X-FB
DATA SHEET

Electrical conduit fastener

July 2021

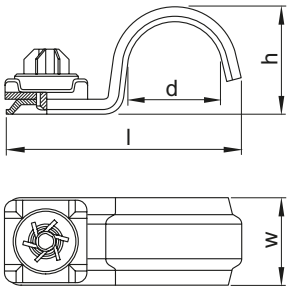
X-FB Electrical conduit fastener

Product data

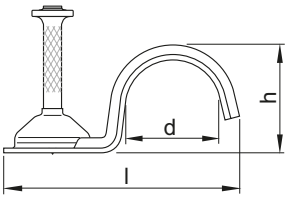
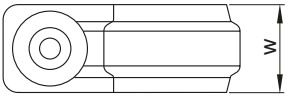
Product description

X-FB MX 	• Quick, cost-efficient fastening of conduits and pipes • Friction-fit in the nose of BX/GX/DX nailers for easy handling • Bracing rib for high rigidity and a tight, secure hold on flexible conduits • Engineered for high-quality, reliable fastening • Virtually dust-free fastening
X-FB C-27 	• Quick, cost-efficient fastening of conduits and pipes • Integrated top hat for high-quality, more reliable fastenings • High-grade, preassembled C27 nail for more secure fastenings on concrete • Reinforcing rib to increase the conduit clip's rigidity

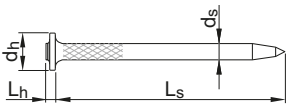
Dimensions for elements

Technical drawing	Designation	Diameter d	Length L	Width w	Height h
X-FB MX 	X-FB 5 MX	5 mm	28.3 mm	17.5 mm	7 mm
	X-FB 6 MX	6 mm	29.4 mm	17.5 mm	8 mm
	X-FB 7 MX	7 mm	30.4 mm	17.5 mm	9 mm
	X-FB 8 MX	8 mm	31.3 mm	17.5 mm	10 mm
	X-FB 9 MX	9 mm	32.3 mm	17.5 mm	10 mm
	X-FB 10 MX	10 mm	33.3 mm	17.5 mm	11 mm
	X-FB 11 MX	11 mm	34.4 mm	17.5 mm	11.5 mm
	X-FB 13 MX	13 mm	36.5 mm	17.5 mm	15 mm
	X-FB 16 MX	16 mm	39.6 mm	17.5 mm	18 mm
	X-FB 20 MX	20 mm	43.8 mm	17.5 mm	22 mm
	X-FB 22 MX	22 mm	45.9 mm	17.5 mm	24 mm
	X-FB 25 MX	25 mm	49.0 mm	17.5 mm	27 mm
	X-FB 28 MX	28 mm	52.2 mm	17.5 mm	30 mm
	X-FB 32 MX	32 mm	56.3 mm	17.5 mm	34 mm
	X-FB 40 MX	40 mm	64.7 mm	17.5 mm	42 mm

Dimensions for elements with pre-mounted nails

Technical drawing	Designation	Diameter d	Length L	Width w	Height h
X-FB-C27  	X-FB 8 C27	8 mm	31.3 mm	17.7 mm	10 mm
	X-FB 11 C27	11 mm	34.4 mm	17.7 mm	13 mm
	X-FB 13 C27	13 mm	36.5 mm	17.7 mm	15 mm
	X-FB 16 C27	16 mm	39.6 mm	17.7 mm	18 mm
	X-FB 18 C27	18 mm	46.0 mm	17.7 mm	20 mm
	X-FB 20 C27	20 mm	43.8 mm	17.7 mm	22 mm
	X-FB 22 C27	22 mm	45.9 mm	17.7 mm	24 mm
	X-FB 24 C27	24 mm	52.0 mm	17.7 mm	26 mm
	X-FB 25 C27	25 mm	49.0 mm	17.7 mm	27 mm
	X-FB 28 C27	28 mm	52.2 mm	17.7 mm	30 mm
	X-FB 32 C27	32 mm	56.3 mm	17.7 mm	34 mm
	X-FB 35 C27	35 mm	64.0 mm	17.7 mm	37 mm
	X-FB 40 C27	40 mm	64.7 mm	17.7 mm	42 mm
	X-FB 50 C27	50 mm	77.0 mm	17.7 mm	52 mm

Dimensions for nails

Technical drawing	Designation	Shank length L_s	Head length L_h	Shank diameter d_s	Head diameter d_h
	X-C 27	27 mm	2 mm	3.5 mm	8 mm

Material specification and material properties for steel elements

Designation	Element	Material	Coating	Minimum coating thickness	Tensile strength f_u
X-FB MX	Element	Galvanized steel sheet	Zinc	10 µm	270–420 N/mm²
X-FB-C27				5 µm	270–420 N/mm²

Material specification and material properties for nails

Designation	Element	Material	Coating	Minimum coating thickness	Hardness
X-C 27	Nail	Carbon steel	Zinc	5 µm	56.5 HRC

- Info for single nails are part of the corresponding Product Data Sheets.

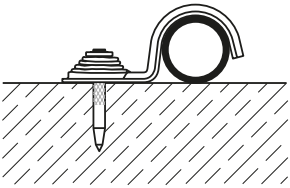
Approvals and certificates

Authority	Approval / certificate no.	Date of issue	Country of issue
ITB	AT-15-7696/2016	12/2016	Poland
DIBt	ETA-16/0301	05/2019	Europe

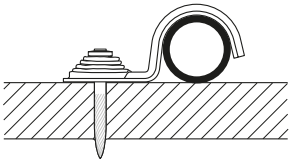
Not all information presented in this product data sheet might be subject to approval / certificate content. Please refer to approval / certificate for further information.

Applications

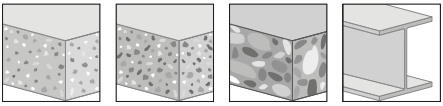
Fastening conduits to concrete



Fastening conduits to steel

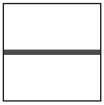


Base materials



Soft concrete | Medium concrete | Tough concrete | Steel

Load conditions



Static / quasi static

Environmental conditions

Dry indoor

- The intended use comprises fastening in dry conditions or temporary outdoor conditions.
- For more details, please refer to following technical document: Hilti Corrosion Handbook.

Fastener program

Item no. and description

Designation	Item no.	Description
X-FB 5 MX	2074366	
X-FB 6 MX	2074367	
X-FB 7 MX	2074368	
X-FB 8 MX	286797	
X-FB 9 MX	2331461	
X-FB 10 MX	2331462	
X-FB 11 MX	286798	
X-FB 13 MX	2813209	Element
X-FB 16 MX	286799	
X-FB 20 MX	286800	
X-FB 22 MX	286801	
X-FB 25 MX	286802	
X-FB 28 MX	286803	
X-FB 32 MX	286804	
X-FB 40 MX	286805	
X-FB 8 C27	401258	
X-FB 11 C27	401259	
X-FB 13 C27	401260	
X-FB 16 C27	401261	
X-FB 18 C27	401262	
X-FB 20 C27	401263	
X-FB 22 C27	401264	Element with
X-FB 24 C27	401265	pre-mounted nail
X-FB 25 C27	401266	
X-FB 28 C27	401267	
X-FB 32 C27	401268	
X-FB 35 C27	401269	
X-FB 40 C27	401270	
X-FB 50 C27	401271	

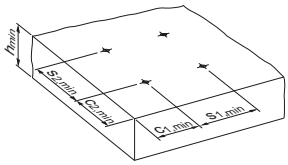
X-FB Electrical conduit fastener – Fastening to concrete

Application recommendation

Fastened material properties

Fastening conduits and pipes with 5 ≤ Ø ≤ 50 mm.

Base material properties and fastener positioning in base material



Base material	Concrete
Base material thickness h_{min}	80 mm (powder-actuated)
Base material thickness h_{min}	60 mm (battery/gas-actuated)
Edge distance $c_{1,min}$, $c_{2,min}$	70 mm
Fastener spacing $s_{1,min}$, $s_{2,min}$	100 mm

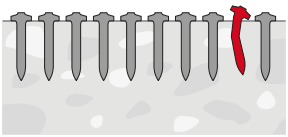
Performance data

Recommended resistance under tension load

Designation	Nail length L_s	Tension load N_{rec}	
		Soft/medium concrete	Tough concrete
X-FB MX + X-X	22–27 mm	0.06 kN	0.06 kN
X-FB MX + X-P, X-U	22–27 mm	0.06 kN	0.06 kN
X-FB MX + X-C	22–27 mm	0.06 kN	0.06 kN
X-FB MX + X-P B3 MX	20–24 mm	0.02 kN	0.02 kN
X-FB MX + X-P G3 MX	20–24 mm	0.02 kN	0.02 kN
X-FB-C 27	27 mm	0.06 kN	0.06 kN

- Redundancy of fastening points is required.
- Minimum number of fastening points for safety relevant fastenings: ≥ 5.
- For more details, please refer to the chapter **Fastener selection guide** in the Direct Fastening Technology Manual (DFTM).

Stick rate estimation



Designation	Soft/medium concrete	Tough concrete
X-FB MX + X-X	90–99%	85–90%
X-FB MX + X-P, X-U, X-C	–	–
X-FB MX + X-P B3 MX	85–98%	70–85%
X-FB MX + X-P G3 MX	75–90%	55–70%
X-FB-C 27	–	–

- The stick rate indicates the percentage of nails that were driven correctly to carry a load.
- Stick rate can vary from the above values depending on job site conditions.

System recommendation

- For more details, please refer to the chapter **Accessories and consumables compatibility** in the Direct Fastening Technology Manual (DFTM).

System recommendation for fastening collated nails with powder-actuated tools

Designation	Powder-actuated tool				Base material			
	DX 6 MX	DX 5 MX	DX 460 MX		Soft concrete	Medium concrete	Tough concrete	
X-FB MX + X-X MX	■	■	□		■	■	■	
X-FB MX + X-P MX, X-U MX	■	■	□		■	■	■	
X-FB MX + X-C MX	■	■	□		■	■	■	

■ = recommended □ = feasible

System recommendation for fastening single nails with powder-actuated tool

Designation	Powder-actuated tool				Base material			
	DX 6 F8	DX 5 F8	DX 460 F8	DX 2	Soft concrete	Medium concrete		
X-FB-C 27	■	■	□		■	■		
X-FB-C 27				■	■	■		

■ = recommended □ = feasible

Cartridge recommendation

Base material	Cartridge color (tool power level)	
	Tool type: DX 6 MX DX 6 F8	Tool type: DX 5 MX, DX 460 MX DX 5 F8, DX 460 F8, DX 2
	Cartridge type: 6.8/11 M	Cartridge type: 6.8/11 M
Soft/medium concrete	titanium ■ (2-5)	yellow ■, red ■
Tough concrete	titanium ■ (4-7)	yellow ■, red ■

- Tool power level adjustment by setting tests on site.
- Start tool energy selection with lowest recommended tool power level.
- Correct according requirement from chapter quality assurance.

System recommendation for fastening collated nails with battery-actuated tools

Designation	Battery-actuated tool				Base material			
	BX 3 ME				Soft concrete	Medium concrete	Tough concrete	
X-FB MX + X-P B3 MX	■				■	■	□	

■ = recommended □ = feasible

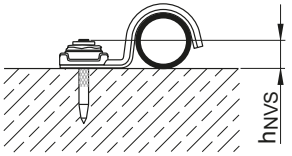
System recommendation for fastening collated nails with gas-actuated tools

Designation	Gas-actuated tool				Base material			
	GX 3-ME	GX 120-ME			Soft concrete	Medium concrete	Tough concrete	
X-FB MX + X-P G3 MX	■				■	■	□	
X-FB MX + X-GHP MX		■			■	■	□	

■ = recommended □ = feasible

Quality assurance

Setting depth control

	Fastener stand-off h_{NVS}	7–11 mm

- Visible setting failures must be replaced with a new fastener, not in the same hole.
- These are abbreviated instructions which may vary by application.
- Always review/follow the instructions accompanying the product.

X-FB Electrical conduit fastener – Fastening to steel

Application recommendation

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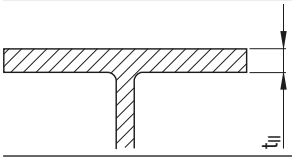


Base material	Steel
Base material thickness $t_{II, min}$	6 mm (powder-actuated)
Base material thickness $t_{II, min}$	4 mm (battery/gas-actuated)
Edge distance c_{min}	15 mm
Fastener spacing s_{min}	20 mm

Performance data

Recommended resistance under tension load

Designation	Nail length L_s	Tension load N_{rec}
		Steel S235 to S355
X-FB MX + X-X 22 MX	22 mm	0.06 kN
X-FB MX + X-U 16 MX	16 mm	0.06 kN
X-FB MX + X-S 14 B3 MX	14 mm	0.06 kN
X-FB MX + X-S 14 G3 MX	14 mm	0.06 kN

- Redundancy of fastening points is required.
- Minimum number of fastening points for safety relevant fastenings: ≥ 5.

System recommendation

- For more details, please refer to the chapter **Accessories and consumables compatibility** in the Direct Fastening Technology Manual (DFTM).

System recommendation for fastening collated nails with powder-actuated tools

Designation	Powder-actuated tool				Base material			
	DX 6 MX	DX 5 MX	DX 460 MX		Steel S235	Steel S275	Steel S335	
X-FB MX + X-X 22 MX	■	■	□		■	■	■	
X-FB MX + X-U 16 MX	■	■	□		■	■	■	

■ = recommended □ = feasible

Cartridge recommendation for X-FB MX + X-X 22 MX

Base material		Cartridge color (tool power level)	
		Tool type: DX 6 MX	Tool type: DX 5 MX, DX 460 MX
		Cartridge type: 6.8/11 M	Cartridge type: 6.8/11 M
S235	$6 \le t_{II} \le 12$ mm	titanium ■ (4-8)	yellow ■, red ■, black ■
S275	$6 \le t_{II} \le 10$ mm	titanium ■ (4-8), black ■ (7-8)	yellow ■, red ■, black ■
S355	$6 \le t_{II} \le 8$ mm	titanium ■ (6-8), black ■ (7-8)	red ■, black ■

Cartridge recommendation for X-FB MX + X-U 16 MX

Base material		Cartridge color (tool power level)	
		Tool type: DX 6 MX	Tool type: DX 5 MX, DX 460 MX
		Cartridge type: 6.8/11 M	Cartridge type: 6.8/11 M
S235	$6 \le t_{II} \le 10$ mm	titanium ■ (4-8)	red ■
	$10 \le t_{II} \le 20$ mm	titanium ■ (5-8), black ■ (7-8)	black ■
S275, S355	$6 \le t_{II} \le 8$ mm	titanium ■ (5-8), black ■ (7-8)	black ■

- Tool power level adjustment by setting tests on site.
- Start tool energy selection with lowest recommended tool power level.
- Correct according requirement from chapter quality assurance.

System recommendation for fastening collated nails with battery-actuated tool

Designation	Battery-actuated tool				Base material			
	BX 3-ME				Steel S235	Steel S275	Steel S335	
X-FB MX + X-S 14 B3 MX	■				■	■	■	

■ = recommended ☐ = feasible

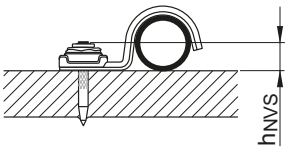
System recommendation for fastening collated nails with gas-actuated tool

Designation	Gas-actuated tool				Base material			
	GX 3-ME				Steel S235	Steel S275	Steel S335	
X-FB MX + X-S 14 G3 MX	■				■	■	■	

■ = recommended ☐ = feasible

Quality assurance

Setting depth control

	Fastener stand-off h_{NVS}	7–9 mm

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