Laboratory for Fire Safety

Classification of the fire resistance in accordance with EN 13501-2:2023 of several linear joint seals in wall consited of aerated concrete and 2 flexible walls abutting an aerated concrete floor

Classification report

Report number YA 2757-1E-RA-001 dated 14 December 2023

Laboratory for Fire Safety

Classification of the fire resistance in accordance with EN 13501-2:2023 of several linear joint seals in wall consited of aerated concrete and 2 flexible walls abutting an aerated concrete floor

Classification report

Client	Bostik Benelux B.V. Denariusstraat 11 4903 RC OOSTERHOUT NB The Netherlands
Prepared by	Peutz bv Lindenlaan 41 6584 AC Molenhoek Postbus 66 6585 ZH Mook The Netherlands
Product name	**Linear joint seals closed with Bostik sealants**
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1 Introduction

This classification report defines the fire resistance classifications assigned to several linear joint seals in a wall consisting of aerated concrete and 2 flexible walls abutting an aerated concrete floor. The joint seals were tested in the Peutz Laboratory for Fire Safety in Haps according to the standard heating curve and in accordance with the procedures given in EN 13501-2:2023.

The joint seals were tested in one test in a wall consisting out of aerated concrete and 2 flexible walls abutting an aerated concrete floor on June 8, 2023.

TESTEN
RvA L 505

For performing the testing and classification, the Laboratory for Fire Safety is recognized by the "Stichting Raad voor Accreditatie" (RvA).

The RvA is member of the EA MLA (**EA MLA**: **E**uropean **A**ccreditation Organisation **M**ulti**L**ateral **A**greement: http://www.european-accreditation.org).

EA: "Certificates and reports issued by bodies accredited by MLA and MRA members are considered to have the same degree of credibility, and are accepted in MLA and MRA countries."

2 Details of the classified system

2.1 General

The system, a vertical wall with several linear joint seals, is defined as a test specimen with vertical linear joint seals and horizontal linear joint seals in a wall abutting an aerated concrete floor, according to EN 1366-4:2021.

2.2 Product description

For the test, the testing framework was closed with a wall of blocks of aerated concrete blocks and floor slab (class G4/600). The thickness of the wall was 100 mm. The slots in the aerated concrete wall where four linear joint seals are placed in have a length of 900 mm. The width of the slots is given in Table 3.2.
In the aerated concrete wall two flexible walls 1200 x 2400 mm (w x h) are mounted. The flexible walls are constructed according EN 1366-4, see Table 2.1. The metal stud profiles are fixed at all four sides with impact plugs (Fisher N6x60) c.t.c. 400 mm (four at each side profile and 3 at the top and bottom profiles). The insulation is removed to a depth of 100 mm along the linear joint seals according EN 1366-4.

t2.1 Flexible wall constructions

Wall	Steel stud depth (mm)	Gypsum board type F in accordance with EN 520		Insulation		Overall wall thickness (mm)
		Number of layers at each side	Thickness of boards (mm)	Thickness (mm)	Density (kg/m^3)	
A	50	1	12.5	50	100	75
B	50	2	12.5	50	100	100

At each side of the flexible walls a vertical linear joint seal is placed with a length of 2400 mm. At both flexible walls an aerated concrete floor slab is mounted (thickness 150 mm). Under the aerated concrete floor slabs two horizontally placed slots are positioned with a length of 1200 mm.

The following combination of materials was incorporated in the supporting construction:
- one side stony material wall / one side stony material wall (vertical);
- one side stony material wall / one side gypsum board wall (vertical);
- one side gypsum board wall / one side stony material floor (horizontal).

The surfaces of the aerated concrete on which the linear joint seals connect are thoroughly cleaned and moistened with water when needed.

For clarity, the numbering of the linear joint seals is taken over from the test report mentioned in Paragraph 3.1.

An overview of the sealants and foams that where used for the linear joint seals is given in Table 2.2.

t2.2 Materials used

Type of material	Abbreviation used in this report
Bostik FP 401 Fireseal Acrylic	FP 401
Bostik FP 403 Fireseal Hybrid	FP 403
Bostik FP 404 Fire Retardant PU (Gun)Foam	FP 404

3 Test reports and results in support of the classification

3.1 Used report

An overview of the used report is given in Table 3.1.

t3.1 Used report

Name of laboratory	Name of client	Report reference number and date	Used methods
Peutz bv	Bostik Benelux B.V.	Test report Y 2757-3E-RA-001 dated September 11, 2023	EN 1363-1:2020 EN 1366-4:2021

The client has stated that the provided report may be used for this classification report.

Details of the relevant linear joint seals with respect to this report are given in Paragraph 3.2. A brief description of the for this report relevant test results is given in Paragraph 3.2.1. For clarity, the numbering of the linear joint seals is taken over from the test report mentioned in Table 3.1. For a complete description and drawings of the test specimen see the test report mentioned in paragraph 3.1.

As stated in EN 13501-2:2023, failure of the integrity criteria is deemed to have occurred when "cracks or openings in excess of the given dimensions" occur. In the requirements for fire resistance tests on linear joint seals (EN 1366-4:2021) is stated that the gap gauges for determining the criterion integrity shall not be used. No visual openings arose during the tests so there is no influence on the classifications in this report.

3.2 Report Y 2757-3E-RA-001

An overview of the tested linear joint seal is given in Table 3.2.

t3.2 Details of the tested linear joint seals

Linear joint seal number	Thickness wall (mm)	Orientation	Joint width (mm)	Details of the tested linear joint seals						
				Seal at the exposed face			Seal at the unexposed face			Fully filled
				Type	Depth (mm)	Backing material	Type	Depth (mm)	Backing material	
1	75	Vertical	10	FP 401	12.5	No	FP 401	12.5	No	No
2	75	Vertical	10	FP 403	12.5	No	FP 403	12.5	No	No
3	100	Vertical	10	FP 401	15	Yes	FP 401	15	Yes	No
4	100	Vertical	10	FP 403	15	Yes	FP 403	15	Yes	No
5	75	Horizontal below floor	10	FP 401	12.5	No	FP 401	12.5	No	No
6	100	Horizontal below floor	10	FP 401	15	Yes	FP 401	15	Yes	No
7	100	Vertical	5	FP 401	10	Yes	FP 401	10	Yes	No
8	100	Vertical	5	FP 403	10	Yes	FP 403	10	Yes	No
9	100	Vertical	10	FP 404	N.a.	N.a.	FP 404	N.a.	N.a.	Yes, FP 404
10	100	Vertical	30	FP 404	N.a.	N.a.	FP 404	N.a.	N.a.	Yes, FP 404

3.2.1 Test results

FP 401 or FP 403 on aerated concrete (wall thickness 100 mm) and flexible wall (wall thickness 75 mm)

The summary of the test results achieved with FP 401 or FP 403 applied on aerated concrete wall/flexible wall in vertical linear joint seals is shown in Table 3.3. The FP 401 or FP 403 is applied over a depth of 12.5 mm on both sides (seal 1 and 2).

t3.3 Test results seal 1 and 2

Test method	Parameter	Sub-criterion	Result in minutes (linear joint seal no.)	
			Thickness wall 100 mm, thickness flexible wall 75 mm	
			Vertical	
			1	2
EN 1363-1:2020	Integrity (E)	– Cotton pad	98	98
EN 1366-4:2021	Integrity (E)	– Sustained flaming > 10 seconds	98	98
	Insulation (I)		70	76

FP 401 or FP 403 on aerated concrete (wall thickness 100 mm) and flexible wall (wall thickness 100 mm)

The summary of the test results achieved with FP 401 or FP 403 applied on aerated concrete wall/flexible wall in vertical linear joint seals is shown in Table 3.4. The FP 401 or FP 403 is applied over a depth of 15 mm with a PU backing on both sides (seal 3 and 4).

t3.4 Test results seal 3 and 4

Test method	Parameter	Sub-criterion	Result in minutes (linear joint seal no.)	
			Thickness wall 100 mm, thickness flexible wall 100 mm	
			Vertical	
			3	4
EN 1363-1:2020	Integrity (E)	– Cotton pad	120*	120*
EN 1366-4:2021	Integrity (E)	– Sustained flaming > 10 seconds	120*	120*
	Insulation (I)		120*	120*

The test was finished after 120 minutes in consultation with the client. After finishing the test, the criteria marked with a '*' where not reached yet.

FP 401 on flexible wall (wall thickness 75 mm) and aerated concrete floor (floor thickness 150 mm)

The summary of the test results achieved with FP 401 applied on flexible wall/aerated concrete floor in horizontal linear joint seals is shown in Table 3.5. The FP 401 is applied over the a depth of 12.5 mm on both sides (seal 5).

t3.5 Test results seal 5

Test method	Parameter	Sub-criterion	Result in minutes (linear joint seal no.)
			Thickness wall 75 mm, thickness floor 150 mm
			Horizontal
			5
EN 1363-1:2020	Integrity (E)	– Cotton pad	98
EN 1366-4:2021	Integrity (E)	– Sustained flaming > 10 seconds	98
	Insulation (I)		66

FP 401 on flexible wall (wall thickness 100 mm) and aerated concrete floor (floor thickness 150 mm)

The summary of the test results achieved with FP 401 applied on flexible wall/aerated concrete floor in horizontal linear joint seals is shown in Table 3.6. The FP 401 is applied over the a depth of 15 mm with a PU backing on both sides (seal 6).

t3.6 Test results seal 6

Test method	Parameter	Sub-criterion	Result in minutes (linear joint seal no.)
			Thickness wall 100 mm, thickness floor 150 mm
			Horizontal
			6
EN 1363-1:2020	Integrity (E)	– Cotton pad	120*
EN 1366-4:2021	Integrity (E)	– Sustained flaming > 10 seconds	120*
	Insulation (I)		120*

The test was finished after 120 minutes in consultation with the client. After finishing the test, the criteria marked with a '*' where not reached yet.

FP 401 or FP 403 on aerated concrete (wall thickness 100 mm)

The summary of the test results achieved with FP 401 or FP 403 applied on aerated concrete wall in vertical linear joint seals is shown in Table 3.7. The FP 401 or FP 403 is applied over a depth of 10 mm a PU backing on both sides (seal 7 and 8).

t3.7 Test results seal 7 and 8

Test method	Parameter	Sub-criterion	Result in minutes (linear joint seal no.)	
			Thickness wall 100 mm	
			Vertical	
			7	8
EN 1363-1:2020	Integrity (E)	– Cotton pad	120*	120*
EN 1366-4:2021	Integrity (E)	– Sustained flaming > 10 seconds	120*	120*
	Insulation (I)		120*	120*

The test was finished after 120 minutes in consultation with the client. After finishing the test, the criteria marked with a '' where not reached yet.*

FP 404 on aerated concrete (wall thickness 100 mm)

The summary of the test results achieved with FP 404 applied on aerated concrete wall in vertical linear joint seals is shown in Table 3.8. The FP 404 is applied over the full depth of the linear joint seal (seal 9 and 10).

t3.8 Test results seal 9 and 10

Test method	Parameter	Sub-criterion	Result in minutes (linear joint seal no.)	
			Thickness wall 100 mm	
			Horizontal	
			9	10
EN 1363-1:2020	Integrity (E)	– Cotton pad	104	42
EN 1366-4:2021	Integrity (E)	– Sustained flaming > 10 seconds	104	42
	Insulation (I)		104	40

4 Classification and field of application

4.1 Reference of classification

This classification has been carried out in accordance with Clause 7 of EN 13501-2:2023 and is valid for the field of application as given in this classification document. The field of application is based on the direct field of application.

4.2 FP 401 Acrylic joining flexible walls to rigid walls

A linear joint seal made out Bostik FP 401 Fireseal Acrylic applied in flexible walls to rigid walls is classified according to the following combinations of performance parameters and classes.

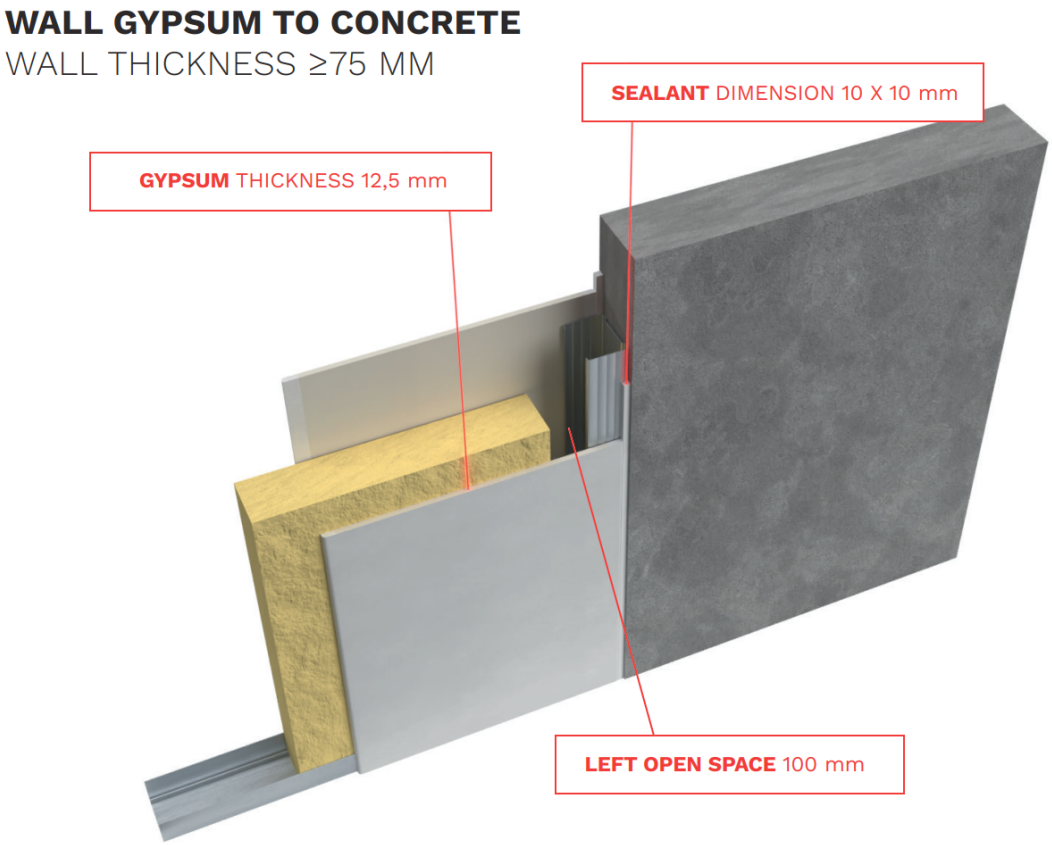
Fire resistance classification	
Applied at both faces	
Wall thickness ≥ 100 mm / flexible wall thickness ≥ 75 mm	**Joint depth (mm)**
EI 60 – V – X – F – W 5 to 10 / E 90 – V – X – F – W 5 to 10	**12.5**

E = Criterion integrity, I = Criterion insulation, V = Vertical application in a vertical wall, X = No movement applied, F = Splice applied in the field, W = Permitted width range in millimetres (depth see conditions)

The following conditions apply:

- the classifications are valid for a vertical orientation in a vertical wall, see Figure 4.1;
- the linear joint seals may be applied at both sides to any type of wall of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness of 100 mm at one side and a flexible wall with a minimal thickness of 75 mm on the other side. The classification covers flexible walls constructions:
  - with or without insulation;
  - which are classified for the required fire resistance;
  - with the overall board thickness of minimal 12.5 mm (each side);
  - with the number of layers of minimal 1 x 12.5 mm (each side);
  - with timber or metal studs.
- the steel (metal stud) profiles are fixed with impact plugs (Fisher N6x60) c.t.c. 400 mm against the rigid wall, the joint is between the gypsum and the rigid wall;
- the surfaces of the material on which the sealant is applied are thoroughly cleaned and treated with water when needed;
- the required depth of the sealant may also be increased with respect to the minimum seal depth;
- the classifications are valid for both directions.

f4.1 Wall gypsum to concrete, wall thickness ≥ 75 mm



Fire resistance classification	
Applied at both faces	
Wall thickness ≥ 100 mm / flexible wall thickness ≥ 100 mm **EI 120 – V – X – F – W 5 to 10**	**Joint depth (mm)** **15**

E = Criterion integrity, I = Criterion insulation, V = Vertical application in a vertical wall, X = No movement applied, F = Splice applied in the field, W = Permitted width range in millimetres (depth see conditions)

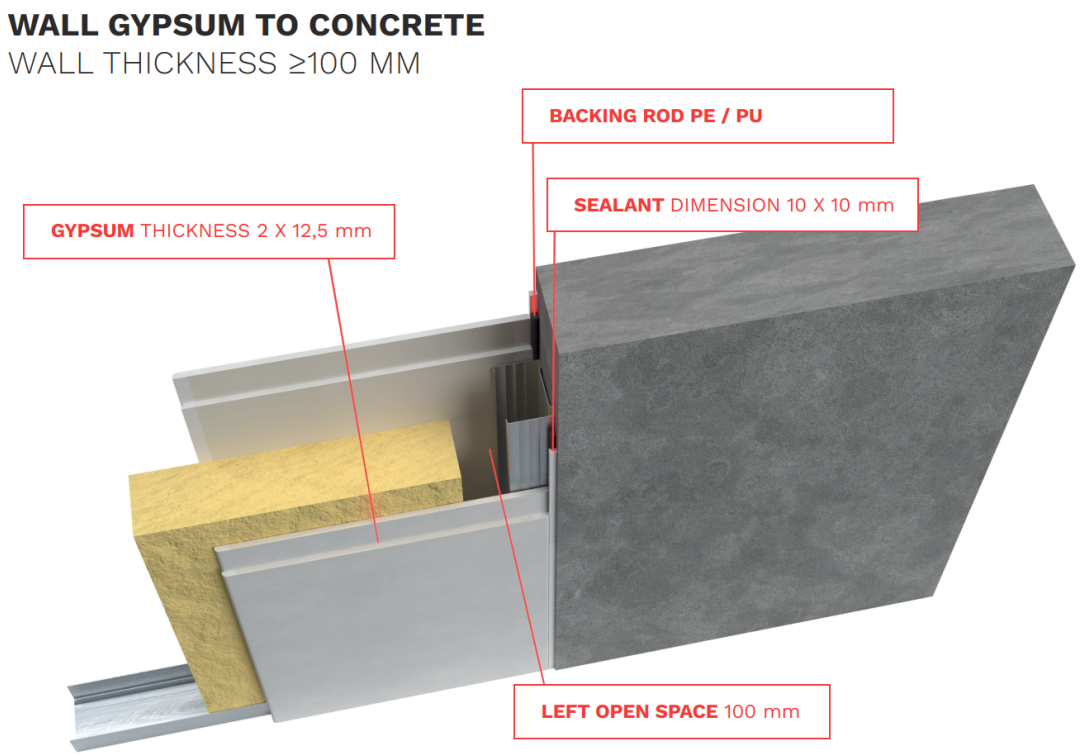
The following conditions apply:

- the classifications are valid for a vertical orientation in a vertical wall, see Figure 4.2;
- the linear joint seals may be applied at both sides to any type of wall of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness of 100 mm at one side and a flexible wall with a minimal thickness of 100 mm on the other side. The classification covers flexible walls constructions:
  - with or without insulation;
  - which are classified for the required fire resistance;
  - with the overall board thickness of minimal 25 mm (each side);

- with the number of layers of minimal 2 x 12.5 mm (each side);
- with timber or metal studs.

- the steel (metal stud) profiles are fixed with impact plugs (Fisher N6x60) c.t.c. 400 mm against the rigid wall, the joint is between the gypsum and the rigid wall;
- the surfaces of the material on which the sealant is applied are thoroughly cleaned and treated with water when needed;
- the use of suitable backing material is mandatory;
- the required depth of the sealant may also be increased with respect to the minimum seal depth;
- the classifications are valid for both directions.

f4.2 Wall gypsum to concrete, wall thickness ≥ 100 mm



4.3 FP 401 Acrylic joining flexible walls to rigid floors

A linear joint seal made out Bostik FP 401 Fireseal Acrylic applied in flexible walls to rigid floors is classified according to the following combinations of performance parameters and classes.

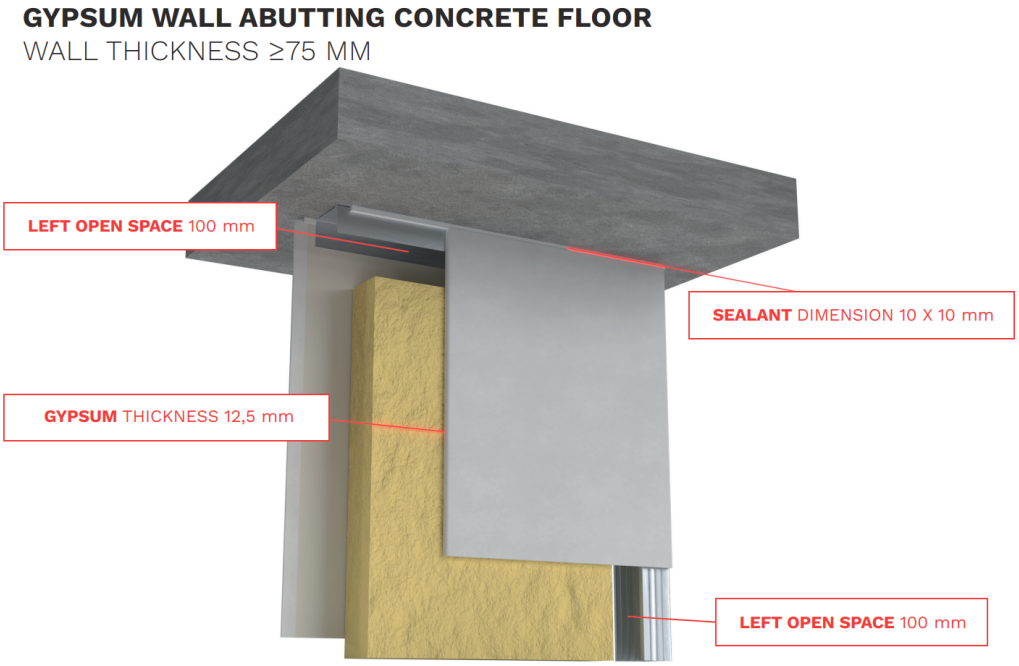
Fire resistance classification	
Applied at both faces	
Floor thickness ≥ 150 mm / flexible wall thickness ≥ 75 mm **EI 60 – T – X – F – W 5 to 10 / E 90 – T – X – F – W 5 to 10**	**Joint depth (mm)** **12.5**

E = Criterion integrity, I = Criterion insulation, T = horizontal application in a vertical wall, X = No movement applied,
F = Splice applied in the field, W = Permitted width range in millimetres (depth see table)

The following conditions apply:

- the classifications are valid for a horizontal orientation in a vertical wall abutting a floor, see Figure 4.3;
- the linear joint seals may be applied at both sides to a gypsum wall with a minimal thickness of 75 mm abutting any type of floor of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness of 150 mm. The classification covers flexible walls constructions:
  - with or without insulation;
  - which are classified for the required fire resistance;
  - with the overall board thickness of minimal 12.5 mm (each side);
  - with the number of layers of minimal 1 x 12.5 mm (each side);
  - with timber or metal studs.
- the steel (metal stud) profiles are fixed with impact plugs (Fisher N6x60) c.t.c. 400 mm against the rigid wall, the joint is between the gypsum and the rigid wall;
- the surfaces of the material on which the sealant is applied are thoroughly cleaned and treated with water when needed;
- the required depth of the sealant may also be increased with respect to the minimum seal depth;
- the classifications are valid for both directions.

f4.3 Wall gypsum to concrete floor, wall thickness ≥ 75 mm



Fire resistance classification	
Applied at both faces	
Floor thickness ≥ 150 mm / flexible wall thickness ≥ 100 mm **EI 120 – T – X – F – W 5 to 10**	**Joint depth (mm)** **15**

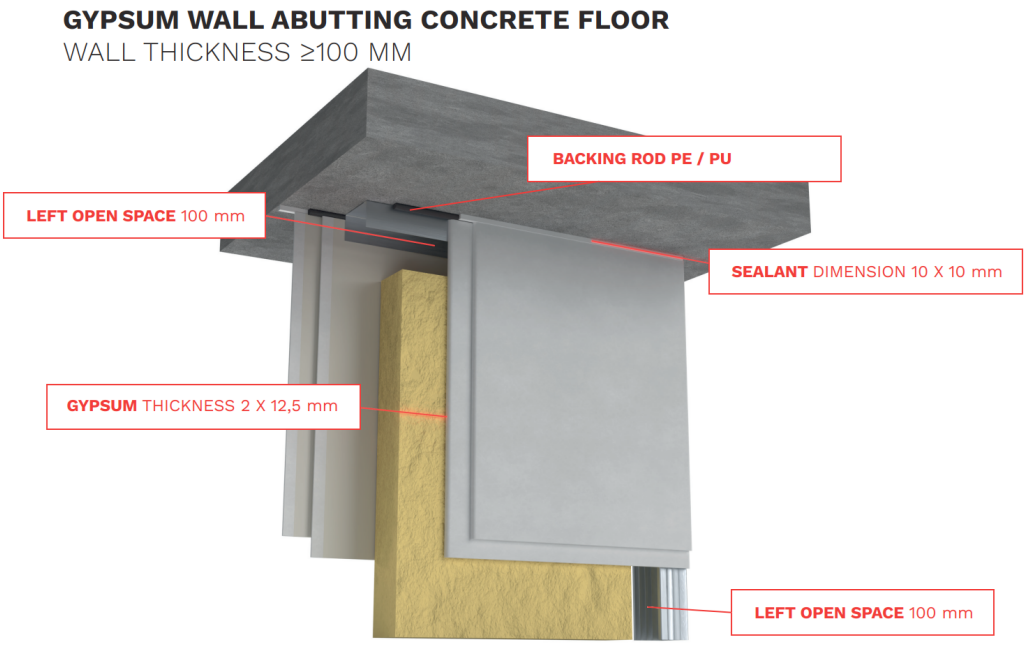
E = Criterion integrity, I = Criterion insulation, T = horizontal application in a vertical wall, X = No movement applied,
F = Splice applied in the field, W = Permitted width range in millimetres (depth see table)

The following conditions apply:

- the classifications are valid for a horizontal orientation in a vertical wall abutting a floor, see Figure 4.4;
- the linear joint seals may be applied at both sides to a gypsum wall with a minimal thickness of 100 mm abutting any type of floor of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness of 150 mm. The classification covers flexible walls constructions:
  - with or without insulation;
  - which are classified for the required fire resistance;
  - with the overall board thickness of minimal 25 mm (each side);
  - with the number of layers of minimal 2 x 12.5 mm (each side);
  - with timber or metal studs.

- the steel (metal stud) profiles are fixed with impact plugs (Fisher N6x60) c.t.c. 400 mm against the rigid floor, the joint is between the gypsum and the rigid floor;
- the surfaces of the material on which the sealant is applied are thoroughly cleaned and treated with water when needed;
- the use of suitable backing material is mandatory;
- the required depth of the sealant may also be increased with respect to the minimum seal depth;
- the classifications are valid for both directions.

f4.4 Wall gypsum to concrete floor, wall thickness ≥ 100 mm



4.4 FP 403 Hybrid joining flexible walls to rigid walls

A linear joint seal made out Bostik FP 403 Fireseal Hybrid applied in flexible walls to rigid walls is classified according to the following combinations of performance parameters and classes.

Fire resistance classification	
Applied at both faces	
Wall thickness ≥ 100 mm / flexible wall thickness ≥ 75 mm	**Joint depth (mm)**
EI 60 – V – X – F – W 5 to 10 / E 90 – V – X – F – W 5 to 10	**12.5**

E = Criterion integrity, I = Criterion insulation, V = Vertical application in a vertical wall, X = No movement applied, F = Splice applied in the field, W = Permitted width range in millimetres (depth see conditions)

The following conditions apply:

- the classifications are valid for a vertical orientation in a vertical wall;
- the linear joint seals may be applied at both sides to any type of wall of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness of 100 mm at one side and a flexible wall with a minimal thickness of 75 mm on the other side. The classification covers flexible walls constructions:
  - with or without insulation;
  - which are classified for the required fire resistance;
  - with the overall board thickness of minimal 12.5 mm (each side);
  - with the number of layers of minimal 1 x 12.5 mm (each side);
  - with timber or metal studs.
- the steel (metal stud) profiles are fixed with impact plugs (Fisher N6x60) c.t.c. 400 mm against the rigid wall, the joint is between the gypsum and the rigid wall;
- the surfaces of the material on which the sealant is applied are thoroughly cleaned and treated with water when needed;
- the required depth of the sealant may also be increased with respect to the minimum seal depth;
- the classifications are valid for both directions.

Fire resistance classification	
Applied at both faces	
Wall thickness ≥ 100 mm / flexible wall thickness ≥ 100 mm **EI 120 – V – X – F – W 5 to 10**	**Joint depth (mm)** **15**

E = Criterion integrity, I = Criterion insulation, V = Vertical application in a vertical wall, X = No movement applied, F = Splice applied in the field, W = Permitted width range in millimetres (depth see conditions)

The following conditions apply:

- the classifications are valid for a vertical orientation in a vertical wall;
- the linear joint seals may be applied at both sides to any type of wall of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness of 100 mm at one side and a flexible wall with a minimal thickness of 100 mm on the other side. The classification covers flexible walls constructions:
  - with or without insulation;
  - which are classified for the required fire resistance;
  - with the overall board thickness of minimal 25 mm (each side);
  - with the number of layers of minimal 2 x 12.5 mm (each side);
  - with timber or metal studs.
- the steel (metal stud) profiles are fixed with impact plugs (Fisher N6x60) c.t.c. 400 mm against the rigid wall, the joint is between the gypsum and the rigid wall;
- the surfaces of the material on which the sealant is applied are thoroughly cleaned and treated with water when needed;
- the use of suitable backing material is mandatory;
- the required depth of the sealant may also be increased with respect to the minimum seal depth;
- the classifications are valid for both directions.

4.5 FP 401 Acrylic connecting stone to stone

A linear joint seal made out Bostik FP 401 Fireseal Acrylic applied connecting stone to stone is classified according to the following combinations of performance parameters and classes.

Fire resistance classification	
Applied at both faces	
Wall thickness ≥ 100 mm **EI 120 – V – X – F – W 5**	**Joint depth (mm)** **10**

E = Criterion integrity, I = Criterion insulation, T = Horizontal application in a vertical wall,
X = No movement applied, F = Splice applied in the field, W = Permitted width range in millimetres (depth see conditions)

The following conditions apply:

- the classifications are valid for a vertical orientation in a vertical wall;
- the linear joint seals may be applied to any type of wall of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness of 100 mm;
- the surfaces of the material on which the sealant is applied are thoroughly cleaned and treated with water when needed;
- the required depth of the sealant may also be increased with respect to the minimum seal depth;
- the classifications are valid for both directions.

4.6 FP 403 Hybrid connecting stone to stone

A linear joint seal made out Bostik FP 403 Fireseal Hybrid applied connecting stone to stone is classified according to the following combinations of performance parameters and classes.

Fire resistance classification	
Applied at both faces	
Wall thickness ≥ 100 mm **EI 120 – V – X – F – W 5**	**Joint depth (mm)** **10**

E = Criterion integrity, I = Criterion insulation, T = Horizontal application in a vertical wall,
X = No movement applied, F = Splice applied in the field, W = Permitted width range in millimetres (depth see conditions)

The following conditions apply:

- the classifications are valid for a vertical orientation in a vertical wall;
- the linear joint seals may be applied to any type of wall of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness of 100 mm;
- the surfaces of the material on which the sealant is applied are thoroughly cleaned and treated with water when needed;
- the required depth of the sealant may also be increased with respect to the minimum seal depth;
- the classifications are valid for both directions.

4.7 FP 404 PU (Gun)Foam connecting stone to stone

A linear joint seal made out Bostik FP 404 Fire Retardant PU (Gun)Foam applied connecting stone to stone is classified according to the following combinations of performance parameters and classes.

Fire resistance classification
Wall thickness ≥ 100 mm **EI 90 – V – X – F – W 5 to 10** **EI 30 – V – X – F – W 10 to 30**

E = Criterion integrity, I = Criterion insulation, V = Vertical application in a vertical wall, X = No movement applied, F = Splice applied in the field, W = Permitted width range in millimetres (depth see conditions)

The following conditions apply:

- the classifications are valid for a vertical orientation in a vertical wall;
- the linear joint seals may be applied to any type of wall of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness of 100 mm;
- the surfaces of the material on which the sealant is applied are thoroughly cleaned and treated with water when needed;
- the Bostik FP 404 Fire Retardant PU (Gun)Foam is filled over the full depth of the linear joint seal;
- the classifications are valid for both directions.

5 Limitations

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

Haps,

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D.J. Den Boer, BSc.
Management

This report contains 23 pages