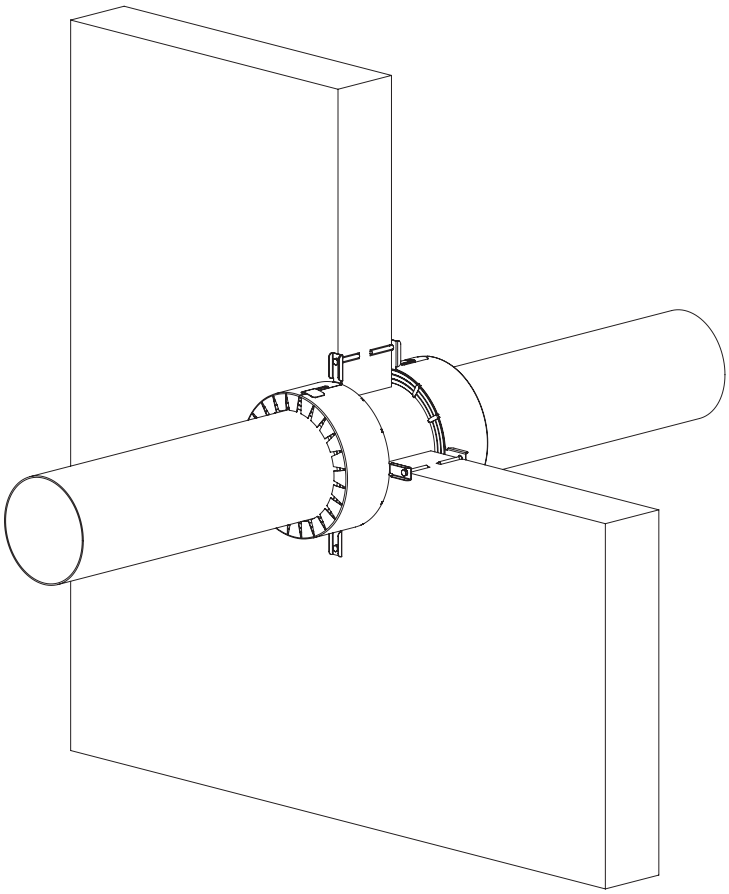
6.4.2 Floor

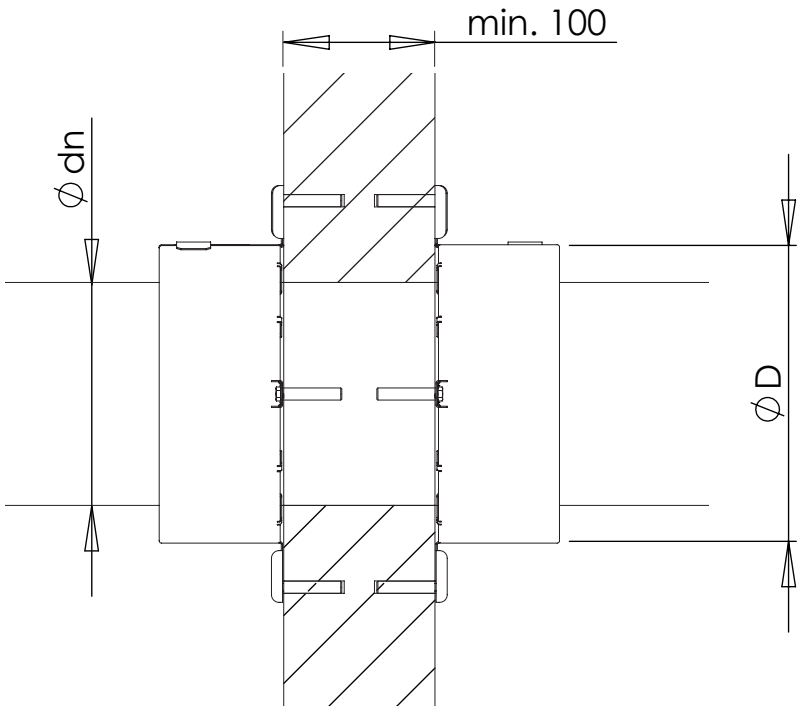
Floor test: Results are applicable on seals with a support frame made of aerated concrete with density and thickness equal or higher than the ones used in test (tested supporting construction: density 650 ± 200 kg/m^3 and 150 mm in thickness).

MG2-A U collars fixed with universal M6 screws.

Pipe Material	Diameter (mm)	Pipe Wall thickness range (mm)	Thickness x length of active component (mm)	Classification
PE	160	4,0 - 9,5	18x80	EI 120-U/U
	140	3,5 - 9,5		
	125	3,1 - 9,5		
	110	2,7 - 6,6	12x60	
	100	2,6 - 6,6		
	90	2,5 - 6,6		
	80	2,4 - 6,6		
	75	2,3 - 6,6		
	63	2,1 - 4,5		
	56	2,0 - 4,5		
	50	1,9 - 4,5		
	40	1,8 - 4,5		
	32	1,8 - 4,5		
PVC	160	3,2 - 7,7	18x80	
	140	2,8 - 7,7		
	125	2,5 - 7,7		
	110	2,2 - 5,3	12x60	
	100	2,1 - 5,3		
	90	2,0 - 5,3		
	80	1,9 - 5,3		
	75	1,8 - 5,3		
	63	1,8 - 3,6		
	56	1,8 - 3,6		
	50	1,8 - 3,6		
	40	1,8 - 3,6		
	32	1,8 - 3,6		
PP	160	4,9 - 9,5	18x80	E 120-U/U
	140	4,3 - 9,5		
	125	3,9 - 9,5		
	110	3,4 - 6,6	12x60	EI 120-U/U
	100	3,3 - 6,6		
	90	3,2 - 6,6		
	80	3,1 - 6,6		
	75	3,0 - 6,6		
	63	2,6 - 4,5		
	56	2,3 - 4,5		
	50	2,1 - 4,5		
	40	1,8 - 4,5		
	32	1,8 - 4,5		

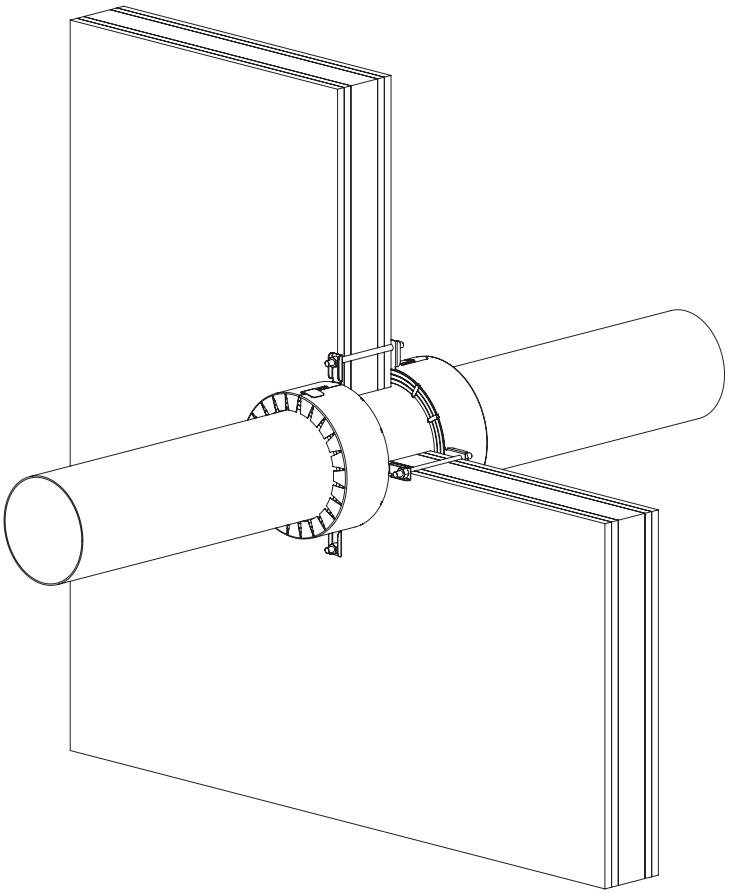
ANNEX B. Installation Drawings (supplied by test solicitor)

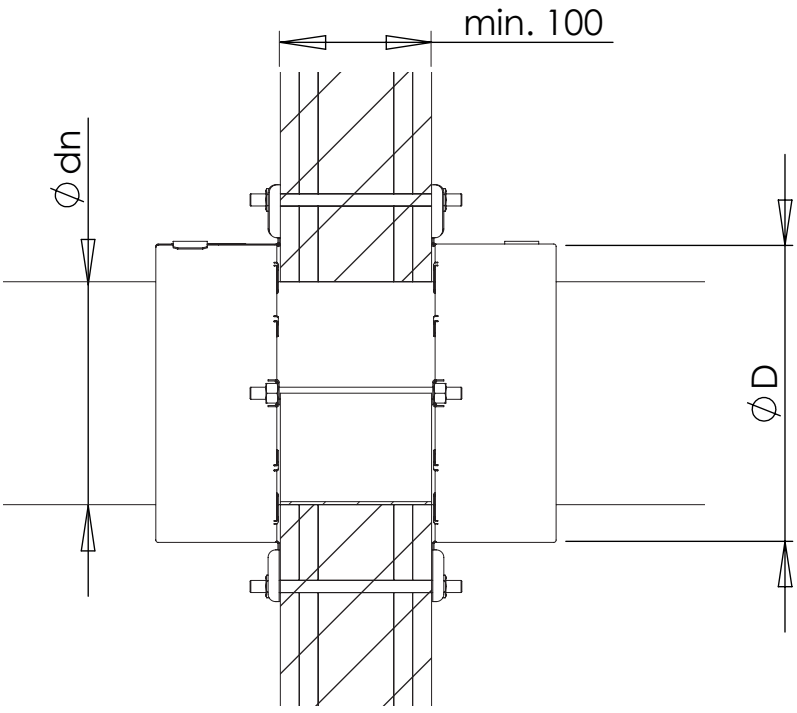




Plan Title / Titre du plan
Mounting in concrete wall / montage en paroi béton

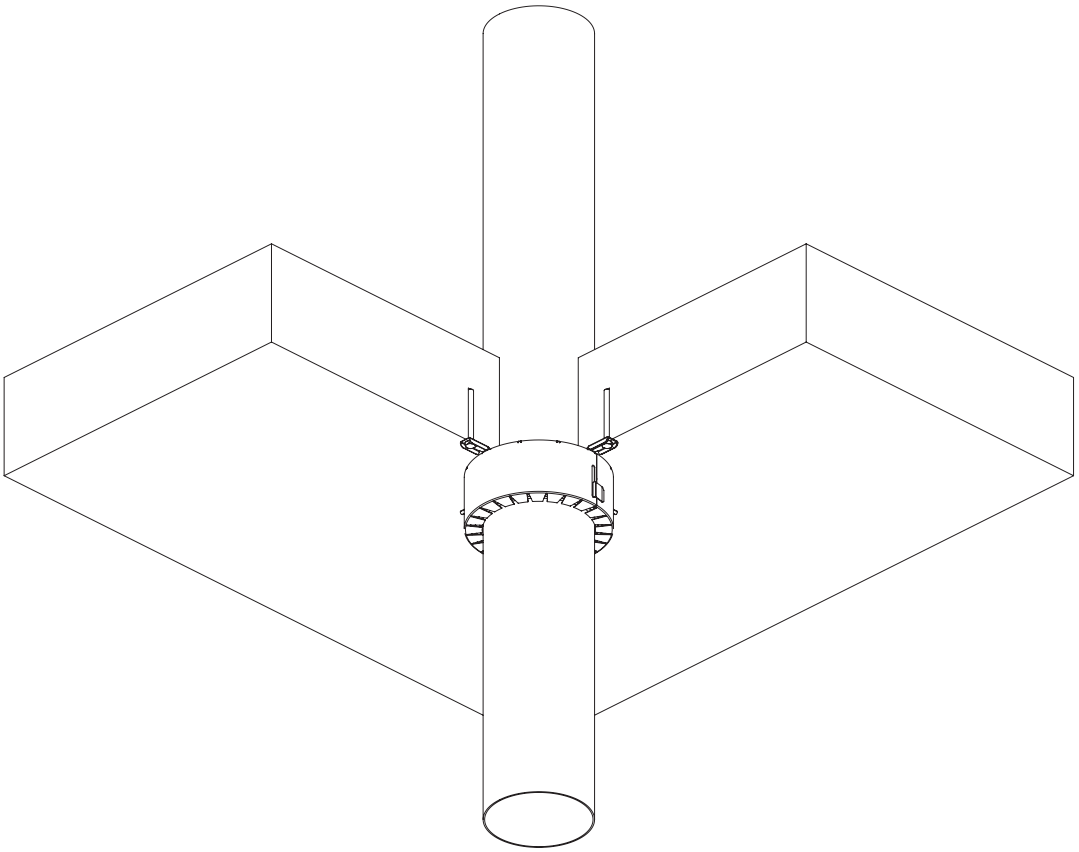
Date / Date:
04/11/16

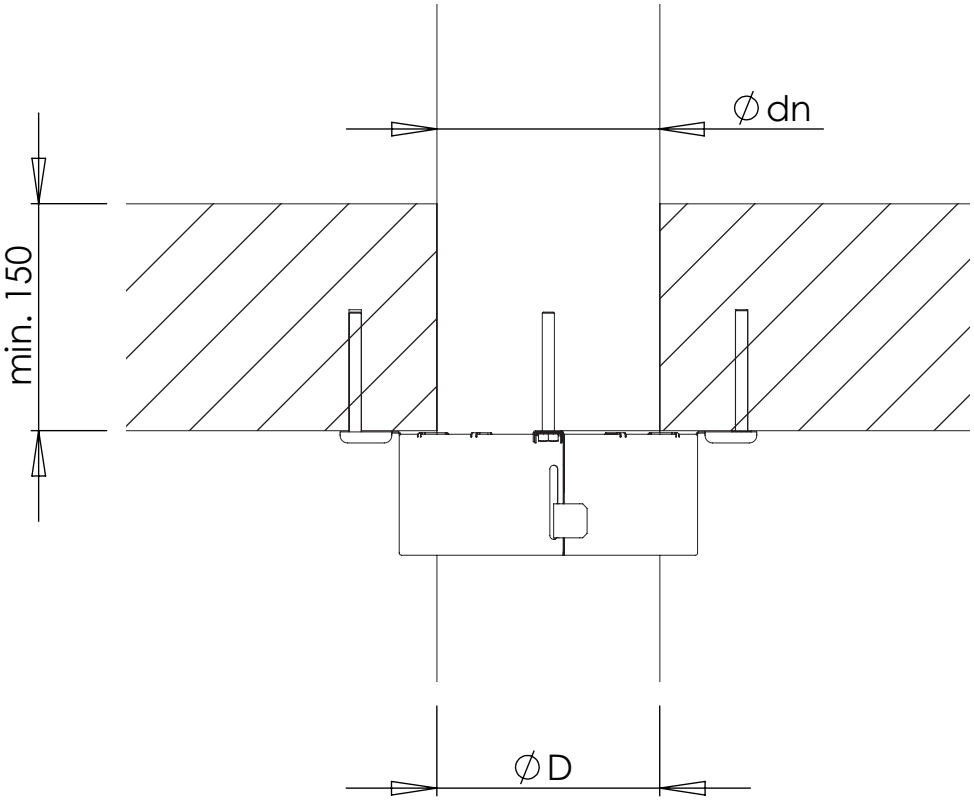




Plan Title / Titre du plan
Mounted in light partition wall / montage en paroi légère

Date / Date:
04/11/16





Plan Title / Titre du plan
Mounted in concrete floor / montage en dalle béton

Date / Date:
04/11/16