



In cooperation with



# FIRE PENETRATION SEALS IN SANDWICH PANEL CONSTRUCTION



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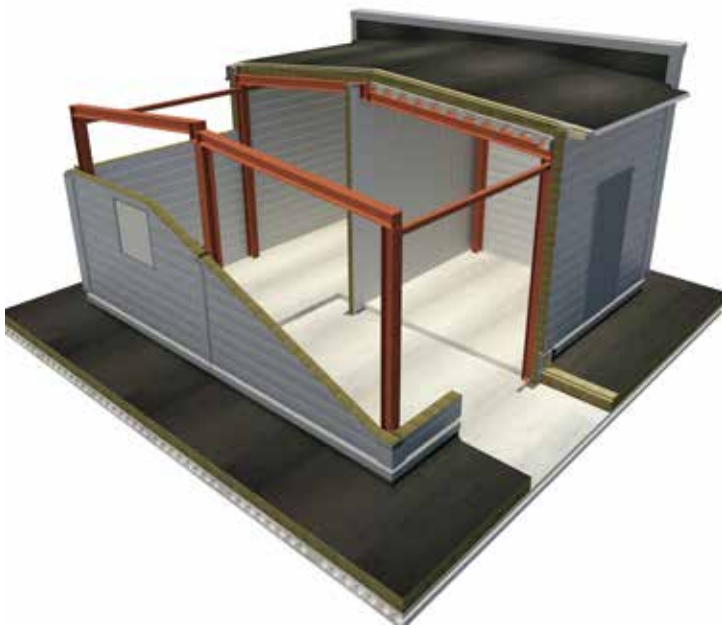
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# INTRODUCTION

## Prefabricated internal walls shorten construction cycles

Many owners of large commercial and industrial projects are capitalizing on the benefits of shorter construction cycles thanks to sandwich panels wall systems. The light, prefabricated panels can be easily transported to site and quickly erected, allowing other trades to begin their work immediately. In facilities such as data centers where every additional day of uptime counts, these fast-track construction methods are helping improve and accelerate the return on their construction investment.



## The challenge

Unfortunately, the existing standards for fire testing penetration seals in sandwich panels has frustrated many designers looking for solutions in these types of walls. Firestop manufacturers cannot compare results across panel types or manufacturers, making widespread testing cost prohibitive and leading to an industry-wide lack of tested systems in these wall construction types.

## The Future Solution

To meet the current market demand, Hilti Firestop has cooperated with Paroc Panel System and Rf-Technologies Fire Dampers to test a wide range of applications for certified fire protection solutions in sandwich panel construction.



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# DESIGN OF PAROC PANEL SYSTEM SANDWICH PANELS

## Design of Paroc Panel System sandwich panels

With large span widths, unique fire-door support testing and a wide range of panels for various applications, Paroc Panel System has a solution for every facility. Hilti and Rf-Technologies have partnered to provide a portfolio of solutions for the most common mechanical, electrical and telecoms penetrations in industrial facilities. To help ensure the most cost-efficient design of your sandwich panel construction, contact the manufacturers early in the design process. Especially as it relates to Firestop and Fire Dampers, early consideration of the tested system parameters will reduce the need for time-consuming Engineering Judgments and the risk of costly delays to timelines, rework or problems during commissioning.

Paroc Panel System panels are manufactured using AST® Technology that helps ensure their high tensile strength, reliable longevity and fire resistance. Five various Paroc Panel System sandwich panels have been certified for fire penetration seals. Panel type should be chosen according to required strength, fire and thermal insulation properties:

- AST S for internal walls with normal fire requirements
- AST F, AST F+ and AST S+ for internal walls with high fire requirements
- AST E for walls with higher strength and fire requirements

## Technical performance of Paroc Fire Proof Panels

Panel Type	Panel Properties					
	Nominal thickness, mm	100	120	150	175	200
	Actual thickness, mm	99	120	151	173	202
AST L	Fire rating, max <sup>2)</sup> horizontal/vertical	NPD	NPD	EI120/EI180	EI120/EI180	EI120/EI180
	Weight, kg/m <sup>2 3)</sup>	17	18	21	22	24
AST S	Fire rating, max <sup>2)</sup> horizontal/vertical	EI60/EI60	EI90/EI90	EI180/EI180	EI180/EI180	EI240/EI240
	Weight, kg/m <sup>2 3)</sup>	19	21	23	25	28
AST S+	Fire rating, max <sup>2)</sup> horizontal/vertical	EI120/EI120	EI120/EI120	-	-	-
	Weight, kg/m <sup>2 3)</sup>	19	21	-	-	-
AST F	Fire rating, max <sup>2)</sup> horizontal/vertical	EI45/EI120	EI45/EI120	EI240/EI240	EI240/EI240	EI240/EI240
	Weight, kg/m <sup>2 3)</sup>	21	24	27	30	33
AST F+	Fire rating, max <sup>2)</sup> horizontal/vertical	EI120/EI120	EI120/EI120	-	-	-
	Weight, kg/m <sup>2 3)</sup>	21	24	-	-	-
AST E	Fire rating, max <sup>2)</sup> horizontal/vertical	EI45/EI120	EI45/EI120	EI240/EI240	EI240/EI240	EI240/EI240
	Weight, kg/m <sup>2 3)</sup>	22	24	28	31	34

- = Not available

<sup>2)</sup> Fire resistance – contact please Paroc Panel System for more information regarding details and spans. Paroc Panel System's AST® panels are non-combustible and classified Euroclass A2-s1,d0 in accordance with the standard EN 13501-1.

# FIRE-RATED WALLS

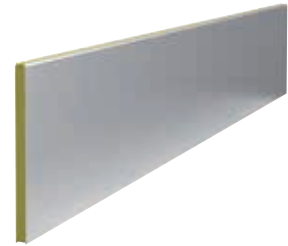
## General

Paroc Fire Proof Panels are non-combustible, Euroclass A2-s1,d0 in accordance with the standard EN 13501-1. Fire resistance for Paroc Panel System structures has been classified according to the standards EN 13501-2, EN 15254-5 and EN 15254-7.



## Fire-rated walls

Fire-rated walls are non-loadbearing, which means that loads may not be transferred from e.g. roof structures down onto a Paroc Fire Proof Panel wall. Fire classifications are subject to restrictions on span widths. Contact Paroc Panel System or visit [www.parocpanels.com](http://www.parocpanels.com). Separate rules apply for acoustic panels and panels with facings of stainless or galvanized steel.



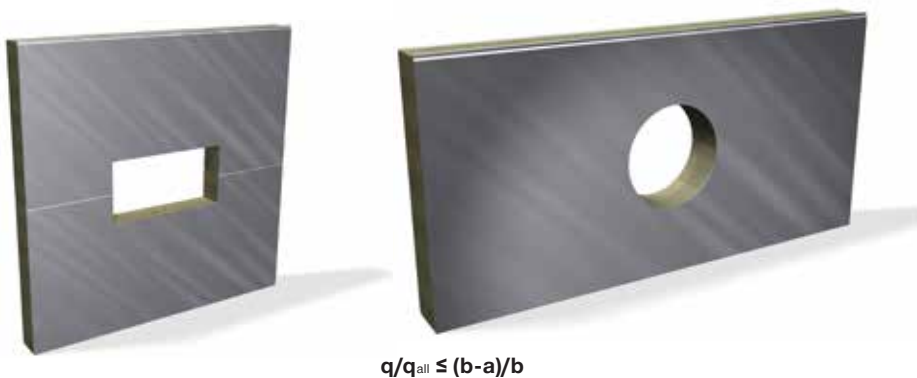
## Openings and cut-outs

When dimensioning Paroc Fire Proof Panels panels, account for strength loss that occurs due to openings and cut-outs for doors, windows, pipe penetrations, etc. Design panels with cut-outs to take the loads they are subject to irrespective of the openings. If this is not possible, loads directed on the panels are to be transferred to adjacent panels or using auxiliary structures to the building frame. In case of large openings, the structures can be made of steel profiles transferring the load to the building main frame.

The maximum opening sizes for single service penetrations do not reduce the strength of Paroc Fire Proof Panels panels sufficiently to require special measures. However, multiple cut-outs within a panel must be considered cumulatively. If required, panels with higher strength classes may need to be used at openings.

If the degree of cut-out exceeds the ratio  $q/q_{all}$ , the load is either to be transferred to adjacent panels in accordance with figure 2, or, if this is not possible, to be directed on the load-bearing frame by auxiliary structures.

Consider maximum opening sizes noted on typical details in this brochure to remain within tested system parameters.



**Figure 1**

Maximum load for panels with cut-outs  $q$ . Allowed load capacity for the whole panel  $q_{all}$  can be taken from the dimensioning curves at the actual span and with largest support width.



**Figure 2**

Load distribution factors.

# APERTURE FRAMING, JOINT STITCHING & THERMOPROFILES

## Aperture framing

All rectangular openings must be framed on both sides of the wall with 30x30-L angles, fixed to panel facing with self-drilling screws at distances of 125 mm. Seal behind L-angles with Hilti CFS-S ACR acrylic sealant.

## Joint stitching

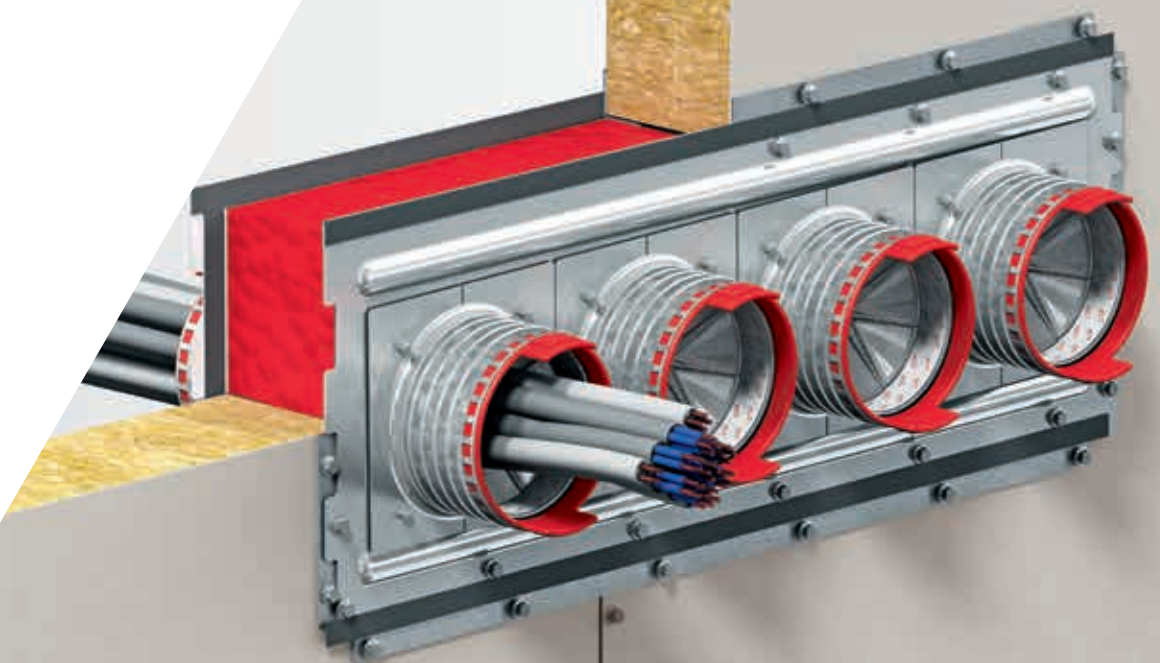
Where openings bisect joints in the sandwich panels, the joints must be stitched with self-drilling screws every 150 mm to a distance of 600 mm on each side of the opening. Additionally, any panel joints within 600 mm of an opening should be similarly stitched.

If an opening bisects more than 2 panel joints, install 100 mm Paroc Fire Proof Panels MIT thermo-profiles every 600 mm behind the L-angle aperture framing.



Paroc Fire Proof Panels with AST® core used for wall

# LOW-VOLTAGE





Product  
**Firestop Speed Sleeve CFS-SL GA**

Construction project

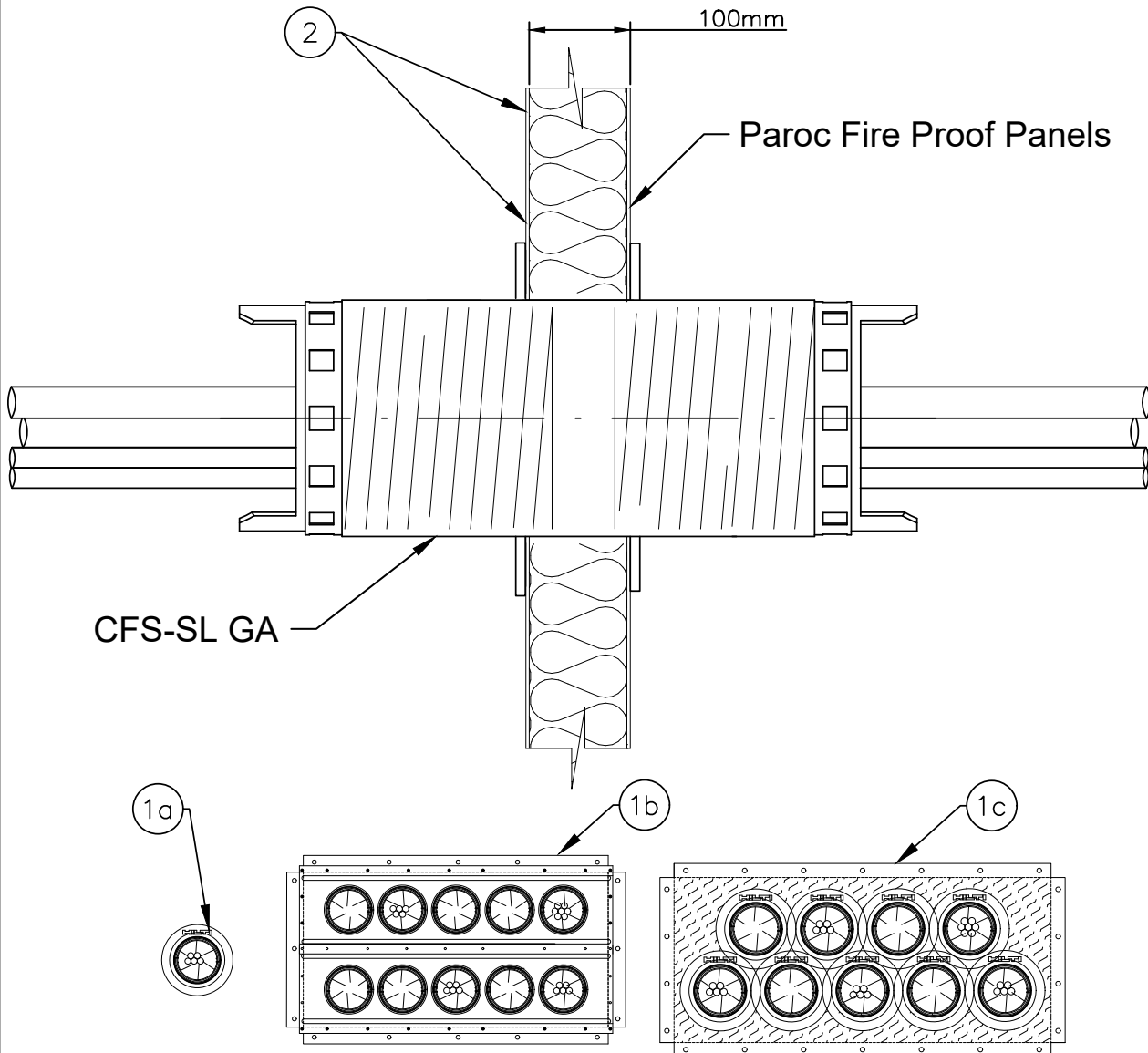
ID  
CFS-SL GA\_SPW\_EL\_001

Content  
Firestop penetration seal for cables through Paroc Fire Proof Panels

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CFS-SL GA

100mm

Paroc Fire Proof Panels

1a

1b


1c

- European Technical Assessment ETA-20/1234 (CFS-SL GA)
- Classification report 20406F
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in according with Hilti instructions for use

Not to scale  
all dimensions in [mm]

A „Typical“ is a preconfigured fire protection solution, consisting of certain components and for certain applications, which is assigned an adopted fire resistance duration. Typicals will be chosen according to its fire resistance duration and are subject to the technical product documentation and the underlying product approvals which will be published by Hilti from time to time, underlying the generic adoption and won't be selected project- or design specific. For this reason the suggested Typicals might not correspond the project- or design specific requirements, and have to be rated by the customer or an expert ordered by the customer with regard to the actual project specific design criteria and requirements.



		Product	Construction project
		<b>Firestop Speed Sleeve CFS-SL GA</b>	
ID CFS-SL GA_SPW_E_001		Content Firestop penetration seal for cables through Paroc Fire Proof Panels	
Page 02	Rev 00		

### ① Installation

Pos	Penetrant	Dimensions [mm]	Firestop material	Opening size [mm]	Annular gap	Pipe insulation and / or cable protection	Min. seal depth [mm]
1a	All cables	$\varnothing \leq 21$	CFS-SL GA M	$\varnothing 115$	none	-	100
1b	All cables	$\varnothing \leq 21$	CFS-SL GA M + CFS-SL GP	660 x 370	Fill entire cavity between gangplates with CFS-FX	-	100
1c	All cables	$\varnothing \leq 21$	CFS-SL GA M + CFS-CT	800 x 350	CFS-S ACR to depth of 10 mm	-	100

### ② Construction: This Typical is relevant for the following construction material

Fire-resistance criteria for the respective construction materials must be also considered.  
 CFS-SL GA M can only be installed in Paroc AST Sandwich Panels with a thickness of 100mm.  
 Where openings bisect joints in the sandwich panels, the joints must be stitched with self-drilling screws every 150mm to a distance of 600mm on each side of the opening and filled with CFS-S-ACR sealant to a distance of 100mm from the aperture edge.

Base material	100mm Paroc Fire Proof Panel AST S, S+, E, F, F+
Aperture Frame	Steel angle (L-shape) 30x30x2mm around perimeter of the opening sealed with CFS-S ACR Sealant between steel angle and wall, and affixed with self-drilling screws (MD21Z 5,5x25) every 100mm. Only applicable for rectangular openings as shown in cases 1b and 1c.

### ③ Information about the firestop

- Hilti Firestop Speed Sleeve CFS-SL GA M
- Application for cables and cable bundles
  - CFS-SL GP Gangplate affixed to wall with Hilti S-DD 03Z self-drilling screws of length  $\geq 25$  mm

### ④ Distance

First service support:  $\leq 500$ mm

**Single sleeves CFS-SL GA M installed directly in sandwich panel wall – linear arrangement**  
 Distance between wall apertures: 35 mm.

**Multiple sleeves CFS-SL GA M installed in coated board seal CFS-CT 1S - cluster arrangement**  
 Distance between adjacent apertures: 35 mm.

**Multiple sleeves CFS-SL GA M with gangplates CFS-SL GP installed in foam seal CFS-FX - cluster arrangement**  
 Distance between the adjacent apertures: in line with the gangplate opening positions.

**Separation between CFS-SL GA and adjacent seals:**

Separations [≥ ... mm]	CFS-SL GA M	CFS-SL GA M + CFS-CT 1S	CFS-SL M + CFS-SL GP + CFS-FX	CFS-BL	CFS-CT 1S	Other penetration seals
CFS-SL GA M		100	200	100	100	200
CFS-SL GA M + CFS-CT 1S	100		100	100	100	200
CFS-SL M + CFS-SL GP + CFS-FX	200	100		100	200	200
CFS-BL	100	100	100		100	200
CFS-CT 1S	100	100	200	100		200
Other penetration seals	200	200	200	200	200	

### ⑤ Deflection solution

Stop cable tray on either side of wall, normal deflection accommodated by unsupported cables.

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# ELECTRICAL





Product  
**Firestop Block CFS-BL**

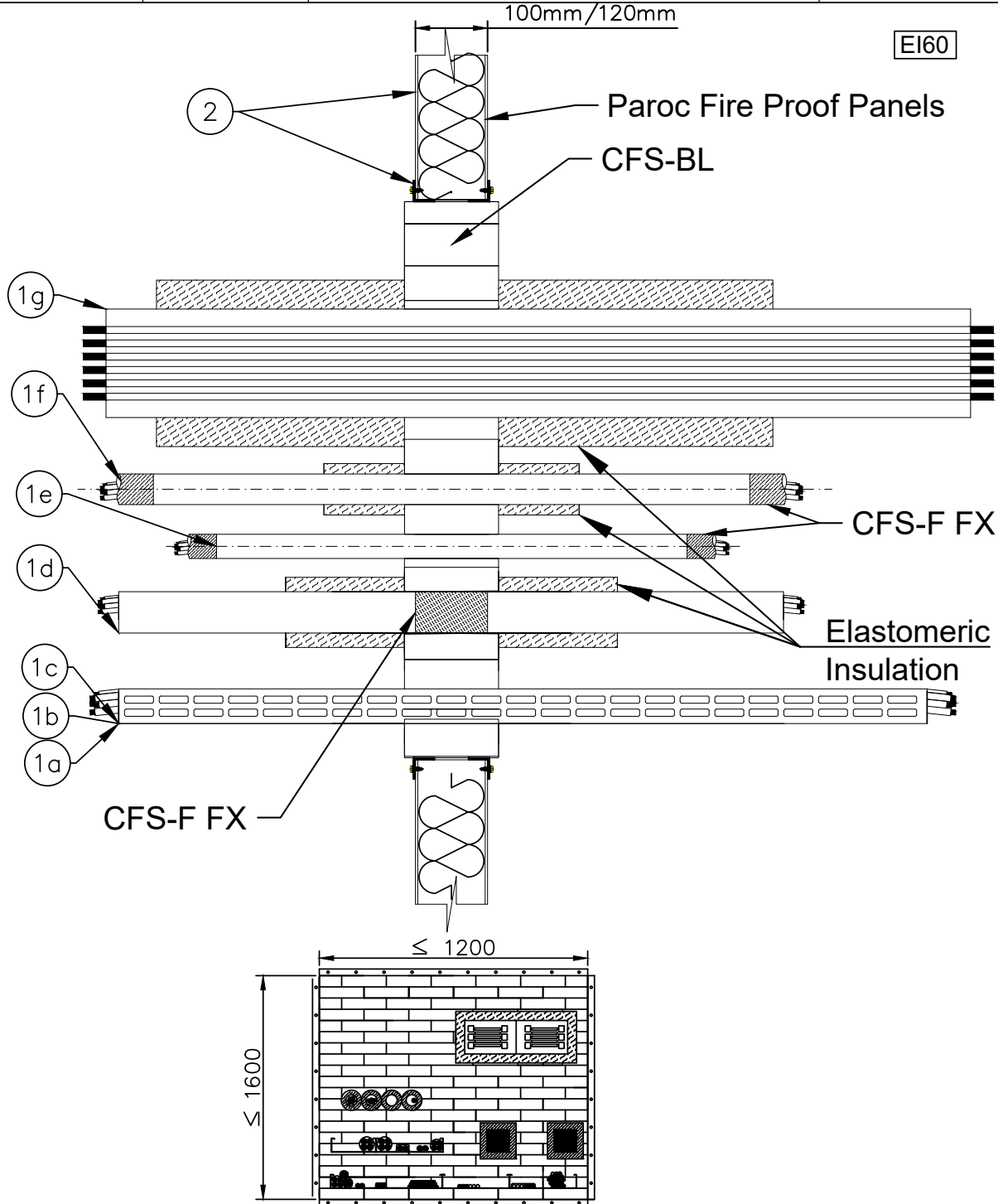
Construction project

ID  
CFS-BL\_SPW\_MX\_001

Content  
Firestop penetration seal for cables, metallic cable trays,  
cable trunking, conduits and busbars through Paroc Fire  
Proof Panels

Page 01


Rev 00



- European Technical Assessment ETA-13/0099 (CFS-BL)
- Classification report 20406C
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in accordance with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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		Product	<b>Firestop Block CFS-BL</b>	Construction project
		ID		
Page 02	Rev 00	Firestop penetration seal for cables, metallic cable trays, cable trunking, conduits and busbars through Paroc Fire Proof Panels		

### ① Installation

Pos	Penetrant	Description/ Type	Dimensions [mm]	Firestop material	Opening size [mm]	Annular gap	Pipe insulation and / or cable protection	Min. seal depth [mm]
1a	All cables	-	$\varnothing \leq 80$	CFS-BL	$\leq 1200 \times 1600$	CFS-FIL to a depth of 15mm	-	130
1b	Cable bundles	Individual cable $\varnothing \leq 21\text{mm}$	$\varnothing \leq 100$	CFS-BL	$\leq 1200 \times 1600$	CFS-FIL to a depth of 15mm	-	130
1c	Metallic Cable trays	-	$\leq 1100$	CFS-BL	$\leq 1200 \times 1600$	CFS-FIL to a depth of 15mm	-	130
1d	Cable trunking	-	$\leq 100 \times 100$	CFS-BL	$\leq 1200 \times 1600$	CFS-FIL to a depth of 15mm	Trunking filled with CFS-FX to thickness of wall and locally wrapped with foamed elastomeric insulation on either side of penetration seal, T*= 32 mm, L*= 300 mm	130
1e	Small cable conduits	Plastic and/or steel	$\varnothing \leq 16$	CFS-BL	$\leq 1200 \times 1600$	CFS-FIL to a depth of 15mm	-	130
1f	Large cable conduits	Steel	$\varnothing \leq 50$ (with cables $\varnothing \leq 21$ )	CFS-BL	$\leq 1200 \times 1600$	CFS-FIL to a depth of 15mm	Conduit capped with CFS-FX to a depth of 40mm and locally wrapped with foamed elastomeric insulation on either side of penetration seal, T*= 20 mm, L*= 200 mm	130
1g	Busbar	E+I Engineering copper busbar	5000 amp	CFS-BL	$\leq 1200 \times 1600$	CFS-FIL to a depth of 15mm	Busbar locally wrapped with foamed elastomeric insulation on either side of penetration seal, T*= 32 mm, L*= 500 mm	130

T\* = insulation thickness, L\* = insulation length

### ② Construction: This Typical is relevant for the following construction material

Fire-resistance criteria for the respective construction materials must be also considered.

CFS-BL seal can only be used in the Paroc AST sandwich panels with thicknesses of 100mm or 120mm.

Where openings bisect joints in the sandwich panels, the joints must be stitched with self-drilling screws every 150mm to a distance of 600mm on each side of the opening.

Base material	100mm or 120mm Paroc Fire Proof Panel AST S, S+, E, F, F+
Aperture Frame	Steel angle (L-shape) 30x30x2mm around perimeter of the opening sealed with CFS-S ACR Sealant between steel angle and wall, and affixed with self-drilling screws (MD21Z 5,5x25) every 100mm

### ③ Information about the firestop

Hilti Firestop Block CFS-BL

- Application for cables, cable trays, trunking, conduits and busbars
- For aperture heights  $\geq 1000\text{mm}$ : CFS-BL seal must be secured by 2x channels fixed vertically over seal, installed  $\geq 400\text{mm}$  from seal edge & each other.

### ④ Distance

First service support:  $\geq 400\text{mm}$

Distances between services within CFS-BL seal					
	Cables / cable Supports / small conduits	Large conduits	Busbar	Trunking	Seal edge
Cables / cable Supports / small conduits	$\geq 50$	$\geq 100$	$\geq 250$	$\geq 100$	$\geq 50$
Large conduits	$\geq 200$	$\geq 40$	$\geq 200$	$\geq 200$	$\geq 50$
Busbar	$\geq 200$	$\geq 200$	$\geq 25$	$\geq 200$	$\geq 25$
Trunking	$\geq 200$	$\geq 200$	$\geq 200$	$\geq 100$	$\geq 50$

Separation between adjacent seals					
	CFS-CT Service Penetrations	CFS-CT Damper Penetrations	CFS-D	CFS-SL GA	Other seals
CFS-BL	$\geq 100$	$\geq 200$	$\geq 50$	$\geq 100$	$\geq 200$

### ⑤ Deflection solution

Firestop Blocks can accommodate moderate deflection of services. Please contact Hilti for further details.

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Product  
**Firestop Cable Disc CFS-D**

Construction project

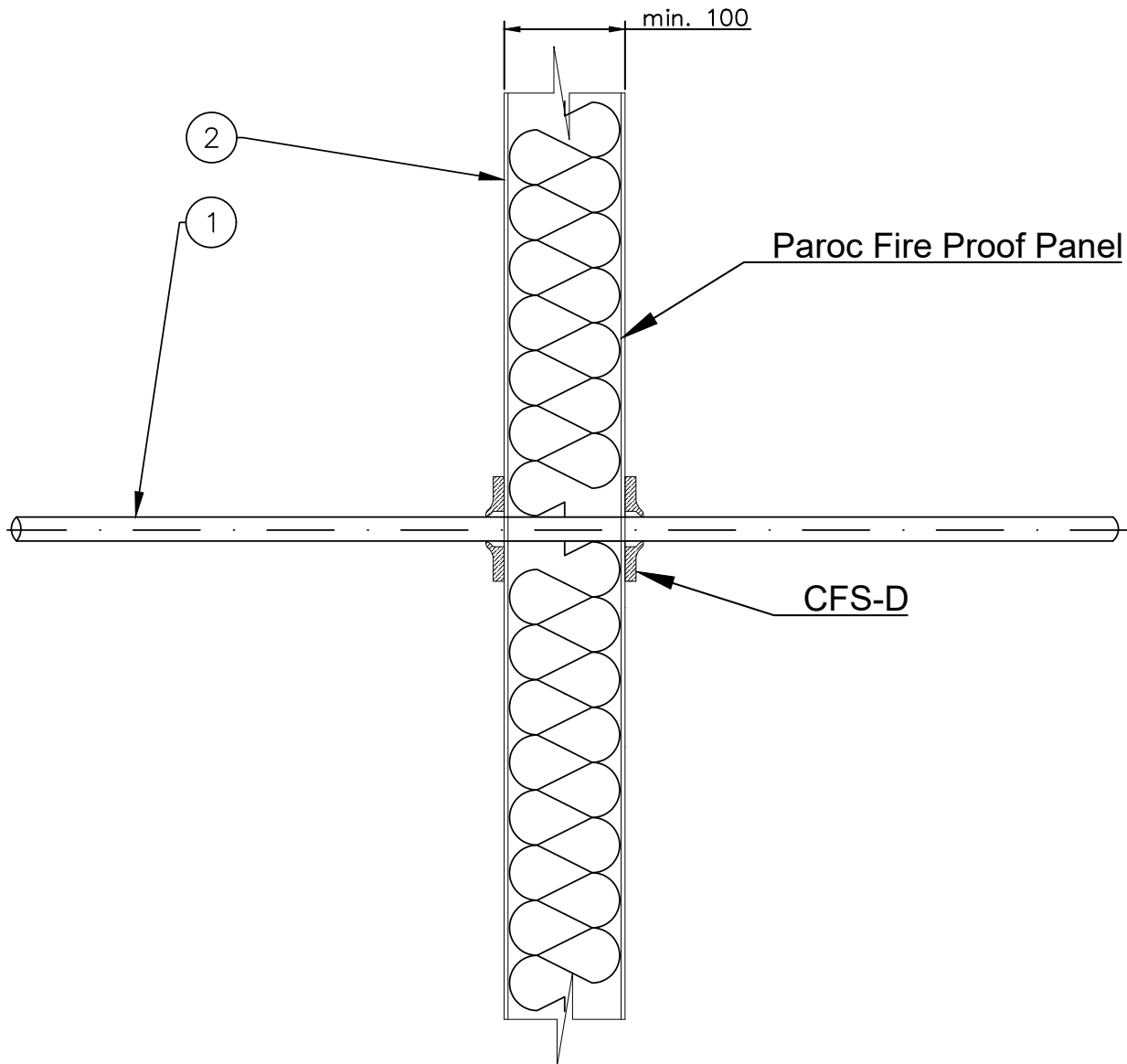
ID  
CFS-D\_SPW\_E\_001

Content  
Firestop penetration seal for single/small cable bundles  
through Paroc Fire Proof Panels

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EI60



- European Technical Assessment ETA-16/0050 (CFS-D)
- Classification report 20406G
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in according with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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		Product	<b>Firestop Cable Disc CFS-D</b>	Construction project
		ID		
CFS-D_SPW_E_001		Firestop penetration seal for single cables through Paroc Fire Proof Panels		
Page	02	Rev	00	

### ① Installation

Pos	Penetrant	Dimensions [mm]	Firestop material	Opening size [mm]	Annular gap	Pipe insulation and / or cable protection	Min. seal depth [mm]
1a	All cables	$\varnothing \leq 21$	CFS-D	$\varnothing \leq 25$	-	-	100

### ② Construction: This Typical is relevant for the following construction material

Fire-resistance criteria for the respective construction materials must be also considered.  
The tested wall thickness represents a minimum thickness required for the penetration fire-resistance rating.

Base material	Paroc Fire Proof Panel AST S, S+, E, F, F+
Aperture Frame	No aperture framing required

### ③ Information about the firestop

Hilti Firestop Cable Disc CFS-D  
- Application for cables

### ④ Distance

First service support:  $\geq 500\text{mm}$

Distances between openings [mm]

Separation between penetration seals			
	CFS-D	CFS-BL	CFS-SL GA
CFS-D	$\geq 100$	$\geq 100$	$\geq 100$

### ⑤ Deflection solution

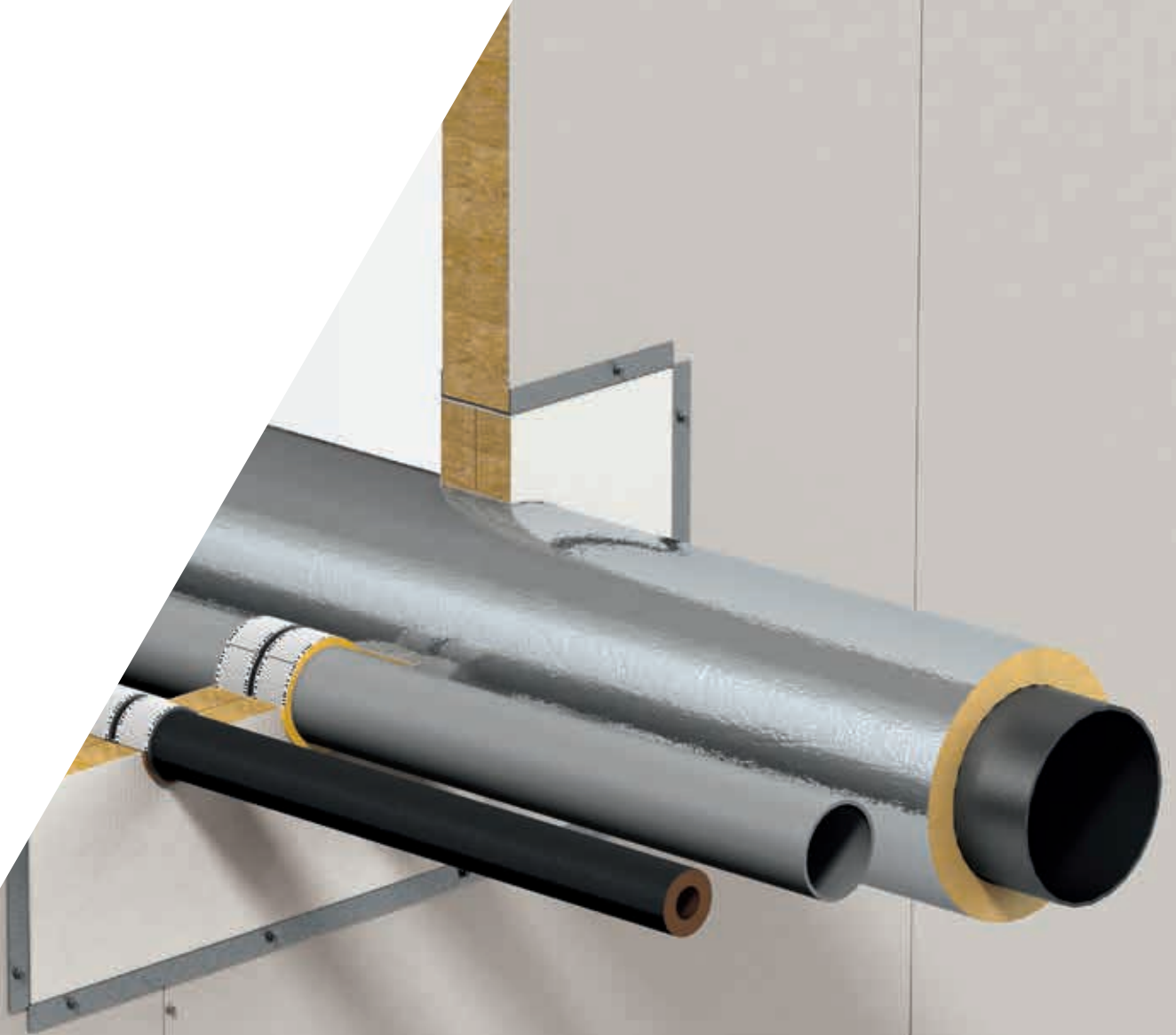
Stop cable tray on either side of wall, normal deflection accommodated by unsupported cables.

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# MECHANICAL PIPING





Product  
**Firestop  
Coated Board System CFS-CT**

Construction project

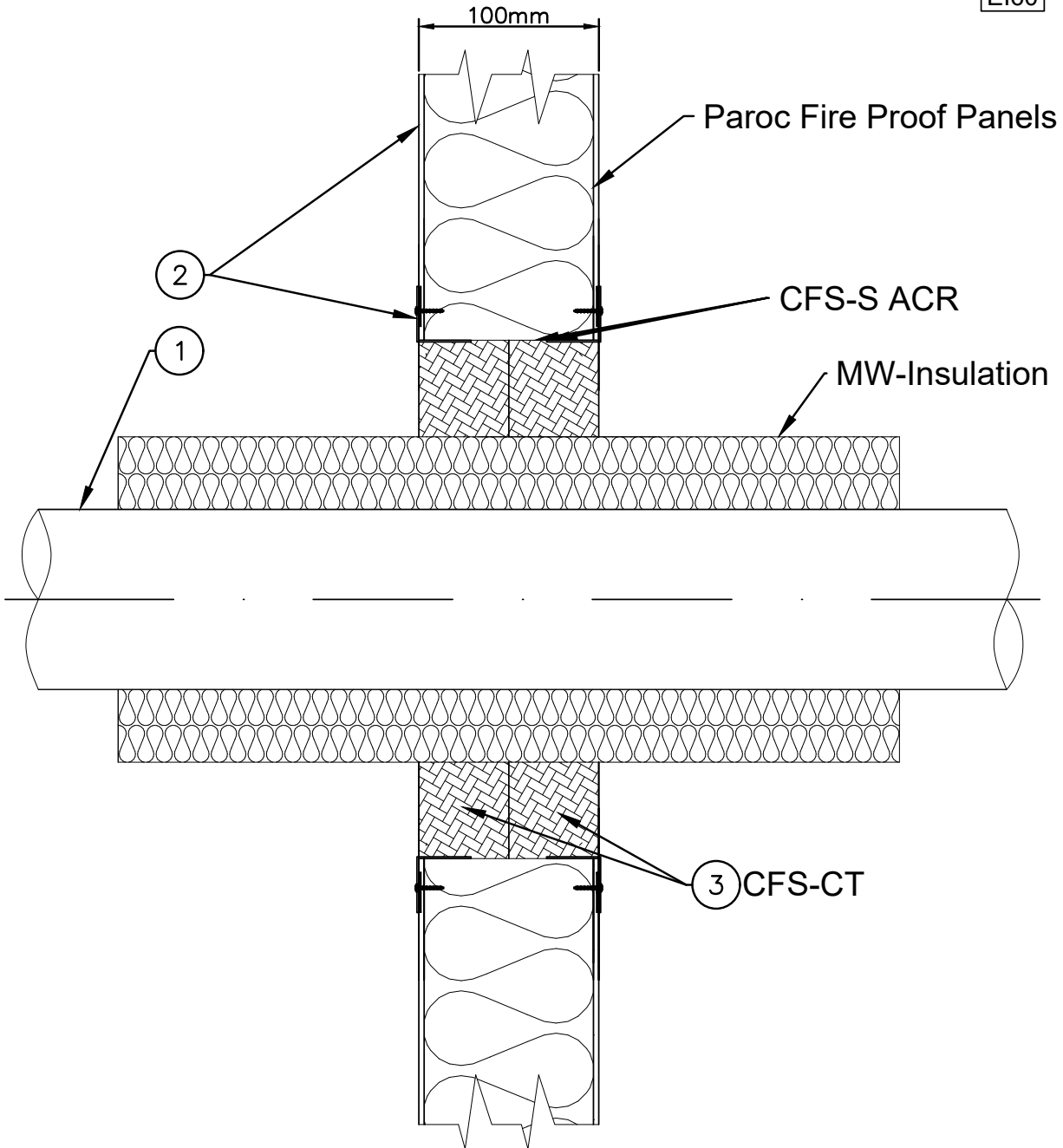
ID CFS-CT\_SPW\_NCP\_001

Content  
Firestop penetration seal for single and multiple  
non-combustible pipes through Paroc Fire Proof Panels

Page 01

Rev 00


EI60



- European Technical Assessment ETA-11/0429 (CFS-CT)
- Classification report 20406D
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in according with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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		Product	<b>Firestop Coated Board System CFS-CT</b>	Construction project
		ID		
Page 02	Rev 00	CFS-CT_SPW_NCP_001 Firestop penetration seal for for single and multiple non-combustible pipes through Paroc Fire Proof Panels		

### ① Installation

Pos	Penetrant	Description/Type	Dimensions [mm]	Firestop material	Opening size [mm]	Annular gap	Pipe insulation and /or cable protection	Min. Seal depth [mm]
1a	Non-combustible pipe	Copper, steel, stainless steel and cast iron	$10 < \varnothing \leq 64$	CFS-CT	$\leq 2000 \times 600$	CFS-S ACR to depth of 10 mm	Aluminium-backed mineral wool, insulated continuously through penetration seal $T^* = 30\text{mm}$ , $L^* \geq 750\text{mm}$	100
1b	Non-combustible pipe	Steel, stainless steel and cast iron	$64 < \varnothing \leq 324$	CFS-CT	$\leq 2000 \times 600$	CFS-S ACR to depth of 10 mm	Aluminium-backed mineral wool, insulated continuously through penetration seal $T^* = 40\text{mm}$ , $L^* \geq 750\text{mm}$	100

$T^*$  = Insulation thickness,  $L^*$  = Insulation length

### ② Construction: This Typical is relevant for the following construction materials:

Fire-resistance criteria for the respective construction materials must be also considered.  
 CFS-CT 1S 2x50 can only be installed in the Paroc AST Sandwich Panels with thickness of 100mm.  
 Where openings bisect joints in the sandwich panels, the joints must be stitched with self-drilling screws every 150 mm to a distance of 600 mm on each side of the opening.

Base material	100mm Paroc Fire Proof Panel AST S, S+, E, F, F+
Aperture Frame	Steel angle (L-shape) 30x30x2mm around perimeter of the opening sealed with CFS-S ACR. Sealant between steel angle and wall, and affixed with self-drilling screws (MD21Z 5,5x25) every 100mm

### ③ Information about the firestop

Hilti Firestop Coated Board System CFS-CT  
 - Application for non-insulated and MW-insulated non-combustible pipes,  
 non-insulated pipes to be wrapped with local mineral wool insulation to the length specified

### ④ Distance

First service support:  $\geq 250$  mm

Distances between penetrants [mm]

Separation between services				
	Metal pipes	Plastic Pipes	Seal Edges	Other services
Metal Pipes	$\geq 50$	$\geq 50$	$\geq 50$	$\geq 200$

Distances between openings [mm]

Separation between penetration seals				
	Other Seals	CFS-CT - Damper Penetrations	CFS-BL	CFS-SL GA
CFS-CT	$\geq 200$	$\geq 200$	$\geq 100$	$\geq 100$

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Product

Firestop Wrap CFS-W P in  
Firestop Coated Board System CFS-CT

Construction project

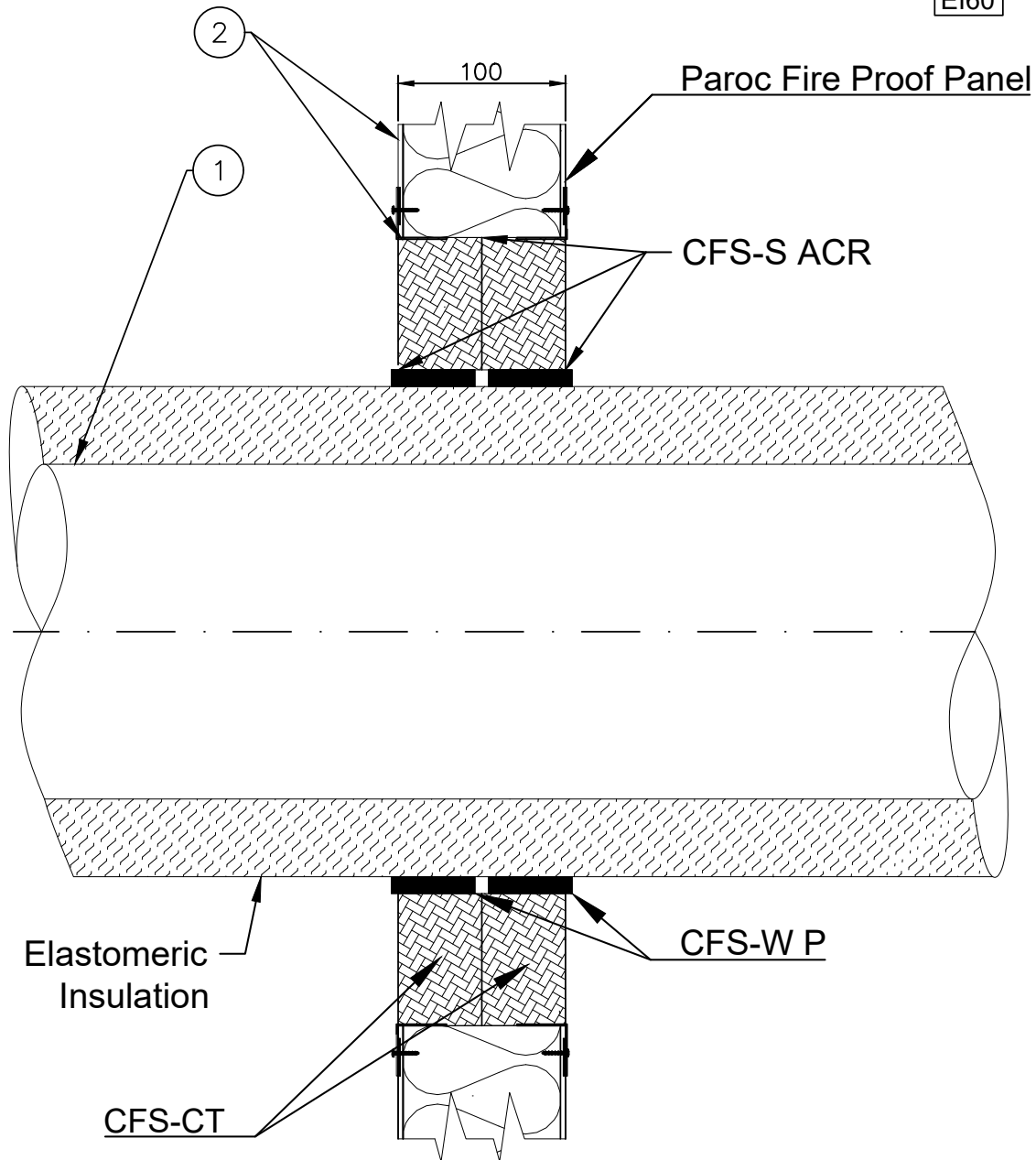
ID  
CFS-W P\_CFS-CT\_SPW\_NCP\_001

Content  
Firestop penetration seal for single and multiple  
non-combustible pipes with combustible insulation  
through Paroc Fire Proof Panels

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- European Technical Assessment ETA-20/0989 (CFS-CT)
- Classification report 20406D
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in accordance with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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Product  
**Firestop Wrap CFS-W P in  
 Firestop Coated Board System CFS-CT**

Construction project

ID  
**CFS-W P\_CFS-CT\_SPW\_NCP\_001**

Content  
 Firestop penetration seal for single and multiple  
 non-combustible pipes with combustible insulation  
 through Paroc Fire Proof Panels

Page 02

Rev 00

### ① Installation

Pos	Penetrant	Description/Type	Dimensions [mm]	Firestop material	Opening size [mm]	Annular gap	Pipe insulation and /or cable protection	Min. Seal depth [mm]
1a	Non-combustible pipe	Copper, steel, stainless steel and cast iron	$10 < \varnothing \leq 64$	CFS-CT CFS-W P	$\leq 2000 \times 600$	CFS-S ACR to depth of 10mm	Continuous foamed elastomeric insulation, T*= 15.5 - 39.5 mm	100
1b	Non-combustible pipe	Steel, stainless steel and cast iron	$64 < \varnothing \leq 219$	CFS-CT CFS-W P	$\leq 2000 \times 600$	CFS-S ACR to depth of 10mm	Continuous foamed elastomeric insulation, T*= 32 - 50 mm	100

T\* = Insulation thickness

### ② Construction: This Typical is relevant for the following construction material

Fire-resistance criteria for the respective construction materials must be also considered.  
 CFS-CT applications can only be installed in the Paroc AST Sandwich Panels with thickness of 100mm.  
 Where openings bisect joints in the sandwich panels, the joint must be stitched with self-drilling screws every 150mm to a distance of 600mm on each side of the opening.

Base material	100mm Paroc Fire Proof Panel AST S, S+, E, F, F+
Aperture Frame	Steel angle (L-shape) 30x30x2mm around perimeter of the opening sealed with CFS-S ACR. Sealant between steel angle and wall, and affixed with self-drilling screws (MD21Z 5,5x25) every 100mm

### ③ Information about the firestop

Hilti Firestop Wrap CFS-W P in Hilti Firestop Coated Board System CFS-CT  
 - Application for non-combustible pipes with continuous combustible insulation

Wrap Layer	
$\varnothing$ [mm]	Layers
10-64	2
64-219	3

### ④ Distance

First service support:  $\geq 250$ mm

Distances between penetrants [mm]

Separation between services				
	Metal pipes	Plastic Pipes	Seal Edges	Other services
Plastic Pipes	$\geq 50$	$\geq 50$	$\geq 50$	$\geq 200$

Distances between openings [mm]

Separation between CFS-CT 1S 2x50 seal with adjacent seals				
	All other seals	CFS-CT - Damper Penetrations	CFS-BL	CFS-SL GA
CFS-CT	$\geq 200$	$\geq 200$	$\geq 100$	$\geq 100$

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Product

Firestop Wrap CFS-W P in  
Firestop Coated Board System CFS-CT

Construction project

ID  
CFS-W P\_CFS-CT\_SPW\_CP\_001

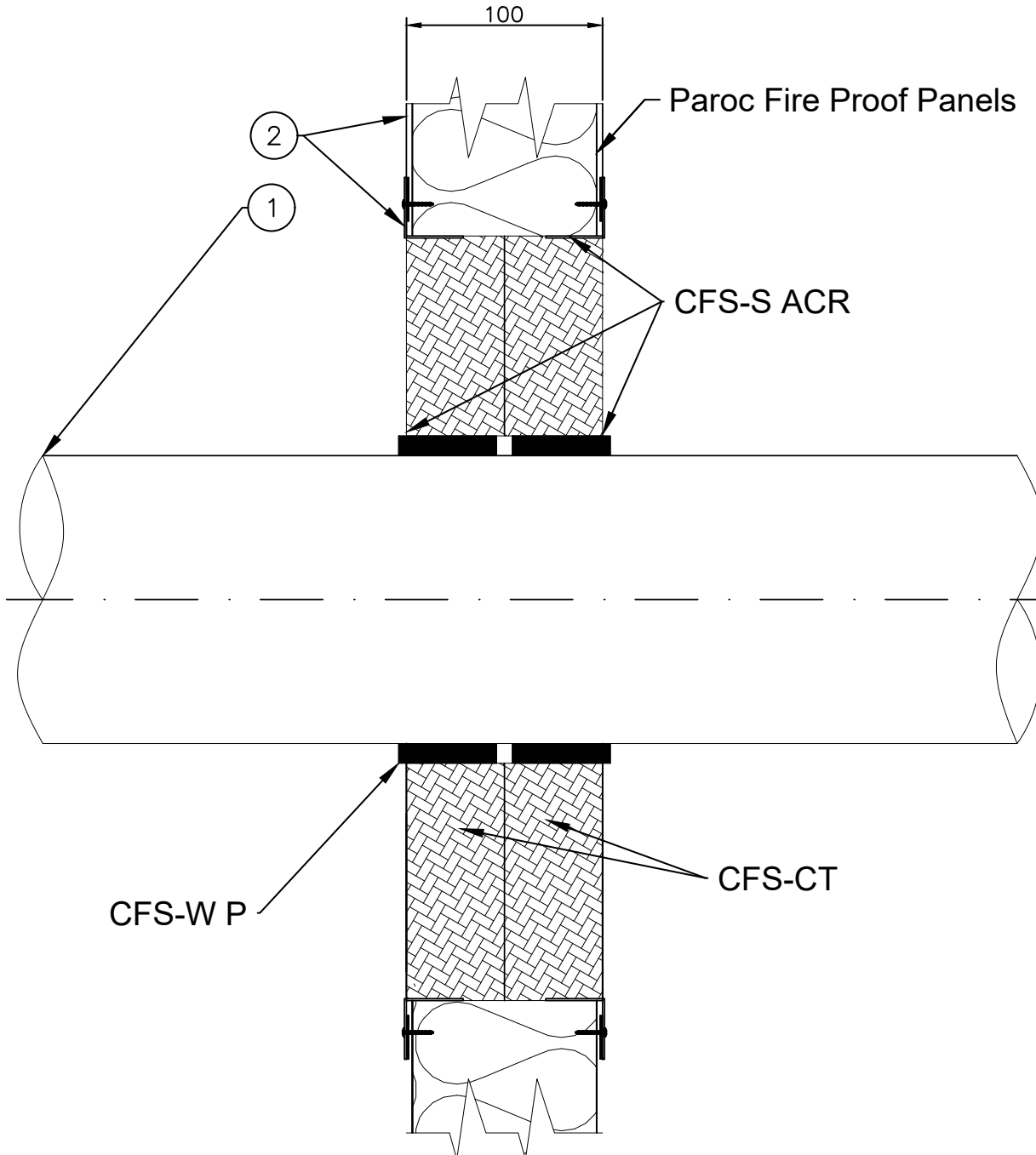
Content

Firestop penetration seal for single and multiple  
combustible pipes through Paroc Fire Proof Panels

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- European Technical Assessment ETA-11/0429 (CFS-CT)
- Classification report 20406D
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in according with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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Product  
**Firestop Wrap CFS-W P in  
 Firestop Coated Board System CFS-CT**

Construction project

ID  
**CFS-W P\_CFS-CT\_SPW\_CP\_001**

Content  
 Firestop penetration seal for single and multiple  
 combustible pipes through Paroc Fire Proof Panels

Page 02

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① Installation

Pos	Penetrant	Description/Type	Dimensions [mm]	Firestop material	Opening size [mm]	Annular gap	Min. Seal depth [mm]
1a	Combustible pipe	PP	$\varnothing \leq 110$	CFS-CT CFS-W P	$\leq 2000 \times 600$	CFS-S ACR to depth of 10mm	100
1b	Combustible pipe	PVC	$\varnothing \leq 110$	CFS-CT CFS-W P	$\leq 2000 \times 600$	CFS-S ACR to depth of 10mm	100
1c	Combustible pipe	PE	$\varnothing \leq 110$	CFS-CT CFS-W P	$\leq 2000 \times 600$	CFS-S ACR to depth of 10mm	100

② Construction: This Typical is relevant for the following construction material

Fire-resistance criteria for the respective construction materials must be also considered.  
 CFS-CT 1S 2x50 can only be installed in the Paroc AST Sandwich Panels with thickness of 100mm.  
 Where openings bisect joints in the sandwich panels, the joints must be stitched with self-drilling screws every 150mm to a distance of 600mm on each side of the opening.

Base material	100mm Paroc Fire Proof Panel AST S, S+, E, F, F+
Aperture Frame	Steel angle (L-shape) 30x30x2mm around perimeter of the opening sealed with CFS-S ACR. Sealant between steel angle and wall, and affixed with self drilling screws (MD21Z 5,5x25) every 100mm

③ Information about the firestop

Hilti Firestop Wrap CFS-W P in Hilti Firestop Coated Board System CFS-CT  
 - Application for single or multiple combustible pipes:

Wrap layer	
$\varnothing$ [mm]	Layers
32-56	2
63-75	3
90-110	4

④ Distance

First service support:  $\geq 500$ mm

Distances between penetrants [mm]

Separation between services				
	Metal pipes	Plastic Pipes	Seal Edges	Other services
Plastic Pipes	$\geq 50$	$\geq 50$	$\geq 50$	$\geq 200$

Distances between openings [mm]

Separation between CFS-CT 1S 2x50 seal with adjacent seals				
	All other seals	CFS-CT - Damper Penetrations	CFS-BL	CFS-SL GA
CFS-CT	$\geq 200$	$\geq 200$	$\geq 100$	$\geq 100$

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Product  
**Firestop Collar CFS-C P**

Construction project

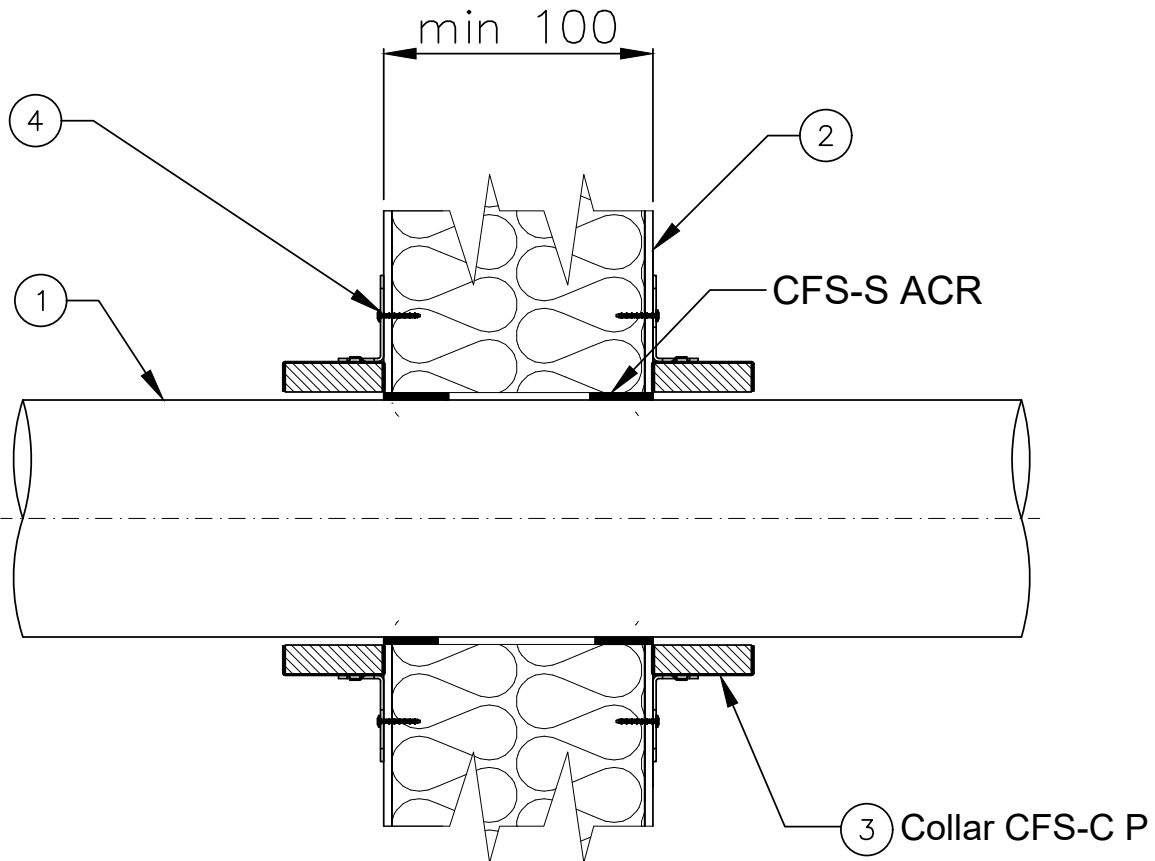
ID CFS-C P\_SPW\_CP

Content  
Firestop penetration seal for single combustible pipes  
through sandwich panel walls

Page 01

Rev 00

EI60




- European Technical Assessment ETA-10/0404 (CFS-C P)
- Classification report 20406E
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in accordance with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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		Product	Firestop Collar CFS-C P	Construction project
		ID		
Page	02	Rev	00	

### ① Installation

Pos	Penetrant	Description/Type	Dimensions [mm]	Firestop material	Opening size [mm]	Annular gap filler	Pipe insulation and/or cable protection (length)	Min. seal depth [mm]
a	Combustible pipe (U/U)	PP	Ø 75x1,9	CFS-C P	85	CFS-S ACR 15 mm depth	Pipes may be insulated with ≤ 4 mm sound decoupling	100
b		PVC	Ø 110 (2,2 - 5,3 mm)		120		Pipes may be insulated with 4 - 9mm sound decoupling	

### ② Construction: This Typical is relevant for the following construction materials:

Fire-resistance criteria for the respective construction materials must also be considered. The tested wall thickness represents a minimum thickness required for the penetration fire-resistance rating.	
Base Material	Paroc wall AST-S, AST-S+, AST-F, AST-F+, AST-E

### ③ Information about the firestop

Hilti FirestopCollar CFS-C P

- Application for combustible pipes in singular round openings
- Number of Fixings and Fixation types:

Pos	Material	Fixing material
a	PP	3x Hilti S-MD21Z 5,5x25
b	PVC	4x Hilti S-MD21Z 5,5x25
c		

### ④ Distances

First support min. 250mm

	Distances between adjacent seals	
	CFS-C P	Other Seals
CFS-C P	≥ 100	≥ 200

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Product

Firestop Endless Collar  
CFS-C EL

Construction project

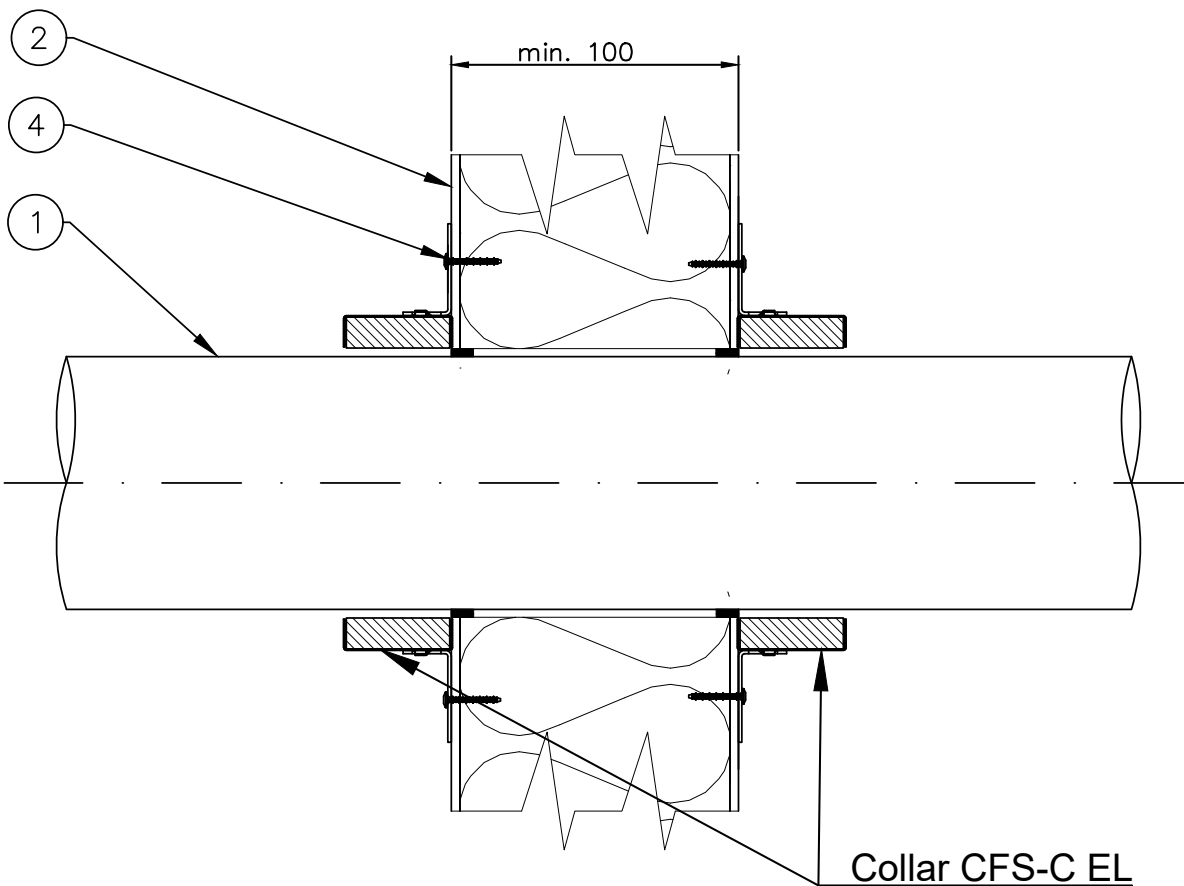
ID  
CFS-C EL\_SPW\_CP\_001

Content  
Firestop penetration seal for single combustible pipes  
through sandwich panel walls

Page 01

Rev 00


EI60



- European Technical Assessment ETA-14/0085 (CFS-C EL)
- Classification report xxxxx
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in accordance with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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		Product	<b>Firestop Endless Collar CFS-C EL</b>	Construction project
		ID		
CFS-C EL_SPW_CP_001		Firestop penetration seal for single combustible pipes through sandwich panel walls		
Page 02	Rev 00			

### ① Installation

Pos	Penetrant	Description/ Type	Dimensions [mm]	Firestop material	Opening size [mm]	Annular gap filler	Annular gap filler depth (min.)	Pipe insulation and / or cable protection	Seal depth [mm]
1a	Combustible pipe (U/U)	PP	Ø 32-110	CFS-C EL	40 ≤ Ø ≤ 130	CFS-S ACR ≤ 10 mm	CFS-S ACR ≤ 5 mm	Pipes may be insulated with ≤ 9 mm sound decoupling	100
1b	Combustible pipe (U/U)	PVC	Ø 50-110	CFS-C EL	62 ≤ Ø ≤ 130	CFS-S ACR ≤ 10mm	CFS-S ACR ≤ 5 mm	Pipes may be insulated with ≤ 9 mm sound decoupling	100
1c	Combustible pipe (U/U)	PE	Ø 32-110	CFS-C EL	40 ≤ Ø ≤ 130	CFS-S ACR ≤ 10 mm	CFS-S ACR ≤ 5 mm	Pipes may be insulated with ≤ 9 mm sound decoupling	100

### ② Construction: This Typical is relevant for the following construction material

Fire-resistance criteria for the respective construction materials must be also considered.  
The tested wall thickness represents a minimum thickness required for the penetration fire-resistance rating.

Base material	Paroc wall AST-S, AST-S+, AST-F, AST-F+, AST-E
---------------	--

### ③ Information about the firestop

Hilti Firestop Endless Collar CFS-C EL  
- Application for combustible pipes in singular round openings

Fixing:  
- Hilti S-MD21Z 5,5x25 self drilling screws

### ④ Distance

First support min. 250mm

Distances between penetrants [mm]

	Distances between services			
	Cables / Cable Supports	Metal Pipes / Pipe Insulation	Plastic Pipes / Pipe Closure Devices	Seal Edges
Plastic Pipes / Pipe Closure Devices	≥ 200	≥ 200	≥ 200	≥ 200

Distances between openings [mm]

	Separation between penetration seals					
	CFS-CT Service Penetrations	CFS-CT Damper Penetrations	CFS-BL	CFS-SL GA	CFS-D	CFS-C EL
CFS-C EL	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200	≥ 200

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# RF-TECHNOLOGIES FIRE DAMPERS





Product  
**Firestop Coated Board System  
CFS-CT**

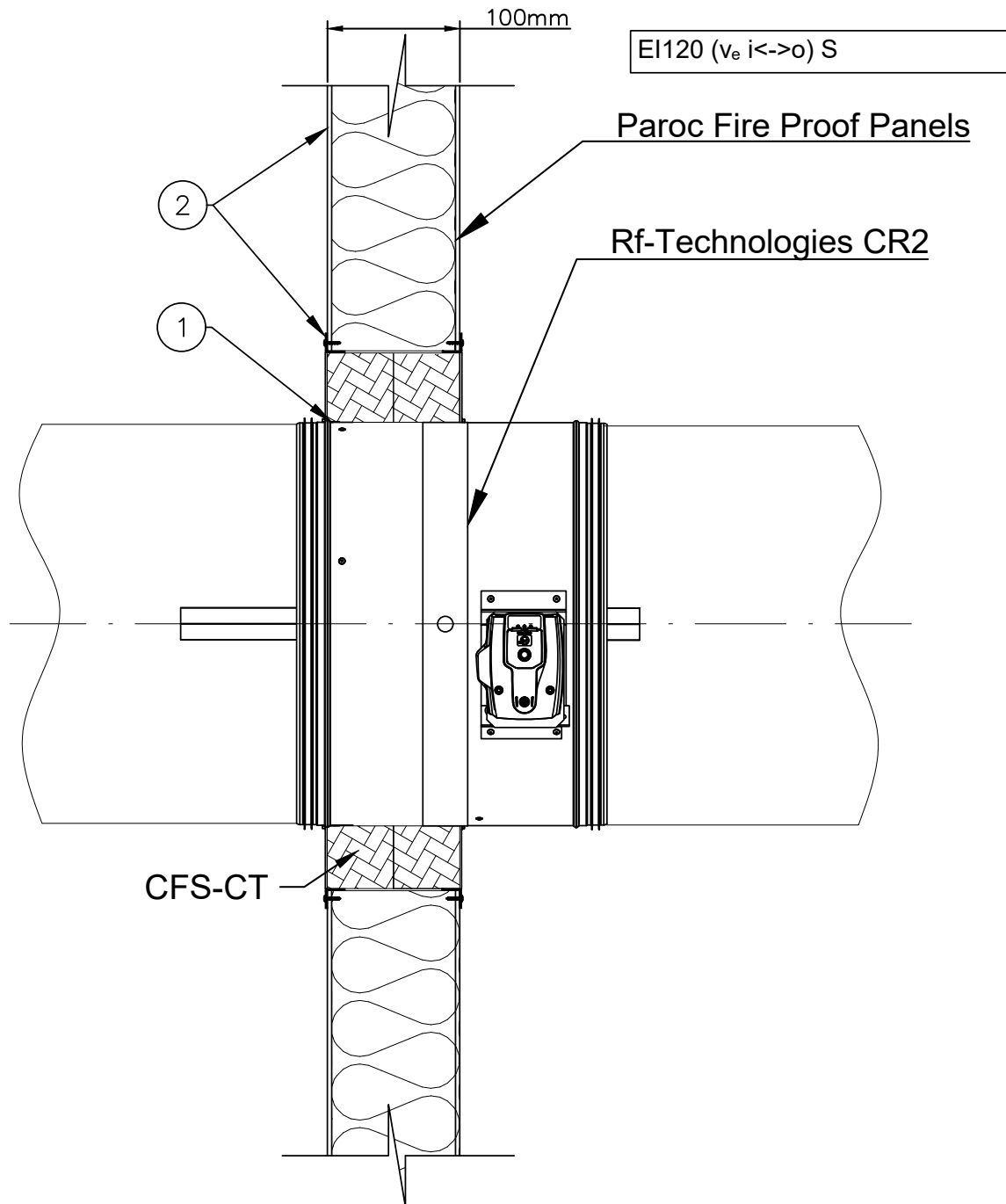
Construction project

ID  
CFS-CT\_SPW\_FD\_001

Content  
Firestop penetration seal for Rf-Technologies round  
fire dampers through Paroc Fire Proof Panels

Page 01


Rev 00



- European Technical Assessment ETA-11/0429 (CFS-CT)
- Classification report 20406J
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in according with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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		Product	Construction project
		<b>Firestop Coated Board System CFS-CT</b>	
ID CFS-CT_SPW_FD_001		Content Firestop penetration seal for round RF-Technologies fire dampers through Paroc Fire Proof Panels	
Page 02	Rev 00		

### ① Installation

Pos	Penetrant	Description/ Type	Dimensions [mm]	Firestop material	Opening size [mm]	Annular gap	Pipe insulation and / or cable protection	Min. seal depth [mm]
1a	Round dampers	Rf-T CR2	$\varnothing \leq 630$	CFS-CT	$\leq 730 \times 730$	CFS-S ACR to a depth of 10 mm	-	100

### ② Construction: This Typical is relevant for the following construction material

Fire-resistance criteria for the respective construction materials must be also considered.

Applications with CFS-CT 1S 2x50 can only be installed in Paroc AST Sandwich Panels with thickness of 100mm.

Where openings bisect joints in the sandwich panels, the joints must be stitched with self-drilling screws every 150mm to a distance of 600mm on each side of the opening.

Base material	100mm Paroc Fire Proof Panel AST S, S+, E, F, F+
Aperture Frame	Steel angle (L-shape) 30x30x2mm around perimeter of the opening sealed with CFS-S ACR Sealant between steel angle and wall, and affixed with self-drilling screws (MD21Z 5.5x25) every 100mm

### ③ Information about the firestop

RF-Technologies Fire Damper: CR2  $\varnothing \leq 630$

Hilti Firestop Coated Board System CFS-CT

- Application for round fire dampers in single installation

### ④ Distance

Minimum separation of 75mm between Fire Damper and a construction element

Minimum distance to other openings: 200 mm

### ⑤ Deflection solution

- RF-Technologies Fire dampers can be installed into sandwich panel walls in accordance with deflection requirements such as DW145.

- The fire damper must be solidarized with the wall by screw-fixing RF-Technologies made-to-measure fixing lugs.

Please contact RF-Technologies or your distributor.

- The sealing details between fire damper and wall remain unchanged.

- The connection of galvanized ductwork to the fire damper should be made with breakaway bolts or a flexible joint to allow for movement between the damper and ductwork.

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Product

# Firestop Coated Board System CFS-CT

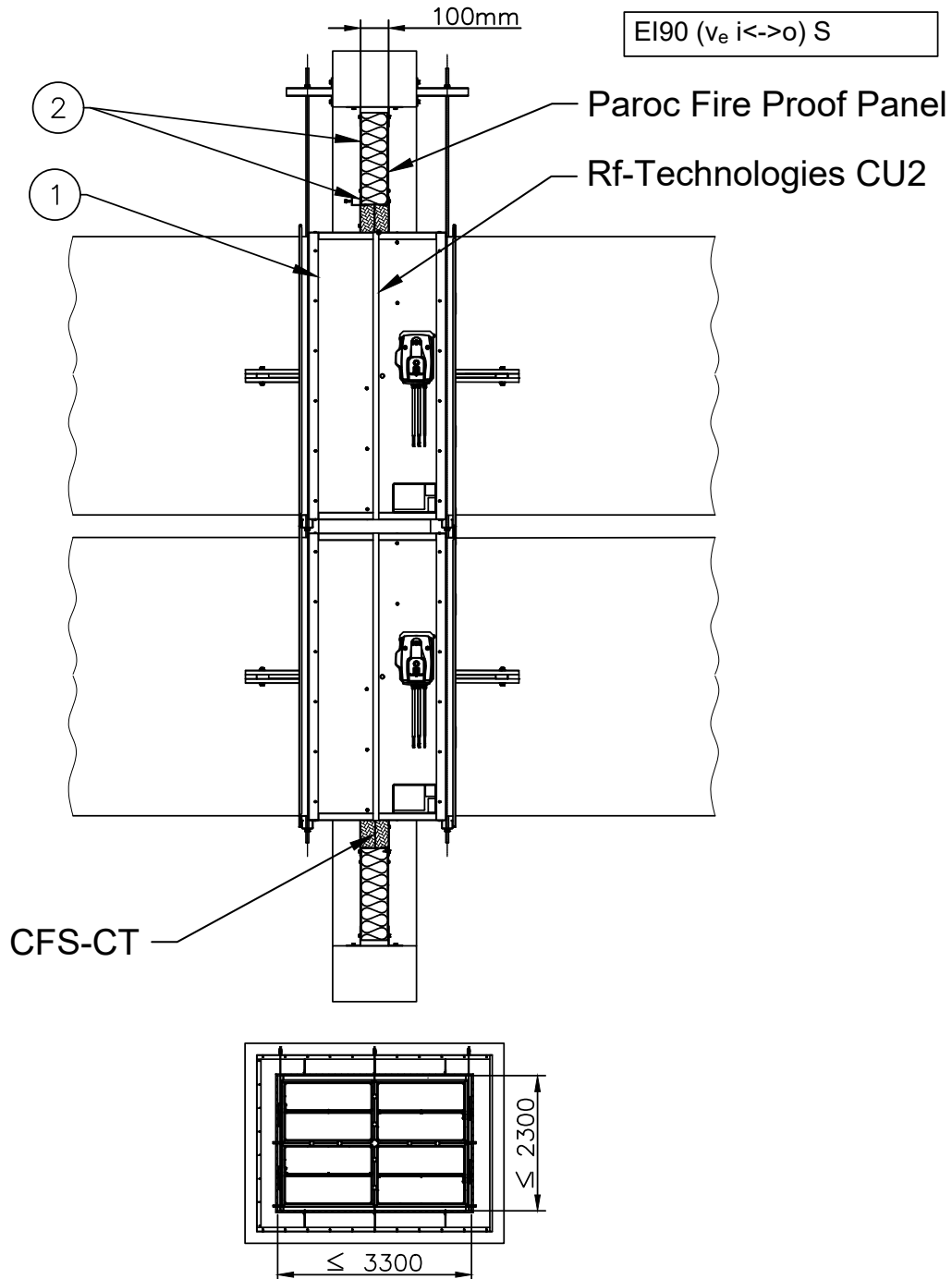
Construction project

ID  
CFS-CT\_SPW\_FD\_003

Content  
Firestop penetration seal for single or multiple  
rectangular Rf-Technologies through Paroc Fire Proof  
Panels

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- European Technical Assessment ETA-11/0429 (CFS-CT)
- Classification report 20545B
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in according with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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		Product	<b>Firestop Coated Board System CFS-CT</b>	Construction project
		ID		
CFS-CT_SPW_FD_003		Firestop penetration seal for single or multiple rectangular Rf-Technologies through Paroc Fire Proof Panels		
Page 02	Rev 00			

### ① Installation

Pos	Penetrant	Description/Type	Dimensions [mm]	Firestop material	Opening size [mm]	Annular gap	Min. seal depth [mm]
1a	Rectangular dampers	Rf-Technologies CU2	Individual damper: 2000 x 1000mm  (max 2x2 rectangular dampers with min dist.)	CFS-CT	Maximum 45mm annular space between CFS-CT & damper	CFS-S ACR to a depth of 10 mm	100

### ② Construction: This Typical is relevant for the following construction material

Fire-resistance criteria for the respective construction materials must be also considered.  
 Applications with CFS-CT 1S 2x50 can only be installed in Paroc AST Sandwich Panels with thickness of 100mm.  
 Where openings bisect joints in the sandwich panel, the joint must be stitched with self-drilling screws every 150mm to a distance of 600mm on each side of the opening.

Base material	100mm Paroc Fire Proof Panel AST S, S+, E, F, F+
Aperture Frame	Steel angle (L-shape) 30x30x2mm around perimeter of the opening sealed with CFS-S ACR Sealant between steel angle and wall, and affixed with self-drilling screws every 100mm. If an opening bisects more than 2 panel joints, install 100mm Paroc Panel System MIT thermo-profiles every 600mm behind the L-angle aperture framing.

### ③ Information about the firestop

Rf-Technologies Fire Damper CU2: 2000 x 1000  
 Hilti Firestop Coated Board System CFS-CT  
 - Application for rectangular fire dampers in single and battery installations

### ④ Distance

Distance between fire damper and construction element: 75mm  
 Minimum separation of Fire Dampers in separate ducts: 200mm

### ⑤ Deflection solution

- Rf-Technologies Fire dampers can be installed into sandwich panel walls in accordance with deflection requirements such as DW145.
- The fire damper must be solidarized with the wall by screw-fixing Rf-Technologies made-to-measure fixing lugs. Please contact Rf-Technologies or your distributor.
- The sealing details between fire damper and wall remain unchanged.
- The connection of galvanized ductwork to the fire damper should be made with breakaway bolts or a flexible joint to allow for movement between the damper and ductwork.

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STEAL BEAM



Product  
**Firestop Blocks CFS-BL**

Construction project

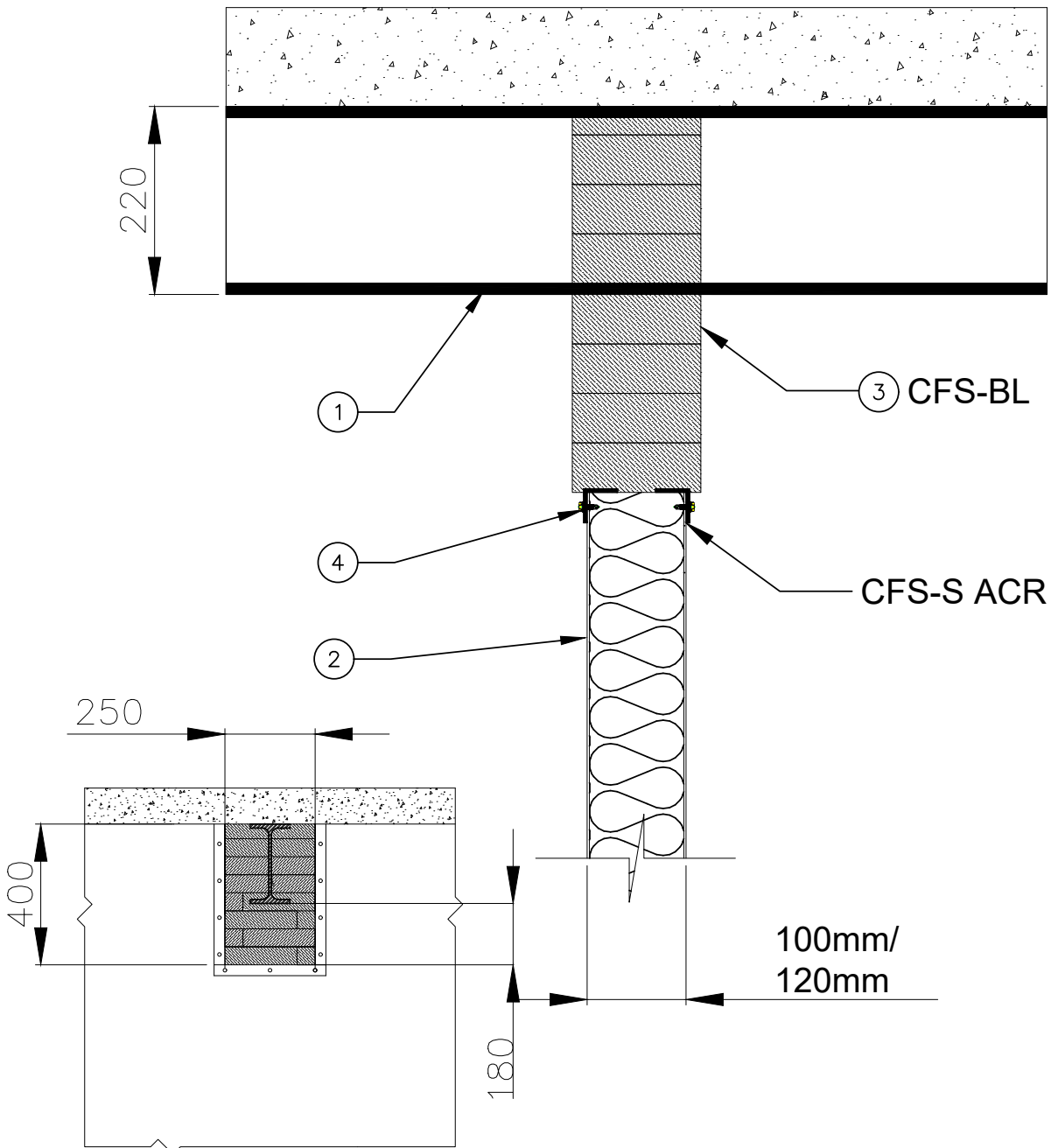
ID CFS-BL\_SPW\_SB

Content  
Firestop penetration seal for steel beam through  
Paroc Fire Proof Panels

Page 01

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EI60



- European Technical Assessment ETA-13/0099 (CFS-BL)
- Assessment report 20406K
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in according with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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		Product	Construction project
		Firestop Blocks CFS-BL	
ID CFS-BL_SPW_SB		Content	
Page 02	Rev 00	Firestop penetration seal for steel beam through Paroc Fire Proof Panels	

### ① Installation

Pos	Penetrant	Description/Type	Dimensions [mm]	Firestop material	Opening size [mm]	Min. seal deph [mm]
1.	Steel beam	IPE 220 (fire protected steel beam)	110x220	CFS-BL	≤ 250 x 400	100

### ② Construction: This Typical is relevant for the following construction materials:

Fire-resistance criteria for the respective construction materials must also be considered.	
Base Material	100/120mm Paroc wall AST-S, AST-S+, AST-F, AST-F+, AST-E
Aperture frame	Steel angle (L-shape) 30x30x2mm around perimeter of the opening sealed with CFS-S ACR Sealant between steel angle and wall, and affixed with self-drilling screws (Hilti S-MD21Z 5,5x25) every 100mm.

### ③ Information about the firestop

Hilti Firestop Block CFS-BL

- Application for steel beam with vertical deflection

Service protection:

- Intumescent Paint: Hilti Fire Finish 120+ (dry layer thickness: 5mm)

### ④ Deflection Solution

1. Ensure opening appropriately dimensioned to accommodate deflection between steel flashing and service penetrations.
2. The maximum recommended vertical compression value for Hilti firestop blocks CFS-BL is 10mm per unit. For a total height of 180mm of blocks underneath the steel beam, the penetrant system can accommodate approximately 40mm. compression of vertical movement.

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Product

Firestop Coated Board System CFS-CT

Construction project

ID CFS-CT\_SPW\_SB

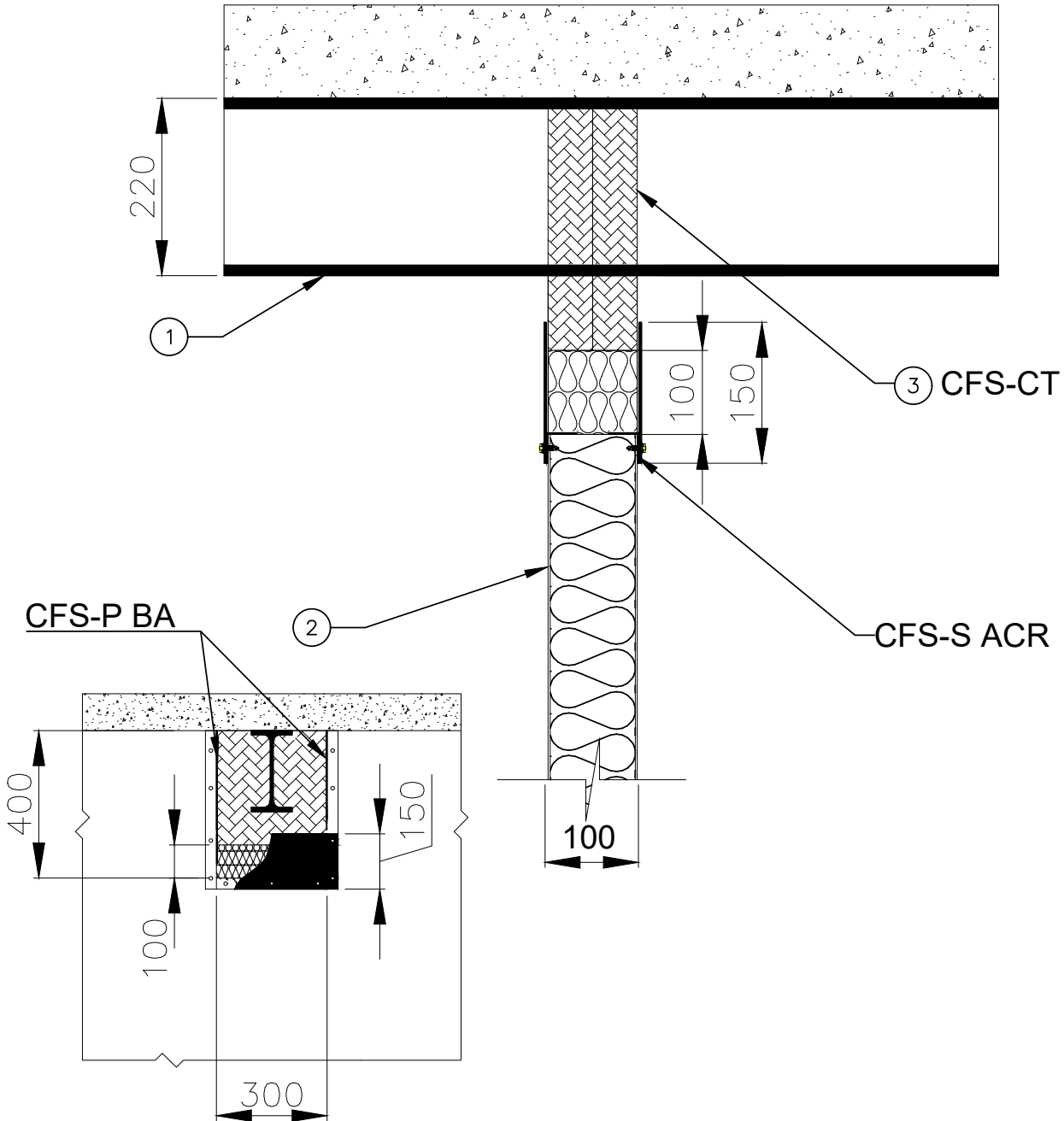
Content

Firestop penetration seal for steel beam through  
Paroc Fire Proof Panels deflection solution

Page 01

Rev 00


EI60



- European Technical Assessment ETA-11/0429 (CFS-CT)
- Assessment Report: 204061
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in accordance with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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		Product	<b>Firestop Coated Board System CFS-CT</b>	Construction project
		ID		
Page	02	Rev	00	Firestop penetration seal for steel beam through Paroc Fire Proof Panels deflection solution

### ① Installation

Pos	Penetrant	Description/Type	Dimensions [mm]	Firestop material	Opening size [mm]	Min. seal depth [mm]
a	Steel beam	IPE 220 (fire protected steel beam)	110x220	CFS-CT CFS-P BA CFS-S ACR	≤300 x 400	100

### ② Construction: This Typical is relevant for the following construction materials:

Fire-resistance criteria for the respective construction materials must also be considered. The tested wall thickness represents a minimum thickness required for the penetration fire-resistance rating.	
Base Material	100mm Paroc wall AST-S, AST-S+, AST-F, AST-F+, AST-E
Aperture frame	Steel angle (L-shape) 30x30x2mm around perimeter of the opening sealed with CFS-S ACR Sealant between steel angle and wall, and affixed with self-drilling screws every 100mm

### ③ Information about the firestop

Hilti Firestop Coated Board CFS-CT

- Application for Steel beam

Service protection:

- Intumescent Paint: Hilti Fire Finish 120+ (5mm dry thickness)

Fixing Material:

- Hilti S-MD21Z 5,5x25 self drilling screws for fixing of steel angle 30x30x2

### ④ Deflection Solution

1. Ensure opening appropriately dimensioned to accommodate deflection between steel flashing and service penetrations.
2. Dimension of the opening height so that the distance between the bottom edge of the steel beam and the bottom edge of the opening equals 180mm to allow a vertical movement of 40mm.
3. Install CFS-P BA bandage on the vertical flank (left-/right side) of the opening over the entire height.
4. Install mineral wool board CFS-CT (back to back) perfectly fit in opening taking into account a residual opening at the bottom area of 100mm.
5. Install mineral wool with a density of 40kg/m<sup>3</sup> slightly compressed from a thickness of 120mm to a thickness of 100mm, to accommodate required movement at bottom area of opening.
6. In this design, the uncompressed MW can achieve up to 40mm compression through vertical movement providing system flexibility without any deformation. Based on the vertical movement value, the height of the layer of MW must be calculated to limit the vertical compression to 50%.
7. Install on both sides 1mm thick and 150mm high metal sheets in the width of the opening including the 30mm wide metal angles, taking into account an overlap at bottom compression area. The CFS-CT mineral wool panel is overlapped to 20mm in the lower area seal.

NOTE 1: For fixing of the metal sheets use the same screws as for the fixing of the 30mm wide angles.

NOTE 2: Prior to the metal plate fixing, the contact area to the 30mm wide sheet metal angles must be sealed with sealant.CFS-S ACR.

A „Typical“ is a preconfigured fire protection solution, consisting of certain components and for certain applications, which is assigned an adopted fire resistance duration. Typical will be chosen according to its fire resistance duration and are subject to the technical product documentation and the underlying product approvals which will be published by Hilti from time to time, underlying the generic adoption and won't be selected project- or design specific. For this reason the suggested Typical might not correspond the project- or design specific requirements, and have to be rated by the customer or an expert ordered by the customer with regard to the actual project specific design criteria and requirements.





**SPECIAL SOLUTIONS  
FOR SERVICE  
DEFLECTION**



Product  
**Firestop Coated Board system CFS-CT**

Construction project

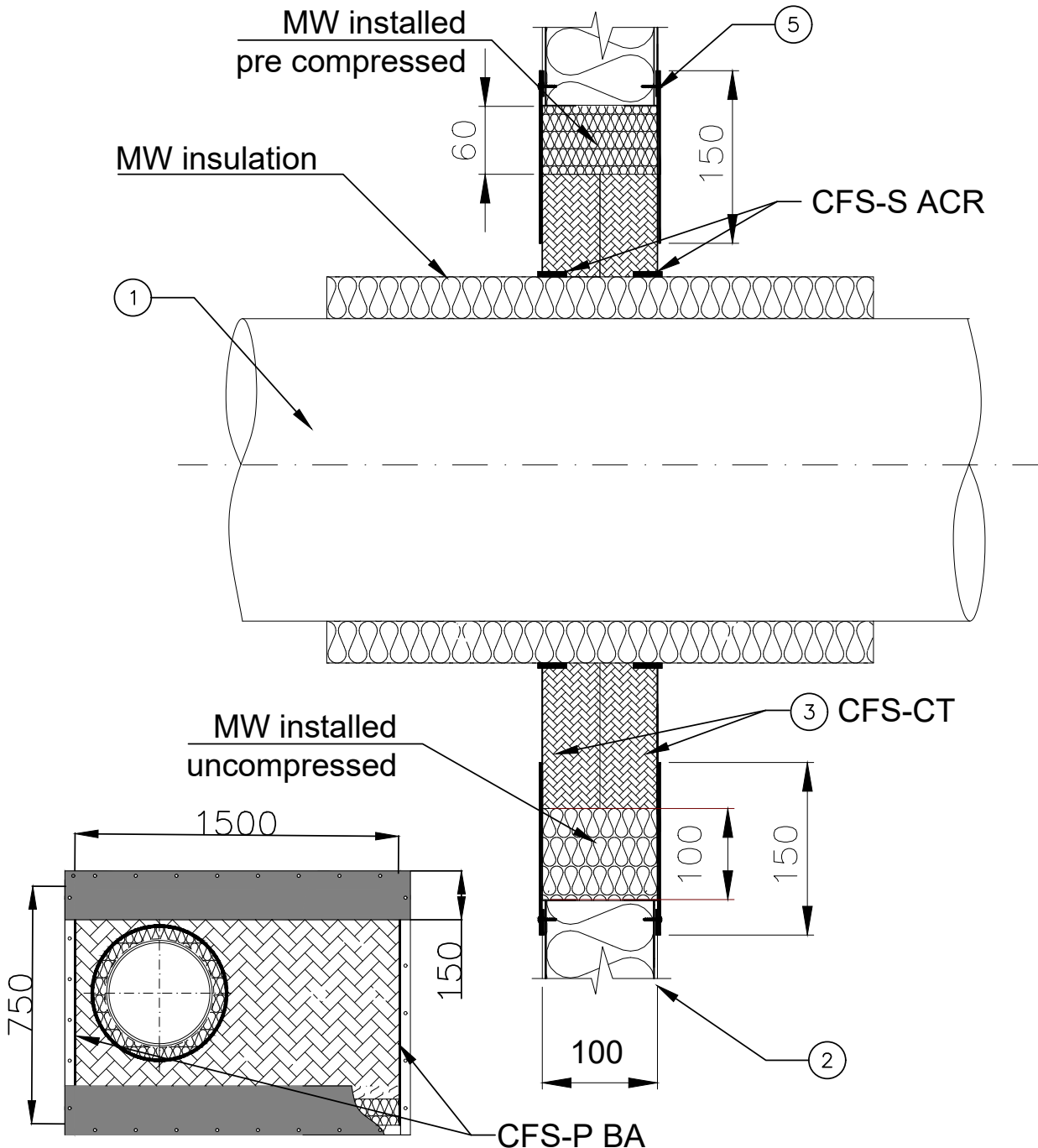
ID CFS-CT\_SPW\_DEF\_NCP\_001

Content  
Firestop penetration seal for non-combustible pipes with non-combustible insulation through Paroc Fire Proof Panels (pipe vertical deflection solution)

Page 01

Rev 00


EI60



- European Technical Assessment ETA-11/0429 (CFS-CT)
- Classification Report: 20406D
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in according with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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		Product	<b>Firestop Coated Board system CFS-CT</b>	Construction project
		ID		
Page 02	Rev 00	Firestop penetration seal for non-combustible pipes with non-combustible insulation through Paroc Fire Proof Panels (pipe vertical deflection solution)		

### ① Installation

Pos	Penetrant	Description/ Type	Dimensions [mm]	Firestop material	Opening size [mm]	Annular gap filler	Pipe insulation and/or cable protection (length)	Min. seal depth [mm]
a	Non combustible (CU / FE) pipes	Copper/Steel	CU ≤ 60 FE ≤ 324	CFS-CT CFS-P BA CFS-S ACR	≤1500 x 750	CFS-S ACR to depth of 25mm	Aluminium-backed mineral wool, insulated continuously through penetration seal T*=40mm, L*≥750mm	100

T\* = Insulation thickness, L\* = Insulation length

### ② Construction: This Typical is relevant for the following construction materials:

Fire-resistance criteria for the respective construction materials must also be considered. The tested wall thickness represents a minimum thickness required for the penetration fire-resistance rating.	
Base Material	100mm Paroc wall AST-S, AST-S+, AST-F, AST-F+, AST-E
Aperture frame	Steel angle (L-shape) 30x30x2mm around perimeter of the opening sealed with CFS-S ACR Sealant between steel angle and wall, and affixed with self-drilling screws every 100mm

### ③ Information about the firestop

Hilti Firestop Coated Board  
- Application for non combustible pipe with non-combustible (MW) insulation for vertical deflection

### ④ Distance

First service support: ≤ 250 mm

Distance between openings 200mm

Distance between services [mm]

	Metal Pipes / Pipe Insulation	Seal Edges
Metal Pipes	≥ 100	≥ 50
Seal Edges	≥ 50	≥ 50

### ⑤ Fixing material

Hilti S-MD21Z 5,5x25 self drilling screws for fixing of steel angle 30x30x2

### ⑥ Deflection solution


- Ensure opening appropriately dimensioned to accommodate deflection between steel flashing and service penetrations.
- Install CFS-P BA bandage on the vertical flank (left-/right side) of the opening over the entire height.
- Install mineral wool board CFS-CT (back to back) perfectly fit in opening taking into account a residual opening at the top of 60mm and at the bottom of 100mm.
- TOP AREA: Install mineral wool with a density of 40kg/m<sup>3</sup> precompressed from a thickness of 120mm compressed to 50% to a thickness of 60mm, placed in the top compression area.  
BOTTOM AREA: Install mineral wool with a density of 40kg/m<sup>3</sup> slightly compressed from a thickness of 120mm to a thickness of 100mm, to accommodate required movement at bottom of opening.
- In this design, the uncompressed MW can achieve up to 40mm compression through vertical movement, accommodated by the release of top compressed MW providing system high flexibility without any deformation.
- Install on both sides 1mm thick and 150mm high metal sheets across the width of the opening including the 30mm wide metal angles, taking into account an overlap of the upper and lower compression areas. The CFS-CT mineral wool panel is overlapped to 20mm in the lower area and 60mm in the upper area seal.

NOTE 1: For fixing of the metal sheets use the same screws as for the fixing of the 30mm wide angles.

NOTE 2: Prior to the metal plate fixing, the contact area to the 30mm wide sheet metal angles must be sealed with sealant.CFS-S ACR

A „Typical“ is a preconfigured fire protection solution, consisting of certain components and for certain applications, which is assigned an adopted fire resistance duration. Typical will be chosen according to its fire resistance duration and are subject to the technical product documentation and the underlying product approvals which will be published by Hilti from time to time, underlying the generic adoption and won't be selected project- or design specific. For this reason the suggested Typical might not correspond the project- or design specific requirements, and have to be rated by the customer or an expert ordered by the customer with regard to the actual project specific design criteria and requirements.



		Product	Construction project
		<b>Firestop Coated Board system CFS-CT for Pipe deflection</b>	
ID CFS-CT_SPW_DEF_NCP_002		Content	
Page 02	Rev 00	<b>Firestop penetration seal for non-combustible pipes with combustible insulation through Paroc Fire Proof Panels deflection solution</b>	

### ① Installation

Pos	Penetrant	Description/Type	Dimensions [mm]	Firestop material	CFS-WP Layer	Opening size [mm]	Annular gap filler	Pipe insulation and/or cable protection (length)	Min. seal depth [mm]
a	Non combustible (CU / FE) pipes	Copper, steel, stainless steel and cast iron	10 < Ø ≤ 60	CFS-W P CFS-CT CFS-P BA CFS-S ACR	2 Layer	≤1000 x 750	CFS-S ACR to depth of 25mm	Continuous foamed elastomeric insulation, T* = 15.5 - 39.5 mm	100
b									
c		Steel, stainless steel and cast iron (U/C)	60 < Ø ≤ 219		3 Layer			Continuous foamed elastomeric insulation, T* = 32 - 50 mm	

T\* = Insulation thickness, L\* = Insulation length

### ② Construction: This Typical is relevant for the following construction materials:

Fire-resistance criteria for the respective construction materials must also be considered. The tested wall thickness represents a minimum thickness required for the penetration fire-resistance rating.	
Base Material	100mm Paroc wall AST-S, AST-S+, AST-F, AST-F+, AST-E
Aperture frame	Steel angle (L-shape) 30x30x2mm around perimeter of the opening sealed with CFS-S ACR Sealant between steel angle and wall, and affixed with self-drilling screws every 100mm

### ③ Information about the firestop

Hilti Firestop Coated Board  
- Application for non combustible pipe with combustible insulation for vertical deflection

### ④ Distance

Distance between openings 200mm

First service support: ≤ 250 mm

Distance between services [mm]

	Metal Pipes / Pipe Insulation	Seal Edges
Metal Pipes	≥ 100	≥ 50
Seal Edges	≥ 50	≥ 50

### ⑤ Fixing material

Hilti S-MD21Z 5,5x25 self drilling screws for fixing of steel angle 30x30x2

### ⑥ Deflection solution

- Ensure opening appropriately dimensioned to accommodate deflection between steel flashing and service penetrations.
- Install CFS-P BA bandage on the vertical flank (left-/right side) of the opening over the entire height.
- Install mineral wool board CFS-CT (back to back) perfectly fit in opening taking into account a residual opening at the top of 60mm and at the bottom of 100mm.
- TOP AREA: Install mineral wool with a density of 40kg/m<sup>3</sup> precompressed from a thickness of 120mm compressed to 50% to a thickness of 60mm, placed in the top compression area.  
BOTTOM AREA: Install mineral wool with a density of 40kg/m<sup>3</sup> slightly compressed from a thickness of 120mm to a thickness of 100mm, to accommodate required movement at bottom of opening.
- In this design, the uncompressed MW can achieve up to 40mm compression through vertical movement, accommodated by the release of top compressed MW providing system high flexibility without any deformation.
- Install on both sides 1mm thick and 150mm high metal sheets over the width of the opening including the 30mm wide metal angles, taking into account an overlap of the upper and lower compression areas. The CFS-CT mineral wool panel is overlapped to 20mm in the lower area and 60mm in the upper area seal.

NOTE 1: For fixing of the metal sheets use the same screws as for the fixing of the 30mm wide angles.

NOTE 2: Prior to the metal plate fixing, the contact area to the 30mm wide sheet metal angles must be sealed with sealant.CFS-S ACR

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Product  
**Firestop Coated Board System CFS-CT**

Construction project

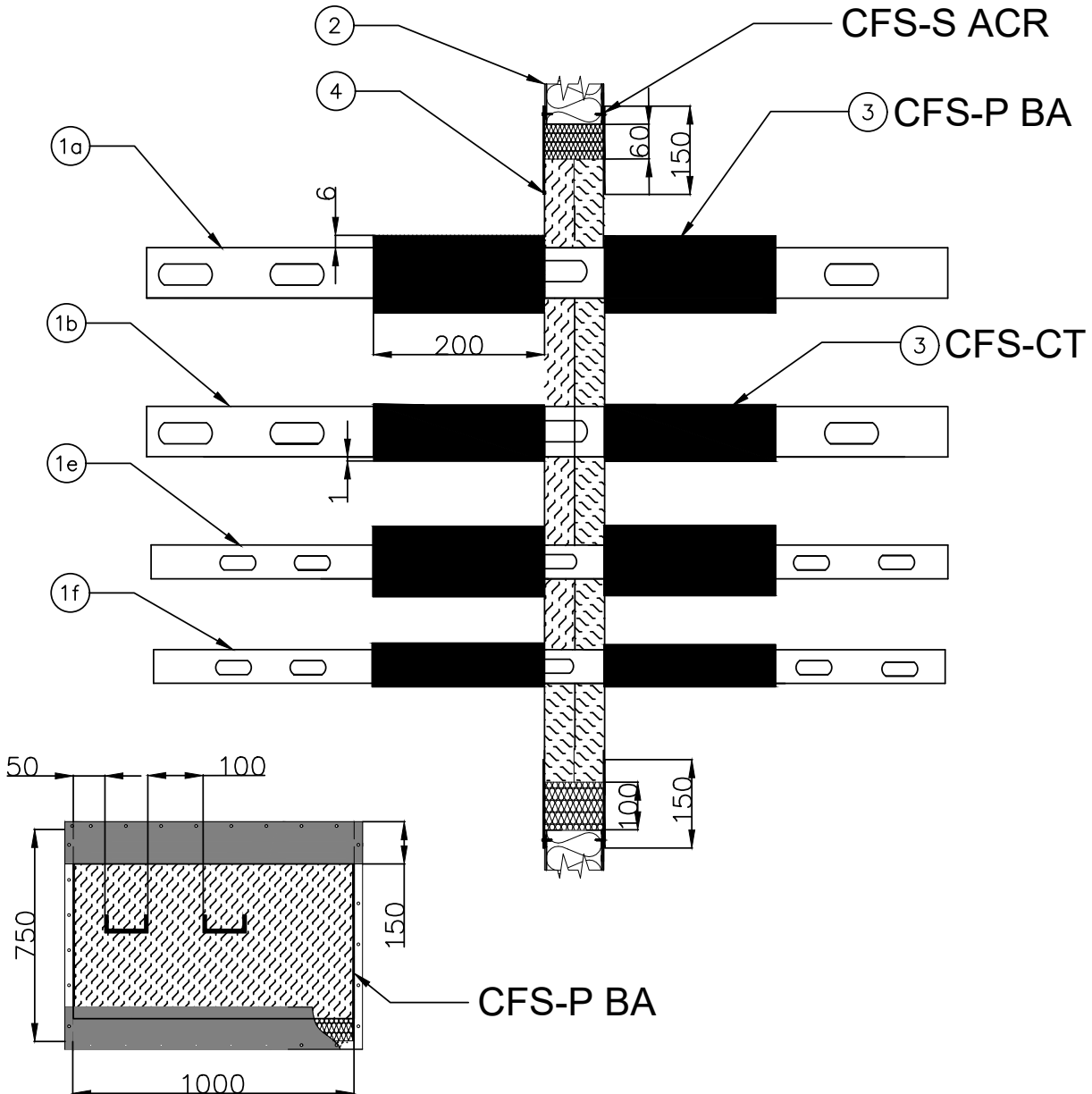
ID CFS-CT\_SPW\_MQ

Content  
Firestop penetration seal for Hilti Installation channels  
with deflection solution

Page 01

Rev 00


EI60



- European Technical Assessment ETA-11/0429 (CFS-CT)
- Assessment Report: 204061
- Fire reaction class acc. to EN13501-1
- Fire resistance acc. to EN13501-2
- Installation in according with Hilti instructions for use

Not to scale  
all dimensions in [mm]

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		Product	Firestop Coated Board System CFS-CT	Construction project	
		ID			CFS-CT_SPW_MQ
Page	02	Rev	00	Content	Firestop penetration seal for Hilti Installation channels with deflection solution

### ① Installation

Pos	Penetrant	Description/Type	Dimensions [mm]	Protection material	Opening size [mm]	Annular gap filler	Min. seal depth [mm]
a	Installation channels	Hilti MQ 41/3	41 x 41mm (Hilti MQ 41/3)	CFS-P BA, 6mm thick, length 200mm	≥1500 x 750	CFS-S ACR to depth of 10mm	100
b		Hilti MQ 41/3	41 x 41mm (Hilti MQ 41/3)	CFS-CT, 1mm dry thick, length 200mm			
c		Hilti MQ 41D	41 x 82mm (Hilti MQ 41B)	CFS-P BA, 6mm thick, length 200mm			
d		Hilti MQ 41D	41 x 82mm (Hilti MQ 41B)	CFS-CT, 1mm dry thick, length 200mm			
e		Hilti MM C-30	30 x 30 mm (Hilti MM C-30)	CFS-P BA, 6mm thick, length 200mm			
f		Hilti MM C-30"	30 x 30 mm (Hilti MM C-30)	CFS-CT, 1mm dry thick, length 200mm			

### ② Construction: This Typical is relevant for the following construction materials:

Fire-resistance criteria for the respective construction materials must also be considered. The tested wall thickness represents a minimum thickness required for the penetration fire-resistance rating.	
Base Material	100 mm thick Paroc wall AST-S, AST-S+, AST-F, AST-F+, AST-E
Aperture frame	Steel angle (L-shape) 30x30x2mm around perimeter of the opening sealed with CFS-S ACR Sealant between steel angle and wall, and affixed with self-drilling screws every 100mm

### ③ Information about the firestop

Hilti Firestop Coated Board CFS-CT  
- Application for Hilti Installation channels

### ④ Distance

Distance between openings 200mm  
First service support: ≤ 250 mm

Distances between services [mm]

	Installation channels	Seal Edges	Other services
Installation channels	≥ 100	≥ 50	≥ 200

### ⑤ Fixing material

Hilti S-MD21Z 5,5x25 for fixing of steel angle 30x30x2

### ⑥ Deflection solution

- Ensure opening appropriately dimensioned to accommodate deflection between steel flashing and service penetrations.
- Install CFS-P BA bandage on the vertical flank (left-/right side) of the opening over the entire height.
- Install mineral wool board CFS-CT (back to back) perfectly fit in opening taking into account a residual opening at the top of 60mm and at the bottom of 100mm.
- TOP AREA: Install mineral wool with a density of 40kg/m<sup>3</sup> precompressed from a thickness of 120mm compressed to 50% to a thickness of 60mm, placed in the top compression area.  
BOTTOM AREA: Install mineral wool with a density of 40kg/m<sup>3</sup> slightly compressed from a thickness of 120mm to a thickness of 100mm, to accommodate required movement at bottom of opening.
- Install from both sides 1mm thick and 150mm high metal sheets in the width of the opening including the 30mm wide metal angles, taking into account an overlap of the upper and lower compression areas.  
The CFS-CT mineral wool panel is overlapped to 20mm in the lower area and 60mm in the upper area seal.

NOTE 1: For fixing of the metal sheets use the same screws as for the fixing of the 30mm wide angles.

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