



CFS-FS: FLEXIBLE SEAL

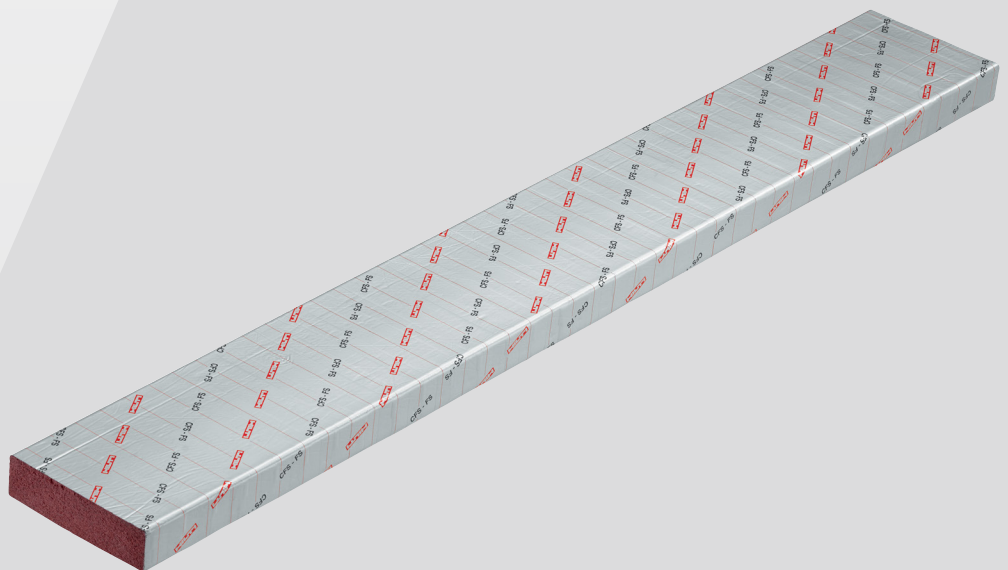
Product pack

Classification Report No. 23581B

TECHNICAL DATA ➤

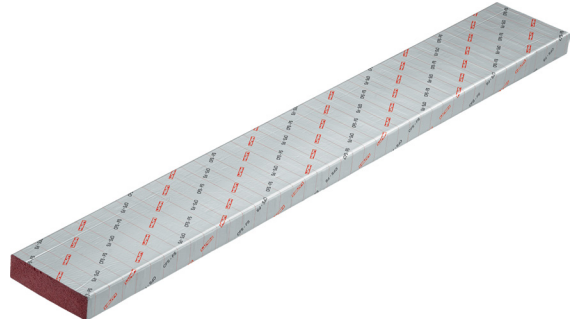
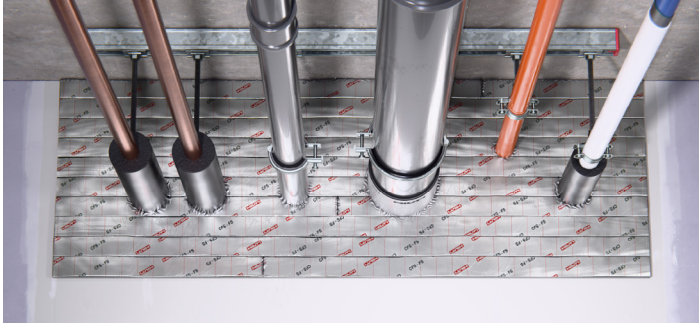
APPLICATIONS ➤

CHANGE LOG ➤



CFS-FS FLEXIBLE SEAL

Ready-to-use, intumescent flexible foam strip designed to firestop medium to large size openings.



APPLICATIONS

- Sealing single, multiple, or mixed penetrations in medium to large openings
- 3-Sided Letterbox Openings with single, multiple, or mixed penetrations
- Temporary or permanent sealing of cables and cable tray penetrations
- Temporary or permanent sealing of insulated and non-insulated metallic pipes and combustible pipe penetrations
- Walls (approval up to max. opening 1200mm x 500mm)
- Concrete, masonry and gypsum wall assemblies
- Wall assemblies rated up to EI60

ADVANTAGES

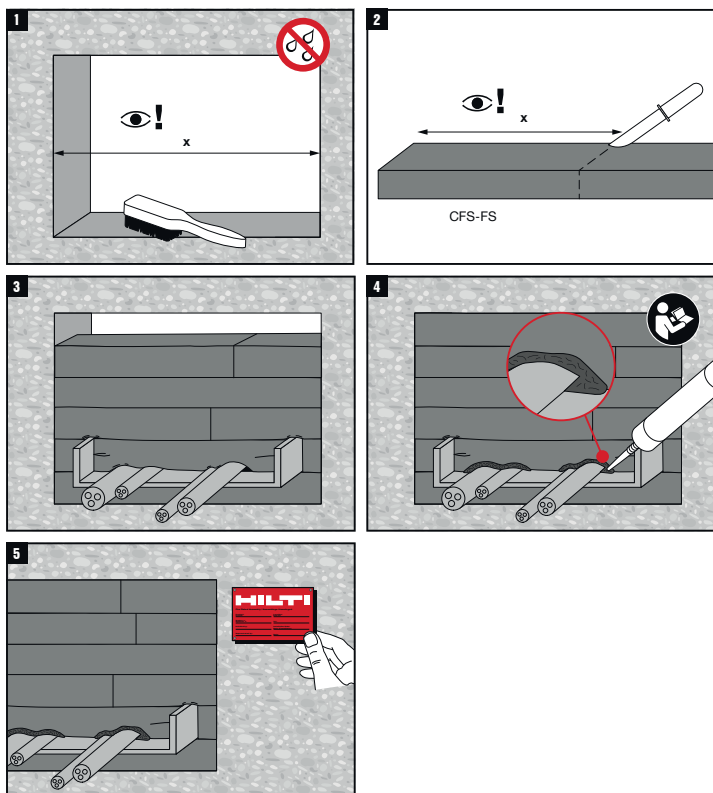
- Tested Movement Capability – allows for 25mm of service deflection – tested in partnership with WarringtonFire (see Standard Details for installation guidance)
- Easy installation — no special tools required & up to 4x faster than coated board installations
- Minimal ancillary products required
- Economical to use with short installation times & no waste
- Suitable for re-penetration or new penetrations
- Flexible material easily molds around penetrants
- Halogen, asbestos and solvent free
- Operational immediately after installation
- Smoke resistant
- Completely dust and fiber free rooms and places where electrical installations are frequently used (ie: data centres, hospitals, laboratories, etc.)

Technical data

Colour	Silver and red
Dimensions	1000 x 130 x 35 mm
Shelf life	No shelf life
Storage and transportation temperature – range	-15 °C - 60 °C
Application temperature range	-5°C - 50°C
Temperature resistance, cured	-15 °C - 80 °C
Intumescent activation	Approx. 200° C
Expansion ratio (unrestricted)	Up to 1:3
Approvals	EN 1366-3

Order designation	Sales quantity	Item number
Hilti CFS-FS M Flexible Seal	5 pc	2375033

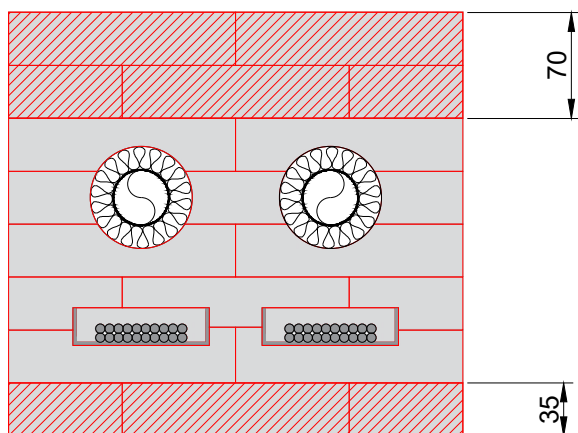
INSTALLATION INSTRUCTIONS



1. Measure opening
2. Cut CFS-FS to size
3. Fit around services
4. Fill gaps with CFS-FIL to 25mm depth
 - Gap size (width) $\leq 15\text{mm}^*$
5. Opening complete

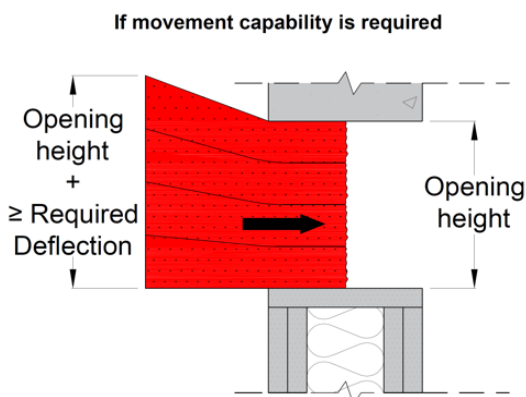
*Gap filler only required if gaps completely through the seal $> 0\text{mm}$

INSTALLING WITH MOVEMENT – ADDITIONAL PARAMETERS



The hatched areas should be free of services when considering movement:

- 70mm from top of opening
- 35mm from bottom of opening



Product needs to be compressed to accommodate movement as shown.

- Product Height = Opening Height + Movement Required
- E.g. 185mm (Opening Height) + 25mm (Movement Required)
- Min height of 210mm CFS-FS Installed into Opening

MINIMUM INSTALLATION DISTANCES

Service		Plastic pipe		Metal pipe		Conduits (Plastic)**		AluComp pipe	Cable/ cable support**		Clima Split bundle	Cable trunking	Rect. Plastic Duct (PVC)	CPVC pipe	TracPipe
	Service Information	≤50	≤125	N-C Ins.*	C Ins.*	S ≤32	S ≤ 50; B ≤100;	-	S ≤21; B ≤100; Coa. ≤28;	S ≤ 80	-	-	-	-	-
Distance to seal edge	Opening Edge / Top / Bottom / Side	50	0	0	0	30	0	30	30	100	50	0	0	30	30
Plastic pipes	≤50	50	50	50	50	50	50	50	50	100	50	50	50	50	50
	≤125		0	0	30	30	0	30	30	100	50	0	0	30	30
Metal pipes	N-C Ins.*			0	0	0	0	0	0	100	0	0	0	30	30
	C Ins.*				30	30	30	30	30	100	50	30	30	50	30
Conduits (Plastic)**	S ≤32					50	50	50	50	100	50	50	50	50	50
	S ≤50; B ≤100;						0	30	30	100	50	0	0	30	30
AluComp pipes	-							50	50	100	50	50	50	50	50
Cable / cable support**	S ≤21; B ≤100; Coa. ≤28; Support;								0	0	50	30	30	30	30
	S ≤80									0	100	30	100	100	100
Clima Split bundle	-										50	50	50	50	50
Cable trunking	-											0	0	30	30
Rect. Plastic Duct (PVC)	-												0	30	30
CPVC pipes	-													50	30
TracPipe	-														50

*Insulation

N-C = Non-Combustible (e.g., stone wool etc.)

C = Combustible (e.g., Armaflex, phenolic etc.)

**Cables / Cable Support / Conduits

S = Single Cable/Conduit

B = Bundle Cable/Conduit

Coa. = Coaxial Cable

All Cable Distances include Cable Support

All measurements in mm

CFS-FS AND MOVEMENT

HOW FLEXIBLE SEAL WAS TESTED TO ACCOMMODATE FOR SERVICE MOVEMENT/ FLOOR DEFLECTION

A representative penetration seal, sealed with CFS-FS Flexible Seal, was set up within a field of direct application according to classification report No. 23581B. In order to represent what would occur in reality, all services along their respective support were moved 25mm downwards and remained in that position. The wall construction with the penetration seal was then tested in accordance with EN 1366-3;2021.

WHY TEST FOR SERVICE MOVEMENT?

Accommodating building movement is essential to prevent damage to the structure and its components by minimizing stress on adjacent elements. The increasing trend towards longer structural spans in modern buildings leads to greater slab deflection. Consequently, MEP services suspended from these slabs, move in conjunction with the slab deflection. Traditional firestop seals, such as ablative batt systems, often lack the necessary flexibility to accommodate service movement.

Therefore, we believed it is important to test Flexible Seal's capability to accommodate for this service movement and verify it's resulting capability under fire conditions.

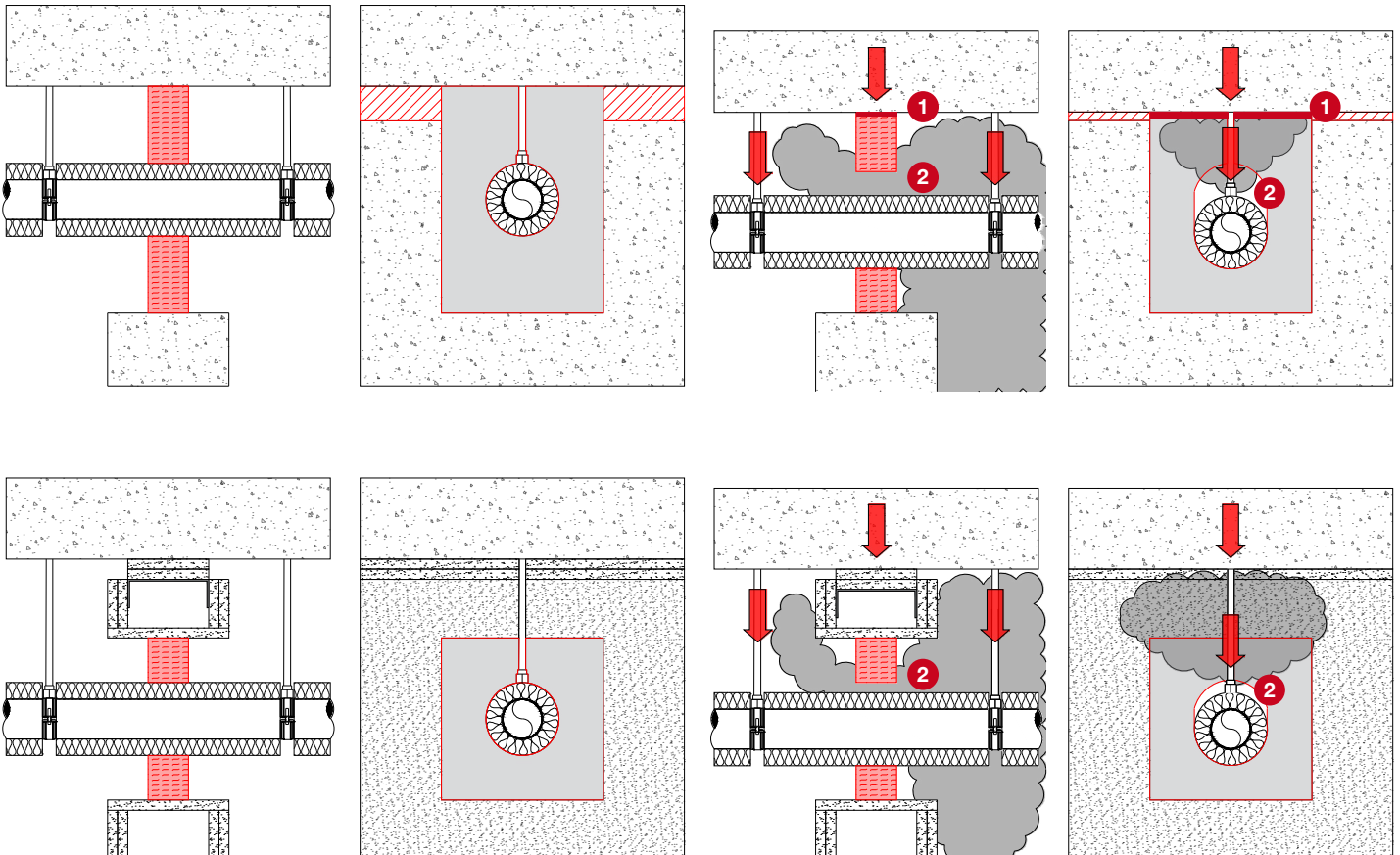
TWO MOVEMENT ASPECTS TO CONSIDER

1. Slab deflection onto Firestop

- 3-sided letterboxes
- Wall accommodates movement with a head of wall joint, does not protect Firestop
- Deflection of the soffit causes compression of the firestopping
- If it is a rigid solution (i.e. batt) this will crush the firestopping and break the seal

2. Service deflection with slab

- 3-sided and 4-sided letterboxes
- Services attached to the slab which will deflect
- Deflection of the soffit causes services to move too
- If it is a rigid solution (i.e. batt) this will break the seal around any service rendering it ineffective



WALL THICKNESS DIAGRAMS

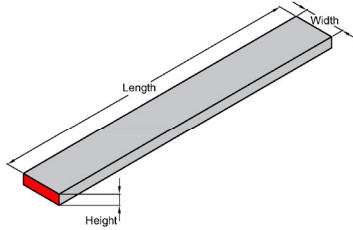
CFS-FS: 16

Fire Rating up to EI 60

Information

- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG > PDF > BIM/CAD > Web >

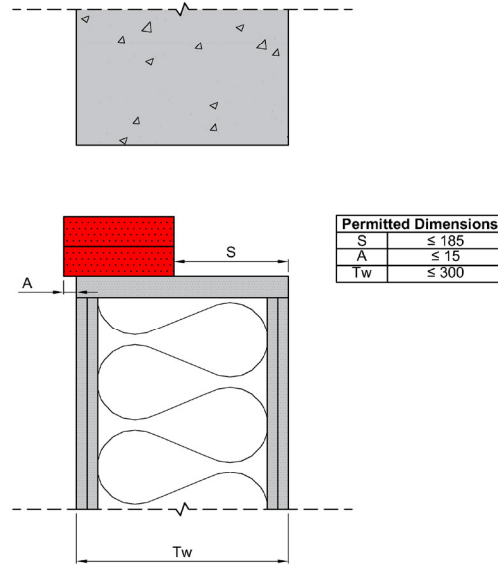


CFS-FS Product Dimensions [mm]		
Width	Length	Height
130	1000	35

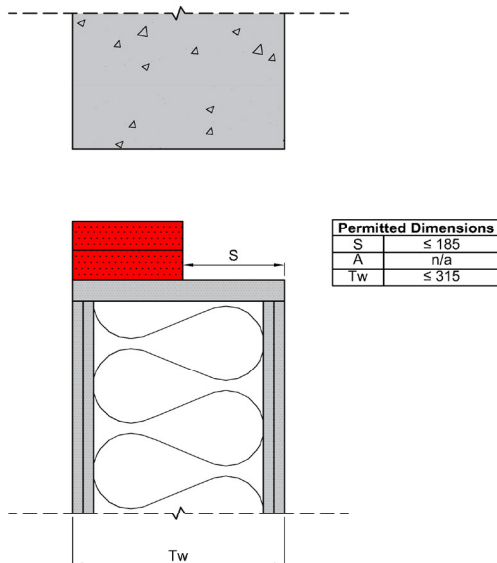
Wall Thickness (Tw)
All wall thicknesses between these tested are covered: Minimum wall thickness = 100mm Maximum wall thickness = 500mm
Wall comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2

Seal Position
The CFS-FS penetration seal can be installed centrally inside the wall (detail 1) or eccentrically (details 2, 3) as long as the following positions in relation to both wall surfaces are respected: $S/S_2 \leq 185$ mm; $A \leq 15$ mm

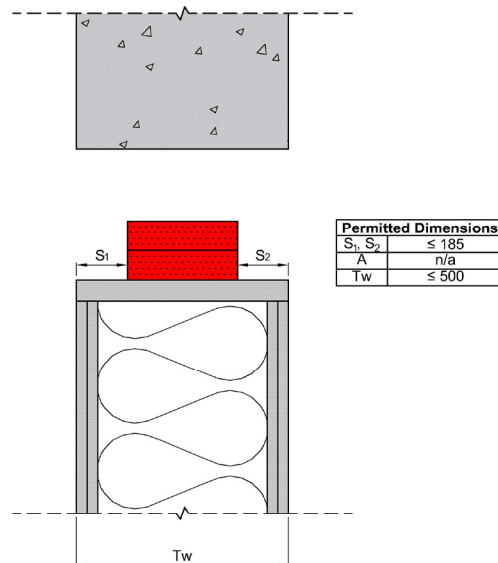
1: CFS-FS M Overhanging wall



2: CFS-FS M Flush with wall



3: CFS-FS M Centred in opening



1. The application limits on this detail are for guidance purposes only. For more detailed information based on the full range of available test results please contact the Hilti Technical Advisory Service.
2. The product and application has been assessed as a minimum to the BS 476 standard. It may have additional European and worldwide testing. Please contact Hilti for further information.
3. All installations should be carried out in accordance with Hilti's installation instructions and by competent & experienced installers using Hilti branded products.
4. All services are to be correctly and adequately supported to prevent collapse and distortion.

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APPLICATION INFORMATION

FOR PIPES/CABLE DIAMETERS

S = Single pipe/cable*

B = pipe/cable Bundle

*For pipes, if no S or B, assume single pipe.

FOR INSULATION

N-C = Non-Combustible (e.g., stone wool etc.)

C = Combustible (e.g., Armaflex, phenolic etc.)

None = No insulation

LS = Local Sustained

LI = Local Interrupted

CS = Continuous Sustained

CI = Continuous Interrupted

Please note, in many cases details have numerous pages. Please check all pages for the necessary information as differing insulation layouts might be on differing pages (e.g., LS one page 1 and LI on page 2 etc.).

PENETRATION TYPE

Single = penetration seal intended for penetrations with only one service passing through

Multi = penetration seal intended for penetrations where more than one service of the same type (e.g. cables) or pipe material group pass through

Mixed = penetration seal intended for penetrations where more than one type of services (e.g. cables and pipes or pipes of different pipe material groups) pass through

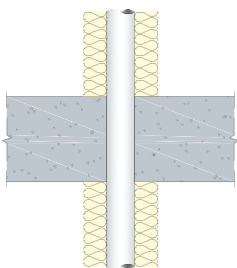
CLASSIFICATION

Classification will give the best-case EI value possible. As such, check each specific detail as there may be instances where a higher I value is possible or another sized service within the application may attain a lower value (e.g., 110mm pipe achieves EI 120 but a 160mm pipe achieves EI 90).

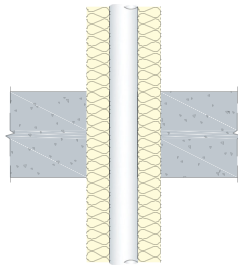
PRODUCT/DETAIL

Full product name first/Detail ID (See specific detail for the full ID).

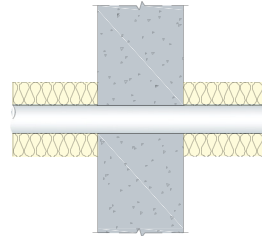
Please note, in many cases details have numerous pages. Please check all pages for the necessary information.



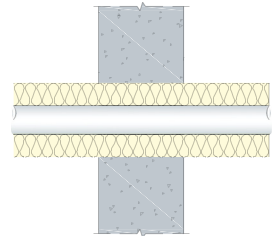
Continued Interrupted (CI)



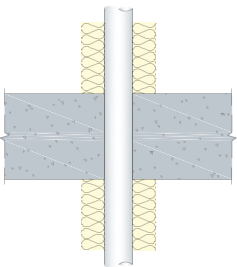
Continued Sustained (CS)



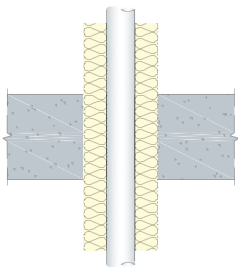
Continued Interrupted (CI)



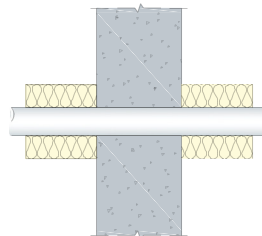
Continued Sustained (CS)



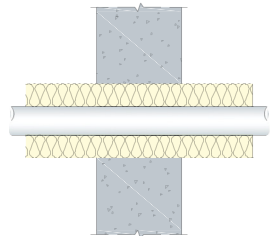
Local Interrupted (LI)



Local Sustained (LS)



Local Interrupted (LI)



Local Sustained (LS)

Single board drywall	Double board drywall	Rigid wall	Timber wall	Sandwich panel	Rigid floor	Timber floor	Metal deck	Linear joints		
Mechanical			Electrical			HVAC				
Min. base material thickness	Pipes ⁱ		Insulation ⁱ			Penetration type ⁱ			Classification ⁱ	Product/Detail ⁱ
	Material	Size	N/C	C	None	Single	Multi	Mixed		
≥ 100	Copper	Ø ≤ 108	Armaflex CS			✓			EI 60	CFS-FS: 01
			Kooltherm CS			✓				
≥ 100	Steel, Stainless Steel, Iron	Ø ≤ 114	Armaflex CS			✓			EI 60	CFS-FS: 01
			Kooltherm CS			✓				
≥ 100	Copper	Ø ≤ 108	Rockwool CS			✓			EI 60	CFS-FS: 05
≥ 100	Steel, Stainless Steel, Iron	Ø ≤ 114	Rockwool CS/LS			✓			EI 60	CFS-FS: 05
≥ 100	PVC	Ø ≤ 50				✓	✓	✓	EI 60	CFS-FS: 02
≥ 100	PVC-C	Ø ≤ 50				✓	✓	✓	EI 60	CFS-FS: 02
≥ 100	PVC-U	Ø ≤ 50				✓	✓	✓	EI 60	CFS-FS: 02
≥ 100	PE-X	Ø ≤ 50				✓	✓	✓	EI 60	CFS-FS: 02
≥ 100	ABS	Ø ≤ 50				✓	✓	✓	EI 60	CFS-FS: 02
≥ 100	SAN + PVC	Ø ≤ 50				✓	✓	✓	EI 60	CFS-FS: 02
≥ 100	PE	Ø ≤ 50				✓	✓	✓	EI 60	CFS-FS: 02
≥ 100	PP	Ø ≤ 50				✓	✓	✓	EI 60	CFS-FS: 02
≥ 100	PVC	Ø ≤ 125				✓	✓	✓	EI 60	CFS-FS: 03
≥ 100	PVC-C	Ø ≤ 125				✓	✓	✓	EI 60	CFS-FS: 03
≥ 100	PVC-U	Ø ≤ 125				✓	✓	✓	EI 60	CFS-FS: 03
≥ 100	PE-X	Ø ≤ 125				✓	✓	✓	EI 60	CFS-FS: 03
≥ 100	ABS	Ø ≤ 125				✓	✓	✓	EI 60	CFS-FS: 03
≥ 100	SAN + PVC	Ø ≤ 125				✓	✓	✓	EI 60	CFS-FS: 03
≥ 100	PE	Ø ≤ 125				✓	✓	✓	EI 60	CFS-FS: 03
≥ 100	PP	Ø ≤ 125				✓	✓	✓	EI 60	CFS-FS: 03
≥ 100	CPVC (Spears)	Ø ≤ 60.3				✓	✓	✓	EI 60	CFS-FS: 04
≥ 100	AIC – Uponor Unipipe Plus	Ø ≤ 32	Armaflex CS			✓			EI 60	CFS-FS: 06
			Kooltherm CS			✓				
≥ 100	AIC – Uponor MLC	Ø ≤ 50	Armaflex CS			✓			EI 60	CFS-FS: 06
			Kooltherm CS			✓				
≥ 100	Geberit Mepla MLC	Ø ≤ 40				✓	✓	✓	EI 60	CFS-FS: 07
≥ 100	Uponor Unipipe Plus MLC	Ø ≤ 32				✓	✓	✓	EI 60	CFS-FS: 07
≥ 100	Uponor MLC	Ø ≤ 50				✓	✓	✓	EI 60	CFS-FS: 07
≥ 100	TracPipe CC	Ø ≤ 52				✓	✓	✓	EI 60	CFS-FS: 14
≥ 100	TracPipe	Ø ≤ 49				✓	✓	✓	EI 60	CFS-FS: 14
≥ 100	PP – Geberit Silent Pro	Ø ≤ 50				✓	✓	✓	EI 60	CFS-FS: 15
≥ 100	PP - Rehau Raupiano Plus	Ø ≤ 110				✓	✓	✓	EI 60	CFS-FS: 15
≥ 100	PP – Wavin AS+	Ø ≤ 110				✓	✓	✓	EI 60	CFS-FS: 15

All measurements in mm

Single board drywall	Double board drywall	Rigid wall	Timber wall	Sandwich panel	Rigid floor	Timber floor	Metal deck	Linear joints
Mechanical			Electrical			HVAC		
Min. base material thickness	Service	Electrical service		Penetration type ¹			Classification ¹	Product/Detail ¹
		Max. Diameter (Ø) or Size (H x W)	Insulation	Single	Multi	Mixed		
≥ 100	Single Cables	80			✓	✓	EI 60	CFS-FS: 13
≥ 100	Cable Bundles	100			✓	✓	EI 60	CFS-FS: 13
≥ 100	Metal Trunking	150 x 150	Rockwool Ductwrap		✓	✓	EI 60	CFS-FS: 09
≥ 100	Single Plastic Conduit	≤ 32			✓	✓	EI 60	CFS-FS: 11
≥ 100	Single Plastic Conduit	≤ 50			✓	✓	EI 60	CFS-FS: 12
≥ 100	Plastic Conduit Bundle	≤ 100			✓	✓	EI 60	CFS-FS: 12

All measurements in mm



Single board drywall	Double board drywall	Rigid wall	Timber wall	Sandwich panel	Rigid floor	Timber floor	Metal deck	Linear joints
Mechanical			Electrical			HVAC		
Min. base material thickness	Service	HVAC service		Penetration type ¹			Classification ¹	Product/Detail ¹
		Max. Diameter (Ø) or Size (H x W)	Insulation	Single	Multi	Mixed		
≥ 100	Clima Split	Copper Pipe	≤ 28	Armaflex CS		✓	✓	EI 60
		PVC Pipe	≤ 32	✓	✓		EI 60	CFS-FS: 08 ²
		Cable	≤ 14	✓	✓		EI 60	
≥ 100	PVC Duct	< 220 x < 90		✓	✓		EI 60	CFS-FS: 10 ²

All measurements in mm



Single board drywall	Double board drywall	Rigid wall	Timber wall	Sandwich panel	Rigid floor	Timber floor	Metal deck	Linear joints		
Mechanical			Electrical			HVAC				
Min. base material thickness	Pipes ¹		Insulation ¹			Penetration type ¹		Classification ¹	Product/Detail ¹	
	Material	Size	N/C	C	None	Single	Multi			Mixed
≥ 100	Copper	Ø ≤ 108	Armaflex CS			✓		✓	EI 60	CFS-FS: 01
			Kooltherm CS			✓		✓		
≥ 100	Steel, Stainless Steel, Iron	Ø ≤ 114	Armaflex CS			✓		✓	EI 60	CFS-FS: 01
			Kooltherm CS			✓		✓		
≥ 100	Copper	Ø ≤ 108	Rockwool CS			✓		✓	EI 60	CFS-FS: 05
≥ 100	Steel, Stainless Steel, Iron	Ø ≤ 114	Rockwool CS/LS			✓		✓	EI 60	CFS-FS: 05
≥ 100	PVC	Ø ≤ 50				✓	✓		EI 60	CFS-FS: 02
≥ 100	PVC-C	Ø ≤ 50				✓	✓		EI 60	CFS-FS: 02
≥ 100	PVC-U	Ø ≤ 50				✓	✓		EI 60	CFS-FS: 02
≥ 100	PE-X	Ø ≤ 50				✓	✓		EI 60	CFS-FS: 02
≥ 100	ABS	Ø ≤ 50				✓	✓		EI 60	CFS-FS: 02
≥ 100	SAN + PVC	Ø ≤ 50				✓	✓		EI 60	CFS-FS: 02
≥ 100	PE	Ø ≤ 50				✓	✓		EI 60	CFS-FS: 02
≥ 100	PP	Ø ≤ 50				✓	✓		EI 60	CFS-FS: 02
≥ 100	PVC	Ø ≤ 125				✓	✓		EI 60	CFS-FS: 03
≥ 100	PVC-C	Ø ≤ 125				✓	✓		EI 60	CFS-FS: 03
≥ 100	PVC-U	Ø ≤ 125				✓	✓		EI 60	CFS-FS: 03
≥ 100	PE-X	Ø ≤ 125				✓	✓		EI 60	CFS-FS: 03
≥ 100	ABS	Ø ≤ 125				✓	✓		EI 60	CFS-FS: 03
≥ 100	SAN + PVC	Ø ≤ 125				✓	✓		EI 60	CFS-FS: 03
≥ 100	PE	Ø ≤ 125				✓	✓		EI 60	CFS-FS: 03
≥ 100	PP	Ø ≤ 125				✓	✓		EI 60	CFS-FS: 03
≥ 100	CPVC (Spears)	Ø ≤ 60.3				✓	✓		EI 60	CFS-FS: 04
≥ 100	AIC – Uponor Unipipe Plus	Ø ≤ 32	Armaflex CS			✓		✓	EI 60	CFS-FS: 06
			Kooltherm CS			✓		✓		
≥ 100	AIC – Uponor MLC	Ø ≤ 50	Armaflex CS			✓		✓	EI 60	CFS-FS: 06
			Kooltherm CS			✓		✓	EI 60	
≥ 100	Geberit Mepla MLC	Ø ≤ 40				✓	✓		EI 60	CFS-FS: 07
≥ 100	Uponor Unipipe Plus MLC	Ø ≤ 32				✓	✓		EI 60	CFS-FS: 07
≥ 100	Uponor MLC	Ø ≤ 50				✓	✓		EI 60	CFS-FS: 07
≥ 100	TracPipe CC	Ø ≤ 52				✓	✓		EI 60	CFS-FS: 14
≥ 100	TracPipe	Ø ≤ 49				✓	✓		EI 60	CFS-FS: 14
≥ 100	PP – Geberit Silent Pro	Ø ≤ 50				✓	✓		EI 60	CFS-FS: 15
≥ 100	PP - Rehau Raupiano Plus	Ø ≤ 110				✓	✓		EI 60	CFS-FS: 15
≥ 100	PP – Wavin AS+	Ø ≤ 110				✓	✓		EI 60	CFS-FS: 15

All measurements in mm

Single board drywall	Double board drywall	Rigid wall	Timber wall	Sandwich panel	Rigid floor	Timber floor	Metal deck	Linear joints
Mechanical			Electrical			HVAC		
Min. base material thickness	Service	Electrical service		Penetration type ¹			Classification ¹	Product/Detail ¹
		Max. Diameter (Ø) or Size (H x W)	Insulation	Single	Multi	Mixed		
≥ 100	Single Cables	80			✓	✓	EI 60	CFS-FS: 13
≥ 100	Cable Bundles	100			✓	✓	EI 60	CFS-FS: 13
≥ 100	Metal Trunking	150 x 150	Rockwool Ductwrap		✓	✓	EI 60	CFS-FS: 09
≥ 100	Single Plastic Conduit	≤ 32			✓	✓	EI 60	CFS-FS: 11
≥ 100	Single Plastic Conduit	≤ 50			✓	✓	EI 60	CFS-FS: 12
≥ 100	Plastic Conduit Bundle	≤ 100			✓	✓	EI 60	CFS-FS: 12

All measurements in mm



Single board drywall	Double board drywall	Rigid wall	Timber wall	Sandwich panel	Rigid floor	Timber floor	Metal deck	Linear joints
Mechanical			Electrical			HVAC		
Min. base material thickness	Service	HVAC service		Penetration type ¹			Classification ¹	Product/Detail ¹
		Max. Diameter (Ø) or Size (H x W)	Insulation	Single	Multi	Mixed		
≥ 100	Clima Split	Copper Pipe	≤ 28	Armaflex CS		✓	✓	EI 60
		PVC Pipe	≤ 32	✓	✓	✓	EI 60	CFS-FS: 08 ²
		Cable	≤ 14	✓	✓	✓	EI 60	
≥ 100	PVC Duct	< 220 x < 90		✓	✓	✓	EI 60	CFS-FS: 10 ²

All measurements in mm



CFS-FS: 01

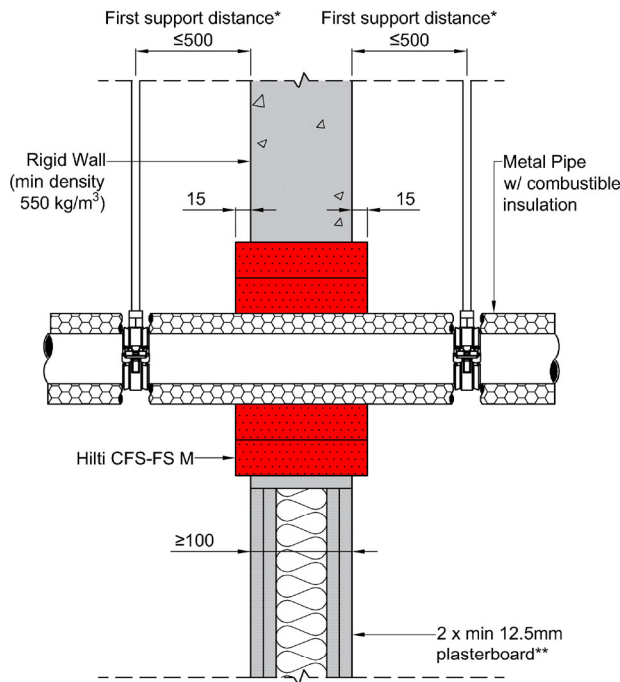
METAL PIPE W/ COMBUSTIBLE INSULATION

Fire Rating up to EI 60

Information

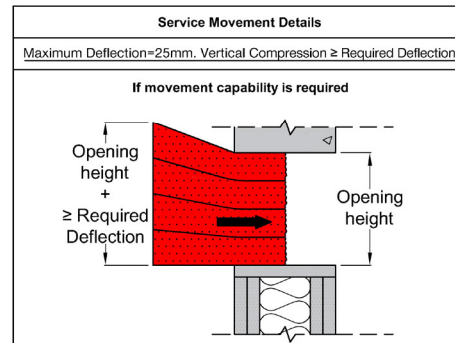
- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



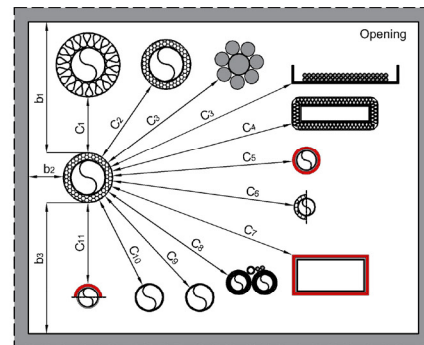
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

Metal Pipe w/ Combustible Insulation				
Material	Diameter Range; (Min. Wall Thickness Range) [mm]	Type of Insulation	Insulation Thickness Range; Type [mm]	Classification
Copper, Steel, Stainless Steel, Iron	$d \leq 54$ (0/0.6 - 54/1.2)	Armacell Armaflex®	7.5 - 38 (AF1 - AF6); CS	EI 60 (C/U)
		Kingspan Kooltherm®	15 - 40; CS	
	$54 \leq d \leq 108$ (54/1.2 - 108/1.5)	Armacell Armaflex®	17 - 42.5 (AF3 - AF6); CS	
		Kingspan Kooltherm®	20 - 40; CS	
Steel, Stainless Steel, Iron	$d \leq 114$ (0/2.0 - 114/2.0)	Armacell Armaflex®	18 - 43 (AF3 - AF6); CS	EI 60 (C/U)
		Kingspan Kooltherm®	20 - 40; CS	



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥70 ^{1†}
b ₂	To side of opening	≥0 ^{1†}
b ₃	To bottom of opening	≥35 ^{1†}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundles/cable carrier	≥30 ^{1††}
C ₄	To cable trunking w/ mineral wool insulation or TracPipe®	≥30
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥30
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥30
C ₈	To ClimaSplit bundle	≥50
C ₉	To CPVC	≥50
C ₁₀	To combustible plastic pipe w/o addn. protection	≥50
C ₁₁	To conduit w/ or w/o Hilti CFS-B	≥30

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 0mm if no movement is required.
^{†††}For cables d > 21mm, a min distance of 100mm from other services is required.



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4. All services are to be correctly and adequately supported to prevent collapse and distortion.

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CFS-FS: 01

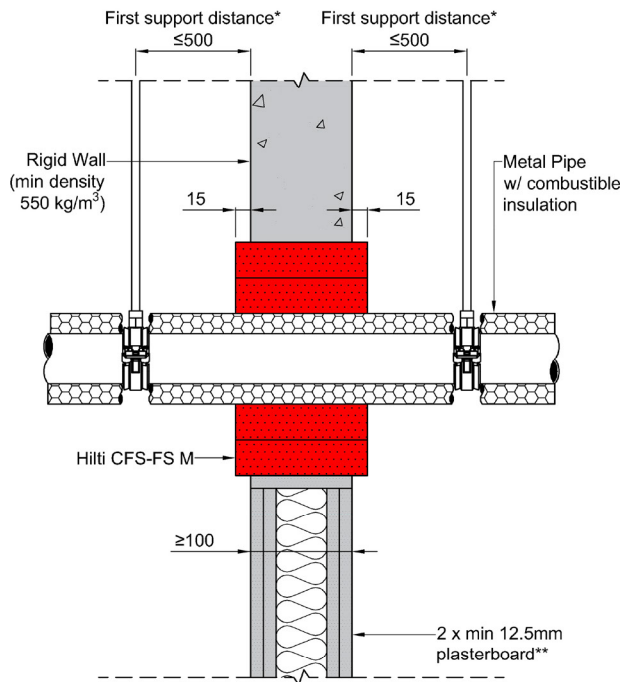
METAL PIPE W/ COMBUSTIBLE INSULATION

Fire Rating up to EI 60

Information

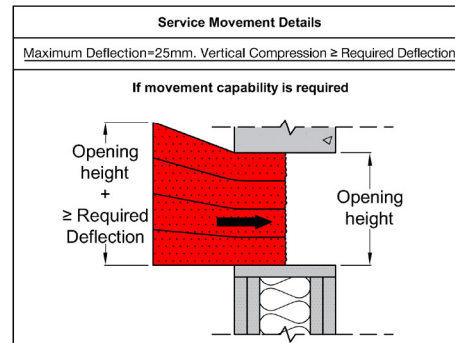
- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



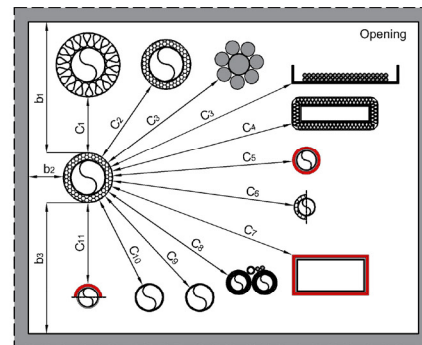
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

Metal Pipe w/ Combustible Insulation				
Material	Diameter Range; (Min. Wall Thickness Range) [mm]	Type of Insulation	Insulation Thickness Range; Type [mm]	Classification
Copper, Steel, Stainless Steel, Iron	$d \leq 54$ (0/0.6 - 54/1.2)	Armacell Armaflex®	7.5 - 38 (AF1 - AF6); CS	EI 60 (C/U)
		Kingspan Kooltherm®	15 - 40; CS	
	$54 \leq d \leq 108$ (54/1.2 - 108/1.5)	Armacell Armaflex®	17 - 42.5 (AF3 - AF6); CS	
		Kingspan Kooltherm®	20 - 40; CS	
Steel, Stainless Steel, Iron	$d \leq 114$ (0/2.0 - 114/2.0)	Armacell Armaflex®	18 - 43 (AF3 - AF6); CS	EI 60 (C/U)
		Kingspan Kooltherm®	20 - 40; CS	



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥0 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundles/cable carrier	≥30 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation or TracPipe®	≥30
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥30
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥30
C ₈	To ClimaSplit bundle	≥50
C ₉	To CPVC	≥50
C ₁₀	To combustible plastic pipe w/o addn. protection	≥50
C ₁₁	To conduit w/ or w/o Hilti CFS-B	≥30

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 0mm if no movement is required.
^{†††}For cables d > 21mm, a min distance of 100mm from other services is required.



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CFS-FS: 02

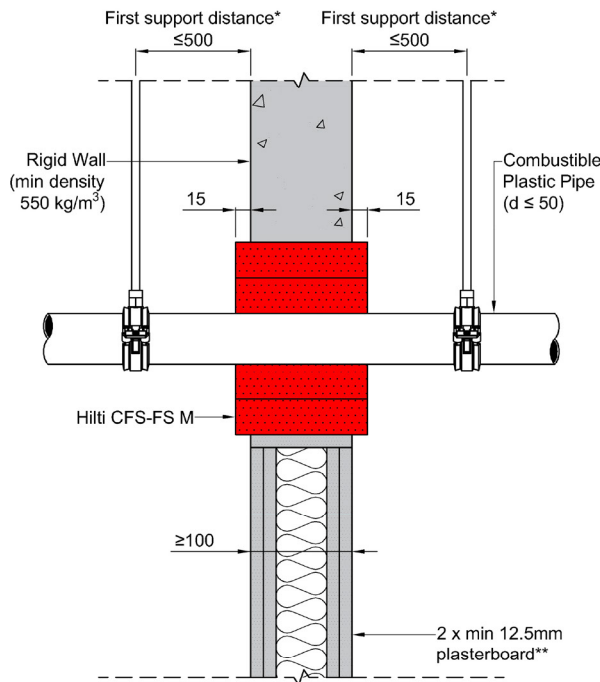
COMBUSTIBLE PLASTIC PIPE ($D \leq 50$ MM)

Fire Rating up to EI 60

Information

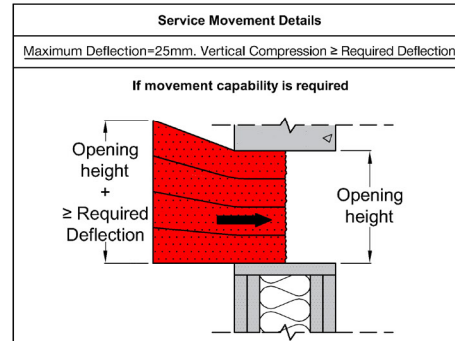
- Not to scale
- All units are in millimetres
- Tested according EN 1366-3
- Classification No. 23581B

DWG > PDF > BIM/CAD > Web >



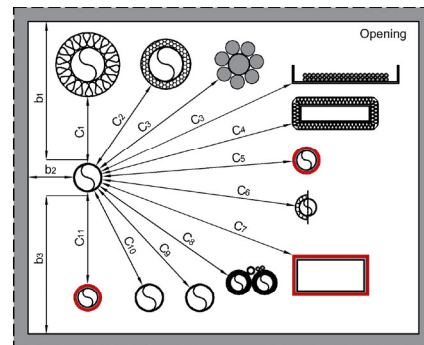
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

Combustible Plastic Pipe ($d \leq 50$)		
Material	Diameter (Range of Wall Thickness) [mm]	Classification
Combustible Plastic Pipe	$d \leq 40$ (1.8/4.5)	EI 60 (U/U)
	$d \leq 50$ (1.8/5.6)	EI 60 (U/C)
<p>The following pipe types are included:</p> <p>-PVC-U in accordance with EN 1329-1, EN1453-1, EN ISO 15493, and EN ISO 1452-2 as well as pipes made of PVC-C in accordance with EN 1566-1, EN ISO 15493 and EN ISO 15877-2</p> <p>-PE in accordance with EN 12201-2, EN 1519-1, EN ISO 15494 and EN 12666-1</p> <p>-ABS in accordance with EN 1455-1 and EN ISO 15493</p> <p>-SAN+PVC in accordance with ISO 19220</p> <p>-PP in accordance with EN 1451-1 (solid wall pipes), EN ISO 15874, EN ISO 15494 but not for multilayer plastic pipes made of PP</p>		



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥ 70 ^{††}
b ₂	To side of opening	≥ 50 ^{††}
b ₃	To bottom of opening	≥ 50 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥ 50
C ₂	To metal pipe w/ combustible insulation	≥ 50
C ₃	To cables/cable bundles/cable carriers	≥ 50 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥ 50
C ₅	To combustible plastic pipes w/ Hilti CFS-B	≥ 50
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥ 50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥ 50
C ₈	To KlimaSplit bundle	≥ 50
C ₉	To CPVC or TracPipe®	≥ 50
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥ 50
C ₁₁	To conduit w/ Hilti CFS-B	≥ 50

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 50mm if no movement is required.
^{†††}For cables $d > 21$ mm, a min distance of 100mm from other services is required.



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CFS-FS: 02

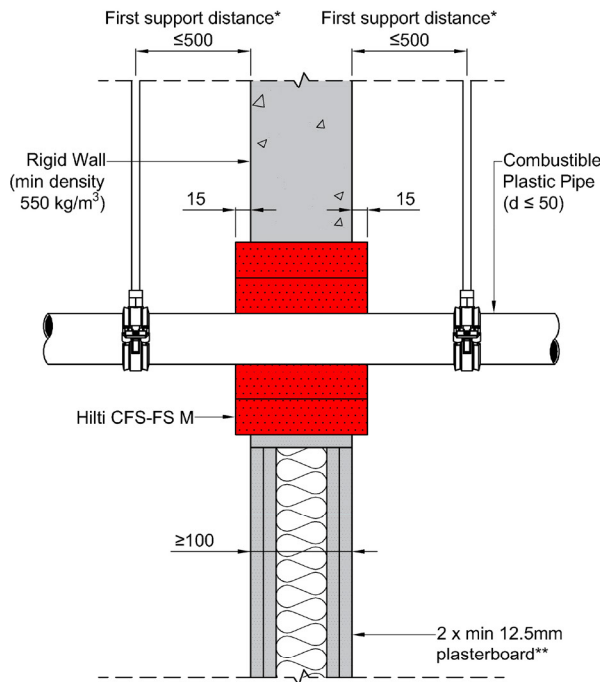
COMBUSTIBLE PLASTIC PIPE ($D \leq 50$ MM)

Fire Rating up to EI 60

Information

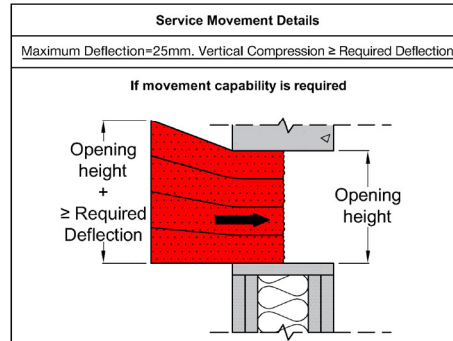
- Not to scale
- All units are in millimetres
- Tested according EN 1366-3
- Classification No. 23581B

DWG > PDF > BIM/CAD > Web >



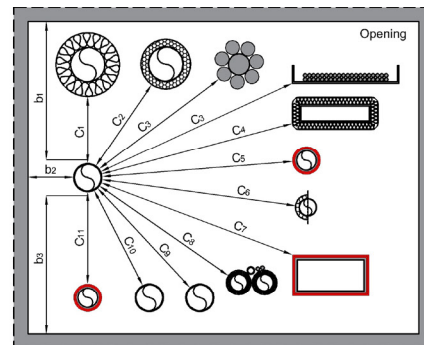
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

Combustible Plastic Pipe ($d \leq 50$)		
Material	Diameter (Range of Wall Thickness) [mm]	Classification
Combustible Plastic Pipe	$d \leq 40$ (1.8/4.5)	EI 60 (U/U)
	$d \leq 50$ (1.8/5.6)	EI 60 (U/C)
<p>The following pipe types are included:</p> <p>-PVC-U in accordance with EN 1329-1, EN1453-1, EN ISO 15493, and EN ISO 1452-2 as well as pipes made of PVC-C in accordance with EN 1566-1, EN ISO 15493 and EN ISO 15877-2</p> <p>-PE in accordance with EN 12201-2, EN 1519-1, EN ISO 15494 and EN 12666-1</p> <p>-ABS in accordance with EN 1455-1 and EN ISO 15493</p> <p>-SAN+PVC in accordance with ISO 19220</p> <p>-PP in accordance with EN 1451-1 (solid wall pipes), EN ISO 15874, EN ISO 15494 but not for multilayer plastic pipes made of PP</p>		



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥ 70 ^{††}
b ₂	To side of opening	≥ 50 ^{††}
b ₃	To bottom of opening	≥ 50 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥ 50
C ₂	To metal pipe w/ combustible insulation	≥ 50
C ₃	To cables/cable bundles/cable carriers	≥ 50 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥ 50
C ₅	To combustible plastic pipes w/ Hilti CFS-B	≥ 50
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥ 50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥ 50
C ₈	To KlimaSplit bundle	≥ 50
C ₉	To CPVC or TracPipe®	≥ 50
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥ 50
C ₁₁	To conduit w/ Hilti CFS-B	≥ 50

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 50mm if no movement is required.
^{†††}For cables $d > 21$ mm, a min distance of 100mm from other services is required.



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CFS-FS: 03

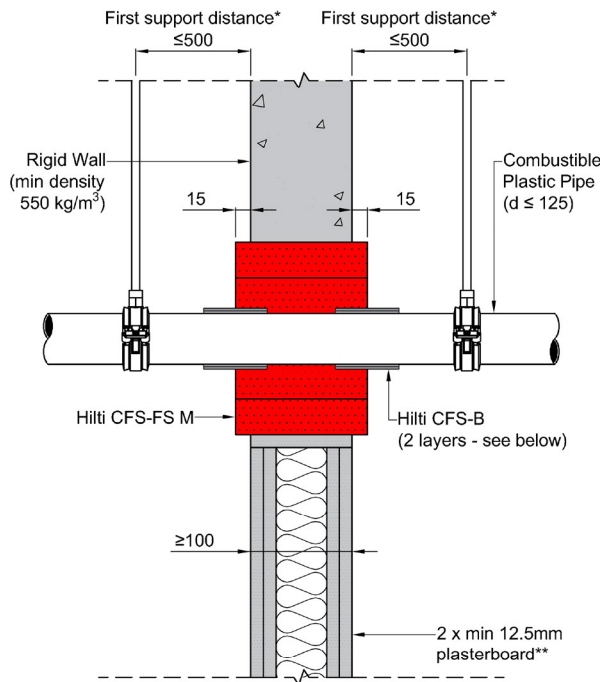
COMBUSTIBLE PLASTIC PIPE ($D \leq 125$ MM)

Fire Rating up to EI 60

Information

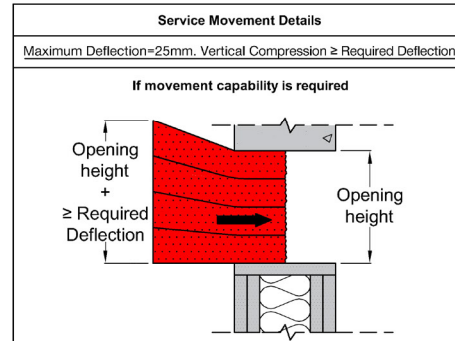
- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

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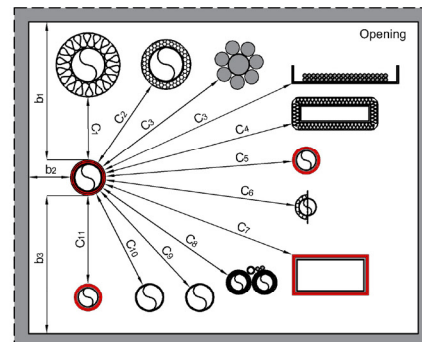
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

Combustible Plastic Pipe ($d \leq 125$)			
Material	Diameter (Range of Wall Thickness) [mm]	Addn. Protection on Combustible Plastic Pipe	Classification
Combustible Plastic Pipe	$32 (1.8/9.3) \leq d \leq 110 (2.7/9.3)$	2 Layers of Hilti CFS-B	EI 60 (C/U)
	$110 (2.7/9.3) \leq d \leq 125 (3.0/9.3)$	2 Layers of Hilti CFS-B	
The following pipe types are included:			
-PVC-U in accordance with EN 1329-1, EN1453-1, EN ISO 15493, and EN ISO 1452-2 as well as pipes made of PVC-C in accordance with EN 1566-1, EN ISO 15493 and EN ISO 15877-2			
-PE in accordance with EN 12201-2, EN 1519-1, EN ISO 15494 and EN 12666-1			
-ABS in accordance with EN 1455-1 and EN ISO 15493			
-SAN+PVC in accordance with ISO 19220			
-PP in accordance with EN 1451-1 (solid wall pipes), EN ISO 15874, EN ISO 15494 but not for multilayer plastic pipes made of PP			



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥0 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundles/cable carriers/conduit w/o addn. Protection	≥30 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥0
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥0
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥30
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥0
C ₈	To ClimaSplit bundle	≥50
C ₉	To CPVC or TracPipe®	≥30
C ₁₀	To combustible plastic pipe w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥0

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 0mm if no movement is required.
^{†††}For cables $d > 21$ mm, a min distance of 100mm from other services is required.



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CFS-FS: 03

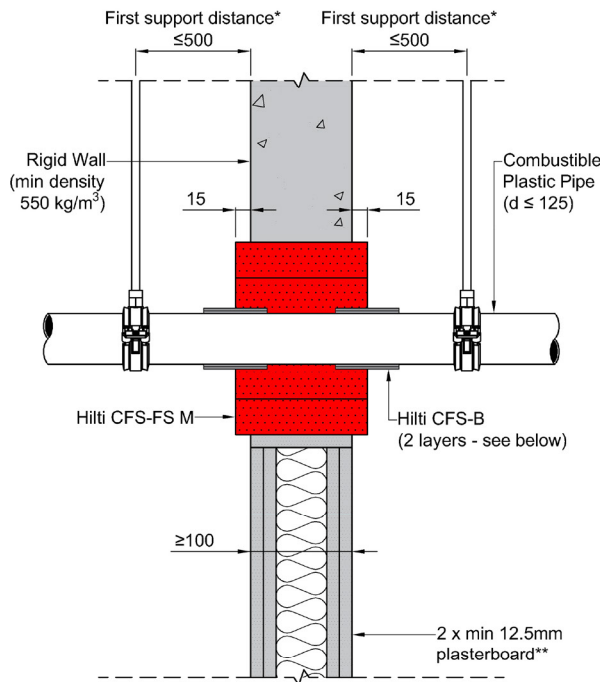
COMBUSTIBLE PLASTIC PIPE ($D \leq 125$ MM)

Fire Rating up to EI 60

Information

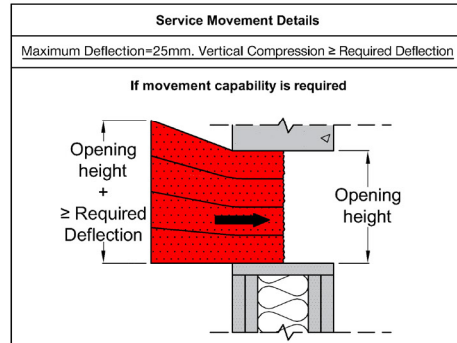
- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



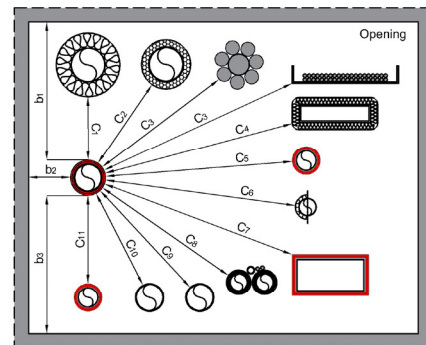
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

Combustible Plastic Pipe ($d \leq 125$)			
Material	Diameter (Range of Wall Thickness) [mm]	Addn. Protection on Combustible Plastic Pipe	Classification
Combustible Plastic Pipe	$32 (1.8/9.3) \leq d \leq 110 (2.7/9.3)$	2 Layers of Hilti CFS-B	EI 60 (C/U)
	$110 (2.7/9.3) \leq d \leq 125 (3.0/9.3)$	2 Layers of Hilti CFS-B	
The following pipe types are included:			
-PVC-U in accordance with EN 1329-1, EN1453-1, EN ISO 15493, and EN ISO 1452-2 as well as pipes made of PVC-C in accordance with EN 1566-1, EN ISO 15493 and EN ISO 15877-2			
-PE in accordance with EN 12201-2, EN 1519-1, EN ISO 15494 and EN 12666-1			
-ABS in accordance with EN 1455-1 and EN ISO 15493			
-SAN+PVC in accordance with ISO 19220			
-PP in accordance with EN 1451-1 (solid wall pipes), EN ISO 15874, EN ISO 15494 but not for multilayer plastic pipes made of PP			



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	$\geq 70^{11}$
b ₂	To side of opening	$\geq 0^{11}$
b ₃	To bottom of opening	$\geq 35^{11}$
C ₁	To metal pipe w/ mineral wool insulation	≥ 0
C ₂	To metal pipe w/ combustible insulation	≥ 30
C ₃	To cables/cable bundles/cable carriers/conduit w/o addn. Protection	$\geq 30^{111}$
C ₄	To cable trunking w/ mineral wool insulation	≥ 0
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥ 0
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥ 30
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥ 0
C ₈	To ClimaSplit bundle	≥ 50
C ₉	To CPVC or TracPipe®	≥ 30
C ₁₀	To combustible plastic pipe w/o addn. protection	≥ 50
C ₁₁	To conduit w/ Hilti CFS-B	≥ 0

¹All distance values can be horizontal, vertical or diagonal.
¹¹b₁, b₂, b₃ = 0mm if no movement is required.
¹¹¹For cables $d > 21$ mm, a min distance of 100mm from other services is required.



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CFS-FS: 04

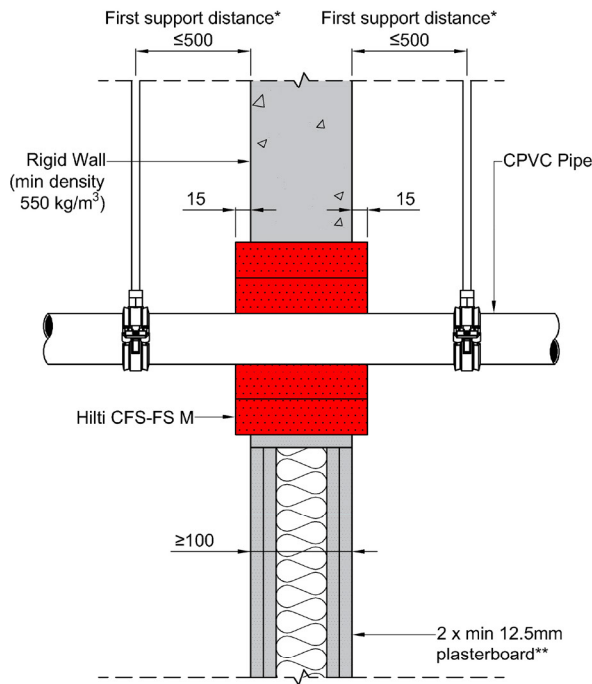
CPVC PIPE

Fire Rating up to EI 60

Information

- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

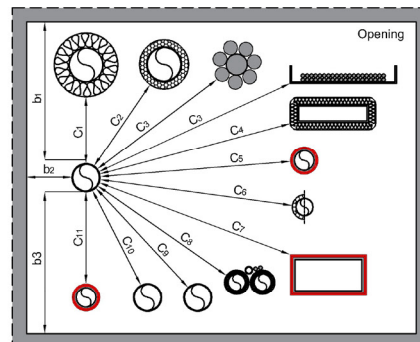
Service Movement Details		
Maximum Deflection=25mm. Vertical Compression ≥ Required Deflection		
If movement capability is required		
Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥30 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation & TracPipe®	≥30
C ₂	To metal pipe w/ combustible insulation	≥50
C ₃	To cables/cable bundles/cable carriers	≥30 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥30
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥30
C ₈	To KlimaSplit bundle	≥50
C ₉	To CPVC	≥50
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥30

¹All distance values can be horizontal, vertical or diagonal.

^{††}b₁, b₂, b₃ = 30mm if no movement is required.

^{†††}For cables d > 21mm, a min distance of 100mm from other services is required.

CPVC Pipe		
Material	Diameter (Wall Thickness) [mm]	Classification
CPVC Pipe (Spears FlameGuard®)	26.7 (2.1)	EI 60 (U/C)
CPVC Pipe (Spears FlameGuard®)	33.4 (2.5)	
CPVC Pipe (Spears FlameGuard®)	42.2 (3.1)	
CPVC Pipe (Spears FlameGuard®)	48.3 (3.6)	
CPVC Pipe (Spears FlameGuard®)	60.3 (4.7)	



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CFS-FS: 04

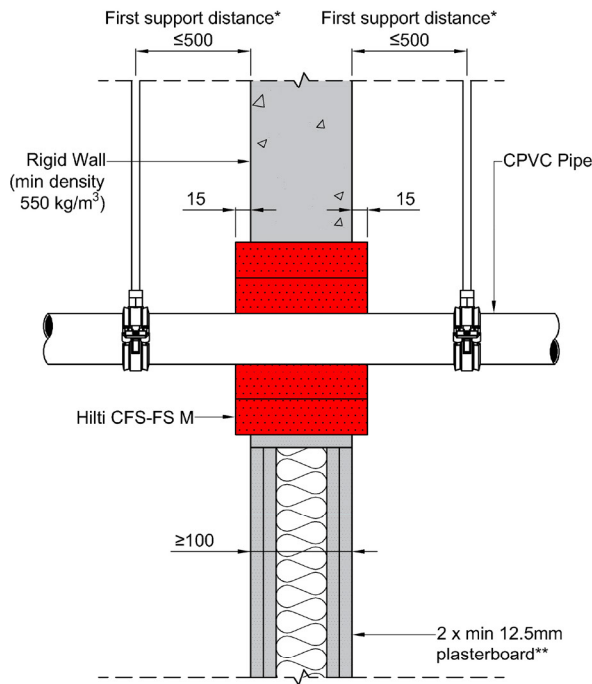
CPVC PIPE

Fire Rating up to EI 60

Information

- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

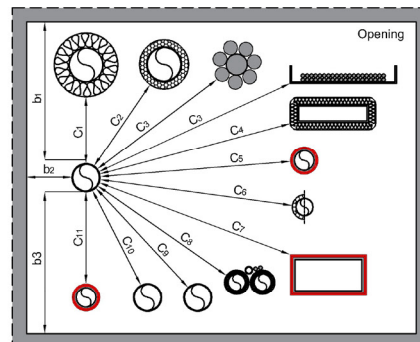
Service Movement Details		
Maximum Deflection=25mm. Vertical Compression ≥ Required Deflection		
If movement capability is required		
Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥30 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation & TracPipe®	≥30
C ₂	To metal pipe w/ combustible insulation	≥50
C ₃	To cables/cable bundles/cable carriers	≥30 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥30
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥30
C ₈	To ClimaSplit bundle	≥50
C ₉	To CPVC	≥50
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥30

¹All distance values can be horizontal, vertical or diagonal.

^{††}b₁, b₂, b₃ = 30mm if no movement is required.

^{†††}For cables d > 21mm, a min distance of 100mm from other services is required.

CPVC Pipe		
Material	Diameter (Wall Thickness) [mm]	Classification
CPVC Pipe (Spears FlameGuard®)	26.7 (2.1)	EI 60 (U/C)
CPVC Pipe (Spears FlameGuard®)	33.4 (2.5)	
CPVC Pipe (Spears FlameGuard®)	42.2 (3.1)	
CPVC Pipe (Spears FlameGuard®)	48.3 (3.6)	
CPVC Pipe (Spears FlameGuard®)	60.3 (4.7)	



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CFS-FS: 05

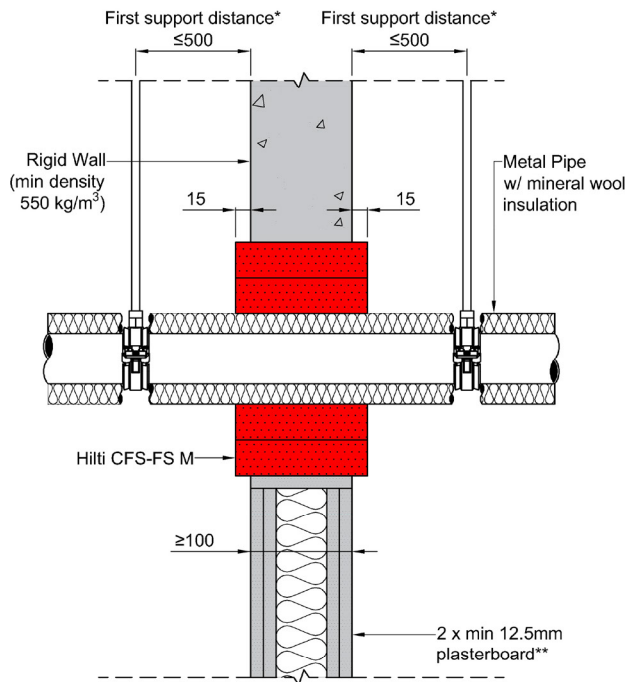
METAL PIPE W/ MINERAL WOOL INSULATION

Fire Rating up to EI 60

Information

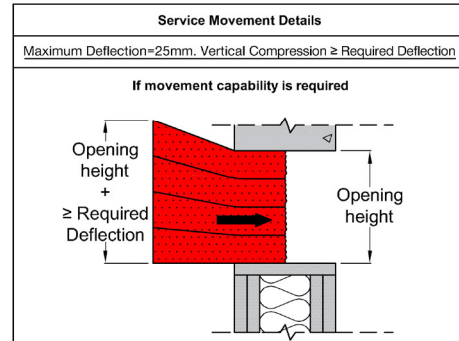
- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



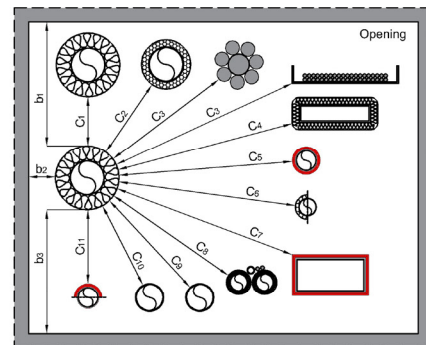
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

Metal Pipe w/ Mineral Wool Insulation				
Material	Diameter Range; (Min. Wall Thickness Range) [mm]	Type of Insulation	Insulation Thickness Range; Type (Length) [mm]	Classification
Copper, Steel, Stainless Steel & Iron	$d \leq 54$ (0/0.6 - 54/1.2)	Rockwool® DuctWrap	≥ 25 ; CS	EI 60 (C/U)
		Rockwool® Rocklap	25; LS ($\geq 1,030$ total)	
	$54 \leq d \leq 108$ (54/1.2 - 108/1.5)	Rockwool® DuctWrap	≥ 40 ; CS	
		Rockwool® Rocklap	40; LS ($\geq 1,030$ total)	
Steel, Stainless Steel & Iron	$d \leq 114$ (0/2.0 - 114/2.0)	Rockwool® DuctWrap	≥ 40 ; CS	
		Rockwool® Rocklap	40; LS ($\geq 1,030$ total)	



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥ 70 ^{††}
b ₂	To side of opening	≥ 0 ^{††}
b ₃	To bottom of opening	≥ 35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥ 0
C ₂	To metal pipe w/ combustible insulation	≥ 0
C ₃	To cables/cable bundles/cable carriers	≥ 0 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥ 0
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥ 0
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥ 0
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥ 0
C ₈	To ClimateSplit bundle	≥ 0
C ₉	To CPVC or TracPipe®	≥ 30
C ₁₀	To combustible plastic pipe w/o addn. protection	≥ 50
C ₁₁	To conduit w/ or w/o addn. protection	≥ 0

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 0mm if no movement is required.
^{†††}For cables $d > 21$ mm, a min distance of 100mm from other services is required.



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CFS-FS: 05

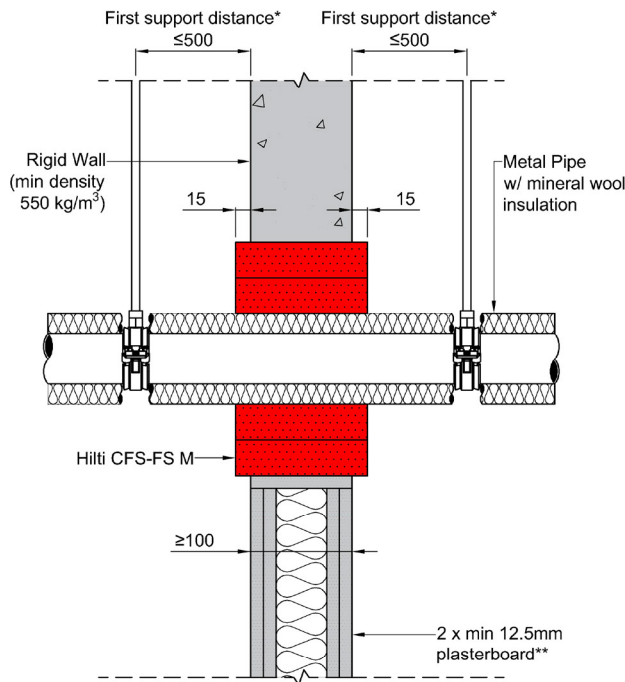
METAL PIPE W/ MINERAL WOOL INSULATION

Fire Rating up to EI 60

Information

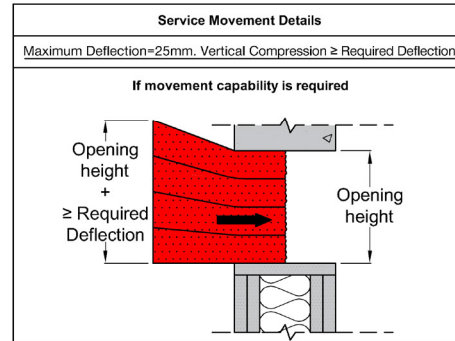
- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



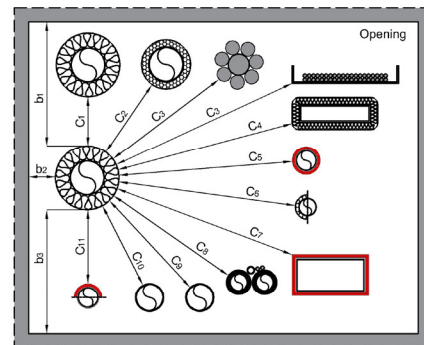
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

Metal Pipe w/ Mineral Wool Insulation				
Material	Diameter Range; (Min. Wall Thickness Range) [mm]	Type of Insulation	Insulation Thickness Range; Type (Length) [mm]	Classification
Copper, Steel, Stainless Steel & Iron	$d \leq 54$ (0/0.6 - 54/1.2)	Rockwool® DuctWrap	≥ 25 ; CS	EI 60 (C/U)
		Rockwool® Rocklap	25; LS ($\geq 1,030$ total)	
	$54 \leq d \leq 108$ (54/1.2 - 108/1.5)	Rockwool® DuctWrap	≥ 40 ; CS	
		Rockwool® Rocklap	40; LS ($\geq 1,030$ total)	
Steel, Stainless Steel & Iron	$d \leq 114$ (0/2.0 - 114/2.0)	Rockwool® DuctWrap	≥ 40 ; CS	
		Rockwool® Rocklap	40; LS ($\geq 1,030$ total)	



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥ 70 ^{††}
b ₂	To side of opening	≥ 0 ^{††}
b ₃	To bottom of opening	≥ 35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥ 0
C ₂	To metal pipe w/ combustible insulation	≥ 0
C ₃	To cables/cable bundles/cable carriers	≥ 0 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥ 0
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥ 0
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥ 0
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥ 0
C ₈	To ClimateSplit bundle	≥ 0
C ₉	To CPVC or TracPipe®	≥ 30
C ₁₀	To combustible plastic pipe w/o addn. protection	≥ 50
C ₁₁	To conduit w/ or w/o addn. protection	≥ 0

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 0mm if no movement is required.
^{†††}For cables $d > 21$ mm, a min distance of 100mm from other services is required.



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CFS-FS: 06

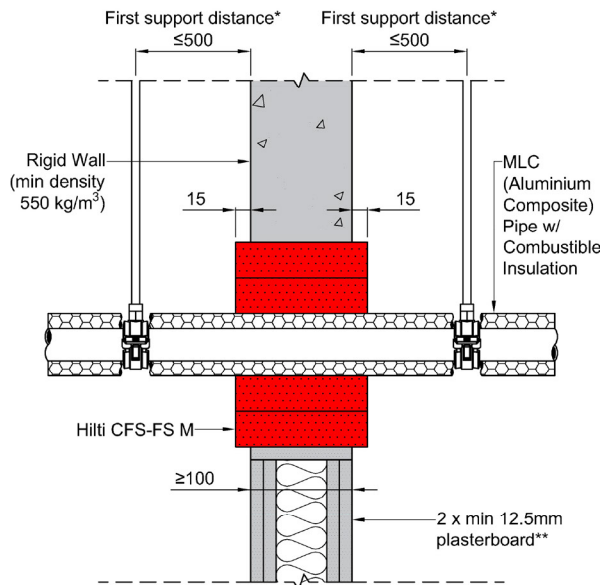
MLC (ALUMINIUM COMPOSITE) PIPE W/ COMBUSTIBLE INSULATION

Fire Rating up to EI 60

Information

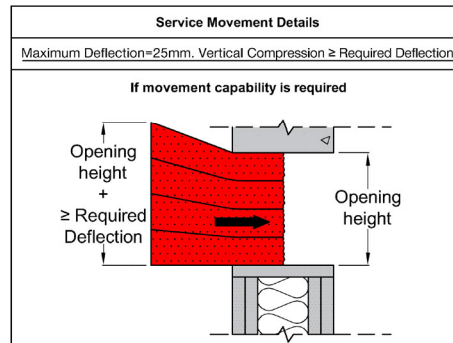
- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



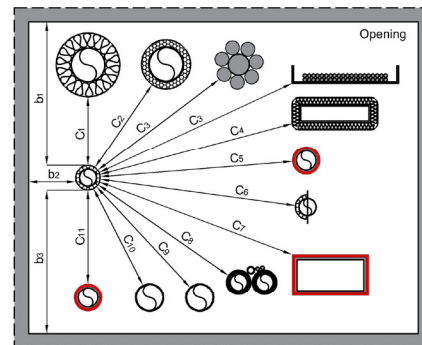
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

MLC (Aluminium Composite) Pipe w/ Combustible Insulation				
Material	Diameter Range (Wall Thickness Range) [mm]	Type of Insulation	Insulation Thickness Range; Type [mm]	Classification
Aluminium Composite Pipe - Uponor Unipipe Plus	$d \leq 16$ (0/2.0 - 16/3.0)	Armcell Armalex®	8 - 32 (AF1 - AF6);CS	EI 60 (U/C)
		Kingspan Kooltherm®	15 - 40;CS	
	$d \leq 20$ (0/2.25 - 20/3.0)	Armcell Armalex®	8 - 32 (AF1 - AF6);CS	
		Kingspan Kooltherm®	15 - 40; CS	
	$d \leq 25$ (0/2.5 - 25/3.0)	Armcell Armalex®	8 - 33.5 (AF1 - AF6);CS	
		Kingspan Kooltherm®	15 - 40; CS	
Aluminium Composite Pipe - Uponor MLC	$d \leq 32$ (0/3.0 - 32/3.0)	Armcell Armalex®	8 - 35 (AF1 - AF6);CS	EI 60 (U/C)
		Kingspan Kooltherm®	15 - 40; CS	
	$d \leq 40$ (0/4.0 - 40/4.0)	Armcell Armalex®	9 - 36.5 (AF1 - AF6);CS	
		Kingspan Kooltherm®	15 - 40; CS	
	$d \leq 50$ (0/4.5 - 50/4.5)	Armcell Armalex®	9 - 37.5 (AF1 - AF6);CS	
		Kingspan Kooltherm®	15 - 40; CS	



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥30 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundle/cable carrier	≥50 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥50
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥50
C ₈	To ClimaSplit bundle	≥50
C ₉	To CPVC or TracPipe®	≥50
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥30

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 30mm if no movement is required.
^{†††}For cables d > 21mm, a min distance of 100mm from other services is required.



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CFS-FS: 06

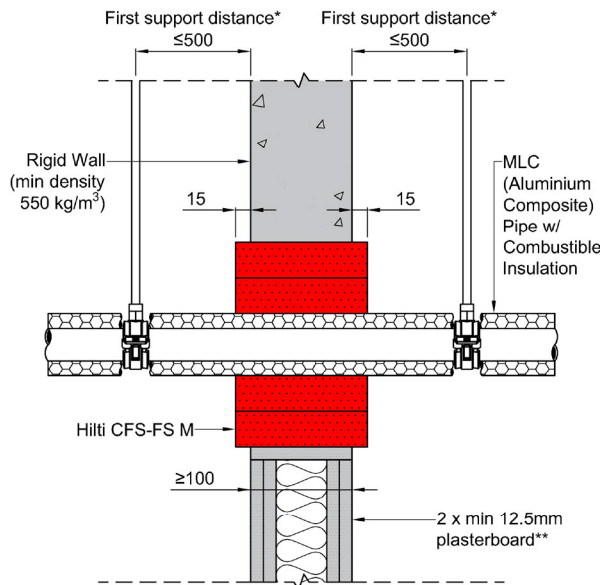
MLC (ALUMINIUM COMPOSITE) PIPE W/ COMBUSTIBLE INSULATION

Fire Rating up to EI 60

Information

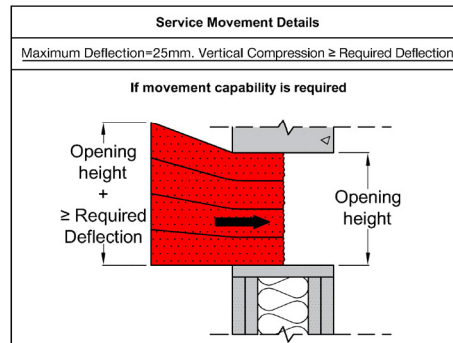
- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



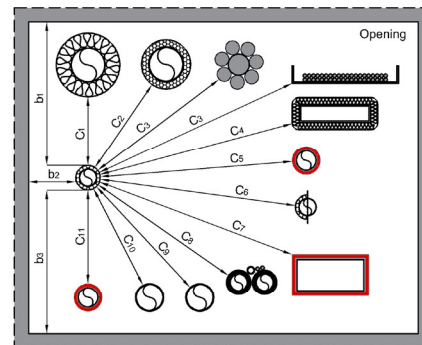
Acoustics rating: $R_w = 50$
 Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
 *First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
 **Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

MLC (Aluminium Composite) Pipe w/ Combustible Insulation				
Material	Diameter Range (Wall Thickness Range) [mm]	Type of Insulation	Insulation Thickness Range; Type [mm]	Classification
Aluminium Composite Pipe - Uponor Unipipe Plus	$d \leq 16$ (0/2.0 - 16/3.0)	Armcell Armaflex®	8 - 32 (AF1 - AF6);CS	EI 60 (U/C)
		Kingspan Kooltherm®	15 - 40;CS	
	$d \leq 20$ (0/2.25 - 20/3.0)	Armcell Armaflex®	8 - 32 (AF1 - AF6);CS	
		Kingspan Kooltherm®	15 - 40; CS	
	$d \leq 25$ (0/2.5 - 25/3.0)	Armcell Armaflex®	8 - 33.5 (AF1 - AF6);CS	
		Kingspan Kooltherm®	15 - 40; CS	
Aluminium Composite Pipe - Uponor MLC	$d \leq 32$ (0/3.0 - 32/3.0)	Armcell Armaflex®	8 - 35 (AF1 - AF6);CS	EI 60 (U/C)
		Kingspan Kooltherm®	15 - 40; CS	
	$d \leq 40$ (0/4.0 - 40/4.0)	Armcell Armaflex®	9 - 36.5 (AF1 - AF6);CS	
		Kingspan Kooltherm®	15 - 40; CS	
	$d \leq 50$ (0/4.5 - 50/4.5)	Armcell Armaflex®	9 - 37.5 (AF1 - AF6);CS	
		Kingspan Kooltherm®	15 - 40; CS	



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥ 70 ^{††}
b ₂	To side of opening	≥ 30 ^{††}
b ₃	To bottom of opening	≥ 35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥ 0
C ₂	To metal pipe w/ combustible insulation	≥ 30
C ₃	To cables/cable bundle/cable carrier	≥ 50 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥ 50
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥ 30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥ 50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥ 50
C ₈	To ClimaSplit bundle	≥ 50
C ₉	To CPVC or TracPipe®	≥ 50
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥ 50
C ₁₁	To conduit w/ Hilti CFS-B	≥ 30

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 30mm if no movement is required.
^{†††}For cables d > 21mm, a min distance of 100mm from other services is required.



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CFS-FS: 07

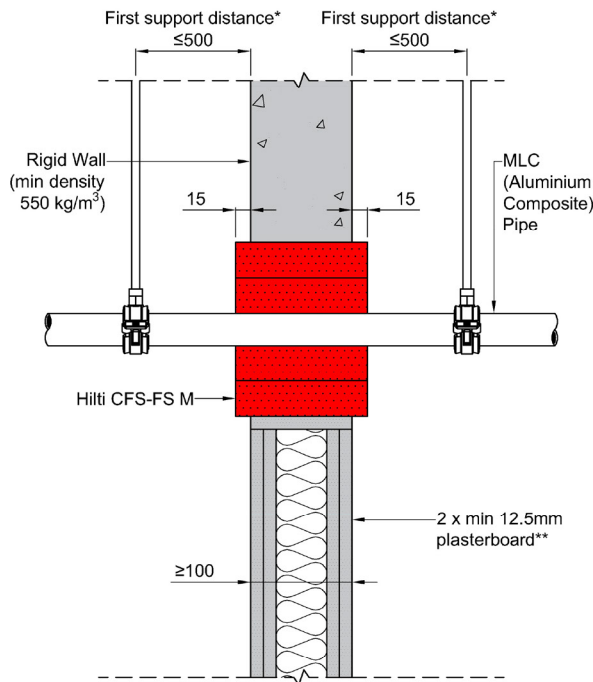
MLC (ALUMINIUM COMPOSITE) PIPE

Fire Rating up to EI 60

Information

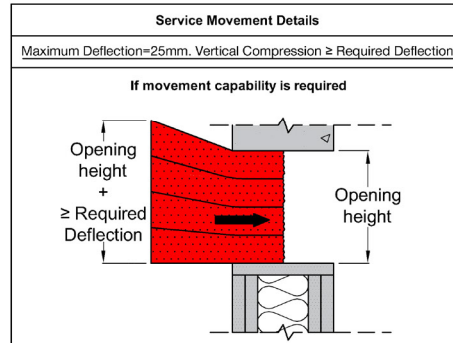
- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG > PDF > BIM/CAD > Web >



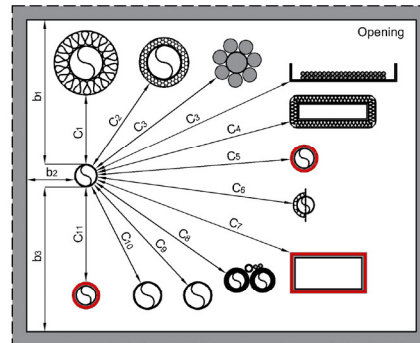
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

MLC (Aluminium Composite) Pipe		
Material	Diameter Range (Min. wall thickness range) [mm]	Classification
Geberit Mepla MLC Pipe	$d \leq 16$ (0/2.25 - 16/4.0)	EI 60 (U/C)
Geberit Mepla MLC Pipe	$16 \leq d \leq 20$ (16/2.25 - 20/4.0)	
Geberit Mepla MLC Pipe	$20 \leq d \leq 26$ (20/2.5 - 26/4.0)	
Geberit Mepla MLC Pipe	$26 \leq d \leq 32$ (26/3.0 - 32/4.0)	
Geberit Mepla MLC Pipe	$32 \leq d \leq 40$ (32/3.0 - 40/4.0)	
Geberit Mepla MLC Pipe	$40 \leq d \leq 50$ (40/3.5 - 50/4.0)	
Uponor uni pipe plus	$d \leq 16$ (0/2.0 - 16/3.0)	
Uponor uni pipe plus	$d \leq 20$ (0/2.25 - 20/3.0)	
Uponor uni pipe plus	$d \leq 25$ (0/2.5 - 25/3.0)	
Uponor uni pipe plus	$d \leq 32$ (0/3.0 - 32/3.0)	
Uponor MLC	$d \leq 40$ (0/4.0 - 40/4.0)	
Uponor MLC	$d \leq 50$ (0/4.5 - 50/4.5)	



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥ 70 ^{1†}
b ₂	To side of opening	≥ 30 ^{1†}
b ₃	To bottom of opening	≥ 35 ^{1†}
C ₁	To metal pipe w/ mineral wool insulation	≥ 0
C ₂	To metal pipe w/ combustible insulation	≥ 30
C ₃	To cables/cable bundle/cable carrier	≥ 50 ^{1††}
C ₄	To cable trunking w/ mineral wool insulation	≥ 50
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥ 30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥ 50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥ 50
C ₈	To KlimaSplit bundle	≥ 50
C ₉	To CPVC or TracPipe®	≥ 50
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥ 50
C ₁₁	To conduit w/ Hilti CFS-B	≥ 30

¹All distance values can be horizontal, vertical or diagonal.
[†]b₁, b₂, b₃ = 30mm if no movement is required.
^{††}For cables d > 21mm, a min distance of 100mm from other services is required.



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CFS-FS: 07

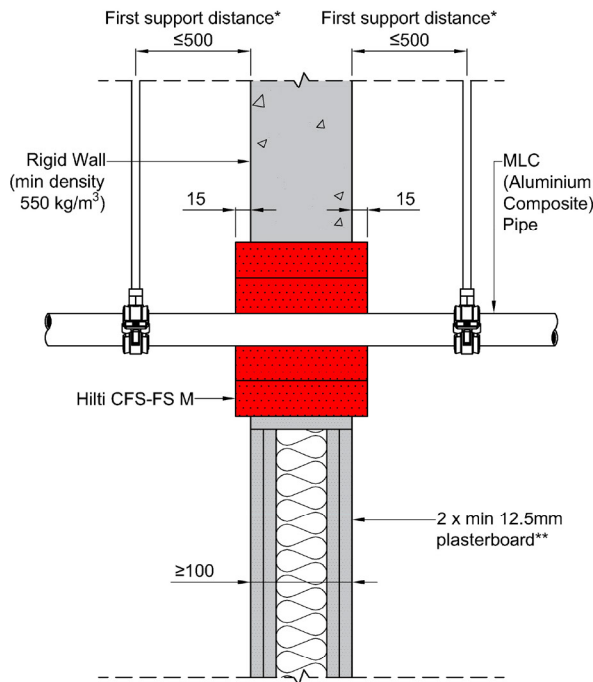
MLC (ALUMINIUM COMPOSITE) PIPE

Fire Rating up to EI 60

Information

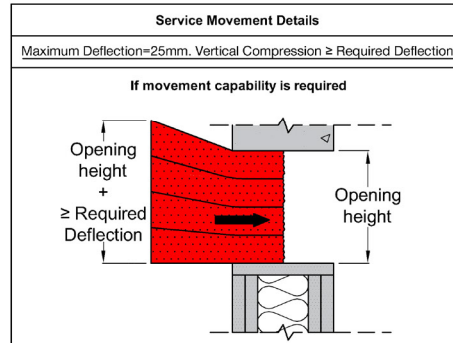
- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG > PDF > BIM/CAD > Web >



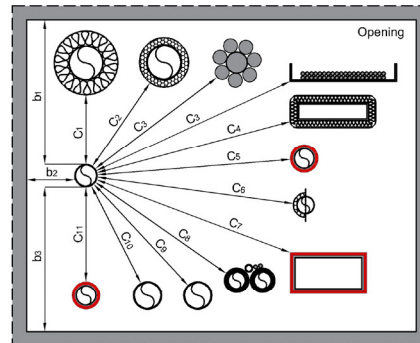
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

MLC (Aluminium Composite) Pipe		
Material	Diameter Range (Min. wall thickness range) [mm]	Classification
Geberit Mepla MLC Pipe	$d \leq 16$ (0/2.25 - 16/4.0)	EI 60 (U/C)
Geberit Mepla MLC Pipe	$16 \leq d \leq 20$ (16/2.25 - 20/4.0)	
Geberit Mepla MLC Pipe	$20 \leq d \leq 26$ (20/2.5 - 26/4.0)	
Geberit Mepla MLC Pipe	$26 \leq d \leq 32$ (26/3.0 - 32/4.0)	
Geberit Mepla MLC Pipe	$32 \leq d \leq 40$ (32/3.0 - 40/4.0)	
Geberit Mepla MLC Pipe	$40 \leq d \leq 50$ (40/3.5 - 50/4.0)	
Uponor uni pipe plus	$d \leq 16$ (0/2.0 - 16/3.0)	
Uponor uni pipe plus	$d \leq 20$ (0/2.25 - 20/3.0)	
Uponor uni pipe plus	$d \leq 25$ (0/2.5 - 25/3.0)	
Uponor uni pipe plus	$d \leq 32$ (0/3.0 - 32/3.0)	
Uponor MLC	$d \leq 40$ (0/4.0 - 40/4.0)	
Uponor MLC	$d \leq 50$ (0/4.5 - 50/4.5)	



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥ 70 ^{††}
b ₂	To side of opening	≥ 30 ^{††}
b ₃	To bottom of opening	≥ 35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥ 0
C ₂	To metal pipe w/ combustible insulation	≥ 30
C ₃	To cables/cable bundle/cable carrier	≥ 50 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥ 50
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥ 30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥ 50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥ 50
C ₈	To KlimaSplit bundle	≥ 50
C ₉	To CPVC or TracPipe®	≥ 50
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥ 50
C ₁₁	To conduit w/ Hilti CFS-B	≥ 30

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 30mm if no movement is required.
^{†††}For cables d > 21mm, a min distance of 100mm from other services is required.



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CFS-FS: 08

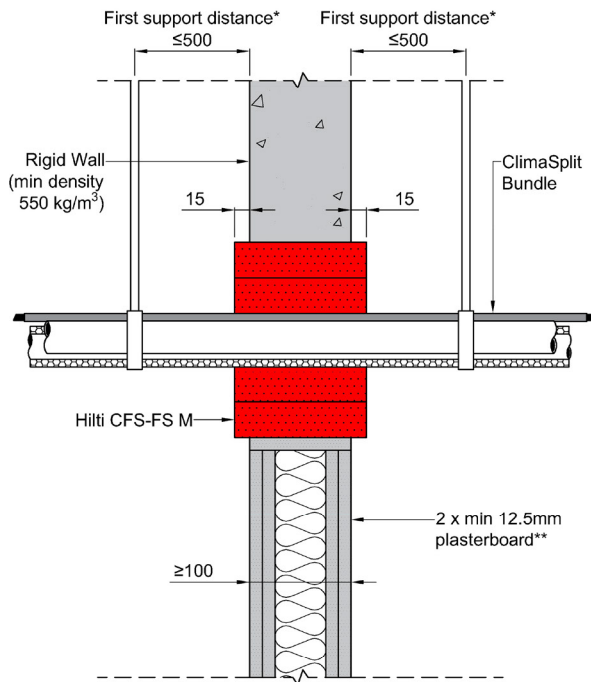
CLIMASPLIT BUNDLE

Fire Rating up to EI 60

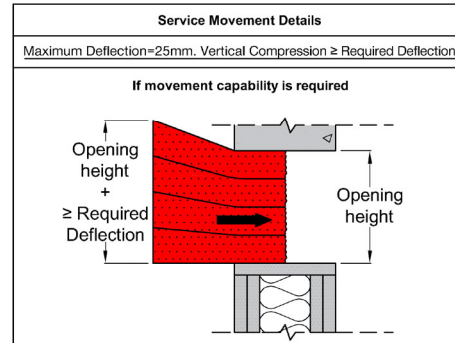
Information

- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



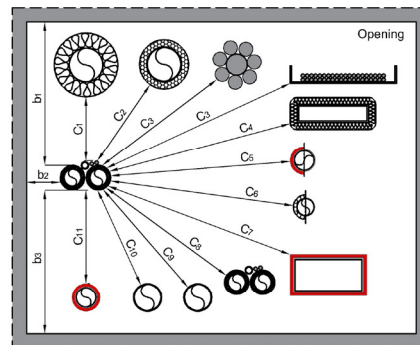
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥50 ^{††}
b ₃	To bottom of opening	≥50 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥50
C ₃	To cables/cable bundle/cable carrier	≥50 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥50
C ₅	To combustible plastic pipe w/ or w/o Hilti CFS-B	≥50
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥50
C ₈	To Climasplit bundle	≥50
C ₉	To CPVC or TracPipe®	≥50
C ₁₀	To conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥50

¹All distance values can be horizontal, vertical or diagonal.
b₁, b₂, b₃ = 50mm if no movement is required.
^{††}For cables > 21mm, a min distance of 100mm from other services is required.

Climasplit Bundle				
Material	Diameter Range; (Min. Wall Thickness Range) [mm]	Type of Insulation	Insulation Thickness Range; Type [mm]	Classification
Copper pipe	d ≤ 12 (0/0.6 - 12/0.6)	Armacell Armaflex®	7.5-15.5; CS	EI 60 (C/U)
Copper pipe	d ≤ 12 ≤ 28 (12/0.6 - 28/0.9)	Armacell Armaflex®	7.5-15.5; CS	EI 60 (C/U)
PVC pipe	d ≤ 32 (0/2.0 - 32/4.0)	N/A	N/A	EI 60 (U/U)
Cable	d ≤ 14	N/A	N/A	EI 60



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CFS-FS: 08

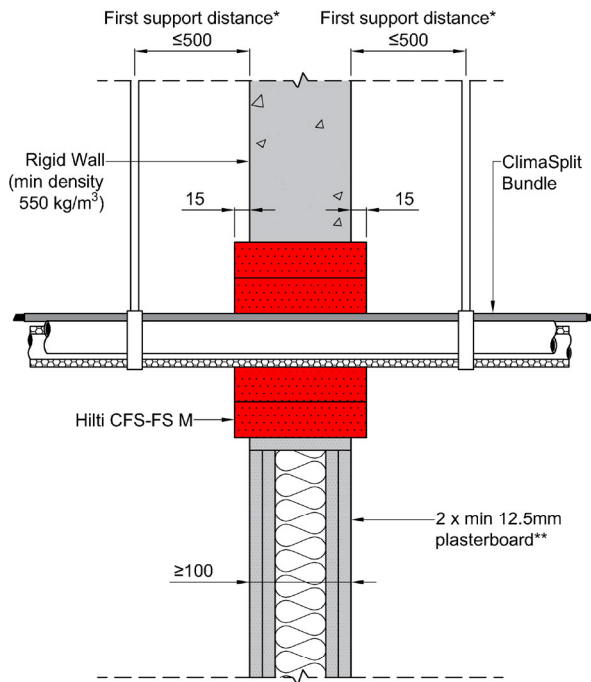
CLIMASPLIT BUNDLE

Fire Rating up to EI 60

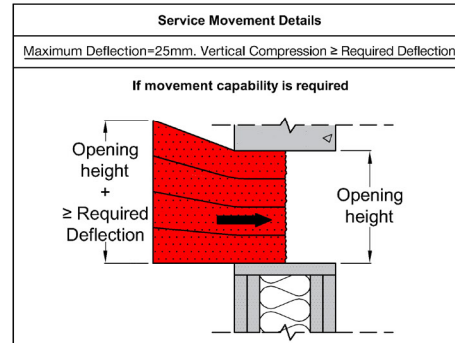
Information

- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



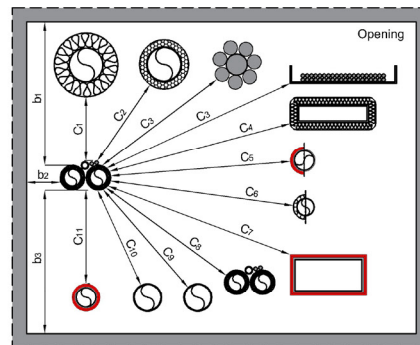
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥50 ^{††}
b ₃	To bottom of opening	≥50 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥50
C ₃	To cables/cable bundle/cable carrier	≥50 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥50
C ₅	To combustible plastic pipe w/ or w/o Hilti CFS-B	≥50
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥50
C ₈	To Climasplit bundle	≥50
C ₉	To CPVC or TracPipe®	≥50
C ₁₀	To conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥50

¹All distance values can be horizontal, vertical or diagonal.
b₁, b₂, b₃ = 50mm if no movement is required.
^{††}For cables > 21mm, a min distance of 100mm from other services is required.

Climasplit Bundle				
Material	Diameter Range; (Min. Wall Thickness Range) [mm]	Type of Insulation	Insulation Thickness Range; Type [mm]	Classification
Copper pipe	d ≤ 12 (0/0.6 - 12/0.6)	Armacell Armaflex®	7.5-15.5; CS	EI 60 (C/U)
Copper pipe	d ≤ 12 ≤ 28 (12/0.6 - 28/0.9)	Armacell Armaflex®	7.5-15.5; CS	EI 60 (C/U)
PVC pipe	d ≤ 32 (0/2.0 - 32/4.0)	N/A	N/A	EI 60 (U/U)
Cable	d ≤ 14	N/A	N/A	EI 60



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CFS-FS: 09

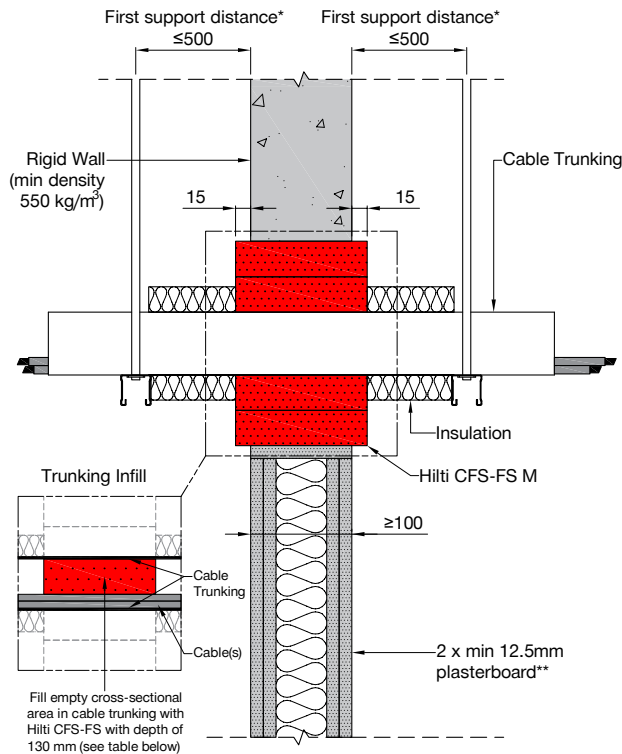
CABLE TRUNKING

Fire Rating up to EI 60

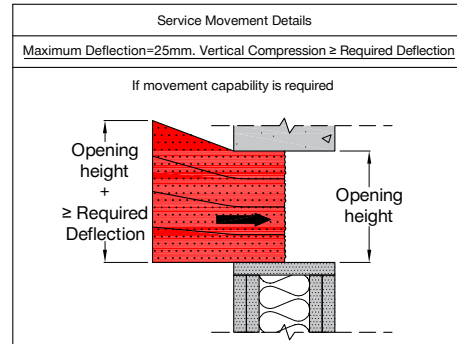
Information

- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

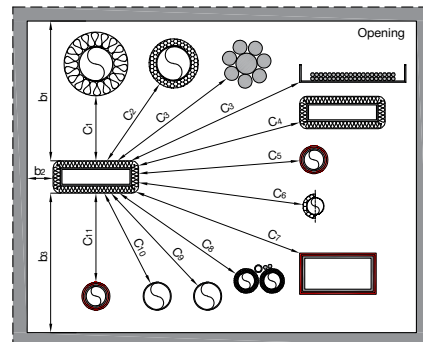


Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) †
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥0 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundle/cable carrier	≥30
C ₄	To cable trunking w/ mineral wool insulation	≥0
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥0
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥0
C ₈	To ClimaSplit bundle	≥50
C ₉	To CPVC or TracPipe®	≥30
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥0

†All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 0mm if no movement is required.

Cable trunking				
Material	Max Dimensions (W x H) [mm]	Type of Insulation	Insulation Thickness Range; Type (Length) [mm]	Classification
Cable Trunking Metal	Up to 150 x 150 [‡]	Rockwool® DuctWrap	25; LI (420)	EI 60 (U/U)
Cables	d ≤ 80 ^{‡‡}	N/A	N/A	EI 60

Note: Fill empty cross-sectional area in cable trunking with Hilti CFS-FS with depth of 130 mm
[‡]Max Cross Section area of 22,500 mm²
^{‡‡}Max 28mm for coaxial cables & max 24mm for non-sheathed cables



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CFS-FS: 09

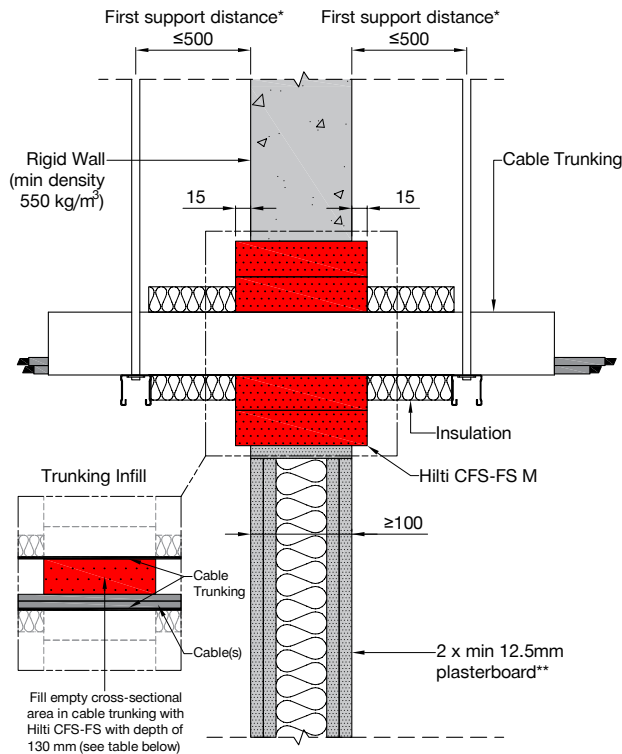
CABLE TRUNKING

Fire Rating up to EI 60

Information

- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web

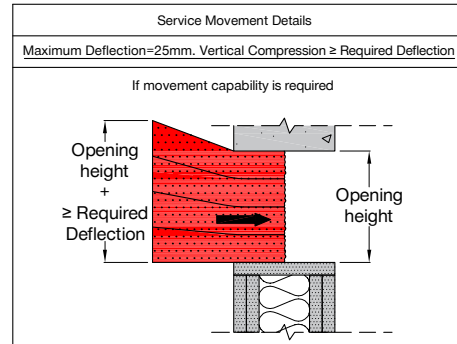


Acoustics rating: $R_w = 50$

Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.

*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.

**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

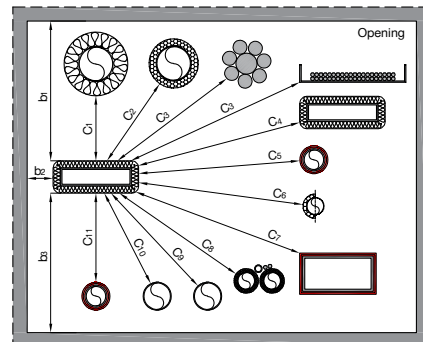


Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) †
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥0 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundle/cable carrier	≥30
C ₄	To cable trunking w/ mineral wool insulation	≥0
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥0
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥0
C ₈	To ClimaSplit bundle	≥50
C ₉	To CPVC or TracPipe®	≥30
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥0

†All distance values can be horizontal, vertical or diagonal.
††b₁, b₂, b₃ = 0mm if no movement is required.

Cable trunking				
Material	Max Dimensions (W x H) [mm]	Type of Insulation	Insulation Thickness Range; Type (Length) [mm]	Classification
Cable Trunking Metal	Up to 150 x 150 [‡]	Rockwool® DuctWrap	25; LI (420)	EI 60 (U/U)
Cables	d ≤ 80 ^{‡‡}	N/A	N/A	EI 60

Note: Fill empty cross-sectional area in cable trunking with Hilti CFS-FS with depth of 130 mm
[‡]Max Cross Section area of 22,500 mm²
^{‡‡}Max 28mm for coaxial cables & max 24mm for non-sheathed cables



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CFS-FS: 10

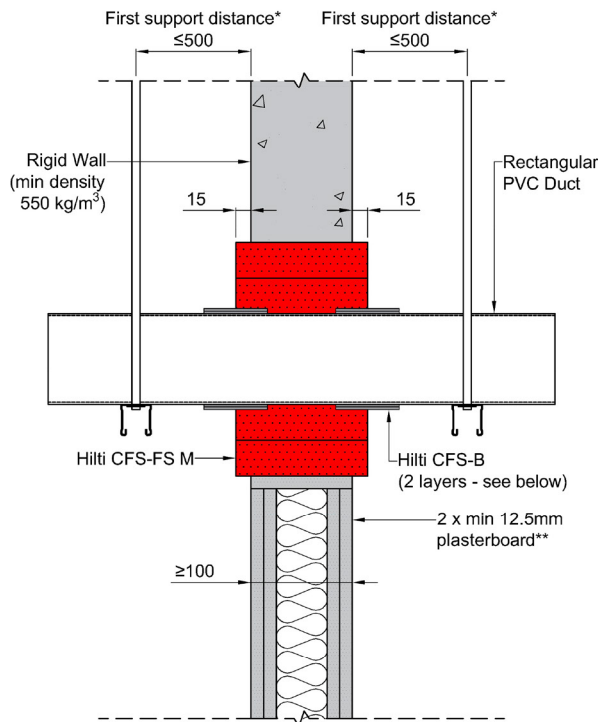
RECTANGULAR PVC DUCT

Fire Rating up to EI 60

Information

- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

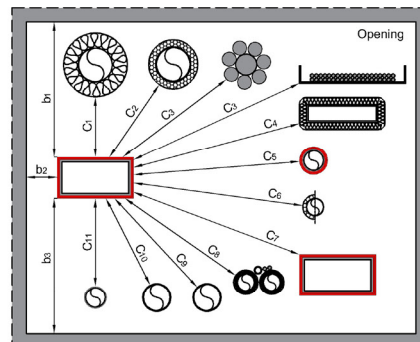
Service Movement Details		
Maximum Deflection=25mm. Vertical Compression ≥ Required Deflection		
If movement capability is required		
Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) [†]
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥0 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundles/cable carriers	≥30 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥0
C ₅	To combustible plastic pipe & conduit w/ Hilti CFS-B	≥0
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥0
C ₈	To ClimaSplit bundle	≥50
C ₉	To CPVC	≥30
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To TracPipe®	≥30

[†]All distance values can be horizontal, vertical or diagonal.

^{††}b₁, b₂, b₃ = 0mm if no movement is required.

^{†††}For cables d > 21mm, a min distance of 100mm from other services is required.

Rectangular PVC Duct		
Material	Max Dimensions (Wx H) [mm]	Classification
PVC	≤ 220 x ≤ 90 [‡]	EI 60 (U/U)
Note: Rectangular PVC Duct Requires 2 layers of Hilti CFS-B		
[‡] Wall thickness: 2.0 mm		



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CFS-FS: 10

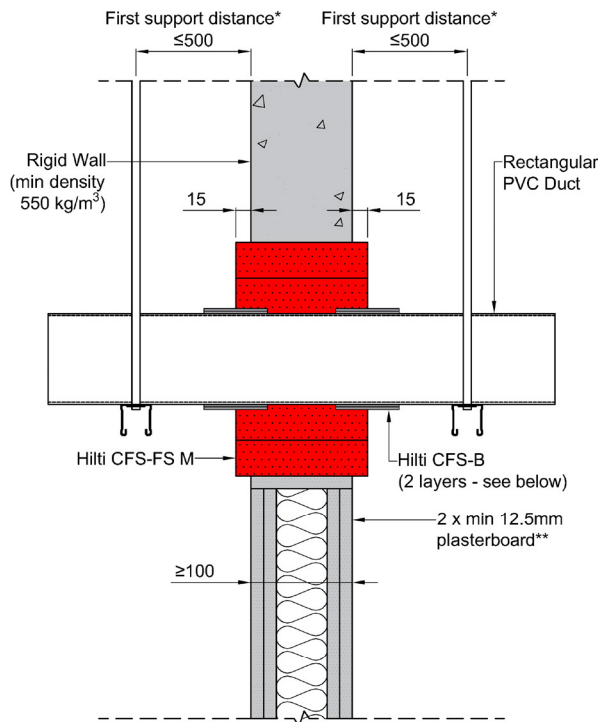
RECTANGULAR PVC DUCT

Fire Rating up to EI 60

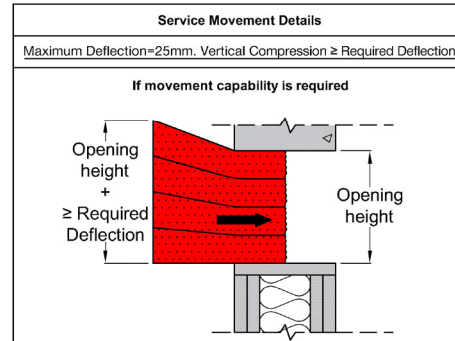
Information

- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web

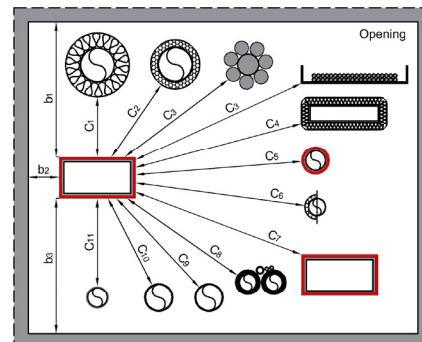


Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) [†]
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥0 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundles/cable carriers	≥30 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥0
C ₅	To combustible plastic pipe & conduit w/ Hilti CFS-B	≥0
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥0
C ₈	To ClimaSplit bundle	≥50
C ₉	To CPVC	≥30
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To TracPipe®	≥30

[†]All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 0mm if no movement is required.
^{†††}For cables d > 21mm, a min distance of 100mm from other services is required.



Rectangular PVC Duct		
Material	Max Dimensions (W x H) [mm]	Classification
PVC	≤ 220 x ≤ 90 [‡]	EI 60 (U/U)
Note: Rectangular PVC Duct Requires 2 layers of Hilti CFS-B		
[‡] Wall thickness: 2.0 mm		

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CFS-FS: 11

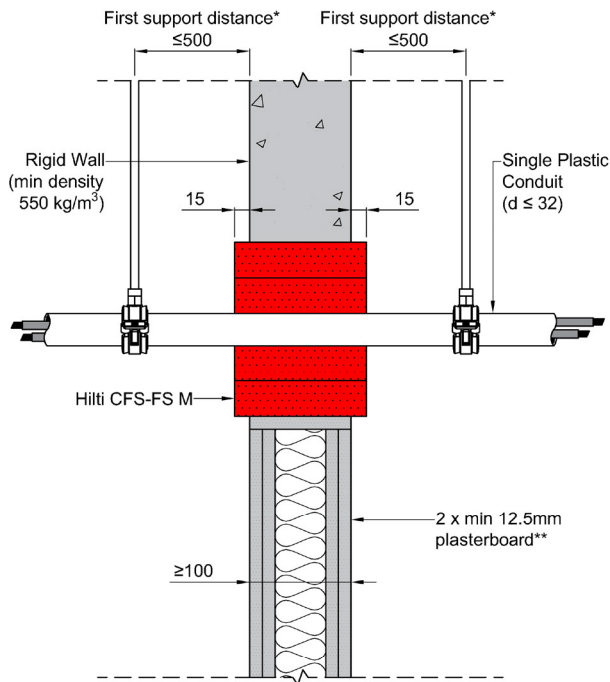
SINGLE PLASTIC CONDUIT (D ≤ 32)

Fire Rating up to EI 60

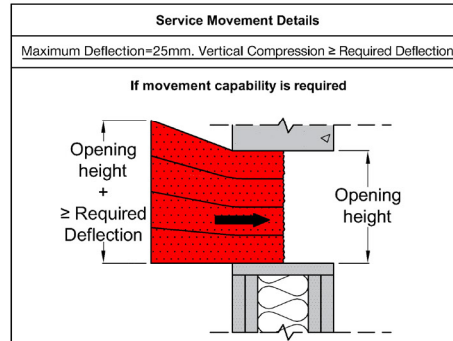
Information

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- Tested according to EN 1366-3
- Classification No. 23581B

DWG PDF BIM/CAD Web



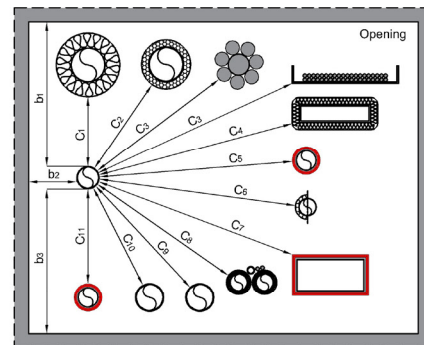
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥ 70 ^{††}
b ₂	To side of opening	≥ 30 ^{††}
b ₃	To bottom of opening	≥ 35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥ 0
C ₂	To metal pipe w/ combustible insulation	≥ 30
C ₃	To cables/cable bundle/cable carrier	≥ 50 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥ 50
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥ 30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥ 50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥ 50
C ₈	To KlimaSplit bundle	≥ 50
C ₉	To CPVC or TracPipe®	≥ 50
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥ 50
C ₁₁	To conduit w/ Hilti CFS-B	≥ 50

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 30mm if no movement is required.
^{†††}For cables d > 21mm, a min distance of 100mm from other services is required.

Single Plastic Conduit (d ≤ 32)			
Material	Diameter [mm]	Addn. Protection	Classification
Single conduit w/ or w/o cable	d ≤ 32 [‡]	N/A	EI 60 (U/U)
Notes: Conduit to extend a minimum of 300mm on either side of the wall surface [‡] Flexible/Pliable Max Wall Thickness: 4.25 mm [‡] Rigid Conduit Max Wall Thickness: 2.0 mm			



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CFS-FS: 11

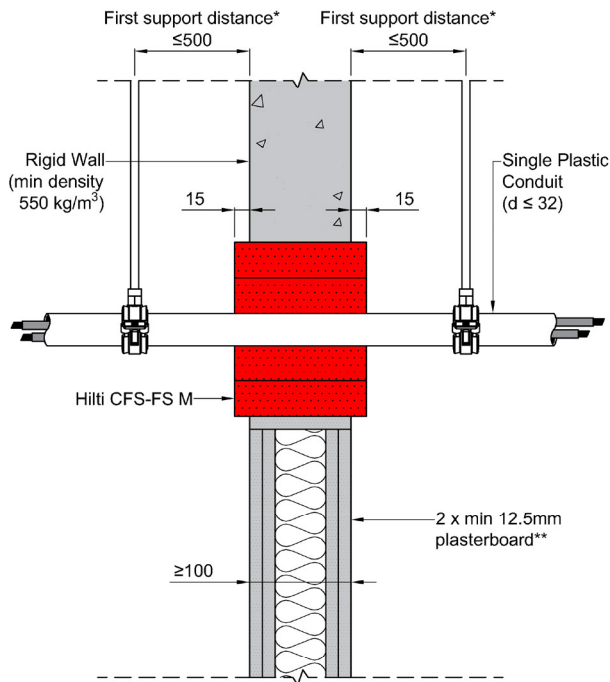
SINGLE PLASTIC CONDUIT (D ≤ 32)

Fire Rating up to EI 60

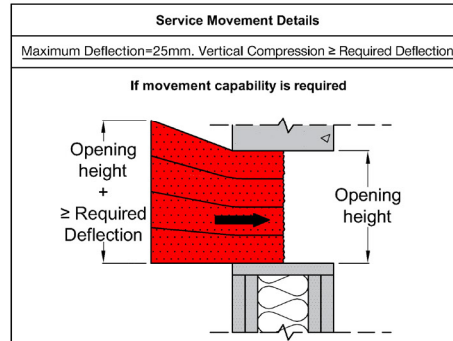
Information

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- Classification No. 23581B

DWG PDF BIM/CAD Web



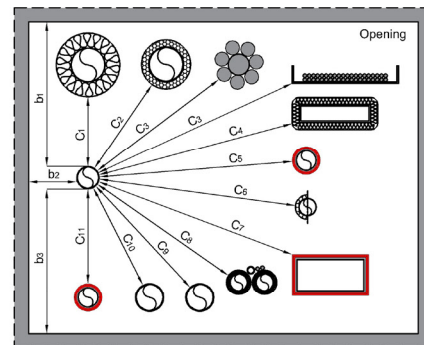
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥ 70 ^{††}
b ₂	To side of opening	≥ 30 ^{††}
b ₃	To bottom of opening	≥ 35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥ 0
C ₂	To metal pipe w/ combustible insulation	≥ 30
C ₃	To cables/cable bundle/cable carrier	≥ 50 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥ 50
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥ 30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥ 50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥ 50
C ₈	To KlimaSplit bundle	≥ 50
C ₉	To CPVC or TracPipe®	≥ 50
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥ 50
C ₁₁	To conduit w/ Hilti CFS-B	≥ 50

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 30mm if no movement is required.
^{†††}For cables d > 21mm, a min distance of 100mm from other services is required.

Single Plastic Conduit (d ≤ 32)			
Material	Diameter [mm]	Addn. Protection	Classification
Single conduit w/ or w/o cable	d ≤ 32 [‡]	N/A	EI 60 (U/U)
Notes: Conduit to extend a minimum of 300mm on either side of the wall surface			
[‡] Flexible/Pliable Max Wall Thickness: 4.25 mm			
[‡] Rigid Conduit Max Wall Thickness: 2.0 mm			



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CFS-FS: 12

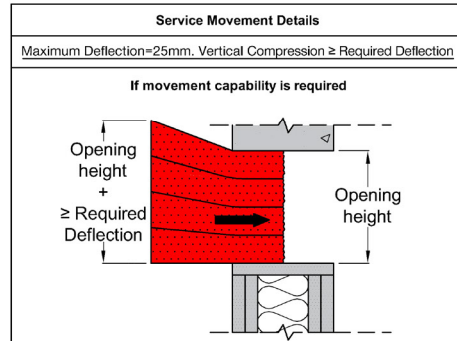
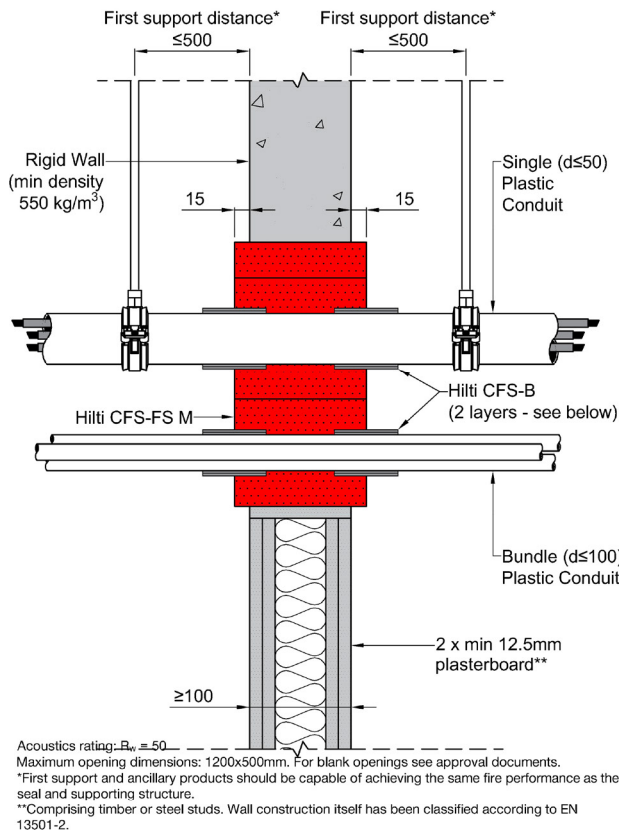
SINGLE (D ≤ 50) & BUNDLE (D ≤ 100) PLASTIC CONDUIT

Fire Rating up to EI 60

Information

- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

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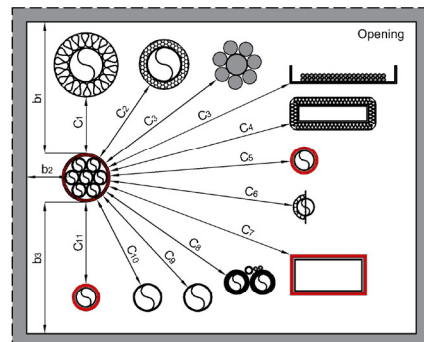
Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥0 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundle/cable carrier	≥30 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥0
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥0
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥30
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥0
C ₈	To ClimaSplit bundle	≥50
C ₉	To CPVC or TracPipe®	≥30
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥0

¹All distance values can be horizontal, vertical or diagonal.

^{††}b₁, b₂, b₃ = 0mm if no movement is required.

^{†††}For cables d > 21mm, a min distance of 100mm from other services is required.

Single (d ≤ 50) & Bundle (d ≤ 100) Plastic Conduit			
Material	Diameter [mm]	Addn. Protection	Classification
Single conduit w/ or w/o cable	d ≤ 50 [†]	2 Layers of Hilti CFS-B	EI 60 (U/U)
Rigid conduit bundle w/ or w/o cable	d ≤ 100 [‡]	2 Layers of Hilti CFS-B	
Flexible/Pliable conduit bundle w/ or w/o cable	d ≤ 100 [‡]	2 Layers of Hilti CFS-B	
Notes: Conduit to extend a minimum of 300mm on either side of the wall surface			
[†] Flexible/Pliable Max Wall Thickness: 7.1 mm			
[‡] Rigid Conduit Max Wall Thickness: 2.0 mm			



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CFS-FS: 12

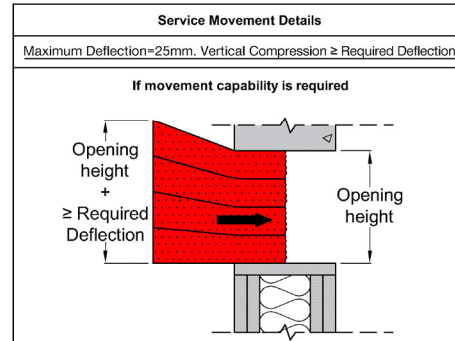
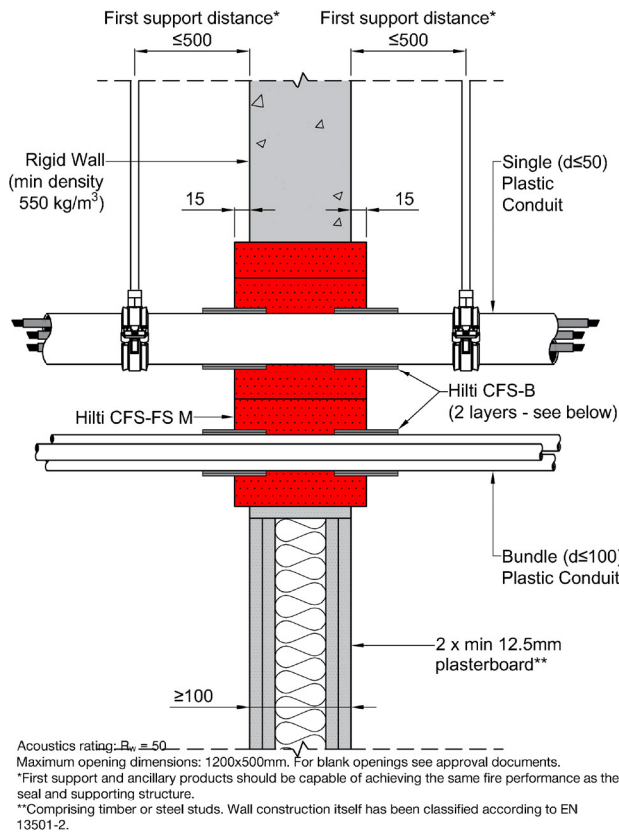
SINGLE ($D \leq 50$) & BUNDLE ($D \leq 100$) PLASTIC CONDUIT

Fire Rating up to EI 60

Information

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- Tested according to EN 1366-3
- Classification No. 23581B

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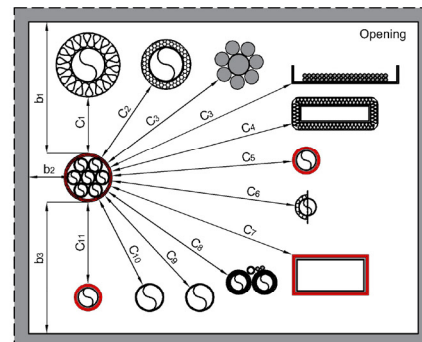
Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥ 70 ^{††}
b ₂	To side of opening	≥ 0 ^{††}
b ₃	To bottom of opening	≥ 35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥ 0
C ₂	To metal pipe w/ combustible insulation	≥ 30
C ₃	To cables/cable bundle/cable carrier	≥ 30 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥ 0
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥ 0
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥ 30
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥ 0
C ₈	To ClimaSplit bundle	≥ 50
C ₉	To CPVC or TracPipe®	≥ 30
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥ 50
C ₁₁	To conduit w/ Hilti CFS-B	≥ 0

¹All distance values can be horizontal, vertical or diagonal.

^{††}b₁, b₂, b₃ = 0mm if no movement is required.

^{†††}For cables $d > 21$ mm, a min distance of 100mm from other services is required.

Single (d ≤ 50) & Bundle (d ≤ 100) Plastic Conduit			
Material	Diameter [mm]	Addn. Protection	Classification
Single conduit w/ or w/o cable	d ≤ 50 [†]	2 Layers of Hilti CFS-B	EI 60 (U/U)
Rigid conduit bundle w/ or w/o cable	d ≤ 100 [‡]	2 Layers of Hilti CFS-B	
Flexible/Pliable conduit bundle w/ or w/o cable	d ≤ 100 [‡]	2 Layers of Hilti CFS-B	
Notes: Conduit to extend a minimum of 300mm on either side of the wall surface			
[†] Flexible/Pliable Max Wall Thickness: 7.1 mm			
[‡] Rigid Conduit Max Wall Thickness: 2.0 mm			



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CFS-FS: 13

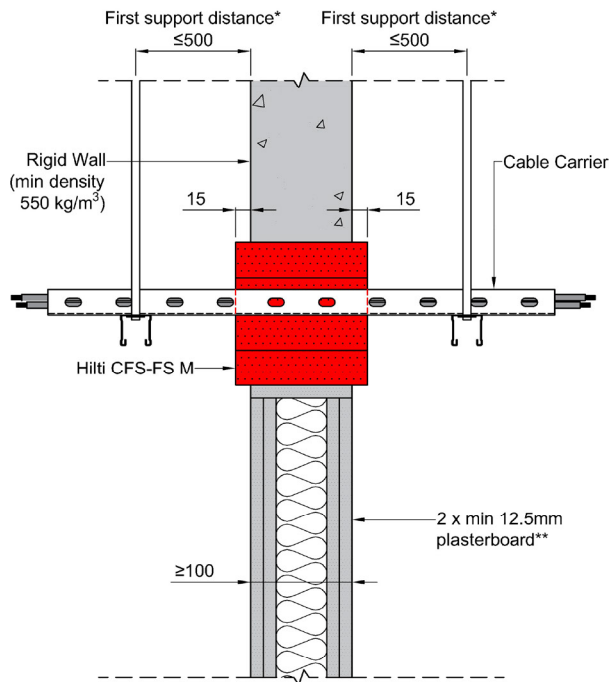
CABLE/CABLE CARRIER

Fire Rating up to EI 60

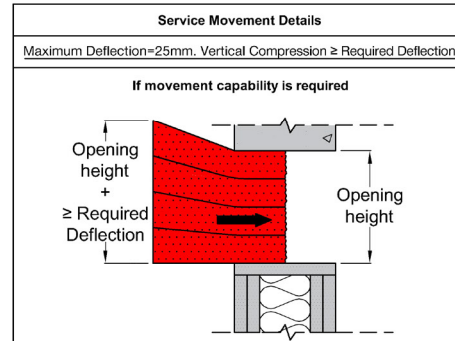
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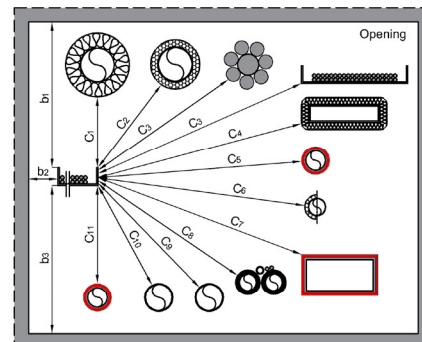
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥30 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundle/cable carrier	≥0 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥30
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥30
C ₈	To KlimaSplit bundle	≥50
C ₉	To CPVC or TracPipe®	≥30
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥30

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 30mm if no movement is required.
^{†††}For cables d > 21mm, a min distance of 100mm from other services is required; Coaxial Cables have distance requirement of ≥50mm.

Cable/Cable Carrier		
Material	Diameter [mm]	Classification
Single Cable	d ≤ 80	EI 60
Cable Bundle (single cable max d ≤ 21mm)	d ≤ 100 (single cable max d ≤ 21)	
Cable Carrier	See approval document for details	
Coaxial Cable	d ≤ 28	
Note: Non-Sheathed Cables (Wires) and Wave Guides are not covered		



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CFS-FS: 13

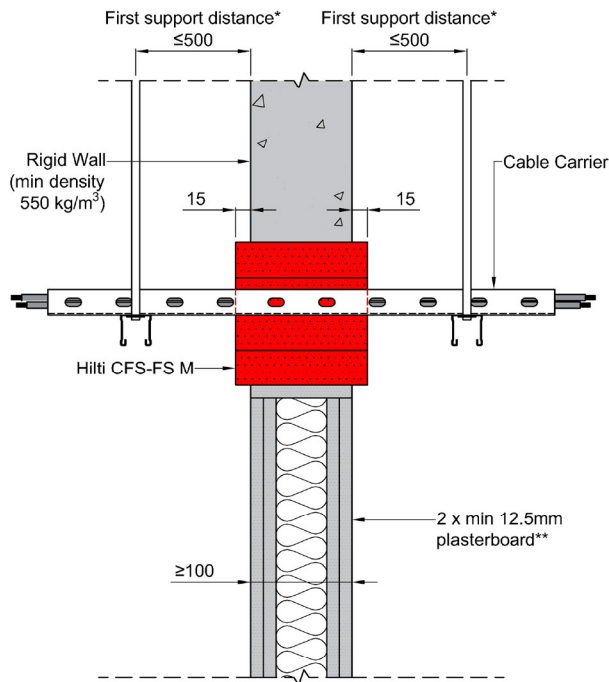
CABLE/CABLE CARRIER

Fire Rating up to EI 60

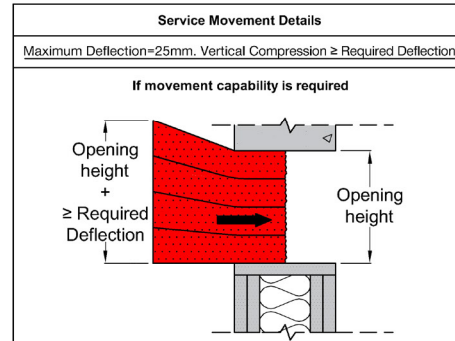
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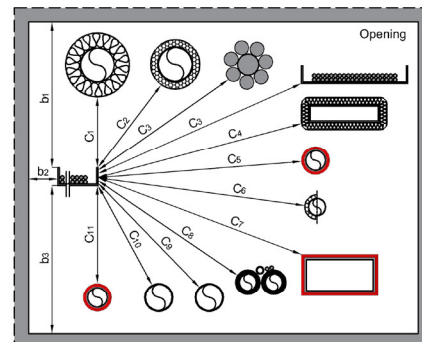
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥30 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥0
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundle/cable carrier	≥0 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥30
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥30
C ₈	To KlimaSplit bundle	≥50
C ₉	To CPVC or TracPipe®	≥30
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥30

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 30mm if no movement is required.
^{†††}For cables d > 21mm, a min distance of 100mm from other services is required; Coaxial Cables have distance requirement of ≥50mm.

Cable/Cable Carrier		
Material	Diameter [mm]	Classification
Single Cable	d ≤ 80	EI 60
Cable Bundle (single cable max d ≤ 21mm)	d ≤ 100 (single cable max d ≤ 21)	
Cable Carrier	See approval document for details	
Coaxial Cable	d ≤ 28	
Note: Non-Sheathed Cables (Wires) and Wave Guides are not covered		



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CFS-FS: 14

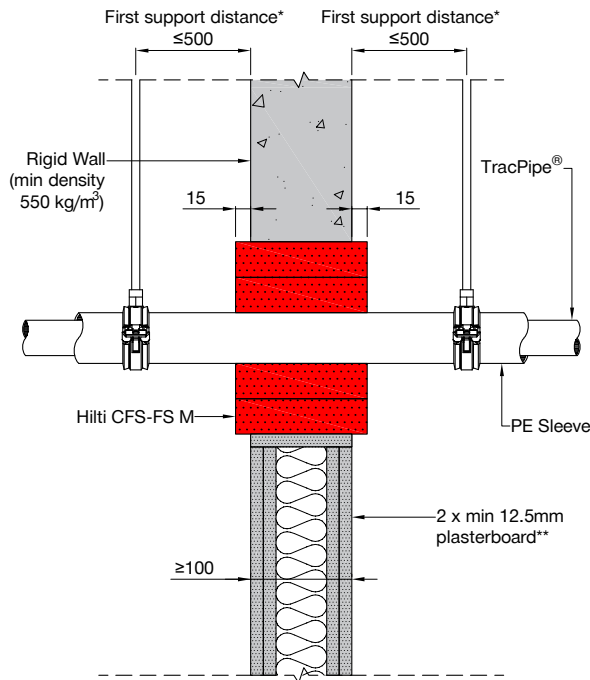
TRACPIPE®

Fire Rating up to EI 60

Information

- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

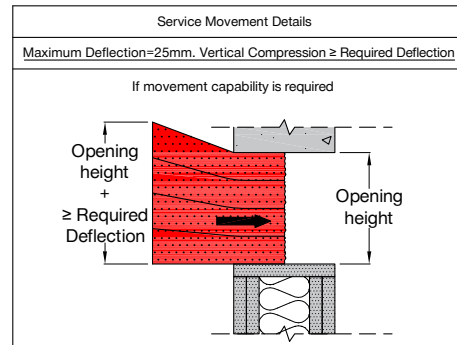
DWG PDF BIM/CAD Web



Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

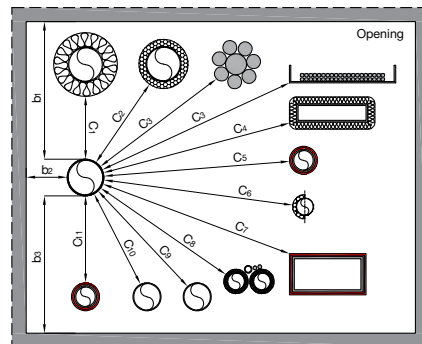
TracPipe®				
Material	Diameter (Min. Wall Thickness) [mm]	Wave Height [mm]	Outer Diameter of PE Sleeve (Length) [mm] ‡	Classification
TracPipe® CC	31 (0.25)	5	40 (132)	EI 60 (C/U)
	38 (0.25)	5.5	50 (132)	
	45 (0.25)	6	56 (132)	
	52 (0.25)	6	60 (132)	
TracPipe®	28 (0.25)	3.5	40 (132)	
	35 (0.25)	4	50 (132)	
	42 (0.3)	4.5	56 (132)	
	49 (0.3)	4.5	60 (132)	

‡Space between TracPipe and PE Sleeve must be filled with CFS-FIL with a minimum depth of 25mm. PE Sleeve wall thickness = 3mm



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) †
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥30 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥30
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundles/cable carriers	≥30 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥30
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥30
C ₈	To ClimaSplit bundle or TracPipe®	≥50
C ₉	To CPVC	≥30
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥30

†All distance values can be horizontal, vertical or diagonal.
††b₁, b₂, b₃ = 30mm if no movement is required.
†††For cables d > 21mm, a min distance of 100mm from other services is required.



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CFS-FS: 14

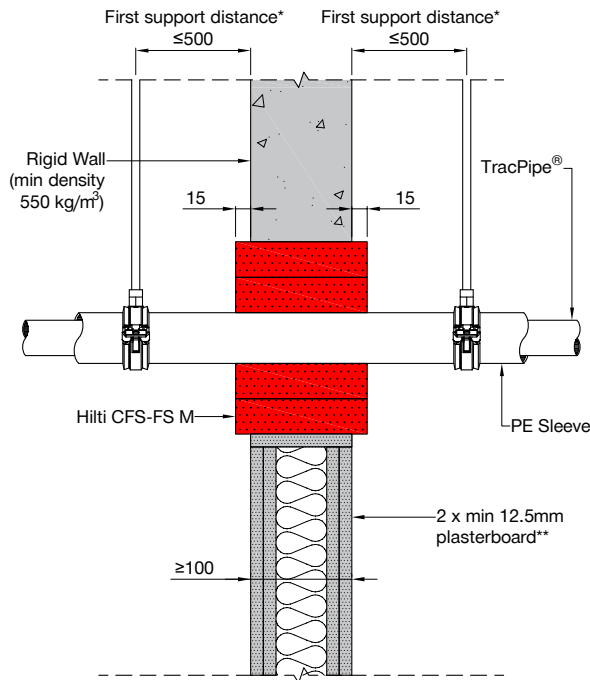
TRACPIPE®

Fire Rating up to EI 60

Information

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- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

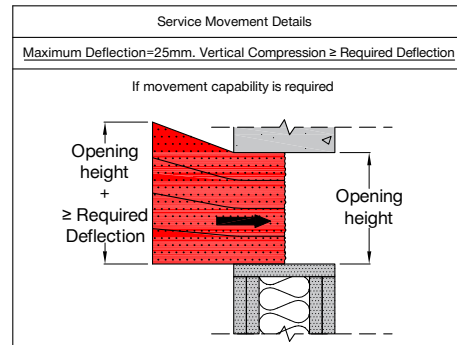
DWG PDF BIM/CAD Web



Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

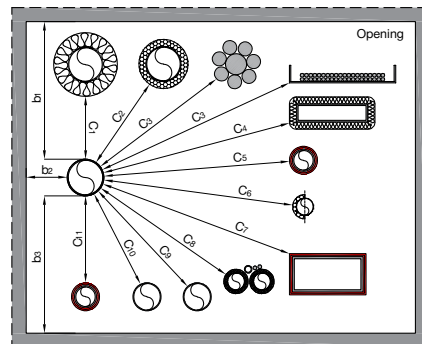
TracPipe®				
Material	Diameter (Min. Wall Thickness) [mm]	Wave Height [mm]	Outer Diameter of PE Sleeve (Length) [mm] ‡	Classification
TracPipe® CC	31 (0.25)	5	40 (132)	EI 60 (C/U)
	38 (0.25)	5.5	50 (132)	
	45 (0.25)	6	56 (132)	
	52 (0.25)	6	60 (132)	
TracPipe®	28 (0.25)	3.5	40 (132)	
	35 (0.25)	4	50 (132)	
	42 (0.3)	4.5	56 (132)	
	49 (0.3)	4.5	60 (132)	

‡Space between TracPipe and PE Sleeve must be filled with CFS-FIL with a minimum depth of 25mm. PE Sleeve wall thickness = 3mm



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) †
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥30 ^{††}
b ₃	To bottom of opening	≥35 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥30
C ₂	To metal pipe w/ combustible insulation	≥30
C ₃	To cables/cable bundles/cable carriers	≥30 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥30
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥30
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥30
C ₈	To ClimaSplit bundle or TracPipe®	≥50
C ₉	To CPVC	≥30
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥30

†All distance values can be horizontal, vertical or diagonal.
††b₁, b₂, b₃ = 30mm if no movement is required.
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CFS-FS: 15

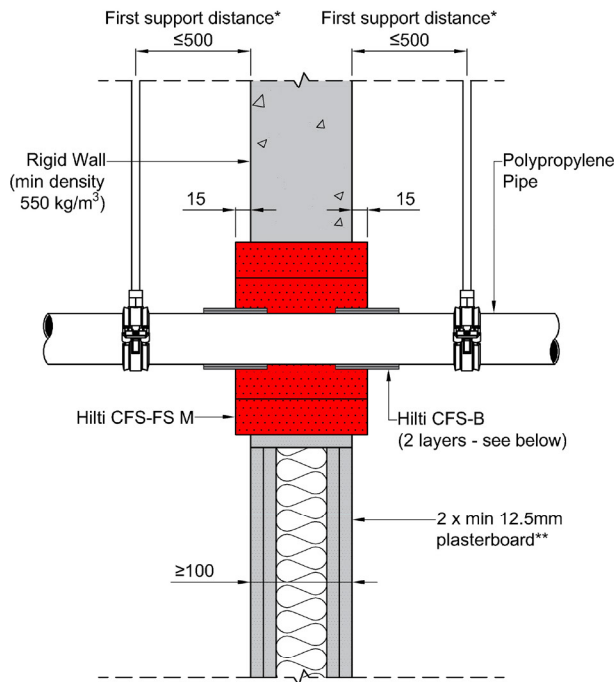
POLYPROPYLENE PIPE

Fire Rating up to EI 60

Information

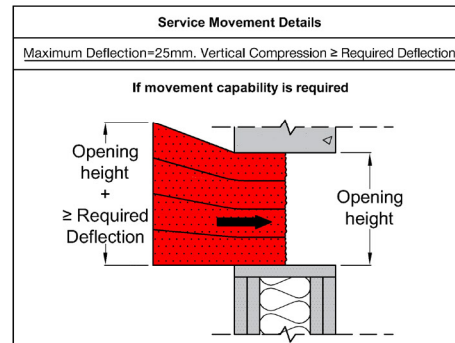
- Not to scale
- All units are in millimetres
- Tested according to EN 1366-3
- Classification No. 23581B

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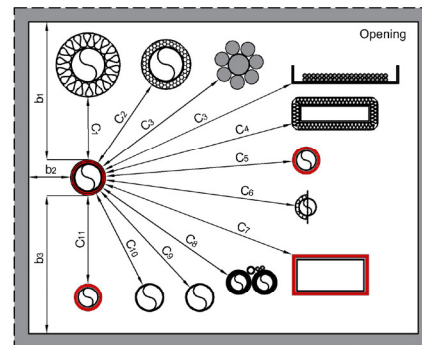
Acoustics rating: $R_w = 50$
Maximum opening dimensions: 1200x500mm. For blank openings see approval documents.
*First support and ancillary products should be capable of achieving the same fire performance as the seal and supporting structure.
**Comprising timber or steel studs. Wall construction itself has been classified according to EN 13501-2.

Polypropylene Pipe			
Material	Diameter Range (Wall Thickness) [mm]	Addn. Protection	Classification
Geberit Silent-Pro	$d \leq 50$ (0/3.0 - 50/3.0)	2 Layers of Hilti CFS-B	EI 60 (U/U)
Rehau Raupiano Plus	$d \leq 50$ (0/1.8 - 50/2.7)		
Rehau Raupiano Plus	$d \leq 75$ (0/1.9 - 75/2.7)		
Rehau Raupiano Plus	$d \leq 90$ (0/2.2 - 90/2.7)		
Rehau Raupiano Plus	$d \leq 110$ (0/2.7 - 110/2.7)		
Wavin AS+	$d \leq 110$ (0/5.3 - 110/5.3)		



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
b ₁	To top of opening	≥70 ^{††}
b ₂	To side of opening	≥50 ^{††}
b ₃	To bottom of opening	≥50 ^{††}
C ₁	To metal pipe w/ mineral wool insulation	≥50
C ₂	To metal pipe w/ combustible insulation	≥50
C ₃	To cables/cable bundle/cable carriers	≥50 ^{†††}
C ₄	To cable trunking w/ mineral wool insulation	≥50
C ₅	To combustible plastic pipe w/ Hilti CFS-B	≥50
C ₆	To MLC (Aluminium composite) pipe w/ or w/o insulation	≥50
C ₇	To rectangular PVC Duct w/ Hilti CFS-B	≥30
C ₈	To KlimaSplit bundle	≥50
C ₉	To CPVC or TracPipe®	≥50
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥30

¹All distance values can be horizontal, vertical or diagonal.
^{††}b₁, b₂, b₃ = 50mm if no movement is required.
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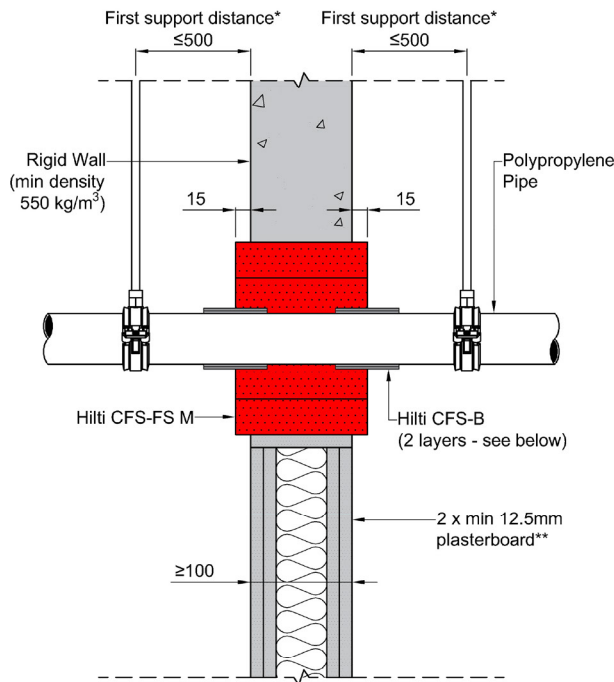
POLYPROPYLENE PIPE

Fire Rating up to EI 60

Information

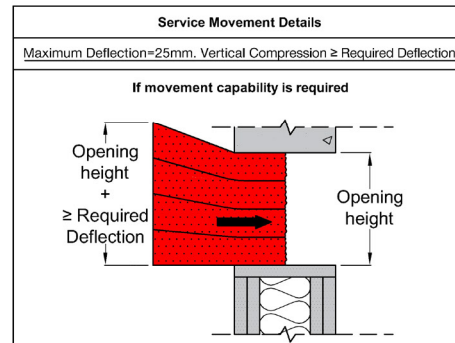
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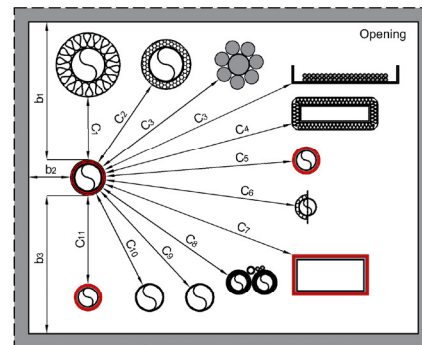
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Rehau Raupiano Plus	$d \leq 110$ (0/2.7 - 110/2.7)		
Wavin AS+	$d \leq 110$ (0/5.3 - 110/5.3)		



Ref.	Service Type (See service standard detail for more specific information)	Distance (mm) ¹
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C ₈	To KlimaSplit bundle	≥50
C ₉	To CPVC or TracPipe®	≥50
C ₁₀	To combustible plastic pipe & conduit w/o addn. protection	≥50
C ₁₁	To conduit w/ Hilti CFS-B	≥30

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