



# Den Braven

## Zwaluw FireProtect®

**Passive fire resistant solutions**

For (expansion) joints, openings and  
technical surface penetrations



**FireProtect**

BETTER RESULTS THROUGH KNOWLEDGE





FireProtect

# Content

<b>Introduction</b>	Page 2
<b>Reaction to fire and fire resistance</b>	Page 3
<b>Linear Joints (EN 1366-4)</b>	
• Explanation classification	Page 4
• Zwaluw FireProtect® FP Acrylic Sealant	Page 5
• Zwaluw FireProtect® FP Silicone Sealant	Page 5
• Zwaluw FireProtect® FP Hybrid Sealant	Page 6
• Zwaluw FireProtect® FP PU Foam	Page 6
<b>Surface Penetrations (EN 1366-3)</b>	
• Explanation classification	Page 7
• Zwaluw FireProtect® FP Sealing System	Page 8
- Zwaluw FireProtect® FP Intumescent Coating	Page 10
- Zwaluw FireProtect® FP Intumescent Acrylic	Page 10
- Zwaluw FireProtect® FP Fire Board	Page 12
• Zwaluw FireProtect® FP Sealing Sticker	Page 12
• Zwaluw FireProtect® FP Pipe Wrap	Page 13
• Zwaluw FireProtect® FP Pipe Collar	Page 14
• Zwaluw FireProtect® FP Pipe Collar Brackets	Page 15
• Zwaluw FireProtect® FP Wall Outlet	Page 16
<b>Product Selector</b>	
• EN 1366-4 product selector	Page 17
<b>Product Order List</b>	Page 21





*As passive fire safety is becoming increasingly important, both in new buildings and in renovation work, Den Braven has decided to focus its efforts on product development and certification for this market segment*

## Introduction

Zwaluw FireProtect® is a complete, fully certified, approved range of passive fire resistant products for use in movement joints, connection joints, openings and surface penetrations between fire compartments.

Passive fire resistant products are the primary means, used in the construction of a building, of limiting the spread of flames, heat and smoke and hugely increasing fire safety. The correct usage of these products meets the basic, legal compartmentalisation requirements. These products contribute to the structural stability of a building, in case of a fire, and provide time for people to get out of a building safely or for the building to be evacuated. Passive fire resistance limits the spread of flames and smoke and thus the transfer and flashover of fire between compartments.

### Passive fire protection:

- Saves lives
- Limits material damage
- Minimises business losses
- Protects the building, which means it is accessible after the fire.

The creation of fire compartments in a building is an essential part of passive fire safety. The underlying aim is to restrict the spread of smoke and flames in the case of a fire to a single compartment and thus to slow down the spread of the fire. This gives people the chance to leave the building safely and gives emergency services time to act and to fight the fire.

As passive fire safety is becoming increasingly important, both in new buildings and in renovation work, Den Braven has decided to focus its efforts on product development and certification for this market segment. With our huge experience in the field of solutions for linear joints (EN 1366-4) we are proud to present our range which also includes solutions for openings and surface penetrations (EN 1366-3).



*Reaction to fire indicates  
how flammable/combustible  
a material is and  
how much it helps a fire to develop*

#### **Reaction to fire and fire-resistance**

Reaction to fire is a completely different matter to fire resistance. Both are strictly regulated in national and international standards.

Reaction to fire indicates how flammable/combustible a material is and how much it helps a fire to develop. A well-known standard for reaction to fire is the German standard DIN4102 part 1, with classifications A1, A2, B1, B2 and B3.

Fire resistance on the other hand is the time, expressed minutes, in which a burning compartment is able to successfully fulfil its role and thus prevent the fire from spreading. This fire resistance of (combined) products has been tested and measured in standardised, common applications. This means that a product with the highest classification for reaction to fire does not offer any guarantee of fire resistance.

This brochure sets out all the essential information about common applications as well as listing the solutions that we provide for you to be able to meet fire resistance requirements. Page 17 gives an overview of the correct products for each application.

Den Braven is well-known as one of the leading developers and manufacturers of sealants, adhesives and PU foams and is regarded as an authority in the field of dedicated concepts that provide complete solutions.

Under the brand name FireProtect® Den Braven has developed a full range of passive fire resistant solutions. The starting point of these solutions is that they provide a (cost-)efficient solution using the latest technology. All the products and applications have been fully tested and certified in accordance with the latest European standards.



**Den Braven**





## Linear joints (EN 1366-4)

A fire compartment consists of fire resistant walls and floors. A compartment is completed by a sound fire-resistant seal of the joints between these walls and floors. The joints between the structure and the (fire) doors and (window) frames have to be fire resistant. Products and systems tested in accordance with EN1366-4 are used to fully seal fire compartments where walls, frames and floors meet. Most of these products and systems were designed to be able to absorb movements in the construction components.

### Our solutions for linear joints consist of:

- Zwaluw FireProtect® FP Acrylic Sealant
- Zwaluw FireProtect® FP Silicone Sealant
- Zwaluw FireProtect® FP Hybrid Sealant
- Zwaluw FireProtect® FP PU Foam

The fire resistance of our solutions for sealing these linear joints has been tested in accordance with national and international standards by certified laboratories (notified bodies). The results of these tests are summarised in test reports and classification reports. These specially developed products can be used separately, but combinations of products have also been tested. This enables us to provide an efficient solution for every situation.



## Classification (EN 1366-4) explained

Two classifications for linear joints are explained below. This provides a better insight into different classifications and the applicability of the products.

*Tested material and product: aerated concrete, wall thickness 100mm - FP Silicone Sealant on both sides*

### EI 180 – V – X – F – W 5 to 30

- EI 180: The joint remains intact for a minimum of 180 minutes and the temperature does not rise over 180°C on the non-fire side
- V: Vertical joint
- X: No movement absorption during the test
- F: Installed and applied on the spot, no prefab parts
- W 5 to 30: Tested and certified widths

*Tested material and product: aerated concrete, wall thickness 100mm - FP Hybrid Sealant on both sides*

### EI 240 – T – M25 – F – W 20 to 30

- EI 240: The joint remains intact for a minimum of 240 minutes and the temperature does not rise over 180°C on the non-fire side
- T: Horizontal application / wall-floor
- M25: 25% movement absorption during the test
- F: Installed and applied on the spot, no prefab parts
- W 20 to 30: Tested and certified widths

## Linear joints (EN 1366-4)



### Zwaluw FireProtect® FP Acrylic Sealant

#### Product Description

Zwaluw FP Acrylic Sealant is a 1-component fire resistant sealant based on acrylic dispersion. Zwaluw FP Acrylic Sealant is a plasto-elastic sealant which is slightly intumescent above +120°C and is suitable for fire resistant sealing of linear joints up to 4 hours.

#### Benefits

- Tested according to EN 1366-4
- Up to 4 hours fire resistance
- Can be applied separately in joints up to 20 mm wide
- Can be combined with FP PU Foam up to 30 mm wide
- Paintable with most water based and synthetic paints
- Easy to apply and clean
- Joint movement up to 7.5%
- Also available in grey
- Nearly non smelling
- Non corrosive towards metals

#### Certifications

- EN 1366-4
- EN 15651-1: F-EXT-INT - Class 7,5P
- DoP 11001211-1001

#### Colour(s)

Concrete grey, white

#### Packaging

310 ml per cartridge

#### Shelf Life

18 Months\*



### Zwaluw FireProtect® FP Silicone Sealant

#### Product Description

Zwaluw FP Silicone Sealant is a fire retardant, elastic, neutral curing silicone sealant. Zwaluw FP Silicone Sealant has a fire resistance up to 4 hours in linear (movement-) joints. Absorbs movements up to 25%.

#### Benefits

- Tested according to EN 1366-4
- Up to 4 hours of fire resistance
- Can be applied in joints up to 30 mm wide
- In combination with Zwaluw FP PU Foam in joints up to 40 mm wide
- Excellent processing, does not slump
- Joint movement up to 25%
- Good resistance to UV, water and weather
- Resists fungus and vermin
- Airtight sealing
- Outside applicable

#### Certifications

- EN 1366-4
- EN 15651-1: F-EXT-INT-CC - Class 25LM
- EN 15651-2: G-CC - Class 25LM
- DoP 53001236-1001
- DIN4102 - Part 1 - Class B1

#### Colour(s)

Concrete grey, white, black

#### Packaging

310 ml per cartridge

#### Shelf Life

12 Months\*

\* please read the storage recommendation of these products at the technical data sheet that can be found on [denbraven.com](http://denbraven.com)





## Linear joints (EN 1366-4)



### Zwaluw FireProtect® FP Hybrid Sealant

#### Product Description

Zwaluw FP Hybrid Sealant is a high quality professional 1-component fire resistant sealant based on hybrid technology and provides up to 4 hours of fire resistance in linear joints.

#### Benefits

- Tested according to EN 1366-4
- Up to 4 hours of fire resistance
- Also suitable for wall/ceiling and wall/floor connections
- Suitable for joints up to 30 mm wide
- Certified for steel/wooden frames
- Certified for all metal-stud connections
- Excellent processing and easy toolability
- Joint movement up to 25%
- Paintable with most water based and synthetic paints
- Non corrosive towards metals
- Good resistance to UV, water and weather

#### Certifications

- EN 1366-4
- EN 15651-1: F-EXT-INT-CC - Class 25HM
- EN 15651-2: G-CC - Class 20LM
- DoP 55001166-2001

#### Colour(s)

Concrete grey, white

#### Packaging

290 ml per cartridge

#### Shelf Life

18 Months\*



### Zwaluw FireProtect® FP PU Foam

#### Product Description

Zwaluw FP PU Foam is a 1-component, fire resistant polyurethane foam. Can be applied by hand or gun. Zwaluw FP PU Foam offers a fire resistance up to 120 minutes. Combined with other FP products up to 4 hours! The canisters Zwaluw FP PU Foam are equipped with an adaptor to accurately apply the foam by hand, or with a connector to apply the foam with a professional PU-gun. Professional polyurethane fill and fix foam with a structure of fine cells. High thermic and acoustic insulation. Offers good fire resistance and excellent bonding. Can be cut after curing.

#### Benefits

- Tested according to EN 1366-4
- Applicable in joints from 5mm to 30 mm wide
- Combined with FP Silicone Sealant applicable in joints from 5mm to 40mm wide
- Separately applied, fire resistance up to 2 hours, combined with other FP products up to 4 hours
- Fire behaviour B1
- Easy to apply by gun
- Fast processing
- Tack free after 8 to 12 minutes

#### Certifications

- EN 1366-4
- DIN4102 – Part 1 - Class B1

#### Colour(s)

Pink

#### Packaging

750 ml per canister

#### Shelf Life

12 Months\*

\* please read the storage recommendation of these products at the technical data sheet that can be found on [denbraven.com](http://denbraven.com)





*The fire resistant properties of our solutions have been tested in accordance with national and international standards by certified organisations (notified bodies)*

## Openings and recesses (EN 1366-3)

A fire compartment consists of fire resistant walls and floors. These walls and floors have openings through which pipes and electricity cables are fed. A fire compartment is not complete until these openings have been sealed safely using the correct materials. Products and systems tested in accordance with 1366-3 are used to seal openings and thus to ensure that the compartments are sufficiently fire resistant despite the openings for electricity cables and mechanical installations. The fire resistant properties of our solutions have been tested in accordance with national and international standards by certified organisations (notified bodies).

The results of these tests are summarised in test and classification reports. These specially developed products can be used separately, but combinations of products have also been tested. This enables us to provide a solution for every situation.

**Below are the products that we offer for sealing openings**

- **Zwaluw FireProtect® FP Sealing System**
  - Zwaluw FireProtect® FP Intumescent Coating
  - Zwaluw FireProtect® FP Intumescent Acrylic
  - Zwaluw FireProtect® FP Fire Board
- Zwaluw FireProtect® FP Pipe Wrap
- Zwaluw FireProtect® FP Pipe Collar
- Zwaluw FireProtect® FP Pipe Collar Brackets
- Zwaluw FireProtect® FP Wall Outlet
- Zwaluw FireProtect® FP Sealing Sticker



*The products are used in accordance  
with the required number of minutes'  
fire resistance for the opening concerned*



## Zwaluw FireProtect® FP Sealing System

The FP Sealing System consists of specially developed FP Intumescent Acrylic and FP Intumescent Coating used with FP Fire Board. Treated openings are both fire resistant and smoke-proof. The system is suitable for indoor applications.

The products are used in accordance with the required number of minutes' fire resistance for the opening concerned. The system provides seals with a fire resistance of up to 120 minutes.

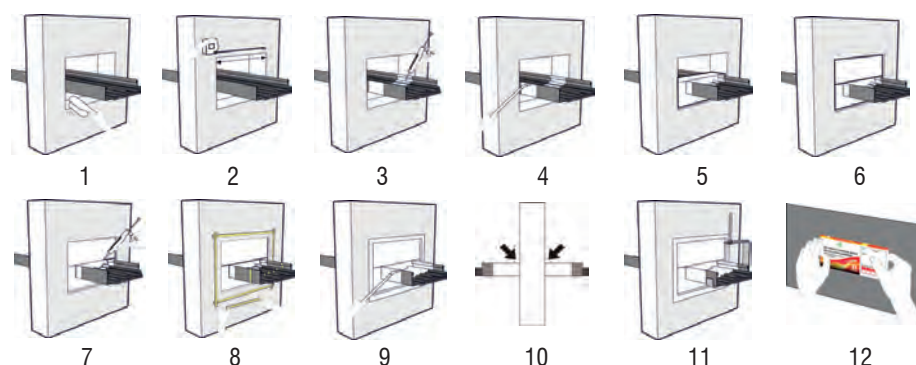
### **FP Sealing System products:**

- FP Intumescent Coating ((intumescent)
- FP Intumescent Acrylic ((intumescent)
- FP Fire Board

The principle behind the intumescent effect of the FP Intumescent Coating and the FP Intumescent Acrylic is based on a tested and proven combination of chemical components. In the case of a fire the intumescent material foams, swells and fills the gap up from a thin coating to 40 times its original size. This intumescent coating seals and isolates so that the spread of the fire is limited to the compartment for a certain period of time.



# Application manual for FP Sealing System



1. Ensure that the surfaces to be treated are clean and free of dust so that the masking tape and the FP Intumescent Coating will adhere properly.
2. Measure the opening carefully using a tape measure, a ruler or possibly callipers and transfer the measurements to the FP Fire Board.
3. Apply FP Intumescent Acrylic where the FP Fire Board will be, between the cables, over a width of at least 60 mm. Seal any spaces or seams using FP Intumescent Acrylic between:
  - cables and other cables
  - cables and adapter pieces
  - cables and cable duct
  - adapter pieces and cable duct
  - adapter pieces and recess
  - in the profile of the cable duct itself.
4. Paint the recess, the cable duct and the cables, where the FP Fire Board will be, over a width of approximately 60 mm using FP Intumescent Coating.
5. Saw the adapter pieces to size out of the FP Fire Board so that they can be fitted tightly into the recess. Paint the sides of the recess and the adapter pieces using FP Intumescent Coating so that the adapter pieces can be properly "bonded" with the recess and the cable duct. Position the relief of the FP Fire Board in one direction.
6. Make the adapter pieces as large as possible in order to keep the number of seams to a minimum. Make as many adapter pieces as are needed to seal the whole recess.
7. Now seal any spaces or seams again using FP Intumescent Acrylic between:
  - cables and adapter pieces
  - adapter pieces and cable duct
  - adapter pieces and recess
  - in the profile of the cable duct itself.
8. Attach masking tape to the cable duct, cables (a minimum of 200 mm from the FP Fire Board) and wall (a minimum of 30 mm from the FP Fire Board).
9. Paint the whole seal using FP Intumescent Coating. Paint the cable duct and cables up to 200 mm from the seal.
10. Carry out steps 7 - 9 on both sides of the wall.
11. Check that the cable duct has a suitable steel mounting bracket on both sides of the wall within 25 cm.
12. Fill in the company details on the FP Sealing Sticker and attach this where it can be clearly seen.

## Surface Penetrations (EN 1366-3)

### Zwaluw FireProtect® FP Intumescent Coating

#### Product Description

Zwaluw FP Intumescent Coating is a, in case of fire and/or radiation heat, strongly expanding coating for creating fire resistant seals. Is part of the Zwaluw FireProtect® FP Sealing System. This system is ideal for creating fire resistant seals in (empty) recesses and around cables, pipes and cable trays. In addition, the system can be applied in combination with, for example, Fire Collars or Fire Wraps.



#### Benefits

- Fire resistant up to 2 hours
- Offers a wide range of solutions for all occurring penetrations/recesses combined with other product of the FP Sealing System
- Intumescent and cooling coating which in case of fire expands to 40 times its original volume
- Thoroughly tested by leading European test institutes (notified bodies)
- Closes recess/penetration for fire and smoke

#### Certifications

- EN 1366-3

#### Colour(s)

White

#### Packaging

5 kg bucket

#### Shelf Life

12 Months\*

### Zwaluw FireProtect® FP Intumescent Acrylic

#### Product Description

Zwaluw FP Intumescent Acrylic is a strongly expanding sealant in case of fire and/or radiation heat, for creating fire-resistant seals. Is part of the Zwaluw FireProtect® FP Sealing System. This system is ideal for creating fire resistant seals in (empty) recesses and around cables, pipes and cable trays. In addition, the system can be applied in combination with, for example, Fire Collars or Fire Wraps.



#### Benefits

- Fire resistant up to 2 hours
- Closes PE / PP / PVC pipes up to Ø40mm in case of fire, preventing the need for a Fire Collar
- Offers a wide range of solutions for all occurring penetrations/recesses combined with the other products in the FP Sealing System
- Intumescent and cooling sealant which expands to 40 times its original volume in case of fire
- Thoroughly tested by the leading European test institutes (notified bodies)
- Closes recess/penetration for fire and smoke

#### Certifications

- EN 1366-3

#### Colour(s)

White

#### Packaging

5 kg bucket

310 ml cartridge

#### Shelf Life

12 Months\*

\* please read the storage recommendation of these products at the technical data sheet that can be found on [denbraven.com](http://denbraven.com)





*Zwaluw FireProtect® is a complete, fully certified, approved range of passive fire resistant products used in movement joints and connection joints, openings and ducts between fire compartments*



## Surface Penetrations (EN 1366-3)

### Zwaluw FireProtect® FP Fire Board

#### Product Description

FP Fire Board is a rock wool board treated with a fire retardant coating and is applied in combination with FP Intumescent Coating and FP Intumescent Acrylic. The FP Fire Board is a component of the FP Sealing System, which is used to create fire retardant seals around cables, pipes and cable trays. This system can also be combined with Fire Collars, Fire Wraps etc.



#### Benefits

- Up to 2 hours of fire resistance
- Shape of the FP Fire Board can easily be adapted to the penetration/recess
- Offers a wide range of solutions for all occurring recesses combined with other products of the FP Sealing System
- Both sides equipped with intumescent and cooling coating
- Thoroughly tested by leading European test institutes (notified bodies)
- Closes recess for fire and smoke

#### Certifications

- EN 1366-3

#### Colour(s)

White coated

#### Packaging

500 x 600 mm, 1 board per box

600 x 1000 mm, 2 boards per foil wrap

#### Thickness

60 mm

### Zwaluw FireProtect® FP Sealing Sticker

#### Product Description

With the FP Sealing Sticker a recess / penetration is clearly identified. On the sticker the minutes of fire resistance (EI), the date of sealing, the applicator and the number of the recess are indicated.



#### Benefits

- Clear identification of the recess
- Professional finishing

#### Dimensions

140 x 60 mm

#### Packaging

10 stickers in a bag



## Surface Penetrations (EN 1366-3)

### Zwaluw FireProtect® FP Pipe Wrap

#### Product Description

The FP Pipe Wrap is fire wrap which strongly expands in case of fire. The FP Pipe Wrap is applied around plastic pipes (PVC, PP, PE) which are fitted through (composite) walls and floors. The Wrap is installed around the pipe and fastened with the glue strip. After that the wrap is pushed in the construction. The intumescent effect of the FP Pipe Wrap prevents heat, smoke and fire to move to the next compartment.



#### Benefits

- Up to 2 hours fire resistance
- Optimal for use in composite walls
- Only one wrap needed for a wall construction
- Is placed in the compartment wall/ceiling/floor
- Available in the most occurring sizes 50 to 160 mm
- Thoroughly tested by leading European test institutes (notified bodies)
- Closes penetration for fire and smoke

#### Certifications

- EN 1366-3

#### Colour(s)

Black

#### Packaging

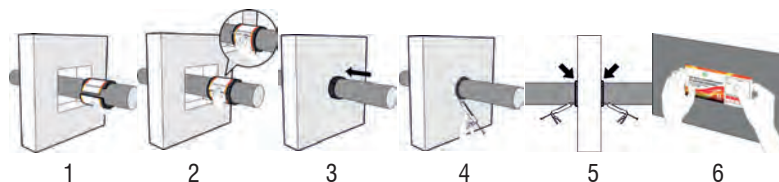
Single

#### Length

120 mm

#### Diameters

Ø 50, 75, 80, 90, 110, 125, and 160 mm



1. Choose the correct FP Pipe Wrap, in accordance with the diameter of the pipe, and attach it to the pipe. FP Pipe Wrap must not be shortened!
2. Remove the backing film from the sticker and attach it to the FP Pipe Wrap so that the FP Pipe Wrap fits tightly around the pipe.
3. Slide the FP Pipe Wrap around the pipe so that the middle of the FP Pipe Wrap is in the middle of the fire-retardant structure.
4. Seal any spaces or seams between the pipe and the FP Pipe Wrap and between the FP Pipe Wrap and the wall using FP Intumescent Acrylic.
5. Carry out step 4 on both sides of the wall.
6. Fill in the company details on the FP Sealing Sticker and attach this where it can be clearly seen.

## Surface Penetrations (EN 1366-3)

### Zwaluw FireProtect® FP Pipe Collar

#### Product Description

The FP Pipe Collar is a fire collar which strongly expands in case of fire. The FP Pipe Collar is used around plastic pipes (PVC, PP, PE) which are fitted through walls, floors and composite walls.

#### Benefits

- Fire resistance up to 2 hours
- Only 34mm high
- No space needed between pipe and construction
- Is mounted on the compartment wall/ceiling
- Available in most common sizes 40 to 250 mm
- Thoroughly tested by leading European test institutes (notified bodies)
- Closes penetration for fire and smoke

#### Certifications

- EN 1366-3

#### Colour(s)

Black

#### Packaging

Single

#### Height

34 mm

#### Diameters

Ø 40, 50, 75, 80, 90, 110, 125, 160, 200, and 250 mm



1. Seal any spaces or seams between the pipe and the structure using FP Intumescent Acrylic.
2. Hold the first part of the FP Pipe Collar tightly against the pipe. Then mark and drill the holes in the wall through the mounting holes of the FP Pipe Collar and fit the first two anchoring devices.
3. Hold the second part of the FP Pipe Collar tightly against the pipe so that it connects to the first part. Then mark and drill the holes in the wall through the mounting holes of the FP Fire Collar and fit the last two anchoring devices.
4. Fill in the company details on the FP Sealing Sticker and attach this where it can be clearly seen.
5. In the case of a pipe duct through a wall: fit a FP Pipe Collar on both sides of the wall.
6. In the case of a pipe duct through a floor: fit a FP Pipe Collar only on the underside of the floor.

## Surface Penetrations (EN 1366-3)

### Zwaluw FireProtect® FP Pipe Collar Brackets

#### Product Description

The FP Pipe Collar Brackets are used to mount the FP Pipe Collar when the recess around the pipe is too big to use the original holes in the collar itself. This set of 4 pieces broadens the possibility of application of the FP Pipe Collar.

#### Benefits

- Enlarges the field of application of the FP Pipe Collar, when recesses are big
- Connects perfectly to the size of the FP Pipe Collar, ensuring solid fixing
- Supplied in complete sets of 4 pieces

#### Certifications

- EN 1366-3

#### Colour(s)

Metal

#### Packaging

4 per foil wrap



1

1. An FP Pipe Collar should at all times be secured at four points. If brackets are used, two sides of the FP Pipe Collar should have at least two brackets. Screw the mounting brackets to the FP Pipe Collar using self-tapping screws.



## Surface Penetrations (EN 1366-3)

### Zwaluw FireProtect® FP Wall Outlet

#### Product Description

The FP Wall Outlet is developed to make electric wall outlets in (composite) walls fire resistant, simply by placing them in the socket.



#### Benefits

- Fire retardant up to 2 hours
- Applicable for existing and new sockets
- Can be used in massive and composite walls

#### Certifications

- EN 1366-3

#### Colour(s)

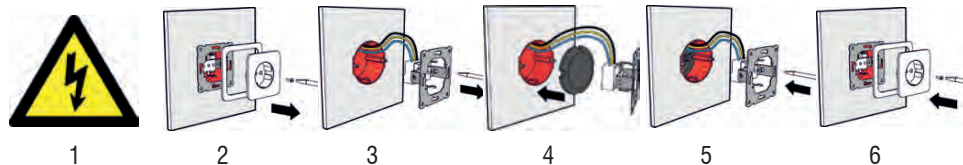
Black

#### Packaging

10 per box

#### Dimensions

Ø62 x 10 mm



1. Check that the wall socket is correct and has been fitted in a fire-retardant structure. Check that there is no power to the wiring.
2. Remove the cover from the wall socket or the switching equipment.
3. Remove any internal parts from the wall socket. Remove any wiring and connecting materials such as wire connectors.
4. Position the FP Wall Outlet against the back of the wall socket.
5. Fit the wiring.
6. Refit the cover of the wall socket.

# Fire-retardant sealing of joints between stone and metal, or between stone and wood

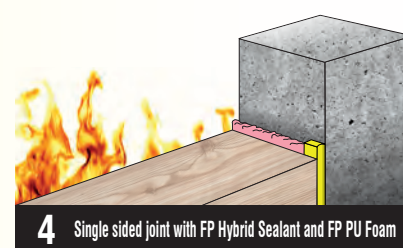
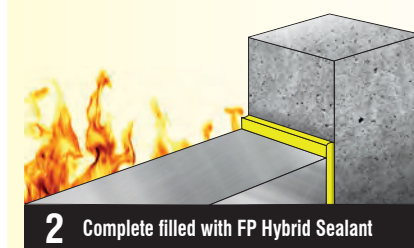
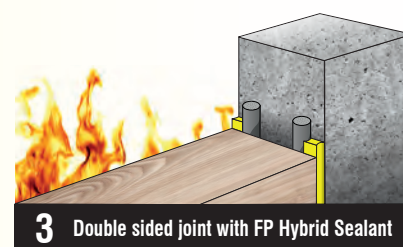
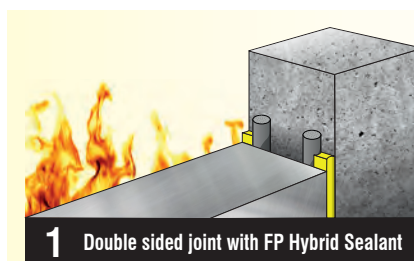
Joints between stony material and metal or wood come in all sorts of designs. These are often the connection of metal or wooden frames in a stony structure.

The tested solutions can be used both horizontally and vertically. All metal connections are permitted (as long as the melting point is 1,000°C or above). The metal frames\* used in practice have a higher melting point and lower heat conduction than the tested 8mm-thick steel profile.

All types of wood are permitted as long as the density of the wood is greater than or equal to 500 kg/m<sup>3</sup> (= fir). The wall thickness should be equal to or thicker than that shown in the tables.

Below are tables containing possible solutions for connecting metal and wood in a fire-retardant manner to stony material. The overview clearly shows how these solutions have been put together.

\* Consult the fire certificates, technical specifications and the technical recommendation of the metal frame supplier.



Stone-Metal, wall thickness 100 mm, vertical and horizontal

Fire-retardancy in minutes	joint width	
	5 mm	20 mm
E 120*	1,2	1,2
E 90*	1,2	1,2
E 60*	1,2	1,2
EI 45	2	2
EI 30	1,2	1,2

Stone-Metal, wall thickness 150 mm, vertical and horizontal

Fire-retardancy in minutes	joint width	
	5 mm	20 mm
E 120*	1,2	1,2
E 90*	1,2	1,2
EI 60	1	1
EI 45	1	1
EI 30	1	1

Stone-Wood, wall thickness 100 mm, vertical and horizontal



Fire-retardancy in minutes	joint width		
	5 mm	8 mm	20 mm
EI 120	-	4	4
EI 90	3	3,4	3,4
EI 60	3	3,4	3,4
EI 45	3	3,4	3,4
EI 30	3	3,4	3,4

\* On the basis of an Expert Review by the European Notified Body EI 120 can be used here, given the fact that the metal frames used in practice conduct a lot less heat than the 8mm-thick steel profile prescribed and tested in the standard EN1366-4.





## Selection tables for linear (construction) joints (EN 1366-4)



Vertical joint in full wall (aerated concrete, concrete, gypsum blocks, masonry, sand-lime brick density  $\geq 650 \text{ kg/m}^3$ ), wall thickness  $\geq 100 \text{ mm}$ ,  $< 115 \text{ mm}$

		joint width					
		5 mm	8 mm	20 mm	25 mm	30 mm	40 mm
Fire-retardancy in minutes	EI 240	-	-	-	-	-	-
	EI 180	D	D	D	D	D	-
	EI 120	B,D	B,D	B,D	D	D	-
	EI 90	B,D	B,D,A	B,D	D	D	-
	EI 60	B,D	B,D,A	B,D	D	D	-
	EI 45	B,D	B,D,A	B,D,A	D	D	-
	EI 30	B,D	B,D,A	B,D,A	D,A	D,A	-

Vertical joint in full wall (aerated concrete, concrete, gypsum blocks, masonry, sand-lime brick density  $\geq 650 \text{ kg/m}^3$ ), wall thickness  $\geq 115 \text{ mm}$

		joint width					
		5 mm	8 mm	20 mm	25 mm	30 mm	40 mm
Fire-retardancy in minutes	EI 240	C,E,F	F,H,I,J	F	F	F	-
	EI 180	C,D,E,F,G	D,F,H,I,J	D,F,H,I,J	D,F,H,I,J	D,F,H,I	I
	EI 120	B,C,D,E,F,G	A,B,D,F,H,I,J	B,D,F,H,I,J	D,F,H,I,J	D,F,H,I	I
	EI 90	B,C,D,E,F,G	A,B,D,F,H,I,J	B,D,F,H,I,J	D,F,H,I,J	D,F,H,I	I
	EI 60	B,C,D,E,F,G	A,B,D,E,F,G,H,I,J	A,B,D,E,F,G,H,I,J	D,E,F,H,I,J	D,F,H,I	I
	EI 45	B,C,D,E,F,G	A,B,C,D,E,F,G,H,I,J	A,B,C,D,E,F,G,H,I,J	A,D,E,F,H,I,J	A,D,F,H,I	I
	EI 30	B,C,D,E,F,G	A,B,C,D,E,F,G,H,I,J	A,B,C,D,E,F,G,H,I,J	A,D,E,F,H,I,J	A,D,F,H,I	I

Horizontal joint in full wall (aerated concrete, concrete, gypsum blocks, brickwork, sand-lime brick density  $\geq 650 \text{ kg/m}^3$ ), connection of wall-floor / wall-ceiling, wall thickness  $\geq 100 \text{ mm}$ ,  $< 115 \text{ mm}$

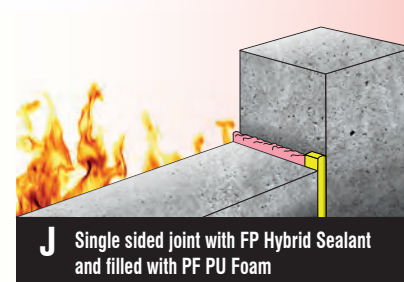
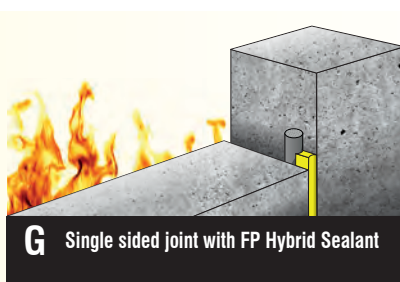
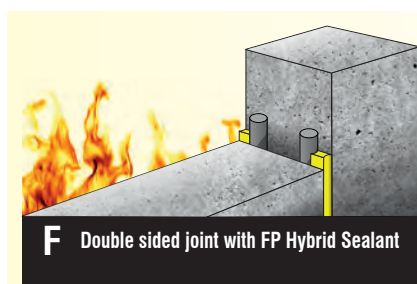
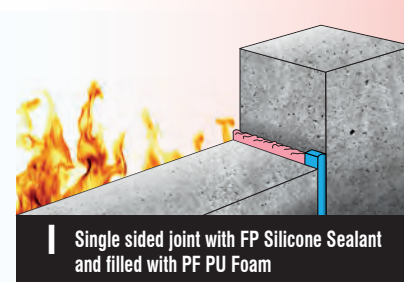
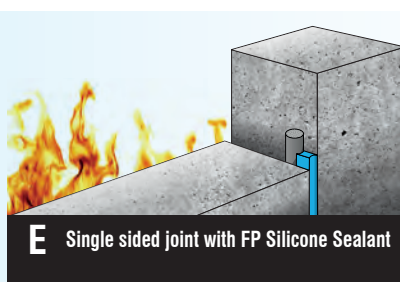
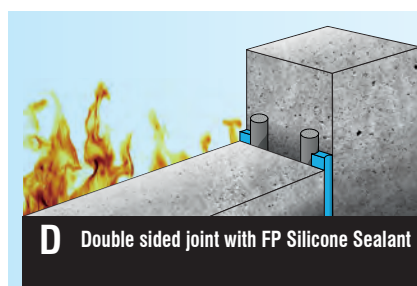
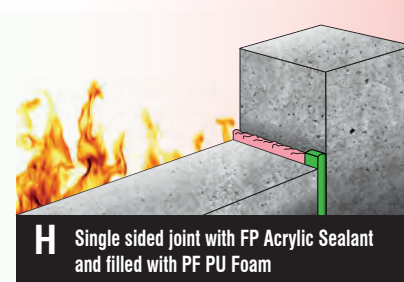
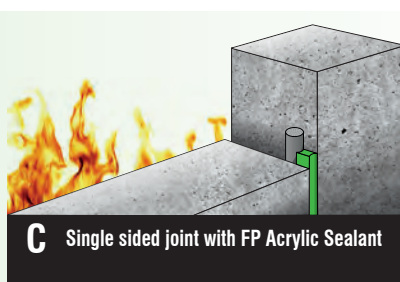
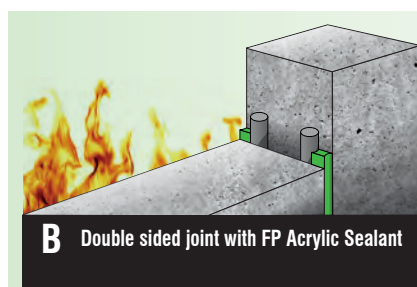
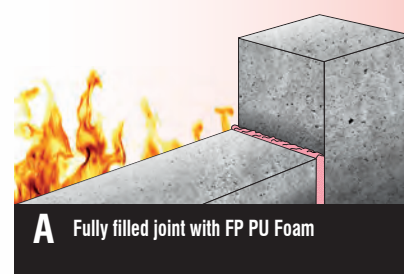
		joint width		
		10 mm	20 mm	30 mm
Fire-retardancy in minutes	EI 240	-	F	F
	EI 180	F	F	F
	EI 120	F	F	F
	EI 90	F	F	F
	EI 60	F	F	F
	EI 45	F	F	F
	EI 30	F	F	F

# Fire-retardant sealing of joints between stony material

Joints between stony material come in all kinds of designs. They are often vertical but can also be horizontal, for example at the connection of an aerated wall to the floor above it.

The tested solutions can be used between all stony materials (aerated concrete, concrete, gypsum blocks, brickwork, sand-lime brick with a density greater than or equal to 650 kg/m<sup>3</sup>). The wall thickness should be equal to or greater than shown in the tables.

Below are tables containing possible solutions for fire-retardant solutions in stone material. The overview shows clearly how these solutions have been put together.



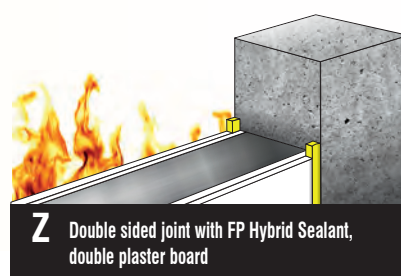
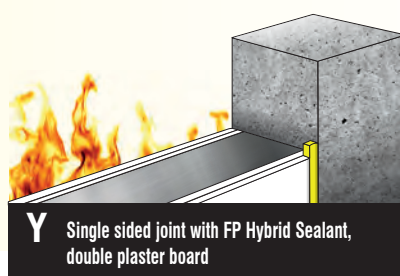
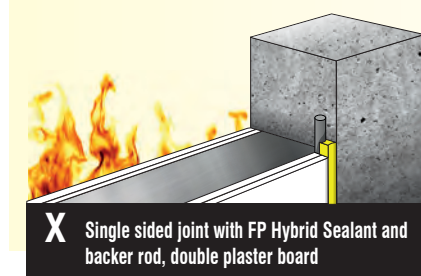
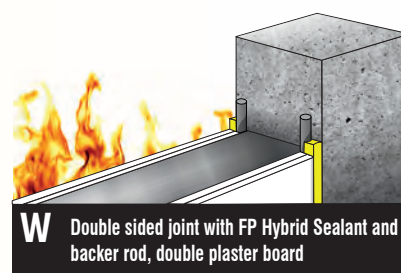
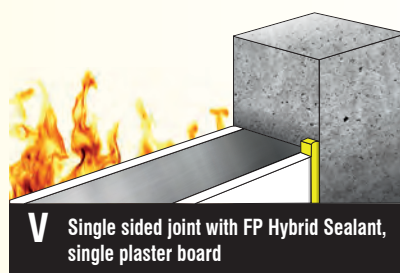
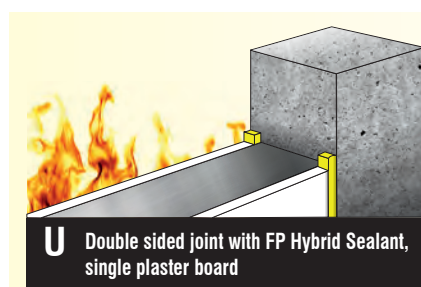
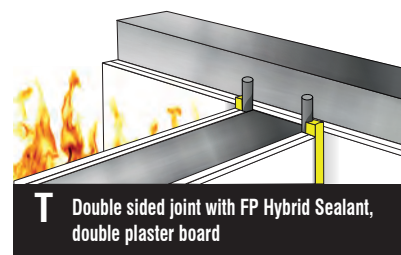
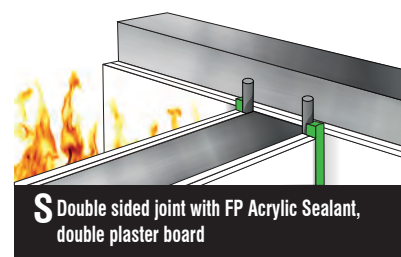


# Fire resistant sealing of joints between stone and plaster, and plaster and plaster



Joints between stony material and plaster come in all kinds of designs. These are often in metal-stud walls that are connected to concrete/stone walls and/or floors. The solutions for these can be used both horizontally and vertically. There are also vertical connections between plaster walls and other plaster walls.

The wall thickness of both the stone wall and the plaster wall should be equal to or greater than that shown in the tables.

Below are tables containing possible solutions for fire resistant connections for plaster. The overview shows clearly how these solutions have been put together.





Metal-Stud / Metal-Stud, vertical

Fire-retardancy in minutes		wall thickness		
			75 mm*	100 mm*
			10 mm	10 mm
EI 120			-	T
EI 90			-	S,T
EI 60			S,T	S,T
EI 45			S,T	S,T
EI 30			S,T	S,T

\* 75 mm (single board) / 100 mm (double boards)

Stone / Metal-Stud, vertical and horizontal

Fire-retardancy in minutes		wall thickness		
			75 mm*	100 mm*
			10 mm	10 mm
EI 120			-	W,X,Y,Z
EI 90			-	W,X,Y,Z
EI 60			U,V	W,X,Y,Z
EI 45			U,V	W,X,Y,Z
EI 30			U,V	W,X,Y,Z

# Better Results through Knowledge

Den Braven supports its FireProtect concept in many ways. The Centre of Excellence is the knowledge and training centre, where training sessions, (digital) workshops and webinars are held for customers and processors. Knowledge is passed on here so that customers and processors stay abreast of the latest regulations and application opportunities and so that the chance of any failure costs is minimised. The centre has every modern convenience. Training sessions and presentations are held in the auditorium, which seats 50 people. Demonstrations and workshops are held in the large practical area and participants can themselves use the products. The Centre of Excellence has a distinctive design, meets the requirements of the passive house and is airtight in accordance with the highest class 3. Den Braven also supports its fire-retardant concept with clear processing instructions and videos, by providing advice at construction sites, by organising toolboxes and by making available a product advice tool. All this to prevent any ambiguities and to make fire-retardant sealing accessible to everyone.





# Den Braven

BETTER RESULTS THROUGH KNOWLEDGE

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