

## Laboratory for Fire Safety

### Summary of a fire resistance test:

#### *Bostik FP 403 Fireseal Hybrid connecting stone to stone*

On behalf of Bostik Benelux BV, six tests were performed for determination of the fire resistance of several linear joint seals with Bostik FP 403 Fireseal Hybrid (further called FP 403 Fireseal Hybrid or Bostik FP 403) in walls or floors of aerated concrete. The tests are performed in accordance with the European standard EN 1366-4:2006+A1:2010 and EN 1366-4:2021 using the standard heating curve.

This summary provides an outline of the product performance and the conclusions of the test. For a complete description of the examined linear joint seals, please refer to the reports mentioned in the footnote.

Based on the test performed in accordance with EN 1366-4:2006+A1:2010, EN 1366-4:2021 and the extended application in accordance with EN 15882-4:2012, the system was classified in accordance with EN 13501-2:2007+A1:2009 and EN 13501-2:2016.

Taking into account the possible classification times mentioned in the standard, a linear joint seal made out of FP 403 Fireseal Hybrid, is classified according to the following combinations of performance parameters and classes.




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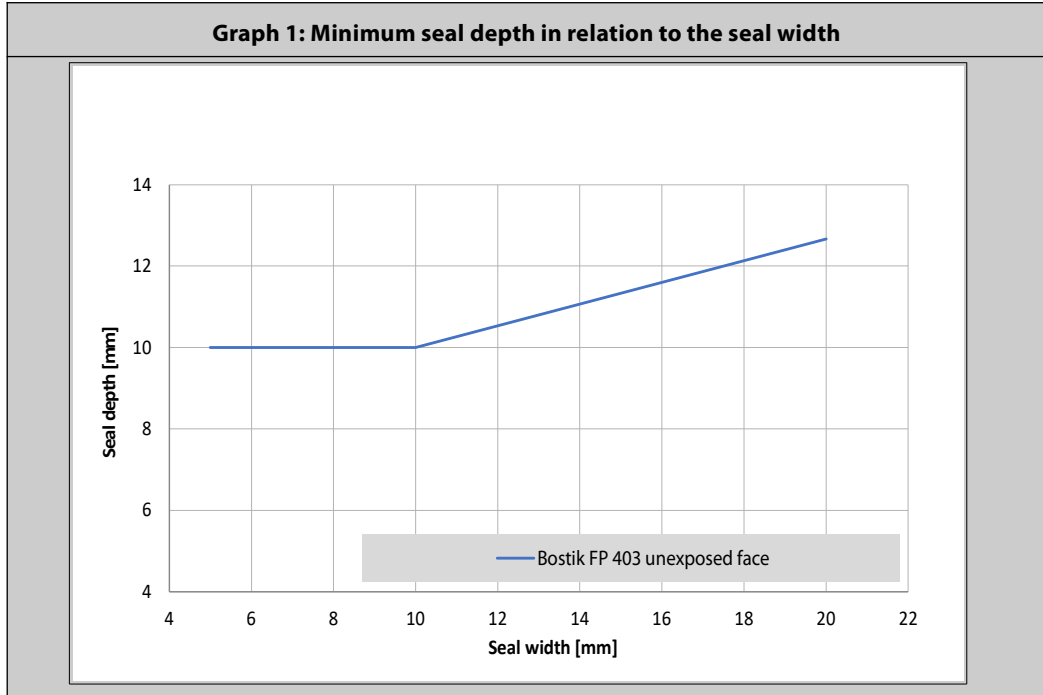
<b>Fire resistance classification (vertical linear joint seals in a stone wall)</b>
<b>Connecting stone to stone wall <math>\geq 70</math> mm</b>
<b>Bostik FP 403 unexposed face</b>  EI 60 – V – X – F – W 5 to 10  EI 45 – V – X – F – W 10 to 20  E 240 – V – X – F – W 5 to 20

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 (see Graph 1 for seal depth)

The following conditions apply:

- the classifications are valid for linear joint seals in a wall with an orientation as mentioned (vertical);
- the linear joint seals may connect to any type of wall of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness of 70 mm;
- the surfaces of the material on which FP 403 Fireseal Hybrid is applied are thoroughly cleaned and treated with primer and moistened with water when needed;
- the use of suitable PE / PU backing material is mandatory;
- the depth of FP 403 Fireseal Hybrid depends on the width of the linear joint seal. The minimum depth of FP 403 Fireseal Hybrid in relation to the width of the linear joint seal is shown in Graph 1 below. The depth of the sealant may also be increased with respect to the Graph (the lines are the minimum and recommended seal depth);
- the allowed movement capability in practice is maximized to 7.5 %;
- when FP 403 Fireseal Hybrid is applied at one face, the classifications are valid with FP 403 Fireseal Hybrid at the unexposed face.

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**Fire resistance classification  
(vertical linear joint seals in a stone wall)**

**Connecting stone to stone  
wall ≥ 100 mm**

Bostik FP 403 exposed face, Bostik FP 404 unexposed face	Bostik FP 403 applied at exposed face	Bostik FP 403 applied at unexposed face	Bostik FP 403 applied at both faces
EI 45 - V - X - F - W 8 to 40	EI 60 - V - X - F - W 5 to 40	EI 60 - V - X - F - W 5 to 40	EI 240 - V - X - F - W 5 to 50
EI 120 - V - X - F - W 8 to 40	E 120 - V - X - F - W 5 to 40	E 240 - V - X - F - W 5 to 40	EI 180 - V - X - F - W 50 to 60
	EI 120 - T - X - F - W 5 to 50	EI 90 - T - X - F - W 5 to 50	E 240 - V - X - F - W 5 to 60
	E 180 - T - X - F - W 5 to 50	E 240 - T - X - F - W 5 to 50	

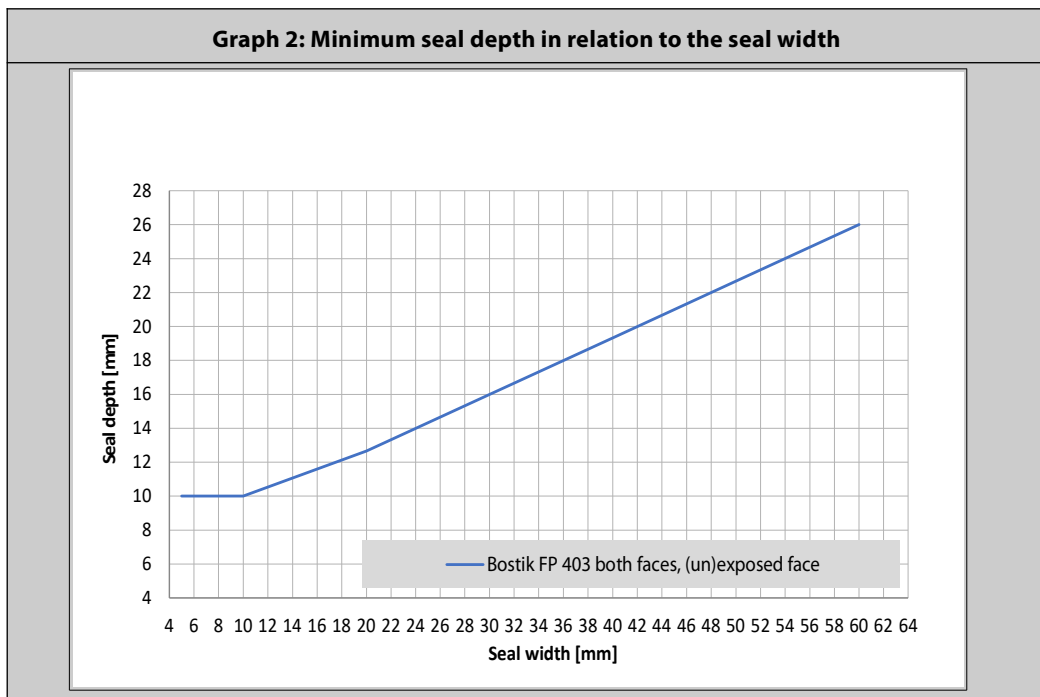
E = Criterion integrity, I = Criterion insulation, V = Vertical application in a vertical wall, T = Horizontal application in a vertical wall,  
X = No movement applied, F = Splice applied in the field, W = Permitted width range in millimetres (see Graph 2 for seal depth)

The following conditions apply:

- the classifications are valid for linear joint seals in a wall with an orientation as mentioned (vertical or horizontal);
- the linear joint seals may connect 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;

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- the surfaces of the material on which FP 403 Fireseal Hybrid or FP 404 Fire Retardant PU (Gun)Foam is applied are thoroughly cleaned and treated with primer and moistened with water when needed;
- except for the linear joint seal in combination with FP 404 Fire Retardant PU (Gun)Foam, the use of suitable PE / PU backing material is mandatory;
- the depth of FP 403 Fireseal Hybrid depends on the width of the linear joint seal. The minimum depth of FP 403 Fireseal Hybrid in relation to the width of the linear joint seal is shown in Graph 2 below. The depth of the sealant may also be increased with respect to the Graph (the lines are the minimum and recommended seal depth). Where the rest of the slot is fully filled with FP 404 Fire Retardant PU (Gun)Foam the seal depth of the FP 403 Fireseal Hybrid is minimal 3 mm;
- the allowed movement capability in practice is maximized to 7.5 %;
- when FP 403 Fireseal Hybrid is applied at both faces, the classifications are valid for both directions. When FP 403 Fireseal Hybrid is applied at one face, the classifications are valid with FP 403 Fireseal Hybrid at the unexposed face or at the exposed face.




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Fire resistance classification (vertical linear joint seals in a stone wall)		
Connecting stone to stone wall $\geq 115$ mm		
Bostik FP 403 unexposed face, Bostik FP 404 exposed face	Bostik FP 403 applied at unexposed face	Bostik FP 403 applied at both faces
EI 180 – V – X – F – W 8 to 25	EI 60 – V – X – F – W 5 to 20	EI 240 – V – X – F – W 5 to 30
EI 240 – V – X – F – W 8	EI 180 – V – X – F – W 5	E 240 – V – X – F – W 5 to 30
E 240 – V – X – F – W 8 to 25	E 240 – V – X – F – W 5 to 20	

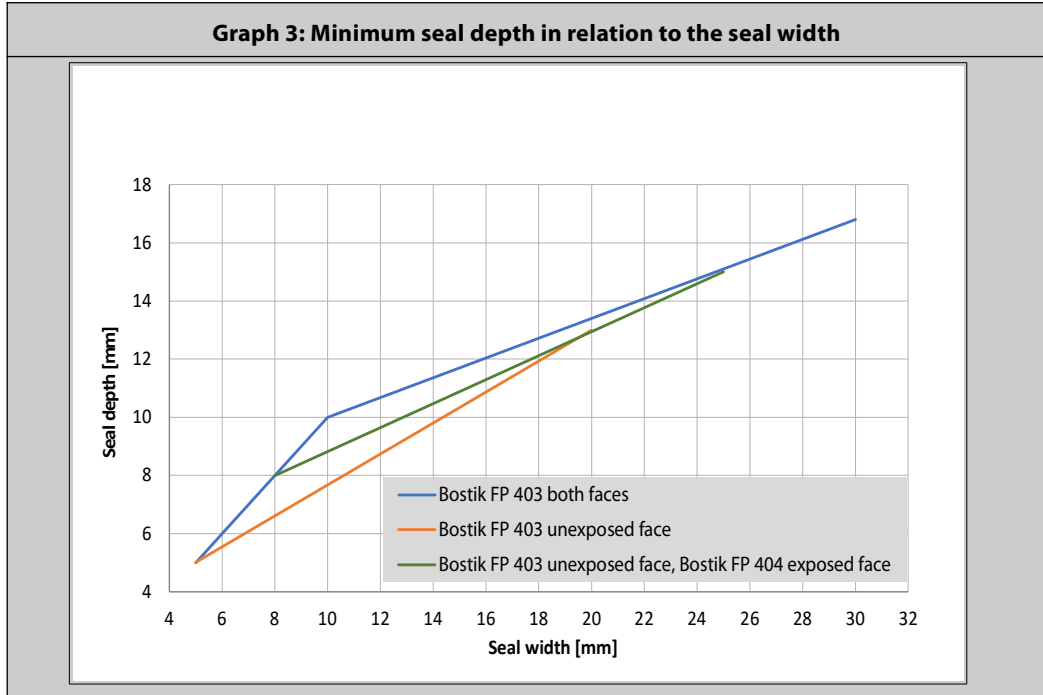
E = Criterion integrity, I = Criterion insulation, V = Vertical application in a vertical wall, X = No movement applied, F = Splice applied in the field, W = Permitted width range in millimetres (see Graph 3 for seal depth)

The following conditions apply:

- the classifications are valid for linear joint seals in a wall with an orientation as mentioned (vertical);
- the linear joint seals may connect to any type of wall of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness of 115 mm;
- the surfaces of the material on which FP 403 Fireseal Hybrid or FP 404 Fire Retardant PU (Gun)Foam is applied are thoroughly cleaned and treated with primer and moistened with water when needed;
- except for the linear joint seal in combination with FP 404 Fire Retardant PU (Gun)Foam, the use of suitable PE / PU backing material is mandatory;
- the depth of FP 403 Fireseal Hybrid depends on the width of the linear joint seal. The minimum depth of FP 403 Fireseal Hybrid in relation to the width of the linear joint seal is shown in Graph 3 below. The depth of the sealant may also be increased with respect to the Graph (the lines are the minimum and recommended seal depth). When applicable, the rest of the slot is fully filled with FP 404 Fire Retardant PU (Gun)Foam;
- the allowed movement capability in practice is maximized to 7.5 %;
- when FP 403 Fireseal Hybrid is applied at both faces, the classifications are valid for both directions. When FP 403 Fireseal Hybrid is applied at one face, the classifications are valid with FP 403 Fireseal Hybrid at the unexposed face.

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**Graph 3: Minimum seal depth in relation to the seal width**



**Fire resistance classification  
(vertical linear joint seals in a stone wall)**

Connecting stone to stone wall $\geq 150$ mm			Connecting stone to stone wall $\geq 200$ mm
<b>Bostik FP 403 exposed face, Bostik FP 404 unexposed face</b>	<b>Bostik FP 403 applied at exposed face</b>	<b>Bostik FP 403 applied at unexposed face</b>	<b>Bostik FP 403 exposed face, Bostik FP 404 unexposed face</b>
EI 60 – V – X – F – W 8 to 50	EI 45 – T – X – F – W 5 to 50 E 240 – T – X – F – W 5 to 50	EI 90 – T – X – F – W 5 to 50 E 240 – T – X – F – W 5 to 50	EI 120 – V – X – F – W 8 to 50

E = Criterion integrity, I = Criterion insulation, V = Vertical application in a vertical wall, T = Horizontal application in a vertical wall, X = No movement applied, F = Splice applied in the field, W = Permitted width range in millimetres (see Graph 4 for seal depth)

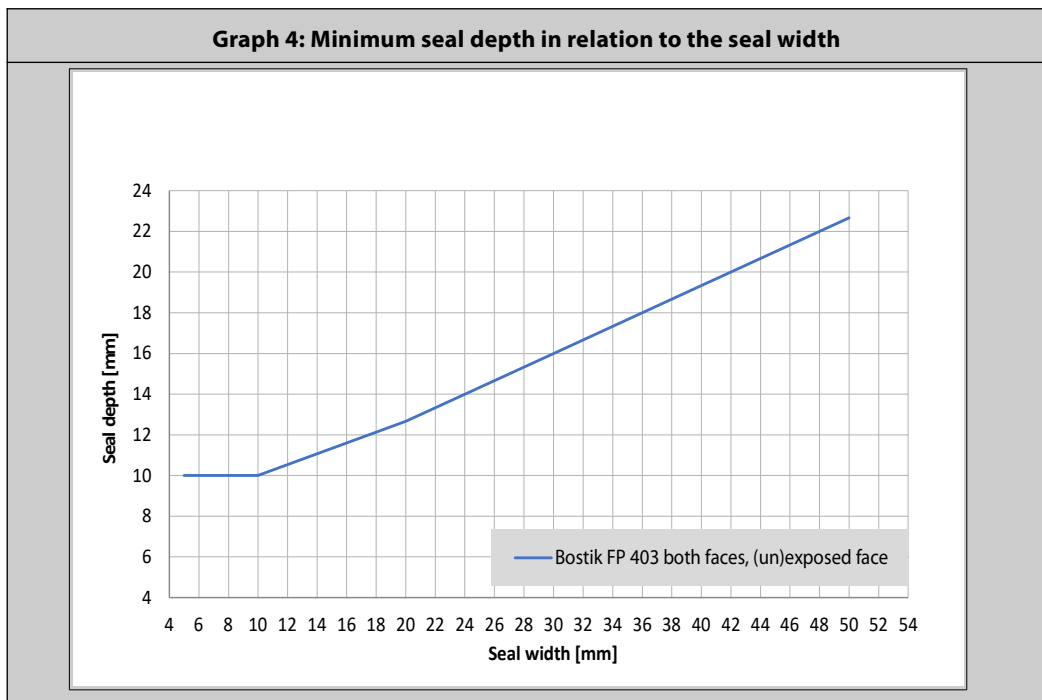
The following conditions apply:

- the classifications are valid for linear joint seals in a wall with an orientation as mentioned (vertical or horizontal);
- the linear joint seals may connect to any type of wall of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness of 150 mm or 200 mm;
- the surfaces of the material on which FP 403 Fireseal Hybrid or FP 404 Fire Retardant PU (Gun)Foam is applied are thoroughly cleaned and treated with primer and moistened with water when needed;

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- except for the linear joint seal in combination with FP 404 Fire Retardant PU (Gun)Foam, the use of suitable PE / PU backing material is mandatory;
- the depth of FP 403 Fireseal Hybrid depends on the width of the linear joint seal. The minimum depth of FP 403 Fireseal Hybrid in relation to the width of the linear joint seal is shown in Graph 4 below. The depth of the sealant may also be increased with respect to the Graph (the lines are the minimum and recommended seal depth). Where the rest of the slot is fully filled with FP 404 Fire Retardant PU (Gun)Foam the seal depth of the FP 403 Fireseal Hybrid is minimal 3 mm;
- the allowed movement capability in practice is maximized to 7.5 %;
- when FP 403 Fireseal Hybrid is applied at both faces, the classifications are valid for both directions. When FP 403 Fireseal Hybrid is applied at one face, the classifications are valid with FP 403 Fireseal Hybrid at the unexposed face or exposed face.

**Graph 4: Minimum seal depth in relation to the seal width**



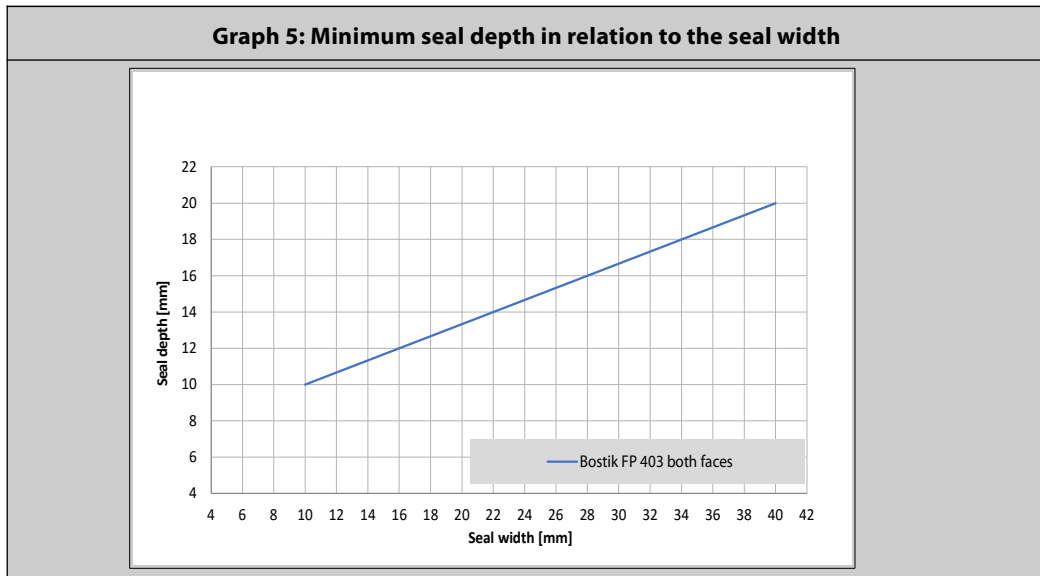
<p>This summary consists out of 11 pages. The classification reports that form the basis for this summary are available for inspection at the client and are registered as YB 1567-3E-RA, dated February, 2020, 18565C dated September 28, 2017, YA 2500-2E-RA-003 dated October 5, 2022 and YB 2088-1E-RA-001 dated November 18, 2019.</p>	<p><b>Reference</b> HL/RO//YB 2500-3E-RA-002 13 October 2022</p>	<p><b>Page</b> 7/11</p>	<p><b>Initials</b> <i>[Signature]</i></p>
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<b>Fire resistance classification</b> <b>(horizontal linear joint seals in a stone wall and a wall abutting a floor)</b> <b>Bostik FP 403 connecting stone to stone, applied at both faces</b> <b>Wall / floor with thickness <math>\geq 100</math> mm</b>
EI 240 – T – M 25 – F – W 10 to 30 EI 180 – T – M 25 – F – W 30 to 40 E 240 – T – M 25 – F – W 10 to 40

E = Criterion integrity, I = Criterion insulation, T = Horizontal application in a vertical wall and a wall abutting a floor, M = Movement induced in %, F = Splice applied in the field, W = Permitted width range in millimetres (see Graph 5 for seal depth)

The following conditions apply:

- the classifications are valid for linear joint seals in a wall and a wall abutting a floor, ceiling or roof with an orientation as mentioned (horizontal);
- the linear joint seals may connect to any type of construction of aerated concrete (class G4/600 or heavier), concrete, block work or masonry with a minimal thickness as mentioned (100 mm);
- the surfaces of the material on which FP 403 Fireseal Hybrid is applied are thoroughly cleaned and treated with Primer when needed;
- the use of suitable PE / PU backing material is mandatory;
- the required depth of FP 403 Fireseal Hybrid depends on the width of the linear joint seal. The minimum depth of FP 403 Fireseal Hybrid in relation to the width of the linear joint seal is shown in Graph 5 below. The required depth of the sealant may also be increased with respect to the Graph (the line gives the minimum and recommended seal depth);
- deformation of the linear joint seals in practice is maximized to 25 %;
- the classifications are valid for both directions.



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Fire resistance classification (linear joint seals in a floor with thickness $\geq 100$ mm)	
Applied at exposed side	Applied at unexposed side
EI 90 – H – X – F – W 10 EI 30 – H – X – F – W 10 to 40 E 120 – H – X – F – W 10 to 40	EI 120 – H – X – F – W 10 EI 60 – H – X – F – W 10 to 40 E 120 – H – X – F – W 10 to 25 E 60 – H – X – F – W 40

E = Criterion integrity, I = Criterion insulation, H = Horizontal supporting construction (floor), X = No movement applied  
 F = Splice applied in the field, W = Permitted width range in millimetres (see Graph 3 for seal depth)

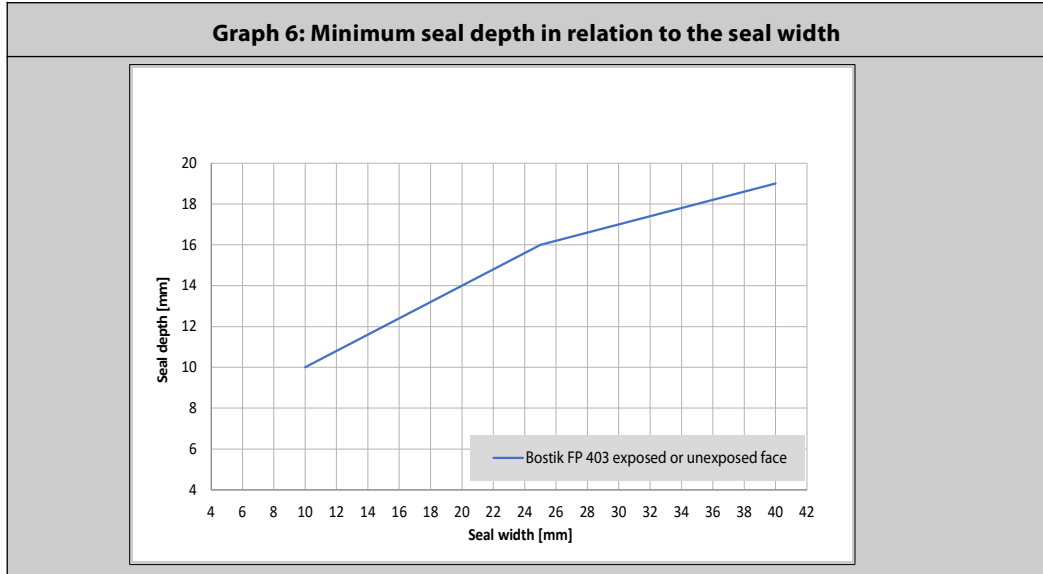
Fire resistance classification (linear joint seals in a wall abutting a floor with thickness both $\geq 100$ mm)	
Applied at exposed side	Applied at unexposed side
EI 90 – T – X – F – W 10 EI 30 – T – X – F – W 10 to 40 E 120 – T – X – F – W 10 to 40	EI 120 – T – X – F – W 10 EI 60 – T – X – F – W 10 to 40 E 120 – T – X – F – W 10 to 25 E 60 – T – X – F – W 40

E = Criterion integrity, I = Criterion insulation, T = Horizontal application in a wall abutting a floor, X = No movement applied,  
 F = Splice applied in the field, W = Permitted width range in millimetres (see Graph 6 for seal depth)

The following conditions apply:

- the linear joint seals may be applied at any type of floor and / or wall of aerated concrete (class G4/600 or heavier), concrete, block work, limestone or masonry with a minimal thickness as mentioned above. In a floor application, the fire resistance applies from below. The fire resistance in a wall abutting a floor application is valid from one side;
- the classifications are not valid for horizontally orientated joints in a wall;
- the surfaces of the material on which the FP 403 Fireseal Hybrid is applied are thoroughly cleaned and treated with Primer when needed;
- the use of suitable PE / PU backing material is mandatory;
- the required depth of the FP 403 Fireseal Hybrid depends on the width of the linear joint seal. The minimal depth of the sealant in relation to the width of the linear joint seal is shown in Graph 6 below. The required depth of the sealant may also be increased with respect to the Graph (the line gives the minimum and recommended seal depth);
- the allowed movement capability in practice is maximized to 7.5%.

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<b>Fire resistance classification</b>
<b>Applied at both faces</b>
<p><b>Wall abutting a floor</b></p> <p><b>Wall thickness <math>\geq</math> 100 mm / Floor thickness <math>\geq</math> 150 mm</b></p> <p>EI 240 – T – X – F – W 5 to 50</p>
<b>Applied at exposed face</b>
<p><b>Wall abutting a floor</b></p> <p><b>Wall thickness <math>\geq</math> 100 mm / Floor thickness <math>\geq</math> 150 mm</b></p> <p>EI 30 – T – X – F – W 5 to 50</p> <p>E 180 – T – X – F – W 5 to 50</p>

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

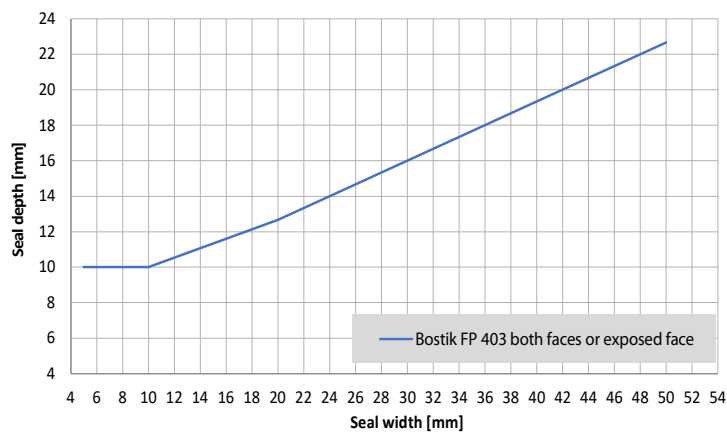
The following conditions apply:

- the classifications are valid for a horizontal orientation in a vertical wall or for a horizontal orientation in a vertical wall abutting a horizontal floor;

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- the linear joint seals may be applied at both sides or one side 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 for the wall and a minimal thickness of 150 mm for the floor;
- the surfaces of the material on which the sealant is applied are thoroughly cleaned and treated with Primer when needed;
- the use of suitable PE / PU backing material is mandatory;
- the required depth of the FP 403 Fireseal Hybrid depends on the width of the linear joint seal. The minimal depth of the sealant in relation to the width of the linear joint seal is shown in Graph 7. The required depth of the sealant may also be increased with respect to the Graph (the line gives the minimum and recommended seal depth);
- the linear joint seals are tested without mechanically induced movement, therefore the allowed movement capability in practice is maximized to 7.5 %;
- the classifications are valid for the tested directions.

**Graph 7: Minimum seal depth in relation to the seal width**



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