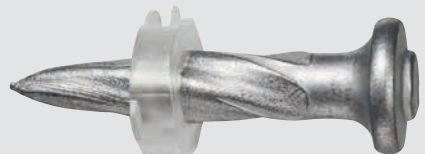




X-X DATA-SHEET

**Nail for fastening to concrete
and steel**



X-X Nail

Product data

Product description

X-X MX



X-X P8



- Innovative Helix nail tip – for better drivability when fastening to tough concrete and steel.
- High hardness (58 HRC) nails for better penetration in tough concrete or steel.
- Optimized for use with Hilti tools – helps to secure sufficient guidance and energy for driving straight and deep into the base material.

Dimensions for nails

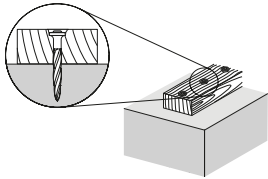
Technical drawing	Designation	Shank length L_s	Head length L_h	Shank diameter d_s	Head diameter d_h
	X-X 22	22 mm	2.4 mm	4.4 mm	8.2 mm
	X-X 27	27 mm			
	X-X 34	34 mm			
	X-X 40	40 mm			
	X-X 47	47 mm			
	X-X 52	52 mm			
	X-X 57	57 mm			
	X-X 62	62 mm			
	X-X 72	72 mm			

Material specification and material properties for carbon steel elements

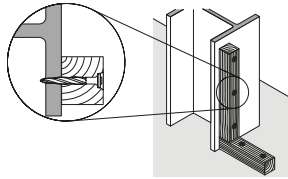
Designation	Element	Material	Coating	Minimum coating thickness	Hardness
X-X	Nail	Carbon steel	Zinc	5 μ m	58 HRC

Applications

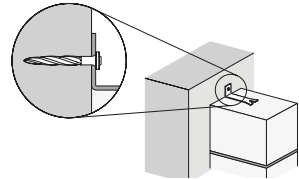
Fastening wood to concrete



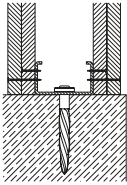
Fastening wood to steel



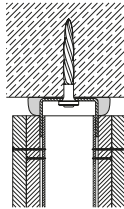
Fastening steel to concrete



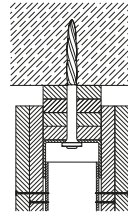
Drywall floor track connection



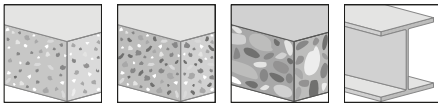
Drywall ceiling track connection



Drywall sliding ceiling connection/deflection head



Base materials



Soft concrete

Standard concrete

Tough concrete

Steel

Load conditions



Static/
quasi static

Fire

Environmental conditions and corrosion information



- The intended use comprises fastening in dry conditions.

Approvals and certificates

Authority	Approval/certificates	Functional area	Application area
DIBt	ETA-22/0876	Europe	Fastening drywall track and deflection head
ITB	ITB-KOT-2021/1985 wydanie 1	Poland	Fastening to steel
ITB	ITB-KOT-2021/2019 wydanie 1	Poland	Fastening to concrete



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

Fastener program

Item no. and description

Designation	Item no.	Description
X-X 22 MX	2312327	Collated nail
X-X 27 MX	2300016	
X-X 34 MX	2300018	
X-X 40 MX	2300019	
X-X 47 MX	2300020	
X-X 52 MX	2300021	
X-X 57 MX	2300022	
X-X 62 MX	2300023	
X-X 72 MX	2300024	
X-X 22 P8	2312326	Single nail
X-X 27 P8	2300007	
X-X 34 P8	2300009	
X-X 40 P8	2300010	
X-X 47 P8	2300011	
X-X 52 P8	2300012	
X-X 57 P8	2300013	
X-X 62 P8	2300014	
X-X 72 P8	2300015	

X-X Nail for fastening wood to concrete

Application recommendation

Fastened material properties and fastener positioning in fastened material

	Fastened material	Wood
	Fastened material thickness t_1	15–50 mm
	Edge distance $c_{1,min}$	250 mm
	Edge distance $c_{2,min}$	20 mm
	Fastener spacing $s_{1,min}$	500 mm

- Edge distances and fastener spacing are recommendations to avoid splitting.

Base material properties and fastener positioning in base material

	Base material	Concrete
	Base material thickness h_{min}	80 mm
	Edge distance $c_{1,min}, c_{2,min}$	70 mm
	Fastener spacing $s_{1,min}, s_{2,min}$	100 mm

- For more details in relation to base material properties, please refer to the chapter **Fastener selection guide** in the Direct Fastening Technology Manual (DFTM).

Fastener shank length recommendation

	For standard fastening:	$L_s = h_{ef} + t_1$
	For flush fastening:	$L_s = h_{ef} + t_1 - 3 \text{ mm}$

Performance data

Recommended resistance under tension and shear load

Embedment depth h_{ef}	Tension load N_{rec}		Shear load V_{rec}	
	Soft/medium concrete	Tough concrete	Soft/medium concrete	Tough concrete
≥ 18 mm	0.25 kN	–	–	–
≥ 20 mm	0.35 kN	0.10 kN	0.35 kN	0.15 kN
≥ 25 mm	0.45 kN	0.15 kN	0.45 kN	0.25 kN

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

Stick rate estimation

	Designation	Soft/medium concrete	Tough concrete
	X-X	84–92 %	80–90 %

- 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 tool

Designation	Powder-actuated tool				Base material		
	DX 6 MX	DX 5 MX	DX 460 MX		Soft concrete	Medium concrete	Tough concrete
X-X 34 MX to X-X 72 MX	■	■	□		■	■	■

■ = recommended □ = feasible

System recommendation for fastening single nails with powder-actuated tools

Designation	Powder-actuated tool				Base material		
	DX 6 F8	DX 5 F8	DX 460 F8	DX 2	Soft concrete	Medium concrete	Tough concrete
X-X 34 P8 to X-X 72 P8	■	■	□		■	■	■
X-X 34 P8 to X-X 62 P8				■	■	■	□

■ = recommended □ = feasible

Cartridge recommendation

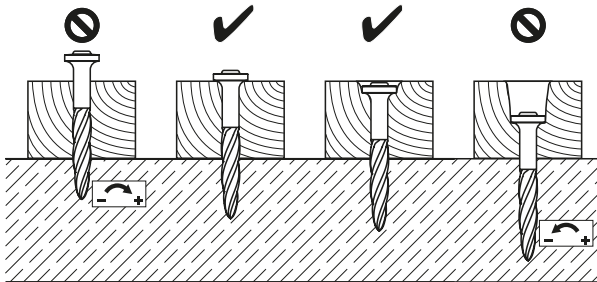
Base material	Cartridge color (tool power level)	
	Tool type: DX 6 MX DX 6 F8	Tool type: DX 5 MX, DX 460 MX DX 5 F8, DX 460 F8, DX 2 ¹⁾
	Cartridge type: 6.8/11 M	Cartridge type: 6.8/11 M
Soft/medium concrete	titanium ■ (2-8)	yellow ■, red ■
Tough concrete	titanium ■ (4-8), black ■ (7-8)	red ■, black ■

¹⁾ Black cartridges do not apply for this tool.

- 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.

Quality assurance

Setting depth control and power tool adjustment



- 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-X Nail for fastening wood to steel

Application recommendation

Fastened material properties and fastener positioning in fastened material

	Fastened material	Wood
	Fastened material thickness t_1	15–50 mm
	Edge distance $c_{1,min}$	250 mm
	Edge distance $c_{2,min}$	20 mm
	Fastener spacing $s_{1,min}$	500 mm

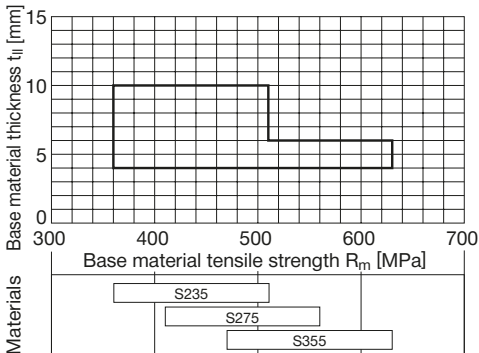
Base material properties and fastener positioning in base material

	Base material	Steel
	Base material thickness t_{II}	4–10 mm
	Edge distance $c_{1,min}$	15 mm
	Fastener spacing $s_{1,min}$	20 mm

Fastener shank length recommendation

	For standard fastening:	$L_s = h_{ef} + t_1$
	For flush fastening:	$L_s = h_{ef} + t_1 - 3 \text{ mm}$

Application limitation for fastening on steel



Performance data

Recommended resistance under tension and shear load

Embedment depth h_{ef}	Tension load		Shear load	
	N_{rec}		V_{rec}	
≥ 7 mm	0.40 kN		0.60 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 tool

Designation	Powder-actuated tool			Base material		
	DX 6 MX	DX 5 MX	DX 460 MX	Steel S235	Steel S275	Steel S335
X-X 22 MX to X-X 62 MX	■	■	□	■	■	■

■ = recommended □ = feasible

System recommendation for fastening single nails with powder-actuated tools

Designation	Powder-actuated tool				Base material		
	DX 6 F8	DX 5 F8	DX 460 F8	DX 2	Steel S235	Steel S275	Steel S335
X-X 22 P8 to X-X 62 P8	■	■	□		■	■	■
X-X 22 P8 to X-X 62 P8				■	■	□	□

■ = 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 ¹⁾
		Cartridge type: 6.8/11 M	Cartridge type: 6.8/11 M
S235 to S355	$4 \leq t_{ } < 6 \text{ mm}$	titanium ■ (1-5)	green ■, yellow ■, red ■
	$6 \leq t_{ } \leq 10 \text{ mm}$	titanium ■ (4-8), black ■ (7-8)	yellow ■, red ■, black ■

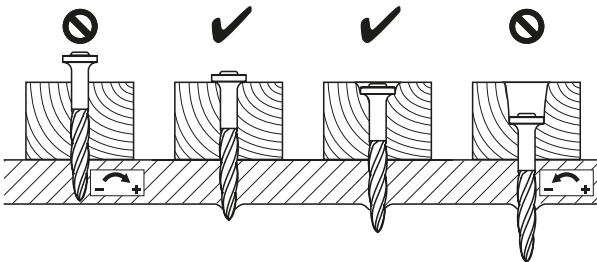
¹⁾ Black cartridges do not apply for this tool.



- 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.

Quality assurance

Setting depth control



- 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-X Nail for fastening steel to concrete

Application recommendation

Fastened material properties and fastener positioning in fastened material

	Fastened material	Steel
	Fastened material thickness t_f	0.5–2 mm
	Edge distance $c_{1,min}$	20 mm
	Fastener spacing $s_{1,min}$	100 mm

Base material properties and fastener positioning in base material

	Base material	Concrete
	Base material thickness h_{min}	80 mm
	Edge distance $c_{1,min}, c_{2,min}$	70 mm
	Fastener spacing $s_{1,min}, s_{2,min}$	100 mm

- For more details in relation to base material properties, please refer to the chapter **Fastener selection guide** in the Direct Fastening Technology Manual (DFTM).

Fastener shank length recommendation

	For standard fastening:	$L_s = h_{ef} + t_f$
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Performance data

Recommended resistance under tension and shear load

Embedment depth h_{ef}	Tension load N_{rec}		Shear load V_{rec}	
	Soft/medium concrete	Tough concrete	Soft/medium concrete	Tough concrete
≥ 18 mm	0.30 kN	0.15 kN	0.50 kN	0.25 kN
≥ 20 mm	0.40 kN	0.20 kN	0.75 kN	0.40 kN
≥ 25 mm	0.50 kN	0.25 kN	1.00 kN	0.50 kN

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

Stick rate estimation

	Designation	Soft/medium concrete	Tough concrete
	X-X	95–99 %	90–95 %

- 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 tool

Designation	Powder-actuated tool				Base material		
	DX 6 MX	DX 5 MX	DX 460 MX	DX 351 MX	Soft concrete	Medium concrete	Tough concrete
X-X 22 MX to X-X 34 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 MX F8	DX 351 F8	DX 2	Soft concrete	Medium concrete	Tough concrete
X-X 22 P8 to X-X 34 P8	■	■	□			■	■	■
X-X 22 P8 to X-X 34 P8				□	■	■	■	□

■ = recommended □ = feasible

Cartridge recommendation

Base material	Cartridge color (tool power level)	
	Tool type: DX 6 MX DX 6 F8 Cartridge type: 6.8/11 M	Tool type: DX 5 MX, DX 460 MX, DX 351 MX ¹⁾ DX 5 F8, DX 460 F8, DX 2 ¹⁾ , DX 351 F8 ¹⁾ Cartridge type: 6.8/11 M
Soft/medium concrete	titanium ■ (2-8)	yellow ■, red ■
Tough concrete	titanium ■ (4-8), black ■ (7-8)	red ■, black ■

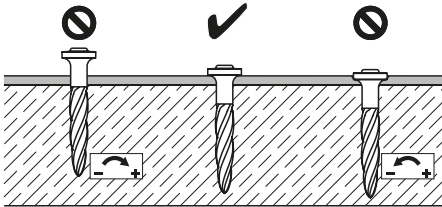
¹⁾ Black cartridges do not apply for this tool.



- 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.

Quality assurance

Setting depth control and power tool adjustment

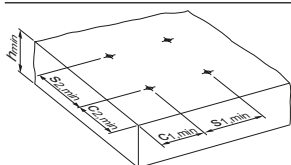


- Visible setting failures must be replaced with a new fastener, not in the same hole.
- These are abbreviated instructions which may vary by application.
- Always review /follow the instructions accompanying the product.

X-X Nail for fastening drywall track and deflection head

Application recommendation

Base material properties and fastener positioning in base material



Base material	Concrete
Concrete class	C20/25 – C40/50
Concrete type	Cracked/uncracked concrete
Base material thickness h_{min}	80 mm
Edge distance $c_{1,min}, c_{2,min}$	150 mm
Fastener spacing $s_{1,min}, s_{2,min}$	200 mm
Fastener spacing $s_{1,max}, s_{2,max}$	600 mm



- Tested concrete strength: $\geq 60 \text{ N/mm}^2$.

Fastened material properties for drywall track

Fastened material type	Fastened material tensile strength R_m	Fastened material thickness t_{fix}
Drywall track	$\geq 270 \text{ N/mm}^2$	0.6 to 1.0 mm

Fastened material properties for gypsum board as part of deflection head configurations

Fastened material type		Fastened material bulk density ρ_b
Gypsum board	DF according to EN 520	$\geq 800 \text{ kg/m}^3$
	GKF according to DIN 18180	

Performance data

Characteristic resistance under shear load and recommended shear loads

	Drywall floor and ceiling track connection		Drywall sliding ceiling connection/deflection head	
	Fastened material thickness t_{fix}			
	0.6 mm (drywall track)	1.0 mm	38.1 mm 3 × 12.5 mm (gypsum board) 0.6 mm (drywall track)	50.6 mm 4 × 12.5 mm
Fastener	X-X 22 MX, X-X 22 P8		X-X 62 MX, X-X 62 P8	X-X 72 MX, X-X 72 P8
Characteristic resistance under shear load V_{Rk}	1.25 kN	1.49 kN	0.94 kN	0.85 kN
Safety factor γ_{GLOB}	2.1			
Recommended shear load V_{rec}	0.60 kN	0.71 kN	0.45 kN	0.40 kN

Characteristic resistance under shear load and fire exposure

	Drywall floor and ceiling track connection		Drywall sliding ceiling connection/deflection head	
	Fastened material thickness t_{fix}			
	0.6 mm (drywall track)	1.0 mm	38.1 mm 3 × 12.5 mm (gypsum board) +0.6 mm (drywall track)	50.6 mm 4 × 12.5 mm
Fastener	X-X 22 MX, X-X 22 P8		X-X 62 MX, X-X 62 P8	X-X 72 MX, X-X 72 P8
Characteristic resistance under shear load V_{Rk} and fire exposure	30 min	0.20 kN	0.23 kN	0.17 kN
	60 min	0.16 kN	0.19 kN	0.17 kN
	90 min	0.12 kN	0.15 kN	0.12 kN
	120 min	0.05 kN	0.11 kN	-
Safety factor γ_{GLOB}	1.0			
Recommended shear load V_{rec} under fire exposure	30 min	0.20 kN	0.23 kN	0.17 kN
	60 min	0.16 kN	0.19 kN	0.17 kN
	90 min	0.12 kN	0.15 kN	0.12 kN
	120 min	0.05 kN	0.11 kN	-

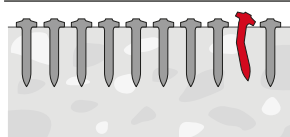
- Drywall loads resulting from dead weight, crowd pressure, eccentric vertical loads (cabinets) or similar.
- Linear interpolation to determine characteristic resistance under shear load between profile thicknesses is admissible.
- Valid partial factors unless otherwise regulated.
- Drywall floor/ceiling track connection can be equipped with Hilti CSF-TTS or PE-sealing.

Calculation equations

$V_{Ed,lim} = H \cdot s \leq V_{R,k} / (\gamma_M \cdot \gamma_F)$	<p>H = Horizontal shear force on the track per meter</p> <p>s = Spacing between fasteners</p> <p>$V_{R,k}$ = Characteristic resistance under shear load</p> <p>γ_M = Partial factor for material properties</p> <p>γ_F = Partial factor for working loads</p>
$V_{Ed,lim} = H \cdot s \leq V_{rec}$	<p>H = Horizontal shear force on the track per meter</p> <p>s = Spacing between fasteners</p> <p>V_{rec} = Recommended shear load</p>

- Design value of shear load acting on a fastening point: $V_{Ed,lim} \leq 2.0$ kN
- Number of fasteners on a profiled drywall track: ≥ 5

Stick rate estimation



Designation	Connection type	Soft/standard concrete	Tough concrete
X-X	Drywall floor track connection	95–99 %	90–95 %
	Drywall ceiling track connection		
	Drywall sliding ceiling connection/deflection head	84–92 %	80–90 %

- 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

System recommendation for fastening collated nails with powder-actuated tool

Designation	Powder-actuated tool			
	DX 6 MX	DX 5 MX	DX 460 MX	DX 351 MX
X-X 22 MX	■	□	□	□
X-X 62 MX, X-X 72 MX	■	□	□	□

■ = recommended □ = feasible

System recommendation for fastening single nails with powder-actuated tool

Designation	Powder-actuated tool				
	DX 6 F8	DX 5 F8	DX 460 F8	DX 351 F8	DX 351-CT F8
X-X 22 P8	■	□	□	□	□
X-X 62 P8, X-X 72 P8	■	□	□	□	□

■ = recommended □ = feasible

Cartridge recommendation

Connection type	Cartridge color (tool power level)	
	Tool type: DX 6 MX DX 6 F8 Cartridge type: 6.8/11 M	Tool type: DX 5 MX, DX 460 MX, DX 351 MX ¹⁾ DX 351 F8 ¹⁾ , DX 351-CT F8 ¹⁾ Cartridge type: 6.8/11 M
Drywall floor connection	titanium ■ (2-8)	yellow ■, red ■
Drywall ceiling connection	titanium ■ (4-8), black ■ (7-8)	red ■, black ■

¹⁾ Black cartridges do not apply for this tool.



- Tool power level adjustment by setting tests on site (see chapter quality assurance).
- For more details, please refer to the chapter **Accessories and consumables compatibility** in the Direct Fastening Technology Manual (DFTM).

Quality assurance

Drywall floor connection

	Designation	Embedment depth	Fastened material thickness	Fastener stand-off
		h_{ef}	t_{fix}	h_{NHS}
	X-X 22 MX, X-X 22 P8	18–22 mm	0.6–1 mm	2–6 mm

Drywall ceiling connection

	Designation	Embedment depth	Fastened material thickness	Fastener stand-off
		h_{ef}	t_{fix}	h_{NHS}
	X-X 22 MX, X-X 22 P8	18–22 mm	0.6–1 mm	2–6 mm

Drywall sliding ceiling connection

	Designation	Embedment depth	Fastened material thickness	Fastener stand-off
		h_{ef}	t_{fix}	h_{NVS}
	X-X 62 MX, X-X 62 P8	20–25 mm	38.1 mm (3 gypsum layers)	1–6 mm
	X-X 72 MX, X-X 72 P8	18–23 mm	50.6 mm (4 gypsum layers)	1–6 mm

- Deflection head gap dimension: $a \leq 20$ mm
- Visible setting failures must be replaced with a new fastener, not in the same hole with a distance of 100 mm.
- These are abbreviated instructions which may vary by application.
- Always review /follow the instructions accompanying the product.