

FIRE RESISTANCE CLASSIFICATION REPORT No. 18190D

Owner of the classification report:

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Introduction:

This classification report defines the classification assigned to single pipe penetration seals in wall constructions, seal type: Walraven BIS Pacifyre® EFC Fire Collar, in accordance with the procedures given in EN 13501-2: 2016 Fire classification of products and building elements – Part 2: Classification using data from fire resistance tests, excluding ventilation services.

This classification report consists of 14 pages and 1 annex and may only be used or reproduced in its entirety.

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1 Details of classified product

1.1 General

The classified product is defined as a single pipe penetration seal, type: Walraven BIS Pacifyre® EFC Fire Collar.

It is evaluated in respect of the fire performance characteristics given in clause 5 of EN 13501-2.

1.2 Description

The penetration seal Walraven BIS Pacifyre® EFC Fire Collar is fully described below, in support of this classification report, listed in paragraph 2.1. Drawings are enclosed in annex 1 of this classification report.

The sealing system is installed in the aperture in the supporting construction.

1.2.1 Penetration seal

Walraven BIS Pacifyre® EFC Fire Collar

Pipe sealing – brand and type: Walraven BIS Pacifyre® EFC Fire Collar.

- number: 2, one at each side of the wall;
- position:
 - installed around the pipe;
 - inside the wall flush with the surface of the wall;
- composition:
 - an intumescent strip is winded around the pipe insulation;
brand and type: Walraven BIS Pacifyre® IM3 – material: glass fibre mesh reinforced graphite strip – section dimensions: 40 mm x 2.25 mm (NV) – fixed by means of the self-adhesive layer (minimal overlap of 15 mm).
 - a fixing band is winded around the intumescent strip for pipe diameters from 50 mm and more;
brand and type: Walraven BIS Pacifyre® EFC Band – material: steel sheet – section dimensions: 42.5 mm x 3.8 mm – sheet thickness: 0.5 mm (NV) - closed by means of its fixing lips slided over one-another (minimal overlap of two band segments).
- fixing:

- the fixing band is clamped inside the supporting construction aperture with the bended side of the fixing band flush with the surface of the wall.

Annular sealing –layer thickness on both side of the wall: 25 mm –

- type:
 - o Pacifyre® A – Acrylate dispersion;
 - o Tangit Fire Protection FP430 –1-component expanding acrylate kit;
 - o Pacifyre® S – polysiloxane;
 - o Pacifyre® H –SMX-technology™.
- position:
 - in the gap between the pipe seal and the aperture edge;
 - a layer on both sides of the backfilling, flush with the wall surfaces.
- backfilling:
 - material: stone wool insulation, density: 100 kg/m³, thickness: 50 mm;
 - position: in between both layers of the annular sealing, in the centre of the wall.

1.2.2 Flexible wall construction used in the test

The standard flexible wall construction with a thickness of 100 mm is composed of a steel frame (thickness: 50 mm), covered with two layers of gypsum boards (type F in accordance with EN 520, thickness: 12.5 mm) on both sides. The wall is insulated inside with stone wool boards (thickness: 50 mm, density: 100 kg/m³). Stone wool insulation is not removed 100 mm around the apertures.

1.2.3 Service support construction

The first support of the pies has been installed at a distance of 500 mm from the wall surface.

1.2.4 Seal design variations

- Walraven BIS Pacifyre® EFC Fire Collars installed around the pipe inside the wall, one at each side of the wall. Annular sealing by means of Pacifyre® A, Tangit Fire Protection FP430, Pacifyre® S or Pacifyre® H.

Flexible walls require an aperture framing made by:

- gypsum boards (thickness \geq 12.5 mm) with the same width of the wall thickness or;

- a stone wool (density: $\geq 100 \text{ kg/m}^3$) insulation ring inside the wall, installed tight fit around the pipe insulation, with a width of at least 100 mm and a thickness which is the same of the width of the wall studs.

2 Test reports and test results in support of the classification

2.1 Test reports

Name of the laboratory that carried out the test	Identification number of the reports	Owner of the report	Date of the test	Test method
WFRGENT nv	18190A	J. Van Walraven Holding B.V.	07/02/2017	EN 1366-3:2009
WFRGENT nv	17818A	J. Van Walraven Holding B.V.	17/06/2016	EN 1366-3:2009

Exposure conditions during the fire resistance test:

Temperature/time curve: standard as in EN 1363-1:2012.

Direction of exposure:

- wall construction: the test specimens were exposed to the fire from one side.

The penetration seals are positioned fully symmetrically.

In test No. 18190, PE pipes 110 x 2.7 and 110 x 10.0 tested as single pipe with separation 200 mm were the most critical pipes for a classification time of 60 minutes. These pipes were also tested with a separation of 0 mm between two adjacent pipes (= zero distance). For this reason all tested PE pipes with a diameter ≤ 110 mm can be EI 60 classified for maximum of two adjacent pipes with a separation of 0 mm (= zero distance).

2.2 Test results

Test report No. 18190A

Observations				Exceeded [minutes]			
No.	Position	Pipe Material	Pipe ø x wall thickness [mm]	Thermal insulation – I	Integrity – E		
				$\Delta T_M = 180^\circ\text{C}$	Ignition of cotton pad	Spontaneous and sustained flaming	Failure with gap gauge
1	D2	PE	40 x 3.0	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
2	D5	PE	40 x 5.5	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
3	C2	PE	50 x 3.0	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
4	C5	PE	50 x 4.6	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
5	B5	PE	110 x 2.7	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
6	A5	PE	110 x 10	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
7	B2	PE	160 x 4.0	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
8	A2	PE	160 x 9.5	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
9	D6	PP	40 x 1.8	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
10	D4	PP	40 x 5.5	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
11	C3	PP	50 x 2.0	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
12	C4	PP	50 x 6.9	125	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
13	B3	PP	110 x 2.7	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
14	A3	PP	110 x 10	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
15	B4	PP	160 x 4.0	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
16	A4	PP	160 x 9.1	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
17	E3	PVC	40 x 1.8	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
18	E3	PVC	40 x 3.0	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
19	C1	PVC	50 x 1.8	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
20	C6	PVC	50 x 5.6	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
21	B1	PVC	110 x 2.2	128	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾

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Observations				Exceeded [minutes]			
No.	Position	Pipe Material	Pipe \varnothing x wall thickness [mm]	Thermal insulation – I	Integrity – E		
				$\Delta T_M = 180^\circ\text{C}$	Ignition of cotton pad	Spontaneous and sustained flaming	Failure with gap gauge
22	A1	PVC	110 x 12.3	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
23	B6	PVC	160 x 3.2	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
24	A6	PVC	160 x 11.8	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
28	D1	PE	110 x 10.0	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
29		PE	110 x 2.7	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
30		PP	110 x 3.6	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾

⁽¹⁾ 132 minutes, no failure. The test was discontinued after 132 minutes.

Test report No. 17818A

Observations		Exceeded (minutes)			
Position	Pipe material	Thermal insulation – I*	Integrity – E*		
		$\Delta T_M = 180^\circ\text{C}$	Ignition of cotton pad	Spontaneous and sustained flaming	Failure with gap gauge
Tangit Fire Protection FP430					
4	PE	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
5	PVC	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
6	PP	130	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
Pacifyre® A					
7	PE	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
8	PVC	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
9	PP	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
Pacifyre® H					
10	PE	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
11	PVC	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
12	PP	121	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
Pacifyre® S					
13	PE	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
14	PVC	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾
15	PP	126	132 ⁽¹⁾	132 ⁽¹⁾	132 ⁽¹⁾

⁽¹⁾ 132 minutes, no failure. The test was discontinued after 132 minutes.

3 Classification and field of application

3.1 Reference of classification

This classification has been carried out in accordance with clause 7 of EN 13501-2:2016.

3.2 Classification

3.2.1 Single pipe penetration seals in a wall construction – fire collar inside the wall (separation between adjacent pipes ≥ 200 mm)

Seal type i) according to § 1.2:

PE pipes (EN 12201-2, EN 1519-1 and EN 12666-1) ABS pipes (EN 1455-1) SAN+PVC pipes (EN 1565-1)					
pipe		Pipe sealing		annular sealing	
\varnothing (mm)	wall thickness (mm)	type	No. of layers of intumescent strip	type	annular space a_1 (mm)
≤ 40	3.0 to 5.5	BIS Pacifyre® EFC	1	Pacifyre® A, Tangit Fire Protection FP430, Pacifyre® S or Pacifyre® H.	0 - 15
≤ 50	3.0 to 4.6		2		
≤ 110	2.7 to 10.0		4		
≤ 160	4.0 to 9.5		8		

EI 120-U/C, EI 90-U/C, EI 60-U/C, EI 45-U/C,

EI 30-U/C, EI 20- U/C, EI 15- U/C

E 120-U/C, E 90-U/C, E 60- U/C, E 45- U/C,

E 30- U/C, E 15- U/C

PP pipes (EN ISO 1873 / Onörm B5174-1 / B5014 / Din 8077/8078)					
pipe		Pipe sealing		annular sealing	
Ø (mm)	wall thickness (mm)	type	No. of layers of intumescent strip	type	annular space a ₁ (mm)
≤ 40	1.8 to 5.5	BIS Pacifyre® EFC	1	Pacifyre® A, Tangit Fire Protection FP430, Pacifyre® S or Pacifyre® H.	0 - 15
≤ 50	2.0 to 6.9		2		
≤ 110	2.7 to 10.0		4		
≤ 160	4.0 to 9.1		8		

EI 120-U/C, EI 90-U/C, EI 60-U/C, EI 45-U/C,
EI 30-U/C, EI 20- U/C, EI 15- U/C

E 120-U/C, E 90-U/C, E 60- U/C, E 45- U/C,
E 30- U/C, E 15- U/C

PVC-U pipes (EN 1329-1, EN 1453-1 and EN 1452-1) PVC-C pipes (EN 1566-1)					
pipe		Pipe sealing		annular sealing	
Ø (mm)	wall thickness (mm)	type	No. of layers of intumescent strip	type	annular space a ₁ (mm)
≤ 40	1.8 to 3.0	BIS Pacifyre® EFC	1	Pacifyre® A, Tangit Fire Protection FP430, Pacifyre® S or Pacifyre® H.	0 - 15
≤ 50	1.8 to 5.6		2		
≤ 110	2.2 to 12.3		4		
≤ 160	3.2 to 11.8		8		

EI 120-U/C, EI 90-U/C, EI 60-U/C, EI 45-U/C,
EI 30-U/C, EI 20- U/C, EI 15- U/C

E 120-U/C, E 90-U/C, E 60- U/C, E 45- U/C,
E 30- U/C, E 15- U/C

3.2.2 Single pipe penetration seals in a wall construction – fire collar inside the wall (maximum 2 pipes with separation between pipes ≥ 0 mm)

Seal type i) according to § 1.2:

PE pipes (EN 12201-2, EN 1519-1 and EN 12666-1) ABS pipes (EN 1455-1) SAN+PVC pipes (EN 1565-1)					
pipe		Pipe sealing		annular sealing	
\varnothing (mm)	wall thickness (mm)	type	No. of layers of intumescent strip	type	annular space a_1 (mm)
≤ 40	3.0 to 5.5	BIS Pacifyre® EFC	1	Pacifyre® A, Tangit Fire Protection FP430, Pacifyre® S or Pacifyre® H.	0 - 15
≤ 50	3.0 to 4.6		2		
≤ 110	2.7 to 10.0		4		

EI 60-U/C, EI 45-U/C, EI 30-U/C, EI 20- U/C, EI 15- U/C

E 60- U/C, E 45- U/C, E 30- U/C, E 15- U/C

3.3 Field of direct application

3.3.1 Orientation

The classifications given in § 3.2.1 are applicable in walls.

3.3.2 Supporting construction

- the test results may be applied to all flexible wall constructions provided:
 - the construction is classified in accordance with EN 13501-2;
 - the construction has an overall thickness equal to or greater than 100 mm;
 - at least two layers of board layers are applied on both sides of the construction;
 - flexible walls with timber studs are constructed with two layers of boards on both sides, 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 minimum 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;
 - aperture framing or (local) wall insulation is needed. See § 1.2.5.
- the test results may be applied to concrete or masonry elements with an overall thickness equal or greater than 100 mm;
- the test results do not cover sandwich panel constructions and flexible walls where the lining does not cover the studs on both sides.

3.3.3 Seal type

The results are valid for single plastic pipe penetration seals. One penetration seal per aperture is covered.

3.3.4 Service support construction

The distance from the surface of the wall to the nearest support position for services shall be 500 mm or less.

3.3.5 Seal size and distances

The annular separation between the pipe sealing and the wall aperture edge is between 0 mm and 15 mm.

Minimum separation between adjacent wall apertures: see 3.2.1 and 3.2.2.

3.3.6 Pipe

- a) pipe diameter and pipe wall thickness: see tables in § 3.2;
- b) pipe materials: see tables in § 3.2;
- c) the test results (U/C) covers uncapped/capped (U/C) and capped/capped (C/C) pipe end situations.

3.3.7 Pipe angle

Only pipes installed perpendicular to the wall are covered.

4 Limitations

This classification document does not represent type approval nor certification of the product.

SIGNED

APPROVED

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Fire collar inside the wall

